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New strategy

A global resources company created by people with passion and skill – this is the mission of KGHM Polska Miedź for the years 2015–2020 with our outlook to the year 2040. International expansion has enabled the company to become one of the world's major copper producers. Further technological development and the optimum management of assets will allow KGHM to become one of the world's top seven producers of copper. KGHM will likewise continue to build shareholder value over the long term.

The starting point for KGHM's new strategy was the achievement of goals set in 2009. Key amongst these was to develop the resource base and increase production capacity, which was achieved among others by our acquisition of the Canadian mining company Quadra FNX, completion and com-missioning of the Sierra Gorda mine, commencing mining operations in Deep Głogów, renewing our concessions in Poland and exploring new deposits. These actions, along with the modernisation of our Głogów smelter/refinery, created the potential to substantially improve the effectiveness and efficiency of our operations. The stability of our Group operations is supported by the medium and long-term financing which has been secured and consolidated at the Parent Company level. In addition, thanks to the construction of combined-cycle gas & steam turbine power plants, we have gained greater energy security. In terms of corporate social responsibility, KGHM has maintained on-going support for social, cultural and charitable activities.

The copper market which KGHM has been active on for 60 years is exceptionally promising. Our strategic priority in the years 2015–2020 is to achieve annual production of 1 million tonnes of copper equivalent and become the seventh largest copper producer in the world. To achieve this goal we are engaged in the largest investment program involving copper mining projects in the history of KGHM as well as the largest exploration campaign in Poland's history. This will enable us to gain access to some of the largest copper deposits in the world, and will be accompanied by enhanced mining and geological know-how at all levels of management and production. We also want to be a global leader in terms of mining innovation and within 25 years we intend to implement an intelligent mine program

Herbert Wirth, Eng., Ph.D., CEO, KGHM Polska Miedź S.A.

KGHM's new strategy is based on three pillars. The first of these is the development of our resource base by increasing resources, searching for low-cost assets, and diversifying our activities. KGHM's objective is to replace each tonne of mined copper with three tonnes of documented copper re-sources, enabling us to secure our long term ability to operate. Exploration by KGHM will be focused on the company's current operating regions, and in the case of new mining projects in areas which are geopolitically stable. The company will search for mining projects which are within the first half of the global cost curve, making KGHM more competitive thanks to a lower average weighted cost of producing copper.

The second pillar of the strategy is the development of our assets on time and budget. This priority encompasses development programs in the core production business in Poland and bringing resource projects into production, such as Deep Głogów, Victoria, Sierra Gorda (phase two and processing of the oxide ore) and Afton-Ajax. KGHM's objective is to standardise management of our projects and investment portfolios by establishing a Global Skills Center for project execution. The transfer of new knowledge to production processes will be possible thanks to the creation of a Knowledge Center and an innovation management model (knowledge and intellectual rights) ensuring access to new technologies and solutions.

The third pillar of the strategy involves ensuring stable production by increasing production capacity to the extent possible thanks to the implementation of modern technological solutions, optimising production processes and organic growth. The priority will be to ensure cost effectiveness, which will be based on on-going improvements on production processes and labor organisation, optimisation of the maintenance program and underground machines management, centralisation of key production processes and the automisation of production. It will also be of key importance to enhance workplace safety by continuing to implement modern safety standards and provide effective training.

The three pillars of KGHM's activities in the years 2015–2020 are based on four supporting strategies. The global organisation and skills development strategy assumes the achievement of an optimum model for the management and supervision of business processes within the Group. The financial strategy involves ensuring stable financing for the activities of the KGHM Group, enhancing the ability to operate in challenging economic conditions, and supporting development and increasing efficiency. The goal of our corporate social responsibility strategy is to strengthen the position of KGHM as a stable, growing and trustworthy partner, caring for the common good and the balanced management of resources. In turn the aim of the global energy strategy is to ensure energy supplies for our operations, including from renewable resources. A crucial goal is to ensure the possibility of purchasing energy for key companies of the Group in Poland and to secure global power purchases at below-market prices.

In terms of the outlook beyond 2020, KGHM's value will be based on the development of new investment projects to increase copper production and diversify the products portfolio. This includes the possibility of mining deposits of potassium salts which are used in the production of artificial fertilizers, as well as uranium in order to secure the supply of fuel for the Polish nuclear power plant. New geological resources will be documented thanks to development of the global exploration and evaluation program, whose aim is to identify promising early-stage resource projects, supported by the implementation of modern, low-cost exploration techniques, and to assess new deposits in Poland. The challenges related to keeping costs under control and to efficiently accesss new deposits will require the implementation of innovative technological solutions. Around the year 2020 we intend to implement new mining methods on an industrial scale, around 2030 the mining of deposits using a centralised management system for key mining processes, and around 2040 it will be possible to develop the world's first mine based on neural networks.

For more information, visit ***www.kghm.pl***

Giant mine Sierra Gorda – the biggest Polish investment project abroad

ARCHIWUM KGHM

A group photo of project partners: first row, from left to right: Jarosław Romanowski – 1st Deputy CEO, KGHM; Valentin Volta – Governor of Antofagasta Province; Herbert Wirth – CEO, KGHM; Michelle Bachelet – President of Chile; Maciej Ściążko – Director-General, Sierra Gorda Project; Katarzyna Kacperczyk – Undersecretary of State at the Ministry of Foreign Affairs; Zdzisław Gawlik – Secretary of State in the Ministry of State Treasury; and Yoshiaki Nakazato – President, Sumitomo Metal Mining.

Through an active expansion and successful acquisition of a Canadian mining company Quadra FNX Mining Ltd. (now renamed KGHM International Ltd.) which comprises the Sierra Gorda mine, KGHM Polska Miedź S.A. has joined the world leaders in copper production.

The extraction of one tonne of copper at Sierra Gorda costs USD2,5 thousand and over USD4 thousand in Poland. Cheaper deposits abroad give us a break to develop more innovative and efficient methods of extraction.

Herbert Wirth, Eng., Ph.D., CEO, KGHM Polska Miedź S.A.

The task number one to be tackled in 2014 by the company managed by Herbert Wirth was to launch on schedule its flagship project, the Sierra Gorda mine in Chile. The mine is Poland's biggest project abroad which ranks 4th in the world in terms of the copper deposits and 8th in terms of its turnout.

This is a good reason for KGHM to be proud, because it has carried the project out in collaboration with a Japanese partner, but it is also a pride of the whole nation.

The site was technically launched at the end of July and a formal opening gala was held on October 1. The mine, whose construction cost over USD4 billion, was named after Ignacy Domeyko, a Polish émigré and father of copper mining in Chile. The investors will keep an eye on all KGHM is going to do for quite a long time on to make sure the company run by Mr. Wirth keeps the scheduled ramp-up date of the Sierra Gorda mine in phase I (2015) and proposes a plant expansion programme that will double its capacity.

Going international should always be a result of cool calculation, not of any pressure or ideology. KGHM was looking for new deposits which are cheaper to extract.

Professor Bogusław Fiedor, Member of the Supervisory Board, KGHM Polska Miedź S.A.

The mine reports a low cost of copper production thanks to the high level of molybdenum present in the ores.

Forty-five per-cent of the mine shares are held by a Japanese financial and industrial group Sumitomo which is the main organiser of project financing and also a key off-taker of its production.

In phase I, Sierra Gorda is expected to yield 120,000 tonnes of copper (KGHM's mines in Poland turn out about 420,000 tonnes of this metal).

Decisions concerning the mine's expansion will be adopted in the near future. According to the current plans, the annual copper production will grow to its target volume of 220,000 tonnes.

Apart from that, KGHM's portfolio contains two more deposits in Canada: Victoria and Afton-Ajax where extraction will start within several years. The company also owns one of the world-largest deposits of molybdenum in Greenland. Except for the Afton-Ajax, all the assets had belonged to the company Quadra FNX which was merged into KGHM in 2012 for the price of over PLN 9 billion (*see map on page 13*).

Poland's place and role on the international market of mineral raw materials.

Statement of Professor Krzysztof Szamałek, Ph.D., a professor of economic geology at the University of Warsaw and the Polish Geological Institute-the National Research Institute, Deputy Chairman of the PAN (Polish Academy of Sciences) Committee for Sustainable Management of Mineral Raw Materials.


JACEK ZYSK

These days, free access to mineral deposits and the possibility of getting raw materials in a safe way is a factor of maintaining a high level of consumption but also an increasingly stronger factor of raw material security.

Access to mineral deposits and the possibility of using them (now and in future) is the key condition of ensuring economic security to this country and of its sustainable development. This security hinges on the possibility of obtaining raw materials from domestic sources and by imports from foreign countries. This is true for both, the raw materials obtained from primary sources (currently exploited mineral deposits) and for the secondary sources and waste. A safe, independent, and reliable access to raw materials (in the required quantity, quality, on the required terms and at fair prices) is believed to be the condition of saving the competitive position of the European Union countries and of the implementation of their Lisbon strategy which provides for economic growth and higher employment.

The necessary conditions of ensuring the nation's mineral raw materials security include:

- ensuring the possibilities to obtain raw materials from domestic, primary, and secondary sources,
- rational utilisation of native raw materials,
- ensuring regular supplies of scarce raw materials from foreign sources.

Issues related to raw materials security are developed into doctrines and modes of action in the United States, the European Union, and other countries. The identification of critical minerals or critical raw materials (EU) and strategic minerals (USA) which are vital for the preservation of the manufacturing ability of strategic economic sectors has opened way, for instance, to such measures as gathering raw material reserves or to amending the policy on prospecting. The problem of access to minerals and their deposits has aggravated in the 21st century. The European Union may have major problems even in accessing such common minerals as the deposits of natural aggregates. This is because of the continuous land development which covers large areas with permanent structures. It is, therefore, even more important to introduce regulations protecting the undeveloped (but discovered and documented deposits) or protecting areas where prospective mineral

deposits are present. Such a legislative work has already been commenced, a law protecting unexplored deposits has been drafted but the pace of the work is far from satisfactory.

International mineral commodities exchange

Although Poland is rich in mineral deposits (as compared to many other countries in Europe) it can meet only a small part of its national demand for raw materials. Only 14 minerals meet more than 90% of the nation's needs in this area. In the European Union, Poland is the only producer of rhenium, the main producer of copper, silver, and cadmium, and it is in the group of the biggest producers of zinc, lead, palladium, and dolomite. Poland also produces significant amounts of platinum, rock salt, cement, gypsum, and anhydrite. Sulphur takes a special position here. Poland is the only country in the EU which mines native sulphur from underground deposits. Despite that, Poland must import a large majority of mineral raw materials. Out of more than 140 mineral raw materials and their products consumed in this country, about 70 are all imported. The right selection of countries supplying particular minerals is part of the nation's strategy for raw materials security. The price criterion, albeit rather important, must not be the only criterion in the selection of a supplier. Many countries in the world (although they have their own sizeable deposits of valuable minerals) are in unstable internal situation, are troubled by ethnic, religious, social conflicts, or are in territorial disputes with their neighbour-countries. These factors make access to mineral supplies difficult or totally impossible. A supplier-country's market position may also be a factor disrupting free commodity exchange. The world continues to be shocked by the problems which occurred several years ago on the market of rare earths elements, where mainland China is the biggest producer and exporter. China's monopolistic position in producing rare earths elements and its policy on exports pushed the prices very high and increased the problems in obtaining them. This temporarily slowed down the development of advanced material technologies in many countries, the United States included, and forced them to adopt new strategies (wider exploration, reaching for less productive own deposits, recycling the mining waste).

Producers are, naturally, trying to increase their shares in the market of mineral supplies. This policy shows up as globalisation and concentration in the mineral sector.

Globalisation and concentration in the mineral sector

The recent years have seen a number of mergers and acquisitions in the mineral sector. The most active here were such giants as BHP Biliton, Anglo-American, and Rio Tinto. Glencore merged with Xstrata into a raw materials giant Glencore-Xstrata which produces 90 raw materials from its own mines worldwide. This policy of big players helps them to reduce investment risk, expand the range of products offered, do price buffering through the diversification of products made of different groups of raw materials. This world trend is followed also by the Polish mineral concern KGHM Polska Miedź (Polish Copper) and, to a lesser extent, the PGNiG Polish Oil and Gas Company. KGHM acquired copper deposits in Canada and Chile to expand its raw materials base, broadened the offered range by new metals obtained from extracted ores, and strengthened its position among the top 10 world producers of copper.

KGHM has done very intensive prospecting also in Poland in the recent time. The company focuses on deposits neighbouring the existing mines. KGHM assumes that it should spend on prospecting in areas whose minerals are not only promising but can also be developed in economic and technological terms. A Polish tax on some minerals practically rules out any reasonable investment in building new copper mines from scratch. But it pays to extract from new areas which are belong to some existing mines and where adequate infrastructures is available, such as, the ore enrichment installations or post-extraction waste tanks.

However, prospecting in the world is dominated by junior companies. These are ready to venture the most risky prospecting works and are quickest in responding to changes on the international market of raw materials. This trend is not so well noticeable in Poland at the moment. Poland does not have its own junior geological companies but their emergence and growth should be expected in the coming years. It is, however, necessary to find out which barriers will limit their development and operation. Poland should certainly adjust its law to such foreseeable situations. When granting licences for raw material and deposit prospecting, we should ask a question whether such a young junior company will be prepared to cover the cost of mineral prospecting.

Clearly, selling the right to geological information or extraction for profit is a business normally done all over the world. But, if we are to protect the competitive character of Polish companies and national economy, we should not neglect this important aspect.

Barriers and limits

A barrier to a more intensive work of prospecting companies in Poland is the never-ending problem of the inferior quality and work atmosphere of government administration. A protracted licensing process, the possibility for the licensing authorities to make multiple interpretations of the geological and mining law, uncertainty of the stability of regulations governing the economic side of the process, public taxes and other charges, reluctance of local communities towards investors, are the most frequently described barriers and limits. But these are not all.

There are also three important groups of factors which stand in the way of Polish mineral mining.

1. natural features of the deposits and the condition of their resource base,
2. economic conditions (extraction profitability),
3. land use in areas where mineral deposits are found or which are promising.

These factors are often interlinked and they get cumulated in the attitudes of local communities which fight against mining industry. Overcoming or, at least, minimizing those factors should be done by a well-designed policy on raw materials and with the use of adequate legal instruments combined with similar tax policies. Special role should be played here by appropriate land use planning that will include the necessity

of utilising the mineral deposits. A special barrier to a rational utilisation of mineral resources is the lack of land use planning co-ordinated with the policy on the management of deposits which are already known or prospective.

Future of raw materials

The 21st century will be the age of mineral raw materials: their supply and quality. We should expect that minerals will be extracted from deposits increasingly more difficult geologically and technologically (they will be much deeper and will contain less useful component). Advanced technologies will demand raw materials of much higher purity than they get today. This will force stronger processing of the extracted minerals and squeezing more material out of them (including the rare earths elements). The business which utilises spoil tips, pit heaps, and other post-extraction and post-processing waste will grow. New technologies will be introduced in prospecting and exploitation (bio hydrometallurgy, underground coal gasification, unmanned deep mines, exploration of new world regions: Arctica, deep oceans).

Poland can play an important role in this process. It should right now intensify work on adopting a national strategy on raw materials that will address the above-mentioned trends and expectations of the coming Polish generations.

That's how it all started...

Interview with Grzegorz Lipień – manager of KGHM Polska Miedź S.A. Prospecting Department.

What is the history and who was first to find copper deposits in what is today the Legnicko-Głogowski Copper Basin (LGOM)?

Certainly not the Germans who merely had a general geological knowledge of the area but the real prospecting started there in 1960s. The works were managed by Jan Wyżykowski, Eng., PhD. His discovery was so great not only because his drilling went stright to the Zechstein layers but, at the same time, he found a zone highly mineralised with copper. There is a saying: "fortune favours the better ones" and so it was. The first borehole which reached copper layers close to Sieroszowice ran across an area of high variability. Had the borehole been made a dozen metres away, the historic discovery of March 1957 would probably never have been done.

In KGHM Prospectus of 1997, the Minister of State Treasury confirmed that the company had financed over 50% of the geological documentation of the "Bytom Odrzański" deposit.

The second borehole in the Lubin area, that is, the actual discovery of the deposit, comes with a story known only to the community of mining geologists. It goes that Jan Wyżykowski offered a bottle of vodka to the drilling crew and asked them to take just one more core sample. And copper mineralisation was found in that very sample! Without this fact, there would have been no sensational discovery of copper ores in the area of Lubin, a deposit whose size was beyond the comprehension of all the prospectors. Extraction was commenced in the 1960s and Poland immediately started making a hard-currency income on copper sales.

The strategy of identifying copper ores is extremely important for a company like KGHM. How has this process evolved over years?

In the first phase, they documented the deposits found 600 metres deep near Lubin and Polkowice. Further drilling determined the borderline at the depth of 1,200 metres. This depth was impressive for the world standards of the time but it was also realistically available. Launching the mine at the Copper Basin allowed the design of a strategy for the identification of the prospective deposits down to the depth of 1,500 metres. Further reconnaissance in the adjacent, reserve, areas of Bytom, Głogów, and Retków was financed in 50% by KGHM Lubin because it was scheduled to use that deposit in future. This level of financing was confirmed by the Minister of State Treasury in KGHM's Prospectus issued in 1997 when the company had its IPO on the Warsaw Stock Exchange. The Prospectus reads that the company had planned to go ahead with prospecting for copper ores deposits based on the boreholes made by the time and to win the approval of

the new geological documentation which gave KGHM an extraction priority over other entities or to get the State Treasury's consent for obtaining the missing part of the required documentation.

In the recent years, we have been exploring the area of Niecka Grodziecka and the place known as Gaworzyce-Radwanice where we have documented 4.1 million tonnes of copper. By the end of the last year, we started some works in the Retków-Ścinawa area. We have obtained a trans-border licence for prospecting in the area of Weisswasser on the German side of the border, and in the area of Stojanów in Poland. The procedures concerning the areas of Bytom Odrzański and Kulów-Luboszyce have not been completed yet.

What are KGHM's plans for carrying our mining projects in those areas?

Monument to Jan Wyżykowski in Lubin

KGHM is a real, highly experienced mining operator which has worked in that region for more than five decades now. We present realistic concepts of deposit management and a full truth of the threats which grow with the depth of extraction. It is a rather vast area. In the first phase, economic reasons justify the management of the deposits in the naturally limited area of Bytom Odrzański with the use of the existing mining infrastructure of KGHM. It includes a technically rational component. The planned construction of a ventilation shaft in the Bytom Odrzański is the first stage of the deposit management which enables the construction of core transport and communications infrastructure for the area, connect it with the ore enrichment plants, and deliver fresh air to the extraction crews.

During the administrative procedure of licensing the Bytom Odrzański and Kulów-Luboszyce area, KGHM many times declared it was thinking of a construction of a stand-alone mine in the more remote northern areas because of the expected presence of concentrated gases in the deposit sphere which might require the application of technical solutions other than the existing ones. The concepts developed at the time did not, and they could not, foresee the effects of the tax on extraction of some minerals on the profitability of the project. A project of this type seems highly risky and hardly profitable today. Careful calculations must be done for virtually every new copper mine in Poland. Our studies produce interesting results in the area known as the Old Copper Basin outside Bolesławiec. Those deposits do not touch with our mines and we have from the very beginning thought of building a new mining establishment there with its own ore enrichment plants, a waste neutralisation tank, and complete infrastructure. Today's tax completely rules out any profitability of this project too. We carry on our studies hoping that the tax will be eased eventually.

Interview by Tomasz Rabenda

Protect State Treasury's interest for future generations

Securing access to mineral resources in the 21st century becomes a strategic challenge to many world countries, Poland included. Concentration and globalisation in the mineral raw materials sector requires every country to define its interests related to raw materials and their respective policy, especially regarding access to deposits.

Estimates show that 2.2 billion tonnes of copper ore sits in a deposit where there is a land use collision (*see map on page 13*). These are strategic areas of KGHM Polska Miedź S.A. because they are directly touching the area where this company already performs mining processes or advanced geological reconnaissance (on the grounds of valid mining and prospecting licences).

The law says that if more than one company applies for the same licence, public interest and sustainable resource management becomes a prevailing criterion. Public and economic interest may be in such a way of managing the resource which allows rational resource management and takes into consideration a long-term plan for the operation of mining and metallurgy plants in the area so as the documented copper ores can be exploited at a regular pace during a stretch of time which allows finding an alternative to copper mining, including solution to the social problems caused by the liquidation of jobs and the end of incomes which were ending up with the local government so far.

Using the technical infrastructures of the adjacent mining areas to manage the copper ore deposits in what is called reserve areas effectively reduces the cost of access and extraction owing to which part of the copper ore resource can be hoisted up and processed into the status of industrial resource, that is, a resource whose extraction is not profitable in the adopted technical and financial model.

As regards deposits identified in the past, priority should be given to companies which carried out and paid for those studies (*see map caption on page 13*) because it is them who had discovered those resources and made a large part of their documentation.

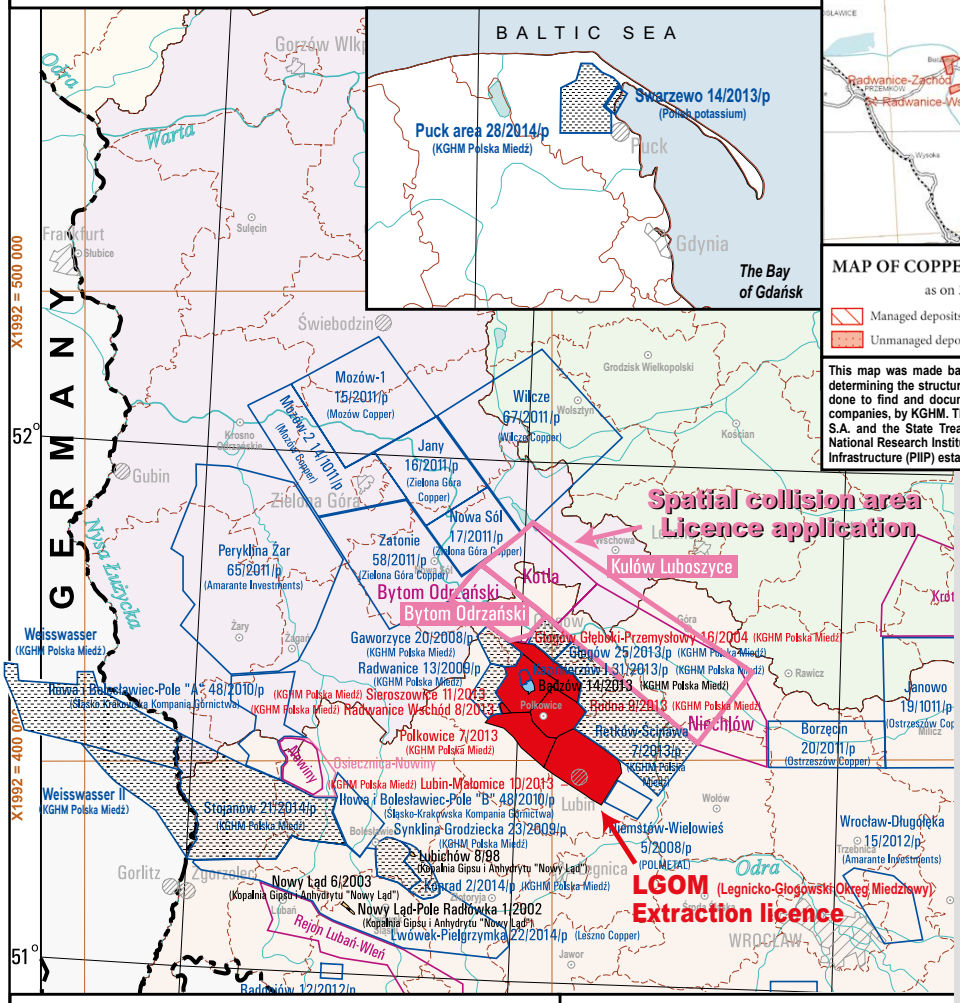
* * *

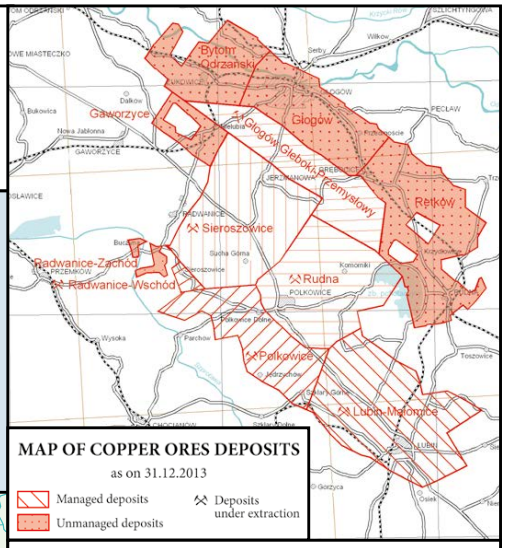
Professor Marek Nieć in a paper titled: The strategy on raw materials wanted now, published in Rzeczpospolita daily on 17.02.2014, said: *the licence-granting policy is chaotic and sometimes a licence goes to entities interested in speculation, not in doing the hard work which leads to the commencement of production*.

The licensing strategy should address the above-mentioned questions.

Eugeniusz M. Makowski
– prezes Geoland Consulting International

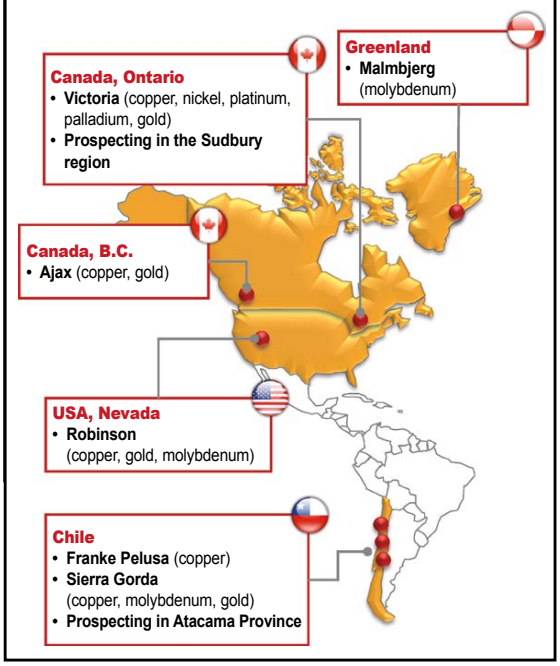
KGHM PROSPECTING PROGRAMME ON THE BACKDROP OF A SECTION OF A MAP OF LICENCES FOR PROSPECTING, IDENTIFICATION, AND EXTRACTION OF THE DEPOSITS OF CHEMICAL, ROCK, AND METAL DEPOSITS, AS ON 31.12.2014.

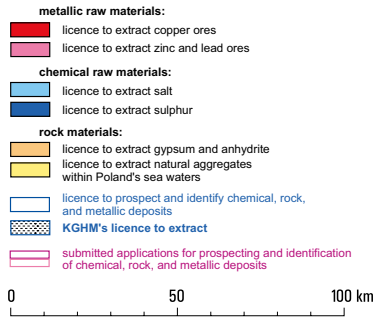




This map was made based on geological data obtained over 5 decades and used in determining the structure and origins of the deposit. A huge amount of geological tests done to find and document copper ores deposits at LGOM were done, among other companies, by KGHM. This resource of data is the property of both, KGHM Polska Miedź S.A. and the State Treasury and its depositary is the Polish Geological Institute-the National Research Institute. These are the foundations of the Polish Spatial Informatioin Infrastructure (PIIP) established in accordance with the INSPIRE Directive.

KGHM'S WORLD PROSPECTING PROGRAMME





MINISTRY OF THE ENVIRONMENT

Graphic and technical computer elaboration: R. Bońda, D. Siekiera

WARSAW - as of 31-12-2014

Coordinate system PL-1992

Protect State Treasury's interest for future generations

Securing access to mineral resources in the 21st century becomes a strategic challenge to many world countries, Poland included. Concentration and globalisation in the mineral raw materials sector requires every country to define its interests related to raw materials and their respective policy, especially regarding access to deposits.

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The law says that if more than one company applies for the same licence, public interest and sustainable resource management becomes a prevailing criterion. Public and economic interest may be in such a way of managing the resource which allows rational resource management and takes into consideration a long-term plan for the operation of mining and metallurgy plants in the area so as the documented copper ores can be exploited at a regular pace during a stretch of time which allows finding an alternative to copper mining, including solution to the social problems caused by the liquidation of jobs and the end of incomes which were ending up with the local government so far.

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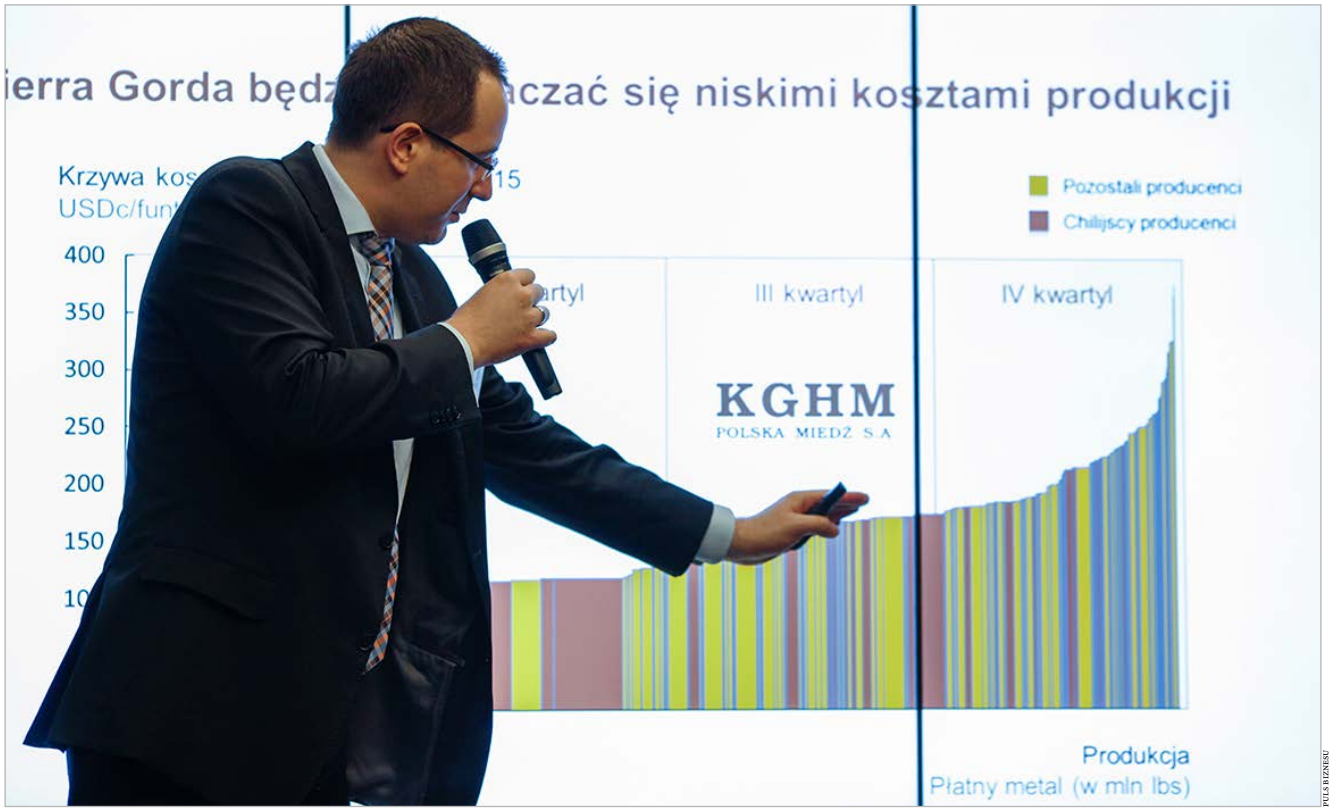
A typical mining project – geological expert opinions on exploration

Interview with Maciej Koński, Ph.D. Chief Manager of the Strategic Analysis and Resource Base Centre, KGHM Polska Miedź S.A.



Mind you, the price of one tonne of copper is the same whether it is extracted in Poland, Africa, Australia, or anywhere else. Therefore, cost control is the key method of competition among mining companies.

What is a typical mining project and its life cycle like?

It is a long-term business. When it comes to investment in geological and mining projects, you cannot expect quick effects. Statistics show that an average period of 19 years passes between the first successful drilling into an economically promising deposit and the commencement of production. This shows how long it takes to make the results noticeable in this particular sector of industry. The resource base is the foundation of the mining business. When a company does not have an adequate number of documented resources it

has, practically, nothing to extract. This is why it is so important for companies to regularly renew their base because on-going production depletes it. Having analysed the scale of prospecting done by more than 20 world-largest copper mining companies we have developed an indicator which shows how much new deposits we must document in relation to what we are actually extracting. This indicator is three to one or, in other words, one tonne of copper hoisted up a mine should be replaced by nearly three tonnes of copper documented in new deposits.

How can this be done?

It all begins with prospecting for new mineral deposits. You must carry out a prospecting campaign. This campaign must be economically viable, so you start with the least costly works. When you are doing a green-field or grass-root exploration, you start with taking surface rock samples, geochemical analyses, and drawing geological maps for the area. This work allows you to identify areas with a higher potential which justifies using more advanced prospecting methods and geophysical studies. This work can be done on the surface or from the air. A device sends a special signal into the ground where it reaches the mineralised zone. The receiving device records the signal bouncing back from deep underground. This confirms the presence of a mineralised zone down there. If the geophysical work is finished with success, a borehole must be drilled to take a core sample and test it in a lab to see the parameters of its mineralisation. Only after that we have evidence that mineralisation may be significant as a deposit and, therefore, also significant in economic terms. A single borehole is definitely not enough to define the borderlines of a potential deposit. We must, therefore, continue drilling which is a relatively expensive part of a copper prospecting campaign. It is good to know that one borehole costs several million zlotys. Having done those boreholes, we can estimate what can be found between them and build a geological model of the deposit. This phase usually takes several years.

How is the further process?

When we finish all that work and have the picture of the underground deposit, engineers come to the scene to develop an economically optimized model of hoisting the raw material up to the surface. You can build an open-cast or underground mine. For the former, you must define the angle of the slopes, the place where you will start extraction, etc. For the latter, you must define the number, type, and depth of the shafts, as well as the directions and method for working the horizontal corridors and mining faces. You must also design the ore enrichment plant, the waste neutralisation tank, and all the other required installations. Only after you have done this documentation, you can estimate the economic effects of the project.

As soon as you have the results of economic analysis in hand, you can say whether working this deposit can be profitable. At this point you need to decide to go ahead with the investment or to drop it. The form of project financing is extremely important too. Building a mine involves huge capital expenditures which can be paid back only after a long time.

Building a single shaft in current Polish conditions costs more than PLN1 billion. When you are using external financing by, say, some banks, they will usually do their own feasibility study to make sure the mining company is credit-worthy.

When the company has examined the proposed economic model, the risks involved, and the potential growth of value, it may decide to build a mine. The construction phase comes to its end several years later and the project is moved to the operating division which manages its production. There is also a ramp-up phase in which the project reaches its target production capacity. In mining projects, this phase takes several to more than a dozen months. When the project reaches its full extracting capacity, you can say that phase is over and you proceed to the full operation phase.

In Poland, KGHM is active wherever prospects for development are found.

What other challenges you face in the mine building process?

Let me stress that co-operation with local community must be included in all the process of building the value of a mining process. This co-operation is picking up importance on the international scale. Global companies like KGHM are aware that should any clash with the surrounding world take place, the news will circulate the world in no time. But there is a flipside here too. News of good prospects can mobilise local communities to co-operation with a mining company. Co-operation is extremely important at the time when the environment ministry works on issuing a mining licence because it is connected with the local land use plan which includes the mining infrastructure.

We have focused on geology but there are a lot more factors involved.

KGHM has defined a set of criteria to screen off projects which do not fit in our ambitions and expectations. First, copper must be the dominating metal in the deposit. We best expertise is in obtaining copper and we want to keep our strong position in copper production industry. Second, the deposit should be large enough to allow copper production of at least 50,000 a year. This is how we disqualify small projects. There are lots of them in the world but the time the company management would have to devote to running ten small projects would never compensate their effort. This is why it pays better to focus on one big project instead. The production period which, in such case, ensures our operation for at least fifteen years is not incidental. Please note that the market of raw materials, especially copper, has a cyclical nature. Hence it is so important to avoid timing the commencement of a project and production with years of poor market conditions and to ensure that the project goes on through one or two cycles of the raw materials market. We want to create value for our shareholders. Mind you, the price of one ton of copper is the same whether it is extracted in Poland, Africa, Australia, or anywhere else. Therefore, cost control is the key method of rivalry among mining companies. Companies with access to deposits allowing low-cost production use the highest margins and show the highest stability in the changing macro-economic environment. We take particular care to get our competitive edge by choosing projects which guarantee low costs of production.

The last factor is connected with geopolitical risk. You must choose what's better for you: a good deposit in a country of high political risk or a worse deposit in a politically stabilised country. There is no good answer

to this question. KGHM, when studying the geopolitical risk, uses internal expert opinions based on the assessment of developments in the political, economic, and social environment of a country involved. The company also uses reports made by leading analytical institutions. Owing to its current contact with the market and monitoring of the on-going world trends KGHM can realistically assess the geopolitical risk.

Mergers and acquisitions are among risk-mitigating methods. Exactly, KGHM used acquisition to become the owner of American deposits, including the most famous one in Sierra Gorda, Chile. Is it a development-prone direction?

By all means, yes. The biggest mining companies follow two lines of development. The first line is exploiting deposits by the company itself. The second one, acquiring companies which already have mining plants or companies which have documented an attractive deposit. This is the KGHM case. For one thing, we continue the policy of documenting new deposits and, for the other, we focus on our core business. The acquisition of Quadra FNX was the biggest transaction in Polish economic history. It gave us a production growth and, at the same time, expanded our resource base. In this way the company ensured for itself a further potential for growth and obtained projects in various phases of implementation and production.

The Sierra Gorda mine was among our targets too. Two offers were put on the negotiating table: one from Poland and one from Japan. The Canadians of Quadra FNX who owned the Sierra Gorda deposit found the Japanese offer much more attractive. They were right because it included not only a higher price for joining the project but also a massive external financing. This led to the idea of acquiring the Quadra FNX company as a whole. Preparations took us more than a year. A team dedicated to this task eventually carried the plan out. We convinced more than 2/3 of the Canadian company shareholders that it is a good thing to sell us the shares for a price which was convenient for us. We also had to make a huge effort to get the Canadian Government's permission to go into the transaction by meeting a lot of strict and restrictive requirements.

Statistics show that an average period of 19 years passes between the first successful drilling into an economically promising deposit and the commencement of industrial production.

It is very important that in this way we have acquired rather low-cost projects. The estimated cost of extraction in the Sierra Gorda mine in the coming five years is about USD2.5 thousand per tonne, that is, USD1.5 thousand less than in KGHM. The Victoria in Ontario, Canada (a project at its construction phase) will be an underground mine with--I mean it--a negative cost. Why is that? There is a method of calculation used in mining where the cost of copper production is diminished by the income on all the side-products. The number of such side-products in Victoria mine is big enough (palladium, platinum, etc.) to generate a sales income higher than the cost of copper production. It is a fabulous opportunity to improve KGHM's cost position and, in addition, it guarantees security to the company. Companies with the highest production cost must drop out of the game whenever there is a turmoil on financial and raw-materials market or when prices suddenly slump down.

In this way, KGHM becomes a global company. But let us go back home. Are there any more attractive deposits in Poland?

Of course, there are. We are directing our deposit documentation to the north. We have documented 4.1 million tonnes of copper in an area adjacent to KGHM, the region of Gaworzyce-Radwanice. Licences for Głogów and Retków-Ścinawa were granted to us last year. We are still struggling to get a licence for the region of Kulów-Luboszyce and Bytom Odrzański. The latter area had been preliminarily documented by KGHM in the 1970s. As a rule, we apply for licences to work in areas where we expect good effects and, more importantly, where we are able to build mines or start production at the areas worked by our existing mines. These areas guarantee KGHM operation for 40 years from now.

But we also look for deposits in regions not directly adjacent to our mines. This includes a number of such projects in Poland: the Stare Zagłębie near Bolesławiec (licence Synklina Grodziecka and Konrad). We are also running a trans-border project. We were granted a licence valid on the Polish and German side of the border. Mineralisation has been found in Germany, close to a town called Weisswasser. In the course of this project implementation we are going to check whether and how close it gets to the Stojanów area in Poland.

And we have applied for a licence in the Zatoka Pucka bay on the Baltic Sea. In December, last year, the Minister of Environment gave us a licence for prospecting and identification of potassium salts and related minerals: copper, silver, and salt present in the area. In Poland, KGHM is active wherever prospects for development are found. We do similar work abroad too. There is a huge potential around the Sierra Gorda mine. I hope we will soon be able to document it. The mine will then run not only for the planned 20 years but twice as long.

Interview by Tomasz Rabenda