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First Delta Securities Inc. - Research Commentary

Speculative Mining Recommendation

January 26, 1998

"Dominant Low-Cost Competition in the World Magnesium Market"

Long-Term Growth for Magnesium Consumption

Magnesium Alloy Corporation | Trading Symbol: MGAC.U-CDN

Introduction

Magnesium Alloy Corporation (Mag Alloy), a public corporation, has announced plans to develop a magnesium property in the Republic of Congo (Congo), West Africa. The property hosts one of the largest evaporite basins in the world. From previous exploration and mining, a resource of 800 billion tonnes of carnallite, a magnesium and potash-rich salt, may be inferred. Mag Alloy has recently been called for trading on the Canadian Dealing Network (CDN). Mag Alloy's predecessor company was Congo Minerals Inc., which negotiated property contracts with the Congolese. Subsequent to obtaining evaluation and development rights, Congo Minerals entered into first an amalgamation agreement to complete financing with a private company and then an agreement with Clavos Enterprises Inc. (a public company trading on the CDN) to form Magnesium Alloy Corporation.

Mag Alloy's business plan calls for the development of a magnesium mining and refining plant in the Congo supplying 50,000 tonnes of primary magnesium metal production per year and ramping up to 100,000 tonnes per year. At current market levels that production would represent US$120 million to US$240 million gross revenue annually. It is Mag Alloy's intention to become the world's lowest-cost producer of magnesium. Utilizing the proximity of this massive source of magnesium to low-cost hydroelectric power, extensive natural gas reserves, and a deep-water port, this project could have a major impact on the world's magnesium markets. With the application of new magnesium cell technology to decrease production costs further, this project could alter the economics of magnesium production. Pilot plant tests of the new technology will be made during the initial phases of development while conventional mine planning is undertaken. Given that Mag Alloy's magnesium resource is among the cleanest and most extensive in the world, we have a very high degree of confidence in this project.

Magnesium is becoming an increasingly important component in the manufacture of cars, with applications developing in many other industries. All major automobile manufacturers are seeking stable, long-term, and low-cost supplies of magnesium.

There is currently a worldwide effort to expand the usage of magnesium through experiments with new alloy development, forging and die-casting techniques, and recovery technology; this effort is being sponsored by industry, governments, and universities. Magnesium has superior qualities of strength, 35% lower weight, and superior vibration characteristics, when compared to aluminum. Because of these attributes and competitive pricing in relation to aluminum, magnesium is supplanting aluminum as the preferred light weight metal of choice. Magnesium is experiencing an expansion of use in the industrial world, particularly in the automotive industry. Global use of magnesium in the automobile industry is projected to increase by 15 to 20% with each new model year and by 5% annually in other industries. Magnesium's decline in price in

relation to aluminum will continue with increased application of new technology and processes and thus make this metal even more competitive in relation to aluminum.

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Production costs for magnesium vary from US$2,000 to US$2,500 per tonne and recent prices have been in the US$2,250 to US$2,750 per tonnes range (aluminum sells for US$1,650 per tonne). A new project in Quebec targeted for mid-2000 is expected to produce magnesium at roughly US$1,700 per tonne. With its access to excellent infrastructure we are confident that Mag Alloy could produce in the range of US$1,400 to US$1,600 per tonne, making the company the lowest-cost producer of magnesium. This underscores the downward price trend for magnesium, which will compete very favourably with aluminum. In the past it has often been magnesium's high cost compared with aluminum's that has kept the development of magnesium applications from gaining wide acceptance.

Mag Alloy's identification of a huge magnesium supply coupled with the necessary infrastructure make this magnesium project unbelievably exciting. Hydro power, offshore oil production, natural gas reserves, a reliable road network, and Congo's most important industrial city and international port, Pointe Noire, are all within or close to the project area; these factors will contribute to low capital and operating costs.

Mag Alloy has recently recruited one of the most experienced engineering teams in the world. This team has designed and constructed magnesium plants worldwide, with recent work on the Dead Sea magnesium plant (25,000 to 50,000 tonnes per year) and Preussag's Iceland facility for production of magnesium from sea water. This engineering team and its affiliates have also agreed to provide new extraction cell technology for the recovery of magnesium which could significantly reduce both capital and operating costs.

The management at Mag Alloy is experienced, capable, and undaunted by the prospects of engineering or financing large mining projects. Led by William B. Burton, who has extensive exploration and development experience, Mag Alloy has an enviable board of directors with experience in successful technology development, international corporate financing, international business law, and mine engineering with a focus on potash mining and processing (a discipline related to magnesium extraction).

The Republic of Congo should not be confused with the Democratic Republic of Congo (formerly Zaire), which has witnessed the recent successful revolution led by Laurent Kabila and has recently reneged on mining contracts.

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Project Licenses and Politics

The Republic of Congo has granted Mag Alloy two exploration permits: the southern Makola and northern Youbi permit areas are located in the Kouilou region of the Republic of Congo. These exploration areas are contiguous to each other along their northern/southern boundaries and are roughly rectangular in shape.

The Atlantic coastline constitutes the western limits of the permit areas, with the southern limits sharing Congo's border with Cabinda (Angola). The northern limit of the license area is approximately 50 kilometres north of the town of Kayes. The eastern limit parallels the coastline approximately 70 kilometres to the east. Congo's main industrial city and shipping terminus, Pointe Noire, is encompassed within the Makola permit area.

Congo (pop. 2.5 million) gained independence from France in 1960 and endured a number of years of turmoil in the form of military instability, economic stagnation, and political infighting. Under the leadership of Major Marien Ngouabi in 1970, Congo became a People's Republic and remained so for the next 22 years. In 1992, after the country's first democratic elections, Pascal Lissouba became Congo's first president. The government has been instituting economic and civil reforms by selling state-owned enterprises, decreasing the size of the civil service, and encouraging outside agencies and international corporations to invest in the country and assist with building infrastructure.

Oil exports make up about 40% of the Congo's GDP and is close to 85% of its export revenues. Export revenues have been applied almost entirely to servicing Congo's foreign debt, but with oil production peaking and discovery expanding 1998 is expected to provide excess revenues. To that end the government created, in January of 1996, the Congo Fund to manage debt servicing and funding for future development.

Recent internal political strife has seen the succession of the former president, Sassou Nguesso, to the leadership of Republic of Congo. President Nguesso has re-established control of the country and is in the process of appointing a new government. This is not expected to result in material changes to the business community at large or to Mag Alloy's activities specifically. Members of Mag Alloy's board of directors are personally familiar with president Nguesso from their business activities in the country prior to 1992.

The first oil licenses were granted in the Congo in the early 1970s, and there have been no arbitrary withdrawals or cancellations of licenses since that time. The Pointe Noire area is an operations and development base for numerous international oil corporations and has seen no significant armed conflict in the last 20 years.

The exploration permits have been granted for a period of four years and may be renewed twice for a three-year period at each renewal. These exploration permits entitle Mag Alloy to a mining permit for each ore deposit it defines for extraction. The permits each cover 2,400 km2, and these areas are located over salt beds known to host extensive potash and magnesium deposits. The Holle Mine, a past producer of potash, is located within the Makola permit area and provides useful data on the nature and extent of the deposits there.

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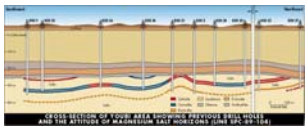
Geology



The target formations are an extensive sequence of potash and magnesium salt beds that extend over a large portion of the coastal region of West Africa. The salts are primarily horizontally layered beds of carnallite (potassium and magnesium), sylvite (potassium), and halite (sodium), and interlayered beds of bischofite (magnesium). These salts and some lesser members are marine evaporite deposits accumulated by the deposition of salt minerals in landlocked sedimentary basins through the evaporation of sea water. An example of an active evaporite basin is the Dead Sea in Israel, which has seen the recent development of a magnesium project partly financed by Volkswagen AG.

The primary ore of interest is carnallite, an ore of potassium, which carries over 8% magnesium. Bischofite and tachyhydrite, high-grade magnesium-rich salts, are also potential targets for magnesium recovery. The deposits were first discovered in Congo in 1960 and are hosted in several basins that form a zone 5 to 40 kilometres wide paralleling the Atlantic coast. The more extensive deposits occur close to the border with Cabinda within the Makola permit area, and it is this region that hosts the past producing Holle Mine and is the primary target area for the development of carnallite beds.

Approximately 12 evaporite cycles have been identified over the entire license area and are buried at depths ranging from 300 to 800 metres. The earliest (deepest) and latest (shallowest) cycles of evaporation are not always present, though the remaining 10 cycles occur uniformly over the license area. The evaporite cycles average 60 metres in thickness but vary up to 150 metres in some localities. From exploration work conducted by BRGM, Les Mines des Potash Alsac (MDPA), and Elf Aquitaine between 1940 and 1970 (including over 100 exploration drill holes) and from data available from the Holle Mine, Mag Alloy has designed its license area to cover the thickest and most complete of the evaporite deposits.

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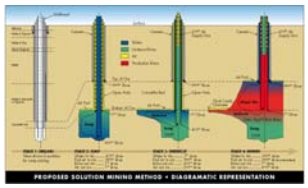
Solution Mining



In Mag Alloy's case primary magnesium and potash production, simply stated, will be a two-stage process: exploitation of the ore and processing of the ore to cathode magnesium and potash. Mag Alloy's project calls for solution mining of

the earlier cycles of carnallite beds and some of the richer magnesium-bearing bischofite beds as the project advances. Reportedly the thickness of these earlier carnallite cycles exceeds 12 metres, a thickness that will greatly reduce costs and difficulties of extraction. Being exceptionally soluble, these cycles lend themselves to solution mining techniques, which allow for soluble extraction of magnesium and potassium from the salt brines. Solution mining involves transporting water to the ore, extracting the ore by taking advantage of its solubility, and pumping the mineral-rich solution to the surface through connecting boreholes or concentric casings in single boreholes. The solution would then be transported by pipeline to metallurgical plants for processing into its component elements.

The Holle Mine produced potash for approximately nine years at a rate of 400,000 to 500,000 tonnes per year using conventional underground mining techniques. The mine's objective to produce 800,000 tonnes per year was never achieved due to geological and water problems. Due to the ore's extremely high solubility, significant water inflow can make underground mining impossible. By tapping the deeper carnallite and bischofite beds using solution mining techniques, Mag Alloy will mine below the water table to eliminate the problems of conventional excavation and extract the ore at lower cost.

Solution mining is used widely at depths of between 150 and 1500 metres for the production of rock salt but has been used less extensively for potash production. The lack of application of this method to potash is likely a result of the lack of purity of potash minerals compared to rock salt and to structural concerns and difficulties relating to the proximity of local water tables. Successful attempts have been made in Canada and various other countries, but potash solution mining has not seen widespread application. IMC Kalium Canada Ltd., at Unity, Saskatchewan, has been commercially applying the solution mining method for potash at depths exceeding 1500 metres since 1964.

Based on the purity of the carnallite, the relatively undisturbed beds of ore, and their depth below the water table, it is anticipated that the solution extraction of magnesium and potash would be the most cost effective and successful mining procedure for Mag Alloy's ore.

Potash will be an integral secondary product of magnesium production because of the potassium content of carnallite. In addition approximately 2.8 tonnes of chlorine will be produced from the refining process for every tonne of magnesium. This secondary production of potash will be a significant element for profitable mining, and the chlorine production indicates that the establishment of a spin-off plastics business with local offshore oil production is possible and will be investigated. The secondary production of potash and a plastics operation could lower operating costs by significant margins.

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Electricity and Natural Gas

As is true with aluminum, the largest aspect of production cost for the recovery of magnesium is the consumption of power. Both magnesium and aluminum require 14,000 to 18,000 kilowatts per tonne of metal produced. It is well documented that most aluminum fabrication plants are located in areas that supply low-cost hydroelectric power. Magnesium production is no different, and Mag Alloy has determined that its power needs may be met close to site with hydroelectric and/or natural-gas-fired power.

Mag Alloy will require 350 megawatts of power for refining and an additional 200 megawatts if a plastics resin plant is developed to refine chlorine produced from magnesium refining. Mag Alloy will also require 120,000,000 m3 of natural gas per year (magnesium is plated from molten salts at 700°C).

The INGA power facility, located at Isangila Falls on the Zaire River (formerly Livingstone Falls, Congo River), is a candidate for hydroelectric power supply. The current facilities at INGA could be capable of providing sufficient power at $0.005 to $0.01 per kilowatt-hour for the power consumption needs of Mag Alloy's magnesium plant. The power costs projected compare favourably with other international power rates for magnesium and aluminum production plants such as the rate of $0.01 per kilowatt-hour for the Norsk hydro magnesium plant at Sept Iles, Canada.

The Sounda Gorge hydroelectric project is currently under construction only kilometres from Mag Alloy's eastern permit boundary. The second phase of construction to produce 240 megawatts of power is slated for completion this year. A third phase will increase dam height to over 100 metres and provide a generating

capacity to 1 gigawatt. Feasibility and financing proposals are in progress for this third phase. A project of the proportions that Mag Alloy is proposing should have a positive influence on a decision to proceed with phase three at Sounda Gorge and provide Mag Alloy with an alternative source of hydro power.

Congo's oil reserves stand at 1.5 billion barrels, with 1998 production estimates of 260,000 barrels of oil per day. Congo has reserves of 4.3 trillion cubic feet of natural gas, the second-largest reserve in sub-Saharan Africa. These reserves produce approximately 30 million cubic feet of natural gas per year, but all of their gas is flared off at site because of the lack of infrastructure. Natural gas supplies are potentially available to Mag Alloy from offshore oil production close to Mag Alloy's permit areas. ELF Aquitaine's N'Kossa field hosts reserves of 440 to 600 million barrels of light, almost-sulphur-free oil, and a joint venture between AGIP and Chevron in the Kitina offshore fields has at least 100 million barrels of low-sulphur oil reserves. The current producing wells all have significant flares of natural gas as a by-product of oil production, and the low-sulphur content indicates low-cost refining for the production of clean natural gas and propane. Mag Alloy has had discussions relating to the establishment of pipelines to use the blow-off gas for natural gas production, and several corporations have indicated their willingness to cooperate with Mag Alloy for mutual benefit.

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Magnesium

Magnesium is the eighth most abundant element in the earth's crust, making up over 2% of the total composition; it is also the third most abundant element dissolved in sea water. The principal sources of magnesium are dolomite, magnesite, sea water, and natural evaporites such as carnallite and bischofite. Various methods may be employed to refine magnesium–from electrolysis to silicothermic reduction. Within electrolytic cell technology there are a number of different applications with a variety of characteristics. Mag Alloy will be applying newly advanced cell technology to this project for reduced power consumption and, ultimately, lower costs.

Magnesium's best attributes are its high strength-to-weight ratio and light weight. As a structural material it can be alloyed with several other elements including aluminum, manganese, rare-earth elements, silver, zinc, and zirconium. The various alloys have unusually high strength and are light weight. Magnesium is most commonly found alloyed with aluminum where its addition to aluminum increases hardness and improves corrosion resistance which accounted for consumption of approximately 50% of primary magnesium production in 1996.

The second-largest and fastest-growing application for magnesium is in high-pressure die-cast products for structural applications. The International Magnesium Association reports that 1996 die-cast applications amounted to 72,300 tonnes and total consumption for this use is expected to exceed 120,000 tonnes by the year 2000, a 65% increase in only four years.

The current growth market for structural applications is within the automotive industry and is founded on magnesium's strength, light weight, superior high-pressure die-casting applications, and declining price in relation to aluminum. Added incentive for the automotive industry is the Partnership for a New Generation of Vehicles (PNGV) between the Big Three U.S. automakers and the U.S. federal government. PNGV addresses U.S. competitiveness in manufacturing and improvements in safety, emissions, and fuel economy in the automotive industry. In response to PNGV each automaker is utilizing increasing amounts of magnesium to address weight restrictions brought about by customer's demands for more safety and luxury items in vehicles. The automakers are also independently redesigning their vehicles to meet stringent fuel consumption and emissions standards slated for the twenty-first century. The design components for these new cars call for increasing amounts of magnesium. As an example Ford Motor Company uses approximately 2.6 kilograms of magnesium in its current vehicles, but Ford's P2000 concept vehicle calls for use of over 103 kilograms of magnesium. Some magnesium parts currently being used by various manufacturers include drive trains, clutch housings, support crossbeams, and seat frames.

European and Japanese automakers are also increasing magnesium use and are designing for additional magnesium applications in the future. The need to create lighter, safer, and more fuel-efficient vehicles is causing a revolution in design applications that is only just beginning.

Future applications will include engine valve covers, engine heads, and latching mechanisms and will extend to use in trucks and public transit vehicles. Magnesium also possesses superior heat radiation properties, heat stability, electromagnetic interference shielding properties, and damping capabilities. Recent developments in thin-wall casting combined with magnesium's other characteristics are leading to increased applications in the electronics field for cellular telephones, video cameras, and personal computers (casings, battery shields, etc).

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Auto Companies Buy into Magnesium Projects

With the recognition that magnesium will play an important role in the future, international automakers are aligning themselves with magnesium producers in new projects designed to provide predictable sources of supply and stable prices for this commodity. As has already been mentioned, Volkswagen AG has invested in the Dead Sea Magnesium Ltd's 50,000 tonnes per year magnesium plant in Israel (25,000 tonnes per year at startup). Volkswagen invested US$100 million for a 35% interest and will consume between 20 and 30% of the project's output. Total cost of the project, which is utilizing new Russian technology, is expected to reach approximately US$420 million. Ford Motor Company is participating in Australian Magnesium Corporation's new magnesium facility, slated for production in 2002, by investing US$30 million in a pilot plant and placing a US$1.5 billion order for magnesium metal. General Motors and Norsk Hydro have announced plans for a long-term supply agreement that will see GM supplying alloy to Norsk Hydro's expanding alloy-ingot casting line at the Becanour foundry in Quebec. Noranda, in joint venture with SNC Lavalin Group Inc. and the Aisin Group (a Japanese automotive parts supplier to Toyota), will begin construction of the (US$500 million) Magnola magnesium plant in Quebec, Canada, this year.

These examples of major world corporations jockeying for secure sources of supply and processing facilities demonstrate the profound growth projected for magnesium and the faith these corporations have in this metal.

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Magnesium Production and Consumption

The cost of producing magnesium varies from US$2,000 to US$2,500 per tonne, and spot markets have been approximately US$2,250 to US$2,750 per tonne. Production has recently been approved for construction of Noranda's Magnola magnesium project at Asbestos, Quebec, Canada. This plant is targeted to produce 58,000 tonnes of magnesium at approximately US$1,700 per tonne. This would make Noranda the lowest-cost producer of magnesium once production begins in the year 2000. In comparison Mag Alloy plans to produce at a cost of US$1,600 per tonne giving it a significant advantage in the market for magnesium.

Production of primary magnesium in 1996 was 314,000 tonnes (including estimates for CIS and PRC of 66,000 tonnes). World primary magnesium production is projected to reach 360,000 tonnes by the end of the decade and at least 500,000 tonnes by 2005. Primary magnesium consumption is forecast to increase from its current level of 295,000 tonnes to 375,000 tonnes by the start of the millennium and 495,000 tonnes by 2005. For the first nine months of 1997 magnesium consumption is higher than for the previous 1996 period, and primary production has fallen slightly. Consumption was 248,000 tonnes during the first nine months of 1997 compared to 222,000 tonnes in the previous period, an increase of 11%, and production has fallen 4.8% from 187,000 to 177,900 tonnes. This agrees with industry projections, which indicate that demand will outpace production until the end of the decade. New primary supplies of magnesium will be required to meet projected demands into the new century.

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Conclusion

The production forecasts assume that all planned magnesium plants and expansions reach their projected levels. Given the nature of the evolving magnesium market and the diverse sources for magnesium it is evident that low-cost production will be the most important factor for new project success.

Many of these new projects are dependent upon establishing strategic alliances and maintaining cost competitive advantages in the market place. It is not unreasonable to presume that some will not meet the demands of rigorous feasibility studies and may fall by the wayside as newer and cheaper sources of magnesium are brought into play. It then becomes evident that cost of production and strategic alliances with major consumers will become a primary factor in profitability. Mag Alloy is well positioned to take advantage of this situation, with an extensive high-grade deposit and the potential for inexpensive sources of energy, by-product production, and cost effective transportation to markets. The Mag Alloy board of directors has an enviable record for establishing major projects in mining and metallurgy with international corporations to assist in the formation of strategic alliances and provide the latest advances in technology and engineering.

Major multinational organizations and corporations have been at work in Congo over many years. The World Bank maintains significant involvement with Congo's government on matters of foreign debt and infrastructure planning and financing. In spite of the recent short-lived conflict which saw the return of an earlier president, Congo has demonstrated relative stability in government for at least the past 20 years. Preceding that, foreign corporations have been successfully conducting business from the start of Congo's independence in 1960.

This is a bold venture and will require astute engineering and very careful monitoring of the data observed at each phase of advancement. Magnesium mining and manufacturing is a growth industry for the twenty-first century. Mag Alloy is undertaking a visionary step in its scope that will profit well into the new millennium. The current skittish markets and depressed junior mining market aside, this is an intelligent project for discerning investors who understand that patience and good management create wealth.

In the past the magnesium industry has been secretive and has been the domain of only a handful of producers. With burgeoning markets and competitive growth in the production sector this will no longer be the case, and Mag Alloy has been quick off the mark to take advantage of this growth industry. We know of no other magnesium project with access to infrastructure or a resource of this magnitude that will be able to compete with Mag Alloy. This project is at an early stage in its development and we have a very high degree of confidence in its projected success. The wise investor should be able to make many times his or her investment from this project.

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