

**INDUSTRIAL MINERAL PROJECTS  
INFORMATION MEMORANDUM**

**SOUTH AMERICAN GOLD AND COPPER  
COMPANY LIMITED  
(TSX : SAG)**



**MAY 28, 2003**

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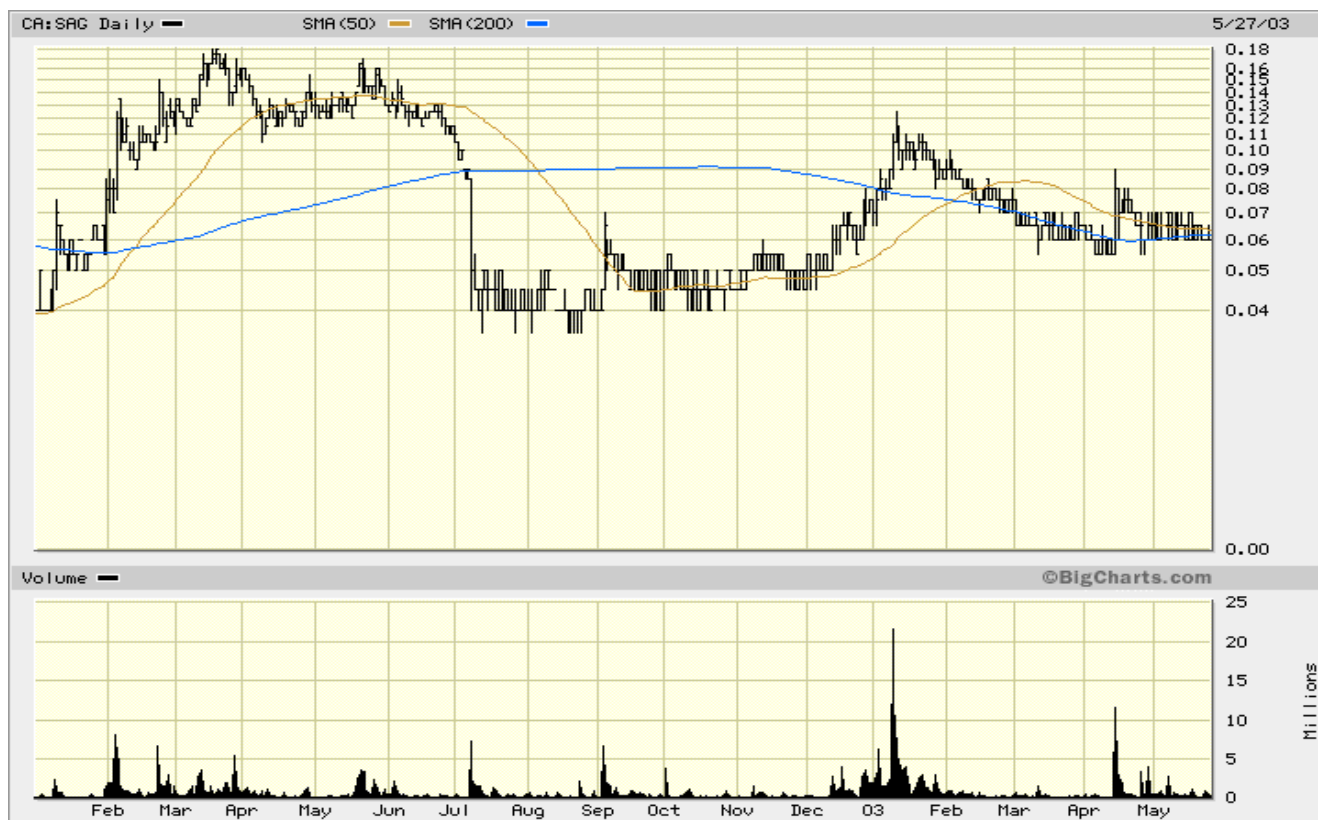
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## SOUTH AMERICAN GOLD AND COPPER COMPANY LIMITED – OVERVIEW

Exchange	Toronto	Shares out. (9.30.02)	(millions)	237.238
Symbol	SAG	Float	(%)	67%
Price (05.27.03)	(C\$) 0.060	Options & warrants	(millions)	38.956
52 week: high (5.29.02)	(C\$) 0.160	Average exercise price	(C\$)	0.114
low (07.12.02)	(C\$) 0.035	Cash (9.30.02)	(US\$ mm)	0.364
Average daily trading volume	1,009,400	Cash on option/warrant exercise	(US\$ mm)	5.927

South American Gold and Copper Company Limited (“SAG” or the “Company”) is a Canadian mining company operating in Chile. The Company has two divisions: limestone, comprising the Cal Norte and Catedral projects; and gold, comprising the Pimenton mine and other exploration projects under evaluation.

- Lime is an industrial mineral used in a wide variety of applications because of its strong alkalinity. As with many industrial minerals, the market tends to be localized owing to the high component of transportation in total costs. It is generally a critical component for its consumers, yet contributes little to the cost of the end product, and it is typically sold under long-term contracts.
- Approximately 52% of Chilean lime consumption is in a variety of uses in the mining industry including leaching of oxide gold ores and flotation of sulfide copper ores. By 2006, we project demand for lime in central Chile will nearly double from approximately 720 metric tonnes per day in 2002. The region already imports nearly one-third of its lime – without new local sources of supply, the region will have to import about 60% of its lime in the second half of this decade.
- SAG has two high grade, advanced lime projects:
  - Cal Norte, a proposed 180 metric tonne per day lime facility, is located approximately 200 miles north of Santiago, about 30 miles from the coast, at a moderate elevation of 2,400 feet. Its target markets include the Los Pelambres mine to the east and the El Solado and Los Bronces mines to the south. The project comprises 1.18 million metric tonnes of 90%-plus CaCO<sub>3</sub> reserves with an additional 808,000 metric tonnes of inferred resources (estimated by John J. Selters, an independent “qualified person.”) Combined, the reserves and resources are sufficient for a mine life of approximately 20 years at planned production rates.
  - Catedral, a proposed 600 metric tonne per day lime facility, is located approximately 85 miles southeast of Santiago. Its target markets include the El Teniente mine, which lies south of Santiago, and the Andina and Los Bronces mines to the north of Santiago. Mineable resources at the Catedral Mona Sur limestone deposit have been estimated by John J. Selters, an independent “qualified person,” at 23.9 million metric tonnes of 90.6% CaCO<sub>3</sub>, sufficient for more than 40 years production at planned rates.
- We estimate the PV<sub>10</sub> of the projected cash flow from Cal Norte and Catedral to be approximately C\$44 million, or C\$0.16 per share fully diluted. As the projects come on stream and project financing begins to be paid down, the projected PV<sub>10</sub> will increase to C\$83 million or C\$0.30 per share in five years.
- Pimenton is a high grade underground gold mine that was mined intermittently in the mid-1990s. The project is centered on a large area of intensive alteration that is believed to be the surface expression of a deep porphyry system. The initial plan is to ramp production up to 45,000 to 50,000 ounces a year. While this will require translating inferred mineral resources into reserves, we believe the nature of the underground veins supports this assumption. Subject to the completion of a debt structured financing, Pimenton is scheduled to be in production by early 2004. Our market-comparable valuation of the existing reserves and resources at Pimenton is approximately C\$40 million, or C\$0.15 per share.
- Our estimated “sum of parts” valuation (Pimenton plus the lime projects) is C\$0.31 per share, which compares with SAGC’s current share price of C\$0.06.

## LIME OPERATIONS

South American Gold and Copper Company Limited has two lime projects in central Chile: Cal Norte and Catedral. Both projects are targeting the rapidly expanding demand for lime in the central region of the country.

### LIME

Lime is an important industrial mineral used primarily because of its alkalinity. It is produced from limestone (calcium carbonate, or  $\text{CaCO}_3$ ) that is processed through a kiln to disassociate the lime (CaO) from carbon dioxide ( $\text{CO}_2$ ). In Chile, lime is used primarily in the flotation of sulfide copper ores and the leaching oxide gold ores as well as in the pulp and paper industry, in agriculture, and in construction.

In central Chile, lime typically sells for between \$110 and \$120 per tonne, based on 100% CaO. The actual selling price is adjusted to reflect the purity of the lime – 78% basis free lime would sell for \$85.80 if 100% pure lime were priced at \$110.

In view of the pricing level, transportation is a significant part of the cost structure. As such, markets are regionalized – the material can be hauled over much greater distances than some industrial minerals, such as aggregates, but cannot be transported economically around the world.

**Competitive advantage is primarily defined by the quality of the lime produced, the cost to transport to market, and dependability of supply. Other important factors include the use of modern, efficient kilns and low mining costs.**

### Chilean Lime Market

Chile consumes in excess of 1.0 million metric tonnes of lime each year, of which approximately 52% is used by the mining industry and 31% is used in pulp and paper. The balance is consumed in agriculture (14%) and construction and other industries (3%).

Demand is increasing rapidly, driven by new gold and copper mines as well as the expansion of existing operations. Between 1998 and 2010, total consumption is expected to increase by more than 60%, driven by a near doubling in consumption in the mining industry. Central Chile (Regions IV, V, VI and Metropolitan Santiago) is expected to show the strongest growth, with mining consumption up 180%.

The table on Page 3 sets out consumption and lime production capacity, split between the northern, central and southern sections of the country. We have not included projected production from SAGC's projects in this analysis. Without this production, Chile could swing from having approximately 116,000 tonnes of capacity over and above consumption in 1998, to having a shortfall of capacity versus consumption in excess of 300,000 tonnes a year – or approximately 850 tonnes a day.

**Chilean Lime Consumption and Capacity, by region**  
(metric tonnes per annum)

	Consumption						Capacity			Balance Surplus / (Deficit)
	Mining	Pulp & Paper	Agriculture	Industry & construction	Other	Total	Captive	Independent	Total	
<b>Northern Chile (I, II, III)</b>										
1998 consumption	268,917	-	-	5,200	-	274,117	115,500	232,000	347,500	73,383
2010 consumption	520,877	-	-	8,200	-	529,077	115,500	342,000	457,500	(71,577)
Increase	251,960	-	-	3,000	-	254,960	-	110,000 <sup>1</sup>	110,001	
	94%	n/a	n/a	58%	n/a	93%				
<b>Central Chile (IV, V, VI, Metro)</b>										
1998 consumption	175,169	-	-	24,452	1,200	200,821	72,600	176,500	249,100	48,279
2010 consumption	490,610	-	-	31,452	3,600	525,662	72,600	176,500	249,100	(276,562)
Increase	315,441	-	-	7,000	2,400	324,841	-	- <sup>2</sup>	-	
	180%	n/a	n/a	29%	n/a	162%				
<b>Southern Chile (VII to XII)</b>										
1998 consumption	88,036	313,000	142,500	1,500	2,100	547,136	541,200	-	541,200	(5,936)
2010 consumption	88,036	406,000	164,000	6,500	3,100	667,636	661,200	-	661,200	(6,436)
Increase	-	93,000	21,500	5,000	1,000	120,500	120,000 <sup>3</sup>	-	120,000	
	0%	30%	15%	333%	48%	22%				
<b>Total</b>										
1998 consumption	532,122	313,000	142,500	31,152	3,300	1,022,074	729,300	408,500	1,137,800	115,726
2010 consumption	1,048,202	406,000	164,000	46,152	6,700	1,671,054	849,300	518,500	1,367,801	(303,253)
Increase	516,080	93,000	21,500	15,000	3,400	648,980	120,000	110,000	230,001	
	97%	30%	15%	48%	103%	63%				

Notes: 1 Replacement and expansion of Inacessa rotary kiln

2 Excludes Cal Norte and Catedral

3 Assumed expansion of captive capacity

Source: Proteus Capital and SAGC estimates

Of this shortfall, approximately 275,000 tonnes is projected to be in central Chile. Indeed, without SAGC's planned production, central Chilean capacity may cover only 40% of that region's demand by 2010.

**Consumption**

There are several major mine expansions or new mining projects currently underway in central Chile that will have a significant effect on the demand for lime:

- El Teniente: expansion of concentrate capacity is expected to add 110 tonnes per day; environmental treatment of acid and gasses is expected to increase lime consumption by 150 tonnes per day.
- Los Pelambres: the mine started production in 1999 and has just completed an initial expansion, taking lime consumption to 136 tonnes per day. A further expansion, requiring an additional 45 tonnes per day is under consideration by Antofagasta Holdings and its partners, Nippon Mining and Mitsubishi.
- Andina: CODELCO is considering doubling the capacity of Andina, which would double lime consumption from 110 tonnes per day. Lime to support current operations is being imported from Jachal in Argentina.
- Pachon: Noranda is continuing to consider development of the Pachon mine that, while located in Argentina, would be operated and supported from Chile. Lime consumption would be approximately 150 tonnes per day.

In addition, Barrick Gold is considering development of the Pascua gold leach project in the southern part of Region III, technically outside central Chile and included in our consumption projections for northern Chile in the table above. The cyanide leach circuit could require approximately 600 tonnes of lime per day.

## Supply

There are currently two significant independent lime producers in Chile – Inacesa and Soprocal – that are related through common ownership. Inacesa is focused on northern Chile, where it operates plants near Antofagasta and Copiapó.

### Lime Supply and Demand: central Chile (tonnes per day)

	2001 (actual)	2002 (estimated)	2003 (projected)	2004 (projected)	2005 (projected)	2006 (projected)	2007 (projected)	2008 (projected)
<b>Production</b>								
Los Lirios	220	220	220	220	220	220	220	220
Melipilla	350	350	350	350	350	350	350	350
Total	570	570	570	570	570	570	570	570
<b>Consumption</b>								
Pelambres	115	136	136	136	180	180	180	180
El Teniente	250	250	250	360	510	510	510	510
Soldado	10	10	10	10	10	-	-	-
Andina	110	110	110	110	110	220	220	220
Los Bronces	170	170	238	238	238	238	238	238
Las Tortolas	42	42	84	84	84	84	84	84
Pachon	-	-	-	-	-	150	150	150
Tambo	25	-	-	-	-	-	-	-
Total	722	718	828	938	1,132	1,382	1,382	1,382
<b>Shortfall without SAGC</b>	(152)	(148)	(258)	(368)	(562)	(812)	(812)	(812)
Imports as a percentage of demand	21%	21%	31%	39%	50%	59%	59%	59%
<b>South American Gold and Copper</b>								
Cal Norte	-	-	-	-	89	179	179	179
Catedral	-	-	-	-	-	60	601	601
Total	-	-	-	-	89	239	780	780
<b>Shortfall with SAGC</b>	(152)	(148)	(258)	(368)	(473)	(573)	(32)	(32)

Source: Proteus Capital and SAGC estimates

## Imports

Chile imports lime, primarily from Argentina and Colombia. Colombian lime is almost exclusively restricted to the far north of Chile, while Argentina transports lime across the Andes to the central region.

There are three Argentinean lime plants that are relevant to the Chilean market: Volcán, Tea, and Pacífico. Volcán and Tea are located north of San Juan, Argentina and approximately 650 road miles to Los Pelambres in Chile. Volcán is family owned with capacity of 120,000 tonnes a year. Tea is larger, with capacity of 230,000 tonnes, supplying a part of Los Bronces in Chile and the domestic Argentinean industry as well as La Alumbrera copper mine located about 400 miles north of the Tea plant in Argentina. Pacífico, located further north near San Juan de Jachal, Argentina (due east of La Serena, Chile), is controlled by Soprocal. The bulk of its 180 tonne per day capacity is exported to Andina.

Compared with SAGC's projects, these plants face additional transport costs of \$30 to \$40 per tonne to deliver to the major gold and copper mines in Chile. In addition, transportation across the Andes is unreliable, especially in winter.

### **Price**

The lime price is quoted basis 100% CaO – the actual price is then adjusted to reflect the purity. Dedicated facilities do not post prices and a lot of independent production is sold under long-term contracts, the terms of which are often confidential. As with any industrial mineral, there can be a large spread between published prices (which tend to change very infrequently) and actual transaction prices.

Typical pricing is currently about \$110 per tonne delivered to the customer – compared with \$120 to \$140 per tonne in 2001 and published prices of \$150 per tonne FOB the producer's plant. The price softening reflects imports of Colombian and Argentinean material.

In view of the projected supply deficit, we believe it is likely that prices will at least return to 2001 levels. However, our Base Case and the Company's feasibility studies assume continuation of the current \$110 per tonne price structure.

### **CAL NORTE**

Minera Cal Norte SA, which owns the Hornito and Ceci Tres limestone mines in the Quelón valley, is currently 60% directly owned by SAGC – the remaining 40% is owned by related parties and will be acquired by SAGC on favorable terms, including a deferred payment basis. The mines are located approximately 200 miles north of Santiago in the moderate terrain of the Chilean coastal range, at an elevation of approximately 2,400 feet, about thirty miles inland from the coastline. The area is semi-arid with sparse desert vegetation.

The proposed plant site location and mines are accessed by four miles of dirt road from Los Pozos, which is 27 miles from the Central Highway, and about 17 miles from Auco, where a paved highway south to Illapel provides good access to Los Pelambres and other mining operations in the area. Los Pozos is on the Chilean power grid.

The Quelón district is an established limestone producer – the initial focus was ornamental limestone. In the early 1990s, production expanded to support the growing demand for cement, primarily from the Hornito and Ceci Tres mines. The predecessor company to Cal Norte suspended operations in 1999 in order to expand production and focus on the higher value metallurgical markets.

Quelón is near the center of the Arquero sequence, a five-mile long sequence of lower Cretaceous volcanics with interbedded marine sediments. At Hornito, the sedimentary beds strike northwest, have been uplifted to dip steeply to the west, with limestone horizons interbedded in calcareous sand and silt stones. The mantos range in thickness from about seven to nearly fifty feet. Minor post-mineral faulting offsets the mantos.

The Manto Principal at Hornito has demonstrated continuity over 1,100 feet, averaging about 23 feet wide. Several other mantos have been discovered at surface. The high grade core of the deposit, typically +/- 90% CaCO<sub>3</sub>, is generally finely crystalline, comprised of dense milk white stone with occasional porosity and some limonite veinlets.

### Reserves and Mining

Mining plans are determined by the capacity of the kiln to be constructed – it is important that the kiln operates on a continuous basis. Thus, mine capacity and scheduling are “oversized” to ensure that there are no interruptions to the supply to the kiln.

#### Reserves and Resources at Cal Norte

	Measured	Indicated	Total (million tonnes)	Inferred	Grand Total	Grade (% CaCO <sub>3</sub> )
<b>Cal Norte</b>						
<b>Hornito</b>						
Manto Principal	1,045,787	320,259	1,366,046	302,259	1,668,305	90.4%
Manto 'D'			-	386,000	386,000	
Manto 'B'			-	120,000	120,000	
Total	1,045,787	320,259	1,366,046	808,259	2,174,305	
<b>Ceci Tres</b>	365,000	589,000	954,000	530,000	1,484,000	87.9%
<b>Others</b>			-	996,000	996,000	
Total/average	1,410,787	909,259	2,320,046	2,334,259	4,654,305	89.4%

Source: SAGC estimates

Production is planned to start at the Manto Principal at the underground Hornito Mine. During previous operations, the mine produced approximately 250 tonnes per day – in order to supply the planned kiln, production will be expanded to approximately 460 tonnes per day. The mining schedule calls for a six-day week, 300-day year.

Mine access will be from a new portal at the 707-level (2,320 feet above sea level) to a decline to the 687-level. From there a ramp in the footwall will decline at minus 12° along the strike length of the manto (1,150 feet) to a switchback, then ramping back down to the other end of the orebody. The reserves extend to the 474-level, which is 1,550 feet above sea level and about 470 feet vertically below the top of the new workings.

Mining will be open stoping. Although the reserves were calculated assuming 65% recovery, SAGC expects to recover at least 85% of the rock with mining costs of approximately \$6.60 per tonne.

### Lime Processing

Run of mine limestone will be crushed to minus two inches. Of the 138,000 metric tonnes mined each year, approximately 30,000 tonnes will end-up as fines (less than ¼-inch), which will be sold, and about 2,700 tonnes will be dust. The remaining 105,000 tonnes will feed the kiln at 300 metric tonnes per day, sufficient to produce 180 tonnes of lime per day, based on an operating schedule of 350 days per year.

### Lime Kiln

Cal Norte plans to install a new pre-heater rotary shaft coal-fired kiln with the capacity to produce 180 metric tonnes of CaO per day – which will require approximately 300 metric tonnes of limestone feed per day.



The limestone will be preheated using exhaust gases. This material will pass directly to a rotary kiln, 9 feet in diameter and 130 feet long, driven by a 35 horsepower electric motor. Fuel and air will be injected at the discharge end of the kiln and flow countercurrent to the limestone.

Lime and carbon dioxide are released once limestone is heated to 810°C (1,500° Fahrenheit). Since CaO is a good thermal insulator, the surface temperature needs to be higher in order to achieve this temperature in the core of pieces of crushed limestone. However, at approximately 1,150°C the CaO begins to “burn,” recombining with CO<sub>2</sub>. Hence, controlling the temperature to between 900°C and 1,100°C (1,650 to 2,000° Fahrenheit) is critical to quality control.

Primary power to the kiln will be coal, trucked 155 miles from the port of Ventanas. Emergency power to operate the kiln will be provided by an existing 185kW diesel generator. The reaction is exothermic, contributing some of the energy required to support the process. The mine will also be supported by power from the electrical grid.

### **Lime Marketing**

Cal Norte is focused on lime consumers north of Santiago. The primary targets include Pelambres, Los Bronces, Andina, and Pachon. Pascua could also become a customer, in view of the likely demand for lime, despite the fact that it is closer to the Inacesa plant at Copaipó.

### **Development and Financing**

The development schedule is approximately twelve months from completion of financing. The only significant time component is ordering, constructing and commissioning the kiln. Mine development required to meet the needs of the kiln should be straightforward and within the timeframe imposed by the kiln.

SAGC is in advanced discussions with a US-based multilateral agency for senior project financing. If these discussions are successful, we believe that project financing may cover a substantial part of the costs of completing the project.

The total capital cost is projected at \$11.0 million, including project-financing costs, working capital and Chilean IVA value added tax that will be recouped from sales. Of that total, approximately \$1 million is for mining equipment and mine development and the balance is for constructing, installing and commissioning the kiln.

We have assumed that project financing covers \$8.5 million, based on the formula used by the multilateral agency that includes sunk capital. In addition, we have assumed that the company receives a domestic loan for IVA that is repaid as the tax is recouped.

On our base case, assuming a lime price of \$110 per tonne and production of 78% CaO, the after tax rate of return to equity is nearly 29%.

**Operating & Financial Projections: Cal Norte**  
(figures in metric tonnes and US dollars)

	Period:	2004	2005	2006	2007	2008	2009	2010	Total
Mine Operation									
Limestone mined	t		69,375	138,750	138,750	138,750	138,750	138,750	1,988,000
Lime Plant Operations									
Limestone delivered	t		69,375	138,750	138,750	138,750	138,750	138,750	1,988,000
Fines screened	22% t		15,263	30,525	30,525	30,525	30,525	30,525	437,360
Dust lost	2% t		1,388	2,775	2,775	2,775	2,775	2,775	39,760
Kiln feed	t		52,725	105,450	105,450	105,450	105,450	105,450	1,510,880
Carbon dioxide	40.6% t		21,406	42,813	42,813	42,813	42,813	42,813	613,417
Lime production	t		31,319	62,637	62,637	62,637	62,637	62,637	897,463
Average grade	%		78%	78%	78%	78%	78%	78%	78%
Lime price (100% CaO)	\$/t		110.00	110.00	110.00	110.00	110.00	110.00	110.0
Price for Cal Norte limestone	\$/t		85.80	85.80	85.80	85.80	85.80	85.80	85.80
Gross revenue	\$		2,687,140	5,374,280	5,374,280	5,374,280	5,374,280	5,374,280	77,002,301
Limestone fines price	\$/t		18.00	18.00	18.00	18.00	18.00	18.00	18.00
Gross revenue	\$		274,725	549,450	549,450	549,450	549,450	549,450	7,872,480
<b>INCOME STATEMENT</b>									
Revenue	\$	-	2,961,865	5,923,730	5,923,730	5,923,730	5,923,730	5,923,730	84,874,781
Operating costs									
Mining	\$		482,850	849,150	772,838	772,838	772,838	772,838	11,245,904
Processing	\$		855,250	1,482,414	1,578,661	1,732,662	1,732,662	1,732,662	24,505,679
Transportation	\$		471,144	942,288	942,288	942,288	942,288	942,288	13,501,041
General & administrative	\$		240,000	240,000	240,000	240,000	240,000	240,000	3,600,000
Royalty	\$		-	-	-	125,275	125,275	125,275	1,481,739
Total	\$	-	2,049,244	3,513,852	3,533,787	3,813,062	3,813,062	3,813,062	54,334,362
EBITDA	\$	-	912,621	2,409,878	2,389,944	2,110,668	2,110,668	2,110,668	30,540,419
Depreciation	\$		-	730,930	1,461,860	1,461,860	1,461,860	1,461,860	14,618,600
EBIT	\$	-	912,621	1,678,948	928,084	648,808	648,808	648,808	15,921,819
Interest	\$	373,948	692,068	573,120	467,500	382,500	297,500	212,500	3,169,135
Income before taxation	\$	(373,948)	220,553	1,105,828	460,584	266,308	351,308	436,308	12,752,684
Taxation	\$	-	37,494	187,991	78,299	45,272	59,722	74,172	2,231,527
Net income	\$	(373,948)	183,059	917,838	382,285	221,036	291,586	362,136	10,521,156
Net cash flow	\$	(373,948)	183,059	1,648,768	1,844,145	1,682,896	1,753,446	1,823,996	25,139,756
Capital expenditure	\$	8,680,000	778,600	186,600	133,000	158,100	218,500	196,200	10,649,000
IVA	\$	1,357,920	(533,136)	(824,784)	-	-	-	-	-
Total	\$	10,037,920	245,464	(638,184)	133,000	158,100	218,500	196,200	10,649,000
Free cash before financing	\$	(10,037,920)	629,663	2,860,071	2,178,645	1,907,296	1,832,446	1,840,296	17,659,892
Free cash to equity	\$	(553,948)	(1,658,041)	399,668	648,645	462,296	472,446	565,296	14,490,756

Source: Proteus Capital and SAGC Estimates

**CATEDRAL**

Compañía Minera Catedral, which owns the Catedral project, is currently 50.1% directly owned by SAGC – the remaining 49.9% is owned by related parties and will be acquired by SAGC on favorable terms including a deferred payment basis. Compañía Minera Catedral owns large high grade limestone properties that are located in the upper Maipo valley, approximately 60 miles southeast of Santiago. Catedral comprises two separate deposits: Rino and Mona Sur.

Access to Catedral is from Vizcachas, south of Santiago, to San Gabriel by paved highway, and then approximately five miles of public gravel highway to Rio Volcán. From there, SAGC will upgrade the public gravel road to Rio Claro, a distance of about ten miles. The final 16 miles to the plant site will involve upgrading the private road, to which Minera Catedral holds a right of way, which services the Gas Andes gas pipeline from Argentina.

The Cathedral limestone deposit is near the southern end of a 130-mile long, north-south trending belt of limestone in the Lo Valdez Formation that approximately follows the border between Argentina and Chile.

The Lo Valdez Formation is a sedimentary calcareous formation laid down in shallow seas during the late Jurassic and early Cretaceous period. As the Andes were uplifted, Lo Valdez became steeply dipping, and most of the formation has been eroded. Remnants comprise steep dipping beds that outcrop in the rugged terrain east of Santiago. Access to this area is limited, further restricting development.

SAGC initially identified Cathedral as a potential supplier of cement grade limestone, which is typically 75% to 80% CaCO<sub>3</sub>. However, during its review of the project, SAGC discovered high grade beds that are suitable for producing metallurgical grade lime. In addition, construction of the Gas Andes natural gas pipeline, which tracks the road SAGC built to access the area, provides a supply of energy to power a lime kiln.

The initial discovery was at Rino, where SAGC has established an *in situ* indicated and inferred resource of 49 million tonnes averaging 89.3% CaCO<sub>3</sub>, of which 55% is believed to be mineable. However, subsequently SAGC discovered a second deposit – Mona Sur – which is located to the south of Rino containing an estimated 37 million tonnes resource potential grading 91.4% CaCO<sub>3</sub>, of which 65% is considered mineable. Mona Sur comprises a series of beds within a massive outcrop that extends into the mountain.

### Reserves and Mining

The overall dimensions of Mona Sur are well understood and the grade of individual beds is typically consistent. However, SAGC will have to conduct a definition drill program comprising five large diameter core holes to establish reserves.

### Reserves and Resources at Cathedral

	Measured	Indicated	Total (million tonnes)	Inferred	Grand Total	Grade (% CaCO <sub>3</sub> )
<b>Catedral</b>						
<b>Mona Sur</b>						
Bed 1					7,371,000	93.0%
Bed 2					3,159,000	91.4%
Bed 3					6,712,875	93.0%
Bed 4					5,011,875	90.8%
Bed 5					6,693,750	89.3%
Bed 7					3,422,250	90.4%
Bed 8					4,320,000	90.8%
Total/average					36,690,750	91.4%
<b>Rino</b>						
Bed D		17,456,647	17,456,647	6,472,796	23,929,443	90.6%
Bed B		19,530,388	19,530,388	5,937,452	25,467,840	88.1%
Total/average		36,987,035	36,987,035	12,410,248	49,397,283	89.3%
Catedral Total		36,987,035	36,987,035	12,410,248	86,088,033	90.2%

Source: SAGC estimates

Mining will be underground, using open stoping. The limestone beds at Mona Sur dip steeply (75°) which should facilitate better than 65% ultimate recovery. The mine will be accessed at the 2700-level (8,850-foot elevation) with mining between this level and the top of the limestone, approximately 1,000 feet above.

In order to supply sufficient limestone to support 210,000 metric tonnes of lime production from the kiln each year, the mine will need to produce approximately 472,500 metric tonnes of limestone a year, or 1,575 tonnes per day based on a 300-day mining year.

### **Lime Processing**

The kiln selected by SAGC operates optimally with limestone crushed to the 2-inch to 4-inch range. Finer material will probably be sold to a cement plant. The planned mining rate is expected to deliver approximately 355,000 tonnes of crushed limestone to the kiln.

### **Lime Kiln**

SAGC has selected a natural gas-fired dual vertical shaft kiln designed by Maerz, a leader in the design of vertical shaft lime kilns. The kiln will comprise two, identical vertical shafts, 150 feet tall and 14 feet in diameter. The limestone will fall through the vertical shafts, passing through an initial preheating zone to the burning zone, and then to a cooling process. The shaft cycles will alternate so that the exhaust gases from the burning cycle in one shaft will be used in the preheating phase of the other shaft – the total cycle will be approximately 12 minutes.

The kiln will be gas powered, with diesel backup in the event of interruptions to the gas supply.

### **Development Plans**

As compared with Cal Norte, Catedral will require significantly greater investment in infrastructure. However, the location of the plant site close to the Gas Andes pipeline will facilitate low-cost energy supply. Water, which is often a problem in Chile, will be produced from a water well that has been successfully drilled on the property by SAGC

### **Lime Marketing**

Marketing of Catedral lime will be focused on metallurgical plants and mines near Santiago, including El Teniente, Los Bronces, Las Tortolas, and Andina. While El Teniente is the closest on the map, lime may have to be trucked to San Bernardo in the southern suburbs of Santiago, and then back south on Route 5 to Rancagua and then to Colón – a distance of nearly 140 miles – unless more direct routes are upgraded. The shortest trucking distances will be to Los Bronces (100 miles) and Las Tortolas (107 miles). Andina is about 170 miles by road – slightly less than the 215 miles from Cal Norte to Andina.

The Company also plans to sell crushed limestone to CODELCO's Los Lirios lime plant, south of Santiago, which currently obtains limestone from Le Perla mine 112 miles from the Los Lirios plant. Cement-grade material may be sold to cement plants and other industrial users in the Santiago Metro area.

### Financing

The total capital expenditure for Catedral is budgeted at \$31 million, excluding working capital and Chilean IVA value added tax that will be recouped from sales. Of that total, approximately \$5 million is for mobile equipment and mine development, \$7 million is road construction and improvement, and the balance of \$19 million is for constructing, installing and commissioning the kiln.

In our financial model, we have assumed that project financing covers approximately \$22 million in a ten-year, 8% loan. In addition, we have assumed that the company receives a loan for IVA that is repaid as the tax is recouped. Our analysis assumes 100% ownership by SAGC.

On our base case, assuming a lime price of \$110 per tonne and production of 78% CaO, the after tax rate of return to equity is in excess of 26%.

### Operating & Financial Projections: Catedral

(figures in metric tonnes and US dollars)

	Period:	2004	2005	2006	2007	2008	2009	2010	Total
Mine Operation									
Limestone mined	<i>t</i>	-	47,250	472,500	472,500	472,500	472,500	472,500	11,859,750
Lime Plant Operations									
Limestone delivered	<i>t</i>	-	47,250	472,500	472,500	472,500	472,500	472,500	11,859,750
Fines screened	23% <i>t</i>	-	10,868	108,675	108,675	108,675	108,675	108,675	2,727,743
Dust lost	2% <i>t</i>	-	945	9,450	9,450	9,450	9,450	9,450	237,195
Kiln feed	<i>t</i>	-	35,438	354,375	354,375	354,375	354,375	354,375	8,894,813
Carbon dioxide	40.6% <i>t</i>	-	14,388	143,876	143,876	143,876	143,876	143,876	3,611,294
Lime production	<i>t</i>	-	21,050	210,499	210,499	210,499	210,499	210,499	5,283,519
Average grade	%		78%	78%	78%	78%	78%	78%	78%
Lime price (100% CaO)	<i>\$/t</i>		110.00	110.00	110.00	110.00	110.00	110.00	110.0
Price for Catedral limestone	<i>\$/t</i>		85.80	85.80	85.80	85.80	85.80	85.80	85.80
Gross revenue	<i>\$</i>		-	1,806,079	18,060,793	18,060,793	18,060,793	18,060,793	453,325,898
Limestone fines price	<i>\$/t</i>		21.00	21.00	21.00	21.00	21.00	21.00	21.00
Gross revenue	<i>\$</i>		-	228,218	2,282,175	2,282,175	2,282,175	2,282,175	57,282,593
INCOME STATEMENT									
Revenue	<i>\$</i>	-	-	2,034,297	20,342,968	20,342,968	20,342,968	20,342,968	510,608,491
Operating costs									
Mining	<i>\$</i>		-	283,500	2,835,000	2,835,000	2,835,000	2,835,000	71,158,500
Processing	<i>\$</i>		-	375,319	3,753,193	3,753,193	3,753,193	3,753,193	94,205,137
Transportation	<i>\$</i>		-	555,336	5,553,363	5,553,363	5,553,363	5,553,363	139,389,421
General & administrative	<i>\$</i>		-	14,400	144,000	144,000	144,000	144,000	3,614,400
Royalty	<i>\$</i>		-	-	-	-	-	-	-
Total	<i>\$</i>		-	1,228,556	12,285,556	12,285,556	12,285,556	12,285,556	308,367,458
EBITDA									
Depreciation	<i>\$</i>		-	-	-	-	3,914,200	3,914,200	39,142,000
EBIT	<i>\$</i>	-	-	805,741	8,057,412	8,057,412	4,143,212	4,143,212	163,099,033
Interest	<i>\$</i>	-	613,553	1,597,826	1,788,539	1,511,978	1,326,960	1,150,032	11,173,592
Income before taxation	<i>\$</i>	-	(613,553)	(792,085)	6,268,873	6,545,434	2,816,252	2,993,180	151,925,440
Taxation	17% <i>\$</i>	-	-	-	1,065,708	1,112,724	478,763	508,841	26,066,283
Net income	<i>\$</i>	-	(613,553)	(792,085)	5,203,164	5,432,710	2,337,489	2,484,339	125,859,157
Net cash flow	<i>\$</i>	-	(613,553)	(792,085)	5,203,164	5,432,710	6,251,689	6,398,539	165,001,157
Capital expenditure	<i>\$</i>	-	15,790,167	15,141,833	1,200,000	1,850,000	400,000	400,000	43,182,000
IVA	<i>\$</i>	-	2,366,130	1,619,197	(3,661,734)	(323,592)	-	-	-
Total	<i>\$</i>	-	18,156,297	16,761,030	(2,461,734)	1,526,408	400,000	400,000	43,182,000
Free cash before financing	<i>\$</i>	-	(18,156,297)	(15,955,289)	9,453,438	5,418,280	7,178,649	7,148,571	132,992,749
Free cash after financing	<i>\$</i>	-	(2,543,720)	(7,677,919)	1,791,564	1,371,110	3,640,089	3,786,939	121,819,157

Source: Proteus Capital and SAGC estimates

**FINANCIAL ANALYSIS**

**Financial Projections – Cal Norte and Catedral Combined**

(figures in metric tonnes and US dollars)

	Period:	2004	2005	2006	2007	2008	2009	2010	Total
Lime Production	<i>t</i>	-	31,319	83,687	273,136	273,136	273,136	273,136	6,180,981
<b>INCOME STATEMENT</b>									
Revenue		-	2,961,865	7,958,027	26,266,698	26,266,698	26,266,698	26,266,698	595,483,272
<b>Operating costs</b>									
Mining		-	482,850	1,132,650	3,607,838	3,607,838	3,607,838	3,607,838	82,404,404
Processing		-	855,250	1,857,733	5,331,853	5,485,854	5,485,854	5,485,854	118,710,816
Transportation		-	471,144	1,497,625	6,495,652	6,495,652	6,495,652	6,495,652	152,890,461
General & administrative		-	240,000	254,400	384,000	384,000	384,000	384,000	7,214,400
Royalty		-	-	-	-	125,275	125,275	125,275	1,481,739
Total			2,049,244	4,742,408	15,819,343	16,098,618	16,098,618	16,098,618	362,701,820
EBITDA			912,621	3,215,619	10,447,355	10,168,080	10,168,080	10,168,080	232,781,452
Depreciation			-	730,930	1,461,860	1,461,860	5,376,060	5,376,060	53,760,600
EBIT		-	912,621	2,484,689	8,985,495	8,706,220	4,792,020	4,792,020	179,020,852
Interest		373,948	1,305,621	2,170,946	2,256,039	1,894,478	1,624,460	1,362,532	14,342,728
Income before taxation		(373,948)	(393,000)	313,743	6,729,456	6,811,742	3,167,560	3,429,488	164,678,124
Taxation	17%	-	37,494	187,991	1,144,008	1,157,996	538,485	583,013	28,297,811
Net income		(373,948)	(430,494)	125,752	5,585,449	5,653,746	2,629,075	2,846,475	136,380,313
Net cash flow		(373,948)	(430,494)	856,682	7,047,309	7,115,606	8,005,135	8,222,535	190,140,913
Capital expenditure		8,680,000	16,568,767	15,328,433	1,333,000	2,008,100	618,500	596,200	53,831,000
IVA		1,357,920	1,832,994	794,412	(3,661,734)	(323,592)	-	-	-
Total		10,037,920	18,401,761	16,122,846	(2,328,734)	1,684,508	618,500	596,200	53,831,000
Free cash before financing		(10,037,920)	(17,526,634)	(13,095,217)	11,632,082	7,325,576	9,011,095	8,988,867	150,652,641
Free cash after financing		(553,948)	(4,201,761)	(7,278,251)	2,440,209	1,833,406	4,112,535	4,352,235	136,309,913

Source: Proteus Capital and SAGC estimates

On our base case assumptions, the total after tax project return to the Company from Cal Norte and Catedral is 15.7% – the rate of return on SAGC’s equity is 26.8%. Total capital expenditure on the two projects is approximately \$53.7 million.

**Sensitivity Analysis**

The table below sets out the sensitivity to the two key variables – lime price and grade. Note that on the lowest case – Case I – that assumes long-term pricing of \$110 per tonne and production of 78% CaO, the combined project rate of return is 11% and the after tax IRR to equity is approximately 15%. If the company is able to produce 80% CaO, the combined project return increases to 12.2% and the return to equity increases 300 basis points to 18%.

**Sensitivity Analysis**

	Input	I	II	Base Case	IV	V
Lime Price	<i>\$/t</i>	110	100	100	125	125
Contained CaO	%	78%	78%	80%	78%	80%
Combined project IRR	%	15.7%	11.0%	12.2%	21.9%	23.2%
Equity IRR	%	26.8%	14.9%	18.0%	45.1%	49.1%
Equity PV10 (today)	<i>C\$ millions</i>	43.650	27.337	31.553	68.017	73.220
	<i>C\$/share</i>	0.16	0.10	0.11	0.25	0.27
Equity PV10 (in five years)	<i>C\$ millions</i>	82.763	60.212	66.037	116.450	123.646
	<i>C\$/share</i>	0.30	0.22	0.24	0.42	0.45

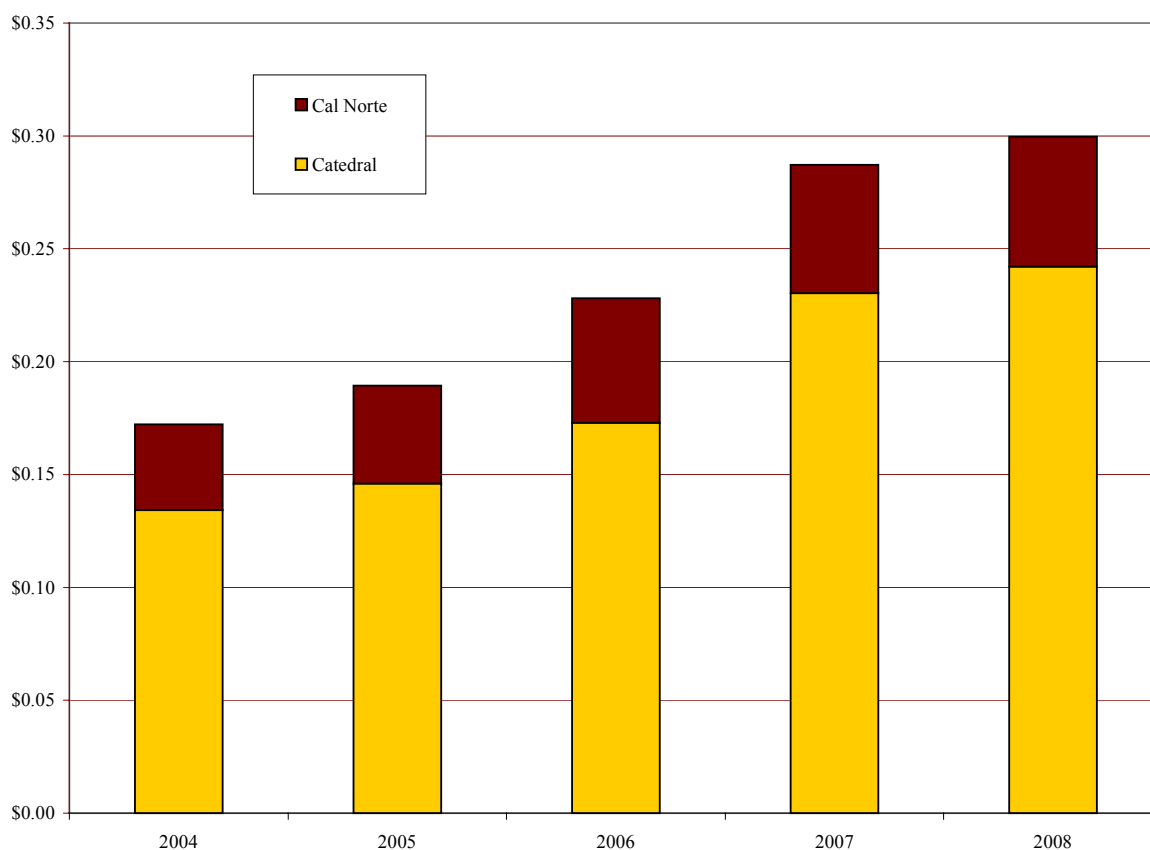
Source: Proteus Capital estimates

If lime prices return to recent past levels, the project economics become extremely robust. Assuming production of 78% CaO and a price of \$125 per tonne, Case IV shows a return to equity of 45%. In Case V, we have assumed production of 80% CaO, in which case the return to equity is nearly 50%.

**Valuation**

The chart below shows the PV<sub>10</sub> of the projected cash flow to the Company from two lime projects on a fully diluted per share basis. The values rise as the projects advance and project debt is paid back. These values compare with the current SAGC share price of C\$0.06 per share.

**PV<sub>10</sub> per share of SAGC**  
**Cal Norte and Catedral: Base Case**  
(C\$ per share)



Source: Proteus Capital estimates

**Valuation Summary: Base Case**

	Cal Norte		Catedral		SAGC Lime Division	
	Today	5 years	Today	5 years	Today	5 years
Project IRR	15.7%		15.6%		15.7%	
IRR to equity	28.7%		26.2%		26.8%	
PV of equity at 10.0%						
C\$	9,870,000	15,882,000	33,780,000	66,881,000	43,650,000	82,763,000
C\$/share	0.04	0.06	0.12	0.24	0.16	0.30

Source: Proteus Capital estimates

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