GEOLOGICAL REPORT

BRIDGETOWN DOLOMITE MINE

MARCH 2008

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1. PURPOSE OF THIS REPORT

This report collates the geological data which has been ascertained at Bridgetown over the years since prospecting and mining commenced.

The reserves at August 2007 are calculated and threats and risks are discussed where applicable.

2. HISTORY

In 1990 Lime Sales Ltd commenced mining to produce dolomitic agricultural lime on portion 8 of the farm Vledermuisdrift 398 situated on the western bank of the Berg River approximately 20km east of Moorreesburg. The attached plan shows the layout at the Bridgetown operations.

Subsequently in 1995/96 Lime Sales (Ltd) in association with Iscor successfully tendered to supply the Saldanha Steel smelter with metallurgical grade dolomite as a flux in the smelting process. The new contract called for the supply of 228 000 tons per year. This constituted a substantial increase in production from the original Ag-lime. Therefore a larger souce of dolomite was required to supply the Saldanha Steel smelter.

A drilling project was commenced to prospect and prove reserves of metallurgical dolomite on both Vledermuisdrift and the neighbouring farm Vogelstruisdrif 335. A 17.6ha site on Vogelstruisdrif was selected as the most promising, and a quarry was commenced in 1997/98 together with an adjacent crushing, screening and washing plant.
Production commenced in 1999 and has proceeded successfully to date.

3. REGIONAL GEOLOGY

The Bridgetown dolomite deposit occurs in the Bridgetown Formation of the Malmesbury Group of rocks.

The Bridgetown Formation consists of 3 members viz:

- A basal member comprising a dolomite unit with intercalated green schists
- An overlying unit of metamorphosed tuffs, lava flows and green schists
- An uppermost unit consisting of fine grained chert.

Four phases of deformation have affected the Bridgetown Farmation causing folding, joints and fractures.

The age of the Malmesbury Group is not well constrained but probably lies within the age range 718 Ma to 630 Ma.

3.1 SITE GEOLOGY

The detailed geology of the site has been carried out by phased exploration drilling programmes comprising diamond drilling, reverse circulation drilling and blast-hole rigs as well as geological mapping and geochemical analyses.

The drilling programmes defined two ore blocks, a northern ore body on Vogelstruisdrif along the western bank of the Berg River and a southern ore body on Vledermuisdrif adjacent to the original Ag-lime quarry.

On the properties the dolomite outcrops intermittently along strike and in one diamond drill hole in the southern ore body dolomite was proved to plus 80m below land surface. The mineable ore zone is up to 200m wide and in general the bodies dip steeply towards the east and the regional strike is aligned NNW-SSE.

The dolomite has been intruded by greenstone dykes, sills and veins. This is particularly evident in the southern ore block. The footwall rocks to the west of the body is phyllite. The palaeo-surface or sub-outcrop is "karst-type" with scattered erosion channels and solution cavities. The dolomite is generally brecciated, strongly jointed and soft weathered zones with relapsed structures occur at random.

In the top 20m of the deposit, zones of hard competent dolomite alternate with softer sheared brecciated and weathered lenses of dolomite which contain clay and silt derived from the overlying overburden.

The water table to the west of the ore body lies at 28m a.m.s.l. and to the east of the body at 26m a.m.s.l. Boreholes have intersected soft weathered zones of dolomite within the body where water was encountered. It is considered that the main limit to the mining depth of the quarry will be the ecomics of pumping and disposing of the ground water.

The northern ore body was the preferred site to commence mining due to the chemical grade, size of proved reserves and the limited presence of greenstone dykes.

The prospecting proved that the northern and southern ore bodies are essentially continuous, but are separated by a zone of silicious dolomite. The silica was probably caused by the invasion of silicious fluids derived from a large greenstone dyke on the eastern flank of the dolomite adjacent to the Berg River.

4. GEOLOGY OF THE NORTHERN ORE BODY

Only the northern ore body is being mined for dolomite for the Saldanha Steel contract, Ag- lime and aggregate products. The body is bounded on the western and southern sides by a greenstone dyke. To the north and east the mining lease property boundaries form the limit to mining.

The ore body is a homogeneous grade dolomite dipping steeply east with a strike length of 550m and an average mining width of 220m to 230m. The dolomite is covered by generally shallow overburden to a depth of 0,5 to 2 m in the centre and south, but deepening to 6m in the extreme east and 6m in the extreme north.

The palaeo-surface of the dolomite under the overburden is karst type and 4 major sink holes up to 18m deep, filled with clay, silt and boulders have been identified. The body is generally free of greenstone dykes, but minor greenstone veins and lenses do occur at random mainly in the central and southern parts. Similarly limestone (calcium carbonate) erratics have been encountered. The greenstone and limestone occurrences are not serious and have been successfully blended away with dolomite rock from adjacent faces. The greenstone dyke which forms the western and southern edges of the body dips steeply eastwards at 60° to 70°

but to the south, the dip of the dyke flattens with depth. The dyke thins northwards to ±5m and in the extreme south it dissipates into small veinlets.

The body is composed essentially of hard competent cream-kaki coloured dolomite with alternating lenses and zones of softer, sheared, brecciated and weathered dolomite. These "softer zones" generally contain clays and silt derived from the overlying overburden. The clay and silt is removed in the screening-washing beneficiation process, but does occasionally cause "spikes"in the silica and fines content of the processed product. The dolomite is strongly jointed and the joints are seldom preferentially orientated. This feature improves the stability of the quarry faces.

Prospect boreholes have proved that high grade dolomite continues to greater than 50m below land surface. (In the southern body high grade dolomite was proved to +80m below surface). Geophysical tests have indicated that the dolomite continues to at least 150m below land surface. The total resource is therefore large, but other constraining factors such as ground water and property boundaries limit the chances of mining to extreme depths.

A geological model has been formulated to determine the proved ore reserve to the 7m elevation (ie 4 quarry benches). The mining geology of the model is detailed in the accompanying plan and cross – sections.

5. GEOLOGY OF THE SOUTHERN OREBODY

The Southern Dolomite Orebody at Bridgetown can be described as all the potential resource area south of the Bridgetown processing plant.

This area contains the original Agg. Lime Quarry which was started in 1988 and stopped producing in 1998. During this period approximately 720 000 tons of dolomite was mined from this quarry. On the western side of the quarry dolomite was intersected in a borehole to a depth of 80m below surface.

The southern deposit generally contains transgressing greenstone dykes and sills and silicious dolomite zones. This makes delineation of ore-blocks more problematical and therefore more intensive exploration drilling will be required before the deposit can be successfully mined. Prospecting indicates that a large elongated sink-hole forms the western edge of the southern deposit.

The geology and chemical characteristics of the northern and southern deposits are essentially similar, but at this stage the southern deposit can only be regarded as an indicated mineral resource due to the limited drill prospecting in this area.

6. GROUND WATER

A possible restriction to mining the dolomite to say the -40m elevation is the possibility of copious inflows of ground water.When the EMPR was originally drawn up in 1998 it was considered that the quarry may be mined to the –40m elevation with a total in situ dolomite resource in both the northern and southern ore bodies of 14,9 million tons. This senario has now been discarded until data regarding the permeability and hydraulic conductivity of the dolomite eventually becomes available.

The water table to the west of the quarry is 2m higher than to the east of the quarry. (viz, 28m above mean sea level and 26m above mean sea level respectively).

It is expected that the initial ground water flow rates into the quarry will gradually decrease over time due to prolonged pumping thereby effectively reducing the hydraulic gradient and the natural water storage of the surrounding dolomite. Therefore, the mining model which evaluates the proved reserves has been designed to incorporate only four benches, each 9m high down to the +7m level.

6.1 Ground Water Monitoring

Two water monitoring boreholes were installed on the land surface to the west and east of the northern quarry in 2006 and are monitored at 4 monthly intervals. Since the boreholes were installed the water table in both boreholes have remained reasonably steady at 10,67m and 11,09m below the land surface at the western and eastern boreholes respectively.

Since January 2005 the volumes of water utilized at the operations and water pumped from the quarry has been recorded daily in the following categories:-

- (i) water extracted from the Berg River for the processing plant
- (ii) water pumped from the quarry sump
- (iii) quarry water released to the "side stream"
- (iv) quarry water used for dust suppression on roads

The following table 1 sets out the results.

TABLE 1

Periods	Pumped from Berg River in (kl.)	Pumped from Quarry Sump (kl.)	Discharged to Side Stream (kl.)	Quarry water used on roads (kl.)
Jan 2005 to Dec 2005 Daily average	36 930 94	67 991 186	60 896 167	7 231 20
Jan 2006 to Dec 2006 Daily average	31 533 86	65 202 179	57 939 159	7 534 21
Jan 2007 to Dec 2007 Daily average	34 516 93	79 936 215	72 779 196	7 161 21
Jan 2005 to Dec 2007 Daily average	102 979 91	213 129 193	191 614 174	21 926 21
Jan 2008 to Feb 2008 Daily average	5 499 89	7 684 124	6 346 103	1 337 22

The above results show a very steady extraction rate from the Berg River of around 91 Kl. Per day. This extraction rate is directly related to the production rate of processed metallurgical grade dolomite of ± 160 000 t.p.a.

The volume of ground water pumped from the quarry to the side stream over the 3 year period is also reasonably uniform at 167 kl per day. The higher 2007 figure is due to the higher rainfall and run-off for that year and the expanding quarry area.

To date there does not seen to have any "draw-down" of the surrounding water table, situated at the ± 31,5m elevation, whereas the deepest point in the quarry is at the 16m elevation. If the water table adjacent to the quarry side-walls does not reduce over the next few years we may have to consider drilling drainage boreholes in the quarry side-walls as they reach their final positions so as to release the water pressure to prevent future side-wall problems as the quarry deepens.

6.2 Water Chemistry

Water samples from the Berg River, quarry sump and the 2 monitoring boreholes are taken at 4 monthly intervals and analysed by the SCIR in Stellenbosch to determine the water chemistry and whether the discharged quarry water pollutes the Berg River.
The results of the chemical analysis are discussed below;

a) The discharged quarry water does not reach the Berg River in the dry periods of the year. The water evaporates and sinks into the bed and floor of the side stream. When the side stream flows after heavy rains the quarry water does reach the Berg River. However, the quality of the water in the side stream is much worse than the quarry water, in fact the quarry water dilutes and improves the quality of the side stream's water. There is to date no evidence that the quarry water pollutes the Berg River.
b) The chloride content of the quarry sump water varies between 1000 and 2000 mg/l depending on dilution by rain (the conductivity is 588m S/m).
c) The chloride content of the western monitoring borehole is ±1400 mg/l and the eastern borehole is 227 mg/l. The reason for this is because the western borehole is partly located in phyllite rock whereas the eastern borehole is entirely situated in dolomite. Similarly the borehole's conductivity are 550 and 149 m S/m repectively.
d) Regarding the Berg River, samples are taken up-stream and down-stream of the side stream. No pollution due to the side stream has been established. The quality of the Berg River has been consistent since sampling the river commenced in 2004.
e) The phyllite rock mass lying to the west of the quarry is clearly the source of the brak-water seeping into the quarry. This is unlikely to change through the life of the quarry.
f) Ground water in intact dolomite has a satisfactory quality.

7. PROSPECTING

7.1 Review of Prospecting Procedures

Prospecting the Northern Quarry area commenced in the mid 1990's using a blast hole drilling rig. The boreholes were drilled on or close to outcropping dolomite in lines across strike or on a grid pattern. In addition, three diamond drill boreholes inclined at 45° were drilled to depths of around 50m below surface.

Because of the limitations of the blast hole rig many boreholes could not be drilled to their designed depths, some contamination of the borehole samples occurred and extraction of useful information from many of the logging sheets was problematic. Nevertheless, sufficient data was available to design and establish the mine in the northern ore body in 1998.

As the quarry expanded and deepened further prospecting became necessary and further prospecting programmes were carried out from 2001 to 2006 to prove reserves and ascertain the grade and geology to greater depths both inside and outside the quarrying area. Both reverse circulation and "in-fill drilling" using a quarry blast hole rig were used. To date 57 reverse circulation boreholes have been drilled.

A reverse circulation prospecting method was notably successful in extracting uncontaminated and reliable samples of dolomite. Blast hole drill rigs, with "top hammers" can only be used for checking information but do not yield worthwhile samples, nor can they drill through broken and brecciated rock, nor wet shaly clays. Deep clays in excess of 8m normally defeats this type of drill rig.

All the boreholes were logged and sampled as they were drilled and the samples analysed by PPC's De Hoek laboratory.

In April 2006 two water boreholes were drilled, one on either side of the quarry and equipped for drawing water samples and measuring the depth of the water table. All the boreholes drilled up to 2005 have been reported on in previous reports. The latest 2006 series of boreholes are reported on below:-

7.2 February 2006 (Blast-hole drill rig)

Boreholes were drilled by a quarry blast hole rig to the south-west of the mining area on open wheatlands to probe the underlying formation to ascertain that there was no underlying dolomite in an area where an overburden and waste screenings dump is planned. No dolomite was located.

7.3 April 2006 (Boreholes drilled in the Northern Orebody Quarry Area)

Boreholes RC48….to RC57 were drilled by the reverse circulation method to ascertain the chemical grades to the 7m level in localized areas where there was insufficient information and to establish two water boreholes on either side of the quarry which could be used for water quality sampling.

It is very unlikely that any further exploratory drilling will be necessary in future to ascertain geological data or chemical grades in the defined area of the Northern Quarry down to the planned 7m elevation which is present the designed final depth of the quarry.

Boreholes RC48 to RC57 re-confirmed all previous geological and chemical conclusions concerning the ore body.

8. RESOURCES AND RESERVES

8.1 Geological Model

A geological model for the northern ore body has been formulated and the resources have been calculated by using a planimeter to determine the cross-sectional areas on each cross-section. The model has 14 parallel cross sections and the sections are 50 metres apart.

The volumes of the rock types have been calculated using the "End Areas Method" which is a standard volumetric calculation method.

The resources of the northern ore body are reported as a proved ore reserve because the reserves have been estimated with a high level of confidence and includes diluting materials and allows for losses that may occur when the dolomite is mined. Further, the mine has been in continuous operation for 10 years and consideration has been given to mining, metallurgical, economic, marketing, legal, environmental, social and governmental factors.

The southern ore body is at present an indicated mineral resource because the location of boreholes at present too widely spaced to confirm geological and/or grade continuity but are spaced closely enough for continuity to be assumed.

BDM J/V have considered that a computer model of the deposit could be attempted so as to more reliably predict the grade of the dolomite ahead of the advancing faces.

However if we decided not to proceed with this project at present for the following reasons.

a) After crushing ± 40 % of the in situ fines (-13mm) has to be screened to waste and the product washed, thereby beneficiating the ore. Modelling this process accurately on a computer is problematic and unlikely to be successful.
b) A large number of prospecting boreholes have been drilled and assayed on the northern deposit thereby giving a high level of confidence in predicting the reserves in the "manual model".
c) More than half of the spatial floor area of the deposit has already been exposed by mining and the grade of the dolomite in the remaining floors can be confidently predicted.
d) All blast-holes are sampled and analysed ahead of bench blasts. This gives management an accurate and reliable forecast of what to expect from the advancing benches.
e) The cost of developing a computer model is expected to be R30 000,00 to R50 000,00. The computer model will be "nice to have" but is not necessary.

8.2 Reserves

8.2.1 Considerations

i. In the northern ore body prospect boreholes have proved that high grade dolomite continues to greater than 50m below surface and in the southern ore body high grade dolomite was proved to 80m below land surface.
ii. Geophysical testes have indicated that the dolomite in the area continues to at least 150m below land surface. The total resources are therefore large, but other constraining factors such as ground water, property boundaries and the chemistry of the dolomite limits the opportunities to mine the dolomite to extreme depths.
iii. The specific gravity of dolomite, weathered dolomite and waste rock used in the calculations is 2,6 tons per m^3 and for overburden 2,4 tons per m^3.

8.2.2 Proved Ore Reserves – Northern Ore Body

Prospect boreholes have proved that this body can be mined for metallurgical grade dolomite over a strike length of 550m and an average width of 220m. The planned depth of the quarry is 40m below land surface (ie 7m elevation) because of possible ground water constraints.

The "in situ" dolomite is crushed, screened at 13mm and washed to produce metallurgical grade dolomite for Saldanha Steel. In this beneficiation process up to 40% of the in situ rock is removed as "waste fines".

In August 2007, at the most recent quarry survey, the proved "in situ" ore reserves have been calculated and are tabled below in Table 2.

TABLE 2

Section No.	Overburden (m^2)	Dolomite (m^2)	Weathered Low Grade Dolomite (m^2)	Dyke (m^2)	Waste Rock (m^2)
-150	0	0	0	0	0
-100	0	308	0	0	0
-50	0	2150	48	0	0
0	100	1746	50	0	72
50	500	2964	462	0	0
100	38	4292	140	0	0
150	286	3180	0	0	0
200	38	2924	140	0	0
250	40	4018	12	0	0
300	275	3604	126	0	0
350	120	4564	90	50	0
400	710	5338	400	138	0
450	1106	7504	160	124	0
500	704	6726	0	82	36
550	704	3092	314	0	220
600	0	0	0	0	0
TOTALS m^2	4741	52410	1942	394	328
VOLUME m^3	237 050	2 620 500	97 100	19 700	16 400
TONS	568 920	6 813 300	252 460	51 220	42 640

NOTE

The true SG or density of dolomite is 2,65 to 2,7. By using a density of 2,6 for the ore reserve determination a small factor of safety has been built into the reserves.

8.2.3 Processed Dolomite Ore Reserve

i. Proved processed metallurgical dolomite reserve = (in situ dolomite) – (40% losses in production process)
= 6 813 300 – 40% of 6 813 300
= 6 813 300 – 2 725 320
= 4 087 980 tons

ii. Weathered Dolomite

Experience has shown that ±30% of the weathered dolomite can be utilized for metallurgical 30% of the weathered dolomite should be added to (i) above
30% of 252 460 tons = 75 738 tons.

The proved processed metallurgical grade dolomite reserve is therefore 4 163 700 tons.

8.2.4 Life of Northern Ore Body

Assuming Saldanha Steel purchase 160 000 tons of processed dolomite per year, the life of the body is:-

$$\frac{4\ 163\ 700 \text{ tons}}{160\ 000 \text{ tons per year}} = \underline{26.02 \text{ years at August 2007}}$$

8.2.5 Stripping Ratio (S.R.)

The stripping ratio is defined as total waste divided by total product.

$$\therefore \text{S/R: } \frac{568\ 900\ (\text{ob}) + 176\ 700\ (\text{w/dol}) + 51\ 200\ (\text{dyke}) + 42\ 600\ (\text{waste rock})}{4\ 163\ 700\ (\text{dol product})}$$

$$\therefore \text{S/R: } \frac{568900(\text{ob})+2725300(\text{w/screenings})+176700(\text{w/dol})+51200(\text{dyke})+42600(\text{w/r})}{4\ 163\ 700\ (\text{dol product})}$$

$$= \frac{3\ 564\ 700}{4\ 163\ 700}$$

$$= 0{,}86 \text{ to } 1$$

The stripping ratio has improved slightly from 0,91 in July 2004.

8.3 Reserves in Southern Ore Body

In the southern ore body 2 diamond drill holes, 12 reverse circulation holes and 21 blast drill rig boreholes have been drilled. These holes are insufficient to prove reserves but the boreholes have indicated dolomite resources in this area.

A dolomite resource of 3,8 million in situ tons of dolomite has been indicated.

It is expected that further prospecting in this body may increase these resources. The southern body contains more greenstone dykes and sills than the northern body and this causes evaluation of this body to be more complex. Further prospecting is recommended.

9. ASSESSMENT OF RISKS CONCERNIG THE DEPOSIT

Because the life of the deposit at present production rates is in excess of 26 years,it is considered appropriate that the following items should be discussed because they could have an influence on the steady operation of the quarry(s).

(i) Primary Client

As Saldanha Steel is the primary client of the operation, production corresponds with Saldanha Steel's requirements. Stoppages at Saldanha Steel for maintenance adversely effects the BDM operation, budgets and continuity.
Further, the present contract/tender system locked to PPI adversely affects the profitability of the operation.