Anonymous (1991): New lifespan for Havelock Asbestos Mine. – S. A. Mining World, 10(8):52–57, 3 Abb.

# New lifespan for Havelock Asbestos Mine

**Consolidated Mining Corporation, in its first departure from the gold mining and recovery scene, has taken over control of the old Havelock Asbestos Mine situated in the mountains along Swaziland's border with South Africa.**

Consmining has breathed new life into the operation by bringing new serpentine deposits into production which will give the mine a further 10 year mining span and the group intends expanding its prospecting activities to delineate new deposits.

At present just about all the output of high quality, finished chrysotile asbestos fibre from this resucitated operation, renamed Bulembu Mine, has been sold forward on export contracts negotiated well into the future. But production from the new ore sources is flexible and can be stepped up to cater for further contracts, and there is a probable production bonus in treating dumps which have built up over half a century.

One of the features of the Bulembu/Barberton area is the mine's aerial ropeway — in operation for more than fifty years — which has been faithfully delivering the mine's asbestos fibre to the rail head at Barberton.

This 20,4 km ropeway, the longest in Africa, was when constructed in 1938 — as indeed it remains — a noteworthy engineering feat which enabled a medium-sized asbestos mine to be opened up and a whole infrastructure to be established in a virtually inaccessible mountain area.

Havelock, which was developed by the British company, Turner and Newall, began its asbestos deliveries in 1939 to customers in South Africa and worldwide, using a fleet of aerial cars, with each carrying 200 kg asbestos payload. The cars travel at 183 m per minute and the line has an hourly capacity of 13,5 t each way.

On its return journey the ropeway transports coal for the mine's power station, a variety of mine supplies as well as food and commodities for the mountain-surrounded mining town.

Although the asbestos deposit was first discovered in 1918, it took another 11 years before Turner & Newall secured a development option and after 900 m of development proved that an extensive orebody existed. The company purchased the mining area in 1930. There was a further timelag, however, before development began in earnest in 1937, with the construction of the milling plant and infrastructure as well as the planning of the ropeway along its mountainous route.

The first deliveries commenced in October 1939 and Havelock gradually built up to a production of 35 000 t of fibre a year, from a mill throughput of between 70 000 to 75 000 t/mth which produced 3 000 t of fibre.

Over the following 40 years, Havelock mine flourished and excavated 40-million tons of ore — first by open pit methods and then by diamond pipe-style mining, with ring haulages

*Havelock Asbestos Mine (Swaziland) Ltd. On the left is the vertical shaft, on the right is the extensive milling plant (1973).*

around the serpentine plug and employing blockcaving methods.

Havelock's infrastructure grew steadily to include housing estates, clubs, sports facilities and eventually a complete town with bank, post office, and a full range of shops. When the mine's labour force reached 2 000, the bustling town was supporting a population of 20 000. In 1973, the Swazi nation acquired a 40 % stake in Havelock Asbestos Mines, with the owners, Turner and Newall, retaining the remaining interest.

By the early 1980s, however, production began to flag noticeably, when the orebodies pinched out at depth and the asbestos grade and fibre length were tailing off. As a result of ongoing disagreement between the owners and the Swazi Government about exploration, no prospecting to establish the necessary reserves had taken place and the closure of the mine at that stage seemed inevitable and only a matter of time.

In 1985, Gefco's Msauli purchased a substantial share in the operation and, with Swazi Government permission, conducted an extensive prospecting programme. But in the process the mine ran down its limited financial reserves to leave the operation approaching financial ruin. Ore reserves were quickly running down and planning for closure commenced.

However, proverbial prospecting luck prevailed. In August 1987 the prospecting drive had penetrated some 600 m when, coincidently during the final prospecting phase, a substantial high grade chrysotile deposit was identified.

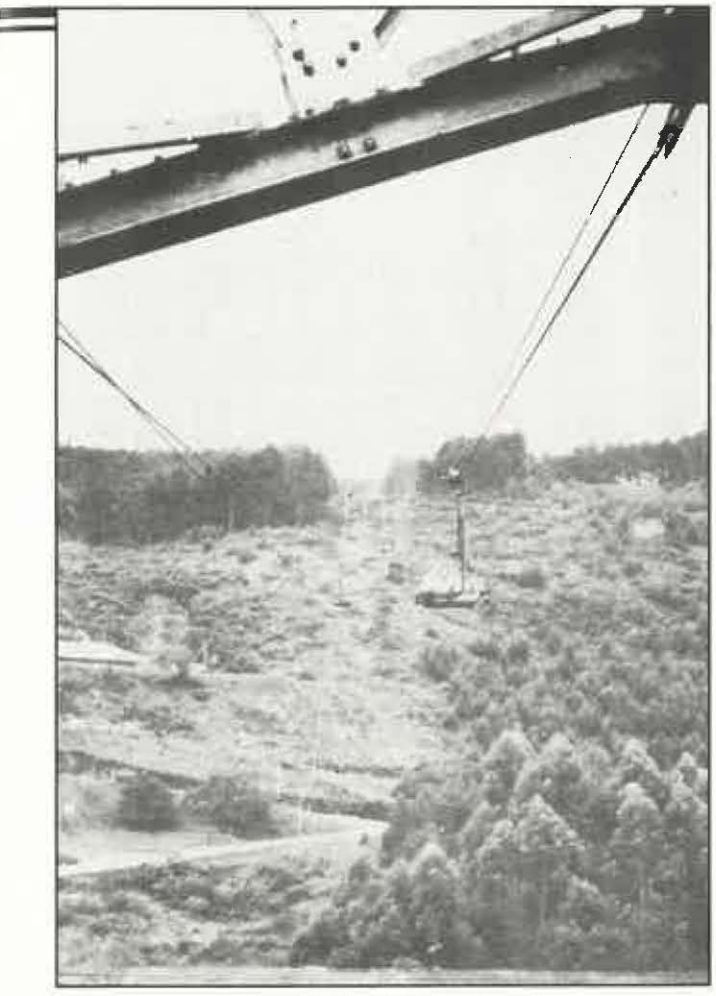
South African banks helped to finance further prospecting to delineate the orebodies, but the finance did not prove adequate and, in addition, loan funds were also exhausted. Recurrent labour unrest also occurred which nearly brought the mine to a standstill on several occasions. Fortunately, other financing sources were tapped and the mine successfully restarted operations in early 1989. By the end of 1990, the recovery from the upper levels of the new orebody was in full swing.

But a bad financial phase followed. The extremely heavy costs of opening up the orebody allied with labour problems plunged the mine deeply into debt again, and on January 30, 1991 it was placed on a care and maintenance basis by the liquidators.

Once more fortune favoured the asbestos mine. A financial saviour in the shape of the Consolidated Mining Group made its appearance — to assess the situation and the operation's potential. Having done so, it decided to purchase Havelock Mine's assets, recommence mining as Hvl Asbestos (Swaziland) Limited and to call the mine Bulembu. All operations in the old Havelock mine were stopped and development concentrated on the new orebody.

The new (or Far West) orebody was already extensively delineated and valued by diamond drilling, while sublevels were established every 12 m to the 550 Level.

Drilling had established the orebody for 180 m on strike and 100 m on dip,



*The cableway seen from the Havelock terminal. The pan on the left is taking fibre to Barberton, the one on the right is returning from Barberton laden with supplies for the mine complex. (This picture was taken in 1973.)*

*The mine commenced operations as an opencast but is now a 100 % underground operation. These have caused extensive caving of the surface. (This picture was taken in 1973.)*

with a maximum width and proven reserves running at about 2,2-million tons — which included a second smaller orebody in the footwall.

While the lower extremity of the orebody has not been fully established, the lowest prospected level included in the ore reserves was well developed and showed that the orebody is still an economic size below this level. Downdip drilling indicates the ore persists for at least another 25 to 30 m, thus bolstering ore reserves by another 400 000 t.

The grade averages at 10 % with the richer ore concentrated in the lower sections, and the grade split indicates a high quality silky chrysotile fibre which gives 3 % grade No 3; 32 % grade No 4; 17 % grade No 5; and 48 % grade No 6.

At the production levels forecast for the mine, these reserves will last another six to eight years and with a yield of over 300 000 t of fibre.

**Mining operation**

The orebody dips at 50° and has been planned as a sublevel caving operation. The ore is drawn through 23,6 m x 2,4 m drives by 1 t diesel driven Eimco 911 loaders. Ring drilling is carried out using Seco Rotary and Gardener Denver percussion machines. Typically there are 10 holes of 50 mm diameter per ring. Holes are charged with Dynagel and blasted in pairs. The drawn ore is passed through a system of ore passes to main levels where it is trammed by 4 t diesel locos, pulling hoppers.

Production levels are currently building up and will reach a maximum of 32 500 a month by early October this year. Initially, the yield will be 8 % fibre, rising over three years to peak at 11 %.

The mining operation in the Far West is well established and sufficient development has been completed to enable ongoing production targets to be fulfilled. The main service infrastructure viz lamps, haulages, airways, ore passes, substations etc are all complete and operative.

**Milling operations**
The mine's old horizontal mill is in sound working order and has a throughput potential of 75 000 t to 80 000 t/mth. In the interests of efficiency and reliability this will be limited to 32 500 t for the rest of the mine's life. There is potential to expand the mill's operations to permit milling tailings dumps and achieve production of shorter grades. Currently the mill is set to extract 3, 4, 5 and 6 grades. There is also potential for shorter grades in the new orebody.

**Engineering**
The mine's 9MW (steam) power station is run at 5 MW and provides most mine power requirements. An alternative back-up supply is available at all times from the national power grid. The aerial ropeway is in full operational order and takes the pressure-packed fibre to Barberton railhead for shipping, bringing on the return trip coal for the power station. Other major equipment at the mine, such as hoists, pumps, etc, are all adequate and operational.

**Personnel**
The majority of the senior technical staff from Havelock has been retained in the new operation, and workers have also been drawn from the previous Havelock labour complement. Industrial relations appear to have settled down and productivity levels are better than they have been for several years.

The new operation employs a total of 800 persons, compared to 1 850 at the previous Havelock operation. The staffing structure has been completely revised to leave only the essential production elements. The cost savings resulting from the smaller labour force has reduced fibre costs dramatically.

**Future potential**
There is a large block of serpentine between the existing mining operations and the RSA/Swaziland border which has not been properly prospected and which may well contain additional orebodies. In addition, the mine has taken out first rights and prospects of all potential fibre-bearing serpentine in the northern part of the country.

The existing tailing dumps are being investigated with a view to milling the older ones which were laid while the mine produced No 5 and No 6 grade. The extent of these dumps is in excess of 3-million tons with a probable yield of 2 %.

**General**
The symbol for Havelock Mine was the Phoenix rising out of the ashes. It seems a fitting emblem for a mine which has returned rapidly and strongly from virtually certain closure to enjoy an operational future of six to ten years (or more) at profitable levels. □

*SECO's production engineering design department is fully computerised.*

*Continued from page 31*
tial part of the system are APS (attendance, performance and safety) charts which reflect the daily record of each member of a Green Area.

"We really obtain a return on Green Areas," said Moore. "We believe they are a major management information tool, and make for a more responsive workforce. A spin-off has been that there has been a 95 % improvement in timekeeping, but most importantly they have allowed us to put the responsibility for quality where it belongs — with the man on the machine."

Critical dimensions undergo a 100 % quality check two or three times before the component is passed on. The operator checks his work himself, with overseeing by a line inspector. In this way non-conformance is spotted before value-adding operations such as heat-treatment, further machining or assembly have taken place. SECO used to have a final inspection department of some 70 quality inspectors. This number is now down to 28 thanks to taking the responsibility further back down the manufacturing line.

In the company's pneumatic equipment division, manufacture is carried out on what is believed to be one of the largest fleets of CNC (computer-numerically controlled) machine tools owned by a private company in the Southern Hemisphere. Replacement value for tooling is of the order of R175 million, among which is a fully controlled, four-axis grinder worth R2 million by itself. The company has also used its expertise to design and build its own twin-spindle, vertical-up CNC drilling machine.

Across the Main Reef Road at SECO's hydraulics division, the Green Areas quality programme is backed up by a combined research and development and production testing complex, representing an investment of some R1,2 million. Technical director Clive Hunt explained that the centre can cater for all hydraulic equipment currently on the market and being developed for the future.

*Routine maintenance being carried out on a gauging system in the calibration department.*

"There are four power packs for driving equipment under test: a water system, a 5/95 (5 % oil/95 % water) hydraulic fluid system, an oil system and a 5/95-and-water system," he said. "We also have a dynamometer for testing rotation gear and an endurance test rig for seals.

"One of our main quality functions is obtaining performance 'footprints' — comprehensive performance test results — on the large hydraulic equipment as it comes in from the UK. We measure and record penetration rates, flows, pressures, temperatures and the like so that, when the machines are in the field and require maintenance or repair, we have a benchmark from which to assess performance." □