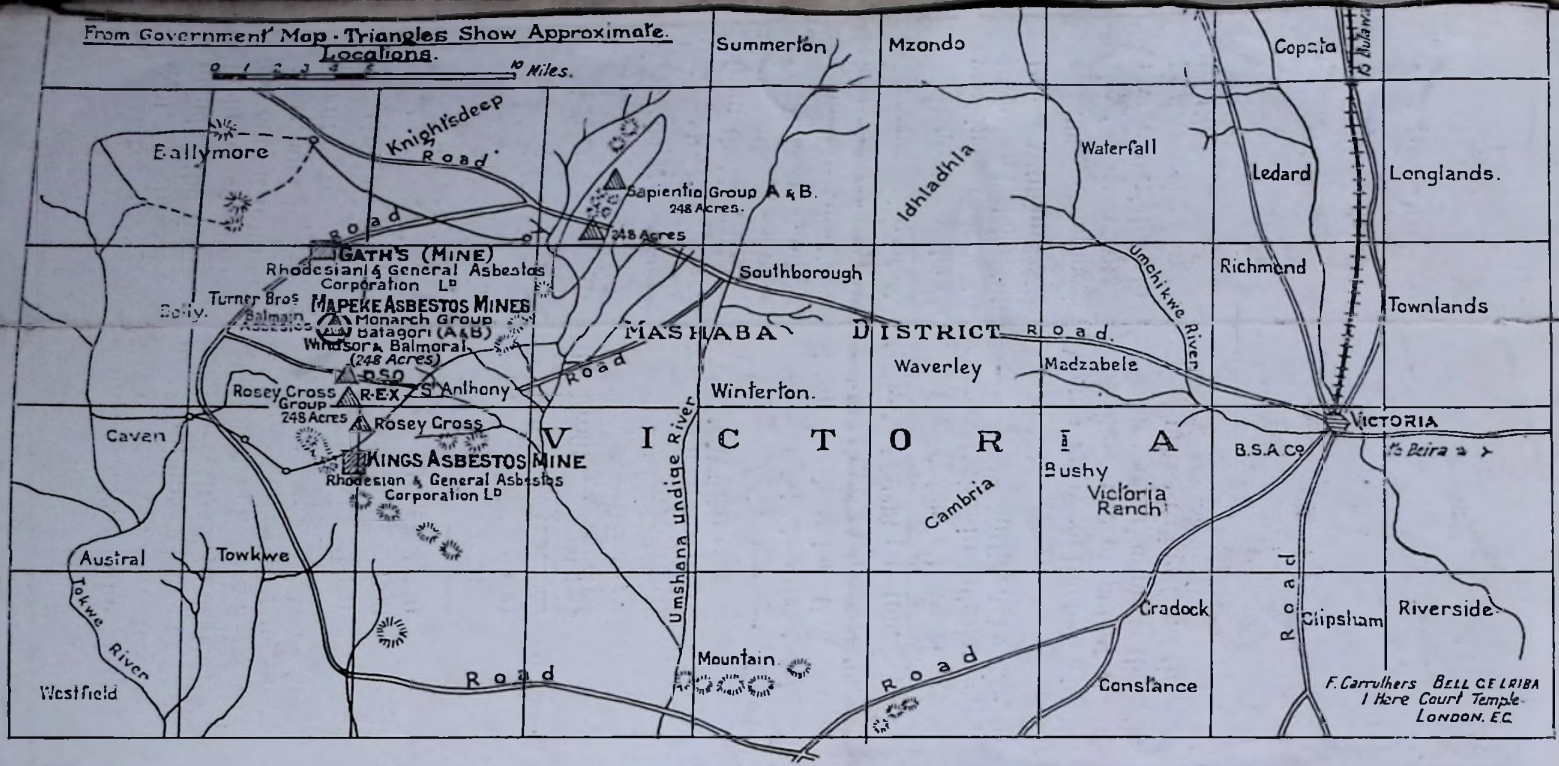


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From Government Map · Triangles Show Approximate Locations.
0 1 2 3 4 5 10 Miles.
Summerton
Mzondo
Copota
Ballymore
Knightsdeep Road
Sapientia Group A & B.
248 Acres.
248 Acres
Idhladhla
Waterfall
Ledard
Longlands.
Road
GATH'S (MINE)
Rhodesian & General Asbestos Corporation Ld
Southborough
Richmond
Umchikwe River
Turner Bros
Balmain
MAPEKE ASBESTOS MINES
Monarch Group
Batagori (A & B)
Windsor & Balmoral
(248 Acres)
MASHABA DISTRICT
Road.
Townlands
Waverley
Madzabele
Road
Rosey Cross Group
248 Acres
R.E.X.
S. Anthony
Winterton.
Caven
Rosey Cross
V I C T O R I A
VICTORIA
B.S.A Co
KINGS ASBESTOS MINE
Rhodesian & General Asbestos Corporation Ld
Umshana Undige River
Bushy
Victoria Ranch
Cambria
Austral
Towkwe
Towkwe River
Cradock
Clipsham
Riverside
Road
Road
Mountain
Road
Westfield
Constance
F. Carruthers BELL CE LRIBA
1 Hare Court Temple
LONDON. E.C.

COPY.

Report on Messrs. Mashaba Rhodesian Asbestos Co. Ltd., Mine and Properties.

August 1930.

By D. Landale Frew, M.E. F.S.I.
C.E. de France.

45, Hope Street, Glasgow, C. 2.

Acting on instructions from Mr. John Gardner, I proceeded to Rhodesia on 5th July and landed at Capetown on 23rd July after a very pleasant voyage.

From Capetown to Bulawayo is a distance of 1362 miles and occupies 68 hours in the train. The trains are quite comfortable and except for the discomfort of dust going through the Karoo and through Bechuanaland the journey is quite pleasant and interesting.

At Bulawayo I met Mr. Bottoms, Manager of Mashaba Mine. We called on Mr. Coghlan, Attorney to the Company. He asked me to wait in town as Capt. Dunsmuir wanted to see me.

After waiting two days for him I decided to go on to the mine, some 187 miles from Bulawayo. This we made by Motor Car over fair roads travelling about 25 to 30 miles per hour.

A Map of district showing the relation of the mine to Bulawayo and the other mines in the neighbourhood is attached.

At the Mine Mr. Bottoms invited me to stay with him and allotted to me one of the three round houses to live in.

For the first week I went about seeing what had been done and getting my bearings and a grip of the situation which I summarise

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as follows:

Certain instructions had been laid down for Mr. Bottoms to carry out and these were being done.

The European staff had been cut down to six including Mr. Bottoms, which I consider is as small as can be done.

Two quarries had been opened up called No.1 and No.2 D.S.O. These consisted of open trenches about 20 ft. wide and 10 to 12 ft. deep, in the form of a cross. Operations on No.1 Quarry, which showed No.2 and 3 grade Asbestos has been suspended meantime.

The operations on No.2 Quarry were partly confined to the removal of the debris from the sides of the deep trenches cut, and partly to the development of the Quarry proper. The method of taking this away is by a surface tramway and a dipping underground mine connected to surface at intervals by shafts or boxholes. The debris, after being picked of Asbestos, is shoveled down the Boxholes and removed from the bottom by trams, pulled up the dipping mine to a suitable dumping ground.

The Asbestos in the debris had been picked out and any new ground opened out in the Quarry was being picked or cobbed by small boys. The underground mine had branches going off at right angles to the main drive to the north proving the ground at a depth of about 75 ft. under the Quarry and had proved an area of approximately 40,000 sq.yds, all showing very good Asbestos up to 1¼" long.

The Mill had produced a sample of some 5 tons of Asbestos and alterations were being made to improve the quality of the

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finished product.

The economic position of the mine at once struck me as being serious as money was being spent on removing this debris in the most expensive method, and little attention was being paid to the getting of a supply of cobbs for the Mill.

After a careful examination of the surface conditions and an underground survey of the workings I decided to make the following alterations.

(1) To stop all expensive development places underground as there was quite 8 years work proved, sufficient to warrant us going on.

(2) To install a new surface haulage to handle more cheaply the removal of newly broken rock.

(3) To extend the surface area of the Quarry on a panel system so that more cobbing boys could be put on.

(4) To employ larger boys to do the cobbing and get a bigger output from them.

(5) Take the boys off tramming and put them on to cobbing.

(6) To get the Mill started at the very earliest.

All these alterations I managed to carry out and on the 13th Auguest, the Mill was started and the alterations made by replacing the trummels by shakers gave good results and better grade of fibre.

I will now give a more detailed state of the mine.

I submit two plans, one a large scale plan showing the relation of the Quarry to the underground workings and the position of the Boxholes.

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On this plan I have shown the Serpentine or Asbestos bearing ground in green, and the barren areas in blue.

I have taken samples from each of these places, and these show the fibre to be increasing going towards the boundary. The size of the fibre is as follows in the various roads. No.4 Road. 1/8" to 13/16" some No.1 grade greater part 2 & 3 grade. Nos.5 & 6 Roads $\frac{1}{8}$" to $\frac{3}{4}$" some No.1 grade, greater part 2 & 3 grade. Nos.6A and 7 Roads $\frac{1}{8}$" to $\frac{5}{8}$". Much ribbon and No.2 grade fibre. No.8 Road Big Veins $\frac{3}{4}$" to 1". Very good quality. No.9 Road. Sample of slip fibre about 2" long. Similar conditions are found in the main drive showing disturbed country rock.

The section I have drawn out shows that incline (25°) goes down to a depth of 80 ft. and all the exploration faces prove that the fibre at that level is much improved from that shown on the surface.

To drive on the mine at the same inclination to prove the ground at a greater depth was going to entail much expense, as it would require to be made wider and a much larger volume of water would require to be faced, which would necessitate more pumping plant and engine power.

As the area already proved is sufficient to warrant the Quarry to be opened on a much larger scale, I thought it was advisable to suspend further underground operations meantime.

Later on, however, I should like two places to be driven under No.1 Quarry to prove the ground there and ascertain whether the ribbon fibre comes together or not.

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Another reason for stopping the development is the nature of the Serpentine. It is so open that it will not be able to be stooped or extracted from underground on a large scale, but is essentially an opencast working which is much cheaper.

The Incline mine proves that the ground to the east of the air shaft is barren and I decided to utilise this as a new dumping ground for the new surface haulage.

To make a success of Asbestos mining the rock must be turned over and cobbed and removed as cheaply as possible.

For this purpose I have drawn out plans and have laid off the work of this new surface haulage to handle the rock with as few hands as possible, something on the lines of dumping redd at Modern Scotch Collieries.

A sketch of this is attached.

From the figures available it is difficult to arrive at an accurate idea of the amount of rock to be removed to get one ton of cobbs on account of the large amount of waste debris that has to be removed to get at the actual Quarry site.

For the month of July the waste removed was 8197 tons and the cobbs got 63 tons.

For the month of August the waste removed was 10,023 tons and the cobbs got 77 tons.

representing in July .8%

" " August .7%

By the end of October a true figure should be got as all

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the waste debris should be removed by that time.

COBBS. After the Serpentine Rock has been loosened by light shots the cobbing boys turn over the rock and pick out the pieces containing Asbestos.

This is the most important operation in the getting of Asbestos. With concentrated attention to the treatment of cobbs much time and labour can be saved in the Mill.

The Cobbs must be clean, and as far as possible free from surplus rock. The Mill has been working on old stock of Cobbs and is only producing 22% fibre from them. With care in the Quarry this figure should be brough up to between 40% and 50%.

Before I left the property the number of Cobbing boys was being increased and the Mill manager was put on to instrct them how to cobb property and see that the cobbs were kept clean, and with a careful daily inspection of the cobbs when weighed, and a system of fines it is hoped to increase the quality.

PLANT. The power for driving the various units is got from a second-hand Gas Engine fed by a gas producer working on wood.

Originally this engine was good for about 120 h.p. but with its having been badly abused in other situations its power is limited and is now developing between 60 and 70 h.p., the present requirements of the combined plant.

This engine drives a generator by belt 520 volts, 330 amps. 375 r.p.m. 50 cycles, which is also second-hand and of old design.

Suitable and adequate switch gear is provided.

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In addition to the Gas Engine the underground pumps are supplied by steam from two Loco type Builers, one 12 h.p. and the other 20 h.p. These are only in commission when the Gas Engine fails, or the water is too heavy for the present Electric pumps.

PUMPS. One No.8 Sulzer pump 3" suction and 3" discharge capable of throwing 8,000 galls. per hour (or 133 galls. per min.) against a head of 75 feet.

One Do. Do.

A new Sulzer No.15 E pump is being installed to pump 14,000 galls per hour (or 233 galls per min.) against a head of 156 feet.

The additional head is to pump the water up to a tank high enough to supply the whole camp with water, and cut off much piping.

The Steam pumps consist of two 3" Evans single acting pumps, one 3" Cameron pump.

These act as stand-byes in the event of anything going wrong with the electric pump.

SURFACE WINCHES. One 18" x 18" diam. Holman Winch Motor driven 500 volts 25 amps. 50 cycles, working the mine incline.

One similar winch working the Quarry dump.

Two 6½ h.p. Sulivan winches working the Quarry surface haulages.

The Mill plant takes up 45 h.p. In addition there is the following plant not in commission.

Two small steam winches.

One 11 K.W. Motor at picking belt No.

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One Blake and Marsden Crusher, 10" x 10" x 1½".

There is also a small oil Engine down at the river for pumping water to the Camp.

While the Gas Engine is very much improved under the present management it is old and many of the parts are very much worn and repairs are expensive, and as this is the only unit for keeping the Mill working it is advisable to have a stand-bye Engine to take its place.

During the night when the Quarry is not working this large engine is being kept running for a very light load. I suggest that a small 20 h.p. oil Lighting set should be installed to take this light load.

This, I estimate, would give a saving of £70 per month.

With regard to the larger stand-bye set it is a question as to whether it should be gas or oil. The timber in the neighbourhood is getting more expensive from year to hear as the haulage of it increases. This will have my attention later when I will draw up a comparitive statement.

I would, however, impress upon you the necessity of having some stand-bye power.

The present plant is all in good condition, and with exception to several spares urgently required for the Gas Engine, breakdowns should be rare.

In carrying out the alterations I made use of what Motors and winches were on the property. Some are too slow and some too

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speedy. The main thing was they were on the ground and filled a gap. It is advisable to have them replaced later.

MILL. The purpose of the Mill is to treat the cobbs and extract the rock from the Asbestos and also to grade the fibre into various lengths, and make it fit for the market.

I have drawn out a diagram of the various operations of the Mill and describe it as follows.

The cobbs are brought in from the Quarry by the individual boys, in bags each day, 100 to 150 lbs. per bag, and the following scale of rates is paid.

No.	Rate	Lbs. of Cobbs.	Overtime.
	30/-	160	120
	27/6	150	110
	25/-	140	100
	22/6	130	90
	20/-	120	80
	17/6	110	70
	15/-	100	60
	12/6	90	50
	10/-	80	40
	7/6	70	30
	5/-	60	20

The rate is the boys monthly wage and the weight is based at the rate of 1d. per 10 lbs., and assuming the boy's food costing 4d. per day. If a boy does not bring in the weight in the first

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column he is only paid at the rate of 1d. per 10 lbs. brought in. If he falls below the overtime weight he gets a loafers ticket and may lose his job. Any weight above the first column figure is paid at 1d. per 10 lbs. This is more or less an experiment to get bigger boys on to cobbing.

The bags are emptied on a table and inspected and weighed and stored in a shed in the Mill house. Another shed is required to lay in a larger stock.

Provision is made in the Mill for drying the Cobbs in wet weather, and this is marked A on the diagram, and consists of a long revolving Cylinder 22' x 3' diam. and is capable of handling 7 tons in 8 hours at 5 R.P.M. The Cylinder is externally heated by a wood furnace. It would be better to cut this out and have sufficient stock of cobbs to carry on over the wet season. From the heater the cobbs pass into a Jaw Crusher B, 8" x 6" set at ½" apart. Both A and B are not used with dry cobbs. The next operation is a set of roller crushers C, 18" diam. x 18" wide set ½" apart, and run at 80 R.P.M. The crushed material is then elevated to the first set of shakers, D. This shaker has two decks on it, the top mesh 5/16" square, the second 1/10" square. Any dust made by the Roller Crushing falls through the 1/10" mesh on to a belt E, and is taken to a dump.

Some of the asbestos may be loosened or fluffed at this stage, and as it passes over the end of the shaker this light fluff is caught up by a gentle air suction and taken into cyclones F and G

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and classed as No.2 and 3. The heavier pieces of Asbestos fall into the first Pan Mill H and get one revolution of the Pan Mill to loosen any rock adhering to the Asbestos. It is again elevated to a second shaker J, with three decks on it, the top deck has 7/16" wire mesh, the second 5/16" wire mesh and the third 1/10" mesh.

What is retained on the 7/16" Mesh drops on to a picking belt and is hand picked and examined before going into the bag and dispatched.

On the other two decks the dust and two sizes of fluff are taken off, and what goes over falls into a second Pan Mill K, and gets one revolution of Crushing. It is again elevated to a third shaker and the large No.2 not fluffed is taken off and bagged ready for the market. The same poeration is gone through in other two pan mills until all the dust is extracted.

Every time the fibre is passed under the Pan Mills it gets fluffed and the cyclones take off more from the 3rd and 4th shakers than from the first two.

After being treated in the 4th Pan Mill there is still a quantity of rock and asbestos not separated. This is allowed to accumulate and is retreated by itself once a week.

The fluffed No.2 and 3 grades which accumulate in the cyclones is bagged by hand, the bags containing about 220 lbs. each, and marked ready for shipment.

In addition to the three grades mentioned there is a quantity of very fine asbestos that does not settle in the cyclones but settles out in the exhauster house and dust chamber. Their

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proportion is small but in time they accumulate and I would like to see a market for them.

Cost of production of one ton of Asbestos at Mill Site.

At present there is not sufficient reliable data to arrive at an accurate figure for this but I have analysised the various costs and drawn up a cost sheet that will bring out this figure accurately when the Quarry and the Mill get fully going.

For the present, one has got to assume certain figures which I will take on the safe side.

(1) Cobbs from Quarry say 1%

(2) Asbestos from Cobbs say 25%.

(3) That the Asbestos grades work out as follows:

No.1 or 2A	=	5%	over 7/16"
No.2 - 2 and 2C	=	6%	over 5/16"
No.3 -	=	89%	under 5/16" and above 1/10".
		100%	

The Mill is capable of treating 8 tons of Cobbs per 10 hours = 200 tons per month and taking 25% = 50 tons of Asbestos per month, single shift, therefore,

20,000 tons rock at 1% = 200 tons Cobbs. Only half of this quantity of rock was hauled for the month of August but with the improved methods of handling I see no reason why this should not be doubled in two months time at much less expense.

By transferring the boys from tramming to Cobbing there should be no increase in the number of boys employed and they would

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be doing more productive work. This item of cost should not increase.

By substituting a small oil engine to take the light night load, the boilers could be shut down entirely and the Gas Engine would also be shut down for at least 12 hours, giving a large saving in firewood.

The European staff would remain the same.

Taking the above conditions into consideration I estimate the cost of producing 1 ton of asbestos to be £17 ready for shipment at the Mill.

The percentage of each grade of Asbestos from the Mill is as follows:

No. 1 or 2A	5%
No. 2 & 2C	6%
No. 3	89%
	100%

The market prices for these grades to-day is as follows:

No. 2A	£37. 10. 0.
No. 2	£32. 10. 0.
No. 3	£27. 10. 0.

and at these percentages gives an average selling price of £28.3 per ton.

50 tons @ £28.3	=		£1,415
50 " @ £17	=	£850	
50 " Transport £2	=	£100	
		£950	£ 950
Monthly profit =			£ 465

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It is not advisable to work on a lower output than 50 tons per month and as the Quarry opens up and more Cobbs got another shift can be put on the Mill.

The cost per ton will fall slightly and not in proportion to the increased output as the European staff will have to be increased to meet the additional shifts.

In sending orders from London care should be taken to send orders for the various grades in proportion to the output of the Mill, otherwise there will be an enormous surplus of No.3 quality.

OTHER CLAIMS belonging to the Company. I have examined these and report on them as far as it is possible with the surface indications and small prospecting work done on them.

These consist of four groups of Blocks.

The D.S.O.	11 Blocks.
Temeraire	11 "
Shashi	7 "
Good Hope	2 "

These are again subdivided into the following:

D.S.O.	429
V.C.	954
K.C.B.	969
D.S.O. No.2	971
D.S.O. No.3	972
D.S.O. Extension	1027
D.S.O. Extension	1084
M.R.A. No.1	1085

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M.R.A. No.2	1086
V.L.E.1.	1178
D.C.M.	1179

The Temeraire group consists of

Temeraire	751
Sultan	876
Rover	877
Nile	878
Temeraire A	942
Royal	953
Temeraire B	955
Temeraire C	956
Temeraire D	957
Temeraire E	958
Nile A	973

These lie about 2 miles S.E. of the D.S.O. Group.

The Shashi Group of 7 blocks lie almost direct north of the .S.O. Group and distance about 10 miles on the banks of the Shashi iver. Their nos. are as follows: 664, 666, 686, 687, 688, 689 and 690.

The Good Hope group No. A and B, 940 and 941 are on the astern side of Gaths.

An excellent survey plan of the D.S.O. and Temeraire groups as been made by Mr. Ramsay, and I have divided this plan into squares arked for reference A B C &c on the top, and 1, 2, 3 &c on the sides

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and any future exploration work has to be referred to in the monthly reports and located and marked on this plan, and a careful record kept of what was found in the cuttings &c.

In the past I find that while a Footage Book was kept it is very difficult to trace where this work was done and in few cases has any record been taken of the fibre exposures.

This has made the work of investigation very difficult and much time was wasted in going over the ground two or three times turning up debris and examining cuttings and adits which should have been property recorded at the time.

D.S.O. In addition to the No.2 Incline and Quarry openings which are in D.S.O. 1027 and D.S.O. 429 on low lying ground there is the No.1 Incline and trench work. This latter shows abundant evidence of thin ribbon fibre but in my opinion is too small in section to work at the present market values. The treatment of the cobbing of this rock will be referred to later.

On the western side of D.S.O. 1084 a north and south dyke cuts off the asbestos bearing ground and this area is being used as a dumping ground. D.S.O. 971, D.S.O. 972 have not been opened but are used as native compound encampments.

On the west of D.S.O. 429 is K.C.B. 969 and one or two openings show good signs of fibre which might be got by driving on No.2 Incline main drive. This area is higher than the D.S.O. 429 and 1027 blocks and to the north of it two adits have been driven into the hill side on the VLEI 1178 Block and show some signs of fibres.

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Further west is the M.R.A. No.2 1086 Block which is a small hill by itself and on this a great deal of work and money has been expended. The strata is all dipping to the south at 45°. The strata consists of thick masses of Serpentine and hard blue stone alternating.

I came to the conclusion that this was purely a mining proposition as the Serpentine is hard and would stand being extracted by underground stoping.

The quantity and quality of the fibre showing is good in places.

I would suggest that when it comes to be worked it should be done by cross cutting the strata by a mine and working right and left in the Serpentine and extracting as much as practicable.

It would take a considerable amount of money to open this up properly and I suggest that for the present it should be held in reserve.

I give a section of this hill showing the inclination of the strata and how a cross cut mine should be set off.

In addition I have shown a map of the D.S.O. Blocks giving the contours of the ground as far as it is possible to judge by the eye.

Regarding the future possibilities of this group I am of opinion that all efforts should be concentrated on the No.2 Quarry. The ground opened up is showing very well and the area opened and proved by the underground proving places and surface indications

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should last for 8 years at 800 tons per day single shift, that is only taking a depth of 75 ft. There is no reason why this should not be opened up to a depth of 250 to 300 feet, when more adequate plant is installed for pumping and haulage. While developments underground will prove the ground under No.1 Quarry and also in the K.C.B. and VLEI Blocks the area is showing signs of making a very large and important quarrying proposition.

As the Mill is established here it should be made centre of activities, the other properties acting as feeders for the Mill. Temeraire Group. This group which is made up of 11 Blocks has to the south of it three detached areas - the Rover 877, the Sultan 876, and the Royal 953.

I suggest that the areas which are not owned or claimed should be acquired by the Company so as to make a consolidated area of the whole and at the same time give access the one to the other for future ease in working.

The areas or blocks referred to are shown on the attached map in Blue.

A great deal of work and money has been spent on Temeraire Block No.751 and has exposed over a very wide area good quality of No.2 and 3 grade fibre. Eleven Boxholes about 50 ft. deep have been sunk and also a large number of long trenches 4 to 5 ft. deep showing the extent of the deposit, which I estimate at 50,000 sq.yds. This work has been done preparatory to opening up the property.

All this work is done on a piece of flat lying ground and

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water is met with about 30 ft. from the surface.

I also give an eye sketch of the contours of these blocks showing the hills surrounding this low lying ground, also the general run of the strata which dips at a high angle.

However, in giving the development of this area consideration I came to the conclusion that instead of opening up on the low lying ground and pumping water advantage should be taken of the surrounding high ground.

I therefore had opened up an old adit on the Nile Block 878 where several good seams of fibre were showing.

From a survey of this adit and the lie of the metals I was able to determine the general lie of the strata in the whole area which I found to be as shown on the contour map.

This was confirmed later by openings in the Rover at A, and also on Temeraire 955 at B, and further convinced me that the acquirement of the three open claims should be made.

However, before opening up the Temeraire blocks I consider that a survey should be made showing the contour more accurately and the location of all openings and trenches marked thereon so that we can ascertain the best and cheapest site to start development on a large scale.

On this information will depend the future development.

I consider the distance between the D.S.O. Mill and Temeraire such as not to warrant a new mill being put up but the cobbs could be taken to the D.S.O. Mill by motor.

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Shashi Group. I went over the ground of this group and with the exception of Block No.664 which is detached, there is little or no exploration work to be seen and on the above block there were signs of Asbestos but not of any great quantity or thickness.

Considering the distance away from the D.S.O. Mill and the extremely bad transport I do not consider that these claims are of much use to the Company. Block 664 is detached from the others and might be acquired by the neighbouring claim holders. Otherwise the claims have not much value at present. I gather that no work is required to be done on them until 1931.

Good Hope Blocks. I was not able to get to see these blocks but understand that they are in a district which is very doubtful.

Blue Bird Proposition. These consist of 10 blocks lying about 5 miles distant from the D.S.O. Mill. They are the property of Messrs. Sagar & Eddington, and the terms of the proposed agreement are submitted along with this report.

I went over this property twice and there is abundant signs of Asbestos of good size and mostly of good quality.

I submit that it would be a good proposition for the Company to purchase with the object of increasing the quantity of No. 1 grade.

In my opinion it could be very cheaply worked.

Management of the Mine. I am satisfied in Mr. Bottoms as an organiser and his ability to gather the best men to take charge of the various departments.

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In my opinion the mine cannot be managed from or by an Agent in Bulawayo.

The Manager at the mine knows what is going on and must take all responsibility and be accountable to the Directors, and in return he must be kept advised of the policy of the Directors.

The Books should be kept at the mine, all cost sheets made up monthly and I suggest that the Books should be audited by an accountant from Bulawayo every 6 months and a statement submitted to London. The main accounts showing sales should be kept in London so that there would be no leakage of information through local people.

It is advisable in a month or two to send out an Engineer to be assistant to Mr. Bottoms, and with a view to take his place if he should want to come home.

This policy should be carried out and not deferred to the appointment of a man on the spot whom the London Directors do not know. This, I consider, has been the root cause of much of the trouble in the past.

It is desirable that there should be more communication between the mine and London office, and for that purpose a cable code should be used.

With regard to the purchase of stores and material for the working of the mine it is the general practice in Rhodesia to have a broker in Bulawayo who carries this out. Messrs. Shatlock & Tate have been doing this for the Company. It is advisable to confirm this appointment and get them to give a monthly statement of what

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the mine has purchased.

Natives. Under regulations of the Rhodesian Government the Native is protected and registered from the time he is able to work. He is paid a monthly wage and his keep on food. The wage for each class of labour along with the scale of food will be found in the appendix.

The native is well looked after and although his wage appears to be low, I consider the labour dear and to cheapen it it would require to be very well organised and each boy allotted a certain task.

The Manager of the mine is made responsible for the wages of the natives under penalty of imprisonment. He in turn may raise an action against the Directors of the Company.

GENERAL. Since writing the foregoing I have received a report on the Blue Bird proposition by Mr. McIntyre, the Mill Manager, a copy of which I give in the appendix. I am still convinced that the property is a good one and would be an additional asset to the Company. It may, however, be policy to delay doing anything in the matter of purchase until the demand for Asbestos increases.

In my estimates I have given no credit for the grades below No.3 and consider that an endeavour should be made to find a market for the Exhauster house dust and the dust which goes to the dump, an examination of which shows that a very large percentage is very fine asbestos, and as this amount is 75% of that milled, even a small price would mean a good profit.

A careful analysis of the Cost Sheets for the next six months on a single shift basis should enable me to advise you of when

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and how to lay down additional plant and open up your other properties.

Considering the distance and the time taken for letters to be delivered, closer co-operation between the Mine and London by coded cables is very advisable.

My opinion of the whole proposition is that the Mining side of the Company is satisfactory and that it requires the financial support of London to carry it over the present critical period between production and the return of money from the sale of Asbestos.

In six months time the Company should be self supporting and making profits.

All which is reported by

D. LANDALE FREW.

GLASGOW,

Oct. 1930.

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APPENDIX.

1. Notes on Natives.
2. System of Time keeping.
3. White Staff.
4. Firewood.
5. Letter to Mr. Bottoms.
6. " " " "
7. Weights of various grades.
8. Cost sheet.
9. Blue Bird Agreement.
10. Occurrence of Asbestos.
11. Samples sent with this report.

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No. 1 Appendix. 20/8/30.

Notes on Natives got from Mr. Neilson.

Number employed, 310 consisting of:

	Min.		Max.	
Hammer boys.	22/6	-	45/-	3 months rise 2/6d.
Shovel Tram boys.	20/-	-	35/-	" " " "
Engine boys.	20/-	-	40/-	
General Surface.	15/-	-	30/-	
Skilled lab.	30/-	-	95/-	
Cobbing boys.	5/-	-	15/-	according to size.
Police "	30/-	-	45/-	
Clerks "	30/-	-	60/-	
Boss "	35/-	-	50/-	

Boys are contracted for one year and are paid the above rates according to what they were getting at the last place, and rise automatically every 3 months by 2/6d to maximum. A boy, if no good, can be dismissed after paying 1 months ticket or a charge of negligence brought against him when he can be dismissed on the spot.

The Management is personally responsible for the payment of these natives.

The native is housed and fed by the Company in addition to the foregoing rates of monthly wages. The following is the scale of food laid down by the Government.

Meallie Meal	2 lbs. per week.
Monkey Nuts	1 Quart twice weekly.
Beans	½ pint " "
Salt	3 oz. per week.

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Meat. 3 rations per week (2½ lbs. per week.)

The cost of food stuffs is as follows:-

Meallie Meal.	12/6d. per bag	185 lbs.
Monkey Nuts.	8/9d. " "	78 "
Beans.	16/-. " "	203 "
Salt	10/-. " "	200 "
Meat	2½d. " lb.	
Fresh vegetables.	2½d. " lb.	

This costs the Company 5.06d. per head per day.

Note by D. Landale Frew.

Each native carries away his rations in any old tin or basin and as the distance between the office and the compound is about ½ a mile there is a wastage through spillage.

It would appear to me that some system of communal cooking would result in a great saving. As this means money on Cook houses &c. it will require to wait.

The native is well fed and looks fit and happy.

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No. 2 Appendix.

The system of Tickets at all mines in Rhodesia is as per sample done up in book form.

On front is:

Reg. No. and name of place registered.

Coys. No.

Name of boy.

Issued date. Rate.

Engaged.

Serial No. Last increase.

Inside are three divisions.

1. Co. No.	2. Food.	3. Co. No.
Date	Co. No.	Date.
Job No.	Job. No.	Job No.
Rate	Rate	Rate
Overseer		Overseer.

As each day's work is completed the white overseer initials the 1st and 3rd division, the latter being torn off and put into a large envelope and sent to time office.

The second division is kept by the boy who presents it to the compound officer for the required food.

The system entails a good lot of time and labour. Time of the overseer and labour in the office making up pays, &c. When the boy's ticket is completed he presents it to the office for payment. Each book contains 30 tickets, representing one month.

If a boy does not work, he does not get paid, but the

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Company is bound to feed him. If, at the end of the month, the boy wants to quit he gives one months notice and if he does not get paid at the end of the month he can claim food for every day he is not paid.

The natives are looked after by the Native Commissioner who is also the local J.P. and has power to examine the books of any Company and enquire into any troubles with the natives.

Recently, owing to the non-payment of natives, he has been down at the office quite a lot.

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No. 3 Appendix.

The white staff is as follows:

Mr.	Stevensons, Chief Engineer	£42. 10. 0. per month.
"	Geo. " Assist. "	27/6d. per shift.
"	McIntyre, Mill Manager.	£40. 0. 0.
"	Jenkins, Mine Manager.	£40. 0. 0.
"	Neilson, Secretary.	£35. 0. 0.
"	Bottoms, Manager.	£50. 0. 0.

All these men are picked men from the staff that were on the ground when Mr. Bottoms arrived, and also from the Norma Mine.

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No. 4 Appendix.

The chief item for power is Firewood, and this is cut and sold in cords by Mr. Eddington. His contract price is 18/6d. per cord, or 128 cub. feet stacked.

The consumption since April is as follows, for Boiler and Gas Engine.

April.	Gas Engine	59 Cords	£51. 12. 6.
	Boilers	51 "	£44. 12. 6.
			£96. 5. 0.
May.	Gas Engine	68 Cords	£ 59. 10. 0.
	Boilers	162 "	£141. 16. 0.
			£201. 6. 0.
June.	Gas Engine	62 Cords	£54. 5. 0.
	Boilers	40 "	£35. 0. 0.
			£89. 5. 0.
July.	Gas Engine	50 Cords	£43. 15. 0.
	Boilers	39¼ "	£36. 0. 2.
			£79. 15. 2.

The Gas Engine consumption has gone down since Stevenson took charge and is running much better than it did.

As this is the only source of supply it is advisable to have a stand-bye engine capable of taking its place. On three occasions it has given trouble and the work on the Quarry held up for a time.

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No. 5. Appendix. Letter to Mr. Bottoms.

E. Bottoms, Esq.,
Manager,
M.R.A.
Mashaba.

Dear Mr. Bottoms,

With reference to our various conversations re the development of the mine I am making the following notes for your guidance.

In the meantime stop all mining work going on to the North of the Main Level. On the south side you may start two places from Nos. 3 & 4 winzes to prove the ground under No. 1 Quarry. This should only be done when funds permit.

A lie or standing room should be made at the foot of the mine for storing Koko-pans. The first opportunity of getting long wood you should put in a bye-pass in the mine and put two ropes on the hauler. This will half the cost of your haulage from the boxholes and assist the quarry at the same time. Concentrate on opening up the Quarry, not in depth, but in surface area with the object in getting as many Cobbing boys on as possible.

As it goes down in depth bench it and rather take advantage of the surface haulages to take away the debris than the boxholes, as they are apt to disorganize the systematic working of the Quarry.

I will possibly make arrangements for plant to be sent out for the automatic dumping of the debris, but in the meantime carry on dumping on the barran ground up to a point near the new hauler.

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The cobbing boys should be increased by putting the day wage boys on piece work.

In future in your reports to London of any prospecting work state where it is by reference to the claims plan made by Ramsay. It is divided into squares and numbered on the top A.B.C. &c. and on the side 1,2,3. Any spot on the plan can be indicated such as Nile F.4. so many feet from Beacon A.D.C.

By making this reference in your footage book and also recording your remarks as to what is found it will be of great value to those who come after.

I have made you a Scroll plan of the D.S.O. Quarry and Mine. I have taken a copy of this for London and I will get it made in duplicate for posting between the London Office and the Mine. On these Maps the workings will require to be marked on say every two months.

With regard to the M.R.A. Block, this I consider a purely mining proposition and should be left alone at present.

With regard to the opening at the Nile, go on with this and report how it is turning out for Cobbs and costs.

It is important that the area lying between the Nile 878 and the Royal 953 be applied for to make one consolidated area of the Temeraire Blocks.

More exploration work should be carried out on the high ground in the Rover, Sultan and Royal as well as the three blocks to be acquired; this can be done gradually.

I will advise London to give up Shashi and will write you later; there is no hurry for this.

Yours faithfully,
(Signed) D. Landale Frew.

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No. 6 Appendix. Letter to Mr. Bottoms.

Grand Hotel,
Bulawayo.

26th August, 1930.

E. Bottoms, Esq.,
Manager,
M.R.A.
Mashaba.

Dear Mr. Bottoms,

The following is the system of opening up the Quarry at the D.S.O. No.1 Mine Quarry.

The present quarry with the existing box-holes to be carried on until such time there is sufficient ground opened up to cope with the requirements of the Mill.

The open cut at right angles to the surface haulage just installed to be carried on until it reaches the boundary or it may run out altogether before it reaches the boundary.

On either side of that cut an area of ground to be measured off not more than 12 foot wide and say 20 ft. long. The first days work on this area will be to drill holes sufficient to loosen 3 ft. deep. These holes will be drilled and fired in the one shift. The second days drilling will be on the sides but 20 ft. further along. The Cobbing bous will be turned on to patch No1 and the loosened ground cobbed. On the third day the cobbed ground will be removed.

The measurements given are only suggested and except for the 12 ft. back the length may be extended or brought in according to the nature of the ground you are in. When the

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first 3 ft. deep has been carried through a second lift can be started and so on until the rail level is reached. Later on and further down the incline say 50 ft. another cut should be started and carried on to the boundary and the same operation repeated.

Yours faithfully,

(Signed) D. Landale Frew.

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No. 7 Appendix.

Weight of various grades of products from the Mill.

Weight of 1 cub. foot in the loose.

2 A grade	=	41 lbs.	
2 "	=	28¼ "	average of 3 samples.
2 C "	=	20 "	
No.3 "	=	17¾ "	
Exhaust house	=	11 "	
Dust "	=	4¼ "	
Dust from belt	=	73 "	per cub. foot.

Weight of solid rock in the Quarry at 14 cub. ft. = 1 ton.

" " loose " " trucks taken at 20 cub.ft. = 1 ton.

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Appendix No. 9.

M E M O R A N D U M O F A G R E E M E N T

made and entered into by and between

MASHABA RHODESIAN ASBESTOS CO., LTD.

Mine owners of Mashaba, of the one part (hereinafter referred to as "The Option Holders")

and,

ISRAEL SAGAR and ALLAN EDINGTON

of the other part (Hereinafter referred to as "The Claim Holders).

W H E R E A S the said SAGAR & EDINGTON are the owners of certain "BLUE BIRD" claims consisting of ten Blocks in number, situate in Southern Rhodesia.

AND WHEREAS the said MASHABA RHODESIAN ASBESTOS CO., LTD., is desirous of obtaining an option with right of purchase over the said Blue Bird Claims.

NOW THEREFORE the said Claim Holders and the said Option Holders hereby covenant and agree upon the following option being granted over the said Blue Bird Claims to the said Option Holders upon the under mentioned terms and conditions, TO WIT:-

(1) The period of option shall be for 12 months (Twelve) from the date of signing these premises, with option of renewal for further period of 6 months (Six).

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(2). The said Option Holders shall have the right to exercise their option at any time during the existence of this agreement.

(3). The purchase price of the said Blue Bird claims shall be the sum of Seven Thousand Five Hundred Pounds, (£7,500. 0. 0.) payable Five Thousand pounds (£5,000. 0. 0.) cash against transfer, and the balance in Cash or Shares within three months of transfer. In the event of Option Holders wishing to purchase property outright within one month of signing of the premises, price will be Four Thousand Pounds (£4,000. 0. 0.) Cash. (See letter)

(4). Immediately upon signing of these premises the Option Holders agree to spend, in developing and prospecting a minimum sum of One Hundred Pounds (£100) per month.

(5). During the period of this option, the Option Holders have the right to mine any Asbestos for which they will pay the Claim Holders, a Royalty of One Pound Fifteen Shillings (£1- 15- 0) per ton of Hand Cobbed Asbestos.

(6). In case the Option Holders exercises their option by purchasing the said Claims, or if this agreement be otherwise terminated, no refund will be made in connection of any monies paid for Royalty on Asbestos won.

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(7). In case of the Option Holders not carrying out the terms of this agreement, the Claim Holders shall be entitled to call upon them in writing to comply with the said agreement, failing which, within one month from such notice, the Claim Holders shall be entitled, should they so desire, to terminate this agreement without prejudice to any other legal rights they might have.

(8). In the event of the Option Holders exercising their option the Claim Holders shall the following preferences for a period of five years:-

(a). For the supply of all foods to natives employed by the Option Holders at or near the said Claims.

(b). For all transport.

(9). The Claim Holders in the event of the option being exercised, hereby reserve to themselves all Store and other Trading Rights at or near the said Claims, and the Option Holders hereby undertakes to grant the Claim Holders all facilities and as far as possible to protect their interests in the running of the said Store or Stores.

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THUS DONE AND SIGNED at Mashaba
on the 22nd day of August 1930.

AS WITNESSES.

1. D.H. Nelron ..... I. Sagar.

2. ..... Allan Edington.

We hereby give you (4) Four months option to take up the aforesaid option.

(signed) Allan Edington. I. Sagar.

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Mashaba. S.R.

15th September, 1930.

D. Landale Frew Esq.,

C/O Mashaba Rhodesian Asbestos Co., Ltd.,

Mashaba.

Dear Sir,

Further to the option given you on the Blue Bird Claims.

In the event of your taking over the ground at (Cash price £4000" we are prepared to accept payment as follows - £1000 down and the balance in 6 monthly instalments of £500.

Yours faithfully,

(signed) I. Sagar.

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P.O. Box 5,

Mashaba,

18th September, 1930.

Dear Mr. Frew,

I visited the Blue Bird yesterday in company with Mr. Bottoms and spent some hours there.

As it is impossible at present to get down the winzes it is difficult to form an accurate estimate of the possibilities of the property at depth. From surface indications round the winze at the extreme north end I should say that very rich ore was encountered at this point. Dumped waste rock still contains an appreciable amount of cob and there are evidences here and in the adjoining cuttings that a good deal of cobbing has been done. The Serpentine formation here also seems to have been subjected to much greater crushing action than anywhere else on the property and this alone is much more favourable to a high degree of enrichment.

Proceeding southward you will have noticed that two winzes appear to be blank although some fibre has been exposed in the adjoining cuttings. This is quite in accordance with experience in all asbestos mining in Rhodesia where barren bars of Serpentine occur in the middle of rich lodes.

The big cutting and stope at the Southern end are probably not far enough advanced to cut the main lode and the continuation of the cutting as an adit would possibly lead to quick and reliable results.

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satisfactory way to prospect the ground and would give a valuable line on percentage. These would have to be placed at regular intervals and to plan.

I hope these few observations will be of some value to you. With my best regards,

Yours very truly,

(signed) D. MacIntyre.

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No. 10 Appendix.

General Remarks on Asbestos.

The asbestos occurs in an olive green rock called Serpentine and throughout the district it is in large masses varying in thickness, lying at varying angles but can be identified from the surrounding rocks which are of a hard blue colour like close grained granite.

The asbestos is contained in cracks in the Serpentine running in all directions and these cracks vary in thickness from nothing to 1½" wide. The asbestos fibre is stretched at right angles across the cracks and this variety is called cross fibre. Another variety is called slip fibre, which is usually found in very disturbed country and has at one time been cross fibre but due to the movement of the rocks it has become flattened out and at first sight appears to be much longer than the corss fibre. This is not so, as on examination of the slip fibre it will be seen that the strands of fibre are only held together by the pressure of the rocks. Samples of this class of fibre accompanying this report.

In undisturbed cross fibre areas there is a tendency for the fibre to get longer and better the deeper down from the surface.

Working on this assumption mining engineers have set off the workings to get as deep as possible with the idea of getting the better quality fibre.

This is usually done by driving a dipping mine in the direction of the strike or longest surface exposure and at

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intervals drive levels off to examine the quality of the fibre. If the intention is to open up a surface quarry, shallow shafts 5' in diam. are sunk down from the surface at intervals of 50 ft. on either side of these levels and connected thereto.

This certainly proves the extent of the rock and the quality of fibre and blocks out the ground to a known depth, so that a value can be put on it.

The ground is then opened round about these shafts and the fibre picked or cobbed from the rock. After cobbing the waste rock is thrown down the shaft or boxhole, and taken away in trolleys along the level and up the sloping mine to a suitable dump.

This method of opening up has several serious objections.

(1) The Quarry becomes a series of cones or craters round each boxhole, and limits the cobbing area.

(2) The method of taking away the debris from the boxholes is slow and expensive.

(3) Material should not be dropped down to be lifted up again, when it can be done otherwise.

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SAMPLES.

Sample from No. 8 Road.

Sample of cobbs.

Sample from No.1 Quarry of Ribbon Fibre.

Mill Samples.

A. From Rolls.

B. 2A Grade.

C. From No.1 Pan.

D. No. 2 Grade.

E. From No. 2 Pan.

F. No. 2C Grade.

G. No. 3.

H. From No. 3 Pan.

J. From Tailings of No. 4 Pan.

K. Conveyor Dust.

L. From Exhaust Chamber.

M. From Fan Dust.

N. Slip Fibre.

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