



PRODUCED IN MATTER OF
BARROW V. MIDALCO
NO 1148 OF 1987



PRODUCED IN MATTER OF
BLYG V. MIDALCO
NO 1161 OF 1987

14th December, 1943.

VISIT TO ASBESTOS MILL, ZEEHAN - DECEMBER, 1943.

The main difficulty at the mill until just prior to my arrival had been to aspirate asbestos fibre from the screens without also aspirating grit and dust. A few days before I arrived, however, Mr. McRoberts had erected a trommel in front of the main aspirating screen and this screened out most of the fine grit and was a major improvement.

Other alterations made during the period of my visit were:-

- (1) Extra buckets were fitted to the main elevator in order to increase its capacity.
- (2) Two extra hammer bars were fitted to the Kubit Mill and this machine was speeded up from 900 to 1800 r.p.m.
- (3) Adjustments were made to the Gyratory Crusher to enable it to crush finer and a new eccentric bush is being ordered for this machine to enable it to crush still more finely.
- (4) The size of ore from the jaw crusher was increased in order to prevent asbestos fibre being overheated and discoloured in the drier.
- (5) The use of No. 1 fan and cyclone to aspirate separate from fibre from No. 1 screen was discontinued as the small amount of fibre collected at this stage was discoloured and this fan and cyclone were removed from the mill.

separate from fibre
aspiration

in fact a
vehicle Kubit
mill.

- (6) The ~~main cyclone~~ was reversed in order to use the unworn side of the hammers in this machine.

The mill is running quite well and with the above alterations appears capable of producing from now on about 2 tons of asbestos per day. The asbestos is fairly clean and roughly equivalent to grade 4K. To increase this

-2-

capacity, additional plant will be required but an estimate of the cost of this has not yet been made.

The mill has been well erected and Mr. McRoberts has done a very good job. This is particularly creditable as he has been without adequate assistance and in a locality where weather and supply difficulties have been most severe.

~~The work in the mill is now being carried out by Mr. McRoberts and his staff to eliminate the need for a mill manager.~~

It is not possible as yet to assess accurately the prospects of the venture as these are almost wholly dependent on the mining side and this is the side to which careful attention must be paid from now on. Here also, additional plant such as hoppers, flying foxes, trucks, etc. should be provided immediately, I consider, but an estimate of the cost of such equipment has not yet been prepared.

One major difficulty we shall have if we wish to increase production by working more than one shift, or if we wish to instal new plant whilst maintaining production, is manpower. The West Coast district of Tasmania is very short of men at present and I understand men have been taken away even from Mt. Lyle to assist with the production of foodstuffs.

Mr. A.E. Mander has promised, however, that he will advise the Tasmanian Man Power Authorities to accord our asbestos project an equal priority with food and timber.

For record purposes, a copy of notes taken whilst in Zeehan, also a copy of notes I left for Mr. McRoberts guidance are attached.

Portion of the attached notes deal with a visit to the Mt. Lyle Co. and I wish particularly to stress the courtesy and co-operation displayed to me by each officer of this Company whom I have met.

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10th December, 1943.

NOTES FOR MR. MCROBERTS.

We should consider now that the asbestos mill is definitely in production and hence should be operated each day just as any other working concern. In other words, the main object now will be to operate continuously and to obtain maximum yield and production of good clean fibre.

The question of additional plant such as Junco, trommels, rolls etc. will be taken up by me on return to Sydney, but in the meantime, you should gradually go

Note - 1943
difficulties in
obtaining
equipment.

~~about fitting up the mill which was done by the~~

~~mill before No. 1 screen, all the things that were~~

~~the things that were done, the things that were done~~

~~the things that were done, the things that were done~~

~~the things that were done, the things that were done~~

If this fan proves to be too small, please advise us. Also an elevator to return overs from No. 3 screen to Torrey cyclone should be erected.

Design Room +
designing Wst. plant
at same time

~~the things that were done, the things that were done~~

~~the things that were done, the things that were done~~

must have had
dust collection in
mind when the
Wst. plant was
being designed

As regards mining, at present the supply will continue to come from the spur and from the main hill near No. 1.

tunnel (by lorry), when the spur is exhausted and I will

take up the matter of flying fox, hoppers, trucks, drying

sheds etc. in Sydney. The tram around to No. 2 tunnel

should be continued as labour permits as this will provide a good place for dumping barren rock. You should obtain a firm price for the flying fox at T.A.T.

As regards the mill, it appears to me that the woven wire screens (particularly the fine types) and the hammers in the Torrey and Kubit will wear rapidly and you should ensure that ample spares of these are kept in hand to avoid

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not considered
fine enough. I
possibly dust
pan was
for service fibre
collection system

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Mr. Howard, Timber Mill Proprietor, took McRoberts and self to Renison Belle on Sunday. The mine at Renison Belle is Renison Associated and this mine has just requested a loan of £5,000 from Government to instal more plant. They intend replacing stamping mill by rolls as they get too much sliming. Mr. O'Dea, the Manager, did not know much about rolls as he had never used them but said Mt. Lyle had recommended them. I asked him about wear on the rolls and he said he believed high speed rolls wore rapidly and corrugated but low speed rolls were better. He was installing low speed rolls - 30" dia. x 16" face and running 27 r.p.m. He said Electrolytic Zinc at Rosebery had a couple of pairs of Allis-Chalmers rolls - high speed 30" x 14" - which needed doing up but which were for sale. He said the difficulty of using high speed rolls as slow speed rolls was that pulleys etc. would not deliver enough power. Mt. Lyle had told him that the best type were "Cornish" rolls with

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high belt speed and then geared down to low roll speed.

At the old Tasmanian Amalgamated Tin mine at Renison Belle, we inspected the air compressor and receiver that we have purchased from Mr. Howard. (Mr. Howard purchased most of the plant from this mill.) Also a flying fox which he offered to us is installed here. The air compressor is a D23, 8 1/2" bore x 10" stroke - Broomwade Machine No. 38576, pressure 100 lbs. per square inch. It was driven by a 45 H.P. 1440 r.p.m. motor (A.G.E.) S.C. The motor is not being supplied to us. 7 Vee belts used for drive. The machine delivered air to workings several hundred yards away through a 3" pipe.

The flying fox seemed rather small to me. The bucket was said to be 1/2 ton, which for one shift per day at the mill would mean 20 trips per hour. (Hodge said it had made 70 trips in two hours, i.e. 35 trips per hour). To operate the mill 3 shifts would mean 60 trips per hour which it could not do.

Visited Renison Associated new mining face. They commenced taking out by open cut but had about 15 feet or more overburden and considered lifting all this to trucks and tramping out and tipping too expensive. They have now driven a tunnel some 30 feet lower, with rise to surface and they remove the overburden and drop it through the rise into trucks below for taking to tip. Saving in cost seemed very doubtful to me.

General practice at all mills I have seen and been told about is to have air compressors at the mill not at the site of workings. Renison Amalgamated have horizontal L-gersol Rand compressor roughly equivalent to our D23 and they take air about 1 1/2 miles to mine by 4" pipes.

Monday, 6th December.

Telegraphed Jacques Melbourne to supply an eccentric

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bush wearing plate for our crusher as it was running without one. Also asked them whether it was practicable for us to use an eccentric bush with only $\frac{1}{8}$ " eccentricity instead of present $\frac{3}{8}$ " in order to get finer crushing. The plate is to be forwarded in one week and Jacques answered they recommended a bush with minimum of $\frac{1}{8}$ " total travel eccentricity. They considered anything less than this would badly reduce capacity. However, Jacques agreed to enlarge upon this in a following letter. At $\frac{1}{8}$ " total movement the movement of mantle will be $\frac{1}{4}$ " and this, with good segments should enable rock to be crushed to $\frac{1}{8}$ " maximum.

make a suggestion
 named: ataly busy
 mple and not t

Arrived at plant about 10 a.m. but men were still busy finishing the gyratory and ~~the~~ ~~just~~ ~~had~~ ~~over~~ ~~the~~

Commenced running ore through plant at 1 p.m. The ore was just as excavated, i.e. no picking was done. The jaw crusher operates very smoothly and takes readily any ore which will enter the top of the mouth. Some of the ore is as large as 12" x 10" x 8" and some as fine as 1/8" mesh. The tonnage into the mill is estimated by the number of trucks brought in. Each truck (and tipping trucks) is called a "half ton truck" and is 23" x 35" x 24" deep. One was taken at random and the ore was bagged and weighed. The weight was 9 cwt. 3 quarters 14 lbs. i.e. 14 lbs. short of 1/2 ton. The ore was damp but not really wet. It may have had 5% water in it. On the above basis our ore as delivered to mill gives 22 1/2 cubic feet per ton.

The drier runs very smoothly and gets very hot but no means of measuring the temperature is available. The fan on the outlet is out of balance on touching on one spot and vibrating rather badly and Mr. McRoberts is to attend to this. He is also to fit a butterfly valve in the outlet stack. In wet weather when ore is wet a high air speed through drier can be used but on a hot dry day like Monday, the fan

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carries asbestos fibre and dust out of the drier. Wood logs are burnt in the drier and combustion is quite good. Normally, about 1 ton per day (at 15/- per ton) approximately, delivered to mine, is burnt, but on wet days this increases to about 2 tons per day. Loose asbestos in the drier is discoloured due to heat and hence we should not aim to crush too fine before the drier.

The trommel after the drier has 1" holes and rotates at about 18-20 r.p.m. Approximately 1/3rd of rock goes through the trommel and by-passes the gyratory. The trommel runs very smoothly and gives no trouble.

The gyratory crusher runs fairly smoothly but at present does a rather poor job. The segments are badly worn on one side and with the mantle set to touch the segments on the good side there is a minimum gap of about 1/2" on the other side. This means that with the movement of the mantle there is about 1 1/4" gap on one side of the machine through which the rock passes. This is aggravated by the fact that the machine is not being fed to capacity and hence is never choke fed. Also the mantle was revolving rapidly throwing rocks around until they found the largest opening to drop through. We stopped the mantle revolving and diverted all feed to the unworn portion of the segments and got better results but still not good. The machine needs new segments properly centred and less throw. The action of the machine is good, however, as it is a cracking action and hence does not lead to excessive wear. At this stage we should crush down to about 1/2" I believe.

1st Screen.

Fibre is apparent at this stage but it is not necessarily the longest fibre in the ore and it is almost invariably discoloured from the drier. If collected separately, this bad colour is very apparent but if taken in with the asbestos liberated later it cannot be noticed.

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During this run no fibre was aspirated from this screen and hence the screen acted simply as a screen to remove fines and as a conveyor.

This screen is now:- Top Deck - $\frac{1}{2}$ " opening woven wire; 2nd Deck - $\frac{1}{2}$ " holes in plate; 3rd Deck 20 mesh. I estimate that $\frac{5}{12}$ ths of total goes over top deck, $\frac{3}{12}$ ths over No. 2 deck, $\frac{2}{12}$ ths over No. 3 deck and $\frac{1}{12}$ th goes through No. 3 deck to tailings. Of the overs from top deck, most material is $\frac{1}{2}$ " or less with a small percentage up to $1\frac{1}{2}$ ".

From the screen all material except tailings goes to the belt elevator running at about 250 feet per minute. Roughly made buckets are spaced on this about 2'-6" apart and this unit at present limits capacity to about 6 tons per hour. At least twice as many buckets are required.

The elevator delivers to the Kubit Mill. This does an excellent job of breaking ore and separating out the fibre but does not tease the fibre. Very little material over $\frac{1}{2}$ " remains after this machine. The bars of this machine are getting worn but not badly so; the lining of the machine shows no sign of wear. The machine is now running about 950 r.p.m. It is proposed to try this machine at 1800 r.p.m. and with two extra bars fitted making a total of 4 bars. The flywheel will have to be removed to do this as otherwise the speed of this will be 18000 ft. per minute which is too dangerous.

No. 2 Screen, on to which ore discharges from the Kubit Mill, is at present:- Top Deck - $\frac{1}{2}$ " opening woven wire; 2nd Deck 20 mesh. I estimated that about $\frac{5}{12}$ ths of material went over the top screen, about $\frac{5}{12}$ ths over the 2nd deck and about $\frac{2}{12}$ ths went through the second deck to tailings.

A fair quantity of fibre is aspirated from the 2nd Deck of No. 2 screen (how much in the total is impossible to estimate accurately, but probably something under $\frac{1}{3}$ rd), but

a large quantity passes over without being aspirated because it is not sufficiently teased out. This screen appears to bump slightly at the front end which makes it difficult to set the hood to pick up fibre without rock, as there is a tendency to bounce rock up into the hood. The fact that the driving rod from the eccentric is attached to the front of this screen (whereas it is connected to the back of both other screens) may be at least a contributing cause of this bouncing particularly if the eccentric or bearing bushes are slack.

From No. 2 Screen the overs from decks Nos. 1 and 2 drop into the Torrey Cyclone running at 1440 r.p.m. This machine teases out the fibre fairly well and breaks rock down to below 1/4". It did not do as well as we thought it should and after the run the hammers were examined and found to be badly worn. The leading edge for about 4" from tip was very much rounded away. For to-morrow's run the Torrey will be reversed thus bringing the unworn side of hammers into play.

The bottom bearing of this machine gets very hot - whether this is because of poor grease or because bearing is overloaded is not known at present. Heat cannot get away very readily from the bearing and we may find a circulating oil system is necessary instead of grease. I think a spare race should be kept on hand.

The Torrey discharges into a Trommel with 1/8" plate and then a 20 mesh screen around this again. This trommel screens out a large quantity of dust, almost half the total tailings coming from this unit. The material both through and over the 1/8" hole passes on to the No. 3 screen.

At present this screen is as follows:- Top Deck - 14 mesh, 2nd Deck - 20 mesh.

Two aspirating hoods are fitted on this screen, one on each deck. It is from top deck No. 3 screen that most of

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really good fibre is obtained, although a quantity (say 1/3rd of total) of fine fibre is obtained from the lower deck.

The overs from No. 1 deck amounting to, say, 1/3rd of total going to the screen at present discharges on to the floor and are shovelled back on to the belt elevator at the end of a run. It will be necessary to instal an elevator to return this material to the Torrey as the material is about 3/16" diameter and contains a high proportion of unteased fibre. (Actually, this material was returned after the run and the Torrey made a very poor job on the second pass. The material was still fairly large and a large quantity of fibre still remained even though an extra 50 lbs. of fibre was obtained by putting about 1 1/2 tons of the overs from No. 3 screen back into the Torrey).

The material from the second deck goes to tailings. (About 6/12ths of the total on this screen) and the throughs from the second deck also go to tailings (about 3/12ths of total).

For this run the total yield was only 1% and the rate was about 8 tons of rock per hour. The fibre was very clean and of grade at least equal to 4K. The main reason for the low yield appeared to be the poor performance of the Torrey.

Tuesday 7th December.

Plant ran for 5 hours - Torrey had been reversed. All remarks made re Monday's run still hold except that the Torrey now does a much better job. Material coming from Torrey was about half the size of yesterday and much more fibre was teased out. The material was better than after the second pass yesterday. In the oven from top deck of No. 3 screen, however, there is still a lot of fibre which must be collected as it is of recoverable size. There is

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The space suit operates successfully, but a
 certain quantity of heavy fine robotor is discharged from
 the plane into the dust room. The dust room is
 a complete outer room of the dust room and is
 the outer room discharges through the dust
 room. The room is so small with the dust room
 it is almost unbearable to walk even into the outer room
 while the inner room is almost impossible to work out
 without a complete service respirator. These conditions
 are not worse than the Russian dust room conditions
 when the first communication and which will be
 displayed for an efficient system. I believe we
 must fit an efficient collector in place of this dust room

~~...efficient collector for the dust from various
parts of plant.~~

Clearly know
about need
for respirators
at times.

~~...dust, with the No. 1 cyclone and ... taking
dust from the tunnel before No. 2 screen. It is so
to walk freely about the mill without a dust mask unless
one wishes to bend over a screen or tailings chute, where
a dust mask is essential. If ...
... and silica dust about would be injurious to health
... a period and we must eliminate ... All~~

not only
not specifically
in evidence
(as yet).
plant - allowed
them to do a
lot of
experimentation

positions where fine dust occurs, such as trommels, tailings
chutes, Torrey cyclone and Kubit mill, ...
... in, with hinged doors provided, to permit inspection
when necessary and a ...
... not run to each position. A hinged flap should be
provided at the end of each tailings chute to fit over a
tailings truck when one is in position. If ...
also to stretch tailings before tipping ...
dust nuisance occurs and in this connection a water supply
... looking into.

Friday, 10th December.

A run was made on Friday after two extra hammer bars
had been fitted to the Kubit Mill and after fitting extra
buckets to the elevator.

In one hour 5 cwt of good clean asbestos was obtained
but losses were heavy as the plant was being fed at the
rate of about 8 tons per hour. No. 3 screen was overloaded
and the aspirating hoods could not deal with the quantity
of asbestos coming over the screen. Also much of the fibre
was insufficiently teased in the Torrey cyclone at this
feed rate. Towards the end of the run the feed was cut
down to about 5 tons per hour and No. 3 screen and the
Torrey then handled the material comfortably. The two
additional bars on the Kubit Mill did not appear to make
much difference.

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-10-

The Kubit Mill was then speeded up to 1800 r.p.m. and in a little over half an hour 5 cwt of fibre was obtained. The quantity of tailings from No. 2 screen increased considerably thus relieving the Torrey of unnecessary work and there was very little material going over No. 2 screen top deck. It appeared as though the Kubit was grinding about twice as finely as before.

It still did not tease out the fibre in the way the Torrey does, however, and consequently much unteased fibre went over into the Torrey. This does not matter as the Torrey does not cut up the fibre.

The runs on Friday were too short to get reliable figures but the plant will run all day Saturday. However, it appeared that a rate of, say, 7 tons per hour and a yield of 4% fibre could probably be maintained, thus giving, say, 2 to 2½ tons of fibre per day or, say, 600 tons per annum.

Mining.

Mr. McRoberts and Mr. Hodge believe the drier will not dry the ore in wet winter weather without previous drainage and atmospheric drying. This means we may have to have, say, a weeks storage at mill and hence more than a hopper at the crusher is necessary.

If we build a long hopper or drying shed on the spur we must then feed the jaw crusher by conveyor and if this hopper is in line with the building it will not be the right angle for a flying fox.

It appears, therefore, that we will need eventually a long hopper running at right angles to building; a conveyor over this to distribute ore as it is delivered from a flying fox; a conveyor beneath the bin to deliver to the jaw crusher. As the ore is variable, in order to keep a constant grade of asbestos it may even be necessary for the hopper to be divided into sections, each to take a different grade ore

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-11-

as it is mined, with the object of mixing these on the conveyor belt as required.

The quality of the ore on the spur appears to me to be generally equivalent to the ore elsewhere on the hill and there is no reason, therefore, why we should not take off the top of the whole spur at least to the level of the roadway at this point.

After further inspection, I doubt whether there is any need to worry much about commencing mining at No. 2 tunnel - we could just as easily commence at the site of the No. 1 tunnel although we should still put in a cross-line to No. 2 tunnel for the purpose of disposing of barren rock. Alternatively, a good spot for disposal of barren rock is the side of our spur nearest to the railway tunnel and by running the conveyor mentioned above beyond the bin, waste rock could be brought down by flying box, conveyed out past the hopper and shot down the hillside.

Tailings.

McRoberts and Hodge suggest that to save labour involved in carting tailings to dumps (two men per day when on full capacity) we could sluice tailings to dump. This would also involve use of large quantity of water, of course.

Air Compressor.

It is proposed to instal the D23 air compressor and receiver at the side of the mill building nearest roadway and near the lower entrance to the mill. Air will then be taken to the workings by 3" pipeline.

Mill. To increase the capacity of the mill and cut down losses, further plant which should be installed is:-

After Gyratory crusher, fit a trommel to by-pass material under 1/4" and put remainder through Kubit Mill. After Kubit Mill put a trommel to take out all dust and put remainder over aspirated screen. No. 1 screen would go

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to this position.

From the screen the material would go to a ~~trough~~.
~~After the Jumbo put a trommel~~ ~~trough~~ and
the remainder goes to a screen for aspirating fibre.
The present No. 2 screen would be in this position. The
remainder of plant up to No. 3 screen would remain, but
after No. 3 screen, overs would go to rolls, then to
trommel to remove all fine grit and dust and then back
into Torrey cyclone.

Mining Costs to date.

Costs to date on rock on spur are as follows:-
There is approximately 15,000 tons to be excavated.
First 300 tons cost £200 on day wages and with expense
of removing overburden etc. Now men are on 3/- per ton
(plus, say, 6d cost to us for air.)

Hence, total cost = 1200 tons @ 3/6 = 420/-

plus 300 tons (Total cost - £200) 4000/-

1500 tons to cost 8200/-

= 5/6 per ton approximately.

Wood.

Wood is cut on contract for 3/- per ton = 80 cubic
feet. In addition 1/6 per cord (= 128 cubic feet) is paid
to Forestry Commission. Mr. McRoberts estimates wood
costs us 15/- per ton delivered at mill. In fine weather
about 1 ton per day is burnt in drier. In wet weather
about 2 tons per day is used in drier.

Labour.

Mr. Hodge receives £7.17. 6 per week (25/- per day
plus £1 "retaining fee" and has no particular status but
is accepted as second-in-charge by the men. Mr. McRoberts
thinks we should definitely make him second-in-charge and
pay him £7.17. 6 per week.

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The next highest paid man is Tomkin a carpenter and Titter who receives £7. 14. 6 and who was originally given this on being in charge of 3 carpenters. Next highest is Bob Clark who gets £6. 2. - per week and is classified, I believe, as a truck driver in order to give him this rate. He is a valuable man and it would pay us to give him more. McRoberts suggests calling him Mill Foreman and paying him, say, £6. 17. 6 per week.

The basic industry wage is £4. 12. - plus $\frac{3}{4}$ per week war loading.

Other classifications in the mill will be as far as I can see:- Jaw crusher attendant, Drier attendant (to be understood to do other work when not stoking drier), operator to attend to screens, elevators and other equipment (one man), Tailings truck man (probably two men), Asbestos bagger (one man). At present the men on tailings also bag and it would be handy to keep these two jobs equal in pay.

Mr. McRoberts is to forward copies of all relevant awards to Head Office as soon as possible.

Other classifications such as miners, flying fox operator, etc., are already covered by award to which Mr. McRoberts is working.

Mr. McRoberts would like to pay 9/- margin to crusher attendant, drier attendant and mill hand, and 5/6 margin to bagger and tailings man.

Samples.

The following samples have been collected for forwarding to Sydney:-

Ore Sample	} Same truck	marked	18
Ore Sample			28
Over No. 1 Top deck	"		35
Over No. 1 Second deck	"		45
Over No. 1 Third deck	"		58
Over No. 2 Top Deck	"		68

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-14-

Over No. 2 Second Deck	marked	78
Over No. 3 second deck	"	88
Tailings from No. 3	"	88
Over No. 3 Top Deck before reversing Torrey	"	108
Over No. 3 Top Deck after reversing Torrey	"	118
Over No. 3 Top Deck after reversing Torrey	"	128
Over No. 3 Top Deck after reversing Torrey	"	128

difficult to say
whether they
were looking for
value - maybe
just plant
efficiency value

Water Supply.

The possibilities in this regard are:-

(1) Pump from Melba Creek where it crosses the Zeehan Renison Belle road. This is a distance of about $\frac{1}{2}$ mile and the creek is about 400 feet below mill level.

(2) Where the old East Dundas tramway and the transmission line intersect, well up in the hills, Melba Creek is still running quite strongly and the East Dundas tramway almost forms a dam at this point.

To pump from here would mean about the same distance as before but there would be much less head. The actual height is not known at present.

(3) The Argent River in front of No. 2 tunnel is a possibility but is very inaccessible and has been known to dry up in Summer.

(4) A further possibility would be to construct a 15 ft. dam between our spur and the Renison Belle Road. This would entrap water from the catchment formed by our main hill and the flat in front of the mill. The main objection to this is that we wish to fill this area with tailings eventually.

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Mt. Lyle M. & B. Co. Ltd.

Mr. McRoberts and I visited the Mt. Lyle Co. on Thursday 9th December. Mr. Murray, General Manager was ill but we saw Mr. Maline, General Superintendent, Mr. Jakins, Mining Superintendent, Mr. Barclay who is apparently Mr. Jakins assistant, Mr. Duff whose position is not quite clear but who has taken Mr. Robinson's place apparently (Mr. Robinson died some six weeks ago) and a number of other officers of the Company. All officers were most friendly and co-operative.

Mr. Maline said he had a brother in the C.S.R. Co. Ltd. many years ago who was manager at Harwood Mill. We questioned Mr. Maline concerning the best type of truck for our mining operations and he recommended the "Ballum" 1 cubic yard side tipping truck, 2'-0" gauge, and he made plans of this truck available to us. He also said he could sell us a couple of dozen wheels for this type if we found it difficult to obtain them. Mt. Lyle Co. make their own trucks and Mr. Maline said that in normal times they would be quite willing to make some for us but he could not offer to do so at present due to material and staff shortages. This truck weighs 12½ cwt. and in 1935 cost £32 each to make in Mt. Lyle Workshops.

I told Mr. Maline we would shortly have to renew the segments in our No. 2 Jacques gyratory crusher and as we had no experience in this work we would welcome any assistance he could offer us. He offered to make a man available to us who was used to this work immediately we were ready to fit the new segments.

Mr. Jakins had visited the site of our asbestos mill but said that he had not considered the best methods of mining. He said, however, that it had crossed his mind that for mining on a fairly large scale it would be

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-16-

possible to drive a shaft into the hill almost at mill level, rise to the surface in the hill and then excavate and dump rock down the rise to trucks in the drive.

Mr. Barclay took us up to West Lyle to see the open cut work after Mr. Maline had explained the whole of the workings to us on a model 100 feet to 1" made of wood. The model is corrected each year.

At West Lyle some 6000 tons of rock per day is being excavated. Most of this is millable rock containing 0.6 to 1.1% ore but a percentage is barren rock which is used to form roads around the hillside. All roads are well made, bitumen sealed and a minimum width of about 30 feet.

There are three main benches each about 50 feet high and a further bench sunk 80 feet below the ordinary working level. To take out material from this lower bench instead of hoisting the material, a 24 ft. tunnel has been cut into the bench from lower down the hillside and the ore is taken out through this by lorry.

For blasting, holes are drilled up to 30 feet deep, but 20 feet is most common and these are charged with A.N. 50 polar gelignite. Monobel had been used following recommendation by Mr. Edwards of I.C.I. but Mt. Lyle could find no advantages and have reverted to gelignite. All holes all over the workings are shot at the one time, usually at a change of shift or at crib time and three minutes before firing a siren wails and continues to wail until all shots have been fired.

Material that has been blasted out is lifted by mechanical shovels (mostly 2½ cubic yard Harman type) and placed in 16 and 20 ton trucks. Any rocks larger than 2'-0" are drilled again and pop shots put in to break them up. The reason for this is that the maximum size rock the rail trucks running to the mill can discharge is 2'-0".

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-17-

There are about 9 mechanical shovels, these being 4 - $2\frac{1}{2}$ cubic yard, 3 - 2 cubic yard, 1 - $1\frac{1}{2}$ cubic yard and 1 - $1\frac{1}{3}$ rd cubic yard.

About half of them are diesel driven and the remainder are electric driven and cables have to be run to these.

When blasting some of the rock is scattered fairly widely and to save the time of the mechanical shovels, a bulldozer is used to push all the pieces to a common dump on each bench.

Some of the 16 and 20 ton lorries are Leylands which have not given very good service and the remainder which are Podans with Gardner Engines have given wonderful service. All trucks (9 total) are fitted with semi-trailers. The lorry has two front wheels, four back wheels and the trailer has two sets of four wheels. The chassis as imported were too light in every case and Mt. Lyle now makes all their own chassis from channel iron. The truck bodies which are exceptionally sturdy are made by Peters Bros., Sydney.

The lorries discharge into a vertical shaft about 8'-0" diameter which has a conical top some 50 feet in diameter. The top portion of this shaft is about 100 feet deep and this, together with the 50 feet diameter cone, constitutes a storage hopper. At this level the ore is regulated to fall a further 800 feet as required, into railway trucks (10 tons with discharge doors at each side of the bottom). This shaft is never allowed to fill up as if a blockage occurred it would be almost impossible to free it. The discharge from the 800 feet shaft into the trucks is controlled by a curtain of heavy chains which is moved away from or in front of the discharge opening as required by means of a motor.

All tools, excavating equipment, lorries etc., are fully maintained and repaired by the Mt. Lyle Co. at

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West Lyle, and an extraordinarily complete stock of spare parts for such equipment is kept. As new parts are hard to get nowadays, however, Mt. Lyle has also made a speciality of reconditioning and Mr. Jakins told me that out of every 3 spare parts now issued from the store for replacement, two are reconditioned units.

For deep drilling, Mt. Lyle uses detachable bits, but for popping and for shallow drilling, steels are still used. Mr. Barclay considered detachable bits were not economical for drilling shallow holes as the hole was invariably bigger than could be drilled with a steel and the tendency then was to use too much explosive.

The bits were originally re-sharpened on a cold grinding machine but this has been replaced by the hot milling process. Too much metal had to be ground off the worn bits with the cold grinding and often only 3 or 4 uses were obtained from a bit. They now average 8 uses per bit. /Mt. Lyle offered to sharpen bits for us, if we commenced using them, at 3d per bit and also agreed to recondition the shank of some of our existing steels.

The total cost of excavating rock at West Lyle (including, I believe, maintenance, depreciation on equipment, overhead etc.) was given to me by Mr. Maline as 8/6 per ton. He said this was far too high and he fully believed that after the war when he could obtain adequate equipment for the work that he would be able to reduce this greatly.

The locker rooms at Mt. Lyle are fitted with lockers 2'-0" x 20" deep and approximately 4'-0" from seat height to top of locker. The door opens just above seat height and a seat runs along the front of all lockers. Each pair of lockers is fitted with a 1/3 K.W. electric heater at the bottom for drying clothes, and ventilation is provided in the locker top. This heat which can hardly be felt in each locker is sufficient to dry the miners' clothes in 8 hours.

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-2-

possible hold ups. I will arrange for one additional set of hammers for the Torrey to be sent to you (coated with Fitwell alloy) but all other items should either be ordered direct by you or a requisition forwarded to us. You will doubtless consider that a number of machines and hand tools, bearings, and other items may be necessary in order to guard against breakdowns and a list of such items should be forwarded for our approval.

Other jobs which we agreed should be carried out are:-

- (1) Exhaust fan from drier requires attention to prevent vibration.
- (2) Exhaust Fan stack to have damper fitted.
- (3) Erect D23 Air Compressor and receiver alongside Mill Building (In this connection I will purchase for you a 45 H.P. motor).
- (4) Handrails to be erected as time and labour permit. This will serve to make plant stagings, access stairway, etc., safer than at present.
- (5) New bottom eccentric bearing with $\frac{1}{8}$ " eccentricity to be ordered from Jacques by you.

As regards water supply both for drills and for drenching purposes, three main items of information are required:-

- (1) Height from Melba Creek at road to Mill.
- (2) Height from Melba Creek at East Dundas Tramway - Transmission line intersection.
- (3) Rough contour of our own valley where dam was proposed.

In addition, of course, if any alternative schemes are brought to light, information on these will be necessary.

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