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AUSTRALIAN BLUE ASBESTOS LIMITED

WITTENOOM GORGE, W.A.

REPORT ON VISIT FROM 27TH NOVEMBER TO 5TH DECEMBER, 1944.

I left Perth for Wittenoom on 27th November by plane (a six passenger Dragon Rapide), and had as a fellow passenger, Mr. Walters, who is prospecting in an arm of Wittenoom Gorge. He told me he had three men working for him at present.

We landed on our new aerodrome at Wittenoom (the first passengers to land). The aerodrome is still a little rough and badly needs a good soaking of rain to consolidate it properly, but generally it is a very good aerodrome. The pilot thought it was a little too close to the range of hills, because it is necessary to keep up 6 to 8,000 feet crossing the gorges and then within a few miles the plane must drop to land on the aerodrome. However, he was not seriously questioning the position.

SETTLEMENT.

The houses and barracks we have built are quite good and the Cane-ite walls are standing well to date. I did not see any Cane-ite seriously damaged and Mr. Broadhurst said that practically no damage had occurred during shipment to Wittenoom, whereas asbestos cement sheeting was usually badly damaged on the way to Wittenoom.

At present four houses are complete and are occupied by (1) Mr. & Mrs. Wallace, (2) Mr. Dignam (Mill Foreman) and his Mother, (3) Mr. Yeldon together with his wife and two small children, and (4) Mr. & Mrs. Moir (Engine Driver). Two other houses are almost completed, one of these being used now as a staff quarters and the other is empty. The staff quarters

are at present occupied by Mr. Singer and Mr. Walker (Underground Supervisor). Mr. Broadhurst and Mr. Hancock are still living in the small room they use as an office.

The foundation has been placed for one staff house, but the second one which has been authorised is not yet commenced. The foundation has also been placed for a staff mess.

One barracks has been completed but the second has not yet been started and some twenty men are still living under canvas. The barracks mess has not yet been commenced.

Water from the settlement is pumped from a well near the barracks and this was almost empty when I arrived. Later the well was deepened about three feet and the extra water obtained is more than sufficient for the needs of the settlement. The houses are not lit by electricity and lamps are used for illumination.

The houses, barracks etc., are almost as cool as it is possible to get them I think. The direct heat of the sun is well insulated from the interior and the fact that the temperature inside rises gradually to over 100° F. cannot be avoided unless all doors, windows etc. are kept closed, as anywhere in the shade the temperature rises to 100 to 110° at this time of year. A slight improvement could be made by closing in the verandahs for, say, 3 feet from the roof as the width of the verandah compared to its height is not sufficient to keep the sun off the walls in the evening.

The houses are well placed so that any breeze goes through each room and in a breeze at night the houses cool rapidly if the doors are left open.

The only complaint Mrs. Wallace had to make was that the heat from the fuel stove in the kitchen was almost unbearable. It may be that oil stoves may be better for this climate and this could be looked into for future houses. Mrs. Wallace is looking and keeping extremely well but says there is not enough to occupy her and she gets rather bored at times.

MILL BUILDINGS.

The position with regard to mill buildings is as follows:-

The change and shower rooms are complete and are quite good. No lockers for clothes are available yet. The lavatory block is completed and is quite satisfactory. The mess building is completed and is of quite a good standard. In each case a section at one end of the building is reserved for staff use.

The store building is completed and generally the store is well kept although more shelves, cupboards etc. are needed yet.

An office consisting of two rooms is built. One room is used by Mr. Broadhurst and Mr. Hancock for both an office and a living room the other room is used by Mr. Wallace and Mr. Walker as an office.

The power house is roofed and the side near the mill is covered in, also half one end is covered in. The remainder is still uncovered. The floor around the engines is concreted, and the machine shop end is concreted but two bays of flooring still need concreting.

The crushing house has no ventilating ridge but the remainder of the roof is on. The sides are not on. No concrete flooring is placed in the building.

The last four bays of the screening and grading building are not roofed and the sides are not on the last five bays. The lean-to adjoining this building is not commenced although the steel and other material has now arrived. Concrete flooring for $2\frac{1}{2}$ bays around the bagging station has been poured but no other floor is placed in this building.

When completed the mill buildings generally will be quite good with adequate space around the plant. Iron of very light gauge has been used for much of the roof and sides and it will probably be necessary to fit storm battens.

MILL PLANT.

Ore Bin and Ross Feeder. This is quite satisfactory and needs very little attention.

No. 1 Crusher (Roll Jaw). This machine does excellent work and runs very smoothly.

No. 2 Crusher (Sturtevant Jaw.) This machine has given a lot of trouble as the feed choked frequently. Recently by attention to the toggle action etc. it has been much improved and is now fairly satisfactory. However, as it has the jaw hinged at the bottom it will probably always give a little trouble by choking.

No. 1 and No. 2 Belt Conveyors. These are good sturdy belts and give no trouble and have adequate capacity.

Rolls. These are two small and will gradually pound to pieces. A new larger set has been placed on order.

Rotex Screens. These have given endless trouble in the actuating mechanism but have now been strengthened so that they operate fairly well. They are still a source of possible weakness, however. New gearboxes of heavier design have been ordered for these screens.

Shaker Screens. All shaker screens work quite well and have a satisfactory action.

Hammer Mills. The hammer mills are quite satisfactory and now that manganese hammers have been fitted, the hammers are giving good service and should last longer than originally estimated.

Waste Bin. The screws in this bin do not operate as the weight of material on top of them is too great. It may be possible to make them work by putting screening plates over them to support the bulk of the weight in the bin.

Electrical Plant. The motors generally will gradually suffer due to the dusty conditions unless the dust is quickly eliminated. Much of the wiring is simply strung about the mill very untidily but where it has been placed in conduit

or piping, particularly if underground trouble has been experienced due to water getting into the wiring.

Air System. The fibre-air system of fans, ducts, separators etc. works fairly well but a lot of work still remains to be done to make this system a good installation.

Dust. No serious attempt to eliminate dust has been made and those concerned are awaiting the arrival of the dust collecting equipment which is on order. The dust is very, very bad and is aggravated on windy days by the open buildings which allows grit, dust and fibre to be blown off the belt conveyors and screens. The main sources of dust are the No. 2 crusher, the rolls, the Rotex screens, the cleaning trommel and the discharge from the waste bin. The mill is so dusty that it is definitely hazardous to health.

General. Generally, although most of the units are quite good as noted above, the whole plant has been put together with very little skilled labour available and many items will require attention before the mill can be relied upon to crush continuously for week upon week. Even if the mill was not operating, probably four good tradesmen and mates would be employed for a month putting the mill in first class running order without installing any new plant.

POWER HOUSE PLANT.

Plant in the power house was running well during my visit and is being well attended to. The completion of this building will help to keep the engines, generators and compressors in good order as at present dust from the mill and from the gorge is quite a nuisance in the power house.

FLOW SYSTEM OF MILL.

Generally the flow diagram of the mill has worked out very well but the obvious points requiring alteration (which have all, I think, been mentioned previously by

Mr. Broadhurst) are:-

- (1) If possible ore should be crushed smaller before going to the rolls. This probably means an additional jaw crusher either at the mill or mine, depending on where a picking belt is placed.
- (2) The rolls are not large enough and must be replaced with the heavier set now on order.
- (3) A waste bin is required near the Rotex screens to collect the dust and grit screened out at this stage.
- (4) A pair of rolls are required to crush the material going to No. 3 Hammer Mill and a screen is then required before No. 3 hammer mill to remove dust and grit. This installation is proceeding. The return conveyor to make a closed circuit from the last screen back to these rolls is now installed but is of no use until the rolls are in operation.
- (5) The trommel for cleaning No. 3 fibre should be moved and placed so that the dust and grit screened out here discharges on to the waste conveyor. At present it discharges back on to the main belt feeding No. 3 hammer mill.
- (6) Plant must be installed to completely eliminate all dust. Much of this plant has been ordered but in view of our experience in Tasmania where multiclone collectors are not entirely satisfactory, it appears as though further equipment should be ordered. All material being discharged from waste bins will probably have to be drenched.
- (7) The hoods on the shaker screens for collecting fibre want replacing with properly designed hoods fitted with adjustable flaps similar to those used in Tasmania.

MINE.

Slightly over 2,000 feet of drives have been made at the mine, 700 feet of this being on a 20 ft. face and the remainder mainly 8 to 9 feet wide.

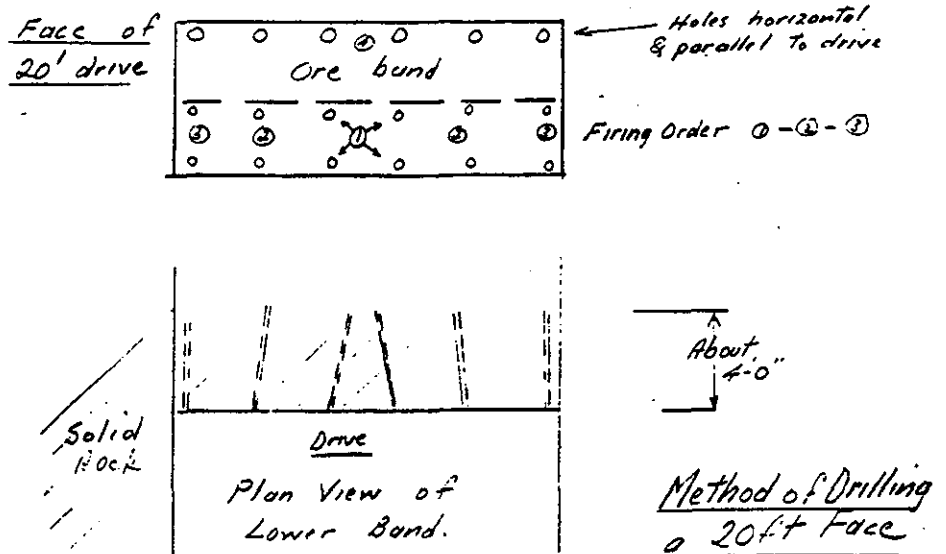
Unfortunately, many of the drives went astray at first due to inadequate surveying but gradually the mine is being straightened out to conform to the plans proposed by Mr. Bowdler. Plan B.M.D. shows the present state of the mine and for reference, a tracing of Mr. Bowdler's plan covering the same area is included on this plan.

At present, 7 faces are being worked, 3 of these being 20 ft. faces, three about 9 ft. and one 12 ft. face. If

the present labour, sufficient to work these faces, continues, some 6 tons of fibre per week will be obtained at the present yield or if all fibre is saved from the mine probably 8 tons per week may be obtained.

In all drives at present being worked the fibre band is at the top. In No. 4 drive it is at the bottom but this drive has been stopped as the rock above the ore band is too hard to drill.

The face is drilled (as shown in sketch for 20 feet face below) and then the lower 2'-9" is shot out and the fibre band left hanging. It is most difficult apparently to leave the whole band hanging and some invariably get broken down and are carted out with barren rock and tipped over the gorge.



The ore on hand is then shot down and until just recently the miners separated the ore in this band and trucked it to the mill and treated the remainder of the band as barren rock. At present the whole ore band from three faces is being brought down but the other four faces are still being picked because the transport facilities cannot handle the whole band to the mill.

To date the whole of the drives have yielded only 1*

From measurements I have made in a number of the drives, I do not believe we can hope to average 3" of fibre. The figure will be nearer $2\frac{1}{2}"$ ($2.45"$ actually obtained as average of 40 measurements), and this, of course, is a maximum figure and it will not be possible to get 100% recovery. A trial has been run taking the whole of the rock from four faces to the mill in order to assess the possible yield and this is being reported separately. At 90% recovery, the yield will be only $2\frac{1}{4}"$.

Six readings across the face of the ^{best} last 20 ft. drive.
were as follows:-

[illegible]

Probable % for 1st and 2nd grade = 46% ($\frac{1}{2}$ " & over)

Five readings from another 20 ft. drive were:-

1.	2.	3.	4.	5.
$\frac{1}{2}$ "	$\frac{1}{2}$ "	$1\frac{1}{2}$ "	$\frac{1}{2}$ "	$\frac{1}{2}$ "
$\frac{1}{2}$ "	$\frac{1}{2}$ "	$\frac{1}{2}$ "	$\frac{1}{2}$ "	$\frac{1}{2}$ "
$\frac{1}{2}$ "	$\frac{1}{2}$ "	$\frac{1}{2}$ "	$\frac{1}{2}$ "	$\frac{1}{2}$ "
$\frac{1}{2}$ "	$\frac{1}{2}$ "	$\frac{1}{2}$ "	$\frac{1}{2}$ "	$\frac{1}{2}$ "
$\frac{1}{2}$ "	$\frac{1}{2}$ "	$2\frac{1}{2}$ "	$\frac{1}{2}$ "	$\frac{1}{2}$ "
$\frac{1}{2}$ "	$\frac{1}{2}$ "		$1\frac{1}{2}$ "	$2\frac{1}{2}$ "
$\frac{1}{2}$ "	$\frac{1}{2}$ "			
$\frac{1}{2}$ "	$\frac{1}{2}$ "			
$2\frac{1}{2}$ "	$2\frac{1}{2}$ "			

Average = $2\frac{1}{2}$ "

Probable percentage 1st and 2nd grade fibre is 40%

Readings from an 8 ft. face were:-

1.	2.	3.	4.	5.
$\frac{1}{2}$ "	$\frac{1}{2}$ "	$\frac{1}{2}$ "	$\frac{1}{2}$ "	$\frac{1}{2}$ "
$1\frac{1}{2}$ "	$\frac{1}{2}$ "	$\frac{1}{2}$ "	$\frac{1}{2}$ "	$\frac{1}{2}$ "
$\frac{1}{2}$ "	$\frac{1}{2}$ "	$\frac{1}{2}$ "	$\frac{1}{2}$ "	$\frac{1}{2}$ "
$\frac{1}{2}$ "	$\frac{1}{2}$ "	$\frac{1}{2}$ "	$\frac{1}{2}$ "	$\frac{1}{2}$ "
$\frac{1}{2}$ "	$\frac{1}{2}$ "	$\frac{1}{2}$ "	$\frac{1}{2}$ "	$\frac{1}{2}$ "
$\frac{1}{2}$ "	$\frac{1}{2}$ "	$\frac{1}{2}$ "	$\frac{1}{2}$ "	$\frac{1}{2}$ "
$\frac{1}{2}$ "	$\frac{1}{2}$ "	$1\frac{1}{2}$ "	$\frac{1}{2}$ "	$\frac{1}{2}$ "
$\frac{1}{2}$ "	$\frac{1}{2}$ "	$\frac{1}{2}$ "	$1\frac{1}{2}$ "	$\frac{1}{2}$ "
$\frac{1}{2}$ "	$2\frac{1}{2}$ "	$\frac{1}{2}$ "	$\frac{1}{2}$ "	$1\frac{1}{2}$ "
$\frac{1}{2}$ "		$2\frac{1}{2}$ "	$\frac{1}{2}$ "	
$2\frac{1}{2}$ "		$2\frac{1}{2}$ "	$2\frac{1}{2}$ "	

Average length = $2\frac{1}{2}$ "

Probable percentage of 1st and 2nd grade = $\frac{5\frac{1}{2}}{11}$ = 50%

The average grading from the fibre produced to date is 1st grade 11.2%, 2nd grade 32.2%, 3rd grade 52.1%, 4th grade 2.5%, and floats 2%.

The fact that only $2\frac{1}{2}$ " of fibre is available, plus the low yield being obtained from mill and mine makes mining costs very high. Much of the low yield is attributed to the mine not sending all fibre to the mill and this should cease immediately. If we cannot take the whole of the ore to the mill we should not mine the face.

If leaving the ore on top continues to give trouble then we must leave the ore on the floor and learn how to drill the harder rock above the fibre. This is probably the best method in any case as it enables the least amount of rock to be taken to the mill.

At present in the mine all bogging is by hand shovel, all trucking is on 18" gauge line by hand, and all drilling is from man handled drilling posts. We badly need mechanical bogging equipment, drill carriages on wheels and power units for conveying ore to waste and to the mill.

As it appears desirable to have an additional crusher and a picking belt, the best installation to cover this and to cover transport to the mill may be a crusher at the mouth of the mine and a belt conveyor from mine to mill. Picking could be done anywhere along the conveyor, the waste going to the gorge.

Explosives, fuses, etc. are issued to the miners and the cost deducted from their earnings each two weeks. Fracture ^(60 to 75% dynamite) costs £5 per case of 50 lbs delivered at Wittenoom, i.e. 2/- per lb. and it takes about 1 lb. of fracture per ton of rock mined. Including fuses etc. the total cost of explosives is about 2/8 per ton of rock mined or £8. 5. - per ton of fibre at the present 2% yield.

3½" drifters are used for drilling. One 3" drifter was tried but was not large enough. A 3½" drifter takes about 180 cubic feet of air per minute.

With present methods of mining, one driller and two bidders can bring down one 20 ft. face each two days (one shift) making 4'-0" headway approximately.

WAGES.

Wages paid at Wittenoom are mining award wages plus 30/- away from home allowance, 15/- district allowance, 15/- special Wittenoom allowance, 5/3 tent allowance. If

a man goes into barracks he loses the 5/3 tent allowance and when he gets a house he loses his away from home allowance. When the additional houses and barracks are built (which have been authorised) the idea is to stop the away from home allowance completely. It may be 6 months yet before this stage is reached.

The wages as paid to various classifications are listed on page (12) attached together with current contract rates for mining.

Mining wages are not excessively high although they appeared to be so from the figures on the Manufacture Report. Figures on the Manufacture Report to date are unreliable as on some reports fortnightly wages have been recorded and on other reports weekly wages have been recorded.

For two weeks ended 16/11/44, total mining wages for 16½ men were £483. Cost of fracture was £51 leaving £432 or an average of £13 per week per man. One man made £22 per week, one man £19 per week, two men £13 per week and the remainder from £8.10. - to £11 per week. For two weeks ended 2/11/44, total wages were £471, fracture was £46 leaving £425 between 18 men or £13. 5. - per week average. The highest earnings were £17 per week and the lowest £8. -. - per week. As a few miners have to have their wages made up to them it does not appear as though mining contract rates can be much reduced until adequate mining equipment is supplied.

In addition to the Contract rates quoted, since all the ore band has been trucked to the mill, an extra 2/- per truck has been paid (approximately 2/- per ton of rock) to compensate for the extra work of trucking to the mill instead of tipping at the mouth of the mine.

WAGES - 30/11/44.

No. of Men.	Classification	Basic Rate	Allowance ^x	Total
1	Mill Foreman (In House)	Flat Rate		£9.10.
1	Engine Driver (In House)	£6.15. 1	30/-	£9. 3.
5	Fitters	£6.17. 1	65/3	10. 2.
2	Truckers	£5.16. 1	65/3	9. 1.
3	Platelayers	£5.16. 1	65/3	9. 1.
10	Boggers	£5.16. 1	65/3	9. 1.
1	Cook	£6. 6. 6	65/3) Plus	9.11.
-	Cook's Assistant	£5. 4. 9	65/3) Free Mess	8.10.
1	Storekeeper (In House)	Flat Rate		8.10.
-	Labourers	£5. 7. 1	65/3	8.12.
2	Truck Drivers	£6. 9. 7	65/3	9.14.10
1	Welder	£5. 7. 1 + 33/-	65/3	10. 5. 4
1	Sheet Metal Worker	£5. 7. 1 + 33/-	65/3	10. 5. 4
1	Plumber	£6.16. 7	65/3	10. 1.10
1	Toolsharpeners	£7. 5. 7	65/3	10.10.10
1	Carpenter	£6.16. 7	65/3	10. 1.10
-	Underground Supervisor	Flat Rate		12. --

In Mill

Crackerman) When mill is working get 1/6 per day extra
Boggers) otherwise paid as labourers.

1 Carpenter on Contract at Settlement

^x Allowances are:- 30/- away from home; 15/- District Allowance;
15/- Special Wittenoom; 5/3 tent allowance.
If in barracks 5/3 deducted. If in house 35/3 is deducted.

CONTRACT RATES (December, 1944)

20 ft. face. £5 per foot of advance for 8 ft. high drive; miners to supply fractures but we supply air, drills, implements etc.
8 ft. face. £3 per foot of advance, basis as for 20 ft. face. Alternatively 30/- per foot for drilling and firing (fracture supplied by drillers) and 30/- per ft. for bogging.

PROSPECTORS' ORE.

The question arises as to whether we should crush ore for prospectors such as Walters and if so at what price.

Assuming selling prices at Pt. Sampson of £70 1st grade, £45 2nd grade, £25 3rd grade, and, say, £18 4th grade (prices as assumed in a previous note dated 7/7/44) the average selling price of fibre obtained from Walter's ore is £36.5 per short ton. The grading of prospectors' ore has been approximately:- 9.8% - 1st grade, 36.2% - 2nd grade, 52% - 3rd grade, 2% - 4th grade.

As long as we clear our working expenses on prospectors' ore it pays us to crush it whilst our own ore is so dear.

Charges are:	Sacks	£1. 5. - per long ton
	Freight	£8. -- -
	Milling	£6. -- -
	P.R. Tax, Workers' Compensation, holiday pay, etc.	£2. -- -

		£15. 5. - per long ton
		= £13.6 per short ton

Therefore, we can pay for fibre in the mill bin up to £36.5 - 13.6 = £22.9 per ton fibre recovered. At the present rate of £20 per ton which we have paid to Walters and other prospectors, we should make £3 per ton profit approximately.

If the average selling price is higher than assumed then we can afford to pay more for the fibre. For example, with

selling prices of £75, £50, £30 and £18 respectively for grades 1 to 4, the average selling price would be £41 and we could pay up to £27.4 without loss or, say, £24 per ton and still make a reasonable profit.

Walters, who is mining in Western Arm of Wittenoom Gorge, wants £22 per ton, although he recently sold us ore for £20 per short ton of fibre. Walters is supposed to be negotiating with De Benales on the basis that Walters receives £10,000 for his leases, but in addition, Walters is to guarantee to supply ore to De Benales from these leases at £22 per ton fibre and to guarantee 25 tons per month for eight years. Presumably the ore will be carted to Yampire Gorge for crushing.

Walters will only agree to produce ore for the duration of the War as he wishes to visit England then, and, hence, negotiations are held up on this point.

As we are not yet sure what selling price we can get for various grade fibres I do not think we should pay more than £20 per ton but we should be prepared to purchase fibre from any prospector including Walters at this figure until we get to the stage where crushing prospectors' ore upsets our own crushing schedules.

In our own gorge, if we supply air we could probably afford to pay, say, £16 per ton (allowing £4 per ton for cost of air) and show the same profit, but if we make it too attractive we may be required to supply air in many places in the gorge and I think a figure of £14 per ton delivered to the bin would be fair.

One other aspect is whether we should pay on an overall tonnage basis or whether it may not be better to pay for each grade recovered.

Payments (without air) under such a scheme would

be:-

1st grade - £75 less £13.6 = £61.4 less 10% profit approx =	£53. -- -
2nd grade - £45 less £13.6 = £31.4 less 10% profit approx =	26. -- -
3rd grade - £25 less £13.6 = £11.4 less 10% profit approx =	10. -- -
4th grade - £18 less £13.6 = £4.4 less 10% profit approx =	<u>4. -- -</u>

Average approx
per ton = £20. -- -

Unless we find prospectors' ore is averaging too low
a percentage in the high grades for our purpose, the simplest
plan is to leave the price on an overall basis at present.

W.B.