1979/8. Pulbeena travertine limestone.

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Abstract

The decrease in grade of travertine limestone worked during the last few months of 1978 at the Pulbeena open cut is due to the increase of peat content in the material mined.

Comprehensive drilling and sampling programmes are recommended.

INTRODUCTION

Following a request from Wright Stephenson and Company (Tas.) Pty. Ltd. for advice concerning the grade of the "agricultural lime" produced from their Pulbeena open cut [CQ433729], a brief inspection and sampling of the deposit was made in December 1978.

GEOLOGY

The deposit consists of undulating travertine beds and lenses, interspersed with peat, calcareous clay, sand and gravel beds and lenses. The travertine occasionally forms low hummocks giving the superficial appearance of folding and the entire sequence is underlain by Precambrian dolomite.

The deposit is believed to have formed by the action of mound spring waters rich in calcium carbonate (? leached from the underlying dolomite) precipitating the travertine limestone.

SAMPLING AND RESULTS

Channel samples were taken at 25 m intervals from the southern and western faces worked during the previous year in the currently operated open cut. These samples were taken vertically down the entire 3 m high bench face, except where beds of peat or clay were sufficiently thick (approximately $\geq$ 0.3 m) to allow them to be drag line excavated separately from the limestone.

A sketch plan of the open cut is shown in Figure 1, and the sample analyses are presented in Table 1 and in Figure 2.

Samples 78300229/3-231/3 are channel samples taken at approximately 10 m intervals, vertically down the one metre high face exposed above the proposed eastern open cut. Samples 78300232/1 and 78300233/1 are grab samples of "grey lime" and "white lime" respectively.

It can be seen from Table 1 that a distinct change occurred in the grade of the travertine mined between samples 78300225/3 and 78300226/3-228/3. The latter samples show:

(*a*) A drop in CaO value (and also the neutralising values expressed as CaO);

(*b*) An increase in the acid insoluble residue;

(*c*) An increase in the content of organic matter (peat).

Further inspection of the results reveals that while samples 78300229/3-

Table 1. ANALYSES OF LIMESTONE SAMPLES, PULBEENA

Sample No.	CaO (%)	$CaCO_3$ (%)	MgO (%)	$MgCO_3$ (%)	Neutralising value as CaO (%)	Acid insol. residue (%)	Organic matter (%)
78300219/3	44.7	79.8	1.2	2.5	46.1	1.9	12.9
220/3	47.9	85.5	1.3	2.7	49.4	1.5	8.7
221/3	48.1	85.8	1.1	2.3	49.4	1.6	8.7
222/3	48.7	86.9	1.1	2.3	50.0	0.7	8.8
223/3	45.9	81.9	1.2	2.5	47.3	1.1	13.3
224/3	44.6	79.6	1.2	2.5	46.0	0.9	15.7
225/3	46.8	83.5	1.5	3.1	48.5	1.3	10.2
226/3	39.5	70.5	1.3	2.7	41.0	2.4	21.3
227/3	40.2	71.7	1.2	2.5	41.6	5.6	18.0
228/3	35.4	63.2	1.1	2.3	36.7	3.8	27.8
229/3	49.3	88.0	1.2	2.5	50.7	3.3	5.4
230/3	45.9	81.9	1.2	2.5	47.3	10.7	3.9
231/3	45.6	81.4	1.1	2.3	46.9	8.2	6.5
232/1	45.0	80.3	1.0	2.1	46.2	3.1	12.5
78300233/1	49.9	89.1	1.1	2.3	51.2	3.2	4.3
Average of 78300219/3 -78300225/3	46.7	83.3	1.2	2.6	48.1	1.3	11.2
Average of 78300226/3 -78300228/3	38.4	68.5	1.2	2.5	39.8	3.9	22.4
Average of 78300229/3 -78300231/3	46.9	83.8	1.2	2.4	48.3	7.4	5.3

231/3 have the highest CaO values, they also show the highest acid insoluble residue values, suggesting that the increased acid insoluble values in samples 78300226/3-228/3 are not as significant as the increases in the peat content.

This inference is confirmed by the nature of the open cut face between sample 78300226/3-228/3, where it was seen to consist of a complex of peat interbedded and admixed with travertine.

DISCUSSION

Sampling

Information provided by R. Hale and T. O'Halloran of Wright Stephenson and Company (Tas.) Pty. Ltd. , and Mr. K. Stackhouse of the Department of Agriculture, indicates several anomalies in sampling procedure;

(*a*) The samples taken are grab samples (from the elevator belt between the screen and the stockpile), which are regarded as being overtly subjective and open to bias.

(*b*) The frequency of sampling (determined by request to the Department of Agriculture) is too infrequent to provide a reliable indication of limestone grade.

Previous drilling

The Departmental report by H.G.W. Keid in 1957 (Keid, 1958) states clearly that the collar points and logs of the drill holes put down by A. Pearson are based entirely on the information supplied by the latter.

The accuracy of the logging cannot be determined, but it would appear too simplistic for the range of lithologies present in the deposit.

In addition, the inferior grade of limestone mined between samples 78300226/3-228/3 suggests that the logging by Pearson is suspect.

Unfortunately there are several discrepancies between the reports of Keid (Keid, 1958; 1959) with regard to the logs of the holes, and the only useful information in these reports is relevant to hole numbers 1, 3 and 4. Logs and sample assay results from these holes are reproduced in Table 2, with minor changes (Keid (1959) does not state which log belongs to which hole and for this reason the logs for holes 3 and 4 cannot be separated and are shown as 3/4).

CONCLUSIONS

(*a*) Wright Stephenson and Company (Tas.) Pty. Ltd. have been mining travertine limestone of grade less than 40% CaO for approximately the last 50 m of drag line scraper advance along the western face of the open cut at Pulbeena.

(*b*) This drop in grade of CaO has been caused mainly by an increase in the peat content of the material mined.

(*c*) Previous drilling information is either unreliable or has unresolvable discrepancies in the data.

Table 2. DRILL LOGS AND SAMPLE ASSAY RESULTS (FROM KEID, 1959)

Hole 1

Depth (m)	Description	Interval width (m)	Grade CaO (%)	Weighted av. grade (%)
0-0.30	Overburden	0.30	24.4	N/A
0.30-1.52	No sample return	1.22	--	
1.52-2.90	Travertine, black soil and timber	1.38	25.7	
2.90-4.42	Travertine	1.52	45.6	44.70
4.42-5.18	Travertine	0.76	42.9	
5.18-finish	(Hole finished in coarse gravel)			

Summary: 2.90-5.18m: 2.28m at 44.70% CaO (79.78% $CaCO_3$)

Hole 3/4?

0-0.30	Dark peaty soil	0.30	39.7	44.70
0.30-1.57	Soil travertine and peat	1.07	44.8	
1.57-2.90	Yellow coloured travertine	1.53	45.6	
2.90-4.27	Grey-blue coloured marl	1.37	20.1	N/A
4.27-finish	(Hole finished in sand)			

Summary: 0-2.90m: 2.90m at 44.70% CaO (79.78% $CaCO_3$)

Hole 3/4?

0-0.30	Black soil with travertine	0.30	43.0	40.13
0.30-1.52	Travertine with peaty soil	1.22	38.8	
1.52-2.90	Dark coloured travertine	1.38	41.9	
2.90-4.27	Travertine and dark coloured sand	1.37	38.9	
4.27-finish	(?Hole finished in sand)			

Summary: 0-4.27m: 4.27m at 40.13% CaO (71.62% $CaCO_3$)

(*d*) Sampling methods currently in use should be abolished and replaced with a more comprehensive approach (see below).

RECOMMENDATIONS

(*a*) The unmined area (excepting existing buildings etc.) within lease 432P/M should be systematically investigated by drilling holes to bedrock on a grid pattern with 25 m centres.

(*b*) Sampling should be undertaken as;

(*i*) Vertical channel samples taken at 10 m intervals along the toe of the new face exposed after a drag line advance of 10 m.

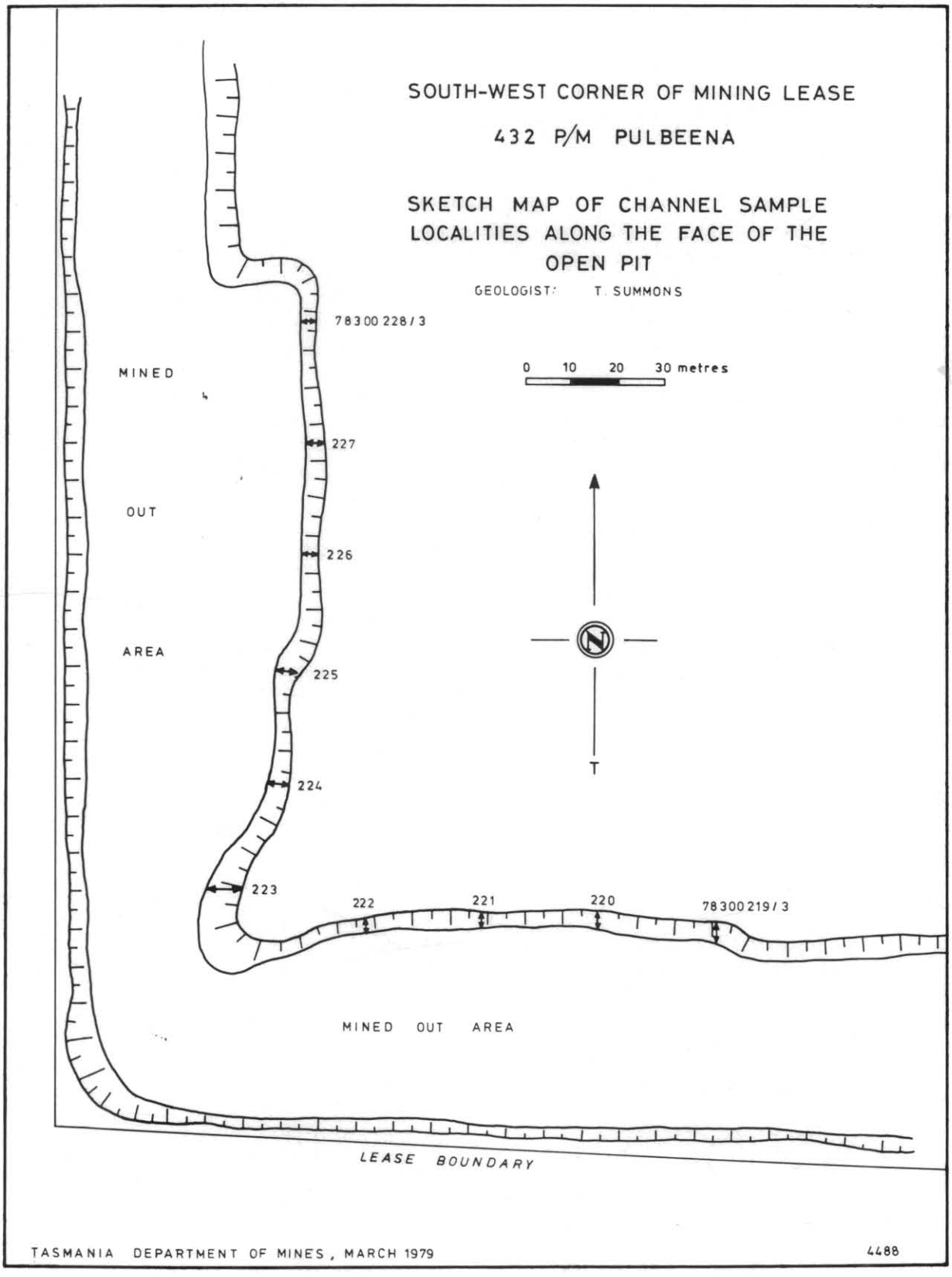
(*ii*) Grab samples taken from the stockpile by inserting a length of pipe (3-5 m long). These samples should be taken at the rate of one per 10 m advance of the drag line scraper in the open cut.

REFERENCES

KEID, H.G.W. 1958. Limestone at Pulbeena Lease 432P/M 29 acres - Mr A. Pearson. *Tech.Rep.Dep.Mines Tasm.* 2:77-79.

KEID, H.G.W. 1959. Boring Pulbeena limestone for sampling. *Tech. Rep.Dep.Mines Tasm.* 3:30-31

[14 March 1979]


SOUTH-WEST CORNER OF MINING LEASE
432 P/M PULBEENA
SKETCH MAP OF CHANNEL SAMPLE LOCALITIES ALONG THE FACE OF THE OPEN PIT
GEOLOGIST: T. SUMMONS
0 10 20 30 metres
MINED OUT AREA
78300228/3
227
226
225
224
223
222
221
220
78300219/3
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MINED OUT AREA
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TASMANIA DEPARTMENT OF MINES, MARCH 1979
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Figure 1.

5 cm

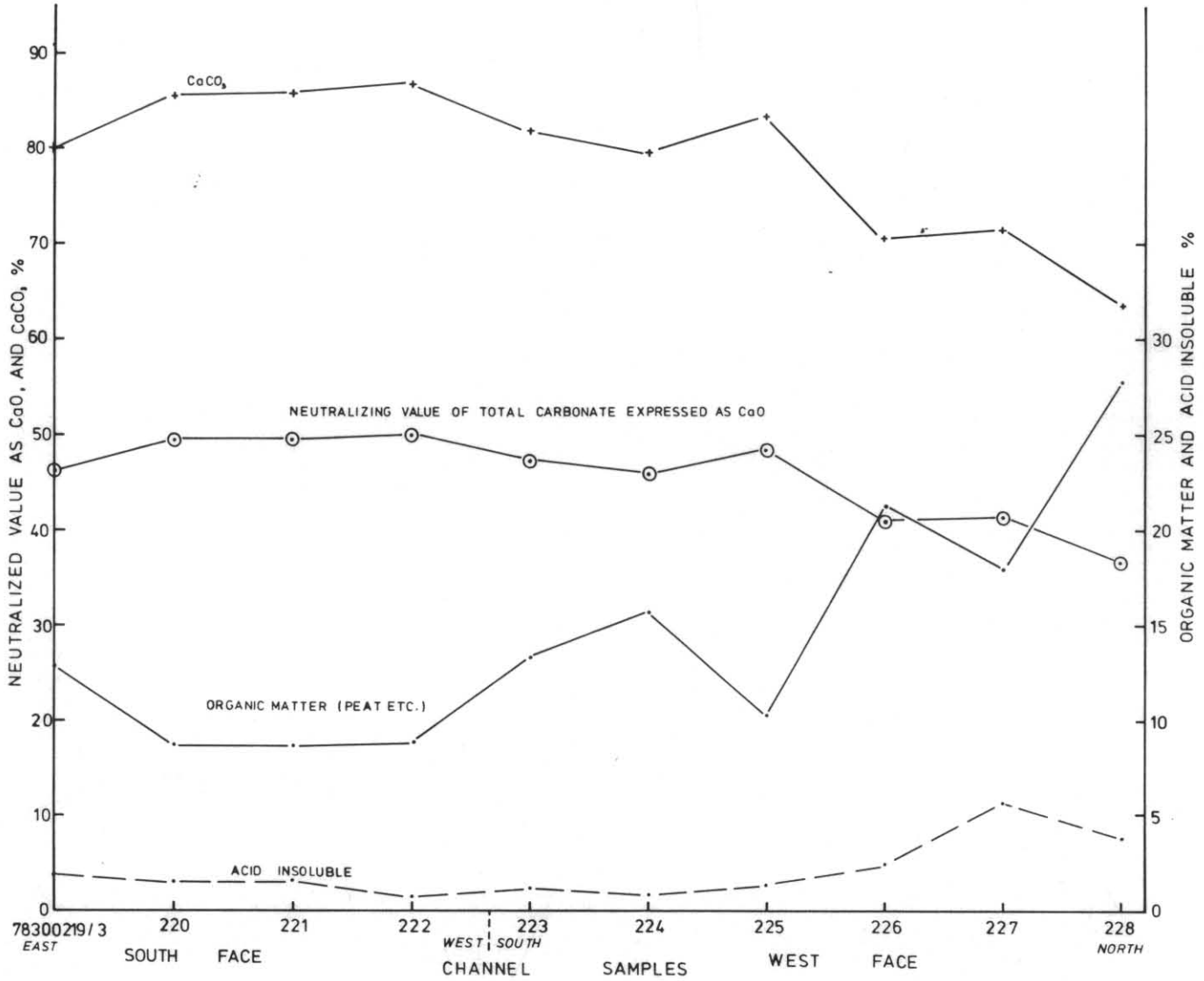

Figure 2. *Major components of travertine limestone mined between December 1977 and December 1978 on ML 432P/M, Pulbeena.*

5 cm