DEPARTMENT OF MINES
SOUTH AUSTRALIA

GEOLOGICAL SURVEY
ENVIRONMENT AND RESOURCE DIVISION

THOMAS LODE - LYNDOCH TALC DEPOSITS
SECTION 3133, HUNDRED OF BAROSSA, COUNTY OF ADELAIDE

by

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THOMAS LODE - LYNDOCH TALC DEPOSITS

SECTION 3133, HUNDRED OF BAROSSA, COUNTY OF ADELAIDE

ABSTRACT

Metasomatic replacement of mica schists of the Torrensian Woolshed Flat Shale has produced the Thomas talc lode.

The talc closely resembles that from other talc deposits in the Lyndoch and Gumeracha areas.

Inferred reserves of 6,700 tonnes have been estimated. Trenching and drilling is required to confirm this figure.

This lode is the smallest in the Lyndoch area and would have most impact on the landscape, and other deposits should be worked in preference.

INTRODUCTION

The Thomas talc lode is located on Section 3133, Hundred Barossa, County Adelaide, four kilometres east southeast of Lyndoch and 60 kilometres by road northeast of Adelaide. This section lies within the District Council of Barossa and the Outer Metropolitan Planning Area, which is under Interim Development Control.

Access, to within 250 metres of the lode, is via an unsealed graded road two kilometres from the Adelaide - Tanunda Highway (see Fig.1).

The accompanying plan (Fig. 2) is based on a stadia theodolite survey carried out by the author and R.J. Harris, (Field Assistant) on 4th September, 1974.

Two samples of talc were submitted to the Australian Mineral Development Laboratories for petrological description and chemical analysis, the results of which are appended. The locations of these samples are shown on Fig. 2.

MINERAL TENURE

Private Mine No. 217 was proclaimed over Section 3133, (approximately 60 hectares) on 13th November, 1973 and covers both Thomas lode and Karawirra lode, see Fig. 1.

REGIONAL GEOLOGY

The Lyndoch talc deposits are located in steep hills along the southeastern margin of the Barossa Valley. Mica schists and quartzites, within the area mapped, are part of the Woolshed Flat Shale, a unit of the Precambrian Adelaidean sequence.

The talc bodies have formed in zones of dislocation on the western limb of a major syncline, striking approximately north and south. The syncline is overturned with its axis dipping steeply eastward, its pitch is 10° to the south (Whittle, p.126 in Dickinson et al, 1951, see Fig.1).

SITE GEOLOGY

Country Rock

The only workings are an abandoned trench; 12m long and up to 4 m wide. The eastern face of this is 3m high.

The talc body is enclosed in a brown knotted mica schist which outcrops poorly on the steep hill slope. Only harder, more siliceous bands in the schist are exposed. Overlying the schist, a pale pink to light grey fine grained quartzite, coarsely bedded

and strongly jointed, outcrops boldly.

The calc-silicate rock underlying the quartzite at the Karawirra lode, 450 metres south (Olliver, 1964) was not observed in this area.

Albite Rock

Albite rock, composed essentially of fine grained, white sodium feldspar ($NaAlSi_3O_8$) is genetically related to and always closely associated with the talc bodies (Stillwell and Edwards p.39 in Dickinson et al, 1951). At Thomas lode, the albite forms a hard, solid, white rock adjacent to and within the talc body. The surrounding schist has been albitised along joint planes and as blebs within the rock. The degree of albitisation decreases away from the talc lode.

Two bodies (maximum dimensions 2.0 x 1.5 metres) of brecciated albite-talc rock outcrop 18 and 30 metres to the north of the trench. This moderately iron stained rock is composed mainly of fine grained albite with irregular patches and stringers of talc.

The Talc Lode

In the old prospecting trench, pale green compact flaky talc, 3 metres thick is overlain by 1 metre of yellow brown weathered, iron stained talc.

Sample No. TT1, collected from this lower zone, contains minor small disseminated grains of albite and a few partly weathered pyrite crystals.

Sample No. TT2, representing near surface material, from the southern end of the lode is more highly iron stained and contains more albite "grit".

The talc is similar to that obtained from the Gumeracha area, and from other lodes at Lyndoch. The talc flakes are generally orientated parallel to the foliation of the original mica schist. The chief impurities are albite, pyrite and quartz with trace amounts of chlorite, rutile, apatite and sphene.

Structure

The strike of the strata adjacent to the talc lode varies from north-northeast (014°) in the central and southern area, to north-northwest (340°) in the northern part, indicating an anticlinal drag fold pitching to the east and centred about the old trench.

Minor faulting in the area is suggested by two outcrops of brecciated albite-talc rock, although attitude and extent could not be determined due to sparcity of outcrop.

GENESIS OF THE TALC

The talc has formed within mica schists, from biotite rich in magnesia. The addition of soda from some external source has produced the associated albite (Offler, 1966). The talc and albite bodies have developed in zones of strong fold distortion, the talc tending to be concentrated along minor faults. These bodies are generally elongated parallel to the regional foliation. Invariably the talc lodes are surrounded by an aureole of albite rich rock and an outer zone of partially albitized schist, within which albite veins are commonly present.

The talc deposits in the Lyndoch area are assumed to have formed at the same time as the more extensive deposits at Gumeracha, probably at the time of the large scale feldspathization, responsible for the production of the Palmer granite

(Whittle, p.25, in Dickinson et al, 1951).

QUALITY OF THE TALC

The near surface talc exhibits typical red-brown iron staining and small yellow brown, weathered, clayey patches.

The two selected samples of talc submitted for petrological description and analysis are listed below.

Sample No.	Dept. No.	Description
TT1	P1548/74	Pale green, flaky, good quality, from old trench 1.5 m below surface.
TT2	P1549/74	Yellow brown, iron stained, "gritty". From surface outcrop.

Sample No. TT1 closely resembles selected best quality talc from the Karawirra lode (see Sample No. P1547/74 in Appendices). Mineral contaminants in Sample No. TT2 include feldspar (albitic), chlorite and trace amounts of quartz.

Partial chemical analyses of the better quality Thomas talc (TT1) is compared with assays of talc from other deposits in South Australia (Dickinson et al, 1951), Table 1, full details are contained in Appendix B.

TABLE 1

SUMMARY OF CHEMICAL ANALYSES

	Theoretical Pure Talc	Tumby Bay	Mt. Fitton	Gumeracha	Karawirra (Olliver,1967)	Thomas TT1
Silica SiO_2	63.50	61.26	62.16	61.90	62.70	61.94
Magnesia MgO	31.70	30.53	32.06	28.23	29.50	29.40
Water H_2O above 100°C.	4.80	4.90	4.51	4.46	4.53	4.55
	100.00	96.69	98.73	94.79	96.73	95.89

RESERVES

A total of 6,700 tonnes of talc is inferred over the area of possible subsurface talc based on:-

- an area of 280 square metres, representing the two main areas of talc outcrop as shown in Fig.2.
- an average depth of 10 metres
- a yield of 90% mineable talc, allowing for inclusions of albite and iron stained patches
- a specific gravity of 2.7.

Reserves can be confirmed by trenching, as shown on Fig.2, to outline the surface extent of talc and drilling to prove depth and quality of subsurface talc, as was used satisfactorily at Highland Lode (Scott, 1975).

ENVIRONMENTAL IMPACT

The talc lode is located on the upper slope of a steep ridge overlooking the southeastern portion of the Barossa Valley (see Plate No. IVBA002). Although this part of the ridge is timbered with large eucalypts, (Plate No.IVBA004), an open cut operation would be visible from the valley.

CONCLUSIONS AND RECOMMENDATIONS

The Thomas talc lode has been formed in a structurally favourable zone, by the metasomatic replacement of biotite in mica schist of the Woolshed Flat Shale of Torrensian age.

The physical and chemical properties of the talc are similar to those of other deposits in the Lyndoch and Gumeracha areas.

PLATE IVBA002 - THOMAS TALC LODE 26778
Looking west - Lyndoch in middle distance

26779.

PLATE IVBA004 - THOMAS TALC LODE
Abandoned trench in centre - looking eastwards from road.

Four trenches are proposed to delineate the limits of the lode, with follow up drilling to confirm the inferred 6 700 tonnes of talc.

However, this lode is visible from the Barossa Valley and the other larger lodes in the Lyndoch area should be mined in preference.

D. C. Scott.

May 5, 1975.

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APPENDIX A

PETROGRAPHIC DESCRIPTIONS

Extracted from A.M.D.E.L. Report MP2286/75

by

DR. P.G. MOESKOPS

Sample No: P1547/74 TS33285 (selected, best quality Karawirra talc)

Rock Name:

Talc-serpentine schist

Hand Specimen:

White, weakly schistose talc-rich rock.

Thin Section:

An optical estimate of the constituents gives the following:

	%
Talc	80
Serpentine	20

This is a weakly schistose talc-serpentine rock. Talc occurs as gently curved ½ to 6 mm long flakes, and as fine fibrous aggregates which overall exhibit a weakly developed sub-parallel orientation. Irregularly shaped ½ to 2 mm long serpentine-rich patches are evenly distributed throughout the section. In detail they consist of very fine fibrous aggregates which locally appear to be almost isotropic. Most of the serpentine-rich patches contain inclusions of talc and there is a general tendency for the patches to be elongated parallel to the schistosity.

Sample No: P1548/74 TS33286 : TT1

Rock Name:

Talc-serpentine rock

Hand Specimen:

White talcose rock.

Thin Section:

An optical estimate of the constituents gives the following:

	%
Talc	80
Serpentine	20

Mineralogically this sample closely resembles P1547/74;

however, the talc is finer grained, some of the serpentine occurs as very fine intergrowths with talc, as well as in discrete patches, and a schistosity is absent.

Sample No: P1549/74: TS33287: TT2

Rock Name:

Talc-chlorite-plagioclase schist

Hand Specimen:

Light brown, weakly schistose, talc-rich rock.

Thin Section:

An optical estimate of the constituents gives the following:

	%
Talc	75
Serpentine	15
Plagioclase	10
Quartz	trace

This ample very closely resembles sample P1547/74; however, it contains about 10% plagioclase and traces of quartz in addition to talc and serpentine.

Plagioclase (albitic) occurs as euhedral to subhedral 0.5-1.0m long laths which are clustered into irregular 5-10 mm sized patches. Most grains are twinned and some appear to be bent and broken. The section contains a few 0.05-0.15mm sized anhedral quartz grains which appear to be predominantly associated with the serpentine.

APPENDIX B

CHEMICAL ANALYSES

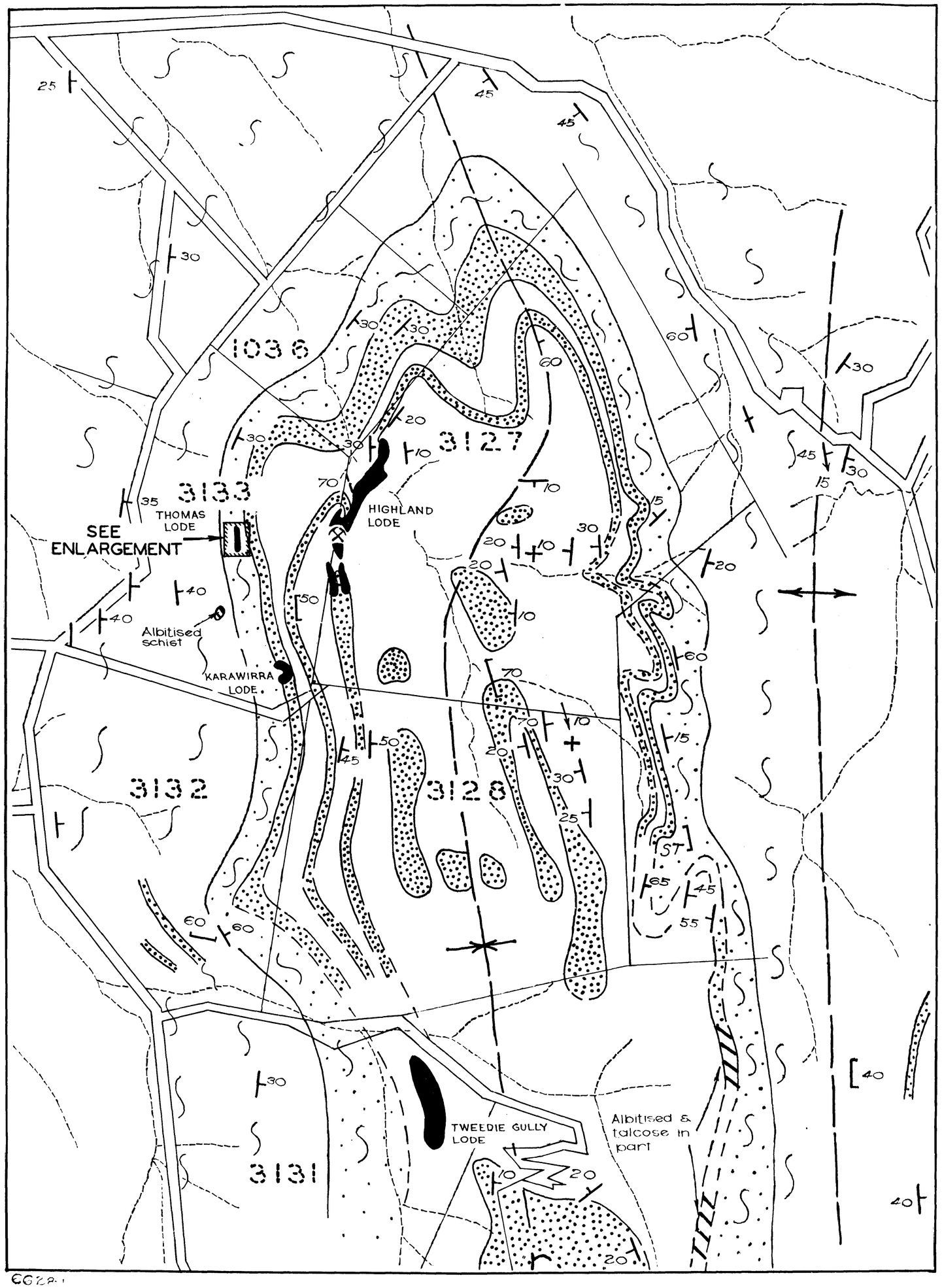
Extracted from A.M.D.E.L. Report AM2295/75

Analysis by : A.B. Tims

	Theoretical Pure Talc	Tumby Bay	Gumeracha	Mount Fitton	Karawirra P1547/74	Thomas TT1, P1548/74	Thomas, TT2 P1549/74
SiO_2	63.50	61.26	61.90	62.16	62.70	61.94	62.40
Al_2O_3		1.76	1.88	0.61	0.15	0.75	1.88
Fe_2O_3		0.33	0.65	0.13	0.17	0.16	0.41
FeO		0.04	1.66	0.45	1.96	1.92	2.13
CaO		nil	nil	nil	0.38	0.13	0.02
MgO	31.70	30.53	28.23	32.06	29.50	29.40	27.30
Na_2O		0.17	0.68	nil	0.02	0.30	0.98
K_2O		0.10	nil	nil	0.01	0.01	0.01
TiO_2		x	0.07	0.02	0.20	0.07	0.08
MnO		x	x	x	0.01	0.01	0.01
P_2O_5		x	0.07	nil	0.25	0.07	< 0.01
H_2O+	4.80	4.90	4.66	4.51	4.53	4.55	4.18
H_2O-		0.22	0.03	0.11	0.11	0.09	0.18
CO_2		x	nil	x	nil	nil	nil
Cl		0.30	nil	x	x	x	x
	100.00	99.61	99.8	100.3	99.99	99.40	99.33

x not determined.

GEOLOGICAL PLAN



EG628-1

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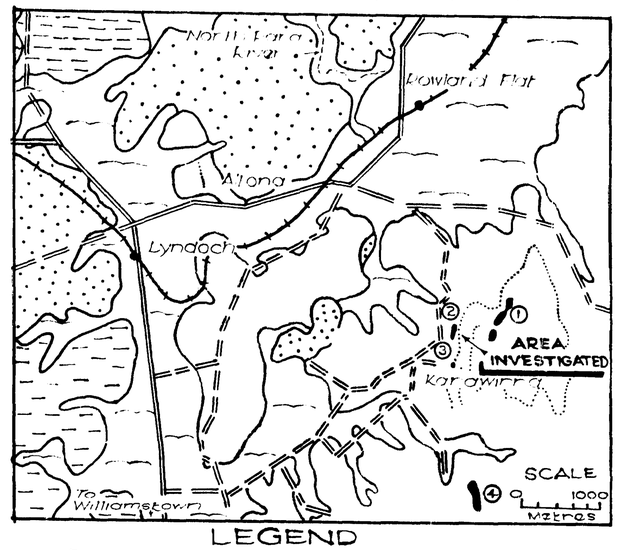
LOCATION & REGIONAL GEOLOGY



LEGEND

RECENT
- Alluvium

TERTIARY
- Sands gravels & clays

PROTEROZOIC - TORRENSIAN
- Phyllites & slates
- Schists with quartzites

- Talc bodies
- ① Highland lode
- ② Thomas lode
- ③ Karawirra lode
- ④ Tweedie Gully lode

LEGEND

- Geological boundary (Observed)
- " " (Inferred)
- Strike & dip of bedding
- + Horizontal
- × Vertical
- Strike & dip of cleavage
- Pitch
- Syncline
- Anticline
- Mine
- Quartzite
- Knotted mica schist
- Mica schist with thin calc silicates
- Creek
- Talc ore bodies

SCALE

0 200 400 600 800 1000

METRES

Modified from Whittle (1951) Plan No 49-402

FIG. 1

DEPARTMENT OF MINES — SOUTH AUSTRALIA

LYNDOCH TALC DEPOSITS
PORTION OF THE HD. OF BAROSSA
GEOLOGICAL PLAN

INDUSTRIAL MINERALS SECTION	D.C Scott GEOLOGIST	Drn. DS	SCALE: 1: 10000
		Tcd. DS.	74-1041
Director of Mines		Ckd. A.F.	
		Exd.	DATE: 6th Dec 1974

6628 - 1

Strike and dip of bedding and contact 35°

Strike and dip of jointing 82°

Sample location TT1

N

420 415 410 405 400 395 390 385

40°

T1 T2 T3 T4

TT1 TT2

A

30° 35° 70°—80° (contact) 30° 82° 32°

LEGEND

Quartzite

Knotted mica schist

Talc—good outcrop

Talc—poor outcrop

Albite rock A

Albitised zone

Albite—talc rock A

Proposed trench T2

Contour (metres) 420

SCALE

METRES 0 5 10 15 20 METRES

M.R.R. 142

D.C. Scott Geologist

74—1042 S.A. Department of Mines