DEPARTMENT OF MINES
SOUTH AUSTRALIA

GEOLOGICAL SURVEY
ENVIRONMENT AND RESOURCE DIVISION

MT. CHAMBERS BARITE DEPOSIT

M.L. 4219, Out of Counties - Flinders Ranges

(J.H. Coad)

by

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Rept.Bk.No. 76/12
G.S. No. 5689
D.M. No. 792/73

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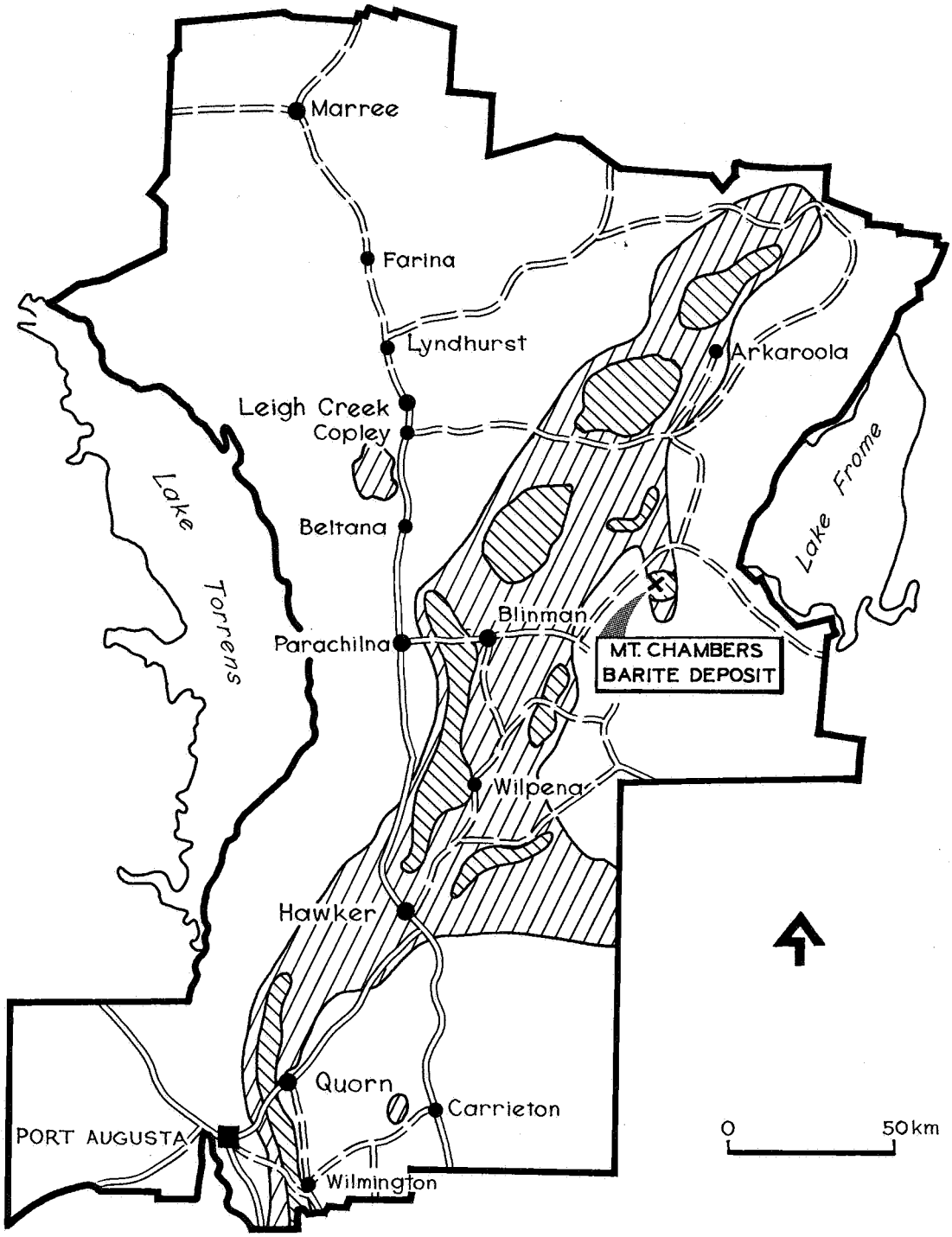
PLANS



ENVIRONMENTAL AREAS

- Class A
- Class B
- Class C

- Country Township
- Special Township
- Main road
- Secondary road

Fig. 1.

DEPARTMENT OF MINES — SOUTH AUSTRALIA

INDUSTRIAL MINERALS SECTION	Drn. J.O.	FLINDERS RANGES PLANNING AREA	SCALE: 1:2 000 000
	Tcd. J.W.	MT. CHAMBERS BARITE DEPOSIT	S12037
	Ckd. A.F.	LOCALITY PLAN	
	Exd.		DATE:

500–2.69 665

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DEPARTMENT OF MINES
SOUTH AUSTRALIA

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ABSTRACT

Since 1941, recorded production from the Mt. Chambers Deposit has amounted to 1 325 tonnes of industrial grade barite.

The barite has formed in fracture zones which cut the bedding of the enclosing siltstones of the Brachina Formation, part of the Wilpena Group sediments of Precambrian age. The white barite is coarsely crystalline with minor silica and satisfies industrial grade specifications.

A total of 3 000 tonnes of barite reserves have been inferred.

The deposit lies within a Class A Environmental Area as defined in the Flinders Ranges Development Plan.

Future mining operations should be planned to avoid permanent disturbance to the amenity of the area. Waste material should be dumped in the low-lying area near the southeastern boundary of the lease.

INTRODUCTION

During an inspection of barite deposits in the Flinders Ranges, the Mt. Chambers Barite Deposit was mapped on 3rd June, 1975. The accompanying geological plan (Fig.2) is based on a stadia theodolite survey by the authors and R.J. Harris (Field Assistant. The deposit was revisited on 24th November, 1975 to record subsequent work by the lease holder.

LOCATION

The deposit is located on Wertaloona Station, out of counties, 1.5 km east-northeast of Mt. Chambers and lies within a Class A Environmental area as defined in the Flinders Ranges Planning Area Development Plan.

The deposit is situated on sparsely vegetated undulating country within hills along the eastern margin of the Flinders Ranges (Plate 1 and 2).

Access from the Wirrealpa - Arrowie road is easterly for 7.5 km along the road to Chambers Gorge and thence northwards for 0.8 km (Fig.2). These graded roads are negotiable by all vehicles except after heavy rain.

MINERAL TENURE AND PRODUCTION

Mineral Claim 190, was held by Mrs. E.M. Coad from 10th October, 1940 to 29th July, 1949.

Mineral Claim 1807 was registered by J.H. Coad on 4th November, 1952 and subsequently converted to Mineral Lease 4219, granted on 29th October, 1973 for 7 years. Actual area is 5·4 ha based on dimensions as shown on Fig.3.

Production of barite from 1941 to the end of 1973, based on returns submitted to the Department of Mines is listed in Table 1.

TABLE 1

Production of Barite, Mt. Chambers Deposit

1941	678
1942	203
1943	179
1944-45	nil
1946	45
1947-59	nil
1960-63	46
1964-67	nil
1968	37
1969-71	nil
Total Tons	1 188
Equivalent tonnes	1 207
1972	40
1973	78
Total	1 325 tonnes

MINING OPERATIONS

The workings extend intermittently for 310 m in an east-northeasterly direction. Total area disturbed by mining, cincluding dumps, approximates 1 900 squ.m. (see Fig.2).

Initial production was won from a trench up to 3 m deep located between Shafts B and C (Fig.3) (Cornelius, 1941). Shafts A, B and C were subsequently sunk to 8.3 m, 7.5 m and 8.2 m respectively. The lode was driven from the bottom of Shaft C for 7.3 m southwesterly and 5.5 m northeasterly as shown on Section A-A' (Cornelius, 1942). Further material was also obtained by deepening the trench in places to 4 m followed by progressive backfilling.

Between June and November, 1975, this fill was removed in preparation for deeper mining (see Plates 1 and 2).

Other workings are essentially exploratory trenches and pits along the barite lode, to an approximate average depth of 1.5 m; the walls of these have partially collapsed, obscuring the lode.

Plate 1(IBKF001) Mt. Chambers Barite Deposit, November, 1975.

Looking easterly along barite lode with Shaft B in centre and old trench recently cleared behind.

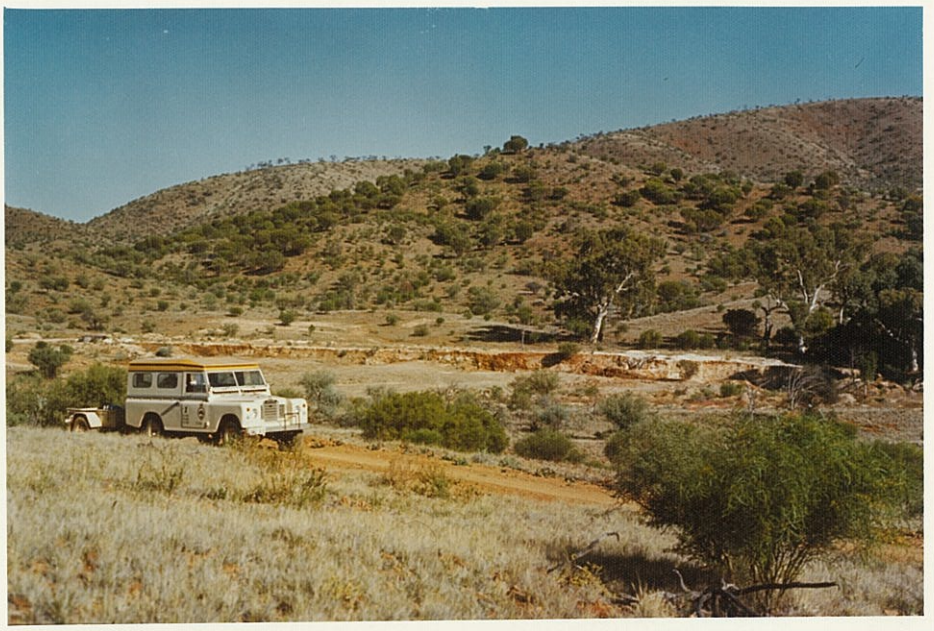


Plate 2 (IBKF002) Mt. Chambers Barite Deposit, November, 1975

Looking north westerly with road to Chambers Gorge in foreground and trench on central zone of barite lode in centre.

The Flinders Ranges Planning Area Development Plan, which was authorised on 8th February, 1973 states the following criteria for mining operations in a Class A Environmental Area:-

> "No mining activities should take place in these areas except in localities where mineral deposits are of paramount significance and their exploitation is in the State or National interest. These localities are: the western face of the Ranges near Depot Creek; the western face of the Heysen Range; portion of Moralana Valley; portion of the Mount Hack and Mount Uro areas; portion of the Stirrup Iron Range; portion of the east Gammons; the Mount Painter - Freeling Heights area, and such other localities as may from time to time be determined. Mining in these localities should only take place under the most stringent conditions following precise delineating of the sites concerned by planning regulations".

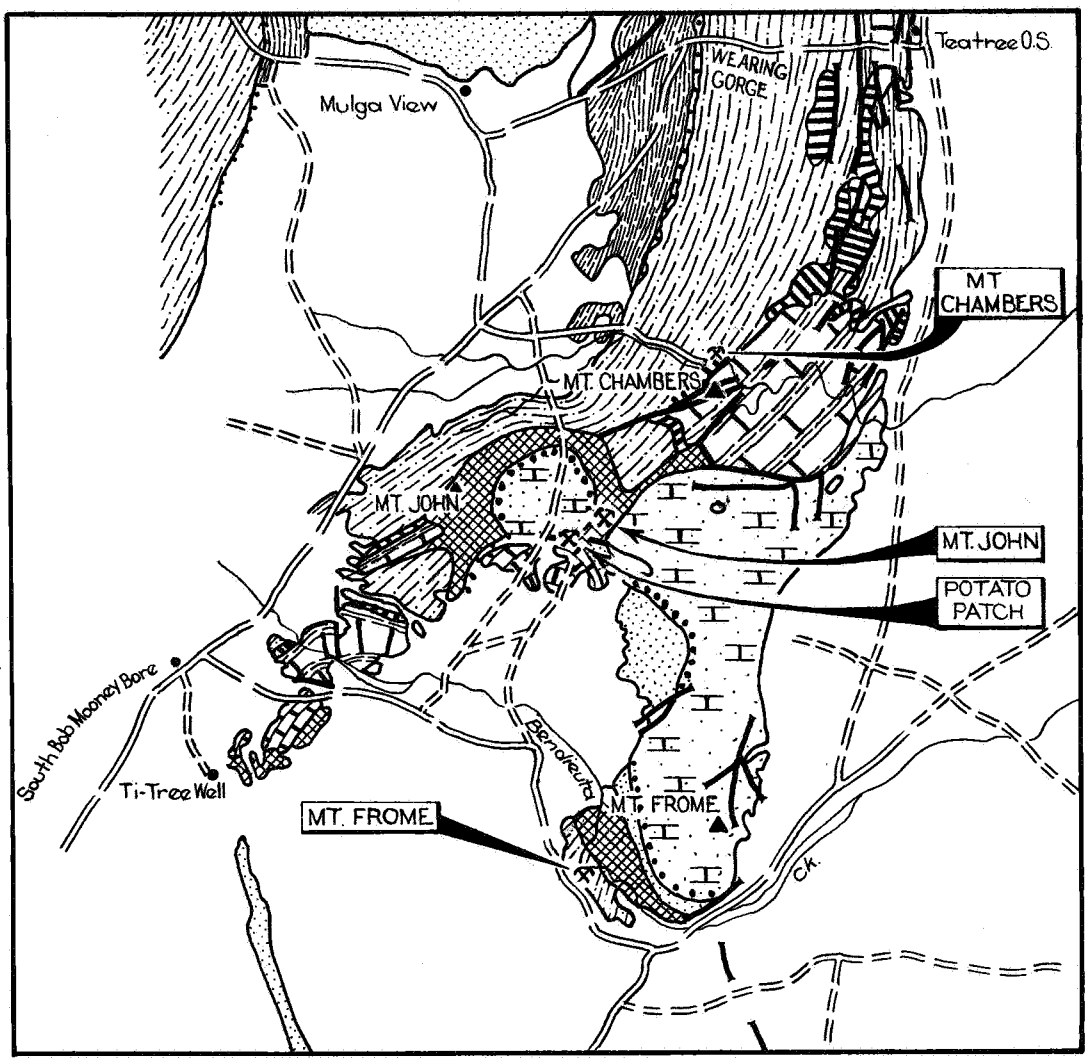
GEOLOGICAL SETTING

The accompanying regional geology plan and stratigraphic sequence (Fig.2) is based on the southeastern portion of COPLEY (Coats, 1973) and the northeastern portion of PARACHILNA (Dalgarno and Johnson, 1965).

The deposit is approximately 3 km north of the eastern lobe of the Chambers Diapir and trends east-northeasterly, parallel to the major fault direction. The steeply dipping lode occurs near the base of the Brachina Formation within the Wilpena Group part of the sequence of Adelaidean sediments of Precambrian age, and is of the infilled fissure type originating from structural movement.

SITE GEOLOGY

The barite lode is enclosed by olive-grey and brown finely laminated siltstones, with occasional interbands of indurated



QUATERNARY — Undifferentiated - alluvium sands clays, gravels.

CAMBRIAN — Undifferentiated - sandstones, shales, limestones.

Parachilna Formation at base - argillaceous sandstones, shales & lenticular limestones.

WILPENA GROUP

POUND QUARTZITE - Feldspathic quartzites & sandstones.

WONOKA FM. - Grey-green shales, calcareous shales, limestones & pebble beds.

BUNYEROO FM. Red-purple shales, minor limestones & dolomite.

ABC RANGE QUARTZITE - Feldspathic sandstone & Quartzite

BRACHINA FM. - Green-purple siltstones & shales.

UMBERATANA GROUP.

NUCCALEENA FM. - Dolomite & dolomitic shale.

UNDIFFERENTIATED - Sandstones, siltstones & shales with minor limestones & dolomites.

WILLOURAN — Tectonic crush zones. (Diapirs)

Fault

Fig. 2

INDUSTRIAL MINERALS SECTION	DEPARTMENT OF MINES — SOUTH AUSTRALIA	Scale : 1 : 250,000
Compiled : J.G.O	EASTERN BARITE DEPOSITS FLINDERS RANGES REGIONAL GEOLOGY	Date : 11-12-75
Drn. J.W. | Ckd A.F.		Drg. No. S12035

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sandstone up to 30 m thick, belonging to the Brachina Formation. The bedding is relatively consistent on both sides of the barite lode with strike ranging from 195° to 240° and dip to the west ranging from 21° to 31°.

The lode extends intermittently for 310 m in an east-northeasterly direction and dips steeply at 75° - 85° to the north-west. The trace of the bedding of the enclosing siltstones in the plane of the lode varies from horizontal in the west to a shallow westerly dip in the east (see longitudinal section Fig.3). This does not appear to have controlled the workable zones of barite as at the South Australia Barytes Ltd's underground mine at Oraparinna. Here, the oreshoots, bifurcations and lode junctions plunge with the dip of the country rock (Hiern & Olliver, 1973).

Workable barite is confined to the following two zones:-

(1) Central Zone - extending for 78 m to either side of Shafts B and C. Width varies from 0.2 m to a maximum of 1.5 m at Shaft B, where the lode bifurcates. Barite is exposed in the northern face of the trench but the floor is partially obscured by debris.

(2) Western Zone - 10 m long, centred about Shaft A. Width varies from 0.5 m to 0.7 m at the shaft. Elsewhere, the lode is too narrow with most of the upper 1-2 m of barite having been removed.

QUALITY OF THE BARITE

The barite in this deposit is white and coarsely crystalline, with occasional minor red-brown iron staining on cleavage faces and zones containing small pyrite crystals. A yield of 60% first grade was obtained (Cornelius, 1943).

Three grab samples, were collected from small stockpiles, at locations shown on Fig. 3. Results are summarised in Table 2 from details in the Appendix.

TABLE 2

Summary of Test Results

Sample No	S.G.	$BaSO_4$	$SrSO_4$	$(Ba+Sr)SO_4$	Fe_2O_3	SiO_2	LOI
A1877/75	4.42	94.5	3.95	98.45	< 0.01	1.34	0.12
A1878/75	4.43	95.2	3.60	98.80	< 0.01	1.02	0.08
A1879/75	4.44	95.8	3.60	99.40	< 0.01	0.46	0.12
Average	4.43	95.2	3.72	98.90	< 0.01	0.97	0.10

The samples are low in impurities with a high total sulphate content (barium + strontium sulphates), low staining and high reflectance figures (see Appendix). The barite satisfies industrial grade specifications for glass, fillers and pigments, and meets the American Society for Testing Materials Specification D602-42 for pigments which requires barite to be white and to contain:

- at least 94% $BaSO_4$
- not more than 0.05% Fe_2O_3

- not more than 0.2% soluble salts
- not more than 0.5% moisture and volatiles
- not more than 2% quartz, clays and foreign materials.

RESERVES

A total of 3 000 tonnes of barite are inferred, comprising 2 600 tonnes in the central zone and 400 tonnes in the western zone, based on the following data:

- a specific gravity of 4.4 for barite
- mining to the 83 m level i.e. the bottom level of Shaft B
- 580 m^2 and 142 m^2 areas of lode respectively, based areas outlined on the longitudinal section in Fig.2.
- average widths of lode 1.0 m and 0.6 m respectively.

The lode is expected to persist below the 83 m level. If the lode width remains relatively constant in the central zone, a yield of 300 tonnes/vertical metre is anticipated below the 83 m level.

CONCLUSIONS

Industrial grade barite has been obtained from white, coarsely crystalline barite at the Mt. Chambers Deposit in the Flinders Ranges. From 1941 to 1973 intermittent production has totalled 1 325 tonnes.

The barite deposit is considered to have formed by migration of barium sulphate from the surrounding Brachina Formation siltstones, a unit in the Adelaidean sediments of Precambrian age, with redeposition in open fissure and fracture zones.

Inferred reserves of barite of 3 000 tonnes are only sufficient to sustain a small scale mining operation.

This deposit is in a Class A Environmental Area and mining methods should be devised to ensure minimum visual impact on the landscape. Overburden should be tipped in a low-lying area near the southeastern lease boundary.

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12th February, 1976
DCS/JGO: JG

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APPENDIX

PHYSICAL AND CHEMICAL ANALYSES

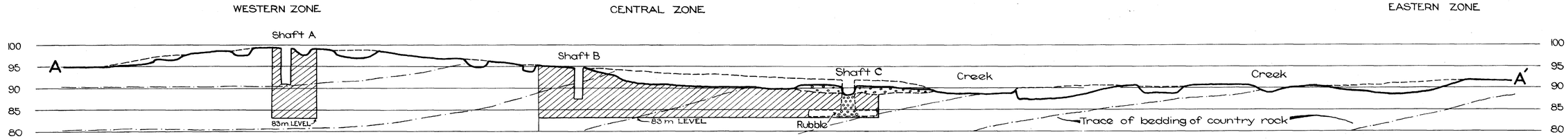
Extracted from AMDEL Report MT 148/76

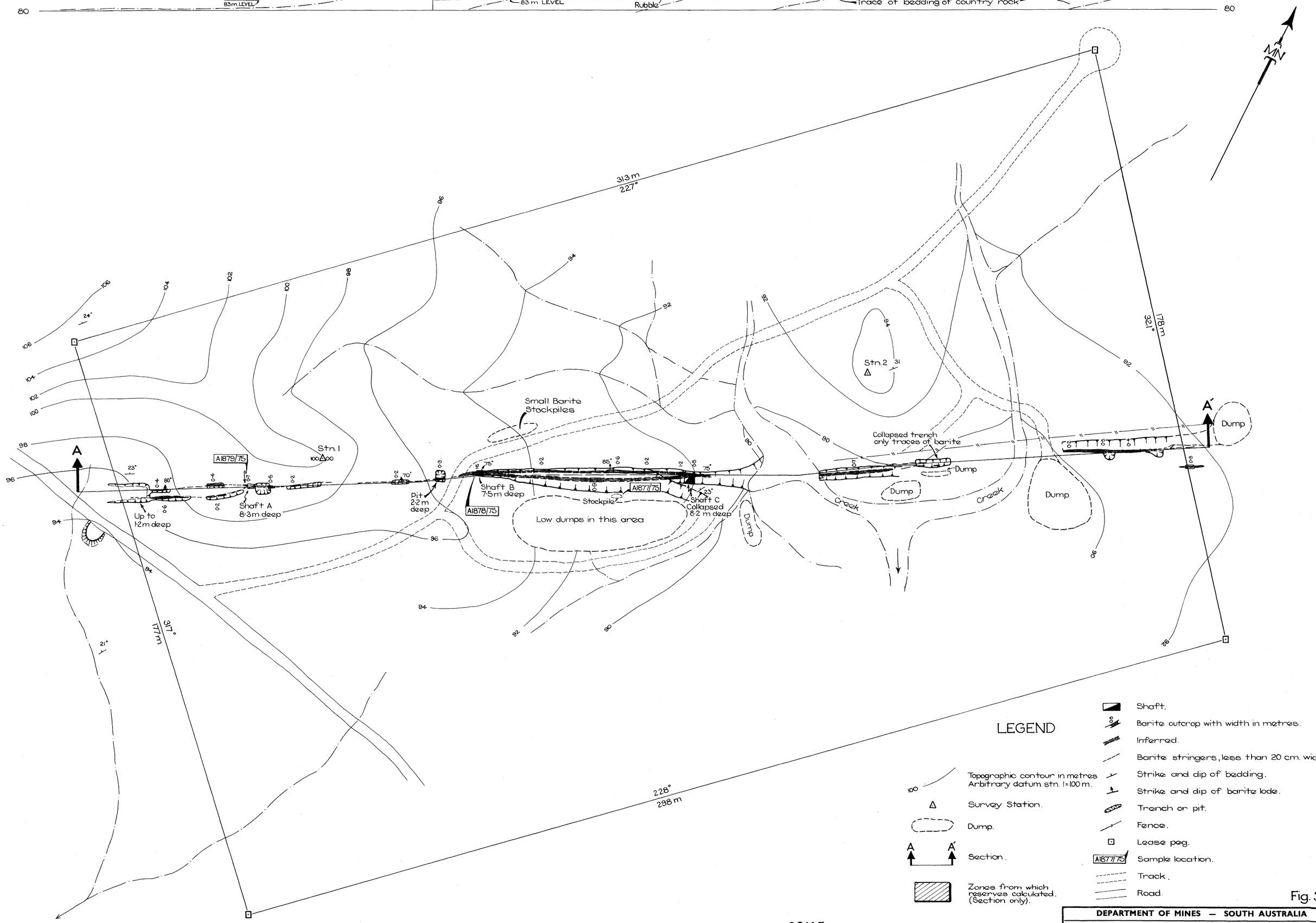
By Dr. W.G. Spencer

Sample No.	A1877/75	A1878/75	A1879/75
Specific Gravity	4.42	4.43	4.44
Staining*	L	L	L
Reflectance R 457	85.8	86.3	89.4
R 570	91.9	91.3	93.2
Yellowness	6.1	5.0	3.8
$BaSO_4$	94.5	95.2	95.8
$SrSO_4$	3.95	3.60	3.60
SiO_2	1.34	1.02	0.46
Al_2O_3	0.03	0.02	< 0.01
Fe_2O_3	< 0.01	< 0.01	< 0.01
CaO	0.02	< 0.01	0.01
K_2O	< 0.01	< 0.01	< 0.01
LOI	0.12	0.08	0.12
Soluble Alk. Earth Metals as Ca ppm	15	15	15

* L - Low or not detected

LONGITUDINAL SECTION A A´





LEGEND

- Topographic contour in metres. Arbitrary datum stn. 1=100 m.
- Survey Station.
- Dump.
- Section.
- Zones from which reserves calculated. (Section only).
- Shaft.
- Barite outcrop with width in metres.
- Inferred.
- Barite stringers, less than 20 cm. wide.
- Strike and dip of bedding.
- Strike and dip of barite lode.
- Trench or pit.
- Fence.
- Lease peg.
- A1877/75 Sample location.
- Track.
- Road.

Fig. 3

SCALE

METRES 0 10 20 30 40 50 60 METRES

Stadia Survey by J. G. Olliver & R. J. Harris
S.F.B's 515 & 529.

DEPARTMENT OF MINES — SOUTH AUSTRALIA

MT. CHAMBERS BARITE DEPOSIT
M.L. 4219
GEOLOGICAL PLAN & SECTION

INDUSTRIAL MINERALS SECTION	D.C. Scott GEOLOGIST	Compiled D.C.S.	Scale: 1:500
		Drn. J.W.	Date: 11th. Dec. 1975.
Director of Mines		Ckd. A.F.	Drg. No. 76-28

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