DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA



# REPT.BK.NO. 84/39
# BELTANA BARITE DEPOSITS - NO. 2 LODE. GEOLOGICAL INVESTIGATIONS 1983. Out of hundreds - Flinders Ranges. ML.4323-
# - Steetley Industries Ltd. -

GEOLOGICAL SURVEY

by

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JUNE, 1984

DME. 550/76

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DEPARTMENT OF MINES AND ENERGY
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Rept.Bk.No. 84/39
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# BELTANA BARITE DEPOSITS - NO. 2 LODE GEOLOGICAL INVESTIGATIONS 1983.

Out of hundreds - Flinders Ranges
ML 4323 - Steetley Industries Ltd.

## ABSTRACT

Beltana No. 2 Lode, or Heppner's Lode, 7.5 km northeast of Beltana in the northern Flinders Ranges and within a Pastoral Landscape Area, has been worked for a length of 50 m and to a depth of 12 m below ground surface.

Barite is white and coarsely crystalline with abundant botryoidal goethite and quartz infilling cavities. Total production is 3 778 tonnes. All but 100 tonnes was mined by Steetley Industries Limited during 1982 and 1983 and beneficiated at Quorn Mill for oil-drilling-grade barite.

Barite and goethite formed during the Ordovician Delamerian Orogeny as infillings of an open fissure near a regional northwest-trending fault. Host rocks are silty shale and clayey siltstone of late Adelaidean (Marinoan) Bunyeroo Formation.

Only low tonnages of barite would be obtained after removal of large quantities of waste material.

## INTRODUCTION

Two barite deposits near Beltana had been previously mapped (Olliver and Scott, 1976) during a reconnaissance assessment of barite deposits throughout the Flinders Ranges. No. 2 lode has also been referred to as Heppner's Lode after the first tenement holder.

Since being mapped in 1975, two companies have mined over 3 700 tonnes of barite from No. 2 Lode. Plate 1 portrays the lode in 1975 prior to mining but after initial bulldozing.

Workings were mapped by stadia theodolite on 30 October 1983 by the author assisted by R.L. Wildy (Chief Geologist), W.S. McCallum (Senior Geologist) and P.P. Crettenden (Field Assistant). No samples were collected; details on petrography and barite quality are included in Olliver and Scott (1976).

## LOCATION, ACCESS AND TOPOGRAPHY

No. 2 Lode is located 7.5 km northeast of Beltana Post Office and is on Puttapa Station, block 693, out of counties, northern Flinders Ranges. Both Beltana No. 1 and 2 Lodes lie within a Pastoral Landscape Environmental Area as defined in the draft Supplementary Development Plan for the Flinders Ranges Planning Area.

Access from Beltana Public Bar is northeastwards along unsealed roads through Beltana township towards Sliding Rock and Cadnia East Homestead for 8.5 km, and then a short final stagger of only 400 m southeast along a track to the deposit (Fig. 1).

The area around No. 2 Lode has very low relief but forms a low rise separating Sliding Rock Creek and Warrioota Creek (Fig. 1).

## MINERAL TENURE

No. 2 Lode was first pegged in 1972 by H.E. Heppner as Mineral Claim 122 and converted to Mining Lease (ML) 4323 on 3 December 1973. ML 4323 is still current but there have been several transfers of title as detailed in Table 1. Area of ML 4323 is 2.03 ha, as calculated from Figure 2.

TABLE 1
MINERAL TENURE - BELTANA NO. 2 LODE

| Tenement | Holder | Registered | Comments |
|---|---|---|---|
| MC 122 | H.E. Heppner | 14-11-72 | Converted to ML 4323. |
| ML 4323 | H.E. Heppner | 3-12-73 | Transferred to Matfor Mining Pty. Ltd. |
| ML 4323 | Matfor Mining Pty. Ltd. | 23-02-79 | Transferred to Hawbar Mining Pty. Ltd. |
| ML 4323 | Hawbar Mining Pty. Ltd. | 11-07-79 | Transferred to Steetley Industries Ltd. |
| ML 4323 | Steetley Industries Ltd. | 26-03-81 | Current; expires 2-12-87, renewable. |

## PRODUCTION

Although first pegged in 1972, recorded production commenced as recently as 1980 with 100 tonnes of oil-drilling-grade barite being mined by Hawbar Mining Pty. Ltd. Most of the recorded production of 3 778 tonnes, was by Steetley Industries Ltd. in 1982 and 1983 (see Table 2). All ore would have been treated at Steetley's Quorn Mill yielding only oil-drilling-grade barite.

TABLE 2
PRODUCTION - BELTANA NO. 2 LODE

| Year | Holder | Tonnes |
|---|---|---|
| 1972-1979 | H.E. Heppner | - |
| 1979 | Matfor Mining Pty. Ltd. | - |
| 1980 | Hawbar Mining Pty. Ltd. | 100 |
| 1981 | Steetley Industries Ltd. | - |
| 1982 | " " " | 1 139 |
| 1983 | " " " | 2 539 |
| | TOTAL | 3 778 |

The quarry is 85 m long, has a maximum width of 11 m and a maximum depth of 12 m (Plates 2 and 3). The current southern access ramp consists of backfill. Large low dumps surround the cut (Fig. 2). About 2 400 $m^3$ of in situ material has been mined of which about 940 $m^3$ would have been barite, assuming an average specific gravity of 4.0 for lode material.

## GEOLOGY

### Stratigraphy

Sediments of late Proterozoic (Marinoan) Wilpena Group crop out poorly near No. 2 Lode. Previously, Leeson and Nixon (1966) and Coats et al. (1973) have interpreted the area as representing part of Wonoka Formation, comprising grey-green shale, grey sandy limestone with minor red-brown and purple calcareous shale, siltstone and dolomite.

Mapping revealed that country rock consists of bedded shale, silty shale and clayey siltstones probably forming part of Bunyeroo Formation. Slight ferruginisation has produced a dominant brown to chocolate brown colour but near the lode, parts of the shale and siltstone have been extensively ferruginised

with abundant goethite and bright colours of yellow, red and reddish-purple. The geological plan (Fig. 2) distinguishes between slightly and heavily ferruginised areas of shale and siltstone.

## Structure

Folding, faulting and diapirism during the Ordovician Delamerian Orogeny produced numerous regional folds but Adelaidean sediments near No. 2 Lode are flat to gently dipping with dips of 12° or less to the north and west. Near the northern limit of the lode, bedding is locally contorted with a 26° easterly dip. Preiss (1983) showed a major northwesterly trending fault along Warrioota Creek with sinistral displacement of Adelaidean sediments just to the northeast of No. 2 lode.

## Mineralisation

The barite lode apparently extended for about 50 m, had a maximum width of about 5 m and has been worked to 12 m below ground surface.

The lode trends north-northwesterly and limited observations on the contact suggest a steep easterly dip of about 80° as shown in Cross Section AB (Fig. 2) and Plate 4. Opposite dips are possible and a 62° westerly dip was observed by Olliver and Scott (1976) on outcropping lode.

Lode material contains brecciated blocks of shale, siltstone and white barite. Much of the ferruginisation appears to post-date an earlier barite-rich iron-poor mineralising phase. The combination of brecciated lode and overall north-northwest trend approximately parallel to a regional northwest-trending fault, suggests that this deposit, similar to many others in the northern Flinders Ranges, formed from filling of open fissures produced during the Delamerian Orogeny e.g. as at Artipena (Robertson, 1981) and Mount Serle (Flint, 1984).

Barite, as reported by Olliver and Scott (1976), is white and coarsely crystalline but contains abundant goethite in bands, stringers and disseminations (Plates 4 & 5). Goethite is abundant within barite remaining in the quarry and is more extensive than is shown on Figure 2. Goethite bands are to 1.5 m

thick and consist of up to 95% goethite with only minor barite; goethite is often botryoidal with quartz as a later infilling of residual cavities. Goethite bands have two prominent directions one of which is north-northwesterly parallel to the overall length of the lode (Plate 4), whereas the other is northeasterly and best developed in the southern portion of the lode (Plate 6). Both sets of bands are near vertical and are highly discordant to bedding.

## RESERVES

Indicated reserves of barite above an existing bench in 1975 (Plate 1) were determined by Olliver and Scott (1976) as 2 000 tonnes with a further 700 tonnes/vertical metre below the bench. Unfortunately, no data are available to determine the relative height of that bench. Since their determination, 3 778 tonnes of barite ore has been mined.

Barite lode, 4 m wide, is exposed on a face at the base of the northern access ramp (Cross Section AB on Fig. 2) but the eastern half is very goethite-rich (Plate 4). Iron-rich barite veneers each wall of the cut but is less than 1 m thick. Data are inadequate to determine reserves.

With existing steep access ramps and maximum depth of cut at 12 m, any further quarrying would require benching with removal of substantial waste material and is probably uneconomic.

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DJF:ZV

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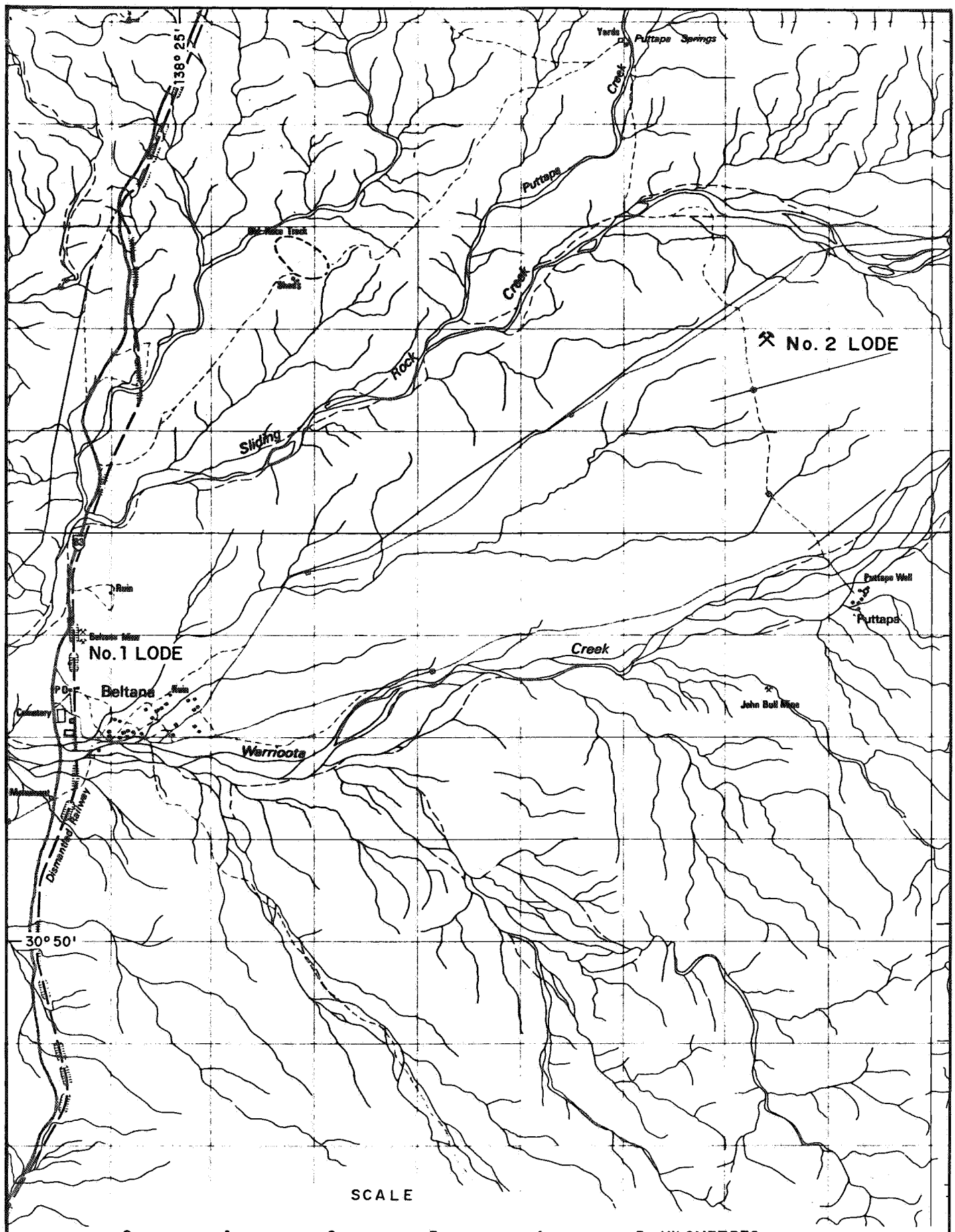


Fig. 1

DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

# BELTANA BARITE DEPOSITS

# LOCALITY PLAN

| | |
|---|---|
| COMPILED D. F. | CDO 5·7·84 DATE |
| DRAWN M. B. | SCALE 1:50 000 |
| DATE May '84 | PLAN NUMBER S17325 |
| CHECKED | |

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PLATE 1. Beltana No. 2 Lode-view southerly prior to mining. Evaluation bench on left hand side. June 1975. Slide No. 12962.

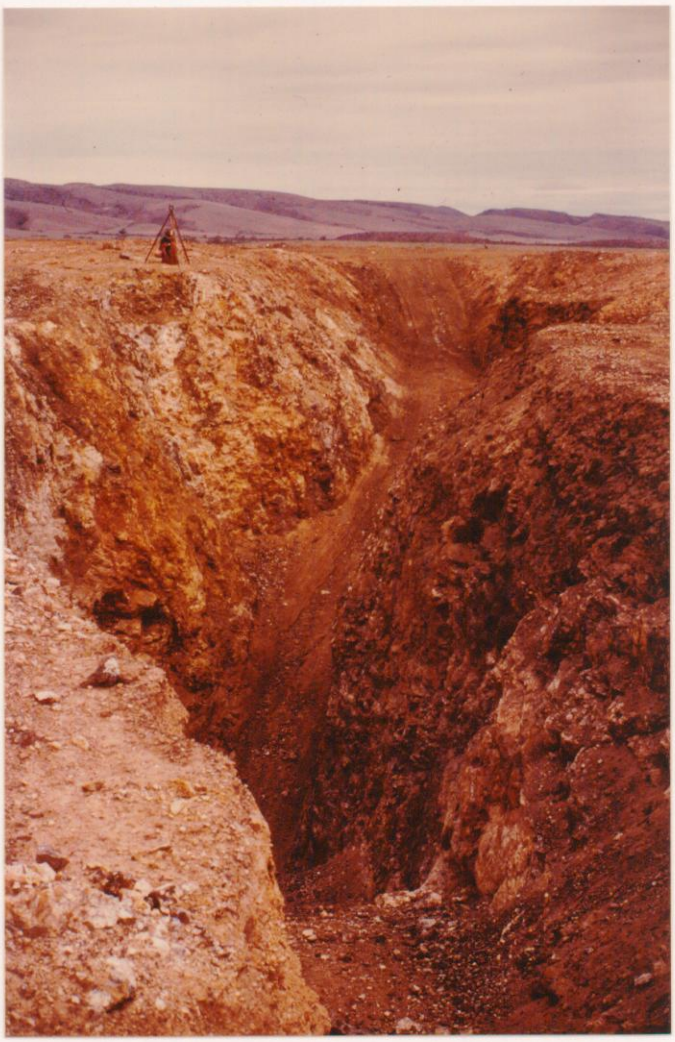


PLATE 2. Beltana No. 2 Lode - view southerly after mining. Dark chocolate brown siltstone and shale on west wall, prominent yellow goethitic alteration of shale on eastern wall near Station A, and relicts of barite lode plastered on both walls. October 1983. Slide No. 24456

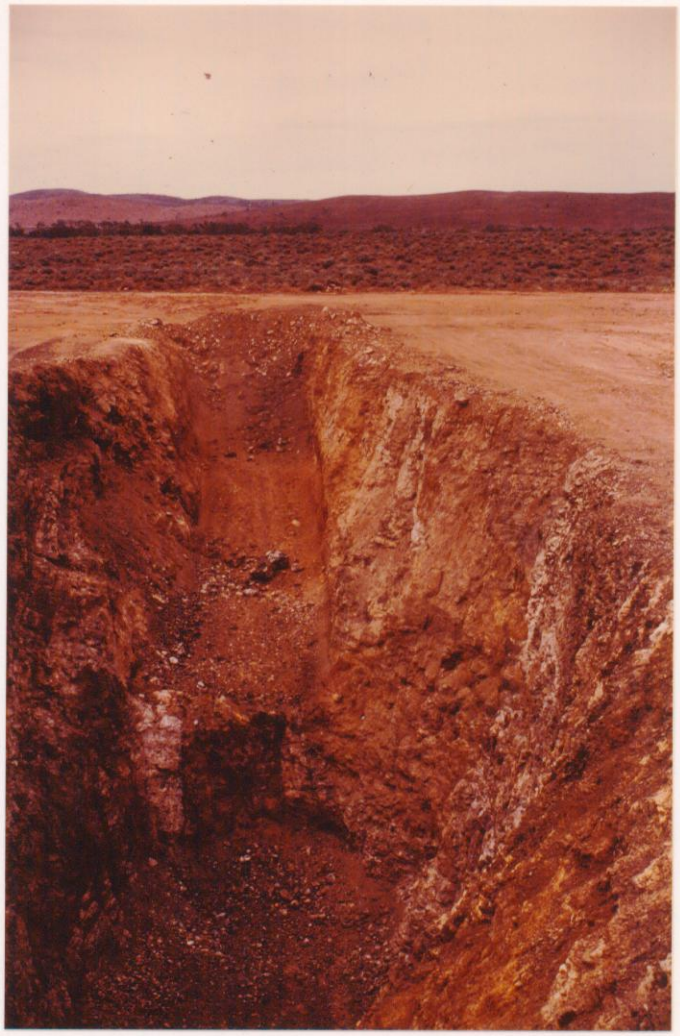


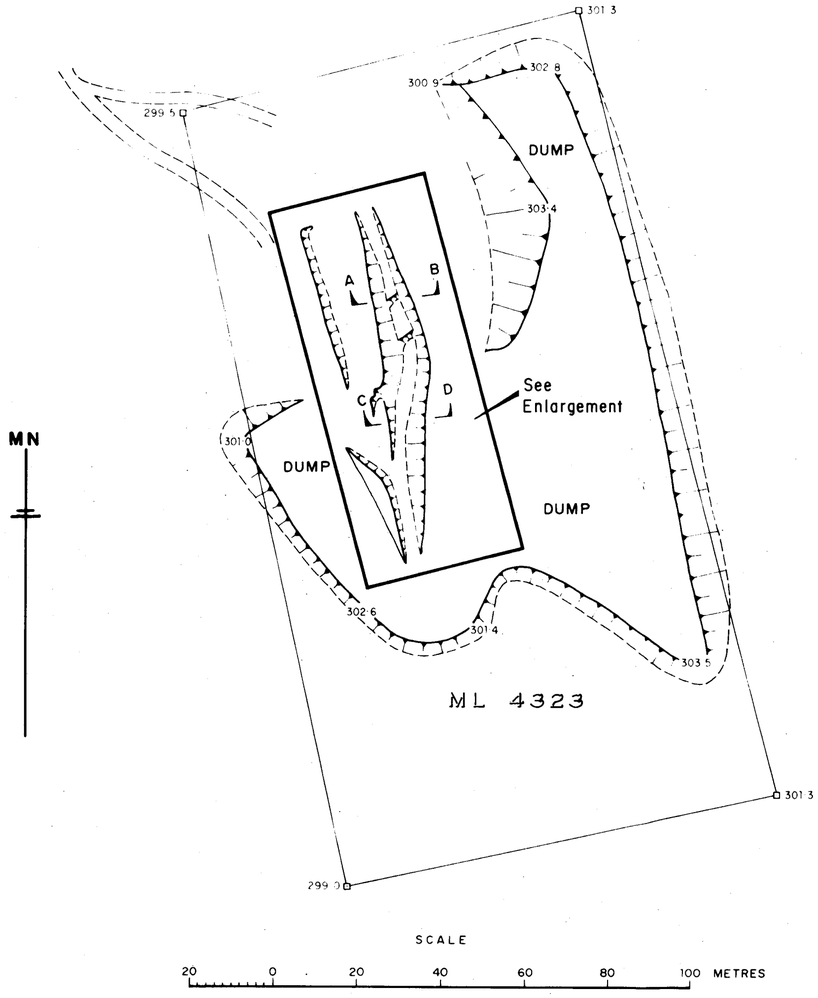
PLATE 3. Beltana No. 2 Lode - view northerly from Station A of northern access ramp with barite lode exposed at base. Zones of white barite low in goethite are readily apparent, as is bright yellow goethitic alteration in shale and siltstone. October 1983.

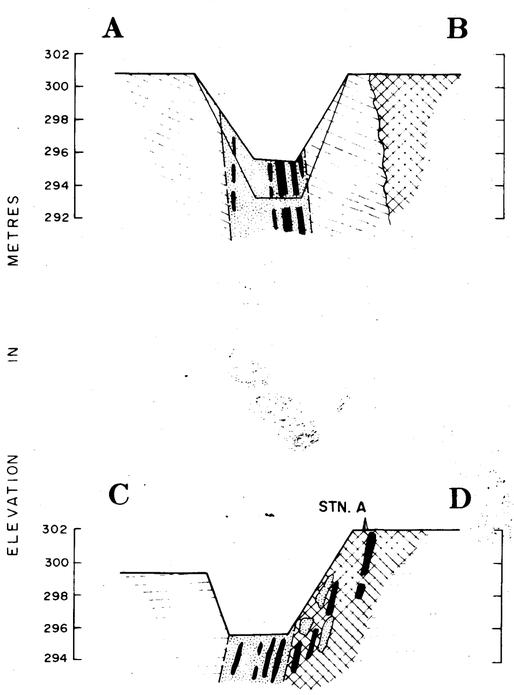
Slide No. 24457

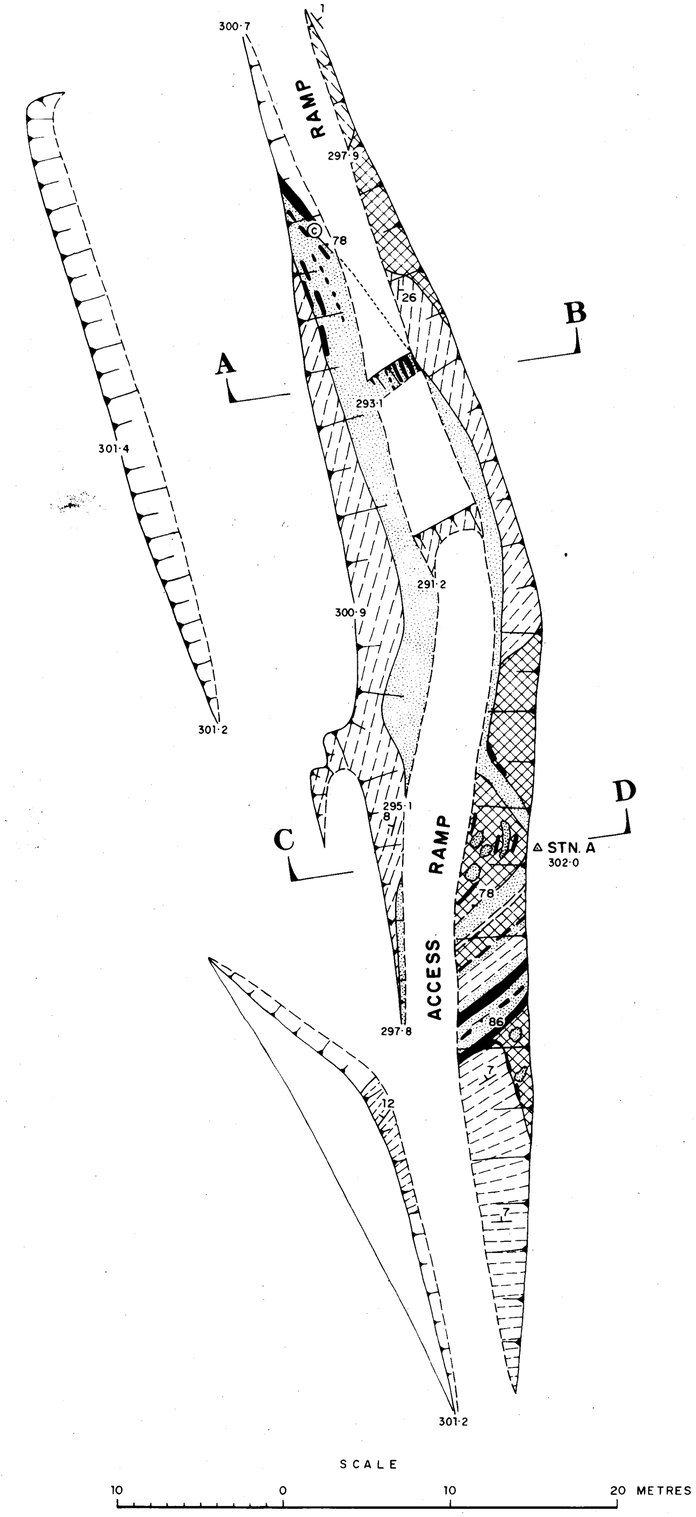
PLATE 4. Beltana No. 2 Lode - barite lode 3.5 m wide on face at base of northern access ramp. Dark botryoidal goethite forms distinct bands parallel to lode margin which dips steeply easterly. Central portion consits of extensively ferruginised barite with yellow goethite. October 1983. Slide No. 24458

PLATE 5. Beltana No. 2 Lode - white, coarse-grained barite on west side of face at base of northern access ramp. Black goethite as staining along irregular fractures and in band on right. October 1983. Slide No. 24459.


PLATE 6. Beltana No. 2 Lode - eastern face on southern access ramp. Northeast-trending vein, consisting of brecciated white barite in a matrix of barite + goethite, cross-cutting gently dipping, dark brown, bedded siltstone. October 1983. Slide No. 24460.




ORDOVICIAN DELAMERIAN OROGENY

Barite: coarse-grained, opaque, light to moderate limonite/goethite staining. Barite brecciated with botryoidal goethite partially infilling cavities with later quartz crystals in vugs.

Barite: heavily ferruginised with bands, stringers and disseminated goethite. Goethite bands are to 1·5m thick and consist of about 95% goethite and 5% barite. Often brecciated with blocks of barite and siltstone. Goethite often botryoidal, quartz as cavity infillings. More abundant than shown on map.

Alteration Zone: variably bleached but heavily ferruginised siltstone and shale. Bright yellow, red and reddish purple goethite colours. Minor brecciation.

ADELAIDEAN WILPENA GROUP

BUNYEROO FORMATION: bedded silty shale and clayey siltstone. Slightly altered and weathered, grey when bleached but dominantly brown to chocolate-brown.

8 Strike and dip of bedding

78 Strike and dip of goethite banding

© 78 Strike and dip of contact of barite vein

Mine workings

A B Geological cross section

△STN.A Survey station

301·2 Spot elevation in metres, AHD (approx)

Stadia survey by P.P. Crettenden, SFB 701

Cross section scale, horizontal = vertical

Fig. 2

| | | |
|---|---|---|
| DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA | COMPILED D F | DATE 5 7 84 |
| BELTANA BARITE DEPOSITS | DRAWN M.B | SCALE As Shown |
| No. 2 LODE, ML 4323 | DATE May '84 | PLAN NUMBER 84-173 |
| GEOLOGICAL PLAN AND CROSS SECTIONS | CHECKED | |

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