DEPARTMENT OF MINES AND ENERGY
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FORRESTON TALC DEPOSITS, RESULTS OF GEOLOGICAL INVESTIGATION AND AUGER DRILLING, 1982, ML.5055, Adler, Jeanes, Gigante & Western Queen (SA) P.L. - Sections 6109, 6274 and 6380, hundred Talunga

GEOLOGICAL SURVEY

by

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FORRESTON TALC DEPOSITS, RESULTS OF GEOLOGICAL INVESTIGATION AND AUGER DRILLING, 1982, ML 5055, Adler, Jeanes, Gigante and Western Queen (SA) P/L - Hundred Talunga -

ABSTRACT

Forreston talc deposits in the Mount Lofty Ranges comprise No. 1, 2, 3 and 4 Lodes, surrounded by numerous smaller talc pods and talcose zones. Talc bodies are often albitic, and associated with extensive zones of albitization within enclosing Precambrian quartzite and schist. Both talc and albite show secondary alteration to clay.

Production from 1937 to 1975 totals 2 809 tonnes from open cuts on all lodes, and underground workings on all except No. 4 Lode. Underground workings on No. 2 Lode have been backfilled.

In 1982, 84 shallow auger drillholes and 3 backhoe trenches delineated talcose extensions to No. 1 Lode and talcose zones between No. 1 and 2 Lodes.

Due to albite, clay and iron oxide contamination, the talc is generally Grade 3. Inferred geological reserves within ML 5055 total 9 800 tonnes.

INTRODUCTION

Forreston talc deposits, in the Mount Lofty Ranges, 32 km northeast of Adelaide, are the northernmost of the Gumeracha talc deposits (Conor and Olliver, 1980), which extend from Lobethal in the south to Forreston.

Forreston deposits include 4 distinct talc lodes, the No.1 to No. 4 Lodes, within an area of 500 m by 500 m, with numerous

other small unnamed talc pods (Fig. 2). Birdwood talc deposit is 160 m east of No. 3 Lode, and the small Symonds and Dicker deposits are east and north of Birdwood deposit, outside the area of Figure 1.

The Department of Mines and Energy was contracted by the claimholders for 5 days drilling with a small machine auger mounted on the back of a Daihatsu 4 wheel drive vehicle, to outline possible extensions to known talc bodies. 84 holes, designated FT 1 to FT 84 were drilled between 23 March 1982 and 28 March, 1982 by A.J. Smith and S.J. Ewen (Field Assistants) and the author. Drill logs are included in Appendix C.

On 14 May 1982, a local contractor dug 3 backhoe trenches of 40 m, 42 m and 11 m length, adjacent to No. 1 Lode to establish talc quality and grade. Detailed geological sections are included in Appendix B. Drill holes and trenches were located by stadia theodolite by A.J. Smith and the author.

The geological map of Forreston at 1:5 000 scale included as Figure 5 in Conor and Olliver (1980) was modified with data from drilling and trenching. Mapping was extended to the east to cover all of MC 1543. Detailed mapping of open cuts at No. 1 to 4 Lodes and underground workings of No. 1 and 3 Lodes was completed by 9 July 1982. Underground workings at No. 2 Lode, briefly described in Conor and Olliver (1980), were inaccessible in 1982.

Five samples, one of country rock and 4 of talc, were submitted to Australian Mineral Development Laboratories (AMDEL) for petrological description; results comprise Appendix A. Results of analytical testing of 12 talc samples submitted to AMDEL are included in Appendix B.

On 4 August 1982, after ML 5055 was granted, the leaseholders commenced work on access tracks and platforms at No. 1 Lode, and extracted ore from the old workings.

LOCATION

Forreston talc deposits are on pastoral land comprising sections 6109, 6274 and 6380, hundred Talunga, county Adelaide, 2.5 km east of Forreston township, 4 km northeast of Gumeracha and 3 km northwest of Birdwood, within District Council of Gumeracha, part of the Outer Metropolitan Planning Area. Access from Gumeracha, 40 km by road from Adelaide, is 1.5 km northwards along the sealed Gumeracha - Forreston road, then 3 km east along Wintons Road which is unsealed. Access from Birdwood is 1.5 km east on the Birdwood - Gumeracha road, then 2 km northwards on Wintons Road.

Talc at No. 1 Lode extends northwards from section 6274 into section 6380. To the east, Birdwood deposit is in section 6275 and Symonds and Dicker deposit is in sections 6258, 6259, 6276, with most workings in 6276 (McCallum & Oors, 1980). Emphemeral drainage is south or east, joining the easterly flowing River Torrens approximately 2 km to the south (Fig. 1).

MINERAL TENURE

Mineral tenure for 1942 to 1978 is detailed in Table 1, with tenements as shown in McCallum & Oors (1980, Fig. 3).

MC 390, registered for S.M. Berry in 1942 over the northern part of section 6274, included No. 1 & 3 Lodes, and was replaced by MC 559 expiring in 1949. MC 429 and MC 560 were held by S.M. Berry in 1942-1946 in the southern part of section 6380, north of No. 1 Lode.

In 1944-45, F.J. Tonkin held MC 640 over a small talc outcrop south of No. 2 Lode, and in 1949, S.A. Silicates held MC 1344 over No. 4 Lode.

E.T. Plaum held MC's 1366 and 1514 over No. 1 & 3 Lodes from 1949 to 1952, while J.W. Wickham held MC's 1345, 1582 over section 6380 to the north from 1949 to 1951, with MC 1710 subsequently held from 1951 to 1954 by D.H. Jarvis.

In 1974, R.O. and S.A. Sickerdick and B. Van Elsen registered MC's 431, 432, 433, 434 over the small deposit south of No. 2 Lode, No. 2 Lode, No. 1 Lode and No. 3 Lode respectively. MC 434 and MC 432 were converted to ML 4398 on 27 September 1974 and ML 4447 on 7 February 1975 respectively, both being surrendered on 17 March 1978.

Exploration Licence 779, granted to Western Queen (SA) Pty Ltd for one year from 12 January 1981, covered an area of 727 km^2, including Forreston.

A consortium comprising P.E. Adler, V. Gigante, K.P. Jeanes, and Western Queen (SA) Pty Ltd, pegged Mineral Claim (MC) 1543 on 5 January 1982 covering that part of section 6274, hundred Talunga, north of Wintons Road (Fig. 3) including Forreston No. 1, 2 and 3 Lodes. Part section 6274 north of Wintons Road was purchased freehold by K.P. & A.J. Jeanes, & V. Gigante in 1982.

On 27 July 1982, ML 5055 was granted to Western Queen (S.A.) Pty Ltd, Adler, Jeanes and Gigante for 7 years.

TABLE 1

MINERAL TENURE

Tenement	Holder	Area (hectares)	Granted	Terminated
No. 1 & 3 Lodes				
MC 390	S.M. Berry	16	19/2/42	1/11/43
MC 559	S.M. Berry	8	1/11/43	28/2/49
MC 1366	E.T. Pflaum	16	4/3/49	17/1/50
MC 1514	E.T. Pflaum	16	6/2/50	24/1/52
No. 1 Lode				
MC 433	R.O. and S.A. Sickerdick, B. Van Elsen	0.6	7/3/74	27/3/75
ML 4398	Sickerdick etc	0.6	27/9/74	17/3/78
North of No. 1 Lode (Section 6380)				
MC 429	S.M. Berry	16	15/5/42	1/11/43
MC 560	S.M. Berry	8	1/11/43	5/2/46
MC 1345	J.W. Wickham	16	12/1/49	24/10/50
MC 1582	J.W. Wickham	16	30/10/50	18/10/51
MC 1710	D.J. Jarvis	16	15/10/51	20/10/54
No. 2 Lode				
MC 432	Sickerdick etc.	0.5	7/3/74	16/4/75
ML 4447	Sickerdick etc.	0.5	7/2/75	17/3/78
South of No. 2 Lode (Section 6274)				
MC 640	F.J. Tonkin	4	27/10/44	6/2/45
MC 431	Sickerdick etc.	2	7/3/74	15/9/75
No. 3 Lode				
MC 434	Sickerdick etc.	2.3	7/3/74	15/9/75
No. 4 Lode (Section 6109)				
MC 1344	S.A. Silicates	7	13/1/49	18/11/49
No. 1, 2, 3 Lodes				
MC 1543	Western Queen Alder, Jeanes, Gigante	17.6	5/1/82	23/7/82
ML 5055	"	17.6	23/7/82 for 7 yrs.	

Note: area is nominally 17.6 ha; area measured from surveyed plan (Fig. 2) is 13.6 ha.

PRODUCTION, 1937-1975

Table 2, adopted from Table 2 in McCallum & Oors (1980), is based on production returns submitted to the Department of Mines and Energy. With the exception of No. 4 Lode, production from individual lodes can not be ascertained. The relevant operators grouped production from No. 1 and 3 Lodes from 1937-1951 and No. 1 and 2 Lodes from 1974-75.

First recorded production was 41 tonnes in 1937 by S.M. Berry, with no mining tenement recorded. S.M. Berry produced a further 43 tonnes from 1942 to 1944 from No. 1 and 3 Lodes.

E.T. Pflaum produced 468 tonnes from the same area between 1949 and 1951, while S.A. Silicates produced 44 tonnes from No. 4 Lode in 1949.

From 1974 to 1975, R.O. and S.A. Sickerdick and B. Van Elsen produced 2203 tonnes from No. 1 and 2 Lodes.

Total production from Forreston was 2 809 tonnes up to 1975.

TABLE 2

TALC PRODUCTION

FORRESTON

Year	Tonnes	Lode No.	Operator	Tenement
1937	41	1, 3	S.M. Berry	-
1938-1941	Nil	"	"	
1942	6	"	"	MC 390,429
1943	21	"	"	" "
1944	16	"	"	MC 559
1945-1948	Nil	-	-	
1949	348	"	E.T. Pflaum	MC 1366
"	44	4	S.A. Silicates	MC 1344
1950	Nil	-	-	
1951	120	1, 3	E.T. Pflaum	MC 1514
1952-1973	Nil			
1974	834	1, 2	Sickerdick, & Van Elsen	ML 4398 4447
1975	1 369	"	"	"
TOTAL	2 809			

TALC - USES AND GRADE REQUIREMENTS

Gumeracha talc contains varying amounts of albite.

Talc is magnesium silicate, $Mg_3 (SiO_2)_4$, with chemically pure talc containing 63.5% SiO_2, 31.7% MgO, and 4.8% H_2O by weight.

Albite is sodium feldspar, Na Al Si_3O_8 with chemically pure albite containing 68.7% SiO_2, 19.5% Al_2O_3 and 11.8% Na_2O by weight.

Talc as mined is marketed in four grades from Grade 1 to 4, based on colour and purity with Grade 1 being white and free from impurities. Albite 'grit' and iron staining reduces most Gumeracha talc to Grade 3, with lesser amounts of Grade 2, and rare pockets of Grade 1.

Grade 2 and 3 talc have industrial applications as a filler or extender in paint, plastic, paper or fertilizers, and as a major constituent in refractory and insulating ceramics.

Talc-albite can be used in low-absorption glazed floor tiles (Spencer and Ware, 1978) and earthenware, stoneware and kiln furniture (Ware, 1979).

REGIONAL GEOLOGY

Regional geology of the Gumeracha talc deposits is shown on the Onkaparinga 1:50 000 map sheet (Forbes, 1979).

Talc deposits are confined to Stonyfell Quartzite and underlying Woolshed Flat Shale, Burra Group metasediments of Torrensian age, with metamorphism to mid amphibolite facies.

Woolshed Flat Shale includes muscovite and biotite schist, and micaceous laminated siltstone, weathering to soft poorly laminated siltstone. Stonyfell Quartzite (Undalya Quartzite equivalent) includes foliated or laminated fine to medium grained quartzite, and thin massive quartzite or sandstone interbedded with muscovite and biotite schist.

Tectonic history has been complex with three main stages of folding and metamorphism (Offler and Fleming, 1968), associated with the Delamerian Orogeny. The resultant fold pattern, ranging from broadly open to tighter, almost isoclinal, is illustrated by outcrop of major quartzite units within Stonyfell Quartzite as shown on Figure 1 (adapted from Fig. 2 in Conor and Olliver, 1980).

Talc and albite have formed by alteration of original alumino-silicate minerals by metasomatism associated with regional metamorphism. Magnesium required for talc has been derived from original dolomitic beds in schist, and sodium for albite from an external source during large-scale feldspathisation responsible for the Palmer Granite to the east (Dickinson et al, 1951:25). In addition to forming discrete ore bodies, talc and albite are disseminated through country rock, with large areas of Woolshed Flat Shale showing extreme albitisation.

Erratic silicification of schist and quartzite indicates silica metasomatism. Pegmatites comprising coarse crystalline quartz and albite represent extreme abilitisation and silicification.

Although talc-albite bodies are restricted stratigraphically, high contrast in ductility between talc and country rock has produced discordant bodies relocated during regional folding late in the tectonic history. More competent schist and quartzite were faulted and brecciated under stress, with talc-albite being squeezed into resultant voids.

Within talc-albite bodies, Conor and Olliver (1980) report disoriented blocks and boulders of country rock, particularly crenulated schist, rimmed or partially replaced by albite,

indicating albitisation associated with tectonic brecciation. Frequency of boulders varies from deposit to deposit. Country rock directly adjacent to talc bodies also shows albitization.

GEOLOGY OF FORRESTON TALC LODES

No. 1, 2, and 4 Lodes are within albitised Woolshed Flat Shale, and No. 3 Lode is in Stonyfell Quartzite, the contact between these two units trending north-north east through the eastern part of ML 5055 (Fig. 2).

Stonyfell Quartzite comprises:

- hard pink or grey to pale orange, medium grained, massive quartzite with faint bedding 5 to 20 mm thick. Quartzite is recystallised in part, with later quartz veining and voids infilled with quartz crystals.
- hard, massive sandstone, similar to the above.
- fine grained, slightly feldspathic quartzite, with 1mm laminae.
- interbedded siltstone or micaceous schist, albitic in part.

Abrupt terminations to some quartzite outcrops imply either lensoidal character, or offsetting by faults. Schist crops out only to the immediate east of No. 3 Lode, and is exposed underground at No. 3 Lode, with quartzite float over the remaining area.

Measured dips and strikes of bedding in quartzite are generally steep to the east or south east, with evidence of a monoclinal fold structure west of No. 3 Lode.

The only outcrop of unaltered Woolshed Flat Shale is hard foliated micaceous siltstone on the track 60 m east of FT 24. Remaining outcrop is talcose or extensively albitized.

Bedding in Woolshed Flat Shale is variable, illustrated by folding northwest of No. 4 Lode, and by variability of measured

dip and strike west and southwest of No. 1 Lode. Bedding is contorted through much of the area of Figure 3.

Albite metasomatism is pervasive through much of the Woolshed Flat Shale, with more extensive areas shown on Figure 2. In particular, west and southwest of No. 1 Lode, siltstone and schist have been extensively albitised, and silicified in part, with abundant disseminated talc or talc pods close to No. 1 Lode. Albitisation and silicification often result in coarser, almost gneissic texture.

A zone of albite, or talc-albite, with purer talc patches extends southeast from No. 1 Lode to the track to No. 3 Lode, thence southwest towards, and possibly joining, No. 2 Lode. This zone has no silicification. Conor and Olliver (1980) state that talc lodes are 'within an arcuate zone representing a regional isoclinal termination which extends from Wintons Road through No. 2 Lode to No. 1, and westwards towards No. 4'. The talc zone is discordant with bedding through much of its extent, though individual pods are often concordant.

With the exception of No. 3 Lode, in Stonyfell Quartzite, talc is restricted to the albitic zones within Woolshed Flat Shale. Many purer talc bodies have abrupt margins, whereas areas of albitic talcose siltstone have gradational boundaries.

Two pegmatites with distinct margins (sample RS 2097, Appendix A) crop out 30 m west and 70 m southwest of Station A. In contrast, the lenticular pegmatite 8 m west of Station A, grades into coarsely albitic partially silicified siltstone-sandstone. Pegmatite which strikes northeast from No. 4 Lode, is very albitic, talcose in part on either side, and contains distinct talc pods.

Samples RS 2093, 2094, 2095 (Appendix A), at or near No. 2 Lode, show minor secondary alteration of talc probably to chlorite, while RS 2095, from No. 1 Lode, displays extensive alteration of talc and albite to illite (a potassium rich clay mineral) or possibly to chlorite. Abundant white clay is disseminated through talc at No. 1 Lode. Analyses (Appendix B) show low potassium content, and secondary alteration is probably to kaolinite or halloysite (hydrated kaolinite), both white clay minerals. This secondary alteration is extensive west and east of No. 1 Lode.

AUGER DRILLING

Detailed drill logs are summarized below from Appendix C with locations shown on Figure 2.

- FT 1 to 7, north-south line east of No. 1 Lode. Alluvium, up to 5.5 m, is underlain by talcose clay-siltstone in FT 5, possible talc in FT 6 and weathered siltstone in remainder.
- FT 8 to 15, north-south line immediately west of No. 1 Lode. Talc in FT 8, 9, 10, and 12, talcose siltstone in FT 11 and 13, talcose clay-siltstone in FT 14, coarsely albitic silicified siltstone (gneissic appearance) in FT 15.
- FT 16 to 24, on north-south line 75 m west of No. 1 Lode to test westward extension. Talcose siltstone in FT 16, pegmatite in FT 17 and 18, variably silicified and albitized (and clayey) siltstone in remainder.
- FT 25 to 34, north-south line along western margin of ML 5055, in area of limited outcrop. Variably silicified and albitized siltstone in all holes except FT 31 with talcose clay-siltstone, and FT 33 with coarse albite, interpreted to be pegmatite.

- FT 35 to 44, north-south line 60 m east of No. 1 Lode in area with scattered talc outcrop. Talc in FT 36 and 40, talc-clay-siltstone in FT 39, 41, 42 and 43, and siltstone or albitic siltstone in remainder.
- FT 45 to 51, on east-west line 130 m southeast of No. 1 Lode, in area with scattered talc outcrop. Variably albitic and silified siltstone in all holes.
- FT 52 to 57 and FT 83 on east-west line north of No. 2 Lode. Weathered siltstone in all holes.
- FT 58 to 66, on east-west line east of No. 2 Lode. Clayey talc-albite in FT 63, talcose and albitic siltstone in FT 61, 65 and 66, siltstone in remainder.
- FT 67 to 72, east-west line south of No. 2 Lode. Quaternary alluvium in FT 72, variably albitic siltstone in remainder.
- FT 73 to FT 77, south of No. 3 Lode. Sandstone or siltstone in all holes.
- FT 78 to 82, northeast-southwest line to test southeastern extension of talc in FT 36 to FT 43. Talcose albitic siltstone in FT 78, siltstone or silicified siltstone in remainder.
- FT 84, on track to No. 3 Lode, area of scattered talc outcrop intersected siltstone.

Drill holes FT 58, 59, and 73 to 77 are in Stonyfell Quartzite; the remaining 77 holes are in Woolshed Flat Shale, or enclosed talc bodies.

Total metreage drilled was 188.9 m, 6 holes intersected talc, and 16 holes intersected talc-albite, talc-clay or talcose siltstone.

NO 1 LODE DETAILED GEOLOGY

Surface geology, trenching and auger drill holes are detailed on Figure 3, and underground geology on Figure 4.

Workings comprise an open cut, with 4 radiating underground drives, herein called 1A, 1B, 1C and 1D, and a declined stope south eastwards from 1D. Conor and Olliver (1980) show further surface workings immediately to the south, but these have since been backfilled.

No. 1 Lode is within albitised and partially silicified Woolshed Flat Shale siltstone and sandstone. Trenching showed that siltstone is laminated or foliated, with patchy silicification and iron staining, and varies from hard, micaceous and relatively fresh, to soft and weathered (Appendix D). Albitized sandstone grades into pegmatite to the west. Massive albitized sandstone crops out south and southwest of No. 1 Lode, and has been mined for building stone from a small pit 35 m south of Trench 2.

Grey crystalline talc with little visible albite is exposed in the open cut near the portal to underground workings. Talc extends northwest, and was intersected in the northern part of Trench 2. Trenches 1 and 2 outlined an area of very talcose albitized siltstone for 10 to 15 m to the south, with a corresponding zone of weathered talc-clay (sample A601/82) in the south of the open cut face. Pods of purer talc are scattered throughout and extend a further 10-15 m to the west, south, and north into section 6380, with a backfilled shaft 10 m north of the fence.

There has been no drilling or trenching to establish the northern limits.

Talc-albite shown extending south east of No. 1 Lode by Conor & Olliver (1980) is confirmed by talc-clay in FT 5, 6.

Trench 3 exposed laminated micaceous siltstone, with alluvium thickening to the east, to a maximum of 5.5 m.

Underground Workings

Drives 1A, 1B, and 1D radiate south, west and north respectively from the entrance portal, with 1C west from 1D, and 4 m north of 1B. The declined stope trending southeast from 1D is 12 m long, and 5 m wide.

Relatively pure talc, confined to the stope and eastern end of the drives, grades into clay-talc with visible relic bedding on the eastern side of the stope and west along the drives, then into slightly talcose clayey siltstone near the western end of 1A, 1B and 1C. A faulted contact with hard silicified albitic sandstone is exposed at the end of 1A. All contacts have moderate to steep dips to the east-northeast, approximately parallel to visible relic bedding.

Faulting is extensive with a major fault (F1, on Fig. 4), with a shallow dip to the east, through 1C, 1D and the stope. High grade talc approximately 1 m on either side of the fault has been stoped out.

Sample RS 2096 from the stope approximately 1 m above F1, contains 80% talc and 20% clay representing either weathered albite or hydrothermally altered talc.

Results of analysis of 7 chip or grab samples are summarized in Table 3 from Appendix B.

TABLE 3

No. 1 LODE, SUMMARY OF ANALYSES

Sample	Location	Weight %			Brightness	Yellowness
		Talc	Kaolinite (Clay)	Quartz		
SURFACE						
A599/82	North of portal (high grade)	87.1	4.8	3.3	54.7	14.7
A600/82	South of portal (high grade)	86.8	5.2	3.4	63.7	12.9
A601/82	South of portal (low grade)	70.5	23.1	1.8	54.8	14.7
UNDERGROUND						
A602/82	1D drive (high grade)	87.2	4.4	3.7	64.6	11.1
A603/82	1C drive (high grade into low grade)	81.1	11.1	3.0	56.8	15.9
A604/82	Stope roof (high grade)	86.1	5.3	3.9	57.8	17.2
A605/82	South of stope (high grade)	86.1	5.6	3.6	53.2	15.2

Excess clay which is generally pale in colour, does not significantly reduce brightness and may not affect talc grade.

NO. 2 LODE DETAILED GEOLOGY

Coarsely crystalline bladed talc, with up to 60% albite as disseminated laths, crops out in a shallow open cut, and extends north-northeast for 20 m (Fig. 5).

Conor and Olliver (1980) reported a 20 m long adit, with associated stoping, which was backfilled in 1976. The portal is believed to have been approximately 20 m southwest of the remaining open cut, with the adit driven eastwards. As backfilling has obscured outcrop, the talcose area on Figure 5 is adapted from Conor and Olliver.

A prominent albitized zone, with no talc, strikes north east, 20 m east of No. 2 Lode (Fig. 2). No talc was intersected in drill holes to the north or south of No. 2 Lode. There is no outcrop of Woolshed Flat Shale on Figure 5.

Samples RS2093, from the open cut, and RS2094, 13 m to the north, comprise sheaves of parallel or radiating fibres of talc altering to kaolinite or chlorite. Red iron oxides stain much of the talc, and infill fractures within albite.

Sample RS2095 from outcrop in the creek bed 130 m northeast of No 2 Lode probably originally contained in excess of 60% talc, the remainder being albite. Most of the talc has now altered to chlorite(?), with abundant iron staining.

Sample A598/82 from the open cut contained 62% talc, 29.8% albite, and several percent quartz and chlorite or kaolinite(?), and 4.2% iron oxide, correlating well with RS 2093.

NO 3 LODE DETAILED GEOLOGY

Surface workings comprise a narrow 13 m long north south trending open cut, with a 9 m deep circular open cut at the northern end, possibly representing an underground adit and chamber stoped through to ground surface (Fig. 6).

Four underground drives, referred to as 3A, 3B, 3C and 3E radiate from the open cut, and 3D drive connects 3B and 3C at their northern end. Total length of underground drives is 50 m.

No. 3 Lode is in Stonyfell Quartzite, which is exposed in the southern part of the open cut, and at the extremities of all drives.

The talc-quartzite contact in 3A and 3D is transitional, marked by several metres of brecciated quartzite with individual quartzite blocks up to 0.5 m, with a talc matrix forming up to 50% of the rock. The contact in the open cut is faulted.

To the north, talc is in faulted contact with albitised, ferruginous siltstone, separated by a steeply southerly dipping fault (F12), exposed on the northern wall of 3D and in 3E. Blocks of siltstone or albitized siltstone are also present within the talc, with faulted or transitional contacts into talc.

Faulting is extensive, and in places up to 50 per cent of talc is iron stained. In general, talc is crystalline fine to medium grained, and white to grey.

Results of analyses of chip samples A595/82, A596/82 and A597/82 from 3A, 3C, 3E are summarized in Table 4.

TABLE 4

No 3 LODE, SUMMARY OF ANALYSES

Sample	Location	Weight %		Brightness	Yellowness
		Talc	Albite		
A595/82	3A drive	75.1	18.6	73.0	6.1
A596/82	3C drive	75.7	18.1	73.2	5.9
A597/82	3E drive	70.0	23.7	61.3	13.7

Albite content is higher than No 1 Lode, with no visible secondary alteration of talc or albite to clay or chlorite. Albite is fine grained and not visible in hand specimen. Brightness is higher than other lodes.

NO 4 LODE DETAILED GEOLOGY

Workings comprise a 25 m long north-south trending open cut, approximately 4 m deep at the northern end (Fig. 7).

Extensively albitised Woolshed Flat Shale is tightly folded 5 m to the northwest (Fig. 2). Blocks of albitised sandstone on the eastern wall are fault bounded.

Talc in the north is grey, bladed and crystalline, with little visible albite. Albite content increases to the south. Talc extends north from the cut for 4 m, and west for several metres, whereas the eastern wall corresponds to the eastern margin of the lode. The southerly extent is obscured by mullock. Talc on the western wall is iron stained and extensive shears, with slickensided surfaces, trend approximately north-south.

Pegmatite trending northeast from No. 4 Lode includes several small talc pods (Fig. 2), and is bounded by talcose albitized siltstone. Several shallow scrapes at the northeast end of this zone in section 6108 expose very albitic talc.

Analytical sample A606/82, from the eastern wall of the open cut contains 81.4% talc and 11.5% albite with a brightness of 66.4 and yellowness of 8.9.

RESERVES

Reserves are geological and do not allow for losses during mining, nor for excessive overburden or difficult mining. Reserves are inferred, as depth extent of lodes is unknown, and in some cases, surface extent is uncertain.

As pure talc has a specific gravity of 2.7 to 2.8, 2.5 has been used to allow for impurities.

No. 1 Lode

High grade talc in underground workings extends over an area of 160 square metres (m^2), yielding 400 tonnes/vertical metre. Assuming an average height difference of 4 m between surface and underground, 1 600 tonnes are inferred down to the present drive level.

As the lode has a moderate plunge to the southeast, a further 1 200 tonnes is inferred to 3 m below drive level. Below this depth to the southeast, alluvium will be in excess of 3 m thick.

Outcrop extends further west, with talc pods to the south, north and west. Exploration here may increase reserves.

No. 2 Lode

Outcrop extends northeast of the open cut over an area of 130 m^2, yielding 300 tonnes/vertical metre. Plunge of the lode is unknown and extent to the south, especially in the backfilled underground workings, is unknown.

No. 3 Lode

Talc exposed over an area of 130 m^2 underground is expected to yield 320 tonnes/vertical metre. As drives are 6 to 9 m below surface 2 000 tonnes are inferred above workings.

As plunge of the lode based on measured fault boundaries is steep northwards into the hill, considerable overburden may have to be removed.

No. 4 Lode

Approximately 300 tonnes of talc remain on the open cut walls down to the present floor with a further 300 tonnes/vertical metre inferred below. Plunge of the lode is unknown.

Unnamed Talc Pods

- Outcrop of 100 m^2, 3 m west of FT 48, is expected to yield 250 tonnes/vertical metre. Float extends to the east over a comparable area.
- Outcrop and float 10 m southeast of FT 80 and 81 extending over 150 m^2, is expected to yield 350 tonnes/vertical metre.
- Outcrop and talc in drill holes FT 36, 39 and 40 which cover an irregular area of 240 m^2, is expected to yield 480 tonnes/vertical metres.

SUMMARY

Forreston talc deposits in the Mount Lofty Ranges, 32 km northeast of Adelaide are within Woolshed Flat Shale and Stonyfell Quartzite metasediments of Torrensian age.

Eighty four shallow auger holes and three trenches delineated possible extensions of talc to the east and west of No. 1 Lode, and potential talc in an arc extending east and south of No. 1 Lode toward No. 2 Lode.

Intermittent operations, both opencut and underground between 1937 and 1975 have produced a total of 2 809 tonnes of talc.

Talc and albite have formed by metasomatic alteration of original country rock during regional metamorphism, with magnesium being derived from original dolomite beds. Talc lodes are surrounded by extensive albitic zones, with associated patchy silicifcation. Talc and albite show secondary alteration to white clay, probably kaolinite, and possibly some talc to chlorite. Kaolinite or chlorite content may not be as detrimental to grade as high albite content.

Most talc in existing workings is No. 3 Grade, with lesser No. 2 and little No 1 Grade. Kaolinitic and iron stained talc between No. 1 and 2 Lodes may be only No. 4 Grade, and No. 2 Lode may be only No. 4 Grade due to high albite content.

Inferred geological reserves are summarised on Table 5, with 3 600 tonnes inferred down to the level of underground workings in No. 1 & 3 Lodes, and a further 6 200 tonnes inferred to 3 m below surface or underground workings at No's 1, 2, and 3 Lodes, and in talc pods between No. 1 & 2 Lodes.

Inferred reserves at No. 4 Lode, outside ML 5055, are 1200 tonnes, down to 3 m below the floor of the present cut.

'High grade' in Table 5 refers to potential No. 2 or 3 Grade, while 'Low grade' refers to probable No. 3 or 4 Grade.

TABLE 5

RESERVES - SUMMARY

LODE	COMMENTS ON GRADE	INFERRED GEOLOGICAL RESERVES, tonnes. per vertical metre	to depth of present workings	to 3 m below surface or present workings	TOTAL
Within ML 5055					
No. 1	High grade, kaolinitic.	400	1 600	1 200	2 800
No. 2	Low grade, 30% albite.	300	-	900	900
No. 3	High grade, 10% albite.	320	2 000	1 000	3 000
Near FT48	Low grade iron stained, kaolinitic.	250	-	700	700
Near FT80,81	Low grade, iron stained, kaolinitic?	350	-	1 000	1 000
Near FT36,39,40	Low grade, iron stained,kaolinitic.	480	-	1 400	1 400
SUB TOTAL			3 600	6 200	9 800
Outside ML 5055					
No 4	High grade 10% albite	300	300	900	1 200
TOTAL			3 900	7 100	11 000

It is recommended that the present operators peg a mineral claim over No. 4 Lode, and over talc pods extending northwards from No. 1 Lode into section 6386.

Wayne McCallum 15/4/83

WSMcC:AF

W.S. McCALLUM
GEOLOGIST

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APPENDIX A.
PETROLOGICAL DESCRIPTIONS
5 Samples
AMDEL report GS 473/83 by M. Farrand.

PETROGRAPHY OF FIVE ROCK SPECIMENS

1. INTRODUCTION

Five hand specimens of rock were received from the South Australian Department of Mines & Energy for petrographic description. The specimens originated from the Forreston talc deposit.

2. PROCEDURE

Thin sections were prepared from the specimens and were examined in transmitted light. The sections were treated with alizarin red-S stain to emphasise the presence of calcite. Sample and thin section numbers are as follows:

Sample	Thin Section No.
RS 2093, FT 5P	C37005
RS 2094, FT 6P	C37006
RS 2095, FT 10P	C37007
RS 2096, Ft 15P	C37008
RS 2097, FT 17P	C37009

3. PETROGRAPHY

Sample: RS 2093, FT 5P; TSC37005

Rock Name:
Plagioclase-talc rock Forreston No. 2 Lode

Hand Specimen:
The rock is weathered and somewhat friable. It consists of brownish yellow feldspar crystals up to 3 mm in length surrounded by a mass of light-green coloured plates of talc. Occasional patches of iron oxide measure up to 4 mm in diameter. On the weathered surface the feldspars are pinkish in colour.

Thin Section:
Mineral percentages by visual estimation are:

	%
Plagioclase	60
Talc	30
Chlorite	10
Epidote	trace
Iron oxides	trace

The plagioclase crystals remain surprisingly fresh but are highly turbid in places owing to strong exsolution of opaque granules, probably of iron oxide. The crystals are well-shaped and measure up to 2 mm in maximum dimension. Many crystals are smaller, in the order of 0.5 mm across. The plagiolcase crystals are sometimes grouped together but are more commonly

separated by a mass of fibrous talc.

Although the talc appears platy in hand specimen, in thin section it is seen to be composed of fibres in parallel or radiating arrangements. Sheaves of fibres which make up the plates measure up to 2.5 mm in length.

Between, and sometimes within, the bundles of fibres are patches of a mineral with low to moderate birefringence which may possibly be a serpentine mineral such as antigorite but, from its moderate birefringence, is more likely to be a chlorite. The mineral is very fine-grained but occurs in scaly masses. Patches measure up to 1.5 mm in diameter but are more commonly in the order of 0.5 mm across.

A yellow-green, pleochroic mineral with a high birefringence occurs at one point in a small cavity, about 0.2 mm in diameter, and is probably epidote.

The occurrence of fine granules of iron oxide within plagioclase crystals has already been mentioned. A second form of iron oxide occurs as rounded granules, within cavities or along fractures in the rock, and varies in colour from almost opaque to light red-brown. A light yellow-brown stain is also visible along fractures in the rock. These forms of iron oxide are probably limonitic and have been introduced late in the history of the rock. A few open cavities within the rock are lined with this limonitic material.

Sample; RS 2094, FT 6P; TSC37006

Rock Name:
Altered plagioclase-talc rock Forreston No. 2 Lode

Hand Specimen:
The specimen is very friable and has a red-brown coloration for the most part, although patches within it are a slightly greenish-white.

Thin Section:
Mineral percentages by visual estimation are:

	%
Plagioclase	40
Talc	35
Chlorite	20
Iron oxides	5

Plagioclase crystals are somewhat less abundant and of coarser grain in this specimen than in the last specimen described. Apart from this difference and the higher degree of alteration there is virtually no difference in the two specimens. The feldspars themselves are not strongly altered but carry a limonitic iron oxide along fractures and cleavage planes.

There is a substantial degree of alteration in the areas of talc fibres. In some parts the talc remains recognisable but has been invaded by red limonitic iron oxide. In other patches the limonitic alteration is absent but a great deal of chloritic material with low birefringence has replaced much of the talc.

The chlorite is fine-grained and occurs partly in patches to the exclusion of talc and partly in close association with talc fibres in those areas where talc formerly predominated.

The red iron oxide, although probably not quantitatively abundant, has a marked affect on the appearance of the areas of talc. The red staining is concentrated between the bundles of fibres but also extends throughout the whole mass of fibres. The presence of iron oxides within fractured feldspar grains has already been mentioned. There is no indication that the iron oxide was ever a sulphide.

Sample: RS 2095, FT 10P; TSC37007

Rock Name:
Altered talc-plagioclase rock North of No. 2 Lode

Hand Specimen:
The specimen is somewhat less friable than the two previously examined but contains several spheroidal cavities. A yellow-brown iron oxide pervades the specimen which appears to have a preferred orientation which was lacking in the specimens previously examined.

Thin Section:
Mineral percentages by visual estimation are:

	%
Plagioclase	30
Talc	20
Chlorite	40
Iron oxides	10

The plagioclase in this specimen is still relatively fresh but has been fragmented and corroded until many grains are reduced to scattered remnants. Fractures within the remnants of the plagioclase crystals are filled partly by iron oxide but largely by a mixture of remnant talc fibres and a chloritic alteration of the talc. The fragmented remnants of plagioclase crystals still measure up to 2.5 mm in maximum dimension.

The alteration of the talc is extremely extensive in this specimen. The maximum extent of remnant patches of talc fibres is 1 mm. The fibres are interspersed with a mineral in fine particles which has a low to moderate birefringence and is assumed to be chlorite. Impregnation by iron oxide is again heavy.

The chloritic alteration of the talc is patchy in its extent and in its severity. In some areas no talc fibres remain, in others the talc is still present as remnant patches of fibres but chlorite has penetrated between and within the bundles of fibres.

Iron oxide pervades much of the fabric of the rock as a light yellow-brown stain and a red-brown oxide of colloidal structures fills, or partly fills, the cavities within the specimen.

Sample: RS 2096, FT 15P; TSC37008

Rock Name:
Talc rock Forreston No. 2 Lode

Hand Specimen:
The specimen is white in colour, high in specific gravity and extremely friable. Plates of greenish talc are recognisable but much of the rock consists of a fine-grained white powdery mineral.

Thin Section:
Mineral percentages by visual estimation are:

	%
Talc	80
?Clay minerals	15
Iron oxides	5

No vestige of feldspar remains in this rock and by far the greater proportion of the section is composed of fibrous talc. The section was prepared from the most coherent part of the specimen and the proportion of soft, white, powdery material is probably less in the section than in the specimen as a whole. The talc consists, as in specimens previously described, of bundles of fibres in a radiating or parallel arrangement. Individual bundles measure up to 1.5 mm in length although the average is about 0.5 mm in length.

A colourless, fine-grained platy mineral occurs in patches between and within the bundles of talc fibres. The material is for the most part isotropic or amorphous and displays no recognisable optical properties. In previous descriptions the assumption has been made that the mineral is chlorite since this the most probable alteration product of talc. However, in this specimen some of the alteration product has a moderate refractive index and on rare occasions displays a biaxial negative interference figure with a very small optic axial angle. This mineral is possibly illite, a clay mineral, and may be the result of alteration of feldspar rather than of talc. A second possibility is that the alteration is the result not of weathering but of metasomatic alteration through the action of hydrothermal solutions. The field relationships of the talc rock to other country rock would provide a more reliable guide to the type of alteration than the rather sparse optical data.

Iron oxides are present in two forms, the first is a black, opaque granular material which is distributed in fine-grained, irregular patches throughout the rock. The second form is of yellow, translucent, limonitic oxide which occurs in patches and along fractures and between bundles of talc fibres.

Sample: RS 2097, FT 17P; TSC37009

Rock Name:
Plagioclase pegmatite West of No. 1 Lode

Hand Specimen:
The specimen consists largely of well-formed, white crystals of feldspar with finer-grained quartz in the interstitial regions.

Thin Section:
Mineral percentages by visual estimation are:

	%
Plagioclase	90
Quartz	8
Microcline	trace
Muscovite	2
Biotite	trace

The major part of the specimen consists of a feldspar which is certainly a plagioclase and probably an albite. The twinning is not well enough developed for an optical determination of the feldspar composition to be made but exsolution of microcline and a moderately abundant sericitic alteration suggests that the composition is highly alkaline. The plagioclase is very little altered but is somewhat turbid owing to exsolution of opaque iron oxide granules. A single crystal occupies the whole width of the thin section. A few patches of poorly-defined albite twinning are present but most of the feldspar is untwinned. Oriented exsolution of microcline in patches up to 0.15 mm in diameter distinguish many of the plagioclase grains. A moderate sericitic alteration is widespread throughout the plagioclase. This may reflect the presence of potassium within the plagioclase which has not been exsolved as microcline. Individual sericitic flakes are up to 0.10 mm in diameter. The albite may be described as an antiperthite.

Quartz occurs as interstitial patches of irregular shape in which individual grains measure about 2.5 mm in maximum dimension. Some of the quartz has lobate margins and shows evidence of having invaded and replaced adjacent plagioclase grains.

Rare, ragged and wispy flakes of biotite are occasional observed between plagioclase crystals. Individual flakes measure up to 0.5 mm in maximum dimension and one patch of ragged flakes measure 1.5 mm across.

4. DISCUSSION

A progressive replacement of plagioclase by talc is observed in the specimens from No. 2 into No. 1 lodes. There is no evidence of any fine-grained sediment as a parent rock. The nature of the original material is uncertain since the talc has completely replaced all minerals but the plagioclase. Unless there has been an intense magnesium metasomatism, it must be assumed that the magnesium present in the talc was derived from an original parent rock. In this case the most probable parent rock, given the coarse grain size of the remnant plagioclase, was a basic or ultrabasic plutonic intrusive of a gabbroic composition.

The presence of a potassium-bearing clay mineral as an alteration product of the talc suggests an episode of metasomatism subsequent in date to the formation of the talc. The presence of pegmatite in the vicinity of the lodes suggests that the origin of such a metasomatism might be a granitic intrusive in the area.

The final alteration of the material has been accomplished, probably by atmospheric solutions, and is marked by the introduction of hydrated iron oxides.

APPENDIX B
RESULTS OF CHEMICAL ANALYSES, 12 Samples

Chemical analyses extracted from AMDEL report MD 366/83 by L.J. Day.

1. INTRODUCTION

Twelve samples from the Forreston talc deposit which were labelled A595-A606/82 were submitted for testing. It was requested that the birghtness of the samples be determined and that they be analysed chemically to determine their composition.

2. PROCEDURES

Representative portions of each sample were crushed in a mortar and pestle to minus 200 mesh (-75 µm). The brightness determinations were performed using a Zeiss Elrepho reflectance photometer. Brightness quoted is at 457 nanometres, using the R457 filter. Yellowness quoted is the difference between R457 and R57 values.

The samples were analysed using inductively coupled plasma atomic emission spectometry.

3. RESULTS

Results of the brightness determinations are given in Table 1. Results of the chemical analyses are given in Table 2.

TABLE 1: BRIGHTNESS DETERMINATIONS

Sample	Brightness (R457)	Yellowness (R57-R457)
A595/82	73.0	6.1
A596/82	73.2	5.9
A597/82	61.3	13.7
A598/82	33.1	27.5
A599/82	54.7	14.7
A600/82	63.7	12.9
A601/82	54.8	14.7
A602/82	64.6	11.1
A603/82	56.8	15.9
A604/82	57.8	17.2
A605/82	53.2	15.2
A606/82	66.4	8.9

TABLE 2: CHEMICAL ANALYSIS

	A595	A596	A597	A598	A599	A600	A601	A602	A603	A604	A605	A606
SiO_2	62.5	63.0	63.3	63.2	60.9	60.8	56.7	60.8	59.6	60.9	60.8	62.5
TiO_2	0.25	0.30	0.37	0.21	0.06	0.06	0.39	0.07	0.20	0.06	0.06	0.21
Al_2O_3	3.92	3.90	5.25	6.05	1.81	1.92	8.45	1.62	4.14	1.96	2.06	2.82
Total Fe as Fe_2O_3	2.90	2.88	2.58	3.84	4.72	4.70	4.42	4.57	4.32	4.70	4.74	2.86
MnO	<0.01	<0.01	<0.01	<0.01	0.01	0.01	<0.01	<0.01	<0.01	0.01	0.01	<0.01
MgO	23.8	24.0	22.3	19.7	27.6	27.5	22.3	27.6	25.7	27.3	27.3	25.8
CaO	0.05	0.04	0.06	0.07	0.04	0.03	0.03	0.04	0.08	0.03	0.03	0.04
Na_2O	2.20	2.14	2.82	3.52	0.14	0.12	0.23	0.17	0.42	0.14	0.11	1.36
K_2O	0.03	<0.01	0.01	0.05	0.06	0.10	0.02	0.02	0.02	<0.01	0.03	<0.01
P_2O_5	0.02	0.02	0.05	0.04	0.02	0.03	0.02	0.01	0.01	0.02	0.01	0.01
L.O.I.	4.08	4.06	4.02	3.46	5.00	4.86	7.05	4.97	6.25	4.90	4.96	4.32
Total	99.8	100.4	100.8	100.2	100.3	100.2	99.5	99.9	100.8	100.0	100.2	99.8

Quantitative mineralogy was calculated for each sample based on:

- Talc: 63.5% SiO_2, 31.7% MgO, 4.8% H_2O.
- Albite: 68.7% SiO_2, 19.5% Al_2O_3, 11.8% Na_2O.
- Chlorite, assumed average composition: 20% Al_2O_3, 41% Fe or Mg oxides, 25% SiO_2, 14% metallic oxides and H_2O^+.
- Kaolinite (or halloysite) assumed composition: 36.6% Al_2O_3, 44.5% SiO_2, 0.4% Fe oxides, 13.4 H_2O^+, 5.3% metallic oxides.

Petrological descriptions (Appendix A) indicated chlorite or illite as a secondary alteration of talc. Chlorite composition is variable, and weight percentage is only approximate. Illite is a potassium clay mineral. Analyses show a very low K_2O content. It is probable that the clay mineral is either kaolinite or halloysite, with the theoretical formulae $Al_4(Si_4O_{10})(OH)_8$, and $Al_4(Si_4O_{10})(OH)_8 \cdot H_2O$ respectively. Halloysite is hydrated kaolinite, often with an increase in cation content.

Initially all Na_2O was assigned to albite, all MgO to talc, and all remaining Al_2O_3 (after albite) was assigned to kaolinite. This generally left a small percentage of free quartz, hydrated iron oxides (ie total Fe as Fe_2O_3 plus remaining L.O.I.), and a very small amount of unassigned metallic oxides.

Samples A599/82 to A605/82, from No. 1 Lode, were recalculated assuming no albite, and that all Al_2O_3 is included in kaolinite. Petrology (Appendix A) indicated no albite in No. 1 Lode.

These samples were again recalculated assuming all Al_2O_3 and MgO goes to chlorite, with a corresponding reduction in talc content in samples A601/82 and A603/82.

Based on petrology (Appendix A), secondary alteration of talc and albite is more likely to be to kaolinite than chlorite, and alternative (b) on the accompanying table is more likely to be correct.

CALCULATED QUANTITATIVE MINERALOGY

Sample	Talc	Albite	Chlorite	Kaolinite	Quartz	Hydrated iron oxides	Un-assigned metallic oxides
A595/82(a)	75.1	18.6	-	0.8	1.7	3.5	0.3
A596/82(a)	75.7	18.1	-	0.7	2.1	3.0	0.3
A597/82(a)	70.0	23.7	-	1.7	1.5	2.7	0.4
A598/82(a)	62.0	29.8	-	0.6	3.0	4.2	0.4
A599/82(a)	87.1	1.2	-	4.2	2.8	4.7	-
OR (b)	87.1	-	-	4.8	3.3	4.7	0.1
OR (c)	87.1	-	8.4	0	3.2	1.3	-
A600/82(a)	86.8	1.0	-	4.6	2.9	4.7	-
OR (b)	86.8	-	-	5.2	3.4	4.6	-
OR (c)	86.8	-	9.2	-	3.1	0.6	0.3
A601/82(a)	70.5	2.0	-	20.9	1.1	5.5	-
OR (b)	70.5	-	-	23.1	1.8	4.6	-
OR (c)	31.1	-	42.2	-	26.7	-	-
A602/82(a)	87.2	1.4	-	3.7	2.9	4.8	-
OR (b)	87.2	-	-	4.4	3.7	4.7	-
OR (c)	87.2	-	8.1	-	3.5	1.2	-
A603/82(a)	81.1	3.6	-	9.4	1.5	4.4	-
OR (b)	81.1	-	-	11.1	3.0	4.6	0.2
OR (c)	67.9	-	21.7	-	11.4	-	-
A604/82(a)	86.1	1.2	-	4.7	3.3	4.7	-
OR (b)	86.1	-	-	5.3	3.9	4.7	-
OR (c)	86.1	-	9.7	-	3.8	0.4	-
A605/82(a)	86.1	0.9	-	5.1	3.2	4.7	-
OR (b)	86.1	-	-	5.6	3.6	4.7	-
OR (c)	86.1	-	10.4	-	3.5	-	-
A606/82(a)	81.4	11.5	-	1.6	2.2	3.0	0.2

(a) - assume all MgO goes to talc, all Na_2O goes to albite, and remaining Al_2O_3 goes to kaolinite.
(b) - assume all MgO goes to talc, and all Al_2O_3 goes to kaolinite
(c) - assume all Al_2O_3 goes to chlorite, and all remaining MgO goes to talc.

APPENDIX C. LOGS OF AUGER DRILL HOLES FT 1 TO FT 84.

Holes drilled between 23 March 1982 and 29 March 1982

Auger RD 9 on Daihatsu tray top 4 wheel drive. Drill rods 5 ft (1.52 m) by 2 3/4 inches (7 cm).

Explanation of symbols used in drill logs.

vf : very fine
sl : slightly
m : moderately
v : very
- rock names in capitals are inferred from cuttings.

Depth (m) from - to	Description
Drill Hole FT 1, 23/3/82	
0 - 0.1	Topsoil
0.1 - 1.2	Silt-sand (vf) - clay, loose, light brown, sl. talcose, + rare small talc fragments; with rounded siltstone and shale fragments below 0.5 m.
1.2 - 2.2	Clay-sand (vf), plastic, reddish orange-brown.
2.2 - 2.5	Sand (vf), clayey, loose, reddish brown.
2.5 - 3.0	SILTSTONE; Silt and sand (vf), sl. clayey, loose, orange-brown, trace of talc.
3.0	End of Hole.
Drill Hole FT 2, 23/3/82	
0 - 1.2	Sand (vf), silt, pale brown, sl. talcose.
1.2 - 2.0	Clay, plastic, reddish orange, becoming pale greenish orange, + small fragments of talc.
2.0 - 2.7	Clay, plastic, reddish orange, with rounded sandstone pebbles.
2.7 - 3.0	SILTSTONE ; Silt and sand (vf), sl. clayey, loose, light orange-brown, sl. talcose.
3.0	End of Hole.
Drill Hole FT 3, 23/3/82	
0 - 0.3	Silty sand, loose, light brown.
0.3 - 2.0	Clay, silty, plastic, reddish orange-brown.
2.0 - 3.5	Clay-sand, loose, brown, trace of talc; very clayey below 2.8 m.
3.5 - 4.5	WEATHERED SILTSTONE; Silt and sand (vf), loose, sl. clayey, olive or blueish grey-brown, sl. talcose.
4.5	End of Hole.

Depth (m) from - to	Description
Drill Hole FT 4, 23/3/82	
0 - 0.7	Silt, loose, pale brown, sl. talcose.
0.7 - 2.5	Clay, plastic, red-brown; trace of talc below 1.5 m.
2.5 - 3.7	Clay, sandy, loose, sl. plastic, sl. talcose.
3.7 - 4.9	SILTSTONE; Silt and sand (vf), sl. clayey, loose, pale orange-brown, m-v talcose, with some hard talc (?) bands 2-5 cm.
4.9	End of Hole, hard, talc-albite on bit.
Drill Hole FT 5, 23/3/82	
0 - 0.9	Topsoil
0.9 - 2.8	Clay, mottled orange, numerous talc fragments.
2.8 - 3.7	TALCOSE SILTSTONE; Silt and clay, loose, pale orange, moderately talcose (20%); hard band at 3.6 m.
3.7	End of Hole, powdered talc on bit.
Drill Hole FT 6, 23/3/82	
0 - 0.3	Topsoil
0.3 - 0.9	Silt and sand (vf), brown + clayey fragments, and some talc fragments; becoming clayey below 0.7.
0.9 - 2.4	Clay, plastic to semi plastic, red-brown, sl. talcose.
2.4	End of Hole, hard, pink TALC on bit.
Drill Hole FT 7, 23/3/82	
0 - 3.8	Clay, deep brown, plastic, with talc and shale fragments.
3.8 - 5.5	Clay, light brown, semi plastic, sl. talcose, + rare shale fragments.
5.5 - 6.0	SILTSTONE; Silt and sand (vf), sl-v clayey, loose, light olive brown.
6.0	End of Hole.

Depth (m) from - to	Description
Drill Hole FT 8, 23/3/82	
0 - 0.3	Sand (vf), silty, pale brown.
0.3 - 1.2	Silt and siltstone fragments, mottled reddish brown.
1.2 - 1.5	TALC; silty, loose, clayey, off white to pale brown.
1.5	End of Hole.
Drill Hole FT 9, 23/3/82	
0 - 0.3	Silt, brown, sl. talcose.
0.3 - 1.3	Silt and siltstone fragments, sl. clayey, pale brown, v talcose.
1.3 - 1.7	TALC; sl. silty, pale brown becoming off white.
1.7	End of Hole.
Drill Hole FT 10, 23/3/82	
0 - 0.8	Silt and clayey siltstone fragments, pale brown, v talcose.
0.8 - 1.5	TALC; loose, light orange-brown; + 30% siltstone from 0.8 - 1.2 m; + 20% siltstone, quartz and albite below 1.2 m.
1.5	End of Hole.
Drill Hole FT 11, 23/3/82	
0 - 0.3	Topsoil
0.3 - 0.8	Siltstone, clayey, brown.
0.8 - 1.3	TALCOSE SILTSTONE; Silt, v talcose, orange, 30% albite, quartz.
1.3	End of Hole.

Depth (m) from - to	Description
Drill Hole FT 12, 23/3/82	
0 - 1.3	Silt, loose, light brown, sl. talcose; with 80% siltstone fragments below 0.2 m.
1.3 - 1.5	TALC; Talc, silty, + 30% clay-talc, quartz and albite.
1.5	End of Hole, very hard.
Drill Hole FT 13, 23/3/82	
0 - 1.3	Clay, semi plastic, greenish orange-brown; + talc fragments below 0.8 m.
1.3 - 1.6	TALCOSE SILTSTONE; silt, loose, v talcose, orange brown.
1.6	End of Hole, very hard, talc on bit.
Drill Hole FT 14, 23/3/82	
0 - 0.4	Silt, loose, brown.
0.4 - 1.1	Silt, clayey, brown, + siltstone fragments.
1.1 - 2.2	TALCOSE SILTSTONE; Silt, v talcose, orange-brown, + 30% clay and albite fragments.
2.2	End of Hole.
Drill Hole FT 15, 23/3/82	
0.0	QUARTZ FELDSPAR GNEISS; medium grained, inpenetrable.
Drill Hole FT 16, 23/3/82	
0 - 1.0	Clay, plastic, red-brown.
1.0 - 1.9	TALCOSE SILTSTONE; Silt, yellow sl-m talcose.
1.9	End of Hole, hard.

Depth (m) from - to	Description
Drill Hole FT 17, 23/3/82	
0 - 0.5	PEGMATITE; inpenetrable.
0.5	End of Hole.
Drill Hole FT 18, 24/3/82	
0 - 0.3	PEGMATITE; inpenetrable.
0.3	End of Hole.
Drill Hole FT 19, 24/3/82	
0 - 1.0	SILTSTONE - QUARTZITE; sand, light brown, + fragments of quartz, quartzite, and white siltstone.
1.0	End of Hole.
Drill Hole FT 20, 24/3/82	
0 - 1.1	Sand, light brown, + fragments of hard, white to orange siltstone; + fragments of greenish brown claystone below 0.8 m.
1.1 - 1.2	SILTSTONE; Silt and sand (vf), light orange-brown.
1.2	End of Hole, very hard.
Drill Hole FT 21, 24/3/82	
0 - 0.9	Silt, sand (vf), light brown, + some quartz grains.
0.9 - 1.8	Silt and sand + some red-green laminated clay fragments.
1.8 - 2.5	SILTSTONE; Silt, sand (vf), light orange, sl. talcose, + rare siltstone fragments.
2.5	End of Hole, very hard, tightly packed clay on bit.

Depth (m) from - to	Description
Drill Hole FT 22, 24/3/82	
0 - 1.1	Silt, loose, orange, sl. micaceous, trace of talc; with clay fragments below 0.8 m.
1.1 - 1.4	SILTSTONE; Silt, sl. clayey, pale brownish orange, sl. micaceous.
1.4	End of Hole, very hard.
Drill Hole FT 23, 24/3/82	
0 - 0.8	Silt, v clayey, loose, pale brown.
0.8 - 1.5	SILTSTONE - SANDSTONE; Silt, clayey, pale brown, + fragments of white sandstone (vf).
1.5	End of Hole.
Drill Hole FT 24, 24/3/82	
0 - 2.0	Sand (vf), and silt, sl. clayey, sl. micaceous, pale orange-brown; light brown below 1.0 m.
2.0	QUARTZ MICA SCHIST; hard grey fragments on bit.
2.0	End of Hole.
Drill Hole FT 25, 24/3/82	
0 - 1.0	Silt, pale brown, + numerous fragments of white to grey quartzite.
1.0	QUARTZITE.
1.0	End of Hole, very hard.
Drill Hole FT 26, 24/3/82	
0 - 1.0	QUARTZITE; hard white coarse grained quartzite fragments.
1.0	End of Hole.

Depth (m) from - to	Description
Drill Hole FT 27, 24/3/82	
0 - 1.0	Sand (vf), brown, + fragments of brown siltstone-claystone.
1.0 - 1.2	QUARTZITE; fragments of white to grey fine grained quartzite, and some quartz.
1.2	End of Hole.
Drill Hole FT 28, 24/3/82	
0 - 1.2	Sand (vf), dark brown, + fragments of weathered feldspathic sandstone.
1.2 - 1.7	FELDSPATHIC SANDSTONE; off white sand and fragments of quartz, and feldspathic sandstone.
1.7	End of Hole.
Drill Hole FT 29, 24/3/82	
0 - 1.5	FELDSPATHIC SANDSTONE; light brown silt, sand (vf), + fragments of weathered feldspathic sandstone.
1.5	End of Hole.
Drill Hole FT 30, 24/3/82	
0 - 0.7	FELDSPATHIC SANDSTONE; pale brown sand with fragments of coarse grained white quartz and feldspar.
0.7	End of Hole.
Drill Hole FT 31, 24/3/82	
0 - 1.2	Sand, light brown, with feldspathic sandstone fragments.
1.2 - 1.5	TALCOSE SILTSTONE; Silt, pale brown, talcose (20%) and albite (30%).
1.5	End of Hole.

Depth (m) from - to	Description
Drill Hole FT 32, 24/3/82	
0 - 1.3	FELDSPATHIC SANDSTONE; angular fragments of feldspar, with some quartz, some off white silt and sand.
1.3	End of Hole
Drill Hole FT 33, 24/3/82	
0 - 1.0	ALBITE?; Albite fragments, fine to coarse, clear to off white, some quartz, some sand.
1.0	End of Hole.
Drill Hole FT 34, 24/3/82	
0 - 2.0	Clay soil, silty, very dark brown; lighter below 1.8 m.
2.0 - 2.2	QUARTZITE; light brown sand, silt, + quartz and quartzite fragments.
2.2	End of Hole.
Drill Hole FT 35, 24/3/82	
0 - 0.8	Clayey soil, silt, sand, orange-brown.
0.8 - 1.8	Silt, sand, light orange-brown, + fragments of orange, red and green siltstone, trace of talc?
1.8 - 3.0	SILTSTONE; light orange silt, sl. clayey, sl. talcose; off white below 2.5 m.
3.0	End of Hole.
Drill Hole FT 36, 24/3/82	
0 - 1.0	Clayey soil, silt, sand, dark brown.
1.0 - 1.5	Silt and sand (vf), loose, reddish brown, sl. clayey, + fragments of olive green weathered siltstone.

Drill Hole FT 36, 24/3/82 (cont)

1.5 - 2.5 Silt and sand (vf), loose, orange, sl. talcose.

2.5 - 3.0 SILTY TALC; Talc, fine with some coarser, sl-m silty, sl. clayey, off white to pale brown.

Drill Hole FT 37, 24/3/82

0 - 0.2 Clay soil, dark brown.

0.2 - 2.4 Silt, sand (vf), light orange-brown, + clayey siltstone fragments, sl. talcose; abundant siltstone fragments below 1.4 m.

2.4 - 2.6 Talc, silty, light brown, + quartzite and siltstone fragments.

2.6 - 4.5 SANDSTONE; Sand (vf), pale orange, + some quartzite and siltstone fragments, sl. talcose.

4.5 End of Hole.

Drill Hole FT 38, 24/3/82

0 - 0.2 Clay soil.

0.2 - 1.4 Claystone, soft, non plastic, orange brown, sl. talcose.

1.4 - 3.0 SANDSTONE; Sand (vf), silty, loose, pale orange, sl. micaceous; pale olive below 2.3 m.

3.0 End of Hole, lost rod down hole.

Drill Hole FT 39, 25/3/82

0 - 0.2 Soil, dark brown.

0.2 - 1.7 Clay, silty, sandy, non plastic, reddish brown; orange brown below 1.2 m.

1.7 - 3.0 TALCOSE SANDSTONE; Sand (vf), sl. silty, loose, pale to off white, sl. talcose; m-v talcose below 2.5 m.

3.0 End of Hole.

Depth (m) from - to	Description
Drill Hole FT 40, 25/3/82	
0 - 1.0	Clay, silty, sandy, non plastic, brown.
1.0 - 1.2	Talc, sandy, v. silty, clayey, orange.
1.2 - 2.0	Sand (vf), sl. silty, off white to white, sl. talcose, trace of muscovite.
2.0 - 2.5	TALC; sl. silty, loose, white; becoming pale brown below 2.2 m.
2.5	End of Hole.
Drill Hole FT 41, 25/3/82	
0 - 1.1	Clay soil, silty, brown, sl. talcose.
1.1 - 1.9	Sand (vf), silt, pale yellow, + 5% quartz fragments, m. talcose.
1.9 - 2.1	Clay, sl. silty, pale brown, + some quartz fragments.
2.1 - 3.0	TALCOSE SILTSTONE; Silt, cream to white, + some albite grains, v talcose.
3.0	End of Hole.
Drill Hole FT 42, 25/3/82	
0 - 1.0	Clay soil, dark brown.
1.0 - 1.6	Clay-silt, orange-brown, m talcose.
1.6 - 2.8	TALCOSE SILTSTONE; Silt, sand (vf), loose, pale brown to off white, sl-m talcose.
2.8	End of Hole.

Depth (m) from - to	Description
Drill Hole FT 43, 25/3/82	
0 - 0.7	Clay soil dark brown.
0.7 - 1.8	Clay-silt, sl. sandy (vf), brown.
1.8 - 2.7	Talc, v silty, orange.
2.7 - 3.0	TALCOSE SILTSTONE; Silt, m talcose, light olive brown.
3.0	End of Hole.
Drill Hole FT 44, 25/3/82	
0 - 0.8	Clay soil brown.
0.8 - 2.0	Clay-silt, loose, dark orange-brown, + fragments quartz, quartzite, reddish siltstone.
2.0 - 2.8	Clay, silty, sandy, semi plastic, orange-brown.
2.8 - 3.1	Silt, fawn, sl. talcose.
3.1 - 3.3	CLAYSTONE; clay, sl. silty, fawn, semi plastic.
3.3	End of Hole.
Drill Hole FT 45, 25/3/82	
0 - 1.8	SILTSTONE; Silt, sand (vf), loose, orange, + fragments hard siltstone.
1.8	End of Hole.
Drill Hole Ft 46, 25/3/82	
0 - 1.3	Silt, orange, + some siltstone fragments.
1.3 - 3.0	SILTSTONE; Silt, light orange-brown, loose, sl. talcose, + some weathered white clay fragments below 2.7 m.
3.0	End of Hole.

Depth (m) from - to	Description
Drill Hole FT 47, 25/3/82	
0 - 1.4	Clay-silt, orange-brown, sl. talcose.
1.4 - 2.5	Silt, sl. clayey, off white, sl. talcose, + some siltstone fragments.
2.4 - 3.0	CLAYSTONE-SILTSTONE; clay-silt, light orange, sl-m talcose, loose.
3.0	End of Hole.
Drill Hole FT 48, 25/3/82	
0 - 1.1	Clay-silt, brown, sl. talcose.
1.1 - 1.3	Sand, silt, sl. clayey, orange, sl. talcose.
1.3 - 2.0	Clay, silty, pale orange-brown, semi plastic, very silty below 1.8 m.
2.0 - 3.0	SILTSTONE; silt, sand (vf), sl. clayey, light orange, sl. talcose.
3.0	End of Hole.
Drill Hole FT 49, 25/3/82	
0 - 0.2	Clay soil, black-brown.
0.2 - 1.3	Clay-silt, red-brown.
1.3 - 2.0	Clay, silty, semi plastic, light orange to pale brown.
2.0 - 2.8	SANDSTONE; sand (vf), sl. clayey, sl. silty, light to pale orange-brown, sl. talcose.
2.8	End of Hole.

Depth (m) from - to	Description
Drill Hole FT 50, 25/3/82	
0 - 0.5	Silt, sand, orange.
0.5 - 2.1	Claystone, silty, reddish orange.
2.1 - 2.5	Clay, silty, pale yellow, plastic.
2.5 - 3.0	SANDSTONE; sand (vf), silt, clayey, loose, yellow.
3.0	End of Hole.
Drill Hole FT 51, 25/3/82	
0 - 0.7	Claystone, soft, reddish brown.
0.7 - 1.4	SANDSTONE-QUARTZITE; sand (vf), loose, light orange, + abundant broken quartzite.
1.4	End of Hole.
Drill Hole FT 52, 25/3/82	
0 - 1.3	Clay-silt, pinkish brown-orange.
1.3 - 2.8	SILTSTONE; Silt, loose, olive-green, some orange.
2.8	End of Hole.
Drill Hole FT 53, 25/3/82	
0 - 1.2	Clay-soil, reddish brown.
1.2 - 2.2	Silt, off white to pale brown, sl. clayey, sl. talcose; + quartz and feldspar fragments.
2.2 - 3.5	SILTSTONE; Silt, sl. clayey, pale orange-brown, + some siltstone fragments.
3.5	End of Hole.

Depth (m) from - to	Description
Drill Hole FT 54, 25/3/82	
0 - 1.6	Clay-silt, orange brown, + some claystone, quartz and quartzite fragments.
1.6 - 2.0	SILTSTONE; Silt, sand, sl. clayey, olive-brown.
2.0	End of Hole.
Drill Hole FT 55, 25/3/82	
0 - 0.2	Clay soil, black-brown.
0.2 - 0.9	Sand (vf), silty, light brown, loose.
0.9 - 1.4	CLAYSTONE-SILTSTONE; Sand (vf), + 90% claystone, siltstone and quartz fragments, off white.
1.4	End of Hole.
Drill Hole FT 56, 25/3/82	
0 - 0.2	Clay-soil, black-brown.
0.2 - 1.3	Clay-silt, orange-brown.
1.3 - 1.5	SILTSTONE; Silt, olive-brown, sl. micaceous, sl. talcose.
1.5	End of Hole.
Drill Hole FT 57, 25/3/82	
0 - 1.2	Clay-silt, red-brown.
1.2 - 1.5	SILTSTONE; silt, dark olive-brown, sl. micaceous, sl. talcose.
1.5	End of Hole.

Depth (m) from - to	Description
Drill Hole FT 58, 25/3/82	
0 - 1.4	Clay-silt, orange-red, + some claystone fragments, sl. talcose.
1.4 - 3.0	SILTSTONE; Silt, sand (vf), pale yellow-brown, + fragments hard white laminated siltstone.
3.0	End of Hole.
Drill Hole FT 59, 26/3/82	
0 - 0.2	Soil with rounded quartzite fragments.
0.2 - 1.2	Clay-silt, orange brown, trace of talc and muscovite.
1.2 - 3.0	SILTSTONE; Silt, sl. clayey, light yellow - brown, sl. talcose, + hard siltstone fragments.
3.0	End of Hole.
Drill Hole FT 60, 26/3/82	
0 - 0.2	Soil with rounded quartz fragments.
0.2 - 0.8	Clay-silt, red-brown.
0.8 - 1.5	SILTSTONE; Silt, sand (vf), sl. clayey, loose, sl. talcose in places, pale yellow brown; yellow brown below 1.0 m.
1.5	End of Hole.
Drill Hole FT 61, 26/3/82	
0 - 0.8	Clay soil, red-brown.
0.8 - 1.5	TALCOSE SANDSTONE; Sand (vf), orange-brown, sl-m talcose, some harder quartzite bands.
1.5	End of Hole.

Depth (m) from - to	Description
Drill Hole FT 62, 26/3/82	
0 - 0.2	Clay soil, black-brown.
0.2 - 1.2	Clay-silt, red-brown.
1.2 - 1.5	Clay-silt, sl. sandy, light olive to grey-brown.
1.5 - 2.0	SANDSTONE; Sand (vf), silt, sl clayey, yellow brown.
2.0	End of Hole.
Drill Hole FT 63, 26/3/82	
0 - 0.2	Clay-soil, black-brown.
0.2 - 1.2	Silt, sand (vf), sl. clayey, orange-brown.
1.2 - 2.0	TALC; sl. clayey, pale brown to off white.
2.0 - 3.0	TALC-SAND; talc, m clayey, m sandy, 50% talc, off white.
3.0	End of Hole.
Drill Hole FT 64, 26/3/82	
0 - 1.0	Clay-soil, red brown.
1.0 - 1.8	SANDSTONE; Sand (vf), silty, m clayey, pale brown to off white, trace of talc.
1.8	End of Hole.
Drill Hole FT 65, 26/3/82	
0 - 1.4	Clay-soil, red-brown, sandy below 1.2 m.
1.4 - 2.4	Sand (vf), silt, light yellow-brown, sl. talcose.
2.4 - 3.0	TALCOSE SILTSTONE; very talcose silt to silty talc, pale yellow-brown.
3.0	End of Hole.

Depth (m) from - to	Description
Drill Hole FT 66, 26/3/82	
0 - 1.4	Clay-silt, red-brown, and pinkish silt.
1.4 - 2.0	Silt, sand (vf), m clayey, pale brown, sl. talcose; yellow brown below 1.8 m.
2.0 - 2.5	TALCOSE SILTSTONE; Silt, sand (vf), pale yellow-brown, m talcose, + hard grey siltstone fragments.
2.5	End of Hole.
Drill Hole FT 67, 26/3/82	
0 - 1.3	Clay-silt, red-brown; sandy below 1.1 m.
1.3 - 2.8	SILTSTONE; Silt, sand (vf), loose, trace of muscovite, light brown becoming darker.
2.8	End of Hole.
Drill Hole FT 68, 26/3/82	
0 - 0.7	Clay-silt-sand, brown.
0.7 - 1.2	SILTSTONE; Silt, sand (vf), yellow, + rare fragments hard siltstone and muscovite.
1.2	End of Hole.
Drill Hole FT 69, 26/3/82	
0 - 0.4	Clay-soil, dark brown.
0.4 - 1.2	Clay-silt, red-brown.
1.2 - 1.4	Clay-silt, light yellow-brown, + angular hard grey siltstone fragments.
1.4 - 2.5	SANDSTONE; Sand (vf), loose, pale to light brown, sl. talcose in layers, some hard bands.
2.5	End of Hole.

Depth (m) from - to	Description
Drill Hole FT 70, 26/3/82	
0 - 0.4	Topsoil, dark brown.
0.4 - 0.8	Silt, sand, some clay fragments, brown.
0.8 - 1.5	SANDSTONE; Sand (vf), silt, pale brown, trace of muscovite; sl. talcose above 1.0 m.
1.5	End of Hole.
Drill Hole FT 71, 26/3/82	
0 - 0.4	Silt, sand, clay, grey-brown, sl. talcose.
0.4 - 1.0	Silt, sand, brown, sl. talcose, + rare hard siltstone fragments.
1.0 - 1.5	SILTSTONE; Silt, sand (vf), light brown, + abundant hard grey siltstone fragments.
1.5	End of Hole.
Drill Hole FT 72, 26/3/82	
0 - 1.2	Topsoil, dark brown.
1.2 - 1.5	Sand, silt, dark brown, with sub rounded quartz pebbles, CREEK GRAVEL.
1.5	End of Hole, very hard drilling.
Drill Hole FT 73, 26/3/82	
0 - 1.6	Clay-silt, sand, orange brown, + claystone fragments.
1.6 - 2.7	Silt, light yellow-brown, + fragments of grey to orange siltstone and silty claystone.
2.7 - 3.0	SILTSTONE; Silt, clayey, loose, light olive-brown, + some siltstone fragments, trace of muscovite or talc.
3.0	End of Hole.

Depth (m) from - to	Description
Drill Hole FT 74, 26/3/82	
0 - 1.2	Sand, orange brown, + fragments of siltstone and silicified siltstone.
1.2 - 1.4	SANDSTONE; Sand (vf), light brown, very hard drilling.
1.4	End of Hole.
Drill Hole FT 75, 26/3/82	
0 - 2.0	Silty clay and silt, red-brown.
2.0 - 3.0	SILTSTONE; Silt, sl. clayey, yellow brown, trace of talc.
3.0	End of Hole.
Drill Hole FT 76, 29/3/82	
0 - 2.0	Sandy clay, brown.
2.0 - 3.0	SILTSTONE; Silt, sl. clayey, light brown, + rare siltstone fragments, trace of talc.
3.0	End of Hole.
Drill Hole FT 77, 29/3/82	
0 - 1.8	Clay-sand, brown to orange-brown.
1.8 - 2.8	SILTSTONE; Silt, sl. clayey, light to pale brown, + fragments of grey and brown siltstone, sl. talcose.
2.8	End of Hole.
Drill Hole FT 78, 29/3/82	
0 - 1.8	Sandy silt, red-brown.
1.8 - 2.2	Silt-clay, brown, sl. talcose.
2.2 - 2.6	Clay-talc, sl. silty, pale brown.
2.6 - 3.8	TALC-SANDSTONE; Talc, v silty, v sandy, loose, light brown; becoming sandier, ie m talcose, below 3.0 m.
3.8	End of Hole.

Depth (m) from - to	Description
Drill Hole FT 79, 29/3/82	
0.0	QUARTZITE; hard, pink, f-m grained, inpenetrable.
0.0	End of Hole.
Drill Hole FT 80, 29/3/82	
0 - 1.2	Clay, silty, orange-brown & grey-brown.
1.2 - 2.0	SILTSTONE; Silt, sand (vf), sl. clayey, light orange, + some clay fragments, trace of muscovite or talc.
2.0	End of Hole.
Drill Hole FT 81, 29/3/82	
0 - 2.2	Clay-silt, brown.
2.2 - 2.8	SILTSTONE; Silt, sand (vf), sl. clayey, + numerous clay fragments, some partially silicified, trace of talc.
2.8	End of Hole.
Drill Hole FT 82, 29/3/82	
0 - 1.8	Clay-silt, greyish red-brown.
1.8 - 2.5	SILTSTONE-CLAYSTONE; Silt, sand (vf), light yellow-brown, + clay and claystone bands.
2.5	End of Hole.
Drill Hole FT 83, 29/3/82	
0 - 0.5	Clay-soil, red-brown.
0.5 - 1.7	Claystone, soft, red-brown.
1.7 - 2.5	SILTSTONE; Silt, sand (vf), loose, light yellow brown to pale yellow.
2.5	End of Hole.

Depth (m) from - to	Description
Drill Hole FT 84, 29/3/82	
0 - 1.0	Clay-soil, red-brown.
1.0 - 3.5	Clay-silt and silt, red-brown, + rare rounded quartz pebbles, sl. talcose.
3.5 - 4.5	SILTSTONE; Silt, sand (vf), light orange-brown, sl-m talcose.
4.5	End of Hole.

APPENDIX D

GEOLOGICAL SECTIONS OF BACKHOE TRENCHES

Trenches were dug by local contractor on 14 May 1982 with 0.5 m wide bucket, to depth ranging from 1 m to 2 m.

TRENCH NO. 1

Distance (m) from North to South	Description
0 - 4.0	Siltstone, clayey, white or orange, some patches of purple ferruginisation, very talcose.
4.0 - 8.6	Talc-siltstone, clayey, soft, offwhite, some crystalline talc pods.
8.6 - 11.2	Siltstone, hard, faint laminae, cream or brown.
11.2 - 13.5	Talc-sand, soft, sand is very fine quartz and albite, talc is soft, grey, clayey, some crystalline talc pods.
13.5 - 14.6	Siltstone, soft, cream, albitic, partially silicified.
14.6 - 17.7	Siltstone, hard, faint laminae 4 mm, light orange and purple.
17.7 - 18.0	Albitised siltstone, albite altering to clay, soft, orange, talcose.
18.0 - 19.8	Quartzite, fine grained, brown, hard, faint laminae 1-2 mm, silicified.
19.8 - 22.0	Siltstone, hard, bedding 5-20 mm, brown, partially silicified.
22.0 - 23.5	Quartzite, fine grained, faint laminae, pale cream-grey with some feruginous staining.
23.5 - 25.0	Siltstone, with 50% talc as hard grey crystalline pods.
25.0 - 26.0	Siltstone, brown, laminated.
26.0 - 29.0	Quartzite, fine grained, bedding 10-20 mm, white, patchy intense silicification and ferruginisation.
29.0 - 30.5	Albitised silicified siltstone, hard, greenish-grey, no laminae.
30.5 - 32.6	Siltstone, finely laminated 0.5-1 mm, ferruginous.
32.6 - 35.0	Siltstone, clayey, laminae 1-3 mm, orange-brown, extensive silicification and ferruginisation from 32.6 to 34.0 m, then irregular silicification.

35.0	- 40.0	Albitised siltstone, laminae 1-1.5 mm, off white; extremely silicified from 35.0 to 37.0 m; partially silicified and extremely albitised with albite veining from 37.0 to 38.0 m.
40.0		End of Trench.

TRENCH NO. 2

Distance (m) from North to South	Description
0 - 4.5	Talc, pale grey to white, hard, massive, fine to medium grained, some ferruginous staining.
4.5 - 6.5	Albitised siltstone, off white, hard, patchy silicification.
6.5 - 7.7	Siltstone, indurated, off white, no laminae, slightly talcose, with 50% crystalline talc pods.
7.7 - 8.7	Siltstone, soft, laminae 1-2 mm, pale fawn, talcose, with some ferruginous staining.
8.7 - 12.1	Albitised siltstone, albite altering to clay, soft, loose, off white, some siltstone bands, very talcose with some crystalline talc pods.
12.1 - 14.4	Albitized siltstone, bedding 2-10 mm, off white to grey, very talcose.
14.4 - 17.3	Talc, loose, soft, silty, clayey, white to off white.
17.3 - 21.5	Siltstone, hard, laminae 1-3 mm, white, ferruginous staining from 17.3 to 18.8 m.
21.5 - 23.3	Quartzite, fine grained, faint laminae 1-5 mm, white or brown.
23.3 - 24.9	Albitised siltstone, hard, faint laminae, pale grey, silicified in part and some ferruginous staining. Up to 80% disseminated talc or crystalline talc pods.
24.9 - 27.0	Quartzite, medium grained, rare faint laminae, pale grey.
27.0 - 28.3	Albitised siltstone, hard, cream to orange, faint laminae 1-2 mm; extensive ferruginisation; and patchy silicification from 27.0 to 27.8 m.
28.3 - 32.0	Albitised siltstone, soft, laminae 1-2 mm, cream to orange.
32.0 - 33.8	Albitised siltstone, albite altering to clay, rare faint laminae, soft, grey to brown, moderately talcose, up to 10% albite.

33.8	-	35.7	Albitised siltstone, albite altering to clay, soft, light orange-brown, slightly talcose.
35.7	-	39.0	Albitised siltstone, albite altering to clay, soft or indurated, laminae 1 mm, grey-brown. Very talcose from 35.7 to 36.5 m, disseminated or crystalline pods.
39.0	-	42.0	Siltstone, hard, fine laminae, muscovite on partings.
42.0			End of Trench.

TRENCH NO. 3

Distance (m) from West to East	Description
0 - 2.0	Siltstone, indurated, pale orange, faint laminae, cleavage parallel, partially silicified.
2.0 - 2.3	Siltstone, grey, as above.
2.3 - 4.5	Siltstone, soft, weathered, clayey, yellow.
4.5 - 8.2	Siltstone as above, overlain by 0.8 m alluvium at 4.5, thickening to east.
8.2 - 11.0	Alluvium, 1.8 m thick.
11.0	End of Trench.

SCALE IN METRES

1000 0 1000

Fig. 1

——— Geological boundary
Woolshed Flat Shale to west, overlain by **Stonyfell Quartzite** to east.

Major quartzite beds within Stonyfell Quartzite.

------ Bedding trend.

From 78-585

DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA

FORRESTON TALC DEPOSITS

LOCATION AND REGIONAL GEOLOGY

COMPILED W. S. M.	C.D.O. 18 · 5 · 83 DATE
DRAWN N. R. S.	SCALE 1:20 000
DATE 4-1-83	PLAN NUMBER 83-8
CHECKED	

3006

FORRESTON TALC DEPOSITS

SECS. 6109, 6274 • HD. TALUNGA

GEOLOGICAL PLAN

Fig. 2

DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

COMPILED	W.S.M.
DRAWN	N.R.S.
DATE	4-1-83
CHECKED	
C.D.O.	18.5.83 DATE
SCALE	1:1 000
PLAN NUMBER	83-9

3006

6108 6109 6274 6275 6276 6380

CLOSED ROAD

ML 5055

ML 4398 (expired)

ML 4447 (expired)

MC 434 (expired)

RS2097

RS2095

Nº 1 LODE
SEE ENLARGEMENT
Fig. 3 (83-10)

Nº 2 LODE
SEE ENLARGEMENT
Fig. 5 (83-12)

Nº 3 LODE
SEE ENLARGEMENT
Fig. 6 (83-13)

Nº 4 LODE
SEE ENLARGEMENT
Fig. 7 (83-14)

Shallow scrape up to 0·5 m deep

Backfilled shaft

Bedding trend

Dump

Stone-lined well

Pothole 0·5 m deep

Dam

House and sheds (position approximate)

STN 'A' 438·00m

STN 'B' 457·71m

STN 'C' 438·85m

STN 'D' 477·73m

STN 'E' 452·84m

STN 'F' 440·96m

STN 'G' 406·70m

PMG POST 423·79m

WINTONS ROAD

Forreston 4 km
Gumeracha 5 km

Birdwood 3·5 km

N

SCALE IN METRES
20 0 20 40 60 80 100

QUATERNARY

Alluvium, creek gravel, clay.

ADELAIDEAN
BURRA GROUP

STONYFELL QUARTZITE – pink or grey to pale orange, hard quartzite or silicified sandstone, massive, medium grained with faint bedding 5–20mm or fine grained with laminae 1mm, slightly feldspathic in part.
Interbeds of fine grained schistose siltstone or sandstone.
Outcrop.
Float.

WOOLSHED FLAT SHALE – hard, grey-brown schistose siltstone, laminae 1mm, muscovite on cleavage. Extensively silicified and albitised, weathering to soft grey to pink-brown siltstone or very fine grained sandstone. Rare in outcrop, generally float or exposed in cuts.

Zone of extensive albitisation.

Pegmatite, intense albitisation and silicification.

TALC – ranging from bladed crystals forming radiating aggregates to fine, silty, clayey talc; albitic in part.

Outcrop or drillhole intersection.

Float.

Talc–albite–schist.

Geological boundary; mapped, indicated, inferred.

Strike and dip of bedding.

Rock sample, petrology.

Auger drillhole and number.

Face of open cut or dump.

Mineral Claim or Lease peg.

Section number, Hundred of Talunga.

Topographic contour, metres AHD.

Fence.

Track.

Survey station and elevation. (survey by Edwards and Harrison, July 1982; SFB 545,679).

Section boundary, not fenced.

N

6380

438

436

434

432

430

428

426

424

422

420

418

416

414

6274

FT8

FT9

FT10

FT11

FT12

FT13

FT14

FT15

FT1
Qra 2·5m

FT2
Qra 2·7m

FT3
Qra 3·5m

FT4
Qra 3·7m

FT5
Qra 2·8m
OVER
TALC-CLAY

FT6
Qra 2·4m
OVER
TALC ?

FT7
Qra 5·5m

STN 'A'
438·00m

A599/82

A600/82

A601/82

PORTAL

TRENCH 1

TRENCH 2

TRENCH 3

0m
THICKNESS OF QUATERNARY ALLUVIUM
0·8m
1·6m
2·0m

For detailed underground geology see Fig. 4 (83-11)

From Conor and Olliver, 1980

From Conor and Olliver, 1980

Area of backfilled open cuts

Dam

EMBANKMENT

Slightly talcose, albitic massive sandstone, some bedding < 5cm

0·5m deep

2m deep

Talc-albite, grey-brown, replacing sandstone

Very talcose sandstone

QUATERNARY
Alluvium, with thickness in drillholes.

ADELAIDEAN, BURRA GROUP
Woolshed Flat Shale - weathered siltstone.

Zone of extensive albitisation.

Pegmatite.

Talc - outcrop or drillhole.

Talc - float or interpreted.

Talc-albite, talc-kaolinite or talcose siltstone; outcrop or drillhole.

Geological boundary; mapped, indicated, inferred.

Strike and dip of bedding.

Strike and dip of bedding, underground.

Chip sample, analytical.

Backhoe trench, showing approximate talc percentage.

Trace of underground workings.

Auger drillhole and number.

Face of open cut or dump.

Lease peg of ML4398 (expired).

Section number, Hundred of Talunga.

Topographic contour, metres AHD.

Fence.

Survey station and elevation.

SCALE IN METRES

10 0 10 20

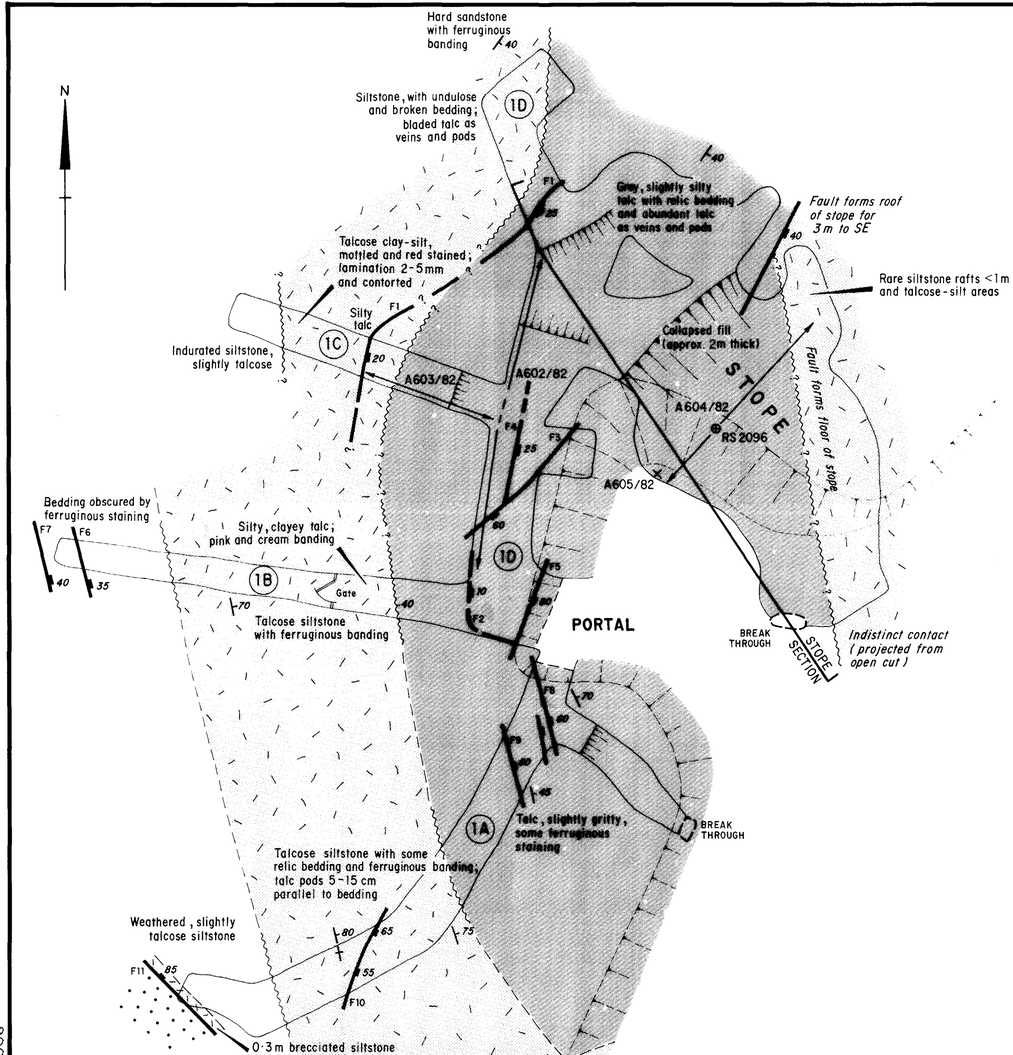
Fig. 3

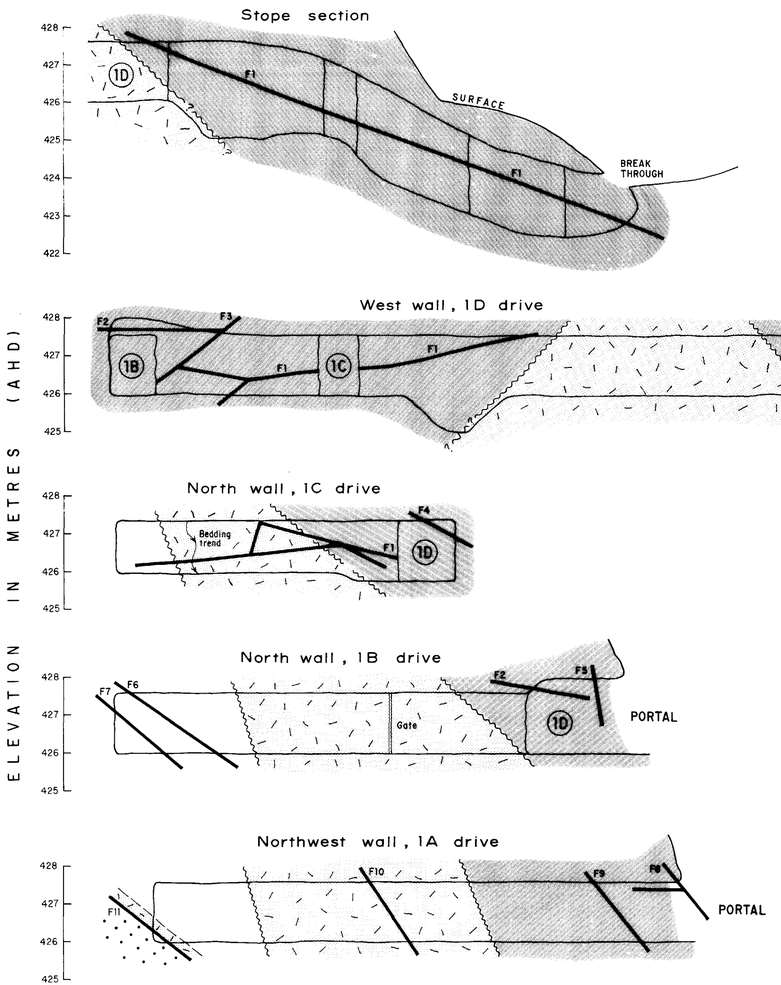
DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

FORRESTON TALC DEPOSITS
Nº 1 LODE
GEOLOGICAL PLAN

COMPILED W.S.M.
C.D. 18·5·83 DATE
DRAWN N.R.S.
SCALE 1:250
DATE 4-1-83
CHECKED
PLAN NUMBER 83-10

3006





Woolshed Flat Shale – weathered, ferruginous or slightly talcose siltstone.

Talc – slightly kaolinitic.

Silty talc, talcose siltstone or talc-kaolinite.

Quartzite, silicified siltstone, brecciated, with red-brown iron staining.

Geological boundary, generally transitional; mapped, indicated, inferred.

Strike and dip of bedding.

Fault or shear; mapped, indicated, with dip and number.

RS2096 Rock sample, petrology.

A604/82 Chip sample, analytical.

1B Underground drive number.

Trace of surface open cut.

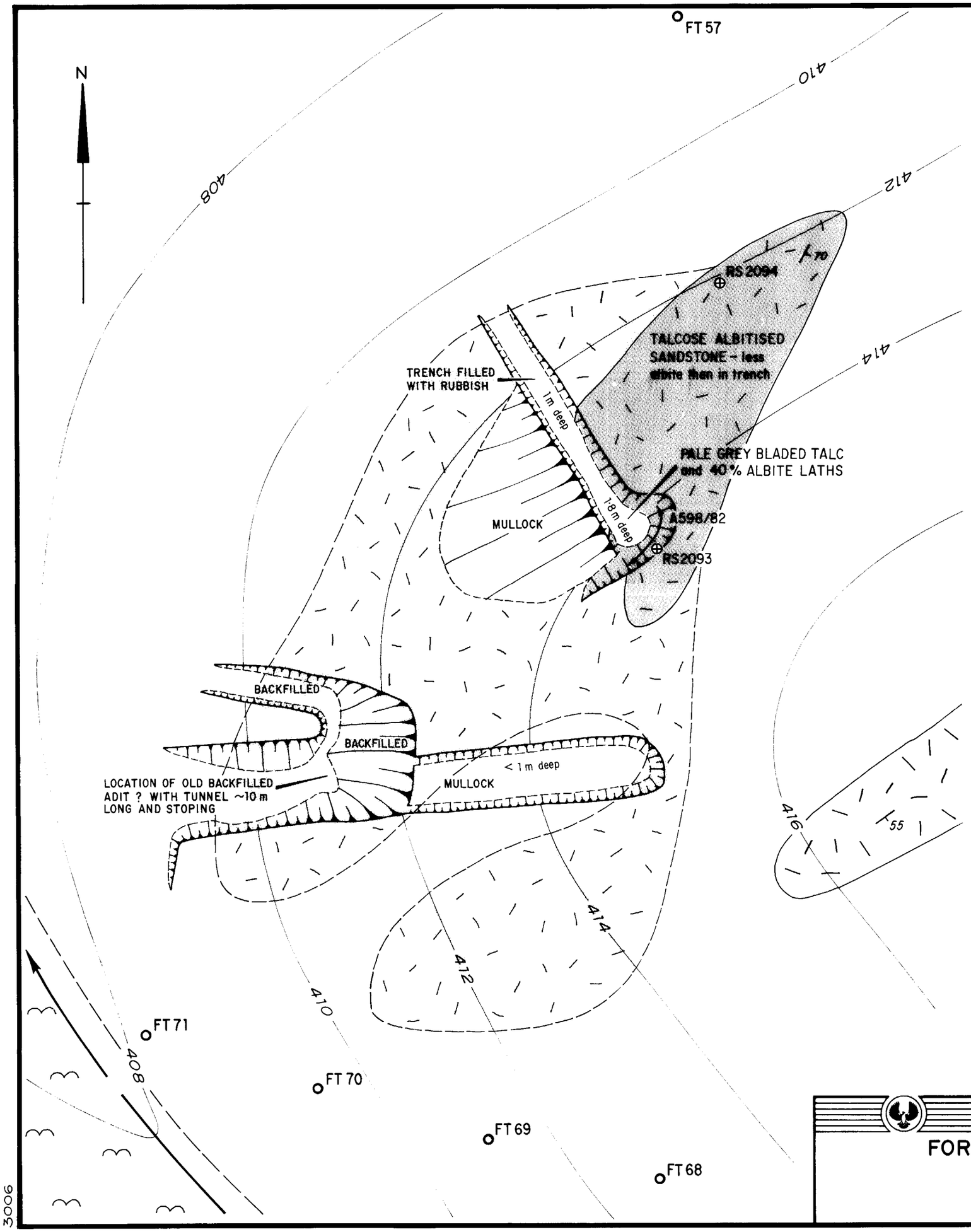
SCALE IN METRES

2 0 2 4 6 8 10

Fig. 4

DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA	COMPILED W. S. M.	C.D.O.	18·5·83 DATE
FORRESTON TALC DEPOSITS	DRAWN N.R.S.	SCALE	1:100
Nº 1 LODE	DATE 4-1-83	PLAN NUMBER	83-11
UNDERGROUND GEOLOGICAL PLAN & SECTIONS	CHECKED		

3006



Quaternary alluvium.

Woolshed Flat Shale – weathered, laminated siltstone, very poor outcrop.

Talc-albite outcrop.

Talc-albite area from Conor and Olliver (1980); now mostly obscured by backfilling.

Zone of extensive albitisation.

Geological boundary, mapped, inferred.

Strike and dip of bedding.

RS2094 — Rock sample, petrology.

A598/82 — Chip sample, analytical.

Face of open cut or dump.

412 — Topographic contour, metres AHD.

FT 69 — Auger drillhole and number.

SCALE IN METRES

10 0 10 20

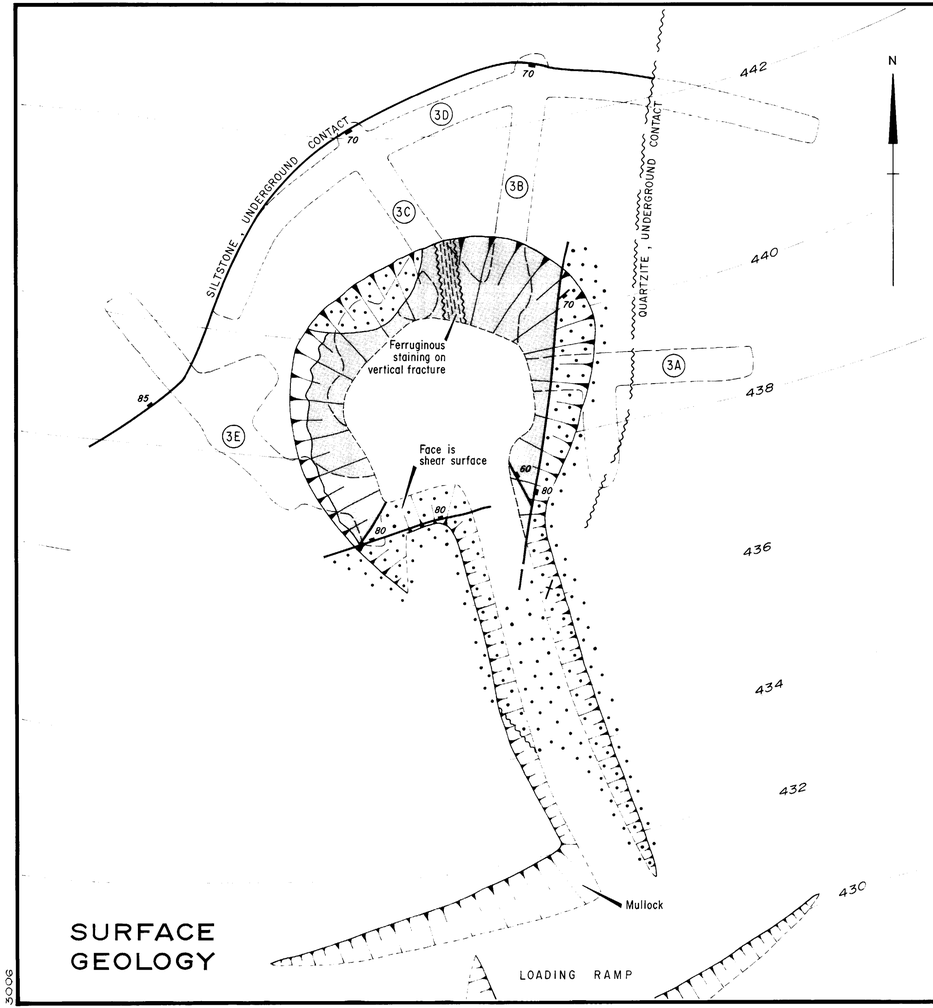
Fig. 5

DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

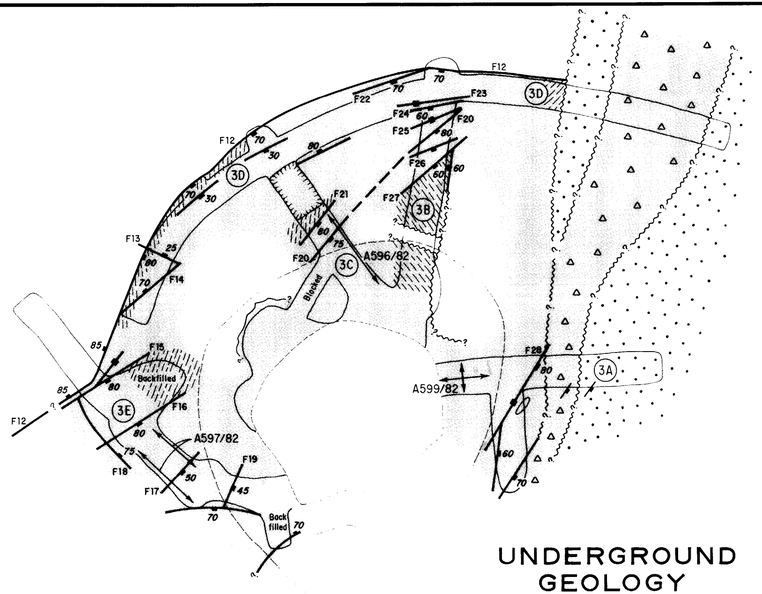
FORRESTON TALC DEPOSITS
Nº 2 LODE
GEOLOGICAL PLAN

COMPILED W. S. M.	C.D.O. 18·5·83 DATE
DRAWN N.R.S.	SCALE 1:250
DATE 4-1-83	PLAN NUMBER 83-12
CHECKED	

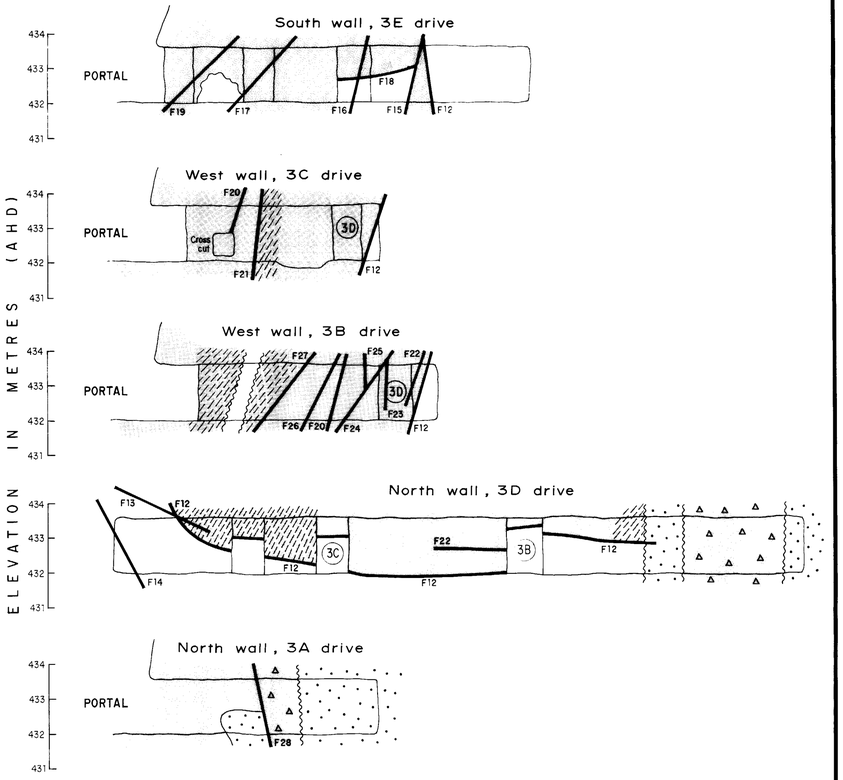
3006



SURFACE GEOLOGY



UNDERGROUND GEOLOGY



Stonyfell Quartzite
— massive quartzite, fine to medium grained, grey-white, faint bedding.

— siltstone or sandstone, iron-stained, laminated and fractured.

Talc, slightly to moderately albitic.

Talc, more than 30% iron-stained.

Talc-quartzite breccia.

Geological boundary.

Geological boundary, transitional or very irregular.

60 F12 — Fault or shear with dip and number.

3B — Underground drive number.

SURFACE

Strike and dip of quartzite.

Trace of underground workings.

Face of open cut or dump.

436 — Topographic contour, metres AHD.

UNDERGROUND

A596/82 — Chip sample, analytical.

Trace of surface open cut.

SCALE IN METRES
2 0 2 4 6 8 10

Fig. 6

DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA

FORRESTON TALC DEPOSITS
Nº 3 LODE
GEOLOGICAL PLANS AND SECTIONS

COMPILED	W.S.M.		18-5-83 DATE
DRAWN	N.R.S.	SCALE	1:100
DATE	4-1-83	PLAN NUMBER	83-13
CHECKED			

3006

Albitised sandstone

Predominantly quartz–albite pegmatite

N

412

410

408

A606/82

80

55

45

30

30

75

40

A606/82

80

70

50

A606/82

65

65

Mullock

NOTE : On WEST wall talc is fine–medium grained , slightly albitic , with numerous albitised sandstone fragments , and with extensive slickensides and shearing

NOTE : On EAST wall talc contains increasing albite and albitised sandstone to south

Woolshed Flat Shale – albitised , fine grained sandstone or siltstone.

Pegmatite.

Talc , albitic in part.

Geological boundary ; mapped , indicated , inferred.

Shear , with dip.

Chip sample , analytical.

Face of open cut or dump.

Topographic contour , metres AHD.

SCALE IN METRES

2 0 2 4 6 8 10

Fig. 7

DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

FORRESTON TALC DEPOSITS
Nº 4 LODE
GEOLOGICAL PLAN

COMPILED	W. S. M.	C.D.O.	18 · 5 · 83 DATE
DRAWN	N.R.S.	SCALE	1 : 100
DATE	4-1-83	PLAN NUMBER	83-14
CHECKED			

3006