DEPARTMENT OF MINES AND ENERGY

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REVIEW OF EXPLORATION FOR KAOLIN NEAR POOCHERA, NORTHERN EYRE PENINSULA, SOUTH AUSTRALIA

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GEOLOGICAL SURVEY
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REVIEW OF EXPLORATION FOR KAOLIN NEAR POOCHERA, NORTHERN EYRE PENINSULA, SOUTH AUSTRALIA

G M FERRIS and
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Kaolin deposits, southwest of Poochera on northern Eyre Peninsula, formed by deep weathering of early to mid-Proterozoic crystalline basement rocks, which are now blanketed by late Tertiary to Quaternary terrestrial sediments. During 1984-89, exploration for kaolin, using widely spaced drilling, outlined three broad areas of kaolinization at Carey's Well, Karcultaby South and Tomney. Inferred resources of 30 million tonnes of kaolinized bedrock were outlined at Carey's Well Deposit. This included intersections in three holes of kaolin with brightness and rheological properties acceptable for paper coating grades. Thickest intersection of high-grade kaolin was 8.9m below 10m of overburden in hole CW10. High brightness kaolin with good rheological properties was intersected in the Karcultaby South area, but overburden thickness is high and the extent of the deposit remains to be tested. Kaolinized bedrock, probably Lincoln Complex, was widespread in prospects around Tomney. The quality of kaolin with respect to brightness, rheological properties and particle morphology was very variable and downgraded the prospects as a source of high-grade kaolin. Preliminary firing tests indicated that kaolin from Carey's Well Deposit may be suitable for production of refractory chamotte. Areas of kaolin from the deposit with high natural brightness, low concentration of impurities and a high yield of fine grained particles (<2μm) may also be suitable for use in whiteware ceramics. Further drilling and sample testing are required to define the limits of the deposit and to delineate areas with respect to kaolin quality. Weathered Hiltaba Suite granite hosts deposits at Carey's Well and Karcultaby South and is the preferred target for high-grade kaolin exploration in this region. Additional target areas, east of Streaky Bay, and near Mount Hall and Mount Cooper remain to be tested by reconnaissance drilling.

INTRODUCTION

Large resources of kaolin have been identified by drilling over a wide area southwest of the township of Poochera on northern Eyre Peninsula, South Australia. Deep weathering of crystalline basement formed kaolin-rich profiles to 50m thickness. The kaolin does not crop out but is overlain by Cainozoic calcrete, clay and sand, which varies in thickness from 8 to >30m. Beneficiated kaolin from drillhole samples has been tested for use in paper, ceramic and refractory industries. This report summarises exploration, drilling and laboratory analyses, and draws some general conclusions on the economic potential of individual prospects with recommendations for further work.

LOCATION, TOPOGRAPHY AND ACCESS

Exploration drilling has outlined three broad areas of kaolinization at Carey's Well, Karcultaby South, and Tomney, 7km southwest of Poochera (Fig. 1). The area is flat to gently undulating and much of the land has been cleared for cereal crops and sheep and cattle grazing with remnant patches of mallee open scrub vegetation (Laut *et al.*, 1977). Access from Poochera, on the Eyre highway (Highway 1), is west 4km along the Streaky Bay road, then south along a graded road for 3 to 5km (Fig. 1). The Karcultaby South prospect is accessible via a graded road, whereas access to the Carey's Well and Tomney prospects is via farm tracks.

REGIONAL GEOLOGY

Regional geology is summarised on STREAKY BAY 1:250 000 geological map (Rankin & Flint, 1991). Sub-surface basement geology has been interpreted from regional magnetics as predominantly gneissic granitoid and paragneiss of Archaean to early Proterozoic Sleaford and Mulgathing Complexes, and granite and gneiss of early Proterozoic Lincoln Complex (Rankin & Flint, 1991). These older metamorphosed units do not crop out in the Poochera area and have been described mostly from coastal Eyre Peninsula. Outcrops of crystalline basement are restricted to mid-Proterozoic Hiltaba Suite granite at Parla Peak, Cocunda Rockhole and Kattata Mine (Fig. 1). The granite is coarse grained and comprises predominantly K-feldspar and quartz with minor plagioclase and biotite. Foliation is not evident, and K-feldspars are characteristically a reddish brown colour with some local variation through pink to white. Geology of the Poochera area is summarised in Fig. 1.

Prior to the mid-Proterozoic, episodic activation and reactivation of predominantly NE-SW, NW-SE and N-S faults in response to compressional tectonics, resulted in recrystallisation and development of a regional foliation (Rankin & Flint, 1991). There is no evidence of major deformation since emplacement of Hiltaba Suite granite, with the exception of some faulting during Tertiary times (Rankin & Flint, 1991). Tectonic stability has provided conditions suitable for preservation of a thick mantle of products formed by deep weathering.

The recognition of the Corrobinnie Depression as the former site of a major river system (Bourne *et al.*, 1974), attracted exploration for channel sand uranium mineralisation on the West Coast of Eyre Peninsula. This work delineated an extensive drainage system of early Tertiary age that included the Narlaby palaeochannel to the

northeast of Poochera and smaller Yaninee palaeochannel southeast of Poochera (Binks & Hooper, 1984). The channels are infilled with early Tertiary fluviatile sand and clay, which in turn are overlain by Pliocene to Holocene fluviatile and lacustrine sediments (Binks & Hooper, 1984).

The present landscape is dominated by extensive tracts of Quaternary deposits. Bridgewater Formation calcarenite is widespread near the coast and formed as coastal dune deposits during periods of low sea level in the Pleistocene. Fine calcareous material was blown inland to form dunes as well as being incorporated into the soil. The inland dunes formed during a period of aridity some 10 000-30 000 years ago (Twidale & Campbell, 1985). Episodes of sediment accumulation were interspersed with periods of erosion and arid pedogenesis producing multiple horizons of sheet, nodular and massive calcrete and carbonate soils (Rankin & Flint, 1991).

EXPLORATION AND DRILLING

During the search for base metals and Tertiary hosted sandstone uranium deposits, intersections of kaolinized basement were reported by Endeavour Oil Co NL (1971, 1972), Central Pacific Minerals (1971), Carpentaria Exploration Co Pty Ltd (1984), and CRA Exploration Pty Ltd (1984). Kaolin had been intersected previously during water well drilling (Fig. 2).

Haematitic brecciated granite at gold prospect, Kattata Mine, reported by Barnes and Flint (1984), encouraged an Exploration Licence (EL) application by Oilmin NL, Western Nuclear Australian Limited, Petromin NL and Transoil NL. EL 1130, covering 720 km^2 was granted on 12 April, 1983. Ground magnetic and gravity surveys were undertaken initially in the Yandra Well and Karcultaby Homestead areas by Solo Geophysics. Six holes were drilled by John Nitschke Drilling Pty Ltd, using a Schramm T4 hammer drill, to investigate potential for metallic mineralisation in areas of coincident gravity and magnetic highs near Yandra (YD1 & YD2) and Karcultaby (KC1 to KC4) (Youles, 1984a). Hole KC2 intersected 48m of mostly white kaolinized granite and this stimulated interest in exploration for economic kaolin mineralisation. Location of drillholes are shown on Fig. 3 and logs are given in Appendix A. A sample of white kaolin (PP-32-1) was collected also from a water well (Carey's Well) 6km NW of KC2.

On 5 June 1984, EL 1130 was replaced by EL 1240 covering an enlarged area of 1151 km^2 (Youles, 1984b). During the quarter ended 4 December 1984, one hole (KC5) was core drilled by Thomson Drilling Co to a depth of 70m (Youles, 1985). Hole KC5 was 10m west of discovery hole KC2 (Fig.3). The log of KC5 is given in Appendix A.

On 4 June 1986, EL 1332 covering a reduced area of approximately 323 km^2 was granted to Petroleum Engineering Services (Aust) Pty Ltd, D A Wilson and I P Youles, operating as South Australian Paper Clays. Between 7 to 15 July 1986, 15 holes (P1 to P15) totalling 383m were drilled under contract by South Australian Department of Mines and Energy (SADME) using an Investigator MK 5 air reverse circulation rig (Youles, 1986). Drillhole sites were selected based on kaolin intersections in water wells. Hole locations are shown on Fig. 3, and logs are given in Appendix B.

Between 5 to 6 August 1987, 5 drillholes (PP1 to PP5) were completed in the Carey's Well area by Thomson Drilling Co (Fig. 3). A total of 109m was drilled using rotary open hole methods which included 12m of NQ coring (Youles, 1987). Logs are presented in Appendix C.

On 20 April 1988, EL 1484 covering an area of approximately 285 km^2 was granted to Petroleum Engineering Services (Aust) Pty Ltd, D A Wilson and C Youles for one year (Wilson, 1988). This EL has been renewed on an annual basis and is due for renewal on 22 April, 1993.

During the quarter ended 21 October 1988, an agreement was entered into with English China Clays (Pacific) Pty Ltd (ECC) to test kaolin prospects outlined by earlier drilling. Between November 1988 and January 1989, 50 holes were drilled by Thomson Drilling Co for a total of 1544m, of which 755m was cored (Lees, 1989). Three areas, Carey's Well, Karcultaby South and Tomney were targeted, and holes were drilled on a 400m grid except for the Karcultaby South prospect, where holes were drilled alongside the road (Fig. 3). Drillhole locations in the Carey's Well area are presented in Fig 4. A summary of drilling is given in Table 1.

TABLE 1. SUMMARY OF ECC DRILLING, NOVEMBER 1988 TO JANUARY 1989.

Prospect	No. of holes	Total depth (m)	Average depth (m)
Carey's Well (CW)	17	486.8	28.6
Karcultaby South (KS)	7	232.9	33.3
Tomney North (TN)	6	140.8	23.5
Tomney West (TW)	6	212.9	35.5
Tomney East (TE)	8	304.3	38.0
Tomney South (TS)	6	166.5	27.8
Total	50	1544.2	30.8

In early 1990, after laboratory tests on samples, ECC decided against exercising their agreement option.

During the quarter ended 21 June 1990, an examination of recent aeromagnetic data showed possible kimberlite intrusions in the northern part of EL 1484 (Youles, 1990). A ground magnetic survey outlined two areas of magnetic high interpreted as a pipe and dyke complex (Youles, 1991). These remain to be tested by drilling.

In March 1991, preliminary firing tests on kaolin samples from Carey's Well Deposit (CW15, 9.5-15.5m) and Tomney East (TE1, 9.5-26.1m & TE2, 11-26m) by Commercial Minerals Ltd (CML) showed that the kaolin had potential for use in refractories. An agreement was negotiated and during 10 to 13 December 1991, bulk kaolin samples from Carey's Well Deposit were collected by Cobweld Industries using a calweld drilling rig. Approximately 50 tonnes of kaolin were collected from 6 holes (BS1-6) with 8 holes being abandoned in overlying hard calcrete or silicified clay. Drillhole locations are shown on Fig. 4.

LABORATORY ANALYSES

AMDEL LTD

Analyses of basement rocks from YD1, YD2 and KC1 recorded no significant metal anomalies (Youles, 1984a). Kaolinized bedrock in some holes showed high brightness and samples from KC2 (20-30m) and PP-32-1 were forwarded to Amdel Ltd, Adelaide, to determine their suitability for paper coating.

Samples were wet sieved at 53μm (300# BSS) and the <2μm fraction separated by sedimentation (Table 2). Brightness and yellowness were determined using a Zeiss Elrepho reflectance photometer (Day, 1984a). Results are presented in Table 2.

TABLE 2. YIELD AND BRIGHTNESS RESULTS FOR DRILLHOLE KC2 AND SAMPLE PP-32-1

Sample Drillhole	Depth (m)	Yield (%) >53μm	Yield (%) <2μm	Brightness (R457)	Yellowness (R57)
KC2	20-22	41	34	86.0	6.4
KC2	22-24	29	41	90.5	4.3
KC2	24-26	40	37	90.6	4.0
KC2	28-30	37	37	91.1	4.0
PP-32-1		29	26	85.5	5.8

A composite sample of the <2μm fraction of samples from hole KC2 and sample PP-32-1 were taken for viscosity measurements. Low shear viscosity was determined using a Brookfield SyncroLectric viscometer rotating at 100 rpm.

The composite sample for hole KC2 recorded a viscosity of 5.0 poise for a solids content of 59% (Day, 1984a). X-ray diffraction (XRD) showed the sample comprised dominantly kaolin with minor halite. After washing with distilled water to remove the salt, a viscosity of 3.5 poise was measured for a solids content of 68%, and the sample was shown to be dilatant (Day, 1984a).

Sample PP-32-1 was too viscous at 56.8% solids content to measure viscosity, and the sample was thixotropic (Day, 1984b). Mineralogy determined by XRD was dominantly kaolin with minor mica/illite (Day, 1984b).

During the quarter ended 11 August 1986, a further 29 samples (Table 3) were tested by Amdel (Youles, 1986). These were wet sieved at 53μm and the <2μm fraction separated by sedimentation. Brightness and yellowness were determined using methods outlined previously, and the chloride concentration was determined. Results are presented in Table 3.

TABLE 3. YIELD, BRIGHTNESS AND YELLOWNESS TEST RESULTS - AMDEL

Sample drillhole	Depth (m)	>53µm (%)	<2µm (%)	Brightness (R457)	Yellowness (R57-R457)	Chloride (%)
P6	16-17	66	12	70	10.6	4.28
P6	27-28	43	23	83	6.7	0.53
P6	29-30	42	20	79	8.3	0.66
P6	31-32	42	21	79.5	8.8	1.35
P4	22.5-24	45	23	87.7	6.0	1.61
P9	8-9	68	9	80	8.3	2.46
P9	11-12	37	24	88.4	4.9	1.33
P9	16-17	49	22	85	7.6	0.82
P2	19-20.5	31	40	90.5	4.1	0.30
P10	14.25-15	44	21	76.5	12.0	0.69
P10	24-24	43	34	88.5	5.3	0.74
P10	25-26	39	41	89.3	5.1	0.58
P10	26-27	56	24	83	7.8	0.70
P11	10.5-11	70	8	83.2	6.4	3.49
P11	12-13	42	23	88	6.1	0.91
P11	13-14	34	26	90	4.3	1.33
P11	16-17	45	23	83.6	8.6	1.04
P11	19-20	41	21	79.1	12.1	1.21
P7	12-13	64	14	85	6.1	1.05
P7	13-14	58	16	83	7.5	2.46
P7	14-15	45	23	84	6.9	1.85
P7	15-16	46	24	85.4	5.8	1.78
P7	16-17	49	23	86.1	5.8	1.39
P7	17-18	39	31	85.1	6.1	0.89
P7	19-20	43	30	80.7	9.6	0.69
P7	21-22	37	37	82.9	7.6	0.72
P7	26-27	42	32	82.6	7.8	1.07
P7	30-31	54	19	78.2	9.4	1.31
P7	31-32	58	18	77.3	9.8	1.45
KC2						0.90

During the quarter ended 11 November 1986, brightness and yellowness tests were made on six samples (Table 4). Samples were washed to remove soluble salt, dried and the brightness determined using methods outlined previously (Table 4). A portion of each sample was washed in distilled water and hand moulded to produce test bars, which were air dried at 110°C overnight (Day, 1986). The bars were fired at 1400°C and the fired brightness determined for two samples (Table 4).

TABLE 4. BRIGHTNESS AND YELLOWNESS TEST RESULTS - AMDEL LTD.

Drillhole	Depth (m)	Brightness <2μm	Brightness <53μm	Yellowness <53μm	Fired colour
P2	19-20.5	90.5	87.8	4.8	
P2 fired	19-20.5	90.5	83.3	2.6	white
P9	11-12	88.4	86.6	5.0	pale grey
P11	13-14	90.0	87.9	5.2	
P11 fired	13-14	-	83.9	1.2	white
P10	25-26	89.3	85.3	6.9	dark grey

In August 1986, 5 samples were forwarded to New Zealand China Clays Ltd for bleaching and viscosity testing. Samples were crushed and sieved to remove the coarse fraction (>9.5mm). Samples were blunged at high solids content, diluted and fractionated (Beadle, 1986). The <10μm and <2μm fractions were separated and brightness of the <2μm fraction determined (Table 5).

Bleaching tests using NaOCl and $Na_2S_2O_4$ were carried out on six samples and the results are given in Table 5. Electrical conductivity and pH were determined for all samples (Table 5).

Viscosity was determined using a Brookfield viscometer for low shear and a Hercules viscometer for high shear (Beadle, 1986). Table 6 summarises test conditions and results of viscosity testing. Poor viscosity results were attributed to high soluble salt content. Three samples were washed to remove the salt and retested (Table 7).

TABLE 5. pH, ELECTRICAL CONDUCTIVITY, YIELD AND BRIGHTNESS TEST RESULTS - NZ CHINA CLAYS

Sample drillhole	Depth (m)	Moisture content	% Solids	pH	Elect. cond mS/cm	NaCl Equiv. ppm	Recovery (%) <10μm	Recovery (%) <2μm	Brightness unbleached	Brightness bleached NaOCl	Brightness bleached $Na_2S_2O_4$
P2	19-20.5	17.7	82.3	7.1	1.0	2500	61	39	91.1/6.3	N/D	N/D
P11	13-14	21.1	78.9	4.3	2.6	6500	67	27	90.1/6.7	N/D	N/D
P10	23-24	19.2	80.8	4.6	3.0	7500	48	35	80.6/13.5	80.3/14.6	82.3/11.9
P9	12-13	15.4	84.6	4.3	2.2	5500	44	26	83.3/10.9	84.8/7.7	82.8/9.8
P7	16-17	20.8	79.2	4.4	3.4	8500	47	33	87.0/8.2	87.7/7.1	85.8/7.8

TABLE 6. VISCOSITY TEST RESULTS - NZ CHINA CLAYS

SAMPLE drillhole	Depth (metres)	DISPERSANT Calgon gm/gm	DISPERSANT Dispex ml/gm	DISPERSANT Soda gm/gm	Temp (°C)	% Solids	Brookfield Viscosity 10rpm	Brookfield Viscosity 100rpm	Viscosity Conc. % solids	Hercules, High Shear Viscosity
P2	19-20.5	0.35%	0.07%	0.04%	23.5 24.8 24.3	69.4 67.2 64.9	800cpe 440 250	204cpe 122 83	71.7	18×10^5 dyne-cm at 660 rpm 2.9×10^5 dyne-cm at 1100 rpm 1.3×10^5 dyne-cm at 1100 rpm
P11	13-14	0.60%	0.12%	0.06%	23.5 23.5	65.4 63.4	550 320	170 110	68.8	18 x 105 dyne-cm at 680 rpm 4.4×10^5 dyne-cm at 1100 rpm
P10	23-24	0.65%	0.13%	0.07%	22 23 23	65.9 63.9 61.9	3800 1850 1050	929 424 233	64.4	18×10^5 dyne-cm at 160 rpm 18×10^5 dyne-cm at 440 rpm 6.7×10^5 dyne-cm at 1100 rpm
P9	12-13	0.55%	0.11%	0.06%	25 25 23.5	68.2 66.3 64.3	4100 1610 800	887 399 216	67.2	8.6×20^5 dyne-cm at 1100 rpm 3.1×10^5 dyne-cm at 1100 rpm
P7	16-17	0.70%	0.14%	0.07%	25 24 24.5	59.9 58.1 56	5900 2120 1020	1960 624 280	57.6	18×10^5 dyne-cm at 290 rpm 18×10^5 dyne-cm at 840 rpm

TABLE 7. VISCOSITY TEST RESULTS OF WASHED SAMPLES - NZ CHINA CLAYS LTD

Sample drillhole	Depth (m)	Dispersant calgon dispex soda gm/gm ml/gm gm/gm	Temp (°C)	% Solids	Brookfield viscosity 10rpm 100rpm	Viscosity conc. % solids	Hercules, high shear viscosity
P9 (72% of soluble salts removed)	12-13	0.75% 0.15% 0.08%	24 24	68.4 63.7	3500cpe 777cpe 1570 341	68.4	18×10^5 dyne-cm at 330rpm 2.2×10^5 dyne-cm at 1100rpm
P7 (69% of salts removed)	16-17	Not recorded (probably not fully dispersed)	23 24	52.4 50.4	2100 502 N/D	51.4	17×10^5 dyne-cm at 1100rpm 6.1×10^5 dyne-cm at 1100rpm
P11 (96% of salts removed)	13-14	0.45% 0.09% 0.05%	25 24	68.1 65.5	1150 304 600 174	69.8	18×10^5 dyne-cm at 680rpm 3.0×10^5 dyne-cm at 1100rpm

CSIRO DIVISION OF MINERALS AND GEOCHEMISTRY, PERTH

During the quarter ended 11 November 1986, the <2μm fraction of P7 (16-17m) was prepared by Amdel Ltd, Adelaide and forwarded to CSIRO, Perth, for brightness and viscosity determination. No information on test methods was recorded. XRD showed that the sample comprised poorly crystalline kaolinite (Darragh, 1986).

Brookfield and Hercules viscometers were used to measure viscosity at low and high shear. Viscosity results were disappointing, with the kaolin being too viscous to measure at solids content above 57% (Darragh, 1986).

During January 1987, further testing to determine the yield of <2μm fraction, brightness and viscosity for samples from drillholes P2 and P4 was undertaken. The <2μm fraction was separated by sedimentation. Brightness was determined using a Elrepho electric reflectance photometer. Viscosity was measured using Brookfield and Hercules viscometers. Results are presented in Table 8.

TABLE 8. BRIGHTNESS AND VISCOSITY TEST RESULTS - CSIRO, PERTH.

Drillhole	Depth (m)	Yield <2μm (%)	Brightness raw	Brightness fired (1000°C)	Viscosity low shear (cp)	Viscosity high shear rate (rpm)	Solids content (%)
P2	19-20.5	44	89.7	91.7	382	250	69.86
P2 treated	19-20.5				322	300	69.89
P4	21-22.5	40.2	83.4	84.9	>1000	250	67.38
P4	22.5-24	39.9	84.7	84.8	>1000	250	67.30
P4 macerated	22.5-24				841	675	68.03
P4 CSIRO Patent	22.5-24				618	800	68.20

COMMERCIAL MINERALS LTD (CML)

During the quarter ended 11 November 1986, sample P2 (19-20.5m) was supplied to CML for laboratory analysis. Information on test methods was not recorded. The sample comprised approximately 70% kaolinite and 30% coarse quartz. Brightness of the <30μm fraction was determined as 80%, and 84% when fired at 1100°C. The sample contained approximately 0.5% sodium chloride (Swan, 1986).

ENGLISH CHINA CLAYS (PACIFIC) PTY LTD

During the quarter ended 11 November 1987, 5 kaolin samples were forwarded to English China Clays (ECC) Australian operation, Kaolin Australia Pty Ltd, Linton, Victoria, to determine yield of <2μm fraction, brightness, chloride content and chemistry. Information on test methods was not recorded. Results are presented in Table 9.

Under agreement with ECC, 50 cored holes were drilled between November 1988 and January 1989. Selected samples were sent to ECC laboratories at St Austell (UK) for tests to determine the suitability for use in coating paper. Information on test methods was not recorded. Testing included determination of the yield of <2μm size fraction, ISO brightness ('A' and 'B'), yellowness ('A' and 'B'), flowability, viscosity concentration, surface area, chemistry (iron, TiO_2, MgO and K_2O), kaolin:mica ratio and conductivity. The results are presented in Appendix D, together with brief lithological descriptions of drillcores.

CSIRO DIVISION OF SOILS, ADELAIDE

During the quarter ended 21 July 1990, a sample of kaolin from KC5 (31.5-32.5m) was collected by J L Keeling (Mineral Resources, SADME) for examination by scanning electron microscope (SEM). Cleaved fragments were mounted on aluminium stubs and coated with a 30-60nm film of gold. The specimens were examined using a Cambridge Stereoscan S250 SEM fitted with an energy dispersive x-ray (EDX) analyser. The kaolin comprised well crystalline coarse platelets (10-15μm across) and areas of fine grained kaolin (<2μm) which included sub spherical and tubular forms (? halloysite).

During 1991, a regional study of kaolinization in the Streaky Bay area was made by G Ferris (student) as part of an Honours thesis (Ferris, 1991). A search was made of all water well records held by SADME to determine intersections of kaolin in the Poochera area. The location of wells which intersected kaolin are shown on Figs 2 & 3, and the logs presented in Appendix E. The study included examination and description of kaolin mineralogy of samples selected from those cores which were available from the 1988-89 drilling program. Preliminary conclusions were drawn with respect to kaolin distribution, nature of weathering and economic potential.

Fifty three samples were taken from various depth intervals to determine any variation in kaolin mineralogy. A further sample (SB028) was collected from the surface dump near the original Carey's Well after which the prospect was named. Bulk mineralogy was determined by XRD and kaolin morphology by SEM.

TABLE 9. TEST RESULTS - KAOLIN AUST. PTY LTD.

	P9 (11-12m)	P11 (13-14m)	PP5 (16-17m)	PP5 (17-18m)	PP5 (18-19m)	PP5 (19-20m)	PP5 (26-27m)
Recovery (wt%)	37.3	50.7	27.1	25.7	25	15.2	20.1
>10µm (wt%)	2.6	11.1	2	2.1	1.7	3.2	2.3
<2µm (wt%)	69.2	60	66.9	62.9	63.1	59.7	59.5
Brightness (ISO)	86.1/6	87/5.8	85/6.2	85.3/5.4	82.8/7.9	87.1/5.8	78.4/10
Bleached Bright	87/5.5	88.8/4.5	85.6/5.5	85.9/5.7	83.4/7.2	87.2/5.5	78.7/9.5
VC Wt % solids	66.8	66.8	69.1	66.1	66.7	66.1	66.1
Pugged VC wt %	67.1	66.3					
Pugged washed VC	69.3	70.3					
CHEMISTRY (XRF wt %)							
SiO_2	46	46	45	45	45	46	45
Al_2O_3	38	39	38	38	38	39	38
Fe_2O_3	0.67	0.32	0.54	0.07	0.58	0.42	0.55
TiO_2	0.35	0.29	1.80	1.70	1.70	0.54	2.60
CaO	0.05	0.05	0.06	0.06	0.06	0.06	0.06
MgO	0.08	0.07	0.10	0.10	0.14	0.10	0.10
K_2O	0.37	0.29	0.25	0.20	0.27	0.20	1
Na_2O	0.11	0.11	0.10	0.10	0.10	0.09	0.12
LOI	14.0	14.1	13.8	14.0	13.7	14.1	13.3

All bulk samples were analysed by XRD with all XRD traces recorded in Ferris (1991). A crystallinity index for kaolinite was determined using the method described by Hinckley (1963) which has been used elsewhere as a guide to the potential of kaolin for use in the paper industry (Murray & Lyons, 1956).

Forty eight samples were examined by SEM. Samples were mounted on aluminium stubs, coated with gold and examined using a Stereoscan S250 SEM fitted with an EDX analyser.

Carey's Well Deposit

Results of laboratory tests are summarised in Table 10. Overburden thickness varied from 9.5m (CW10) to 32.1m (CW8), and kaolin thickness ranged from 2.8m (CW13) to 20.1m (CW6). Only 2 drillholes were available for sampling, and these showed very different kaolin mineralogy.

TABLE 10. CAREY'S WELL DEPOSIT- SUMMARY OF TEST RESULTS - CSIRO, ADELAIDE

Drillhole	Depth (m)	Sample No.	XRD	SEM	Hinckley Index (HI)	Mineralogy (in order of abundance)
CW14	22.2	SB041	X	X	1.29	K, Q, O, M
CW14	27.0	SB042	X	X	1.00	Q, O/A, K
CW15	10.6	SB076	X	X	0.44	K, Q, S
CW15	13.7	SB077	X	X	0.76	K
CW15	15.6	SB078	X	-	1.02	K, Q, S
CW15	21.5	SB079	X	-	0.64	Q, O/A, K
Carey's Well	surface dump	SB028	X	X	0.97	K, Q, M

K - Kaolin, Q - Quartz, O - Orthoclase, A - Albite, M - Mica, S - Salt

In hole CW14, a 4.4m (22.2-26.6m) zone of white kaolin, containing abundant, medium to coarse fractured quartz grains was sampled. Diffraction patterns showed that well crystalline kaolin and quartz were the dominant components. Minor feldspar and mica were recorded. Kaolin was present as predominantly fine grained (0.1-1.5μm) euhedral kaolinite platelets (Plate 1). Slightly weathered K-feldspar crystals, containing prominent etch pits were present at 27m.

In hole CW15, a 8.5m (9.5-18m) zone of white kaolin, containing medium to coarse fractured quartz grains was sampled. Diffraction patterns showed kaolin to be the dominant mineral present and crystallinity increased with depth within the zone of fully kaolinized granite (Table 10). Kaolin from the upper part of the profile comprised abundant, randomly oriented, poorly crystalline halloysite tubes, together with coarse and fine grained kaolinite plates and stacks (Plate 2).

The surface dump sample (SB028) comprised predominantly kaolin and quartz with minor mica. Quartz was characteristically fine to medium grained (~0.5mm). Kaolin

was present as coarse grained kaolinite books (up to 75μm in thickness) and flakes (Plate 3), comprising a mosaic of fine grained, sub to euhedral kaolinite platelets.

Inferred resources of 30 million tonnes of kaolinized bedrock for Carey's Well Deposit were calculated from geological sections using data from 5 holes drilled during 1987 and 17 holes in 1988-89 (Figs 5 & 6). Volumes were determined using Simpson's Rule and converted to tonnes using a specific gravity (SG) of 1.7. On the basis of EEC data, an average yield of kaolin product, with 80% <2μm size fraction, would be between 25-30%. Drilling data were insufficient to determine kaolin resources with respect to grade or potential end use.

Karcultaby South Deposit

Results of laboratory tests are summarised in Table 1. Overburden thickness ranged from 14m (KS5) to 23m (KS4) and kaolin thickness ranged from 4.6m (KS4) to 31.9m (KS1).

Five holes were sampled. All drillcores had a characteristic granitic fabric containing abundant coarse grained, fractured quartz grains. All holes were terminated in kaolinized granite except for KS2, which was terminated in quartz-feldspar-biotite schist, probably early Proterozoic basement.

In hole KS2, a 23.4m (15.9-39.3m) zone of mostly white kaolin was sampled. Diffraction patterns showed kaolin and quartz to be the dominant components, with minor K-feldspar. Mica was recorded at depth. Kaolin was present as fine grained, poorly crystalline platelets and coarse grained, open kaolinite stacks. Slightly exfoliated biotite flakes and fractured quartz grains were observed at depth.

In hole KS4, a 4.6m (18.4-23m) zone of white kaolin was sampled. Diffraction patterns show kaolin, K-feldspar and quartz to be the major components, with minor mica. Kaolin content decreased with depth (Table 11). Kaolin was present as fine grained (0.2-1.5μm), well crystalline kaolinite platelets together with coarse grained, open kaolinite stacks (Plate 4).

In hole KS5, a 16.6m (14-30.6m) zone of cream to white kaolin was sampled. Samples comprised predominantly poorly crystalline kaolin and quartz. Kaolin was present as fine grained, sub to euhedral kaolinite platelets, coarse grained kaolinite stacks and plates, with abundant halloysite (Plate 5).

In hole KS6, a 8.7m (23-31.7m) zone of white to pale brown kaolin was sampled. Samples comprised predominantly poorly crystalline kaolin, quartz and mica. K-feldspar was present at depth. Kaolin was present as fine grained, well crystalline platelets which became less crystalline with depth.

In hole KS7, a 11.2m (15.8-27m) zone of white to grey, iron stained kaolin was sampled. Kaolin, quartz and feldspar were the dominant components, with the kaolin content decreasing with depth (Table 11). No SEM observations were carried out to determine kaolin mineralogy.

TABLE 11. KARCULTABY SOUTH DEPOSIT- SUMMARY OF TEST RESULTS - CSIRO, ADELAIDE

Drillhole	Depth (m)	Sample No.	XRD	SEM	HI	Mineralogy
KS2	23.6	SB091	X	X	0.65	K, Q
KS2	28.9	SB092	X	X	0.27	Q, K, O
KS2	39.3	SB093	X	X	0.74	K, Q, O
KS2	41.4	SB094	X	X	0.80	K, Q, M, O
KS4	22.9	SB069	X	X	1.38	K, O, Q, M
KS4	24.0	SB070	X	X	0.65	Q, O, K
KS4	27.3	SB071	X	-	0.50	Q, O/A, K, M
KS5	14.1	SB084	X	X	0.89	K, Q, S
KS5	15.7	SB085	X	X	0.86	K, Q
KS5	17.1	SB086	X	-	0.60	Q, K
KS5	22.6	SB087	X	-	0.56	K, Q
KS5	26.3	SB088	X	-	0.75	Q, K, O
KS6	23.1	SB080	X	X	0.76	K, Q, M
KS6	25.7	SB081	X	X	0.63	K, Q, M
KS6	29.0	SB082	X	-	0.32	Q, K
KS6	33.0	SB083	X	-	-	Q, K, O/A, M
KS7	18.5	SB089	X	-	1.05	K, Q
KS7	26.0	SB090	X	-	0.65	Q, O/A, K

K - Kaolin, Q - Quartz, O - Orthoclase, A - Albite, M - Mica, S - Salt

Tomney North Deposit

Due to the iron stained nature of the drillcores, only one sample from Tomney North was examined with the results summarised in Table 12. TN1 comprised predominantly kaolin and quartz. Kaolin was present as coarse grained, sub to euhedral kaolinite plates with minor halloysite.

TABLE 12. TOMNEY NORTH DEPOSIT- SUMMARY OF TEST RESULTS - CSIRO, ADELAIDE

Drillhole	Depth (m)	Sample	XRD	SEM	HI	Mineralogy
TN1	10.8	SB075	X	X	0.97	K, Q

K - Kaolin, Q - Quartz

Tomney West Deposit

Results of laboratory tests are summarised in Table 13. Tomney West was characterised by relatively thick intersections of kaolin (>41m). Overburden thickness ranged from 9.5m (TW4) to 27.4m (TW3). Drillcores showed a characteristic granitic fabric containing abundant smoky and clear, coarse grained fractured quartz.

In hole TW1, a 27.6m (10.3-38.9m) zone of white to pale brown kaolin was sampled. Diffraction patterns show kaolin, quartz and mica were the dominant minerals present. Kaolin was present as fine grained, poorly crystalline kaolinite platelets, coarse grained kaolinite books and plates with minor halloysite.

In hole TW2, a +41m (13-54m EOH) zone of iron stained kaolin was sampled. Kaolin and quartz were the dominant minerals present, with mica and K-feldspar recorded at depth. Kaolin was present as very large (~500µm) vermicular kaolinite books (Plate 6), coarse grained kaolinite plates and abundant halloysite.

TABLE 13. TOMNEY WEST DEPOSIT- SUMMARY OF TEST RESULTS - CSIRO, ADELAIDE

Drillhole	Depth (m)	Sample	XRD	SEM	HI	Mineralogy
TW1	13.4	SB062	X	X	0.92	K, Q, S, M
TW1	19.2	SB063	X	X	0.63	K, Q, S, M
TW2	13.0	SB050	X	X	0.61	K, Q, S
TW2	16.5	SB051	X	X	0.77	K, Q, S
TW2	23.6	SB052	X	-	0.79	K, Q, S
TW2	24.6	SB053	X	X	0.77	K, Q, S
TW2	28.4	SB054	X	X	0.97	K, Q, S
TW2	29.5	SB055	X	X	0.56	Q, K, S
TW2	30.4	SB056	X	X	0.53	K, Q, S
TW2	34.5	SB058	X	X	0.8	K, Q, S, M
TW2	36.0	SB059	X	X	1.04	K, Q, S
TW2	37.4	SB060	X	X	1.17	K, Q, S, M
TW2	40.6	SB061	X	X	1.0	K, Q, O, M, S

K - Kaolin, Q - Quartz, O - Orthoclase, M - Mica, S - Salt

Tomney East Deposit

Results of laboratory tests are summarised in Table 14. Overburden thickness ranged from 8.2m (TE2) to 32.5m (TE5) and kaolin thickness ranged from 12.4m (TE4) to 28.7m (TE6). Four holes were sampled.

In hole TE3, a 22.2m (18.5-40.7m) zone of white to cream kaolin was sampled. Diffraction patterns show poorly crystalline kaolin and quartz to be the major components. No SEM was carried out to determine kaolin mineralogy.

In hole TE6, a 28.7m (11-39.7m) zone of white to cream, iron stained kaolin was sampled. Kaolin and quartz were the dominant components, with K-feldspar recorded at depth. Kaolin was generally poorly crystalline with only 2 samples recording crystallinity values >1 (Table 14). Kaolin was present as fine grained, sub to euhedral kaolinite platelets, coarse grained kaolinite plates and books, together with abundant halloysite (Plate 7). Halloysite content increased with depth forming spheroidal aggregates of interwoven tubes at 39.2m (Plate 8).

In hole TE7, a 24m (15.6-6-39m) zone of white to brown kaolin was sampled. Diffraction patterns indicated a high proportion of kaolin and quartz, with mica and K-feldspar present at depth. Kaolin was present as coarse grained, open kaolinite stacks, which comprised fine grained, sub to euhedral kaolinite platelets.

In hole TE8, a 15.4m (27.3-42.7m) zone of yellow, brown to grey kaolin was sampled. Diffraction patterns indicated a high proportion of kaolin and quartz. Minor mica was recorded for both samples (Table 14). Kaolin was present as coarse grained, open kaolinite stacks and plates. The coarse plates comprised fine grained (0.2-1.5μm), sub to euhedral kaolinite platelets.

TABLE 14. TOMNEY EAST DEPOSIT- SUMMARY OF TEST RESULTS - CSIRO, ADELAIDE

Drillhole	Depth (m)	Sample	XRD	SEM	HI	Mineralogy
TE3	20.0	SB072	X	-	0.73	K, Q
TE3	25.0	SB073	X	-	0.55	K, Q
TE3	29.4	SB074	X	-	0.74	K, Q
TE6	11.5	SB043	X	X	0.60	K, Q, S
TE6	12.0	SB044	X	X	1.05	K, Q, S
TE6	13.0	SB045	X	X	1.18	K, Q, S
TE6	15.7	SB046	X	-	0.39	Q, K
TE6	24.7	SB047	X	X	0.84	K, Q
TE6	29.2	SB048	X	X	0.88	K, Q, S
TE6	39.2	SB049	X	X	0.41	Q, O, K
TE7	26.0	SB066	X	X	1.06	K, Q, S
TE7	30.0	SB067	X	-	0.98	K, Q, S, M
TE7	37.6	SB068	X	-	0.52	K, Q, O, S, M
TE8	28.3	SB064	X	X	0.88	K, Q, M
TE8	38.0	SB065	X	X	0.70	K, Q, M

K - Kaolin, Q - Quartz, O - Orthoclase, M - Mica, S - Salt

REFRACTORY TESTING

On 8 March 1991, samples from Carey's Well Deposit (CW15, 9.5-15.5m) and Tomney East Deposit (TE1, 9.5-26.1m, and TE2, 11.0-26.0m) were forwarded to CML and, together with kaolin samples from seven other Australian deposits, were tested to assess their potential to produce a refractory chamotte of a standard equal to or better than that currently imported (Barnes, 1991).

Crushed samples were attritioned and slurried at 25% pulp density and a kaolin concentrate separated by using a Warman hydrocyclone operating at 30 psi, to give a cut at approximately 15-20μm (Barnes, 1991). Estimated yield of kaolin product (<20μm) from Carey's Well was 51% and from Tomney East, 37% (Barnes, 1991).

To be competitive with imported chamotte, the following were required for the calcined sample (Barnes, 1992):

. Bulk SG >2.55
. Al_2O_3 >42%
. $Na_2O + K_2O$ <0.4%
. CaO + MgO <0.2%
. Fe_2O_3 <1.0%
. TiO_2 <2.0%

Table 15 shows the raw and calcined chemical composition of kaolin evaluated for chamotte production. The calcined composition of the Carey's Well sample compared favourably with other samples evaluated, even though Fe_2O_3 content was slightly high. Kaolin from Tomney East was rejected due to poor yield of kaolin product, low Al_2O_3 content and high concentration of impurities.

Firing tests were carried out on kaolin from hole CW15. Samples were broken up, placed in a clay cylinder and heated in a muffle furnace to 1600°C (Barnes, 1992). After firing tests, the sample recorded a BSG between 2.53 and 2.58, with a maximum shrinkage temperature estimated to be slightly greater than 1600°C (Barnes, 1992).

The results were encouraging, and bulk samples were obtained by Calweld drilling at Carey's Well Deposit. The areas chosen for bulk samples were on the basis of low Fe_2O_3 and TiO_2 concentrations recorded for samples from drillholes CW3 and CW10 (Appendix D). However, due to difficult drilling conditions, sites were chosen 100m north of CW10 (BS1-4) and 100m southeast of CW (BS5-6). Drillhole locations are shown on Fig. 4 and logs are presented in Appendix F. Bulk kaolin samples were forwarded to CML's Tallawang plant, NSW, for separation of the kaolin fraction and chemical analyses.

Kaolin mineralogy and morphology were investigated at CSIRO, Division of Soils, Adelaide using SEM.

TABLE 15. CHEMICAL COMPOSITION OF CLAYS FOR CHAMOTTE EVALUATION (BARNES, 1991).

Composition	Tomney East (washed)		Carey's Well (washed)		Williamstown KAOSIL clay CW		Birdwood clay K15GM		Gulgong HR1 (washed)		Gulgong Hiwhite (washed)		Longwood flint clay	
	raw	calcined	raw	calcined	raw	calcined	raw	calcined	raw	calcined	raw	calcined	raw	calcined
Al_2O_3	37.08	42.73	38.1	44.32	39.7	44.7	35.0	40.91	34.3	39.33	35.5	40.91	35.62	40.1
SiO_2	47.40	54.63	46.3	53.85	47.0	52.9	44.7	52.25	49.6	56.88	47.5	54.74	51.12	57.5
Fe_2O_3	0.90	1.04	1.1	1.28	0.30	0.34	0.38	0.44	1.11	1.27	1.31	1.51	0.38	0.43
TiO_2	0.70	0.81	0.05	0.06	0.40	0.45	1.29	1.51	1.12	1.28	1.17	1.35	0.28	0.32
MgO	0.08	0.09	0.09	0.10	0.50	0.56	1.94	2.27	0.40	0.46	0.44	0.51	0.39	0.44
CaO	0.02	0.02	0.04	0.05	0.80	0.90	0.44	0.51	0.40	0.46	0.38	0.43	0.13	0.15
Na_2O	0.09	0.10	0.05	0.06	0.70	0.80	0.05	0.06	0.18	0.21	0.12	0.14	0.04	0.05
K_2O	0.56	0.65	0.07	0.08	0.30	0.34	0.26	0.30	0.11	0.13	0.17	0.20	0.83	0.93
H_2O+	13.24		14.00		11.30		14.20		12.80		13.2		11.11	
total	100.07	100.07	99.8	99.8	101	101	98.26	98.26	100.02	100.02	99.79	99.79	99.90	99.90

In hole BS2, a 7.4m (11.9-19.3m) zone of white kaolin was sampled. The sample comprised poorly crystalline, coarse grained kaolinite plates and books together with minor spherical halloysite.

In hole BS5, a 5.3m (9.9-15.2m) zone of kaolin was sampled. The sample comprised predominantly fine grained (0.3-1μm), well crystalline kaolinite platelets together with minor coarse kaolinite plates and books.

Chemical analyses by CML showed high concentrations of K_2O in samples below 14.9m in BS1 and 13.4m in BS6. SEM observation at CSIRO, Adelaide, confirmed fine fragments of remnant fractured K-feldspar grains, approximately 20-40μm across present in the deeper samples. A lower sample split (<20μm) was recommended. The <10μm fraction of two samples (BS1, 14.9-16.5m and BS6, 13-14.7m) was separated and lower concentrations of K_2O recorded. Two composite samples consisting of 13, 320 kg of low potash and 10, 030 kg of high potash kaolin were forwarded to CML's processing operation at Tallawang, NSW, for firing tests.

DISCUSSION

TEST RESULTS

Between 1984-87, drilling outlined three broad areas of kaolinization southwest of Poochera at Carey's Well, Karcultaby South and Tomney. During 1988-89, these areas were selected for core drilling on a 400m grid. Laboratory analyses indicated that the Carey's Well and Karcultaby South deposits had most potential for use in paper coating with intersections of white, fine grained (<2μm), well crystalline kaolinite. Poor brightness and poor viscosity results downgraded kaolin from the Tomney deposits.

Carey's Well Deposit

Carey's Well Deposit is located in a southerly trending depression within a broad topographic high which includes nearby granite outcrops at Parla Peak and Cocunda Rockhole (Fig. 2). Kaolin was most probably derived from deep weathering of Hiltaba Suite granite, which is a massive, medium to coarse grained granite, containing abundant coarse (up to 13mm) pink K-feldspar (present as both orthoclase and minor perthite), quartz and minor plagioclase and biotite. Kaolin was formed from alteration of K-feldspar and mica.

A total of 28 holes have been drilled in the Carey's Well Deposit. The lowest overburden:kaolin ratio's were recorded in the central region of the deposit including holes CW1, CW4, CW6, CW9 and CW11 (Fig. 4). Overburden thickens to the north (section A-A', Fig. 6) and thins to the southeast, with the least overburden recorded in hole CW15 (9.5m) (Fig. 4). The deposit is open to the north, east and south, and further drilling is required to define the limits of kaolinization.

Kaolin from a zone extending north-south from CW2 to CW11 (Fig. 4) was logged as quartz free (?transported kaolin) or containing fine grained quartz. No drillhole

samples from this zone were available for examination. Sample SB028, collected from the surface dump of Carey's Well located near CW1, contained fine to medium grained (0.5mm) subangular to subrounded quartz grains, very different from the quartz observed in CW14 and CW15. The presence of kaolinite books up to 75µm in length (Plate 3) suggests that the kaolin was not transported, and formed in situ by weathering of a fine grained parent rock. The bottom of CW11 was logged as fine grained granite and is possibly a variant of Hiltaba Suite granite.

ECC results indicated that 3 drillholes (CW3, CW10 & CW14) intersected kaolin with brightness and rheological values suitable for coating paper. The best intersection was 8.9m in hole CW10, below 10m of overburden. Holes CW3 and CW14 recorded narrow zones (<5m) of high-grade kaolin.

Twelve holes intersected kaolin with high brightness (>86%), but only 3 of these had acceptable rheology for coating paper. Samples with poor viscosity also recorded high surface areas (Table 16) which possibly reflect a high halloysite content in the <2µm fraction. A relationship between high surface area, high halloysite content and poor rheology is indicated by the results from holes CW14 and CW15 (Table 10 & 16).

Preliminary firing tests by CML indicated that kaolin from Carey's Well Deposit might be suitable for manufacture of refractory chamotte.

Further drilling is required to determine the extent and grade of kaolin mineralisation and to delineate those areas most suited for coating paper, for refractories or ceramics, or for filler grades.

Karcultaby South Deposit

Forty eight metres of white kaolin was intersected in hole KC2 (Appendix A). Testing by Amdel recorded high brightness (Table 2), but the clay had poor rheological properties and was dilatant possibly due to poor grain size distribution.

Drilling by ECC confirmed the presence of kaolin over a length of 1400m from KS7 to KS4 (Fig. 3). Kaolin was most probably derived from deep weathering of Hiltaba Suite granite, except for KS2 which bottomed in a quartz-feldspar-biotite schist, probably early Proterozoic Lincoln Complex. Kaolin was formed from alteration of K-feldspar and mica. Depth of weathering was variable across the prospect with the thickest intersection recorded in hole KC2 (48m). Overburden thickness is relatively high, with the least overburden recorded in hole KS5 (14m). Kaolin intersections were comparatively thick but thin to the east with partly weathered bedrock intersected in hole KS3, and only 4.6m of kaolin intersected in KS4 (Fig. 3).

ECC results confirm the presence of high-grade kaolin, possibly suitable for coating paper in holes KS1, KS4, KS6 and KS7, but high overburden thicknesses make this prospect less attractive than the Carey's Well Deposit.

Tomney Deposits

Drilling during August 1986 was concentrated in the Tomney area (holes P3-P14) with most holes bottoming in weathered Lincoln Complex granite. Tomney was characterised by thick intersections of kaolinized bedrock (24m in hole P6), but quality was variable with only 6 holes intersecting white kaolin (Appendix B). Initial testing showed that much of the kaolin had poor brightness and poor rheological properties (refer Tables 2-7).

Drilling by ECC outlined 4 separate deposits, Tomney North, East, West and South. Tomney was characterised by low overburden:kaolin ratios (Table 16), with Tomney East and Tomney West recording the thickest intersections of kaolin. Kaolin formed by alteration of mica and K-feldspar. SEM observation of bulk samples showed that kaolin comprised predominantly coarse grained kaolinite plates and books, with abundant halloysite in holes TW2, TE6 and TE8

Overall, laboratory results showed that samples gave a low yield of <2μm size fraction, poor brightness, poor rheological properties and high iron and TiO_2 content, making the kaolin unsuitable for use in the paper industry. No further work is recommended for the Tomney area.

PAPER COATING AND FILLER

ECC results for the best kaolin intersections in each hole are summarised in Table 16. These show that kaolin from Carey's Well and Karcultaby South deposits may be suitable for coating paper. Paper coating is the top end of the market in terms of volume sales and export potential. Kaolin suitable for coating paper has to meet quality specifications which include: the clay must be fine grained (<2μm), have a brightness >86% and must flow readily at 70% solids content (Murray, 1988).

In the Carey's Well Deposit, low viscosity kaolin is distributed in a relatively narrow zone, incorporating holes CW3, CW10, CW14 and possibly BS5 and BS6 (Fig. 4). The remaining holes showed poor viscosity results due in part to the presence of halloysite, as observed in hole CW15 and inferred for other holes by the high surface area of kaolin recorded for the <2μm fractions (Table 16).

In the Karcultaby South Deposit, holes KS1, KS4, KS6 and KS7 all had intersections of kaolin with acceptable brightness and viscosity for paper-coating kaolin (Table 16). Overburden thickness is greater than at Carey's Well but further drilling is warranted to determine the extent of the deposit.

Kaolin is also used in filling paper to improve opacity, smoothness and printability by the debonding of fibres which increases the light scattering area (Bundy and Ishley, 1991). Kaolin suitable for paper filler should be fine grained and have a brightness >80%. The majority of kaolin from Carey's Well and Karcultaby South deposits would be suitable for this use.

REFRACTORIES

Kaolin was used extensively in the manufacture of clay-based refractories, the demand for which has declined in favour of refractories with a higher alumina content, that have a longer service life. The relative low cost of kaolin however makes this an attractive raw material for low temperature (<1200°C) refractories provided that the levels of impurities are low and the clay is in a stable form. This is achieved by beneficiation and calcining the clay at around 1600°C to produce a refractory chamotte.

Chamotte is used as a stable or inert aggregate in fire clay bricks and castable refractories. Production of chamotte requires relatively pure kaolin clay, low in impurities such as Fe_2O_3, TiO_2 and K_2O which form glass phases with lower melting temperatures than mullite and cristobalite, the principal mineralogy of calcined kaolin.

Initial firing tests using kaolin from Carey's Well Deposit were encouraging and prompted further drilling and bulk sampling. These samples are currently being tested by CML.

Kaolin from Tomney East was rejected for chamotte production because of poor yield of kaolin product, low Al_2O_3 content and high concentration of impurities.

TABLE 16. ECC - SUMMARY OF TEST RESULTS FOR BEST KAOLIN INTERSECTION (<2μm Fraction)

CAREY'S WELL DEPOSIT

Drillhole	Overburden/ Kaolin thickness (m)	Kaolin Intersection tested (m)	Brightness (ISO A)	Low Shear Viscosity Concentration (% solids at 5 poise)	Surface Area (m^2/gm)
CW1	17:16	17.0-19.8	86.2	64.2	28.7
CW2	22:7	22.4-29.1	87.5	69.5	19.4
CW3	10:7	13.5-16.2	90.5	72.1	13.1
CW4	15:19	18.2-21.4	88.9	63.2	27.9
CW5	15:7	19.0-22.0	83.5	72.1	17.8
CW6	31:20	30.7-36.3	88.5	64.8	27.8
CW7	32:19	37.5-44.0	80.1	64.3	26.8
CW8	31:11	32.4-44.1	78.6	64.8	26.3
CW9	11:14	11.7-18.7	87.4	65.4	21.8
CW10	9:10	10.1-19.0	89.1	73.2	13.7
CW11	10:9	10.5-19.7	90.0	63.3	25.1
CW12	11:11	11.5-18.4	89.4	67.6	26.0
CW13	13:3	13.3-16.1	89.4	61.2	28.4
CW14	22:4	22.2-26.6	87.8	72.9	13.7
CW15	9:8	9.5-13.5	91.0	66.5	22.5
CW16*					
CW17*					

KARCULTABY SOUTH DEPOSIT

KS1	19:32	25.0-30.6	89.1	70.1	15.0
KS2	16:23	15.9-26.6	87.6	68.7	15.2
KS3*					
KS4	18:4	18.4-23.0	88.4	71.5	15.7
KS5	14:16	23.1-30.6	88.1	68.5	14.9
KS6	23:9	23.0-25.0	87.0	70.0	17.7
KS7	16:11	15.8-22.0	85.6	71.8	15.3

* poor quality kaolin or no kaolin intersected

TOMNEY DEPOSITS

Drillhole	OB/Kaolin Thickness (m)	Kaolin intersection tested (m)	Brightness (ISO A)	Low Shear Viscosity. Concentration (% solids at 5 poise)	Surface Area (m^2/gm)
TN1*					
TN2	10:29	9.7-15.2	80.9	65.0	22.4
TN3*					
TN4	9:5	8.8-13.5	78.4	N/A	22.3
TN5	13:13	12.9-19.8	89.2	57.2	27.1
TN6	16:7	19.6-23.5	89.5	65.6	22.7
TE1	9:23	9.4-16.4	88.1	63.8	24.9
TE2	8:20	8.2-19.7	84.5	62.7	31.9
TE3	18:22	19.8-26.8	88.6	65.5	18.4
TE4	17:9	22.6-27.0	85.8	60.7	23.6
TE5*					
TE6	11:29	15.4-18.7	86.5	63.3	24.6
TE7	15:24	16.6-27.6	86.8	64.3	23.9
TE8	33:9	27.3-33.6	56.7	64.7	27.8
TW1	10:29	11.6-19.2	83.4	65.4	25.2
TW2	13:41	13.0-17.7	88.9	62.7	23.7
TW3	27:24	27.4-32.4	72.0	60.5	19.8
TW4	9:8	9.5-17.3	90.2	63.4	30.5
TW5*					
TW6*					
TS1	15:4	15.0-19.4	83.1	67.7	17.6
TS2*					
TS3	16:14	15.8-19.8	87.6	60.6	24.9
TS4	14:5	13.7-19.0	82.2	64.5	19.6
TS5*					
TS6	17:16	17.5-25.0	89.7	64.4	22.3

* poor quality kaolin or no kaolin intersected

WHITEWARE CERAMICS

Kaolin is the principal component in the manufacture of whiteware ceramics which include wall tile, sanitary ware, stoneware, porcelain and electrical porcelain (Burst, 1991). Whiteware ceramic bodies are typically a mixture of kaolin, ball clay, quartz and feldspar or other fluxes. Typical compositions and properties of kaolin used in ceramics are summarised in Table 17 after Prasad *et al.*, (1991).

TABLE 17. COMPOSITION AND PROPERTIES OF KAOLIN USED IN CERAMICS

Property	%
Chemical composition	
SiO_2	48-49
Al_2O_3	36-37
Fe_2O_3	0.6-1.0
TiO_2	0.02-0.10
LOI	11.2-12.5
Particle size (µm)	
<53µm	100
<10µm	80-96
<2µm	40-70
Modulus of rupture	10-31
Brightness	75-90

ECC results for the <2µm fraction of kaolin from Carey's Well and Karcultaby South deposits indicated that these samples may be suitable for whiteware ceramic manufacture. Holes CW10, CW11, CW12, CW14 and CW15 all recorded relatively high yields of <2µm fraction with low iron and titanium contents, with the best holes being CW10 (10.1-19m, Fe_2O_3 -0.19%, TiO_2 - 0.40%), CW11 (10.5-19.7m, Fe_2O_3 - 0.41%, TiO_2 - 0.17%) and CW15 (9.5-18m, Fe_2O_3 - %, TiO_2 - 0.04%). The best hole for Karcultaby South was KS4 (18.4-23m, Fe_2O_3 - 0.50%, TiO_2 - 0.23%).

Halloysite has some advantages in the manufacture of whiteware ceramics. Halloysite tubes have a higher surface area than kaolinite platelets. During firing, this enables faster formation of mullite and cristobalite resulting in increased translucency and strength in the fired body (Ney, 1983). The low level of impurities and the presence of halloysite in CW15 and possibly CW11, indicate that the southeastern area of the Carey's Well Deposit warrants further investigation for ceramic-grade kaolin.

SUMMARY AND RECOMMENDATIONS

Exploration drilling for metallic mineralisation southwest of Poochera, on northern Eyre Peninsula, by Oilmin, Western Nuclear, Petromin and Transoil in 1983, intersected 48m of white kaolinized granite in hole KC2. This initiated exploration for a commercial high-grade kaolin deposit. Between 1984 and 1991, 77 holes were drilled on exploration licences held by S A Paper Clays consortium of Petroleum Engineering Services, D A Wilson and C Youles. This outlined 3 broad areas of kaolinization at Carey's Well, Karcultaby South and Tomney.

Carey's Well Deposit formed by weathering of mid-Proterozoic Hiltaba Suite granite. Intersections of potential paper-coating-grade kaolin, showing a high yield of <2μm size fraction of crystalline kaolinite with good rheological properties and high natural brightness, were made in 3 holes (CW3, CW10, & CW14). The thickest intersection was 8.9m in hole CW10 which yielded 25% <2μm size fraction with a natural brightness 89.1% and a low shear viscosity of 5 poise at 73 wt.% solids. Other holes intersected mixed kaolinite/halloysite ore including areas with low Fe_2O_3 and TiO_2 contents that have potential for use in manufacture of refractory chamotte and whiteware ceramics. Inferred resources are 30 million tonnes of kaolinized bedrock.

Karcultaby South Deposit includes weathered Hiltaba Suite granite and possible early Proterozoic Lincoln Complex gneiss. High brightness kaolin with good rheological properties was intersected in 4 holes (KS1, KS4, KS6 & KS7) but overburden thicknesses are high (>14m) and the extent of the deposit remains to be tested.

Of the sites investigated, Carey's Well Deposit has advantages in being a large deposit of high-grade kaolin suitable for a range of possible markets and with least overburden thickness. Further drilling is required to define the extent of the deposit and to delineate areas of varying kaolin quality. Karcultaby South Deposit warrants additional drilling to investigate the size of the deposit. No further work is recommended on the Tomney prospect.

On northern Eyre Peninsula, weathered Hiltaba Suite granite appears to be the best target for high-grade kaolin mineralisation. Areas of Hiltaba Suite granite to the east of Streaky Bay, in the Calca - Mount Hall area, and northeast and south of Mount Cooper offer potential for additional deposits and should be investigated by reconnaissance drilling.

March, 1993.

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APPENDIX A
DRILLHOLE LOGS FOR HOLES YD1-2 & KC1-5
Logged by I.P. Youles

Drillhole	Depth (m)	Description
YD1	0- 8	Calcrete
	8-10	Pale grey clayey sand
	10-16	Brown clayey sand
	16-26	Off-white clayey sand
	26-34	Sandy clay
	34-40	Granitic sand
	40-42	Granite - K-feldspar rich
	42-48	Granite (trace mafic rock)
	48-54	Mafic rock (grading to granite)
	54-60	Granite (grading to mafic rock)
	60-62	Mostly mafic rock
	62-66	Granite
	EOH 66m	
YD2	0- 2	Calcrete
	2- 6	Calcrete and red-brown clayey sand
	6-20	Grey, yellow, red, red-brown sandy clay
	20-22	Brown and cream sand in part clayey
	22-40	Sandy clay
	40-56	Mafic rock
	EOH 56m	
KC1	0- 8	Calcrete and sand
	8-12	Orange sand
	12-16	Red sand
	16-24	Orange grading to yellow sand
	24-28	Orange sand
	28-40	Yellow-brown granitic sand
	40-52	Orange-yellow sandy clay (kaolinitic)
	52-64	Weathered pink granite
	64-80	Pink (K-feldspar) granite
	EOH 80m	
KC2	0- 6	Calcrete and sand
	6-14	Yellow, red and white sand
	14-20	Yellow-brown granitic sand
	20-32	Kaolin with 20% clear quartz
	32-68	Kaolin (hard from 64m)
	68-70	K-feldspar granite
	EOH 70m	

KC3	0 - 4	Calcrete and laterite
	4-- 8	Yellow-brown granitic sand
	8 -14	Kaolin with clear quartz grains
	14--21	Kaolin, becoming yellow with depth
	21-24	K-feldspar granite
	EOH 21m	
KC4	0- 4	Calcrete and sand
	4-14	Red to yellow sand
	14-18	Yellow-brown granitic sand
	18-30	Off-white kaolin
	30-48	Kaolin, light khaki grading to dark grey
	EOH 48m	
KC5	0- 6	Calcrete, sand and clay
	6-15	Clays, mostly yellow brown, some red
	15-18	Coarse brown sand
	18-22	Yellow-brown clays with 50% coarse sand
	22-30	Kaolin with 20-30% quartz grains
	30-35	Kaolin, white to yellow with 20-30% quartz grains
	35-46	Kaolin, yellow with 20-30% quartz grains
	46-52	Kaolin, white with buff grey mottling dominant, 20-30% quartz grains
	52-61	Kaolin, mostly white, rare yellow and buff mottling, 20-30% quartz grains
	61-66	Coarse grey sand
	66-70	White to yellow clay with 30% quartz
	EOH 70m	

APPENDIX B
DRILLHOLE LOGS P1 - P15
Logged by I.P. Youles

Drillhole	Depth (m)	Description
P1	0- 2	Calcrete
	2-10	Sand, fine, silty, light brown
	10-12	Sand, fine to medium, red-brown
	12-17	Sand, fine clayey, red-brown, trace white clay
	EOH 17m	
P2	0- 1	Calcrete
	1- 4	Limestone, sandy, light brown
	4- 8	Sand, fine to medium, red-brown to brown (7.9-8m ironstone nodules)
	8-11	Sand, fine, mainly yellow brown to red-brown
	11-15.5	Sandstone, fine, white to yellow-brown
	15.5-18	Sandstone, fine to medium, becoming coarser with depth, white
	18-18.75	Sand, fine to medium, yellow, trace kaolin
	18.75-22.2	Kaolin, white with coarse quartz
	22.2-23.7	Kaolin, off-white, coarse quartz
	23.7-27.5	Kaolin, brown, coarse quartz
	27.5-27.7	Granite, hard
	EOH 27.7m	
P3	0- 1	Calcrete
	1- 4	Limestone, sandy, light brown
	4- 5	Clay, sandy, red-brown to brown
	5-11	Sand, fine to medium, clayey, brown to light brown to yellow-brown
	11-14	Sand, fine, mostly white
	14-30	Sand, yellow to yellow-brown with minor white, red-brown
	EOH 30m	

P4	0- 1	Calcrete
	1- 4	Limestone, light brown
	4- 6	Sand, fine, light brown, calcareous
	6-11	Sand, fine to medium, red-brown to yellow-brown
	11-12	Sandstone, fine to medium grained, red-brown, highly ferruginous
	12-15	Sand, fine to medium, red-brown to brown
	15-16	Sandstone, silicified
	16-19	Sand and sandstone
	19-21	Kaolin and quartz, silicified
	21-24	Kaolin, white
	24-25	Kaolin, contaminated by reaming (not sampled)
	25-26	Kaolin, brown
	26-26.7	Granite, kaolinized
	EOH 26.7m	
P5	0-12	Samples lost
	12-24	Sand, fine, yellow-brown
	24-28	Sand, fine, white, becoming re-brown and gravelly
	28-29	Ironstone, quartz grains cemented by iron oxide
	29-30	Kaolin, varicoloured, minor quartz
	30-31	Kaolin, light brown
	31-32	Kaolin, brown, red, yellow
	32-33	Kaolin, varicoloured
	EOH 33m	

P6	0- 7	Sand and clay, calcareous, light brown
	7-8	Clay, red-grey
	8-11	Sand, fine, red-brown
	11-14	Sand, fine, light brown
	14-14.5	Sand, fine, white
	14.5-15	Silcrete
	15-16	Kaolin, partly silicified
	16-17	Kaolin, white, minor brown
	17-18	Kaolin, cream to red-brown
	18-19	Kaolin, red-brown to cream
	19-20	Kaolin, cream, trace brown
	20-22	Kaolin, white to brown
	22-23	Kaolin, red-brown
	23-24	Kaolin, off-white
	24-25	Kaolin, light brown
	25-26	Kaolin, off-white
	26-34	Kaolin, cream to off-white
	34-36	Kaolin, cream minor light brown
	36-39	Kaolin, light brown, grey, cream
	39-40	Granite, kaolinized
	EOH 40m	
P7	0- 1.5	Calcrete
	1.5-4.5	Clay, orange-red
	4.5-10	Sandstone, fine, orange to white
	10-12	Silcrete
	12-16	Kaolin, white
	16-17	Kaolin, white, trace light brown
	17-18	Kaolin, white
	18-19	Kaolin, light brown and white
	19-20	Kaolin, white
	20-21	Kaolin, off-white
	21-22	Kaolin, white, minor light brown
	22-23	Kaolin, cream
	23-25	Kaolin, light brown and cream
	25-26	Kaolin, cream
	26-27	Kaolin, white
	27-29	Kaolin, white minor light brown
	29-31	Kaolin, cream
	31-34	Kaolin, light brown and cream
	34-35	Granite, kaolinized
	EOH 35m	

P8	0 - 5	Sand, fine, calcareous, yellow-brown
	5- 6	Sandstone, silicified, white
	6-10	Sand, medium, yellow, minor clay
	10-14	Sand, fine to medium, clayey, yellow-brown
	14-14.2	Kaolin, yellow brown, minor quartz
	EOH 14.2m	
P9	0-1.5	Calcrete
	1.5-2.5	Clay, orange to brown
	2.5-4	Sand, fine, clayey, yellow-brown to red-brown
	4-5.5	Sand, fine, clayey, red-brown
	5.5-8	Silcrete
	8-12	Kaolin, white
	12-13	Kaolin, off-white
	13-15	Kaolin, light brown
	15-16	Kaolin, cream minor light brown
	16-17	Kaolin, cream
	17-18	Kaolin, cream minor light brown
	18-19	Granite, weathered
	EOH 19m	
P10	0-3.5	Calcrete, minor brown limestone
	3.5-5.5	Clay, red-brown
	5.5-13	Sand, fine, mainly red-brown
	13-14.25	Silcrete
	14.25-15	Kaolin, white to light brown
	15-16	Kaolin, red-brown
	16-19	Kaolin, mainly red-brown
	19-20	Kaolin, red-brown minor cream
	20-21	Kaolin, red-brown, cream
	21-23	Kaolin, cream, red-brown
	23-24	Kaolin, white minor red-brown
	24-25	Kaolin, white
	25-26	Kaolin, cream
	26-31	Kaolin, cream, 40% quartz
	31-32	not sampled (contaminated)
	32-33	Kaolin, red-brown minor cream, minor quartz grains, hard
	EOH 33m	

P11	0-1.5	Calcrete
	1.5-3	Sand, fine, calcareous, brown
	3- 6	Clay, red-brown
	6- 9	Sand, fine, red-brown
	9-10.5	Silcrete
	10.5-11	Kaolin, white
	11-12	Kaolin, white, minor light brown
	12-14	Kaolin, white
	14-16	Kaolin, white, minor light brown
	16-17	Kaolin, white
	17-18	Kaolin, white, minor light brown
	18-19	Kaolin, light brown, cream
	19-20	Kaolin, white, minor light brown
	20-22	Kaolin, brown, white
	22-25	Kaolin, brown, becoming hard
	25-34.5	Kaolin?, grey, gritty, hard, possibly weathered granite
	EOH 34.5	
P12	0- 4	Calcrete and limestone
	4- 5	Clay, light brown
	5- 7	Sand, fine, light brown
	7- 9	Sand, fine, clayey, brown (hole stopped as too wet)
	EOH 9m	
P13	0-5.5	Limestone, brown
	5.5-10	Sand, fine, orange to brown
	10-11	Clay, red-brown
	11-19	Sand, fine, minor ironstone, mostly red-brown to yellow-brown, becoming paler
	19-20	Sandstone, silicified
	20-29	Sand, fine to medium, yellow-brown to brown
	EOH 29m	
P14	0-5.5	Calcrete and limestone, brown
	5.5-8.5	Sand, fine, yellow-brown
	8.5-10	Clay, red-brown
	10-19	Sand, fine, clayey, brown to yellow-brown
	EOH 19m	
P15	0-3.5	Calcrete and limestone
	3.5-14	Sand, fine, light brown to brown
	14-16	Clay, sandy, red-brown
	EOH 15m	

APPENDIX C
DRILLHOLE LOGS PP1 - PP5
Logged by I.P. Youles

Drillhole	Depth (m)	Description
PP1	0- 2	Calcrete, light brown sandy clay
	2- 6	Calcrete, brown to cream
	6-10	Sandy clay to clayey sand, red-brown to brown to yellow (?weathering profile)
	10-11	Granite, fresh
	EOH 11m	
PP2	0- 2	Calcrete
	2- 5	Calcrete, light brown to cream sandy clay
	5-10	Sandy clay, brown, yellow, red-brown
	10-16	Clayey sand, fine, cream, brown, red-brown
	16-26	Kaolin, white with coarse quartz grains
	EOH 26m	
PP3	0- 3	Calcrete
	3-20	Clayey sand, brown to yellow
	EOH 20m	
PP4	0- 3	Calcrete
	3-13.5	Clayey sand, brown to yellow
	13.5-15	Coarse granitic sand
	15-16	Hard band (?silicified kaolin)
	16-24	Kaolin, white with quartz grains
	EOH 24m	
PP5	0-16	As for PP4
	16-19.4	Kaolin, white with coarse sub-rounded quartz grains
	19.4-20	Kaolin, as for 16m, becoming interbedded with kaolin and fine quartz sand
	20-20.5	No core recovery
	20.5-23.5	Kaolin, white, finely interbedded with kaolinitic fine sand - beds ~ 3mm thick
	23.5-28	Recovery 1m. Kaolinitic fine sand, slight pinkish colour. Driller reports remainder of coring in soft material - interpreted to be kaolin (NQ coring from 16m)
	EOH 28m	

APPENDIX D
ECC - ANALYSES OF 1988-89 DRILLCORE SAMPLES

North :	5807	East :	5800
File :	dh001	Surface:	115.70

Drilled by Thompson Drilling on the 21rd November 1988
Logged in field by S. Kennedy and logged by IRW in Pittong on 12th Dec
Ovb soil and calcrete with alternating clay and sands down to 17.0 m
Core recovery 94.4% and note that hole drilled 7m north of PPS datum peg
Careys well refers to a well drilled for water by farmer Kevin Carey

File Line Number	Strata Roof Depth	Strata Roof Elev.	Thickness Metres	Quality In Situ Ratio	Lithological Definitions Code	Lithological Definitions Descriptions	Quality Data..... Yield	-2mics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	115.7	17.00		ovb	Overburden																
2	17.0	98.7	2.80	3.79	gfk	fully kaolinised granite	23.70	84.10	86.20	5.80	86.60	4.90	69.40	64.20	28.70	0.32	1.00	0.07	0.28	100.00	0.10	300.00
3	19.8	95.9	5.30	1.31	gfk	fully kaolinised granite	21.30	67.80	84.10	6.80	84.70	6.20	53.60	55.70	24.20	0.78	2.20	0.08	0.80	96.00	4.00	410.00
4	25.1	90.6	7.90	0.66	gfk	fully kaolinised granite	23.60	74.50	83.40	7.10	83.10	6.60	57.50	58.70	23.20	0.27	1.50	0.06	0.55	97.00	3.00	600.00
5	33.0	82.7	1.00	0.63	gpk	partly kaolinised gran	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6	34.0	81.7	0.00		eoh	End of Drillhole																

ID: CW1		Surf:	115.70
North :	5807	East :	5800

Drilled by Thompson Drilling on the 23rd November 1988
Logged in field by S. Kennedy and logged by IRW in Pittong on 12th Dec
Ovb soil and calcrete with alternating clay and sands down to 17.0 m
Core recovery 94.4% and note that hole drilled 7m north of PPS datum peg
Careys well refers to a well drilled for water by farmer Kevin Carey

North :	6199	East :	5799
File :	dh002	Surface:	118.40

Drilled on the 30th Nov 1988 and logged by SK
Logged by IRW at Pittong on the 12th December 1988
Ovb consists of soil and calcrete with brown and orange sands
Core recovery 83.1 and granite a FINE GRAINED VARIETY
Unaltered granite at 29.1 metres depth

File line Number	Strata Roof Depth	Strata Roof Elev.	Thickness Metres	Cualty. In Situ Ratio	Lithological Definitions Code	Lithological Definitions Descriptions	Quality Data..... Yield	-2mics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	118.4	22.40		ovb	Overburden																
2	22.4	96.0	6.70	2.09	gfk	fully kaolinised granite	42.00	84.80	87.50	4.80	87.50	4.40	67.10	69.50	19.40	0.36	1.00	0.09	0.58	98.00	2.00	1500.00
3	29.1	89.3	0.40		guk	unkaolinised granite																
4	29.5	88.9	0.00		eoh	End of Drillhole																

ID:	CW2	Surf:	118.40
North :	6199	East :	5799

Drilled on the 30th Nov 1988 and logged by SK
Logged by IRW at Pittong on the 12th December 1988
Ovb consists of soil and calcrete with brown and orange sands
Core recovery 83.1 and granite a FINE GRAINED VARIETY
Unaltered granite at 29.1 metres depth

North : 5798	East : 5400
File : dh003	Surface: 123.90

Drilled on the 1st December 1988 by Thompson Drilling
Logged by SK on site and re-logged by IRW at Pittong 12th December 1988
Core Recovery 73.8 and ovb calcrete at top underlain by coloured sands
Very hard coarse grained FK granite at 10 to 11.2 metres
Some core lost

File Line Number	Strata Roof Depth	Elev.	Thick-ness Metres	Cualty. In Situ Ratio	Code	Lithological Definitions Descriptions	Quality Data..... Yield	-2mics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	123.9	10.00		ovb	Overburden																
2	10.0	113.9	3.50	1.79	gfk	fully kaolinised granite	12.90	63.90	87.80	5.20	88.90	4.10	52.80	58.10	15.40	0.22	0.71	0.04	0.06	100.00	--	2200.00
3	13.5	110.4	2.70	1.01	gfk	fully kaolinised granite	40.70	82.20	90.50	3.80	90.70	3.40	69.20	72.10	13.10	0.15	0.49	0.06	0.14	100.00	--	2800.00
4	16.2	107.7	1.00	0.87	gfk	fully kaolinised granite	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5	17.2	106.7	0.00		eoh	End of Drillhole																

ID: CW3	Surf: 123.90
North : 5798	East : 5400

Drilled on the 1st December 1988 by Thompson Drilling
Logged by SK on site and re-logged by IRW at Pittong 12th December 1988
Core Recovery 73.8 and ovb calcrete at top underlain by coloured sands
Very hard coarse grained FK granite at 10 to 11.2 metres
Some core lost

North : 5400	East : 5800	Drilled on the 24th November 1988 and logged by Sean Kennedy
File : dh004	Surface: 114.00	Logged by IRN at Pittong on the 12th December 1988
		Core recovery 79.5 and ovb calcrete underlain by coloured sands
		Coarse grained granite from 15.5 to 21.4 underlain by fine grained type
		Fine gr granite from 21.4 to 29.9 and then back into Coarse gr granite

File Line	Strata Roof		Thick-ness	Cumlty. In Situ	Lithological Definitions		Quality Data.....													
Number	Depth	Elev.	Metres	Ratio	Code	Descriptions	Yield	-2mics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	114.0	15.50		ovb	Overburden																
2	15.5	98.5	2.50	3.88	gfi	iron stained kaol gran	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3	18.0	96.0	0.20	3.59	gfi	iron stained kaol gran	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4	18.2	95.8	3.20	1.64	gfk	fully kaolinised granite	34.90	85.50	88.90	4.60	88.50	4.40	62.30	63.20	27.90	0.45	0.46	0.07	0.26	100.00	--	190.00
5	21.4	92.6	2.80	1.11	gfk	fully kaolinised granite	26.10	81.10	88.30	4.70	88.10	4.60	60.10	62.90	25.40	0.62	0.61	0.07	0.31	98.00	2.00	280.00
6	24.2	89.8	5.70	0.67	gfk	fully kaolinised granite	26.10	80.60	79.60	7.40	79.50	7.10	59.00	61.00	27.00	0.60	0.65	0.06	0.34	95.00	3.00	415.00
7	29.9	84.1	4.60	0.51	gfk	fully kaolinised granite	17.30	80.30	70.20	9.10	70.70	8.90	59.20	60.80	29.40	0.67	0.82	0.09	0.54	96.00	4.00	270.00
8	34.5	79.5	2.70	0.45	gpk	partly kaolinised gran	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9	37.2	76.8	0.00		eoh	End of Drillhole																

ID: CW4	Surf: 114.00	Drilled on the 24th November 1988 and logged by Sean Kennedy
North : 5400	East : 5800	Logged by IRN at Pittong on the 12th December 1988
		Core recovery 79.5 and ovb calcrete underlain by coloured sands
		Coarse grained granite from 15.5 to 21.4 underlain by fine grained type
		Fine gr granite from 21.4 to 29.9 and then back into Coarse gr granite

North :	6200	East :	5400
File :	dh005	Surface:	126.10

Drilled on the 23rd November 1988 by Thompson Drilling
Logged by SK and logged by IRW in Pittong on the 12th Dec 1988
Core recovery poor at 48.4 and overburden consists of calcrete and sand
Coarse grained granite from 15.5 to 21.4
Fine grained granite from 21.4 to 34.5 and then back into coarse gr type

File Line Number	Strata Roof Depth	Strata Roof Elev.	Thickness Metres	Cumltv. In Situ Ratio	Lithological Definitions Code	Lithological Definitions Descriptions	Quality Data..... Yield	-2mlcs	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	126.1	15.00		ovb	Overburden																
2	15.0	111.1	4.00	2.34	gfi	iron stained kaol gran	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3	19.0	107.1	3.00	1.34	gfk	fully kaolinised granite	36.60	--	83.50	9.20	86.50	7.40	71.20	72.10	17.80	0.44	0.24	0.03	0.08	99.00	1.00	1500.00
4	22.0	104.1	0.10		guk	unkaolinised granite																
5	22.1	104.0	0.00		eoh	End of Drillhole																

D5

ID:	CW5	Surf:	126.10
North :	6200	East :	5400

Drilled on the 23rd November 1988 by Thompson Drilling
Logged by SK and logged by IRW in Pittong on the 12th Dec 1988
Core recovery poor at 48.4 and overburden consists of calcrete and sand
Coarse grained granite from 15.5 to 21.4
Fine grained granite from 21.4 to 34.5 and then back into coarse gr type

North : 6602	East : 5800	Drilled on the 29th November 1988 by Thompson Drilling
File : dh006	Surface: 119.30	Logged by Sean Kennedy and logged also by IRW at Pittong on 12 Dec 1988
		Core recovery 91.8 and ovb consists of calcrete underlain by col sands
		COARSE GRAINED GRANITE with decreasing kaolinisation with depth

File Line Number	Strata Roof Depth	Strata Roof Elev.	Thickness Metres	Cumltv. In Situ Ratio	Lithological Definitions Code	Lithological Definitions Descriptions	Quality Data..... Yield	-2mics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	119.3	30.70		ovb	Overburden																
2	30.7	88.6	5.60	3.43	gfk	fully kaolinised granite	26.60	85.20	88.50	4.50	88.80	4.20	64.30	64.80	27.80	0.44	0.37	0.08	0.12	98.00	1.00	390.00
3	36.3	83.0	4.50	1.90	gfk	fully kaolinised granite	20.20	86.80	70.30	13.20	72.00	13.30	61.70	62.90	28.40	1.30	0.28	0.06	0.23	94.00	4.00	220.00
4	40.8	78.5	4.60	1.31	gfk	fully kaolinised granite	14.50	83.40	86.10	5.80	87.50	4.40	61.00	62.90	26.20	0.80	0.33	0.07	0.27	97.00	1.00	210.00
5	45.4	73.9	5.40	0.95	gfk	fully kaolinised granite	14.30	77.50	85.60	5.90	85.80	5.30	62.70	64.80	19.00	0.80	0.32	0.07	0.24	98.00	0.10	210.00
6	50.8	68.5	0.00		eoh	End of Drillhole																

ID: CW6	Surf: 119.30	Drilled on the 29th November 1988 by Thompson Drilling
North : 6602	East : 5800	Logged by Sean Kennedy and logged also by IRW at Pittong on 12 Dec 1988
		Core recovery 91.8 and ovb consists of calcrete underlain by col sands
		COARSE GRAINED GRANITE with decreasing kaolinisation with depth

North :	6608	East :	6202
File :	dh007	Surface:	115.00

Drilled on the 30th November 1988 and logged by Sean Kennedy
Very deep overburden here consisting of calcrete underlain by col sands
Core recovery 100 percent
Granite the COARSE GRAINED variety becoming greyish with depth

File Line Number	Strata Roof Depth	Strata Roof Elev.	Thickness Metres	Cumltv. In Situ Ratio	Lithological Definitions Code	Lithological Definitions Descriptions	Quality Data..... Yield	-2mics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	115.0	32.00		ovb	Overburden																
2	32.0	83.0	5.50	3.64	gfi	iron stained kaol gran	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3	37.5	77.5	6.50	1.67	gfk	fully kaolinised granite	33.20	82.50	80.10	6.60	80.90	6.00	63.70	64.30	26.80	0.65	0.26	0.12	0.38	96.00	4.00	880.00
4	44.0	71.0	6.00	1.11	gfk	fully kaolinised granite	23.70	74.30	74.60	7.20	75.00	6.90	55.10	53.50	30.80	1.10	0.24	0.22	0.46	97.00	1.00	625.00
5	50.0	65.0	1.00	1.05	gpk	partly kaolinised gran	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6	51.0	64.0	0.00		eoh	End of Drillhole																

ID:	CW7	Surf:	115.00
North :	6608	East :	6202

Drilled on the 30th November 1988 and logged by Sean Kennedy
Very deep overburden here consisting of calcrete underlain by col sands
Core recovery 100 percent
Granite the COARSE GRAINED variety becoming greyish with depth

North : 6599	East : 5399	Drilled on the 29th November 1988 by Thompson Drilling
File : dh008	Surface: 130.00	Overburden not cored but samples of chippings taken every 1 metre
		Core recovery 89.3 and overburden of calcrete and coloured sands
		Coarse grained granite in this borehole but iron stained at base
		Logged by Sean Kennedy and by Ian Wilson in Pittong December 1988

File Line Number	Strata Roof Depth	Elev.	Thickness Metres	Qualty. In Situ Ratio	Lithological Definitions Code	Descriptions	Quality Data..... Yield	-2mics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	130.0	32.10		ovb	Overburden																
2	32.1	97.9	0.30	66.87	gft	iron stained kaol gran	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3	32.4	97.6	11.70	1.67	gfk	fully kaolinised granite	27.90	85.30	78.60	12.70	80.40	11.40	61.90	64.80	26.30	0.81	0.31	0.04	0.16	98.00	2.00	2230.00
4	44.1	85.9	0.00		eoh	End of Drillhole																

D8

		Drilled on the 29th November 1988 by Thompson Drilling
ID: CW8	Surf: 130.00	Overburden not cored but samples of chippings taken every 1 metre
		Core recovery 89.3 and overburden of calcrete and coloured sands
North : 6599	East : 5399	Coarse grained granite in this borehole but iron stained at base
		Logged by Sean Kennedy and by Ian Wilson in Pittong December 1988

North :	5400	East :	5400
File :	dh009	Surface:	119.80

Drilled on the 25th November 1988 by Thompson Drilling of Adelaide
Drilling contractor David Wilson also a director of SAPC
Core recovery 82.9 and overburden of calcrete and coloured sands
Coarse grained globular quartz fully kaolinised granite
Heavily iron stained near the base of the hole

File Line Number	Strata Roof Depth	Elev.	Thickness Metres	Cumulv. In Situ Ratio	Lithological Definitions Code	Description	Quality Data..... Yield	-2mics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	119.8	11.70		ovb	Overburden																
2	11.7	108.1	7.00	1.04	gfk	fully kaolinised granite	19.20	75.50	87.40	6.10	89.40	4.50	62.70	65.40	21.80	0.58	0.63	0.05	0.22	98.00	2.00	2590.00
3	18.7	101.1	6.80	0.53	gfk	fully kaolinised granite	31.90	65.00	88.70	4.50	88.30	3.80	61.90	63.10	22.90	0.46	0.53	0.06	0.22	--	--	2820.00
4	25.5	94.3	5.80	0.37	gfk	fully kaolinised granite	24.10	80.40	87.40	4.90	87.80	4.40	59.20	59.60	31.70	0.80	0.37	0.05	0.39	97.00	3.00	2280.00
5	31.3	88.5	1.50	0.35	gpk	partly kaolinised gran	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6	32.8	87.0	0.00		eoh	End of Drillhole																

ID:	CW9	Surf:	119.80
North :	5400	East :	5400

Drilled on the 25th November 1988 by Thompson Drilling of Adelaide
Drilling contractor David Wilson also a director of SAPC
Core recovery 82.9 and overburden of calcrete and coloured sands
Coarse grained globular quartz fully kaolinised granite
Heavily iron stained near the base of the hole

			Drilled on the 27th November 1988 by Thompson Drilling
North :	4999	East : 5394	Logged by SK in the field and by Ian Wilson in Pittong 12 Dec 1988
			Core recovery 79.2 First hole drilled core barrel lost down hole4
File :	dh010	Surface: 119.70	Coarse grained granite

File Line Number	Strata Roof Depth	Elev.	Thick-ness Metres	Quality In Situ Ratio	Lithological Definitions Code	Descriptions	Quality Data..... Yield	-2mics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	119.7	9.70		ovb	Overburden																
2	9.7	110.0	0.40	15.16	gfi	iron stained kaol gran	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3	10.1	109.6	8.90	0.65	gfk	fully kaolinised granite	32.40	77.60	89.10	4.80	89.60	3.60	69.20	73.20	13.70	0.19	0.40	0.04	0.19	100.00	0.00	2900.00
4	19.0	100.7	1.30	0.57	gfi	iron stained kaol gran	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5	20.3	99.4	0.40		guk	unkaolinised granite																
6	20.7	99.0	0.00		eoh	End of Drillhole																

D10

			Drilled on the 27th November 1988 by Thompson Drilling
ID: CW10		Surf: 119.70	Logged by SK in the field and by Ian Wilson in Pittong 12 Dec 1988
			Core recovery 79.2 First hole drilled core barrel lost down hole4
North :	4999	East : 5394	Coarse grained granite

North : 5000	East : 5801
File : dh011	Surface: 113.40

Drilled on the 28th November 1988 by Thompson Drilling
Core recovery 79.6
COARSE GRAINED GRANITE from 10 to 19.7 and then fine grained to bottom
Logged by Sean Kennedy in field
Samples all air freighted to Cornwall for testing by Dave Blewett

File Line Number	Strata Roof Depth	Strata Roof Elev.	Thickness Metres	Cumltv. In Situ Ratio	Lithological Definitions Code	Descriptions	Quality Data..... Yield	-2mics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	113.4	10.00		ovb	Overburden																
2	10.0	103.4	0.50	12.50	gfk	fully kaolinised granite	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3	10.5	102.9	9.20	0.64	gfk	fully kaolinised granite	38.80	87.50	90.00	3.90	90.00	3.50	62.90	63.30	25.10	0.41	0.17	0.08	0.14	100.00	0.00	1480.00
4	19.7	93.7	5.90	0.40	gfk	fully kaolinised granite	23.00	78.00	83.90	7.30	85.00	6.10	53.50	52.50	22.70	1.20	0.97	0.17	0.50	99.00	1.00	1480.00
5	25.6	87.8	0.30	0.39	gpk	partly kaolinised gran	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6	25.9	87.5	0.00		eoh	End of Drillhole																

D11

ID: CW11	Surf: 113.40
North : 5000	East : 5801

Drilled on the 28th November 1988 by Thompson Drilling
Core recovery 79.6
COARSE GRAINED GRANITE from 10 to 19.7 and then fine grained to bottom
Logged by Sean Kennedy in field
Samples all air freighted to Cornwall for testing by Dave Blewett

North :	5000	East :	6200
File :	dh012	Surface:	112.90

Drilled on the 20th November 1988 and logged by Sean Kennedy
Core Recovery 94.3
Overburde calcrete and coloured clays
COARSE GRAINED GRANITE

File Line Number	Strata Roof Depth	Elev.	Thick-ness Metres	Cmplty. In Situ Ratio	Lithological Definitions Code	Descriptions	Quality Data..... Yield	-2mics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	112.9	11.50		ovb	Overburden																
2	11.5	101.4	6.90	1.04	gfk	fully kaolinised granite	39.00	2.00	89.40	4.30	89.60	3.80	64.50	67.60	26.00	0.46	0.30	0.11	0.32	99.00	0.10	2300.00
3	18.4	94.5	4.00	0.66	gfk	fully kaolinised granite	25.40	79.60	81.90	10.30	86.40	6.40	64.10	64.80	23.90	0.54	0.37	0.12	0.53	98.00	2.00	2200.00
4	22.4	90.5	3.40	0.50	gfl	iron stained kaol gran	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5	25.8	87.1	1.60	0.45	gpk	partly kaolinised gran	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6	27.4	85.5	0.00		eoh	End of Drillhole																

ID:	CW12	Surf:	112.90
North :	5000	East :	6200

Drilled on the 28th November 1988 and logged by Sean Kennedy
Core Recovery 94.3
Overburde calcrete and coloured clays
COARSE GRAINED GRANITE

D12

North : 4999	East : 4999	Drilled on the 27 Nov 88 and logged by Sean Kennedy in Streaky Bay
File : dh013	Surface: 121.00	Core recovery 49.1
		Overburden soil calcrete and red and brown sands
		Coarse grained granite type

File Line Number	Strata Roof Depth	Elev.	Thick-ness Metres	Cumltv. In Situ Ratio	Lithological Definitions Code	Description	Quality Data..... Yield	-2mics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	121.0	13.30		ovb	Overburden																
2	13.3	107.7	2.85	2.92	gfk	fully kaolinised granite	12.00	85.10	89.40	4.00	89.00	2.80	58.90	61.20	28.40	0.45	0.03	0.08	0.05	100.00	0.00	4450.00
3	16.1	104.8	0.00		eoh	End of Drillhole																

ID: CW13	Surf: 121.00	Drilled on the 27 Nov 88 and logged by Sean Kennedy in Streaky Bay
		Core recovery 49.1
North : 4999	East : 4999	Overburden soil calcrete and red and brown sands
		Coarse grained granite type

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North :	5400	East :	5000
File :	dh014	Surface:	131.40

Drilled on the 1st of December 1988 by Thompson Drilling
Logged by Sean Kennedy

File Line Number	Strata Roof Depth	Elev.	Thick-ness Metres	Cumltv. In Situ Ratio	Lithological Definitions Code	Descriptions	Quality Data..... Yield	-2mics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	131.4	22.20		ovb	Overburden																
2	22.2	109.2	4.40	3.15	gfk	fully kaolinised granite	32.80	88.50	87.80	5.00	87.90	4.80	72.10	72.90	13.70	0.27	0.40	0.06	0.52	100.00	0.00	1420.00
3	26.6	104.8	2.20	2.10	gpk	partly kaolinised gran	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4	28.8	102.6	0.00		eoh	End of Drillhole																

D14

ID:	CW14	Surf:	131.40
North :	5400	East :	5000

Drilled on the 1st of December 1988 by Thompson Drilling
Logged by Sean Kennedy

North :	5400	East :	6198
File :	dh015	Surface:	114.80

Drilled on the 2nd December 1988 and logged by Sean
Core recovery 92.2
Calcrete and coloured sands constituting overburden
Medium grained granite

File Line Number	Strata Roof Depth	Elev.	Thick-ness Metres	Cumlv. In Situ Ratio	Lithological Definitions Code	Description	Quality Data..... Yield	-2mics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	114.8	9.50		ovb	Overburden																
2	9.5	105.3	4.00	1.48	gfk	fully kaolinised granite	37.60	2.00	91.00	3.30	89.80	3.60	65.10	66.50	22.50	1.00	0.04	0.07	0.08	100.00	0.00	2310.00
3	13.5	101.3	4.50	0.70	gfk	fully kaolinised granite	37.30	79.30	90.50	3.60	89.50	3.20	65.30	67.60	18.60	0.79	0.03	0.08	0.05	100.00	0.00	2880.00
4	18.0	96.8	2.30	0.55	gfi	iron stained kaol gran	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5	20.3	94.5	2.10	0.46	gpk	partly kaolinised gran	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6	22.4	92.4	0.00		eoh	End of Drillhole																

D15

ID:	CW15	Surf:	114.80
North :	5400	East :	6198

Drilled on the 2nd December 1988 and logged by Sean
Core recovery 92.2
Calcrete and coloured sands constituting overburden
Medium grained granite

North : 4600	East : 5800
File : dh016	Surface: 112.00

Additional hole drilled to south in January 1989
Very hard calcrete so hole stopped at 7 metres
Need to drill deeper to confirm presence of kaolin

File Line Number	Strata Roof Depth	Strata Roof Elev.	Thick ness Metres	Quality In Situ Ratio	Lithological Definitions Code	Lithological Definitions Descriptions	Quality Data..... Yield	-2mics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	112.0	7.00		ovb	Overburden																
2	7.0	105.0	0.00		eoh	End of Drillhole																

D16

ID: CW16	Surf: 112.00
North : 4600	East : 5800

Additional hole drilled to south in January 1989
Very hard calcrete so hole stopped at 7 metres
Need to drill deeper to confirm presence of kaolin

North :	4600	East :	6700
File :	dh017	Surface:	112.00

Additional hole drilled in January 1989
Very hard matrix so hole stopped at 17.1 metres
Hole should have gone deeper to confirm presence of kaolin
Chippings collected from hole show very poor recovery
Inconclusive hole and important to perhaps re-drill to confirm kaolin

File Line Number	Strata Roof Depth	Strata Roof Elev.	Thickness Metres	Cumltv. In Situ Ratio	Lithological Definitions Code	Lithological Definitions Descriptions	Quality Data..... Yield	-2mics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	112.0	12.80		ovb	Overburden																
2	12.8	99.2	4.30	1.86	gpk	partly kaolinised gran	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	16.00
3	17.1	94.9	0.00		eoh	End of Drillhole																

ID: CW17		Surf:	112.00
North :	4600	East :	6200

Additional hole drilled in January 1989
Very hard matrix so hole stopped at 17.1 metres
Hole should have gone deeper to confirm presence of kaolin
Chippings collected from hole show very poor recovery
Inconclusive hole and important to perhaps re-drill to confirm kaolin

North :	6543J2	East :	01889
File :	dh001	Surface:	94.60

Drilled by Thompson Drilling Adelaide on the 12th December 1989
Logged by Sean Kennedy on the ground and by IRW
Core recovery 84.1% and drilled to 57.9metres depth
In vicinity of the KC5 hole drilled by Oilain and ex in Adelaide by IRW
Spare core held in Kaolin Australia at Pittong Victoria

File Line Number	Strata Roof Depth	Elev.	Thickness Metres	Cualty. In Situ Ratio	Lithological Definitions Code	Description	Quality Data..... Yield	-2mics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	94.6	19.50		ovb	Overburden																
2	19.5	75.1	5.50	2.22	gfk	fully kaolinised granite	31.20	80.20	89.90	4.10	89.90	3.90	66.20	68.60	18.30	0.31	0.42	0.11	0.30	--	--	1650.00
3	25.0	69.6	5.60	1.10	gfk	fully kaolinised granite	35.10	80.30	89.10	4.70	89.30	4.60	66.90	70.10	15.00	0.27	0.41	0.09	0.28	--	--	2000.00
4	30.6	64.0	6.80	0.68	gfk	fully kaolinised granite	32.20	77.50	74.40	15.50	77.40	13.10	64.90	68.40	13.70	0.55	0.41	0.09	0.26	--	--	1700.00
5	37.4	57.2	6.60	0.50	gfk	fully kaolinised granite	21.70	71.50	81.60	8.20	82.80	6.80	64.50	69.30	13.10	0.34	0.47	0.07	0.39	--	--	1400.00
6	44.0	50.6	7.40	0.38	gfk	fully kaolinised granite	18.30	71.50	84.10	6.30	84.20	6.10	64.90	69.10	11.10	0.28	0.51	0.05	0.44	--	--	1100.00
7	51.4	43.2	6.50	0.32	gpk	partly kaolinised gran	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
8	57.9	36.7	0.00		eoh	End of Drillhole																

ID:	KS 1	Surf:	94.60
North :	6543J2	East :	01889

Drilled by Thompson Drilling Adelaide on the 12th December 1989
Logged by Sean Kennedy on the ground and by IRW
Core recovery 84.1% and drilled to 57.9metres depth
In vicinity of the KC5 hole drilled by Oilain and ex in Adelaide by IRW
Spare core held in Kaolin Australia at Pittong Victoria

North :	65585	East :	81467
File :	dh002	Surface:	91.80

Drilled on the 13th December 1988 by Thompson Drilling
Logged by Sean Kennedy of Gilfillan
Core recovery 79.5% and drilled to 42.3 metres depth

File Line Number	Strata Roof Depth	Elev.	Thickness Metres	Cumltv. In Situ Ratio	Lithological Definitions Code	Description	Quality Data..... Yield	-2mics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	91.8	15.90		ovb	Overburden																
2	15.9	75.9	10.70	0.93	gfk	fully kaolinised granite	20.20	69.20	87.60	5.30	88.40	4.30	65.80	68.70	15.20	0.60	0.64	0.06	0.26	--	--	450.00
3	26.6	65.2	12.70	0.42	gfk	fully kaolinised granite	14.00	73.10	79.20	11.70	82.60	8.80	62.10	63.70	21.90	1.10	0.78	0.11	0.46	--	--	490.00
4	39.3	52.5	3.00		guk	unkaolinised granite																
5	42.3	49.5	0.00		eoh	End of Drillhole																

D19

ID: KS 2		Surf:	91.80
North :	65585	East :	81467

Drilled on the 13th December 1988 by Thompson Drilling
Logged by Sean Kennedy of Gilfillan
Core recovery 79.5% and drilled to 42.3 metres depth

S AUST KARCULTABY COATTING EVALUATION 89 05-11-1989 08:00:45

North : 65499	East : 822899	Drilling completed on the 13th December 1988
File : dh003	Surface: 98.90	Core recovery 53.8%
		Logged by Sean and drilled by Thompson Drilling
		No kaolinisation encountered in this hole

File / Line Number	Strata Roof Depth	Strata Roof Elev.	Thickness Metres	Cumlv. In Situ Ratio	Lithological Definitions Code	Lithological Definitions Descriptions	Quality Data..... Yield	-2mics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	98.9	6.00		ovb	Overburden																
2	6.0	92.9	3.30		guk	unkaolinised granite																
3	9.3	89.6	0.00		eoh	End of Drillhole																

ID: KS 3	Surf: 98.90	Drilling completed on the 13th December 1988
North : 65499	East : 877899	Core recovery 53.8%
		Logged by Sean and drilled by Thompson Drilling
		No kaolinisation encountered in this hole

S AUST KAOLIN/CLAY COATING EVALUATION 89 05-11-1989 08:01:06

North : 65035	East : 82269	Drilled on the 10th January 1989 and logged by Sean Kennedy Core recovery 76.81
File : dh004	Surface: 93.50	

File Line Number	Strata Roof Depth	Strata Roof Elev.	Thick-ness Metres	Cumltv. In Situ Ratio	Code	Lithological Definitions Descriptions	Quality Data..... Yield	-2mics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	Ti02	Mg0	K20	Kaolin	Mica	Cond
1	0.0	93.5	18.40		ovb	Overburden																
2	18.4	75.1	4.60	2.50	gfk	fully kaolinised granite	43.10	88.40	88.40	5.00	88.80	4.50	68.50	71.50	15.70	0.50	0.23	0.09	0.21	--	--	1330.00
3	23.0	70.5	4.90	1.21	gpk	partly kaolinised gran	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4	27.9	65.6	0.00		eoh	End of Drillhole																

D21

			Drilled on the 10th January 1989 and logged by Sean Kennedy
ID: KS 4		Surf: 93.50	Core recovery 76.81
North : 65035	East : 82269		

North : 65513	East : 81070	Drilled on the 10th January 1989 and logged by Sean Kennedy	
File : dh005	Surface: 93.20	Core recovery 86.9%	

File Line Number	Strata Roof Depth	Elev.	Thickness Metres	Cumltv. In Situ Ratio	Lithological Definitions Code	Descriptions	Quality Data..... Yield	+2mlcs	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	93.2	14.00		ovb	Overburden																
2	14.0	79.2	5.00	1.75	gfk	fully kaolinised granite	40.40	78.40	88.60	4.60	88.90	4.30	65.40	67.50	17.60	0.69	0.34	0.11	0.27	--	--	3000.00
3	19.0	74.2	4.10	0.96	gfk	fully kaolinised granite	43.30	81.10	84.30	6.40	85.80	5.50	64.10	67.30	16.40	0.00	0.21	0.12	0.28	--	--	2900.00
4	23.1	70.1	7.50	0.53	gfk	fully kaolinised granite	29.80	81.40	88.10	5.40	89.40	4.10	66.00	68.50	14.90	0.62	0.30	0.12	0.41	--	--	3200.00
5	30.6	62.6	1.00	0.50	gpk	partly kaolinised gran	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6	31.6	61.6	0.00		eoh	End of Drillhole																

ID: KS 5	Surf: 93.20	Drilled on the 10th January 1989 and logged by Sean Kennedy	
North : 65511	East : 81070	Core recovery 86.9%	

North : 65030 | East : 81889 | Drilled on the 11th January 1989 and logged by Sean Kennedy
File : dh006 | Surface: 94.10 | Core recovery 62.7%

File Line Number	Strata Roof Depth	Elev.	Thick-ness Metres	Cualty. In Situ Ratio	Code	Lithological Definitions Descriptions	Quality Data..... Yield	-2mics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	94.1	23.00		ovb	Overburden																
2	23.0	71.1	2.20	6.53	gfk	fully kaolinised granite	34.40	72.70	87.00	5.20	87.50	4.50	67.60	70.00	17.70	0.68	0.48	0.08	0.27	--	--	472.00
3	25.2	68.9	6.50	1.65	gfk	fully kaolinised granite	31.00	75.70	80.90	7.10	81.20	6.20	65.60	66.50	24.70	0.59	0.29	0.08	0.25	--	--	495.00
4	31.7	62.4	4.30	1.11	gpk	partly kaolinised gran	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5	36.0	58.1	0.00		eoh	End of Drillhole																

ID: KS 6 | Surf: 94.10 | Drilled on the 11th January 1989 and logged by Sean Kennedy
North : 65030 | East : 81889 | Core recovery 62.7%

North :	65502	East :	80660
File :	dh007	Surface:	93.00

Drilled on the 11th January 1989 and logged by Sean Kennedy
Core recovery 84.6%
Drilled by Thompson Drilling
Core remaining stored at Kaolin Australia in Pittong

File Line Number	Strata Roof Depth	Elev.	Thickness Metres	Quality In Situ Ratio	Lithological Definitions Code	Description	Quality Data..... Yield	-2mics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	93.0	15.80		ovb	Overburden																
2	15.8	77.2	6.20	1.59	gfk	fully kaolinised granite	42.20	83.10	85.60	6.10	85.60	5.80	68.00	71.80	15.30	0.30	0.30	0.08	0.17	--	--	990.00
3	22.0	71.0	5.00	0.88	gfk	fully kaolinised granite	20.60	83.90	77.40	11.60	78.50	11.30	67.30	67.10	17.90	1.20	0.46	0.11	0.44	--	--	750.00
4	27.0	66.0	0.50	0.04	gpk	partly kaolinised gran	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5	27.5	65.5	0.00		eoh	End of Drillhole																

ID:	K5 /	Surf:	93.00
North :	65502	East :	80660

Drilled on the 11th January 1989 and logged by Sean Kennedy
Core recovery 84.6%
Drilled by Thompson Drilling
Core remaining stored at Kaolin Australia in Pittong

S AUST KAOLIN/CLAY COATING EVALUATION 89 05-11-1989 08:02:56

North : 65420	East : 81860	This hole was drilled by a previous exploration programme
File : dh008	Surface: 94.00	The core was sampled from the Adelaide Department of Mines and Energy
		The hole was originally drilled by Thompson Drilling
		IRN sampled from rock store along with Ian Youles of S.A.P.C.
		Samples were tested by Dave Blewett in St. Austell

File Line Number	Strata Roof Depth	Elev.	Thick-ness Metres	Cualty. In Situ Ratio	Code	Descriptions	Quality Data..... Yield	-2mics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	94.0	20.00		ovb	Overburden																
2	20.0	74.0	10.00	1.25	gfk	fully kaolinised granite	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3	30.0	64.0	5.00	0.83	gfk	fully kaolinised granite	26.50	79.00	82.90	9.40	84.20	8.20	67.10	72.60	12.40	0.28	0.39	0.05	0.22	98.00	2.00	--
4	35.0	59.0	3.80	0.66	gfk	fully kaolinised granite	19.60	76.00	73.90	15.60	76.10	14.00	67.30	--	14.80	0.63	0.40	0.04	0.25	99.00	1.00	--
5	38.8	55.2	3.80	0.55	gfk	fully kaolinised granite	19.80	72.90	74.10	15.70	76.80	13.40	66.70	70.70	29.70	0.58	0.42	0.04	0.29	98.00	2.00	--
6	42.6	51.4	4.00	0.47	gfk	fully kaolinised granite	15.30	72.00	77.60	8.30	77.90	8.20	65.40	71.30	13.30	0.12	0.50	0.03	0.35	100.00	0.10	--
7	46.6	47.4	5.20	0.39	gfk	fully kaolinised granite	14.50	73.00	76.50	8.50	76.70	8.50	65.80	71.70	15.50	0.13	0.46	0.04	0.40	100.00	0.00	--
8	51.8	42.2	9.20	0.30	gfk	fully kaolinised granite	13.90	76.10	81.90	6.90	81.90	6.90	69.00	73.30	18.40	0.16	0.42	0.02	0.31	98.00	1.00	--
9	61.0	33.0	1.50	0.29	gpk	partly kaolinised gran	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10	62.5	31.5	0.00		eoh	End of Drillhole																

D25

ID: KC 5	Surf: 94.00	This hole was drilled by a previous exploration programme
		The core was sampled from the Adelaide Department of Mines and Energy
		The hole was originally drilled by Thompson Drilling
North : 65420	East : 81860	IRN sampled from rock store along with Ian Youles of S.A.P.C.
		Samples were tested by Dave Blewett in St. Austell

North :	2900	East :	3600
File :	dh001	Surface:	85.60

File Line Number	Strata Roof Depth	Elev.	Thick-ness Metres	Cumlty. In Situ Ratio	Lithological Definitions Code	Descriptions	Quality Data..... Yield	-2mics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	85.6	15.00		ovb	Overburden																
2	15.0	70.6	4.40	2.13	gfk	fully kaolinised granite	25.60	82.70	83.10	8.90	88.40	4.20	65.40	67.70	17.60	0.54	0.25	0.03	0.18	99.00	1.00	1220.00
3	19.4	66.2	5.60	0.94	gfi	iron stained kaol gran	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4	25.0	60.6	8.00	0.52	gpk	partly kaolinised gran	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5	33.0	52.6	0.40		guk	unkaolinised granite																
6	33.4	52.2	0.00		eoh	End of Drillhole																

ID: SI...		Surf:	85.60
North :	2900	East :	3600

North : 2900	East : 1700
File : dh002	Surface: 82.30

File Line Number	Strata Roof Depth	Strata Roof Elev.	Thickness Metres	Cumulv. In Situ Ratio	Lithological Definitions Code	Lithological Definitions Descriptions	Quality Data..... Yield	-2mics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	82.3	13.00		ovb	Overburden																
2	13.0	69.3	0.00		eoh	End of Drillhole																

ID: S2...	Surf: 82.30
North : 2900	East : 1700

North : 3300	East : 3600
File : dh003	Surface: 84.50

File Line Number	Strata Roof Depth	Strata Roof Elev.	Thickness Metres	Quality In Situ Ratio	Lithological Definitions Code	Lithological Definitions Descriptions	Quality Data..... Yield	-2mics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	84.5	15.80		ovb	Overburden																
2	15.8	68.7	4.00	2.47	gfk	fully kaolinised granite	35.50	76.00	87.60	5.30	89.00	3.90	58.90	60.60	24.90	0.56	0.27	0.17	0.35	97.00	3.00	2750.00
3	19.8	64.7	1.80	1.70	gfi	iron stained kaol gran	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4	21.6	62.9	3.60	1.05	gfk	fully kaolinised granite	42.00	87.00	88.60	4.90	90.20	3.30	60.20	61.30	22.70	0.71	0.17	0.15	0.35	100.00	0.10	2500.00
5	25.2	59.3	4.70	0.70	gfk	fully kaolinised granite	24.20	84.30	87.00	5.30	88.20	4.00	60.50	61.00	--	0.77	0.46	0.13	0.58	98.00	2.00	2100.00
6	29.9	54.6	2.50	0.59	gpk	partly kaolinised gran	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7	32.4	52.1	0.00		eoh	End of Drillhole																

10: 53...	Surf: 84.50
North : 3300	East : 3600

North : 2900	East : 3900
File : dh004	Surface: 83.20

File Line Number	Strata Roof Depth	Elev.	Thick-ness Metres	Cualty. In Situ Ratio	Code	Descriptions	Yield	-2mics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	YC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	83.2	13.70		ovb	Overburden																
2	13.7	69.5	5.30	1.62	gfk	fully kaolinised granite	23.10	81.90	82.20	8.20	85.30	6.80	61.10	64.50	19.60	0.52	0.26	0.13	0.48	97.00	3.00	2750.00
3	19.0	64.2	2.00	1.17	gfi	Iron stained kaol gran	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4	21.0	62.2	0.00		eoh	End of Drillhole																

ID: S4...	Surf: 83.20
North : 2900	East : 3900

North : 2500	East : 3600
File : dh005	Surface: 81.00

File Line Number	Strata Roof Depth	Elev.	Thick-ness Metres	Quality In Situ Ratio	Lithological Definitions Code	Descriptions	Quality Data..... Yield	-2mics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	81.0	9.00		ovb	Overburden																
2	9.0	72.0	0.50		guk	unkaolinised granite																
3	9.5	71.5	0.00		eoh	End of Drillhole																

ID: SS...	Surf: 81.00
North : 2500	East : 3600

North : 3700	East : 3600
File : dh006	Surface: 85.80

File Line Number	Strata Roof Depth	Strata Roof Elev.	Thickness Metres	Cualty. In Situ Ratio	Lithological Definitions Code	Lithological Definitions Descriptions	Quality Data..... Yield	-2mics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	85.8	16.80		ovb	Overburden																
2	16.8	69.0	0.70	15.00	gfi	iron stained kaol gran	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3	17.5	68.3	7.50	1.28	gfk	fully kaolinised granite	29.10	86.80	89.70	4.20	89.80	3.80	61.90	64.40	22.30	0.51	0.25	0.06	0.17	100.00	0.10	2430.00
4	25.0	60.8	4.40	0.83	gfk	fully kaolinised granite	27.00	84.90	87.20	5.00	86.90	4.70	61.90	64.40	24.50	0.72	0.14	0.07	0.27	100.00	--	2450.00
5	29.4	56.4	4.80	0.60	gfk	fully kaolinised granite	20.20	87.00	87.80	5.00	88.20	4.50	59.20	61.20	28.80	0.78	0.30	0.11	0.24	100.00	--	2150.00
6	34.2	51.6	2.40	0.53	gpk	partly kaolinised gran	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7	36.6	49.2	2.20		guk	unkaolinised granite																
8	38.8	47.0	0.00		eoh	End of Drillhole																

ID: S6...	Surf: 85.80
North : 3700	East : 3600

North :	8200	East :	2950
File :	dh007	Surface:	84.70

File Line Number	Strata Roof Depth	Elev.	Thick-ness Metres	Quality In Situ Ratio	Lithological Definitions Code	Descriptions	Quality Data..... Yield	-2mics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	Ti02	MgO	K20	Kaolin	Mica	Cond
1	0.0	84.7	7.00		ovb	Overburden																
2	7.0	77.7	10.10	0.43	gfi	Iron stained kaol gran	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3	17.1	67.6	0.00		eoh	End of Drillhole																

ID: H1...		Surf:	84.70
North :	8200	East :	2950

North :	7800	East :	2950
File :	dh008	Surface:	82.70

File Line Number	Strata Roof Depth	Elev.	Thick-ness Metres	Cumltv. In Situ Ratio	Lithological Definitions Code	Descriptions	Quality Data..... Yield	-2mics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	82.7	9.70		ovb	Overburden																
2	9.7	73.0	5.50	1.10	gfk	fully kaolinised granite	39.10	85.10	80.90	9.90	82.70	8.00	64.90	65.00	22.40	0.73	0.25	0.12	0.41	99.00	1.00	3200.00
3	15.2	67.5	7.60	0.46	gfk	fully kaolinised granite	35.70	84.50	74.50	9.30	75.50	8.80	60.20	61.10	24.90	0.59	0.28	0.15	0.37	97.00	3.00	3050.00
4	22.8	59.9	7.60	0.29	gfk	fully kaolinised granite	27.80	85.30	70.60	9.50	72.30	8.80	61.70	62.80	21.30	0.46	0.38	0.15	0.40	98.00	2.00	2300.00
5	30.4	52.3	8.00	0.21	gfk	fully kaolinised granite	17.20	82.70	72.20	9.60	72.70	9.40	58.70	59.90	25.70	0.62	0.46	0.13	0.59	97.00	3.00	2150.00
6	38.4	44.3	4.50		guk	unkaolinised granite																
7	42.9	39.8	0.00		eoh	End of Drillhole																

ID: M2...		Surf:	82.70
North :	7800	East :	2950

North : 8200	East : 2710
File : dh009	Surface: 82.40

File Line Number	Strata Roof Depth	Strata Roof Elev.	Thickness Metres	Quality In Situ Ratio	Lithological Definitions Code	Lithological Definitions Descriptions	Quality Data..... Yield	~2mics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	82.4	5.50		ovb	Overburden																
2	5.5	76.9	0.50		guk	unkaolinised granite																
3	6.0	76.4	0.00		eoh	End of Drillhole																

ID: N3...	Surf: 82.40
North : 8200	East : 2710

North : 8200	East : 3350
File : dh010	Surface: 81.20

File Line Number	Strata Roof Depth	Elev.	Thickness Metres	Cumltv. In Situ Ratio	Lithological Definitions Code	Descriptions	Quality Data..... Yield	-2mics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	81.2	8.80		ovb	Overburden																
2	8.8	72.4	4.70	1.17	gfk	fully kaolinised granite	24.90	72.90	78.40	10.40	80.70	9.50	50.00	--	22.30	1.50	0.21	0.70	0.92	96.00	4.00	2250.00
3	13.5	67.7	6.10	0.51	gfi	iron stained kaol gran	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4	19.6	61.6	0.00		eoh	End of Drillhole																

ID: M4...	Surf: 81.20
North : 8200	East : 3350

North :	8600	East :	2950
File :	dh011	Surface:	80.00

File Line Number	Strata Roof Depth	Strata Roof Elev.	Thickness Metres	Cumulv. In Situ Ratio	Lithological Definitions Code	Lithological Definitions Descriptions	Quality Data..... Yield	-2mics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	80.0	12.90		ovb	Overburden																
2	12.9	67.1	6.90	1.17	gfk	fully kaolinised granite	40.00	78.30	89.20	4.90	87.40	4.60	58.80	57.20	27.10	0.44	0.11	0.16	0.15	100.00	--	--
3	19.8	60.2	5.70	0.64	gfk	fully kaolinised granite	28.10	84.20	89.30	4.90	89.60	4.30	59.30	59.80	26.60	0.60	0.20	0.18	0.35	100.00	--	--
4	25.5	54.5	4.00	0.49	gpk	partly kaolinised gran	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5	29.5	50.5	0.00		eoh	End of Drillhole																

ID: MS...		Surf:	80.00
North :	8600	East :	2950

North :	8200	East :	3750
File :	dh012	Surface:	83.50

File Line Number	Strata Roof Depth	Elev.	Thickness Metres	Cumltv. In Situ Ratio	Lithological Definitions Code	Descriptions	Quality Data..... Yield	-2mics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	83.5	16.00		ovb	Overburden																
2	16.0	67.5	3.60	2.78	gfk	fully kaolinised granite	35.90	78.00	88.40	4.30	88.50	4.20	56.30	57.30	23.30	0.47	0.31	0.11	0.38	100.00	0.10	--
3	19.6	63.9	3.90	1.33	gfk	fully kaolinised granite	25.30	84.20	89.50	4.30	89.70	3.80	62.70	65.60	22.70	0.44	0.39	0.06	0.57	100.00	0.10	2800.00
4	23.5	60.0	0.00		eoh	End of Drillhole																

ID: HS...		Surf:	83.50
North :	8200	East :	3750

North : 5300	East : 1900
File : dh013	Surface: 78.40

File Line Number	Strata Roof Depth	Strata Roof Elev.	Thickness Metres	Cumltv. In Situ Ratio	Lithological Definitions Code	Descriptions	Quality Data..... Yield	-2aics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	78.4	10.30		ovb	Overburden																
2	10.3	68.1	1.30	4.95	gfk	fully kaolinised granite	11.00	75.30	84.70	6.20	85.30	5.90	58.00	61.70	23.70	0.64	0.51	0.11	0.39	100.00	--	2700.00
3	11.6	66.8	7.60	0.72	gfk	fully kaolinised granite	25.20	74.60	83.40	7.90	86.40	5.80	64.10	65.40	25.20	0.87	0.79	0.05	0.48	100.00	--	1640.00
4	19.2	59.2	7.20	0.40	gfk	fully kaolinised granite	29.80	76.40	79.20	8.40	79.60	8.20	57.80	59.30	25.20	0.98	0.32	0.19	0.45	100.00	--	2700.00
5	26.4	52.0	4.70	0.31	gfk	fully kaolinised granite	26.70	73.10	74.30	9.50	73.80	9.60	59.70	62.70	21.30	0.86	0.28	0.18	0.50	99.00	0.10	2600.00
6	31.1	47.3	7.80	0.23	gfk	fully kaolinised granite	25.70	81.30	69.40	9.90	70.00	9.60	58.00	60.60	26.60	0.55	0.27	0.10	0.23	100.00	--	2690.00
7	38.9	39.5	0.00		eoh	End of Drillhole																

ID: Wi...	Surf: 78.40
North : 5300	East : 1900

North :	4900	East :	1900
File : dh014		Surface:	79.10

File Line Number	Strata Roof Depth	Elev.	Thickness Metres	Cumltv. In Situ Ratio	Code	Lithological Definitions Descriptions	Quality Data..... Yield	~2micS	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	79.1	13.00		ovb	Overburden																
2	13.0	66.1	4.70	1.73	gfk	fully kaolinised granite	19.90	82.80	88.90	5.10	89.90	3.90	61.30	62.70	23.70	0.44	0.44	0.08	0.11	100.00	--	2150.00
3	17.7	61.4	5.90	0.77	gfk	fully kaolinised granite	19.40	84.90	90.20	3.90	90.30	2.90	59.90	63.80	26.80	0.40	0.60	0.11	0.28	99.00	0.10	1840.00
4	23.6	55.5	2.80	0.61	gfk	fully kaolinised granite	17.80	84.50	87.80	6.00	88.90	4.00	59.70	62.00	26.30	0.67	1.10	0.10	0.34	97.00	1.00	2000.00
5	26.4	52.7	2.00	0.53	gfk	fully kaolinised granite	16.00	78.80	73.00	16.20	75.90	14.10	57.80	58.50	21.70	1.30	0.83	0.06	0.27	100.00	--	1780.00
6	28.4	50.7	5.00	0.40	gfk	fully kaolinised granite	18.70	80.10	89.20	4.60	89.90	4.10	59.20	62.00	22.40	0.85	1.20	0.08	0.24	97.00	2.00	2700.00
7	33.4	45.7	6.00	0.31	gfk	fully kaolinised granite	18.20	79.70	71.50	14.60	72.60	13.80	60.80	63.30	21.60	1.50	0.68	0.06	0.18	99.00	0.10	2250.00
8	39.4	39.7	7.00	0.24	gfk	fully kaolinised granite	14.30	77.50	84.00	6.30	84.30	5.80	58.30	61.00	20.70	1.00	0.88	0.06	0.43	97.00	3.00	2100.00
9	46.4	32.7	7.60	0.20	gfk	fully kaolinised granite	11.90	79.20	82.00	6.00	81.90	5.60	58.70	60.30	23.20	0.82	0.70	0.09	0.34	98.00	2.00	1700.00
10	54.0	25.1	0.00		eoh	End of Drillhole																

ID: W2...		Surf:	79.10
North :	4900	East :	1900

North : 5300	East : 2300
File : dh015	Surface: 80.00

File Line Number	Strata Roof Depth	Strata Roof Elev.	Thickness Metres	Cumltv. In Situ Ratio	Lithological Definitions Code	Lithological Definitions Descriptions	Quality Data..... Yield	-2mics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	Ti02	MgO	K20	Kaolin	Mica	Cond
1	0.0	80.0	27.40		ovb	Overburden																
2	27.4	52.6	5.00	3.42	gfk	fully kaolinised granite	21.60	75.20	72.00	15.00	75.30	13.40	59.20	60.50	19.80	1.70	0.54	0.14	0.90	91.00	7.00	2600.00
3	32.4	47.6	9.00	1.22	gfk	fully kaolinised granite	15.80	72.30	65.50	19.40	67.10	18.60	60.20	61.50	19.10	1.70	0.51	0.15	0.86	97.00	2.00	2700.00
4	41.4	38.6	4.00	0.95	gfk	fully kaolinised granite	12.20	71.80	77.50	9.80	79.00	8.40	58.30	58.30	19.70	1.40	1.20	0.15	1.30	87.00	10.00	2800.00
5	45.4	34.6	6.00	0.71	gfk	fully kaolinised granite	10.90	69.60	79.20	8.40	79.90	7.40	56.80	58.70	20.30	1.40	1.40	0.14	1.30	90.00	5.00	2450.00
6	51.4	28.6	0.00		eoh	End of Drillhole																

ID: W3...	Surf: 80.00
North : 5300	East : 2300

North : 5300	East : 1500
File : dh016	Surface: 79.10

File Line Number	Strata Roof Depth	Elev.	Thick-ness Metres	Cualtv. In Situ Ratio	Lithological Definitions Code	Descriptions	Quality Data..... Yield	-2aics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K20	Kaolin	Mica	Cond
1	0.0	79.1	9.50		ovb	Overburden																
2	9.5	69.6	7.80	0.76	gfk	fully kaolinised granite	27.10	85.90	90.20	4.10	90.60	3.10	62.10	63.40	30.50	0.60	0.42	0.09	0.18	100.00	---	2700.00
3	17.3	61.8	0.00		eoh	End of Drillhole																

ID: W4...	Surf: 79.10
North : 5300	East : 1500

North : 4500	East : 1900
File : dh017	Surface: 75.60

File Line Number	Strata Roof Depth	Elev.	Thickness Metres	Cumltv. In Situ Ratio	Lithological Definitions Code	Descriptions	Quality Data..... Yield	-2mics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Kica	Cond
1	0.0	75.6	25.80		ovb	Overburden																
2	25.8	49.8	0.00		ovb	Overburden																
3	25.8	49.8	3.40	4.74	gfi	Iron stained kaol gran	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4	29.2	46.4	12.00	1.05	gfi	Iron stained kaol gran	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5	41.2	34.4	1.00	0.98	gfi	Iron stained kaol gran	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6	42.2	33.4	0.00		eoh	End of Drillhole																

ID: WS...	Surf: 75.60
North : 4500	East : 1900

North : 4900	East : 1500
File : dh018	Surface: 84.20

File Line Number	Strata Roof Depth	Strata Roof Elev.	Thickness Metres	Cumltv. In Situ Ratio	Lithological Definitions Code	Lithological Definitions Descriptions	Quality Data..... Yield	-2mics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	84.2	5.00		ovb	Overburden																
2	5.0	79.2	2.00		guk	unkaolinised granite																
3	7.0	77.2	0.00		eoh	End of Drillhole																

ID: W6...	Surf: 84.20
North : 4900	East : 1500

North : 4900	East : 5350
File : dh019	Surface: 90.10

File Line Number	Strata Roof Depth	Strata Roof Elev.	Thickness Metres	Cualty. In Situ Ratio	Lithological Definitions Code	Lithological Definitions Descriptions	Quality Data..... Yield	-2mics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	90.1	9.40		ovb	Overburden																
2	9.4	80.7	7.00	0.84	gfk	fully kaolinised granite	22.50	80.20	88.10	5.30	89.20	4.40	61.50	63.80	24.90	0.70	0.59	0.10	0.33	100.00	--	2500.00
3	16.4	73.7	9.70	0.35	gfk	fully kaolinised granite	32.60	79.50	86.30	5.90	87.20	5.00	60.60	62.20	33.40	0.80	0.38	0.16	0.46	99.00	0.10	3280.00
4	26.1	64.0	6.00	0.26	gfk	fully kaolinised granite	24.60	82.20	83.30	7.70	85.50	5.50	57.90	58.30	23.40	1.20	0.40	0.22	0.73	97.00	3.00	2620.00
5	32.1	58.0	0.00		eoh	End of Drillhole																

ID: El...	Surf: 90.10
North : 4900	East : 5350

North : 5300	East : 5350
File : dh020	Surface: 90.30

File Line Number	Strata Roof Depth	Elev.	Thickness Metres	Cualty. In Situ Ratio	Lithological Definitions Code	Descriptions	Quality Data..... Yield	-2mics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	90.3	8.70		ovb	Overburden																
2	8.2	82.1	11.50	0.45	gfk	fully kaolinised granite	24.00	81.30	84.50	7.20	88.00	4.60	61.20	62.70	31.90	0.66	0.41	0.07	0.28	100.00	--	2350.00
3	19.7	70.6	9.00	0.25	gfk	fully kaolinised granite	15.50	83.60	88.20	4.90	88.60	3.90	61.70	62.70	25.40	0.81	0.40	0.06	0.23	99.00	1.00	1700.00
4	28.7	61.6	0.00		eoh	End of Drillhole																

ID: E2...	Surf: 90.30
North : 5300	East : 5350

North : 4900	East : 5700
File : dh021	Surface: 90.30

File Line Number	Strata Roof Depth	Elev.	Thick-ness Metres	Cuality In Situ Ratio	Code	Descriptions	Quality Data..... Yield	-2mics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	90.3	18.50		ovb	Overburden																
2	18.5	71.8	1.30	8.89	gfk	fully kaolinised granite	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3	19.8	70.5	7.00	1.39	gfk	fully kaolinised granite	24.40	61.90	88.60	4.80	88.80	4.30	63.50	65.50	18.40	0.69	0.50	0.10	0.42	100.00	0.10	3100.00
4	26.8	63.5	8.40	0.69	gfk	fully kaolinised granite	20.80	70.90	85.80	6.40	86.70	5.30	61.30	63.30	16.30	0.95	0.75	0.08	0.51	99.00	1.00	3630.00
5	35.2	55.1	5.50	0.52	gfk	fully kaolinised granite	24.50	66.90	76.20	8.80	76.50	8.20	61.70	63.40	17.20	1.10	0.58	0.05	0.68	99.00	0.10	2700.00
6	40.7	49.6	0.00		eoh	End of Drillhole																

ID: E3...	Surf: 90.30
North : 4900	East : 5700

North : 5300	East : 5700
File : dh022	Surface: 91.00

File Line Number	Strata Roof Depth	Elev.	Thick-ness Metres	Quality In Situ Ratio	Code	Lithological Definitions Descriptions	Quality Data..... Yield	-2mics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	91.0	14.60		ovb	Overburden																
2	14.6	76.4	2.70	3.38	gfi	iron stained kaol gran	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3	17.3	73.7	5.30	1.14	gfk	fully kaolinised granite	22.10	81.80	85.80	5.80	87.10	4.60	58.10	60.70	23.60	0.83	0.31	0.16	0.59	99.00	1.00	1700.00
4	22.6	68.4	4.40	0.74	gfk	fully kaolinised granite	16.70	77.80	85.30	5.70	86.40	4.50	61.30	62.20	23.80	1.70	0.53	0.08	0.44	98.00	1.00	2000.00
5	27.0	64.0	3.60		gnk	unkaolinised granite																
6	30.6	60.4	0.00		eoh	End of Drillhole																

ID: E4...	Surf: 91.00
North : 5300	East : 5700

North : 4900	East : 6150
File : dh023	Surface: 89.00

File Line Number	Strata Roof Depth	Strata Roof Elev.	Thickness Metres	Cumltv. In Situ Ratio	Lithological Definitions Code	Lithological Definitions Descriptions	Quality Data..... Yield	-2mics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	89.0	32.50		ovb	Overburden																
2	32.5	56.5	7.00	2.90	gfk	fully kaolinised granite	18.40	73.90	64.90	21.90	67.10	19.90	50.00	--	30.40	2.10	0.40	0.42	1.00	100.00	--	1790.00
3	39.5	49.5	6.00	1.56	gfk	fully kaolinised granite	9.20	77.30	76.20	12.60	77.50	11.30	53.10	49.60	29.70	1.90	0.65	0.27	0.85	91.00	3.00	1500.00
4	45.5	43.5	0.00		eoh	End of Drillhole																

ID: E5...	Surf: 89.00
North : 4900	East : 6150

North : 4500	East : 5700
File : dh024	Surface: 86.60

File Line Number	Strata Roof Depth	Strata Roof Elev.	Thickness Metres	Cualty. In Situ Ratio	Lithological Definitions Code	Lithological Definitions Descriptions	Quality Data..... Yield	-2aics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	86.6	11.00		ovb	Overburden																
2	11.0	75.6	4.40	1.56	gfi	iron stained kaol gran	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3	15.4	71.2	3.30	0.89	gfk	fully kaolinised granite	35.20	85.70	86.50	6.30	87.70	4.70	61.00	63.30	24.60	0.44	0.41	0.10	0.32	99.00	1.00	2790.00
4	18.7	67.9	6.50	0.48	gfk	fully kaolinised granite	32.00	75.50	89.90	4.10	90.20	2.90	59.70	62.50	23.50	0.67	0.32	0.06	0.26	99.00	0.10	2800.00
5	25.2	61.4	9.00	0.30	gfk	fully kaolinised granite	26.90	81.20	85.20	8.10	90.50	3.40	61.70	64.40	24.10	0.71	0.38	0.08	0.24	100.00	0.10	2500.00
6	34.2	52.4	5.50	0.24	gfk	fully kaolinised granite	23.30	83.50	76.20	15.10	80.30	11.70	61.20	63.00	29.80	0.91	0.12	0.10	0.29	100.00	0.10	2300.00
7	39.7	46.9	0.00		eoh	End of Drillhole																

ID: E6...	Surf: 86.60
North : 4500	East : 5700

North :	5300	East :	6150
File :	dh025	Surface:	86.60

File Line Number	Strata Roof Depth	Elev.	Thick-ness Metres	Cumltv. In Situ Ratio	Lithological Definitions Code	Descriptions	Quality Data..... Yield	-2wics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	86.6	15.60		ovb	Overburden																
2	15.6	71.0	1.00	9.75	gfk	fully kaolinised granite	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3	16.6	70.0	11.00	0.81	gfk	fully kaolinised granite	25.50	74.90	86.80	5.50	86.80	5.10	62.70	64.30	23.90	0.76	0.62	0.15	0.54	98.00	2.00	2700.00
4	27.6	59.0	5.40	0.56	gfk	fully kaolinised granite	29.20	88.90	78.40	8.00	78.90	7.60	63.70	64.70	21.30	0.79	0.71	0.11	0.66	96.00	3.00	2800.00
5	33.0	53.6	6.60	0.41	gfk	fully kaolinised granite	24.70	73.70	75.70	8.40	75.70	8.10	61.50	61.20	20.00	0.93	0.57	0.21	0.69	97.00	3.00	1820.00
6	39.6	47.0	0.00		eoh	End of Drillhole																

TO: E7...		Surf:	86.60
North :	5300	East :	6150

North : 5600	East : 5700
File : dh026	Surface: 90.00

File Line Number	Strata Roof Depth	Strata Roof Elev.	Thickness Metres	Cumltv. In Situ Ratio	Lithological Definitions Code	Lithological Definitions Descriptions	Quality Data..... Yield	-2mics	ISO'A'	Yel'A'	ISO'B'	Yel'B'	Flow	VC	SfArea	Iron	TiO2	MgO	K2O	Kaolin	Mica	Cond
1	0.0	90.0	27.30		ovb	Overburden																
2	27.3	62.7	6.30	2.71	gfi	iron stained kaol gran	25.20	74.50	56.70	22.30	59.50	22.20	62.70	64.70	27.80	2.20	0.96	0.13	0.63	96.00	4.00	1800.00
3	33.6	56.4	9.10	1.11	gfk	fully kaolinised granite	22.00	74.40	78.50	7.40	78.90	6.90	64.10	63.90	28.20	0.92	1.10	0.09	0.60	96.00	4.00	2000.00
4	42.7	47.3	0.90	1.05	gpk	partly kaolinised gran	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5	43.6	46.4	0.00		eoh	End of Drillhole																

ID: E8...	Surf: 90.00
North : 5600	East : 5700

APPENDIX E
LOGS OF WATER BORES INTERSECTING KAOLIN

5832-26

0-1m	Brown soil
1-7	Travertine limestone & sand
7-8	Laterite rubble
8-19	Yellow sand - mainly fine-clayey in parts
19-48	Cream sand - mainly fine, occasional coarse grain
48-62	White pipe clay and grey quartz - decomposed granite
62-63	Solid granite - pinkish quartz & feldspar - some biotite
EOH 63m	

5832-53

0-1m	Brown sandy soil
1-6	Buff fine grained dense nodular limestone
6-22	Light brown fine sand with fragments of limestone
22-33	Cream fine sand
33-47	Pink, fine-medium grained sand
63-68	Light grey fine sand & silt
68-73	Light grey fine sand with abundant angular quartz grit
73-79	Greyish brown clayey fine sand & silt with angular quartz grit
79-90	White gritty clay
EOH 90m	

5832-59

0-1m	Deep red brown ochreous sandy clay surface soil
1-2	Loam & travertine limestone
2-5	Cream calcareous sand & clay - aeolianite
5-7	Pale grey, mixed fine quartz sand & clay
7-20	Pale yellow fine quartz sand - some clay & quartz grit
20-22	Fine yellow quartz sand & abundant quartz grit
22-39	Off-white kaolin clay & quartz grit
39-50	White kaolin & quartz grit (granite bedrock)
EOH 50m	

5832-76

0-1m	Brown soil
1-4	Light brown sandy limestone
4-12	Cream sandy limestone
12-17	Yellow-buff very sandy marl
17-21	Cream gritty clayey sand
21-35	Yellow clayey grit
35-49	White kaolin & quartz
49-50	Grey granite
EOH 50m	

5832-79

0-1	Brown clay
1-5	Travertine limestone
5-7	Pale pink calcareous sand
7-16	Pale brown fine siliceous sand
16-20	Fine yellow siliceous sand & quartz grit
20-51	White kaolin clay & quartz grit (decomposed granite)
51-52	White clay & quartz (drillers log)
EOH 52m	

5832-82

0-0.3m	Brown soil
0.3-1	Massive travertine
1-7	White sand and travertine
7-10	Fine yellow sand
10-12	Fine yellow sand & some gravel
12-17	Yellow clayey sand
17-20	Reddish sandy clay
20-24	Red clayey sand
24-25	Yellow sand - some grit
25-53	White gritty pipe clay
53-55	Pipe clay & quartz - decomposed granite
55-55.3	Solid brown granite
EOH 55.3m	

5832-83

0-0.3m	Loam & limestone rubble
0.3-3	Soft limestone
3-13	Yellow, sandy clay & sandstone
13-36	Sandy clay & quartz gravel & sandstone
36-37	Sand
37-41	Sand & sandstone
41-42	Sand & gravel
42-43	Gravel
43-49	White clay & quartz gravel
EOH 49m	

5832-84

0-1m	Travertine & clay
1-5	Yellow clay
5-10	Yellow sand - some clay
10-15	Red clay
15-28	Yellow clayey sand
28-30	Yellowish sandstone
30-37	Yellow sand - some clay
37-38	Grey quartz gravel (fine)
38-46	Decomposed granite - grey quartz & kaolin
EOH 46m	

5832-85

0-5m	Pale pink limestone
5-11	Pinkish - yellow sandy - clayey limestone
11-13	Yellow brown slightly calcareous sandy clay
13-14	Yellow - pink sandy limestone - hard
14-19	Yellow- pink sandy limestone - soft
19-23	Yellow & grey sandy limestone - soft
23-24	Pink medium grained sandstone, slightly calcareous
24-27	Yellow - pink medium grained sandstone, some grit, calcareous
27-30	Yellow calcareous clayey grit
30-60	White kaolin & quartz angular fragments. Abundant highly weathered feldspars. Probably a decomposed acid igneous rock
EOH 60m	

5832-86

0-6m	Limestone
6-8	Buff sandy clay
8-15	Yellow sandy clay
15-22	Buff sandy clay
22-24	Bright brown clay
24-27	Yellow clay & few quartz
27-43	Cream clay
43-51	White clay
51-58	White clay & coarse quartz grains
EOH 58m	

5832-89

0-5	Light brown calcareous sand, slightly clayey & containing fragments of travertine
5-12	Light brown clayey calcareous sand with fragments of limestone
12-17	Light brown, fine calcareous sandstone with limestone grit
17-27	Red brown fine grained calcareous sandstone with shell fragments, quartz grit & some lateritic grains
27-43	Light brown clayey sand with abundant sub-angular quartz grains
43-50	White & light brown clay with some sand & abundant quartz grit
50-57	White clay with grey quartz & fragments of strongly weathered granite
EOH 57m	

5832-90

0-2	Pale brown soil & kunkar
2-5	Pale brown lime sand
5-7	Red brown & pale brown limy clay
7-11	Yellow fine grained sand
11-19	Reddish brown slightly clayey sand
19-37	Cream clay with angular quartz, white clay & dark minerals. (weathered granite)
37-38	Decomposed granite
EOH 38m	

5832-91

0-5	Cream sandy limestone
5-9	Light buff sandy marl
9-16	Light yellow brown sandy marl
16-18	Cream sandstone - quartzite
18-22	Cream sandstone
22-43	White kaolin & quartz - decomposed granite
EOH 43m	

5832-108

0-4	Dirty grey limestone rubble
4-14	Light yellow brown sandy clay
14-20	Buff grit & sandy clay
20-30	Pinkish clay with quartz grains
30-37	White kaolin & quartz
37-40	Yellow clay & quartz
40-55	White kaolin & quartz
55-59	Yellow kaolin & quartz
59-60	Pink & grey granite
EOH 60m	

5832-109

0-1	Grey soil and travertine boulders
1-2	Creamy grey slightly sandy limestone
2-3	Creamy grey limestone clay with brown sandy nodules
3-4	Varicoloured (cream & brown) sandy limestone clay
4-7	Red brown fine clayey sand
7-13	Brown (reddish) fine clayey sand
13-16	Reddish brown clayey sand with some fine gravel
16-24	Buff-coloured very gritty clay with hard layers, becoming darker at depth
24-31	Off-white kaolin with numerous smoky quartz grains
31-32	No sample - clay & gravel (drillers log)
32-33	Grey granite
EOH 33m	

5832-123

0-0.5	Brown micaceous sandy soil with travertine boulders
0.5-3	Creamy grey limestone
3-7	Varicoloured (cream & dark brown) gritty limestone clay
7-10	Red sandy clay with some fine gravel
10-14	Orange calcareous sandstone (fine)
14-20	Fine yellow sandstone
20-39	White & yellowish kaolin with quartz grains
39-40	granite
EOH 40m	

5832-124

0-2m	Travertine limestone
2-5	Yellow-brown calcareous clay
5-13	Fine white siliceous sand
13-24	Fine yellow siliceous sand & grit
24-27	Bright yellow fine siliceous sand
27-29	White kaolin clay
29-47	White kaolin clay & quartz grit - decomposed granite
EOH 47m	

5832-126

0-0.3m	Brown soil
0.3-5	Pinkish cream sandy limestone
5-13	Yellow - cream sandy limestone
13-17	Yellow brown stiff sandy marl
17-18	Brown red clayey sandstone
18-25	Yellow grey quartz grit (granitic?)
25-27	Cream clayey sand
27-30	Buff pink clayey medium grained sandstone
30-35	Yellow brown grit & clayey sand
35-45	Dirty white kaolin
45-46	White to pink sand & granite
EOH 46m	

5832-128

0-6m	No sample - limestone (drillers log)
6-20	Reddish brown fine clayey sand or sandy clay
20-38	" " with greenish brown lumps
38-43	Dark red purple brown clayey sand with fine quartz & ironstone gravel
43-57	White clay with quartz grains
57-60	Orange grey & brown coarse quartz sand with limonite rock & feldspar fragments
EOH 60m	

5832-154

0-6	Travertine limestone
6-15	Yellow-brown fine siliceous sand
15-27	Bright yellow fine siliceous sand
27-37	Yellow brown fine siliceous sand & lateritic ironstone concretions
37-53	White kaolin clay with quartz grit - decomposed granite
53-61	Pink kaolin clay with abundant quartz grit
61-66	Pale pink kaolin clay with abundant quartz grit
66-67	Quartz rich granite - hard bedrock
EOH 67m	

5832-159

0-1m	Soil
1-3	Cream limestone
3-10	Buff gritty marl
10-13	Ferruginous sandstone
13-33	White kaolin & quartz
33-43	Decomposed grey granite
EOH 43m	

5832-160

0-23m	No samples
23-43	White kaolin & quartz
43-44	Light grey clay & quartz - decomposed granite
EOH 44m	

5832-163

0-4m	Dirty grey limestone
4-7	Light brown sandy clay
7-14	Cream clayey sandy coarse grit
14-15	White to cream fine and coarse sand (beach sand)
15-20.7	White kaolin & quartz
20.7-21	Light grey granite
EOH 21m	

5832-164

0-2m	Clay
2-7	Clay, ironstone gravel
7-10	Sandstone
10-23	Sand
23-26	Sandy quartz
26-37	White clay & quartz gravel
37-55	Quartz gravel with clay
55-57	Sample missing
EOH 57m	

5832-165

0-1m	Brown soil
1-4	Calcareous clay & limestone
4-7	Brown sandy clay - calcareous
7-11	Fine brown siliceous sand & clay
11-13	Fine yellow siliceous sand & quartz grit
13-43	White kaolin clay & quartz grit
43-51	Fine quartz & kaolin clay
51-52	Quartz rubble - very little clay
52	Granite - no sample
EOH 52m	

5832-168

0-7m	Travertine limestone
7-20	Brown calcareous clay & sand
20-35	Brown clay - slightly calcareous
35-59	White kaolin clay
EOH 59m	

5832-175

0-30m	No samples - existing well
30-35	Cream sandstone
35-36	Very coarse angular quartz in kaolin - decomposed granite
EOH 36m	

5832-176

0-23m	No sample
23-30	Sand
30-33	White clay & abundant fine quartz
EOH 33m	

APPENDIX F
DRILLHOLE LOGS FOR BS1, BS2 & BS5

DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA
MINERAL RESOURCES DIVISION

LOG OF CALWELD DRILLHOLE

PROJECT: INKSTER KAOLIN — HOLE No: BS 1

LOCATION: Carey's Well Deposit — ELEV: — REFERENCE No:

AGE	UNIT	CORE DESCRIPTION	LOG	DEPTH (m)	CORE LOSS	CASING	ANALYSES
		Top of hole 0 - 11.8m not logged (refer hole BS 2)		11			
PROTEROZOIC	HILTABA SUITE	KAOLINIZED GRANITE:White, soft moist with coarse quartz 2-10mm diam. approx. 20%. Slickensided clay surfaces (micaceous texture in part). Very minor pale o/b Fe patches 0.5-1mm diam.		12 13			
		KAOLINIZED GRANITE:White, soft minor very pale orange patches. Kaolin micaceous in part. Quartz approx. 25%. coarse grained.		14			SEM # 2259, 2262 (13.8m)
		KAOLINIZED GRANITE:White, soft minor Fe staining. Possible white mica or coarse kaolinite. Quartz grey-white approx. 15%.		15 16			
		KAOLINIZED GRANITE:As above but larger Fe patches.					SEM # 2257 (16.5m)
		KAOLINIZED GRANITE:White with orange Fe patches 5-10mm across approx. 20% of sample. White sandy patches possibly remnant feldspar.		17			
		KAOLINIZED GRANITE:White kaolin with pervasive orange Fe staining. Crumbly grains of partly weathered feldspar. Coarse quartz.		18			SEM # 2255 (18.5m)
		GRANITE:Moderate - very weathered. Clayey with red brown feldspar pitted.		19			
		END OF HOLE 19.5m		20			

REMARKS:
Best kaolin 11.8 - 16.1m

LOCATION PLAN No:
CO-ORDINATES:
DRILLED BY:
DATE: 10 - 12 Dec. 1991
INCLINATION:
DRILL No:
AZIMUTH:
LOGGED BY: G. Ferris/ J. Keeling
DATE:
SHEET 1 OF 1
PLAN No: 92-291

5584

DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA
MINERAL RESOURCES DIVISION

LOG OF CALWELD DRILLHOLE

PROJECT: INKSTER KAOLIN HOLE No: BS 2

LOCATION: Carey's Well Deposit ELEV: REFERENCE No:

AGE	UNIT	CORE DESCRIPTION	LOG	DEPTH (m)	CORE LOSS	CASING	ANALYSES
PLEISTOCENE - HOLOCENE		SAND:Very fine - fine, very silty, calcareous brown.		1			
	BRIDGEWATER FORMATION	SILT:Pale orange brown to pale brown, calcareous. Minor soft nodules with calcareous pisolites. Calcrete bands.		2 3			
		CLAY:Moderate silty, pale brown. Patches with rounded calcarenite clasts 2-20mm diam.		4			
		SILT:Calcareous with minor calcrete and SAND very fine - fine,quartz. Patches of white alunite in gypsum? sand at 5.0m.		5			
TERTIARY ?		SAND:Very fine - fine, very CLAYEY orange brown to red brown, mod. plastic.		6 7			
		SAND:Very fine - fine, very SILTY, slightly CLAYEY, orange brown with yellow brown and red brown patches, moist.		8			
		SANDSTONE:Silcreted. SAND:Coarse - very coarse in matrix of fine sand. Mod.- w. cement.		9			
		SAND:Very fine and very coarse and GRAVEL:Fine, subangular to rounded 1-8mm, white to pale grey in fine silty sand.		10			

REMARKS:

LOCATION PLAN No: CO-ORDINATES:

DRILLED BY:

DATE: 10 - 12 Dec. 1991 INCLINATION:

DRILL No: AZIMUTH:

LOGGED BY: G. Ferris/ J. Keeling DATE:

SHEET 1 OF 2 PLAN No: 92-292a

5584

DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA
MINERAL RESOURCES DIVISION

LOG OF CALWELD DRILLHOLE

PROJECT: INKSTER KAOLIN HOLE No: BS 2

LOCATION: Carey's Well Deposit ELEV: REFERENCE No:

AGE	UNIT	CORE DESCRIPTION	LOG	DEPTH (m)	CORE LOSS	CASING	ANALYSES
TERTIARY		GRAVEL:Fine 3-9mm, 30%. SAND:Coarse - very coarse 40%. SAND:Very fine - fine, 30%. GRUSS - weathered granite.					
		SAND:Very fine - very coarse, GRAVEL:Fine, indurated in part by hard clay matrix. Coarse sand 40-50%		11			
PROTEROZOIC	HILTABA SUITE	KAOLINIZED GRANITE:Indurated and partly iron stained to 12.2m. Trace of silver-white mica.		12			
		KAOLINIZED GRANITE:White, moderately hard with coarse quartz to 12mm.		13			
		KAOLINIZED GRANITE:White, soft friable. Coarse quartz, white and grey to 8mm diameter, fractured approx. 25%. Very minor spots of yellow-brown Fe oxide.		14			
		KAOLINIZED GRANITE:As above with minor Fe patches to 1mm. diameter. Slickensided clay surfaces.		15			
		KAOLINIZED GRANITE:White, soft and friable, moist. Kaolin breaks with a ragged felted texture.		16 17			
		KAOLINIZED GRANITE:White to very pale orange. Coarse quartz is very friable.		18 19			
		KAOLINIZED GRANITE:Yellow brown to orange brown, friable quartz.					
		END OF HOLE 19.5m		20			

REMARKS:

Best kaolin 12.6m - 19.1m

LOCATION PLAN No: CO-ORDINATES:

DRILLED BY:

DATE: 10 - 12 Dec. 1991 INCLINATION:

DRILL No: AZIMUTH:

LOGGED BY: G. Ferris/ J. Keeling DATE:

SHEET 2 OF 2 PLAN No: 92-292b

5584

DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA
MINERAL RESOURCES DIVISION

LOG OF CALWELD DRILLHOLE

PROJECT: INKSTER KAOLIN — HOLE No: BS 5

LOCATION: Carey's Well Deposit — ELEV: — REFERENCE No:

AGE	UNIT	CORE DESCRIPTION	DEPTH (m)	ANALYSES
PLEISTOCENE - HOLOCENE		SAND:Very fine - fine, very silty calcareous, brown.		
	BRIDGEWATER FMN. ?	SAND:Very fine - fine, moderately silty orange brown, calcareous. Minor fine quartz sand and ironstone fragments.	1 2 3	
		SAND:Very fine - fine, moderately silty and clayey with calcrete. Moist below 3.8m.	4	
		CLAY:Moderately SILTY (gypsum) with patches of very pale yellow ALUNITE/KAOLIN.	-	SEM # 2256
		CLAY:Moderate plastic red brown.	5 6	
		CLAY:Moderately SANDY.		
TERTIARY ?		SAND:Very fine - coarse moderately SILTY, slightly CLAYEY orange brown, with hard orange brown to red brown pisolites (3-15mm diam.). Subrounded to well rounded.	7	
		SAND:V. fine and v. coarse bimodal with silcrete layers.		
		SAND:Fine - medium and very coarse bimodal 30-40% coarse grains 1-3mm diam. subangular to subrounded, opaque white to pale grey. Silcrete fragments.	8 9	
PROT.	HILTABA	SILCRETE		
		KAOLIN:White, hard and indurated. Coarse quartz. 25mm wide band sandy kaolin.	10	T/S - Sandy band cutting kaolinized granite (9.5m)

REMARKS:

LOCATION PLAN No: — CO-ORDINATES:

DRILLED BY:

DATE: 10 - 12 Dec, 1991 — INCLINATION:

DRILL No: — AZIMUTH:

LOGGED BY: G. Ferris/ J. Keeling — DATE:

SHEET 1 OF 2 — PLAN No: 92-293a

5584

DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA
MINERAL RESOURCES DIVISION

LOG OF CALWELD DRILLHOLE

PROJECT: INKSTER KAOLIN HOLE No: BS 5

LOCATION: Carey's Well Deposit ELEV: REFERENCE No:

AGE	UNIT	CORE DESCRIPTION	LOG	DEPTH (m)	CORE LOSS	CASING	ANALYSES
PROTEROZOIC	HILTABA SUITE	KAOLINIZED GRANITE:White with angular quartz aggregates to 15mm across. Minor patches 1-2mm across of very pale orange Fe oxide staining.		11			SEM # 2258
		KAOLINIZED GRANITE:White to very pale yellow. Coarse quartz patches grey - pale grey, equant fractured grains. Quartz content approx. 20-25%. Minor Fe spots		12			
		KAOLINIZED GRANITE:White to very pale orange. Quartz 20-25% pale grey to grey 5-10mm across.		13			SEM # 2260
		PARTLY KAOLINIZED GRANITE:White to pale orange kaolin with bleached and pitted feldspar grains pale yellow to white. Fine grained white mica. Coarse quartz, grey.		14 15			T/S - Partly kaolinized granite (14.5m)
		GRANITE:Reddish feldspar, quartz, mica.		16			
		END OF HOLE 16m					

REMARKS:

LOCATION PLAN No: CO-ORDINATES:

DRILLED BY:

DATE: 10 - 12 Dec. 1991 INCLINATION:

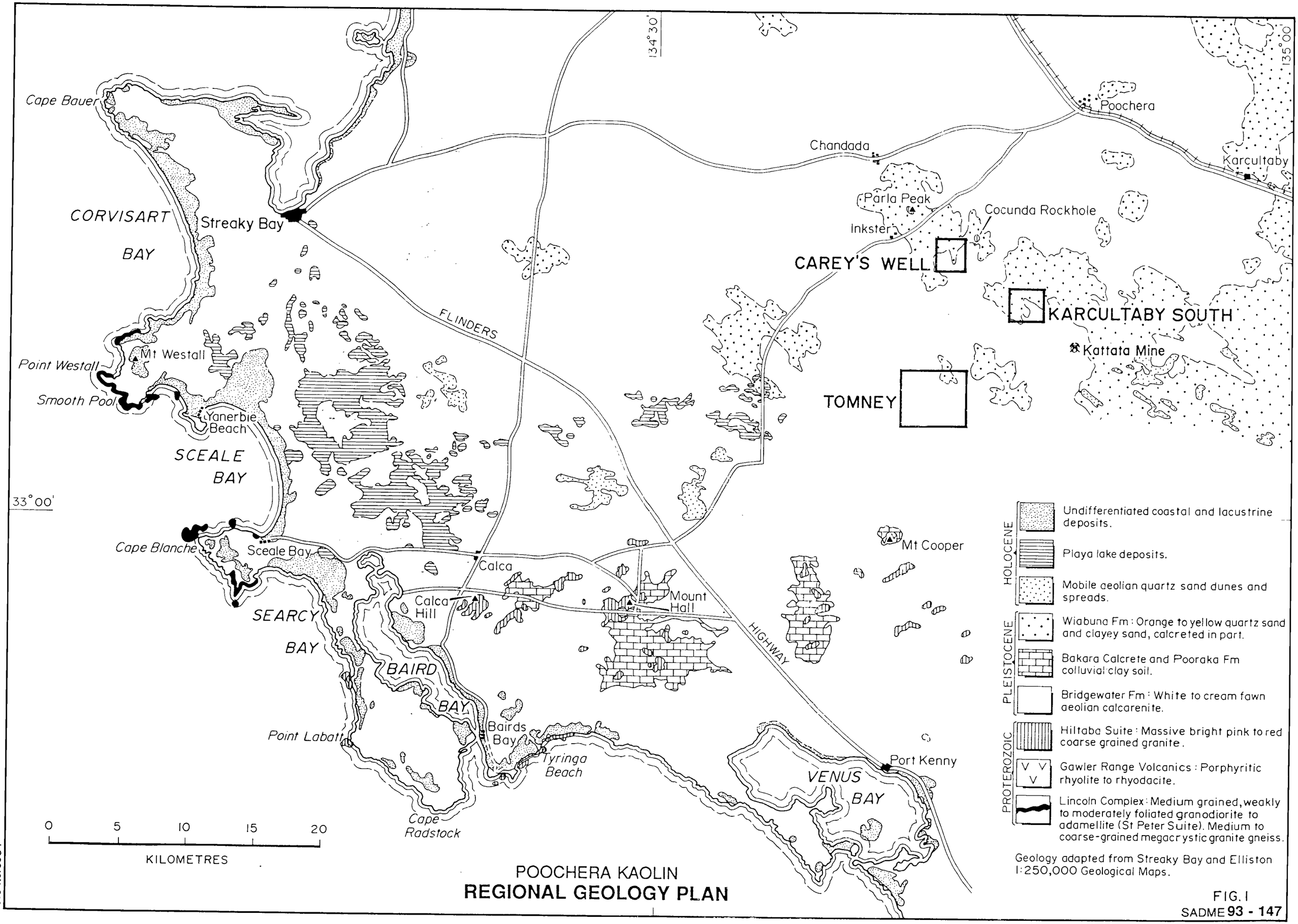
DRILL No: AZIMUTH:

LOGGED BY: G. Ferris/ J. Keeling DATE:

SHEET 2 OF 2 PLAN No: 92-293b

5584

FIGURES

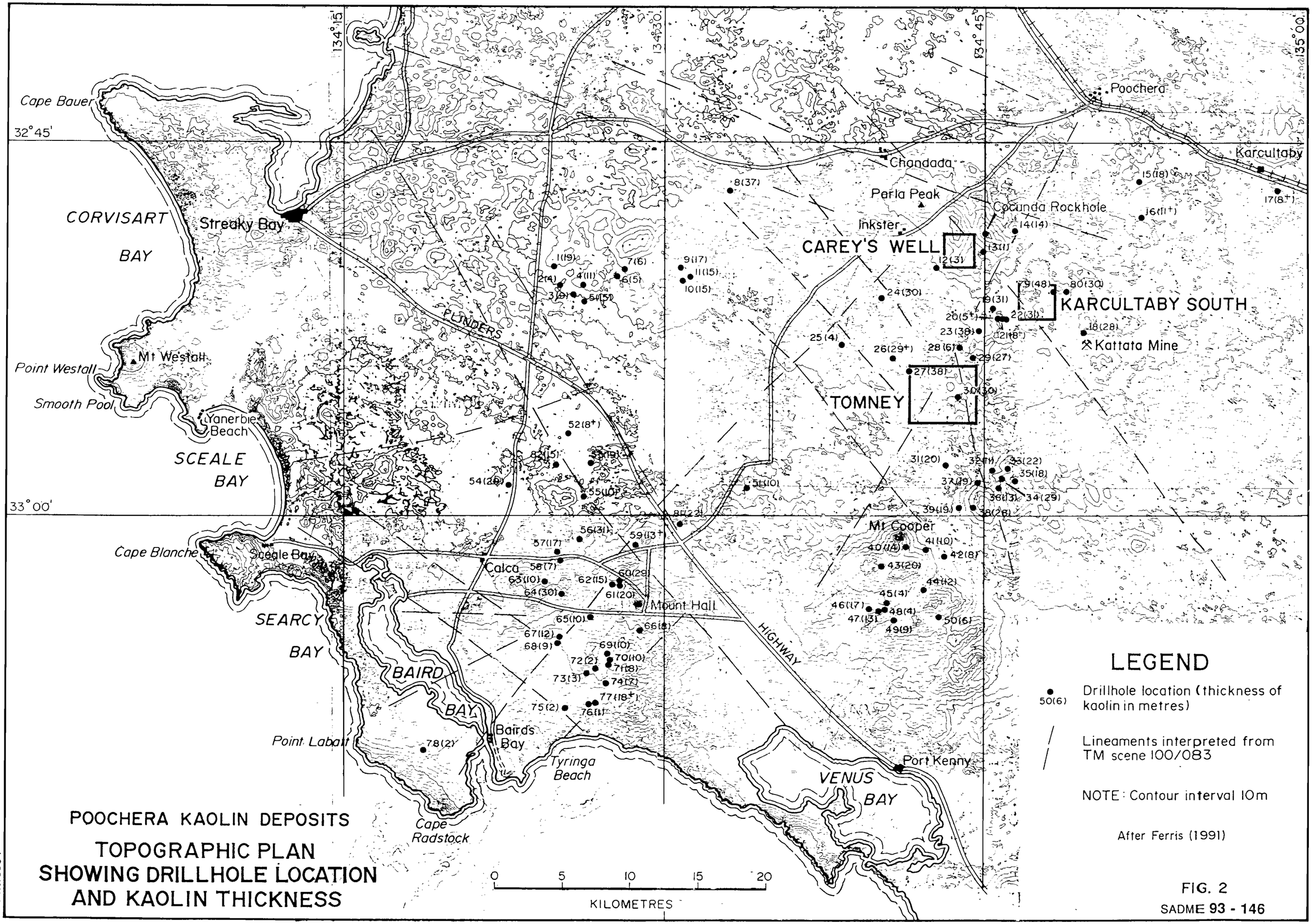


Geology adapted from Streaky Bay and Elliston 1:250,000 Geological Maps.

POOCHERA KAOLIN
REGIONAL GEOLOGY PLAN

FIG. 1
SADME 93 - 147

Job No. 5584



LEGEND

50(6) Drillhole location (thickness of kaolin in metres)

Lineaments interpreted from TM scene 100/083

NOTE: Contour interval 10m

After Ferris (1991)

POOCHERA KAOLIN DEPOSITS

TOPOGRAPHIC PLAN SHOWING DRILLHOLE LOCATION AND KAOLIN THICKNESS

FIG. 2

SADME 93 - 146

Job No. 5584

LEGEND

- ○ 5832-160 ..... Water bore containing Kaolin
- ⊗ KC 4 ..... 1984 drillholes
- ● P 2 ..... 1986 drillholes
- • PP 5 ..... 1987 drillholes
- ⊙ CW 3 ..... 1988-89 drillholes
- □ BS1-4 ..... 1991 drillholes
- Main, sealed road
- Graded road
- Vehicular track

P1 P15

EYRE HIGHWAY

POOCHERA

Moorkitabie

To STREAKY BAY

Chandada

5832-5

Condooringie Well

KC 1

Parla Peak

O 5832-53

O 5832-76

Cocunda Rockhole

Inkster

CW 6 CW 8 CW 7 CW 5 CW 2 PP 1 PP 2 PP 3 CW 1 CW 3 BS5-6 PP 4 PP5 CW 9 CW 14 CW 15 BS 1-4 CW 4 CW 13 CW 10 CW 11 CW 12 CW 16 CW 17

Carey's Well

CAREY'S WELL

5832-176

KARCULTABY SOUTH

O5832-79 KC 4 KS 2 KS 1 KS 3 KS 5 KS 7 KC 3 KC 2 KS 6 KS 4

P 2

Whichelby

5832-154

O 5832-86

Tootla

O 5832-59

5832-168

5832-82 to 85

Kattata Mine

P 14

P 3

TN 5 TN 1 TN 4 TN 3 TN 6 TN 2

TOMNEY NORTH

P 13

P 4

O5832-163

5832-165

5832-164

P 12

P 9

P 81

TOMNEY

TE 8 TE 4 TE 2 TE 7 TE 1 TE 3 TE 5

P 10 TW 4 TW 1 TW 3 TW 6 TW 2 TW 5

5832-159

TE 6

TOMNEY WEST

TOMNEY EAST

P 11 TS 6 TS 3 TS 1 TS 2 TS 4 TS 5

P 5

TOMNEY SOUTH

O 5832-160

YD 2

YD 1

Yandra Well

Yandra

O5832-126

5832-124

O5832-91

5832-126

O5832-90

O5832-89

O5832-108

Wattle Hill

O5832-109

5832-123

O5832-133

P6

METRES 1000 0 1 2 3 4 5 KILOMETRES

DEPARTMENT OF MINES AND ENERGY

POOCHERA KAOLIN

DRILLHOLE LOCATIONS

Figure.....3

Job No. 5584

SOUTH AUSTRALIAN DEPARTMENT OF MINES AND ENERGY

93-57

N

Hiltaba Suite Granite :
Massive med - coarse grained
k - feldspar and quartz granite

COCUNDA ROCKHOLE

SCRUB

SCRUB

CW 8

CW 6

CW 7

SEC 33

SEC 32

PP1

CW 5

CW 2

PP2

5832-175

CAREY'S WELL

CW 3

BS5-6

CW 1

PP5

PP3

Windmill

Rubble Pits

SCRUB

KAOLINIZATION (APPROX.)

SCRUB

CW 14

CW 9

PP4

CW 4

CW 15

WESTERN LIMIT OF

SEC 34

BS1-4

CW 13

CW 10

CW 11

CW 12

SCRUB

SEC 15

CW 16

CW 17

SCRUB

SEC 14

SCRUB

SCRUB

POOCHERA KAOLIN

CAREY'S WELL DEPOSIT

SECS 30 TO 34 HD OF INKSTER

- ..... 1987 drillholes
- ..... 1988 - 89 drillholes
- ..... 1992 coiweld drillholes
- ..... Water bores
- ..... Graded road
- ..... Station track/fire break
- ..... Section boundary
- ..... Fence on section boundary
- ..... Fence
- ..... Extent of scrub

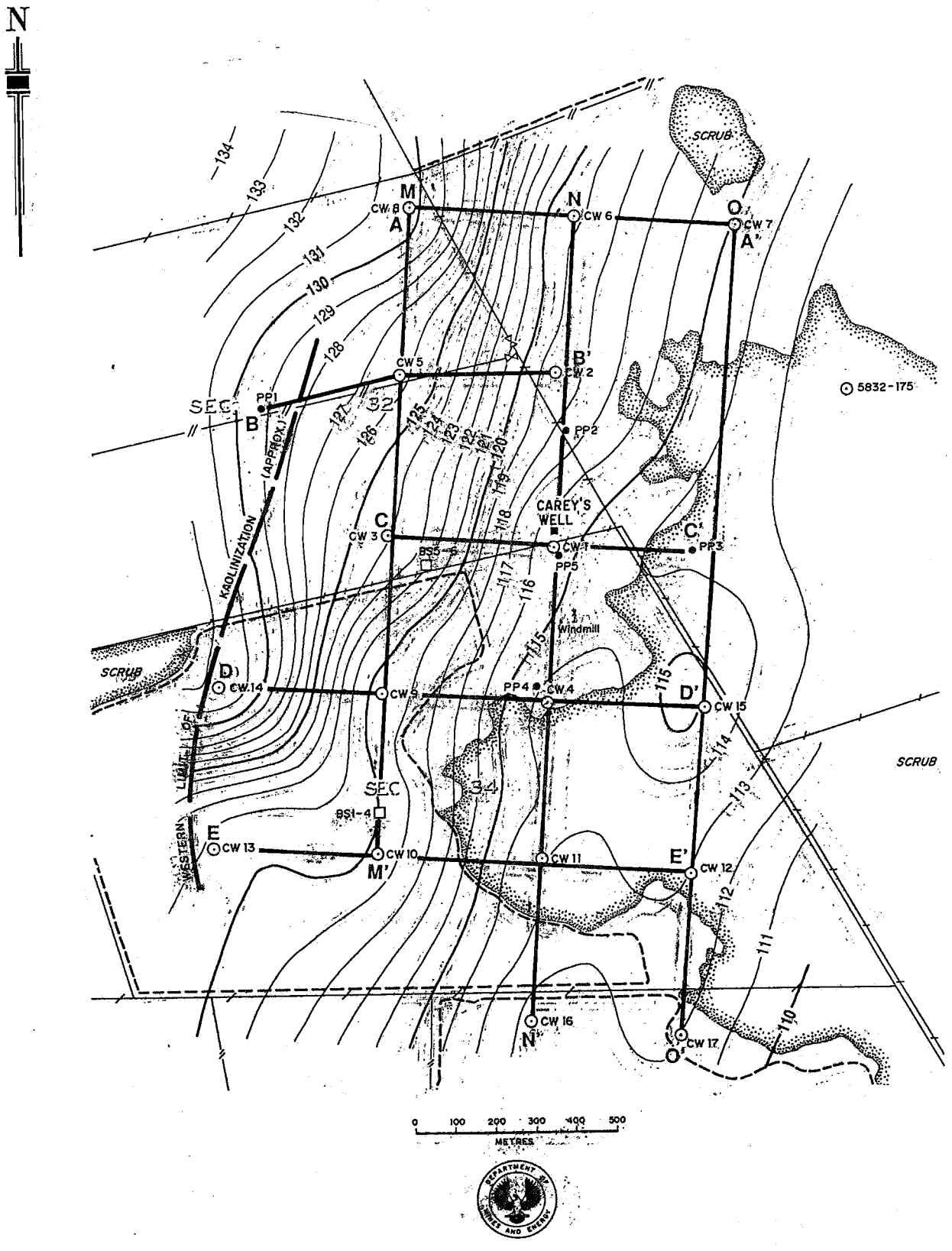
0 100 200 300 400 500
METRES

Figure.....4

Job No. 5584

SOUTH AUSTRALIAN DEPARTMENT OF MINES AND ENERGY

93-58



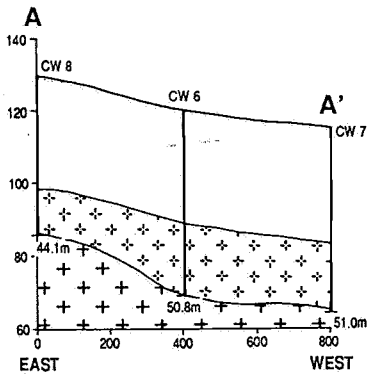
POOCHERA KAOLIN

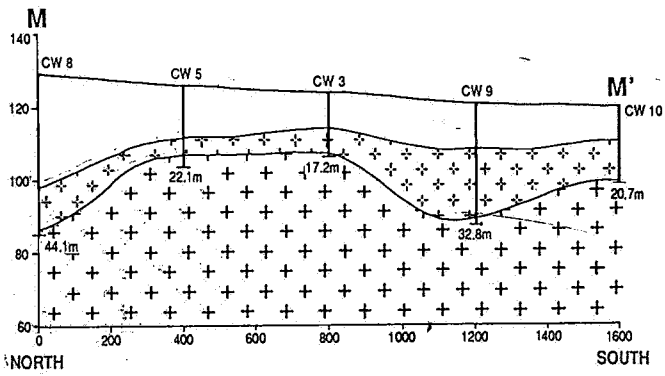
CAREY'S WELL DEPOSIT
TOPOGRAPHY AND CROSS SECTION LOCATIONS

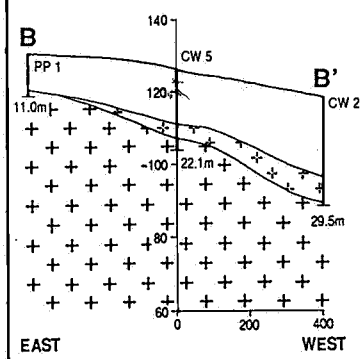
Figure.....5

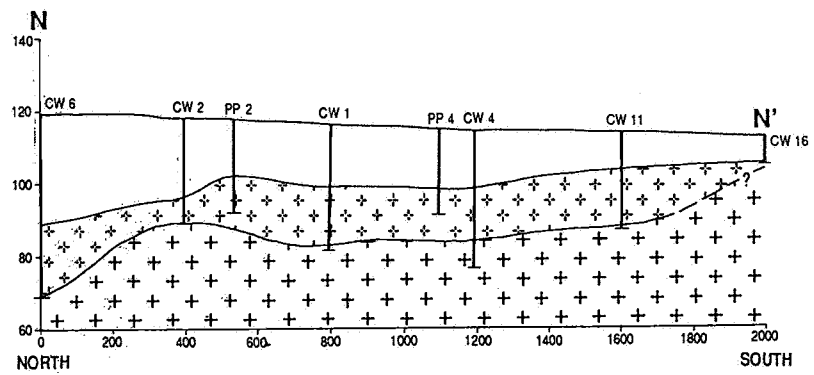
For Details of Sections see Figure 6.

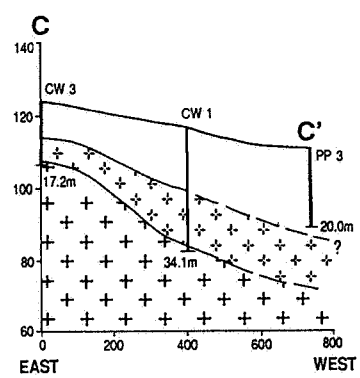
Job No. 5584

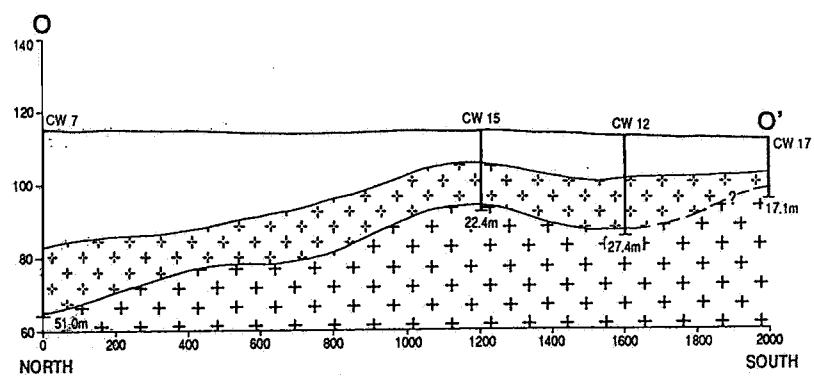


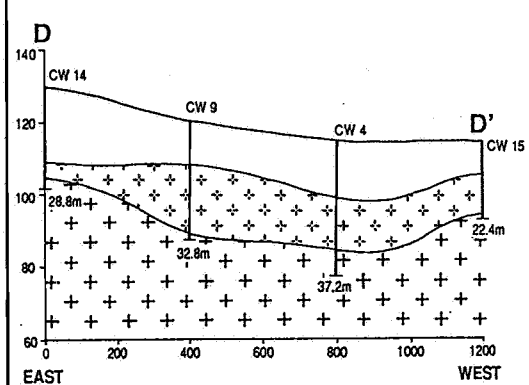


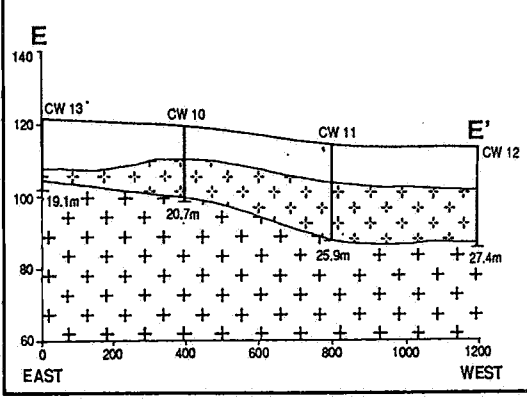












LEGEND

Overburden, clay, calcrete, clayey sand

Kaolinized granite

Granite bedrock

0 100 200 300 400 500 METRES

POOCHERA KAOLIN

CAREY'S WELL DEPOSIT SECTION DETAILS

Figure.....6

Job No. 5584

SADME

93 - 149

PLATES

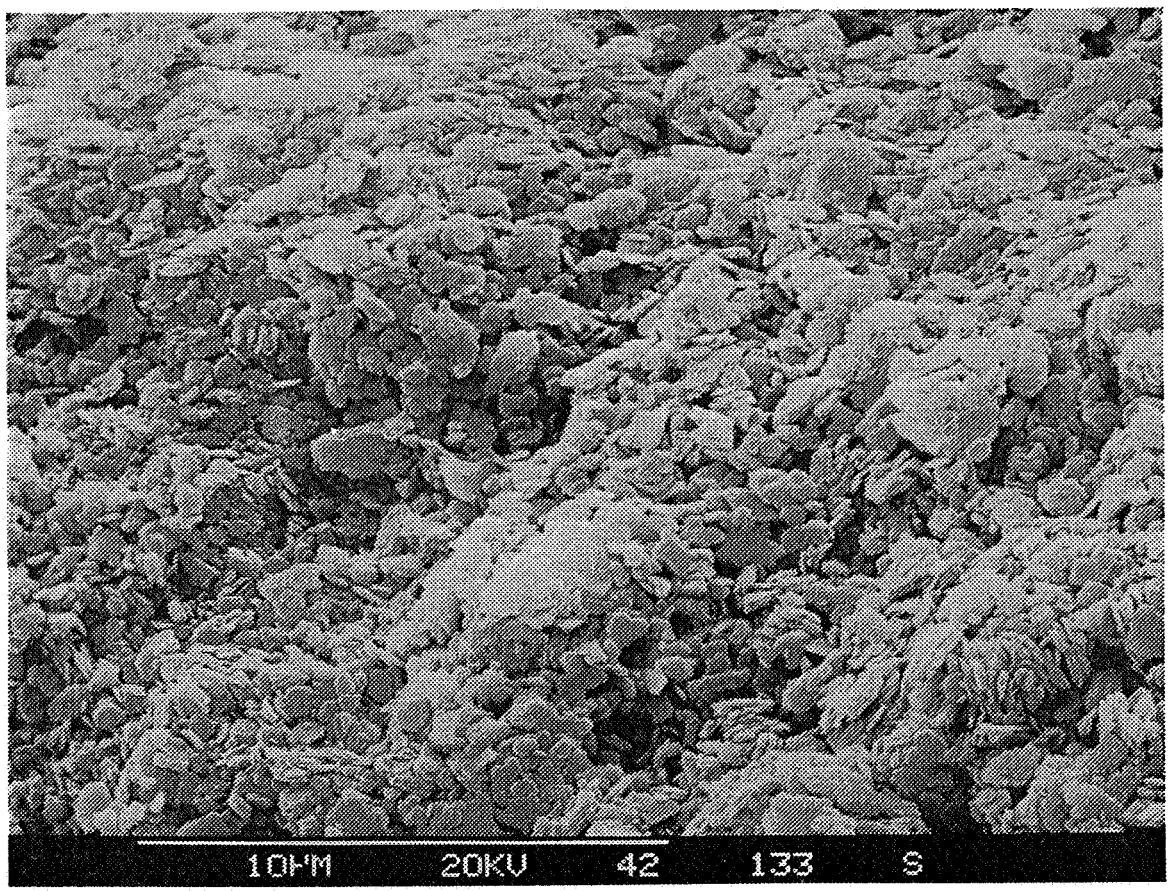


Plate 1. Carey's Well. CW14. Sample SB042. Detail of fine grained (<2µm), well crystalline kaolinite platelets. Bar scale 10µm, photo. no. 42/133.

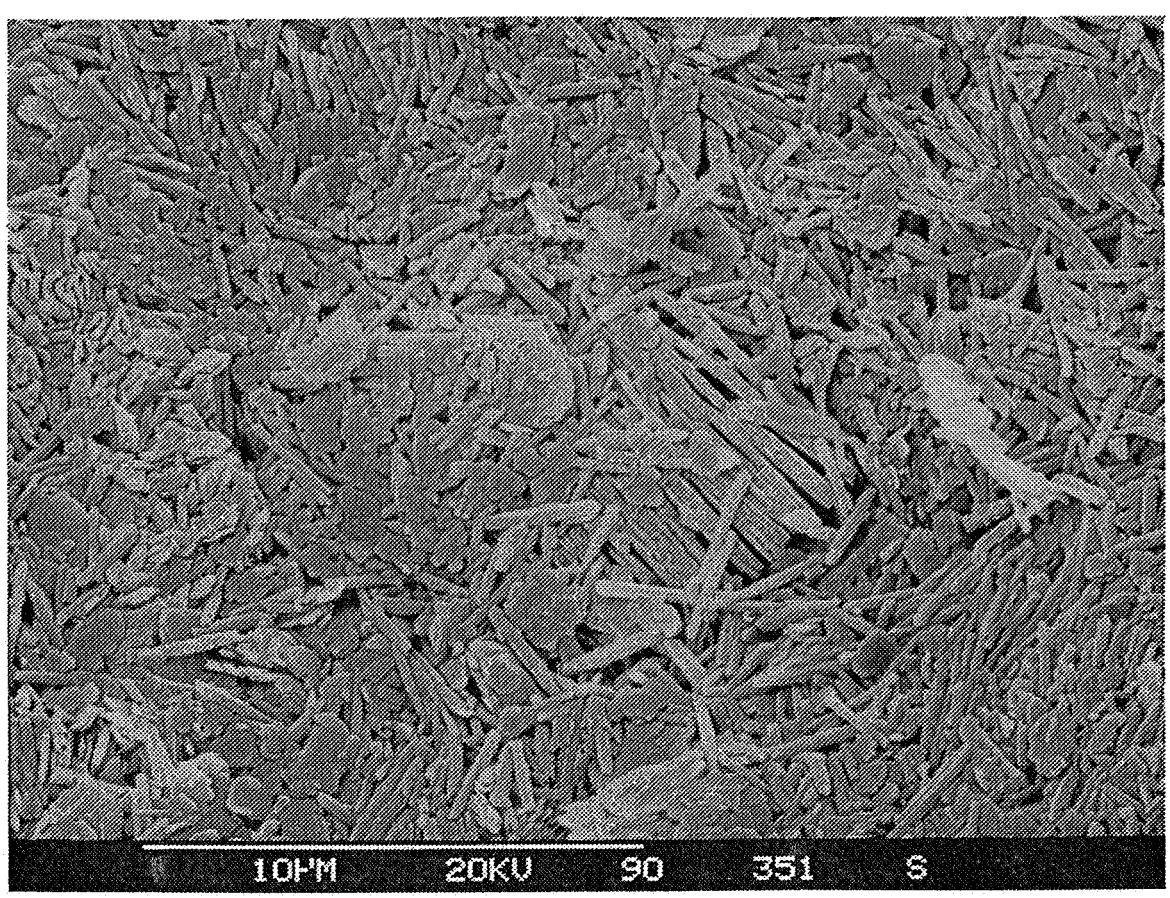


Plate 2. Carey's Well. CW15. Sample SB076. Poorly crystalline kaolinite plates and halloysite on surface of coarse grained, open kaolinite stack. Bar scale 10µm, photo. no. 90/351.

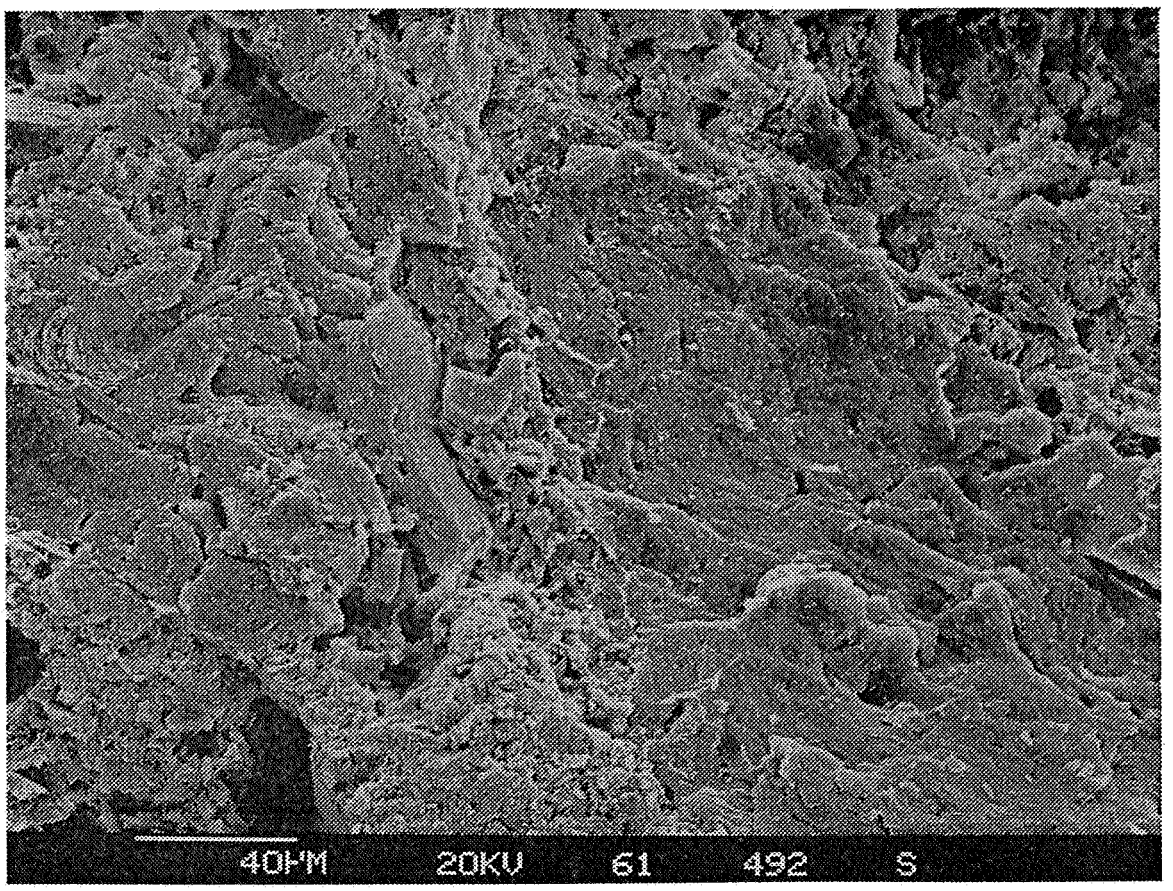


Plate 3. Carey's Well surface dump. Sample SB028. Coarse grained vermicular kaolinite within a matrix of coarse and fine grained kaolinite plates. Bar scale 40µm, photo. no. 61/492.

Plate 4. Karcultaby South. KS4. Sample SB069. Coarse grained kaolinite stack within a matrix of fine grained (<2µm), well crystalline kaolinite platelets. Bar scale 20µm, photo . no.76/604.

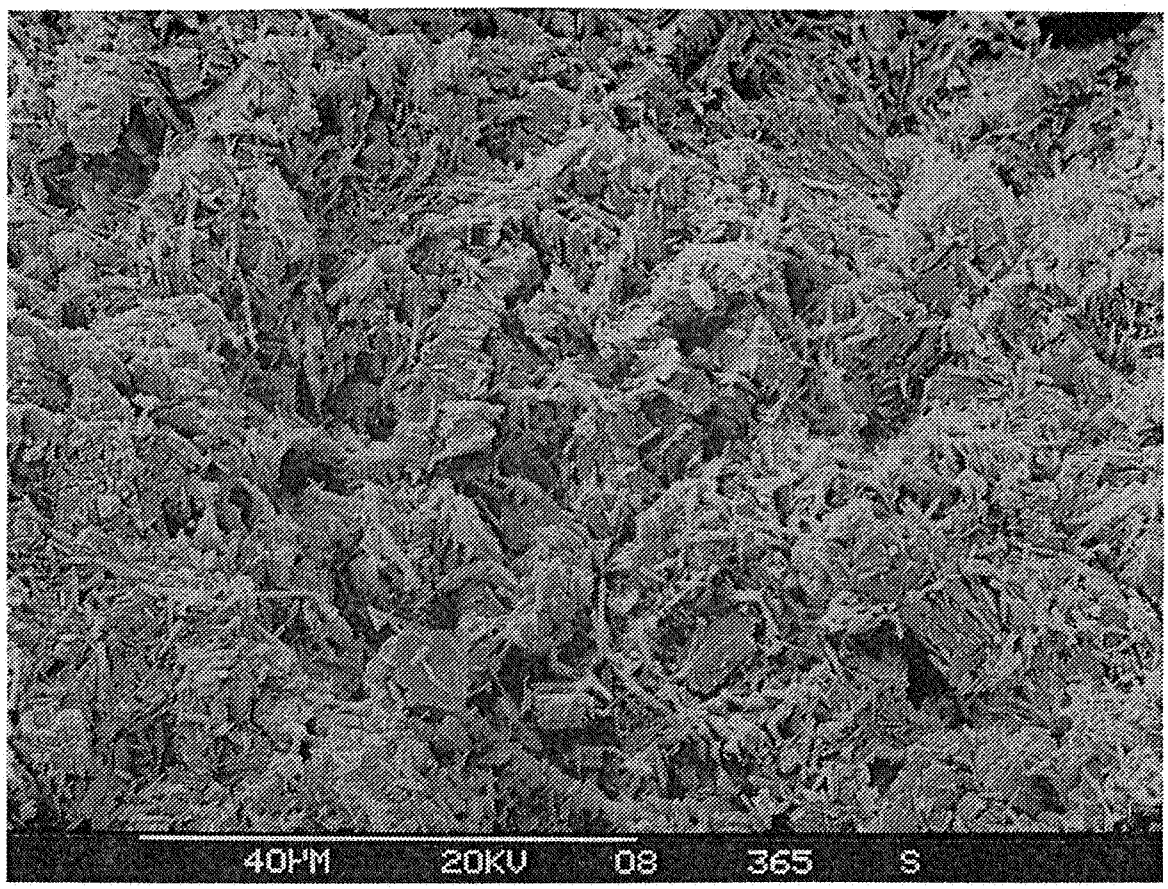


Plate 5. Karcultaby South. KS5. Sample SB085. Representative view of sample showing coarse grained kaolinite books and plates with abundant halloysite. Bar scale 40µm, photo. no. 08/365.

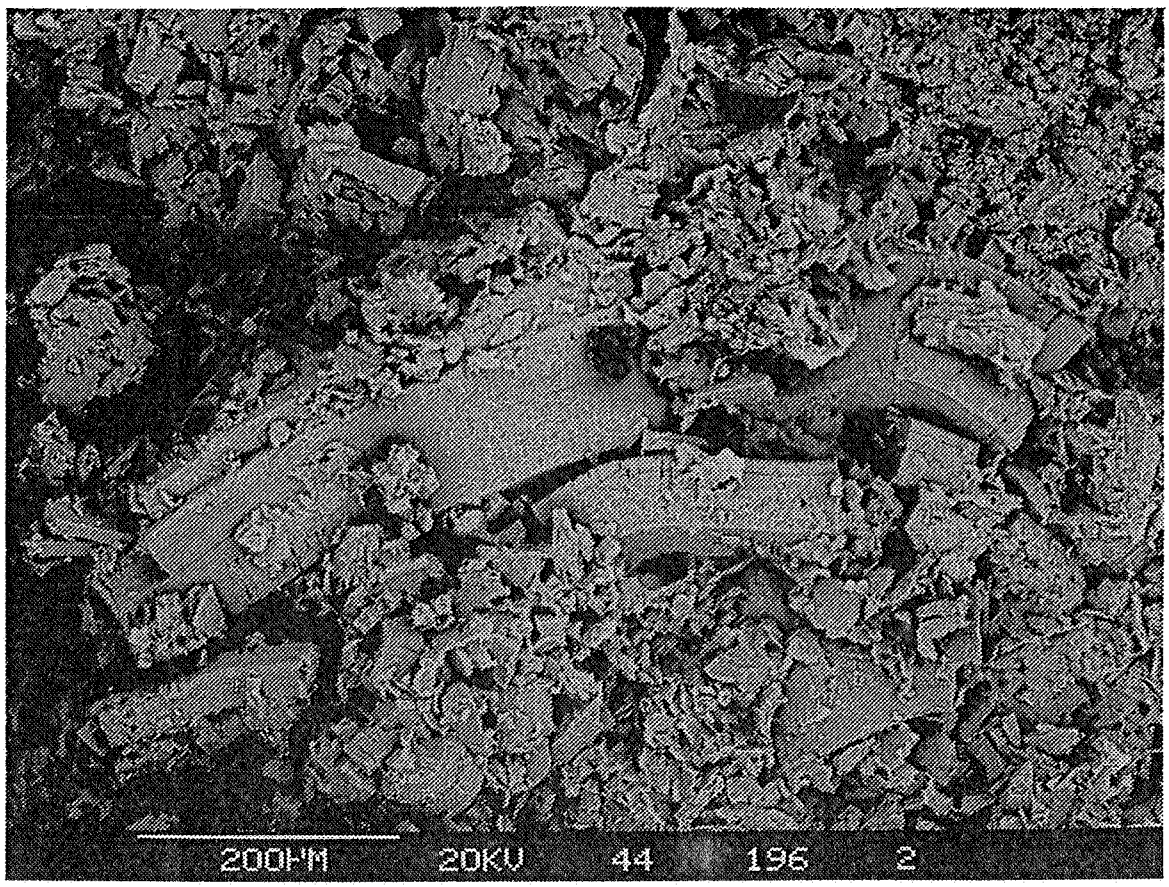


Plate 6. Tomney West. TW2. Sample SB050. Coarse vermicular kaolinite within a matrix of stumpy kaolinite books and coarse kaolinite plates. Halloysite present on surface of coarse kaolinite books. Bar scale 200µm, photo. no. 44/196.

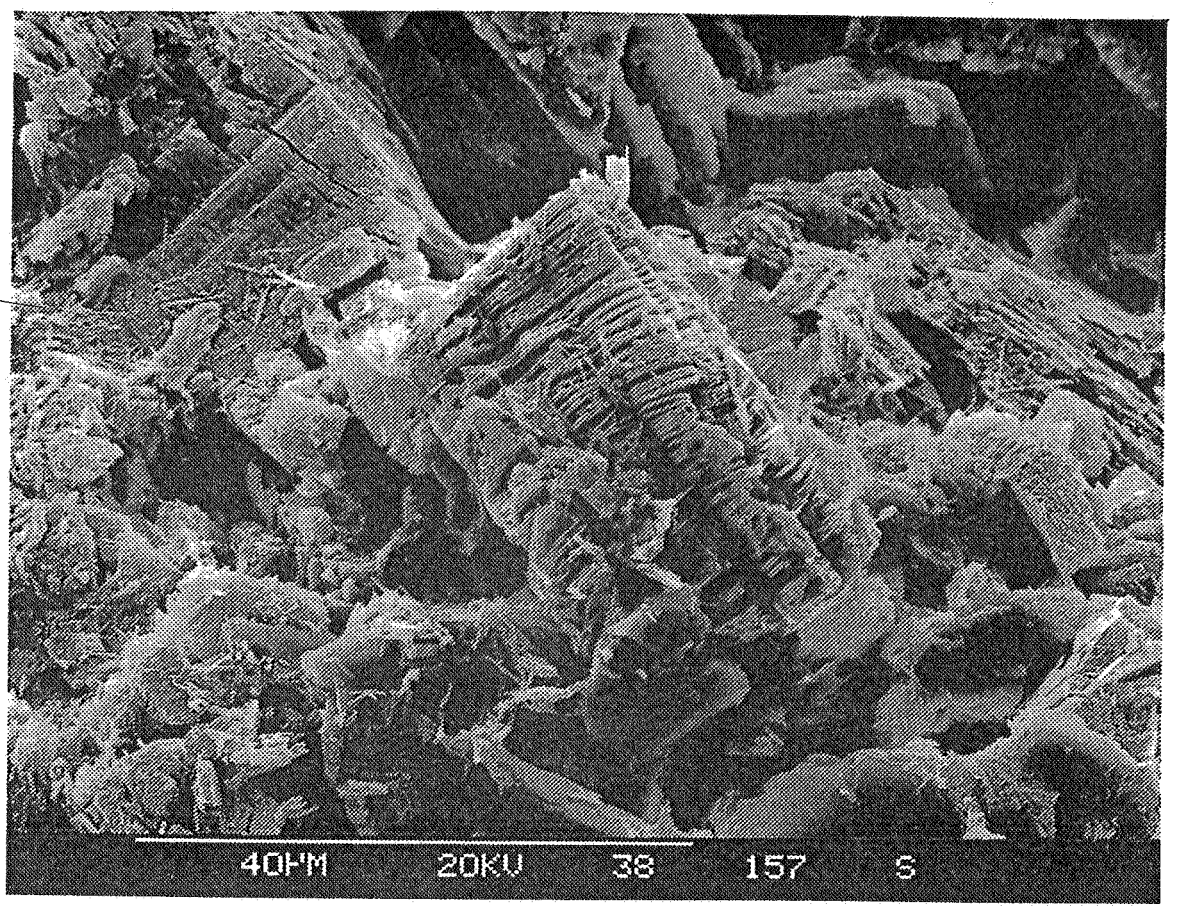


Plate 7. Tomney East. TE6. Sample SB047. Coarse grained open kaolinite stacks partly coated with halloysite tubes. Bar scale 40μm, photo. no. 38/157.

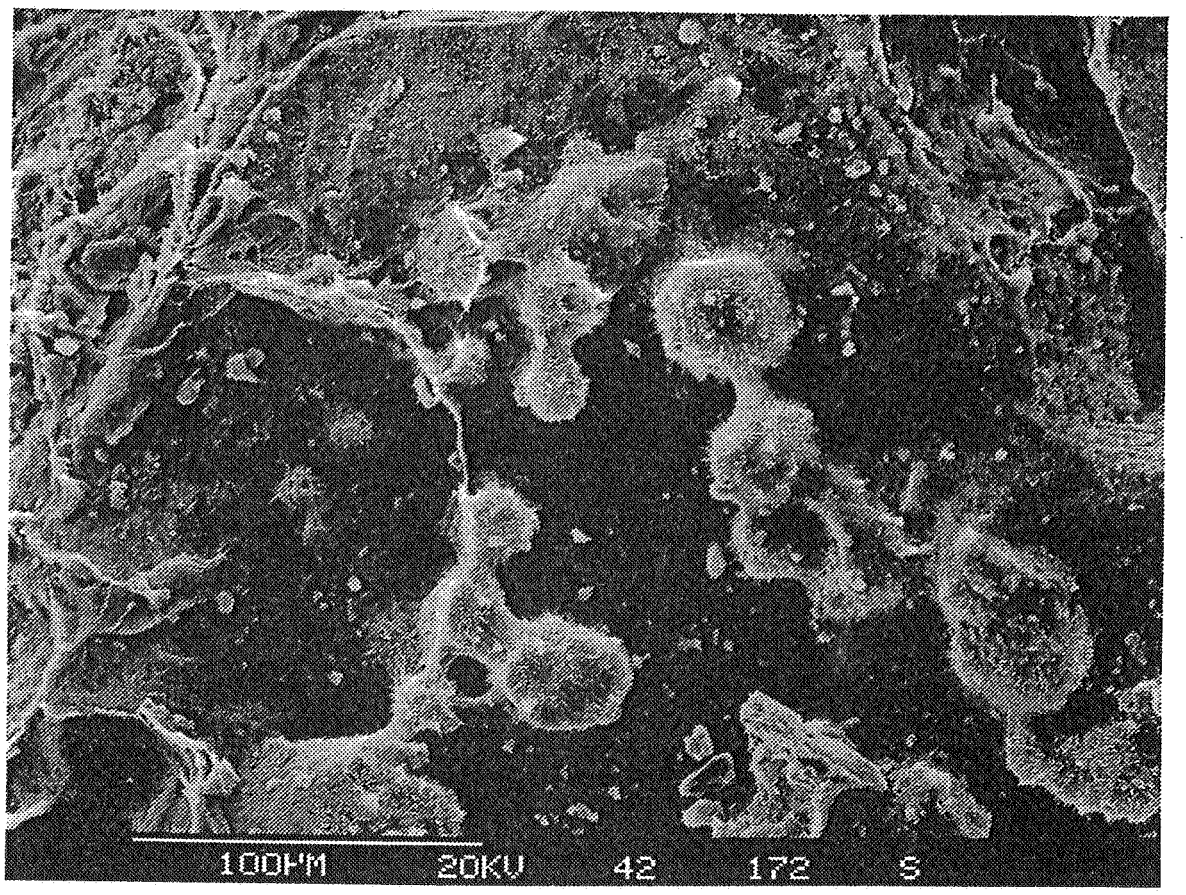


Plate 8. Tomney East. TE6. Sample SB047. Spheroidal aggregates of interwoven halloysite tubes. Bar scale 100μm, photo. no. 42/172.