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HILMAC Pty Limited

Percussion drilling and geological results Arthur River E.L.43/70

Cann Creek Magnesite & Foya Talc

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Dr. D Duncan instructed that this report 88-2862 be moved to Open File
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1. SUMMARY

Percussion drilling results at Cann Creek have shown that in the area drilled, 10% of the interbedded talc carbonate sequence contains high grade magnesite (greater then 41% MgO on a carbonate basis). An area of talc was observed on the east side of the carbonate, and a "quartzite" to the west. A complicated structure has left the question of the quantity of magnesite unresolved.

2. INTRODUCTION

The aim of this project was to delineate 100,000 tonnes of high grade magnesite at the Cann Creek deposit in E.L.43/70 Arthur River, north western Tasmaina. The magnesite was to be of a grade suitable for Mineral Holdings Pty Ltd's potential users. Talc associated with the magnesite and dolomite was to be observed as a secondary interest. Any high purity quartzites, or precious metals indications were also for noting.

Kevin Pinner acted as the co-ordinator for the field work and associate activities in Tasmania. Preliminary drill pad and track bulldozing, positioning, and supervision of the drilling and sampling of the first 13 drill holes was conducted by Kevin.

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3. CONCLUSIONS

The twenty percussion drill holes, and chemical analysis indicate that 10% of the carbonate is high grade magnesite. Cavities, typical of karst weathering, make assessment of the near surface carbonates difficult. Interbedding of the magnesite with dolomite, chloritic and talc schist, sericite phyllite and laminated siltstone degrade the deposit. A complicated structure, including folding and faulting, exhibits dislocated magnesite outcrops and subcrops. Tertiary dolerite over the northern area of Cann Creek may be too thick to consider exploring under. Down dip extent of the carbonate have yet to be defined.

Talc and quartzite in the Cann Creek area have been observed. The talc in the main part of the magnesite sequence could also have similar complicated features, and does not seem as prospective as the talc on the east side(Foya deposit). The limit of this talc is not known. Quartzite of the Keith Beds buttup against the west side of the carbonate. The quality and extent of these is unknown. Different types of quartzites are probably to be found on the south side of Cann Creek, and are possibly related to the quartzites seen in the "burrow pit" on the main track into the area.

4. RECOMMENDATIONS

Recommendations:-

1 Deeper drilling in the area of the high grade magnesite. Possibly with a Warman 400 rig capable of rotary drilling and diamond drilling. This will determine the morphology of the magnesite.

2 drill with rig capable of penetrating cavities, and coring for purposes of avoiding contamination and mixing of the sample, and observing quality for marble use.

3 resurvey area topographically - accurate map production.

4 explore to the south for magnesite by mapping and drilling percussion holes.

5 sample by pits the extent and quality of talc in the east area of the carbonate.

6 conduct an orientation survey for precious metals by stream sediment sampling, with view to possible follow up by soil sampling.

7 assess the quality and extent of the Keith Beds quartzites on the west side of the carbonates.

5. EXPLORATION

Access was cut by bulldozer into the sites for the percussion drilling near outcrops of high grade magnesite. Drill chip samples were split and portions analysed with respect to magnesite mineralogy.

5.1. mapping/surveying

A map of the drill hole positions and the interpretation of the geology were made. They are at the end of the report. A tape and compass method of positional surveying was used to fix in the positions of the drill sites.

5.1.1 accuracy problems

There is a surveying or drafting discrepancy in the base map from previous workers (for example plan TASh 3455 in CRA report 14728). It appears that the correction for magnetic declination has been made twice for the surface workings and tracks. Consequently there is a problem aligning the previous work with the percussion drilling and geological mapping. The positional data is presented in **appendix 1.**

5.2. drilling

A percussion drilling program was conducted at the Cann Creek (holes are prefixed with **PD88CC** meaning Percussion Drill hole in year 1988 at Cann Creek) site to evaluate the extent and quality of magnesite. Eighteen positions in the carbonate sequence (map

attached) were drilled with a hydraulic Atlas Copco percussion rig. Drilling to a maximum of 30m was accomplished by a hydraulic Atlas Copco rig. Diameter of the holes was from 75mm to 110mm. Air recovery was used to take samples over 2 to 3 metre intervals. Drill chips from some sections of the holes were submitted to Analabs laboratories for analysis.

5.2.1 sample numbers

The sample number system used for the drill samples describes the depth of a sample in a particular drill hole. For example the sample collected in drill hole number 18 over the 24m to 26m depth range would be sample number 182426. Because the recovery from drilling was not continuous the samples are not always in contiguous runs. Also not all samples were submitted for analysis.

5.2.2 recovery

Chips and dust was recovered during the drilling process in a dust sampler. Wet and puggy ground produced some problems for this method. Sample return was often reduced, because of binding in the drill hole. The sampler wasn't designed for wet sampling. Increased contamination and mixing became a risk because of sample intermittently sticking to hole wall. Different lithologies acted in differing ways.

The samples recovered were split in a Jones riffle splitter with three or four passes. A 2kg sample was sent to Analabs for chemical analysis; 100gm sieved sample put in craft packets for logging work; and the remainder stored at Kevin Pinner's.

5.2.3 cavities

The carbonate contained cavities in places. The cavities are typical of karst weathering. Drilling in most cases was not able to precede beyond the cavity because of loss of sample and/or hole jamming. These abandoned holes indicate that there is further carbonate beyond their limit.

5.2.4 results

The drill logs are contained in **Appendix 2**. A hole drilled sub horizontally into the main high quality outcrop (PD88CC19) only intersected about 12m of magnesite. This was the thickest magnesite drilled.

5.3. geology

The Cann Creek - Foya prospect geology is structurally controlled, and similar to foreign deposits with talc and magnesite. Faulting and folding are common and may be interesting for precious metals associations, as well as being related to the talc in the carbonate.

5.3.1 structure complex

The drill logs (**Appendix 2**) and mapping (map shows possible positions for anticlines, and the carbonate zone flanked by a siliceous sequence to the west, and a talc rich one in the east) indicate that the deposit is of complex nature, being mixed carbonates interbedded with talc schist and "sericite" phyllite.

5.3.1.1. folding

On the east end of the body there is structural evidence for a down fold, the drilling also struck penetration and recovery problems. Two costeans across the strike show evidence for folding. At this stage of the understanding of the structure, no general dip direction can be decided on.

5.3.1.2. faulting

Faulting on the western side of the carbonate is evidenced in the costeans. There is a discernible fault plane in the costean on the lower level. It is in a talc schist and "sericite" phyllite. Pyrite cubes up to half a cc were observed in the talc schist. The upper costean exhibits a quartzite with prominent "boudinage" structure.

5.3.1.3. extension of deposit N-S

North and south extensions of the rocks seen in the prospect are highly likely. Such occurrences are affected by the nature of weathering of the carbonate (karst weathering contributing greatly to the near surface morphology) and the silicate.

5.3.1.4. Tertiary capping

The igneous rocks 100m to the north of Cann Creek hide the sequence. These were postulated to be thin lava flows occurring as a "cake icing" layer. PD88CC16 was drilled vertically into the "basalt" (weathered dolerite) but did not penetrate into the carbonate sequence. The Tertiary rock is not simply following the topography as a thin cover.

5.3.1.5. conclusion

High grade magnesite outcropping at the surface appears to be limited in extent in the area drilled. The results of the drilling and the interpretation of the structure suggests that there is no continuous body of magnesite which would make up 100,000 tonnes of high grade ore.

The shape of the magnesite bodies is illdefined, but may be almond shaped when showing karst features. Depth limits of the magnesite outcrops are not known, however DDH85CC2 suggests that carbonate is found at over 140m below the creek level. More drilling is required to determine the shape of the high grade bodies, the down dip extent being the main unknown.

5.3.2 foreign deposits

Some international "magnesite deposits" known to contain talc are listed in **Appendix 3**. Similarities with the Cann Ck deposit include the presence of dolomite, chlorite, phyllites, slate, pyrite, rutile. The Ta Shin Chiao deposit of China contains dolomite, magnesite and 10% schist and 3% calcite, with accessory minerals such as talc scapolite (mizzonite), rutile, quartz, sericite, tourmailne, graphite. Magnesite in the Ta Shin Chiao deposit grades to dolomite at the ends and sides of the carbonate body. The Volchegorsk deposit in USSR had magnesite and dolomite as shown below plus 2.1% of combined talc, chlorite, serpentine and pyroxene; and 0.6% quartz and chalcedony.

deposit	magnesite	talc	dolomite	silica	others (%)
Timmins	54	28	-	15	3 hematite
(east zone)	70	8	-	16	1 hematite
Ta Shin Chiao	12	a	75	(10)	3 calcite
Volchegorsk	71.8	(2.1)	25	0.6	

Deposits which also have structural similarities to Cann Ck are Kao, Jhiroli Pithoragrh, Tundah and Gol (India), in the Carpathians (Czechoslavia), Onot Sayan (USSR), and possibly the Kharidhunga (Nepal).

5.3.3 talc relationship

During the work observations were also made on the occurrence of talc and quartzite. The drilling intersected talc in some drill holes. No drill holes were specifically put down to test the talc, though some samples were taken of the drill chips and from an outcrop east of the drilling area.

Most of the features of the USSR, Onot deposit are observed in the Cann Creek - Foya prospect. Hydrothermal formation of talc and chlorite-talcose schists in magnesites and dolomites takes place in the Onto deposit where the largest talc deposit is 500m long and 40m thick. It is situated in magnesite, and the talc was formed by hydrothermal-metasomatic replacement of dolomites (Lower Proterozoic) from the solution supply channel along a regional fault. Other bodies of talc are veins and lenses in magnesite and at contact with antigorite-chlorite schists, serpentinites and amphibolites. The silica forming the talc may be mobilized from quartzites.

5.3.4 silica

West of the carbonate zone there appears to be a occurrences of silica rock (quartzite). North of Cann Ck the silica occurrences outcrops, and has a relict texture of conglomerate or is some structural texture such as a boudinage. This quartzite may be considerably more ancient than the "flour quartzites" found in the region. Silica float rock was found on the south side of the creek, and is probably associated with the quartzite "burrow-pit" near DD84CC1.

5.4. chemical results

Samples of drill dust/chips and outcrop rock were submitted to Analabs for chemical analysis. The results of the analyses are given in **Appendix 4.**

5.4.1 quality

Mixing of low grade and high grade magnesite during the drilling degraded the results of the analyses. However any thick (that is a body thicker than the sample intervals) high grade body should still show up as high MgO in the analyses. Minor contamination can be expected as mentioned above. Only a small amount of non-magnesite mineral is required to lower the MgO content of the sample. This is a problem caused by using percussion drilling and sampling over a fixed interval rather than for specific rocks as is the case with diamond drilling.

Only four intervals showed high grade magnesite, they are:-

hole PD88 CC 6	~ 5m of	+41.5% MgO
hole PD88 CC10	~ 3m of	+41.5% MgO
hole PD88 CC19	~ 10m of	+41.5% MgO
hole PD88 CC21	~ 6m of	+40 % MgO.

Out of 400m of drilling, 150m was drilled as overburden or cavity, 25m high quality magnesite. This constitutes about 10% of the body. These analyses appear low grade when compared to rock chip sample assays which can show +45% MgO. However a vein of distinct mineral or rock, in the magnesite can reduce the quality considerably. In mining these minerals may easily be disposed of.

A "chloritic" band up to10m wide, with Al2O3 analyses of around 10%, is seen in drill holes CC13; CC4; CC19; CC20; CC18 and CC11. These form a band on the eastern side of the main high grade magnesite outcrop.

5.4.2 Gold

A sample of "talc schist" (BS2) containing sulphides, and a quartz vein siltstone (CC21) were assayed but were below detection limit (<0.008ppm).

5.5. Next steps

Further investigation is required on the magnesite to find its extent; resurveying for making an accurate map; the possibilities for use as marble further considered; talc and silica evaluated; and potential for gold assessed.

5.5.1 drilling deeper

Although there appears to be no continuous body of high grade magnesite outcropping at Cann Creek, there is still the question of what magnesite may lie down dip from the outcrop. The nature of the structure complicates the exploration, the main magnesite outcrop could be at the crest of a fold, and the dip is not definitely known. Investigation of this problem by deep drilling could help.

Other bodies of magnesite, unrelated to the visible outcrops, may exist on the south side of the Cann Creek.

5.5.1.1. resurveying

At some early stage of further investigations, a topographic survey needs to be conducted. A correct positional map for the drill holes, access tracks and costeans can then be drafted.

5.5.2 marble

Prices typical for polished marble in Australia can be $140/sq metre (retail), and may be as low as $65/m for some imported floor marble from Asia, the Italian stock lines are from $80 to $150/sq metre (retail). These prices would be carrying a mark up of about

100%. These figures are those given by an associate of Tiles Expo, an Italian organized firm operating in Australia. They polish and sell marble.

5.5.3 Gold and precious metals

There appears to be a detectable "background" of gold in the area, though other pms (precious metals) are usually below detection. In the Savage - Whyte (?) River area pms such as osmium (Whyte R.) and gold (including Browns Plains) are found. Gold is known to occur with magnesite in the Timmins (Canada) deposit, and platinum-gold is found around the Fifield (NSW) magnesite and the Glen Geddes (Qld) serpentinite - magnesite belt.

5.5.3.1. reconnaisance survey

A reconnaisance survey would establish the strenght of the pm background and indicate if any anomalies are in the area. Such a survey could include a stream sediment sampling and special sample preparation.

5.5.3.2. detailed survey

If any anomalies are discovered from the stream sediment sampling, rock chip and soil auger sampling could form part of a more detailed survey. Deep weathering is a problem in the region.

5.5.4 Talc

East of the carbonate zone at Cann Ck a talc schist has been exposed by road cut. This has been sampled during another project, and is still under evaluation. The eastern extent of the talc is not known or mapped. Poor exposure is likely to limit surface mapping. A trial

pitting or shallow drilling could be used to map the extent and quality of the talc. Market requirements for talc will determine the approach required to evaluate the Foya deposit.

Talc occurring in the main part of the carbonate zone may be adversely affected by the folding and faulting. The interbedded nature of the carbonate and talc requires investigation to see what the possibilities are for a exploiting both minerals.

5.5.5 Silica

Quartzite west of the carbonate zone at Cann Creek could be tested for quality, and mapped to relate them to other occurrences to the south. There appears to be a difference in the nature of the two quartzites, this may require investigation.

Phillip C J Mackenzie
(geologist)

6. KEYWORDS

Magnesite, carbonate, percussion drilling, talc, quartzite, structure.

Burnie 1:250,000 Sheet SK55 - 3

7. LIST OF PLANS

plan number	title	scale
P573.1	Drill Location Plan	1:1,000
P573.2	Geology Plan	1:1,000

8. APPENDICES

Appendix 1. Positional Survey data

Appendix 2. Drill logs

Appendix 3. International magnesite deposits with talc occurrence

Appendix 4. Analytical data

Appendix 5. (VOLUME 2) Percussion drilling and geological results Arthur River EL 43/70. Cann Creek Magnesite & Faya Talc Interim report.

Appendix 6 (VOLUME 3) Amdel analytical reports

Appendix 1

Positional Survey data

degs	0.017	dist (m)	(m)	deg	(fall)	**6990.33**	**9609.18**	**1000.00**	A	
from	to	slope	slope	Az	rise	Northing	Easting	height		
A		25	17	330	7.309	7013.07	9601.79	1007.31		
		25	19	45	8.139	7025.94	9621.62	1015.45		
	B	15	17	350	4.386	7040.28	9622.12	1019.83	B	
	CC11	27	5	294	2.353	7056.09	9600.36	1022.19	11	
	eoh	30	-70	90	-28.2	7053.95	9610.40	994.00		
	CC10	12.3	1	260	0.215	7056.51	9588.07	1022.40	10	
	eoh	9	-70	90	-8.46	7055.87	9591.08	1013.94		
CC11	CC9	25	1	252	0.436	7053.47	9575.50	1022.84	9	
	eoh	24	-70	90	-22.6	7051.77	9583.53	1000.29		
	CC15	9	0	230	0	7049.25	9567.55	1022.84	15	
	eoh	12	-52	63	-9.46	7051.16	9574.69	1013.38		
	CC14	9	0	230	0	7045.02	9559.61	1022.84	14	
	eoh	27	-50	65	-20.7	7048.93	9576.52	1002.16		
CC11	CC18	7	0	257	0	7055.96	9593.36	1022.19	18	
	eoh	30	-89	90	-30	7055.85	9593.87	992.19		
B	C	13	14	332	3.145	7052.40	9618.64	1022.98	C	
		20	16	332	5.513	7070.88	9613.34	1028.49		
		30	9	281	4.693	7082.46	9586.07	1033.18		
	G	10	-9	281	-1.56	7086.32	9576.98	1031.62	K	
	CC16	130	19.5	11	43.39	7199.12	9624.86	1075.02	16	
	eoh	27	-89.5	0	-27	7199.35	9624.91	1048.02		
G	CC17	10	-9	120	-1.56	7079.71	9584.32	1030.06	17	
	eoh	12	-43	120	-8.18	7073.84	9590.84	1021.87		
G	F	155	19.5	10	51.74	7221.79	9631.71	1083.36	F	
	basalt	70	-8	100	-9.74	7195.82	9695.98	1073.62	b	
C		30	-10	40	-5.21	7070.59	9641.92	1017.77		
	BOG	21	-6	98	-2.2	7063.45	9661.55	1015.57	Bog	
						6990.33	**9609.18**	1000.00		
A	CC5	33.5	-6	270	-3.5	6997.26	9576.59	996.50	5	
	eoh	15	-70	90	-14.1	6996.19	9581.61	982.40		
	CC4	11	0	270	0	6999.54	9565.83	996.50	4	
	eoh	30	-70	90	-28.2	6997.41	9575.87	968.31		
	CC3	8	-2	270	-0.28	7001.20	9558.01	996.22	3	
	eoh	21	-70	90	-19.7	6999.71	9565.04	976.49		
		21	20	354	7.182	7020.83	9560.08	1003.40		
	D	8	20	32	2.736	7026.24	9565.30	1006.14	D	
	CC21	2.4	0	180	0	7023.89	9564.80	1006.14	21	
	eoh	15	-70	90	-14.1	7022.82	9569.82	992.04		
D	CC20	15	5	85	1.307	7024.42	9580.13	1007.45	23	
	eoh	30	-70	90	-28.2	7022.28	9590.17	979.25		
D	CC12	15.5	11	265	2.958	7028.09	9550.20	1009.10	12	
	eoh	30	-70	90	-28.2	7025.96	9560.23	980.90		
CC3	CC19	12.5	0	31	0	7010.35	9566.54	996.22	19	
	eoh	30	-24	22	-12.2	7033.07	9581.86	984.02		
A						**6990.33**	**9609.18**	**1000.00**		
A	Cann	25	-6	116	-2.61	6975.02	9628.77	997.39	Cann	
Cann	E	10	2	114	0.349	6969.15	9636.86	997.74	E	
	CC2	22	9	146	3.442	6949.00	9645.00	1001.18	2 36 9 645e 54	
E		23	-4	237	-1.6	6960.92	9615.44	996.13		
		25	-3	260	-1.31	6961.80	9590.49	994.82		

degs from	0.017 to	dist (m) slope	(m) slope	deg Az	(fall) rise	6990.33 Northing	9609.18 Easting	1000.00 height	A	
		26	1	290	0.454	6975.57	9568.44	995.28		
	CC8	4.5	-2	323	-0.16	6979.65	9566.54	995.12	8	
	eoh	30	-70	90	-28.2	6977.51	9576.58	966.93		
	CC6	20.5	-1	253	-0.36	6977.86	9546.12	994.76	6	
	eoh	30	-70	90	-28.2	6975.73	9556.16	966.57		
CC8	CC13	30.5	-1	253	-0.53	6976.99	9536.16	994.59	13	
	eoh	30	-70	90	-28.2	6974.86	9546.20	966.40		
CC8	CC7	11.5	-1	247	-0.2	6977.45	9555.26	994.92	7	
	eoh	6	-70	90	-5.64	6977.03	9557.26	989.28		
CC13		30	1	230	0.524	6962.91	9509.68	995.11		
		40	0	249	0	6956.65	9470.17	995.11		
CC2	cont	90	-48	273	-66.9	6964.59	9586.83	934.29	2	down
	cont	60	-52	230	-47.3	6947.24	9554.21	887.01		hole
	cont	30	-53	268	-24	6950.38	9536.43	863.05		survey
	eoh	32.5	-55	265	-26.6	6952.65	9517.93	836.43		data

Appendix 2

Drill logs

Tenement	CANN CREEK	E.L. 43/70	Logged by	Phillip Mackenzie				
Hole No.	**PD88CC3**							
Coodrinates		Azimuth	90 Drillers	MAXFIELD	Commenced	Apr-88	Depth	21m
		Inclination	-70 Drill type	Atlas Copco percussion	Completed			

DEPTH from (m)	to (m)	weathering	Chip Description	33% HCl acid reaction	SAMPLE No.	from (m)	to (m)
0	3		no sample				
3	6		w & grey dolm, phyllite, mag?	mod to strong	30306	3	6
6	9		grey talc schist, grey carb, qtz	some	30609	6	9
9	12		talc schist, grey dolm	some	30912	9	12
12	15		w & grey carb, talc	mod some	31215	12	15
15	18		grey dolm, w & grey carb, talc, p	some	31518	15	18
18	21		grey sericite phyllite	minor			
			EOH				

EL43/70

Tenement CANN CREEK E.L. 43/70 Logged by Phillip Mackenzie

Hole No. **PD88CC4**

Coodrinates

Azimuth 90 Drillers MAXFIELD

Inclination -70 Drill type Atlas Copco percussion

Commenced Apr-88 Depth 30m

Completed

DEPTH from (m)	to (m)	weathering	Chip Description	33% HCl acid reaction	SAMPLE No.	from (m)	to (m)
0	3	wth	no sample				
3	6		sericite, grey mags	minor			
6	9		grey mag, talc sch	minor	40609	6	9
9	12		grey carb, talc sch	minor	40912	9	12
12	15		d grey phyllite(schillered),carb	minor			
15	18		d grey phyllite(schillered),carb	minor	41518	15	18
18	21		d grey phyllite(schillered),carb	minor	41821	18	21
21	24		d grey talc, phyll, mage	minor	42124	21	24
24	27		grey & white carb, talc grey whit	minor	42427	24	27
27	30		grey & white carb, talc grey whit	minor	42730	27	30
			EOH				

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Tenement	CANN CREEK	E.L. 43/70	Logged by	Phillip Mackenzie				
Hole No.	**PD88CC5**							
Coodrinates		Azimuth	Drillers	MAXFIELD	Commenced	Apr-88	Depth	15m
		Inclination	Drill type	Atlas Copco percussion	Completed			

DEPTH from (m)	to (m)	weathering	Chip Description	33% HCl acid reaction	SAMPLE No.	from (m)	to (m)
0	3		sericite phyllite, d grey carb	some			
3	6		sericite phyllite, silica, carb	some			
6	9		sericite phyllite	none			
9	12		phyllite, possible cavity	minor			
12	15		mud, phyllite, mags, talc, qtz, ca	minor			
			EOH				

Tenement	CANN CREEK	E.L. 43/70		Logged by	Phillip Mackenzie				
Hole No.	**PD88CC6**								
Coodrinates		Azimuth	90	Drillers	MAXFIELD	Commenced	Apr-88	Depth	30m
		Inclination	-70	Drill type	Atlas Copco percussion	Completed			
DEPTH						33% HCl			
from (m)	to (m)	weathering			Chip Description	acid reaction	SAMPLE No.	from (m)	to (m)
0	2				no sample				
2	3				talc schist, carb	moderate	60203	2	3
3	6				white talc, white mag, carb	moderate	60306	3	6
6	9				d grey & w mag dolm	moderate	60609	6	9
9	12				d grey & w mag dolm	moderate	60912	9	12
12	15				d grey & w mag dolm		61215	12	15
15	18				d grey & w mag dolm	strong	61518	15	18
18	21				d grey & w mag dolm	moderate	61821	18	21
21	24				grey & w mag, qtz	minor	62124	21	24
24	27				grey & w mag		62427	24	27
27	30				grey & w mag, sericite phyllite	minor	62730	27	30
					EOH				

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Tenement	CANN CREEK	E.L. 43/70		Logged by	Phillip Mackenzie				
Hole No.	**PD88CC7**								
Coodrinates		Azimuth	90	Drillers	MAXFIELD	Commenced	Apr-88	Depth	6m?
		Inclination	-70	Drill type	Atlas Copco percussion	Completed			

DEPTH from (m)	to (m)	weathering	Chip Description	33% HCl acid reaction	SAMPLE No.	from (m)	to (m)
0	3	wth	no sample, wet zone, yl br mud				
3	6		no sample, Abandoned				

Tenement	CANN CREEK	E.L. 43/70		Logged by	Phillip Mackenzie				
Hole No.	**PD88CC8**								
Coodrinates		Azimuth	90	Drillers	MAXFIELD	Commenced	Apr-88	Depth	30m
		Inclination	-70	Drill type	Atlas Copco percussion	Completed			
DEPTH						33% HCl			
from (m)	to (m)	weathering			Chip Description	acid reaction	SAMPLE No.	from (m)	to (m)
0	1				no sample				
1	3				grey siltst, w & grey carb, qtzite	minor			
3	6				grey siltstone	none			
6	9				siltst, sericite, mags				
9	12				l green grey talc sch, w mags	some			
12	15				l green grey talc sch, w mags				
15	18				l green grey talc sch, w mags				
18	21				grey mags, talc sch	mod-some	81821	18	21
21	24				grey & w mag dolm, talc sch	some	82124	21	24
24	27				grey & w mags	some	82427	24	27
27	30				grey & w mags	some	82730	27	30
					EOH				

027

Tenement	CANN CREEK	E.L. 43/70		Logged by	Phillip Mackenzie				
Hole No.	**PD88CC9**								
Coodrinates		Azimuth	90	Drillers	MAXFIELD	Commenced	Apr-88	Depth	24m
		Inclination	-70	Drill type	Atlas Copco percussion	Completed			

DEPTH from (m)	to (m)	weathering	Chip Description	33% HCl acid reaction	SAMPLE No.	from (m)	to (m)
0	3	mod	l br talc sericlye sch, qtz				
3	6	mod	l br talc sch				
6	9	mod	l br & grey talc sch	some			
9	12		grey talc sch	some			
12	15		w & grey mags, talc sch	some			
15	18		grey & w mags				
18	21		grey & w mags				
21	24		cavity fill-qtz, talc sch, mags				
			EOH				

Tenement	CANN CREEK	E.L. 43/70		Logged by	Phillip Mackenzie				
Hole No.	**PD88CC10**								
Coodrinates		Azimuth	90	Drillers	MAXFIELD	Commenced	Apr-88	Depth	9m
		Inclination	-70	Drill type	Atlas Copco percussion	Completed			

DEPTH from (m)	to (m)	weathering	Chip Description	33% HCl acid reaction	SAMPLE No.	from (m)	to (m)
0	3	mod	l br wth sltst				
3	6	wth	l br wth talc sch	mod; Cl gas			
6	9		d grey & w mag	none	100609		
			abandoned, cavity				

028

Tenement	CANN CREEK	E.L. 43/70		Logged by	Phillip Mackenzie				
Hole No.	**PD88CC11**								
Coodrinates		Azimuth	90	Drillers	MAXFIELD	Commenced	Apr-88	Depth	30m
		Inclination	-70	Drill type	Atlas Copco percussion	Completed			
DEPTH						33% HCl			
from (m)	to (m)	weathering			Chip Description	acid reaction	SAMPLE No.	from (m)	to (m)
0	1				no sample				
1	3	wth			1 br wth talc sch				
3	6				1 br & grey wth talc sch				
6	9				grey talc sch	some	110609	6	9
9	12				grey talc sch, carb	some	110912	9	12
12	15				grey talc sch, carb	mod	111215	12	15
15	18				grey talc sch, carb	minor	111518	15	18
18	21				grey talc sch, sericite phyll,carb		111821	18	21
21	24				sericite phyllite, carb, qtz	mod	112124	21	24
24	27				grey dolm, talc sch, phyllite		112427	24	27
27	30				talc sch, carb, sparry calcite	strong	112730	27	30
					EOH				

1340029

Tenement	CANN CREEK	E.L. 43/70		Logged by	Phillip Mackenzie			
Hole No.	**PD88CC12**							
Coodrinates		Azimuth	90	Drillers	MAXFIELD	Commenced	Apr-88	Depth 30m
		Inclination	-70	Drill type	Atlas Copco percussion	Completed		

DEPTH from (m)	to (m)	recovery	weathering	Chip Description	33% HCl acid reaction	SAMPLE No.	from (m)	to (m)
0	3			sericite phyllite	none			
3	6		wth	sericite phyllite	none			
6	9							
9	12		wth	wth phyllite	none			
12	15							
15	18		grey	grey phyllite	minor			
18	21			grey phyllite, talc sch, carb	strong			
21	24			grey carb + talc schist	strong	122124	21	24
24	27			grey carb + talc schist	strong	122427	24	27
27	30			grey & white carb + talc sch	strong	122730	27	30
				EOH				

Tenement	CANN CREEK	E.L. 43/70		Logged by	Phillip Mackenzie				
Hole No.	**PD88CC13**								
Coodrinates		Azimuth	90	Drillers	MAXFIELD	Commenced	Apr-88	Depth	30m
		Inclination	-70	Drill type	Atlas Copco percussion	Completed			

DEPTH from (m)	to (m)	weathering	Chip Description	33% HCl acid reaction	SAMPLE No.	from (m)	to (m)
0	4		no sample				
4	6		grey dolm, w & grey mag, phyll	some			
6	9		sericite phyllite, carb	mod			
9	12		carb, talc	mod	130912	9	12
12	15		talc sch, carb				
15	18		sericite or talc, carb	strong			
18	21		grey dolm, talc schist	mild			
21	24		grey & w dolm mag	mild	132124	21	24
24	27		grey & w dolm mag		132427	24	27
27	30		dolm talcy	mild			
			EOH				

EL43/70

Tenement	CANN CREEK	E.L. 43/70		Logged by	Phillip Mackenzie				
Hole No.	**PD88CC14**								
Coodrinates		Azimuth	65	Drillers	MAXFIELD	Commenced	Apr-88	Depth	27m
		Inclination	-50	Drill type	Atlas Copco percussion	Completed			

DEPTH from (m)	to (m)	weathering	Chip Description	33% HCl acid reaction	SAMPLE No.	from (m)	to (m)
0	3	wth	wth br grey sltst	mild			
3	6	wth	l br wth phyllite				
6	9	wth	l br wth phyllite	none			
9	12	wth	br wth phyllite				
12	15	wth	l br yl talcy phyll				
15	18	wth	l br yl & grey talcy phyll	mild			
18	21		grey talc sch, grey dolm	mild	142124	21	24
21	24		white & grey carb	strong	142427	24	27
24	27		grey dolm, w mag	mild			
27	30		EOH				

Tenement	CANN CREEK	E.L. 43/70		Logged by	Phillip Mackenzie				
Hole No.	**PD88CC15**								
Coodrinates		Azimuth	63	Drillers	MAXFIELD	Commenced	Apr-88	Depth	12m
		Inclination	-52	Drill type	Atlas Copco percussion	Completed			

DEPTH from (m)	to (m)	weathering	Chip Description	33% HCl acid reaction	SAMPLE No.	from (m)	to (m)
0	10	wth	wth siltstone, clay				
10	12	wth	1 br wth talc sch, carb	mild			
12	15		abandoned				

033

Tenement	CANN CREEK	E.L. 43/70		Logged by	Phillip Mackenzie				
Hole No	**PD88CC15A**								
Coodrinates		Azimuth	50	Drillers	MAXFIELD	Commenced	Apr-88	Depth	24m
		Inclination	-55	Drill type	Atlas Copco percussion	Completed			
DEPTH						33% HCl			
from (m)	to (m)	weathering			Chip Description	acid reaction	SAMPLE No.	from (m)	to (m)
0	8	wth			wth siltstone				
8	10	wth			l be wth talcy sltst	Cl gas, slight			
10	12								
12	14								
14	16				grey talc sch, carb	mild	A151416	14	16
16	18				talc sch, carb	strong	A151618	16	18
18	20				talc sch, carb				
20	22								
22	24				l br talc sch, grey dolm w mag	mild	A152224	22	24
					abandoned				

Tenement	CANN CREEK	E.L. 43/70		Logged by	Phillip Mackenzie				
Hole No.	**PD88CC16**								
Coodrinates		Azimuth	vert	Drillers	MAXFIELD	Commenced	Apr-88	Depth	27m
		Inclination	-90	Drill type	Atlas Copco percussion	Completed			
DEPTH						33% HCl			
from (m)	to (m)	weathering			Chip Description	acid reaction	SAMPLE No.	from (m)	to (m)
0	24	wth			wth "basalt" clay				
24	27				d grey basalt				
					EOH				

Tenement	CANN CREEK	E.L. 43/70		Logged by	Phillip Mackenzie				
Hole No.	**PD88CC17**								
Coodrinates		Azimuth	120	Drillers	MAXFIELD	Commenced	Apr-88	Depth	12m
		Inclination	-43	Drill type	Atlas Copco percussion	Completed			
DEPTH						33% HCl			
from (m)	to (m)	weathering			Chip Description	acid reaction	SAMPLE No.	from (m)	to (m)
0	8	wth			clay, wth siltstone				
8	10				grey talc, carb	mod strong			
10	12				grey talc	mod			
					abandoned (wet)				

Tenement	CANN CREEK	E.L. 43/70		Logged by	Phillip Mackenzie				
Hole No.	**PD88CC18**								
Coodrinates		Azimuth	vert	Drillers	MAXFIELD	Commenced	Apr-88	Depth	30m
		Inclination	-90	Drill type	Atlas Copco percussion	Completed			
DEPTH						33% HCl			
from (m)	to (m)	weathering			Chip Description	acid reaction	SAMPLE No.	from (m)	to (m)
0	6	wth			no sample, wth, clay				
6	7				grey carb, talc schist	moderate			
7	12				no sample				
12	14				talc grey carb some white	mod			
14	16				talcy grey carb some white				
16	18				talc sch, grey dolm	mod	181618	16	18
18	20				l grey carb, talc sch	mild	181820	18	20
20	22				l grey carb, talc sch		182022	20	22
22	24				l grey carb, talc sch	mild	182224	22	24
24	26				w carb, sparry, talc	mod	182426	24	26
26	28				grey & w carb	mild	182628	26	28
28	30				grey & w carb	mod	182830	28	30
					EOH				

Tenement	CANN CREEK	E.L. 43/70		Logged by	Phillip Mackenzie				
Hole No.	**PD88CC19**								
Coodrinates		Azimuth	22	Drillers	MAXFIELD	Commenced	Apr-88	Depth	30m
		Inclination	-24	Drill type	Atlas Copco percussion	Completed			
DEPTH						33% HCl			
from (m)	to (m)	weathering			Chip Description	acid reaction	SAMPLE No.	from (m)	to (m)
0	2				grey and white magnesite some		190002	0	2
2	4				dolm		190204	2	4
4	6						190406	4	6
6	8						190608	6	8
8	10				white magnesite crystln	mild	190810	8	10
10	12						191012	10	12
12	14						191214	12	14
14	16						191416	14	16
16	18						191618	16	18
18	20				talcy schist, grey carb		191820	18	20
20	22						192022	20	22
22	24						192224	22	24
24	26						192426	24	26
26	28						192628	26	28
28	30				grey & w dolm, qtz	mod strong	192830	28	30
					EOH				

037

Tenement	CANN CREEK	E.L. 43/70		Logged by	Phillip Mackenzie				
Hole No.	**PD88CC20**								
Coodrinates		Azimuth	90	Drillers	MAXFIELD	Commenced	Apr-88	Depth	30m
		Inclination	-70	Drill type	Atlas Copco percussion	Completed			
DEPTH						33% HCl			
from (m)	to (m)	weathering			Chip Description	acid reaction	SAMPLE No.	from (m)	to (m)
0	2				no recovery				
2	3	wth			wth talc sch, dol	some			
3	6	wth			wth talc sch, dol	some			
6	9				grey talc sericite sch, carb				
9	12				talc schist		200912	9	12
12	15				grey seri phyl, grey & w carb,qz	some			
15	18				grey seric, talc? carb				
18	21				grey seric, carb, qtz	some			
21	24				talc, setic, dolm, mags?	some	202124	21	24
24	27				grey seric phyll, mags	minor	202427	24	27
27	30				d grey seric phyll (schiller)EOH				

2341038

Tenement	CANN CREEK	E.L. 43/70		Logged by	Phillip Mackenzie				
Hole No.	**PD88CC21**								
Coodrinates		Azimuth	90	Drillers	MAXFIELD	Commenced	Apr-88	Depth	15m
		Inclination	-70	Drill type	Atlas Copco percussion	Completed			
DEPTH						33% HCl			
from (m)	to (m)	weathering			Chip Description	acid reaction	SAMPLE No.	from (m)	to (m)
0	3	wth			wth talc /sericite, soft, br yl	minor			
3	6	wth			wth talc /sericite, soft, br yl	-			
6	9	wth			wth talc /sericite	minor			
9	12				white & grey mag breccia (80%)	major	210912	9	12
12	15				white & grey mag	major	211215	12	15
					EOH				

Appendix 3

International magnesite deposits with talc occurrence

NAME	COUNTRY	TEXTURES	ACCESSORIES	ASSOCIATIONS	HOST GEOLOGY
ALMORA	India	coarse grey pink yellow, massive dolm	talc dolomite quartz chlorite chalcedony	dolomite dolomitic lst stromatolites	
BELORETSK	USSR		sericite quartz talc chlorite graphitic	qtz carb sh, mica qtzites, lst dolm	
BHUJUND	India	coarse	talc graphite	dolm band 3m thick	slates phyllites quartzites pyritic lst
CARPATHIANS	Czechoslavia	crystln banded	dolm talc qtz chlorite ankerite pyrite		biohermal carbonate rk of epizonal metamorphozed cpx, fine gr dol mag/dol graphitic sch/graphitic sericite tuff/diabase tuff, gabbro amphibolites, diabase
CHAMBA	India	coarse	talc graphite		slates phyllites quartzites pyritic lst
CHING-SHAN-HAI	China		talc scapolite in grey dolm mizzonite		
DASHIQIAO	China		talc		
DASHIQIAO	China	thick layered, radiating, spotted, banded massive coarse	dolm tremolite talc clinochlor qtz pyrite chalcopyrite hematite	carb argillaceous, dolm marble, tremolite dol marble with scapolite, sericite mica sch, tourmaline chlorite schist phyllite	Gairian Fm/Dashiqiao Fm/Langzhishan Fm, Anshan Gp

NAME	COUNTRY	TEXTURES	ACCESSORIES	ASSOCIATIONS	HOST GEOLOGY
DELORO	Canada	massive med grained	talc28% serpentine qtz15% hematite 3%	diabase dyke chlorite iron formation, volcs	serpentinite body intruding greenstone belt coontaining volcs sed rk dunites
DUNEI	India	coarse	talc graphite		slates phyllites quartzites pyritic lst
GABBS	USA	crypto - cse	brucite granodiorite pyrite silica scheelitedolm talc chlorite chert diopside forsterite	dolomite lst shale volcanics intruded by intermediates and granodiorite	
GOL	India	fine to ces	talc dolm		quartzite/talc phyllite15-40m/dolm 12m/mags talc 50-110m//dolm/carb pyritic slate phyllite
GORNOSLAV	Bulgaria		talc	serpentinized dunites	
HUAZIYU	China		talc		
JHIROLI	India	coarse grey pink yellow, massive dolm	talc dolomite quartz chlorite chalcedony	dolomite dolomitic lst stromatolites	
KAO	India	coarse	talc graphite dolm	dolm carb shale	slates phyllites quartzites pyritic lst

2340042

NAME	COUNTRY	TEXTURES	ACCESSORIES	ASSOCIATIONS	HOST GEOLOGY
KHARIDHUNGA	Nepal		talc siderite		
KHIGAN GROUP	USSR	crypto	talc silica	dolm cherts lst	
KUAN MA SHAN			mica schist calcite dolm opal boitite talc tourmaline	chlorite schist sericite sch	
MANTERN			talc	talc schist	
MARCHENREN RANGE	Korea		marbles calcite dolm forsterite diopside pargasite talc	massive dolm marbles	marbles, gneiss amphibolite migmatites
MINERIOS	Brazil	sugary	talc actinolite bands	albite dolomite	silicaceous gneiss dolomite magnesite; ressidual banding
ONOT SAYAN	USSR		talc dolm serp		dolom lst schist amphibolites gneiss biotite & lenocratic granites
PATEN GOT	India	coarse	talc graphite		limestone

NAME	COUNTRY	TEXTURES	ACCESSORIES	ASSOCIATIONS	HOST GEOLOGY
PICAJA	Brazil		talc		
PITHORAGARH	India	cse grey pink yellow, massive dolomite	talc dolm siderite breunerite chert quartz chlorite chalcedony	dolom stromatolites	quartzite/talc phyllite15-40m/dolm ;mass dolm, lst mag , tuff phuyll, marble, slates12m/mags talc 50-110m//dolm/carb pyritic slate phyllite
SAVINA	USSR	cse, rarely med fine gr	dolm chlorite talc pyrite qtz	dolm lst schists amphibolites gneiss biotite & luco granites	lst, dolm, amphib/ mag /hbl sch, dolm-chlor chlor-talc biotite schist
SERRA DAS EGUAS	Brazil		talc hematite, minor enstatite emerald spondumene topaz beryl garnet pyrite epidote sphene		proterzoic dolm/qtzites/Archaeozoic gneiss schists of Braziliann Complexo Fondamentale
SHETLANDS	UK		talc serpentine chlorite chromite magnetite hematite;44% talc, 45% magnesite, 10%magnetite chlorite	epidorite	phyllites/ ultrabasics
TA LING			scapolite talc		
TA SHIN CHIAO	China	cse med	talc scapolite in grey dolm mizzonite rutile qtz sericite tourmaline calcite graphite; 76% dolm, 3% lst, 12% mags, 10% schist	grey dolm scapolite, mag grades to dolm at ends and sides	dolm mag/ marble/slate sch/qtzite ss
TARRAKAISSE	Sweden		chlorite talc asbestos	amphibolite	

NAME	COUNTRY	TEXTURES	ACCESSORIES	ASSOCIATIONS	HOST GEOLOGY
THAL	India	fine to ces	talc dolm		quartzite/talc phyllite15-40m/dolm 12m/mags talc 60-110m//dolm/carb pyritic slate phyllite
TUNDAH	India	coarse	talc graphite	slate qtzite carb sh	slates phyllites quartzites pyritic lst
UDEREI GROUP	USSR	fine med cse	dolm qtz talc siderite graphite hematite iron hydroxides		
VALE DE PEDRA PRETA	Brazil		talc itabiarite	sil gneiss dolm mag	
VAVDOS	Greece	crypto fibrous granular	dolm chalcedony qtz calcite, selvages serp chlorite talc tremolite	dunite serpentinite websterite olv clinopxite gabbro	shelf carbonates shales greywackes
VOLCHEGORSK	USSR		71.8% mags 25.0% dolm; talc chlorite serpentine, pyroxene (2.1%), qtz + chalcedony 0.6%	dibase	

Appendix 4

Analytical data

046

ANALABS

734047

A division of MacDonald Hamilton & Co Pty Ltd
52 Murray Road, Welshpool, W.A. 6106
Phone (09) 458 7999
FAX: 004 31 8890
Telex AA92580

RECEIVED
10 MAY 1988
A.M.'s'd

ANALYTICAL REPORT No. 999.43.08.05329

THIS REPORT MUST BE READ IN CONJUNCTION WITH THE ACCOMPANYING ANALYTICAL DATA

Mineral Holding
2nd Floor, 100 Collins St.,
Melbourne
Vic. 3000

ORDER No.	PROJECT

DATE RECEIVED	RESULTS REQUIRED
14/04/88	ASAP

No. OF PAGES OF RESULTS	DATE REPORTED	No. OF COPIES	TOTAL No. OF SAMPLES
9	05/05/88	1	74

STATE OF SAMPLES		PRE-TREATMENT							ANALYSIS		
REFER BELOW	SAMPLE NUMBERS	DRY	CRUSH	SPLIT	PULVERISE	SIEVE	OTHER SEE REMARKS	NONE	REFER TO ANALYSIS SECTION	PREPARATION	METHOD
	Various	SO	Prep: 006,014,016						Al2O3,SiO2,TiO2,Fe2O3,MnO,CaO,K2O,MgO,P2O5/408.		
	Various	SO	Prep: 006,014,016						Al2O3,SiO2,TiO2,Fe2O3,MnO,CaO,K2O,MgO,P2O5/408.		
	Various	SO	Prep: 006,014,016						Al2O3,SiO2,TiO2,Fe2O3,MnO,CaO,K2O,MgO,P2O5/408.		
	CCT 1/2	SO	Prep: 006,014,016,Roast						LOI/615		
	CC21,B52	SO	Prep: 006,014,016						Au/309		

RESULTS TO

Mineral Holding
2nd Floor, 100 Collins St.,
Melbourne
Vic. 3000

RESULTS TO

REMARKS

STATE OF SAMPLES		ANALYSIS — PREPARATION				ANALYSIS — METHOD	
whole core	WC	perchloric acid	A1	cold acid	CA	atomic absorbtion	AAS
split core	SC	hydrochloric acid	A2	specific sulphide	SS	x-ray fluorescence	XRF
cutting	CU	nitric acid	A3	other mixed acids	Ma	spectrophotometry	SPEC
rock	Ro	aqua regia	A4	alkaline attack	AA	colorimetry	COL
soil	SO	nitric-perchloric	A5	volatilization	VO	chromatography	CHR
pulp	PU	HF mixture	A6	ignition	IG	titration	TTN
water	WA	HF under pressure	A7	pressed powder (XRF)	PP	other chemicals means	CHEM
tissue	TI	fusion	A8	glass fusion (XRF)	GF	miscellaneous	MISC
stream sediment	SS					fluorescence	FLUOR
heavy mineral	HM					inductively coupled plasma	ICP

AUTHORISED OFFICER

047

ANALABS

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ANALYTICAL DATA

SAMPLE PREFIX | REPORT NUMBER | REPORT DATE | CLIENT ORDER No. | PAGE

999.43.08.05[illegible] | [illegible] | 1 OF 8

TUBE No	SAMPLE No	Au	Na2O	Al2O3	CaO	Fe2O3	K2O	MgO	MnO	P2O5
1	[illegible]609	-	0.133	1.35	12.50	[illegible]	0.07	21.8	0.02	0.023
2	060912	-	0.267	5.40	5.80	[illegible]	2.65	22.4	0.07	0.060
3	061215	-	0.156	2.75	13.40	[illegible]	0.30	23.7	0.05	0.050
4	061518	-	0.311	7.60	5.25	[illegible]	0.93	18.3	0.08	0.108
5	060609	-	0.266	3.55	10.40	4.90	0.22	24.0	0.07	0.066
6	060912	-	0.230	9.00	4.95	[illegible]	2.30	13.3	0.05	0.073
7	061215	-	0.372	14.00	1.45	[illegible]	4.00	6.5	0.03	0.090
8	061518	-	0.370	13.80	1.35	[illegible]	3.80	5.6	0.03	0.101
9	[illegible]621	-	0.378	12.90	3.05	[illegible]	2.80	7.4	0.06	0.181
10	062124	-	0.478	10.20	3.15	9.50	1.35	14.0	0.09	0.140
11	062427	-	0.208	2.80	13.30	[illegible]	0.40	20.9	0.04	0.057
12	062730	-	0.148	2.05	13.40	[illegible]	0.34	21.5	0.03	0.032
13	060203	-	0.504	6.75	4.70	5.25	1.80	18.4	0.06	0.064
14	060306	-	0.460	5.85	8.95	6.20	0.39	19.9	0.10	0.096
15	060609	-	0.120	1.85	3.30	2.15	0.14	36.6	0.04	0.037
16	060912	-	0.047	0.35	1.85	0.70	0.03	43.1	0.03	<0.007
17	061215	-	0.034	0.40	2.35	0.50	0.04	41.8	0.01	0.007
18	061518	-	0.070	0.45	11.60	0.43	0.03	28.4	0.02	0.014
19	061821	-	0.121	0.40	11.80	0.27	0.03	25.0	0.01	0.007
20	062124	-	0.128	0.40	14.40	0.35	0.03	23.2	0.01	0.009
21	062427	-	0.222	2.80	13.90	1.60	0.58	19.3	0.04	0.027
22	062730	-	0.168	4.70	13.70	1.95	1.10	16.9	0.03	0.050
23	081821	-	0.202	3.00	9.55	4.00	0.22	24.4	0.05	0.060
24	082124	-	0.128	0.85	14.50	1.05	0.06	25.1	0.01	0.023
25	082427	-	0.203	1.15	11.50	0.98	0.14	30.0	0.07	0.014

ANALABS

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ANALYTICAL DATA

FIX | REPORT NUMBER | REPORT DATE | CLIENT ORDER No. | PAGE

999.43.08.05[illegible] | 05/05/88 | 5 OF

SiO2	TiO2	Na2O	LOI
37.8	0.18	-	23.30
40.8	0.94		14.00
29.9	0.47	-	24.30
44.8	1.09	-	11.13
31.8	0.64	-	23.50
49.7	0.57	-	13.70
62.0	0.66	-	6.93
61.4	0.59	-	6.54
54.9	0.88	-	9.14
47.6	1.42	-	9.92
34.0	0.36	-	24.30
29.8	0.21	-	26.50
47.8	0.74	-	13.60
36.8	1.01	-	19.10
14.4	0.28	-	39.60
4.6	0.08	-	48.60
8.5	0.05	-	45.50
25.9	0.06	-	32.30
37.7	0.03	-	24.50
33.1	0.03	-	27.80
33.8	0.15	-	26.00
34.8	0.22	-	25.00
35.4	0.49	-	21.60
31.5	0.12	-	26.40
21.6	0.17		[illegible]

23.1018

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ANALABS

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ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	999.43.08.05335	05/05/88		2 OF 8

TUBE No	SAMPLE No.	Au	Na2O	Al2O3	CaO	Fe2O3	K2O	MgO	MnO	P2O5
1	082[illegible]	-	0.176	0.85	5.30	0.65	0.10	35.8	0.01	0.009
2	09[illegible]	-	0.358	3.55	8.00	[illegible]	[illegible]31	24.0	0.04	0.039
3	09[illegible]	-	0.134	2.20	9.75	2.00	[illegible]11	26.4	0.03	0.021
4	09[illegible]	-	0.108	1.75	6.50	1.50	0.18	34.6	0.03	0.027
5	09[illegible]321	-	0.098	0.95	5.55	0.85	0.10	38.1	0.02	0.014
6	100[illegible]	-	0.046	0.70	2.45	0.95	0.09	41.9	0.04	0.021
7	1106[illegible]	-	0.512	3.20	7.40	2.35	0.15	25.4	0.04	0.027
8	110912	-	0.635	7.65	6.15	7.85	0.49	20.0	0.09	0.087
9	111215	-	0.595	6.50	5.55	5.65	0.41	21.9	0.07	0.064
10	1115[illegible]	-	0.520	8.00	5.85	6.80	0.94	17.4	0.08	0.087
11	1121[illegible]	-	0.600	8.75	5.70	5.30	1.10	15.9	0.07	0.094
12	1124[illegible]	-	0.525	6.30	15.40	5.00	0.59	13.6	0.08	0.080
13	1127[illegible]	-	0.485	5.80	15.70	4.15	0.55	14.7	0.08	0.082
14	1221[illegible]	-	0.135	1.60	10.70	1.45	0.14	24.8	0.03	0.027
15	122427	-	0.155	2.30	11.80	2.00	0.20	23.3	0.04	0.037
16	122730	-	0.155	3.40	10.10	3.60	0.41	24.0	0.02	0.048
17	130912	-	0.405	9.00	6.90	7.40	1.25	14.0	0.08	0.133
18	132124	-	0.735	7.75	13.20	3.20	1.75	14.5	0.05	0.085
19	132427	-	0.615	7.55	13.70	3.15	1.65	14.1	0.05	0.080
20	142124	-	0.102	2.30	10.70	2.20	0.27	29.1	0.03	0.037
21	142427	-	0.058	1.30	7.50	1.30	0.21	35.4	0.03	0.027
22	A151618	-	0.142	3.20	9.60	3.10	0.34	25.3	0.05	0.041
23	A152224	-	0.135	4.60	4.85	3.20	0.78	26.6	0.05	0.055
24	182428	-	0.295	6.85	7.95	5.75	0.56	20.4	0.07	0.105
25	182[illegible]	-	0.176	5.15	11.60	4.00	0.71	21.0	0.05	0.069

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ANALYTICAL DATA

FIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	999.43.08.05335	05/05/88		6 OF

SiO2	TiO2	Na2O	LOI
26.7	0.07	-	32.20
43.0	0.32	-	16.60
31.6	0.24	-	24.30
15.8	0.17	-	37.90
10.4	0.09	-	42.80
6.6	0.08	-	46.30
43.8	0.31	-	15.70
43.9	1.16	-	11.08
43.6	0.75	-	13.70
45.7	0.90	-	12.30
47.8	0.87	-	11.50
38.9	0.65	-	17.70
37.4	0.56	-	19.30
33.9	0.20	-	25.90
36.3	0.28	-	22.80
36.8	0.50	-	20.20
44.9	1.22	-	14.40
34.5	0.45	-	22.80
34.3	0.36	-	23.70
21.0	0.30	-	33.00
13.3	0.15	-	40.50
34.9	0.40	-	22.00
31.8	0.42	-	26.20
39.1	1.04	-	16.80
34.3	0.53		

23/10/49

ANALABS

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ANALYTICAL DATA

SAMPLE PREFIX | REPORT NUMBER | REPORT DATE | CLIENT ORDER No. | PAGE

999.43.08.05335 | 05/05/88 | | 3 OF 8

TUBE No.	SAMPLE No	Au	Na2O	Al2O3	CaO	Fe2O3	K2O	MgO	MnO	P2O5
1	18[illegible]		0.270	7.15	11.50	4.60	[illegible]5	15.5	0.05	0.092
2	190[illegible]		[illegible].008	0.25	1.30	0.23	[illegible].03	44.5	0.02	0.009
3	[illegible]		[illegible].304	[illegible].50	1.10	[illegible].12	[illegible]	[illegible].2	0.02	<0.007
4	190[illegible]		[illegible].007	0.30	2.35	0.13	[illegible].01	44.0	0.02	<0.007
5	190[illegible]		0.003	0.35	3.00	0.13	0.12	43.6	0.02	0.009
6	191[illegible]		0.148	2.50	4.60	3.20	0.17	35.8	0.05	0.055
7	191214	-	0.148	7.50	4.20	10.60	0.39	21.5	0.11	0.121
8	191416	-	0.196	7.55	5.35	10.40	0.[illegible]7	23.6	0.12	0.119
9	191613	-	0.545	9.50	3.00	8.30	1.25	16.8	0.09	0.112
10	191820	-	0.770	11.90	2.20	5.80	2.35	11.0	0.06	0.094
11	192[illegible]		-	11.40	4.15	4.95	[illegible].5	10.8	0.07	0.092
12	192[illegible]	-	-	10.10	5.20	5.65	2.[illegible]	13.0	0.07	0.092
13	192[illegible]	-	-	9.10	5.40	7.85	1.65	17.0	0.09	0.105
14	192628	-	-	8.80	5.30	8.45	1.45	17.6	0.11	0.115
15	192830	-	-	8.75	5.05	9.85	1.55	16.6	0.11	0.133
16	200913	-	-	8.20	4.60	12.20	0.54	19.9	0.12	0.144
17	202124	-	-	7.00	8.20	4.85	1.00	15.8	0.08	0.087
18	202427	-	-	10.40	4.50	6.85	1.75	12.0	0.09	0.117
19	210912	-	-	1.80	1.50	2.60	0.12	40.8	0.04	0.041
20	211215	-	-	1.85	1.75	2.50	0.11	41.0	0.04	0.034
21	CCT 1	-	-	-	-	-	-	-	-	-
22	CCT 2	-	-	-	-	-	-	-	-	-
23	CC21	<0.008	-	-	-	-	-	-	-	-
24	852	<0.008	-	-	-	-	-	-	-	-
25										

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ANALYTICAL DATA

REFIX | REPORT NUMBER | REPORT DATE | CLIENT ORDER No. | PAGE

999.43.08.05335 | 05/05/88 | | 7 OF 8

SiO2	TiO2	Na2O	LOI
37.0	0.66	-	20.80
2.9	0.03	-	50.10
1.4	<0.01	-	52.20
1.7	<0.01	-	50.70
1.3	<0.01	-	50.50
16.6	0.43	-	35.90
40.4	1.35	-	13.70
38.4	1.32	-	12.42
48.7	1.13	-	9.15
55.8	0.76	-	7.38
54.4	0.60	0.550	10.04
49.6	0.30	0.540	11.73
45.0	1.04	0.335	11.97
44.3	1.09	0.265	11.99
46.0	1.44	0.148	10.47
44.3	1.62	0.230	7.96
44.8	0.56	0.330	15.90
51.3	0.90	0.255	10.42
11.1	0.32	0.080	41.20
11.5	0.32	0.066	41.30
-	-	-	7.20
-	-	-	1.80
-	-	-	-
-	-	-	-

030

ANALABS

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ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	999.43.08.05335	05/05/88		4 OF 8

TUBE No.	SAMPLE No.	Au	Na2O	Al2O3	CaO	Fe2O3	K2O	MgO	MnO	P2O5
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22	DETECTION	0.008	0.001	0.05	0.05	0.01	0.01	0.1	0.01	0.007
23	UNITS	PPM	%	%	%	%	%	%	%	%
24	METHOD	309	103	408	408	408	408	408	408	408
25										

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ANALYTICAL DATA

EFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	999.43.08.05335	05/05/88		8 OF

SiO2	TiO2	Na2O	LOI					
0.1	0.01	0.001	0.01					
%	%	%	%					
408	408	610	615					

F30362

051

734052

Arthur River E.L. 43/70

Cann Creek Prospect

Drill Location Plan

R573-1 PCM.

drill hole

5 cm

10m

Scale 1:1,000
A.M.G grid

PCM

369 600mE

369 700mE

5 447 100mN

5 447 000mN

CC16
CC17
CC18
CC11
CC10
CC9
CC15
CC14
CC12
CC21
CC20
CC19
CC3
CC4
CC5
CC8
CC6
CC7
CC13
CC2

Cann Ck

052

734053

5 cm

Arthur River E.L. 43/70
Cann Creek Prospect
Geology Plan

R573-2 SBM.

poss anticline

shear zone

72° dip

10m

Scale 1:1000
AMG grid

PCM

5 447 100mN

basalt

basalt

talc schist

quartzite

5 447 000mN

talc schist

Cann Ck

talc schist
phyllite
carbonate

phyllite

phyllite

talc schist

67-77°

88-2862 v2/3
Appx 5

Percussion drilling and geological results Arthur River EL.43/70

Cann Creek Magnesite & Foya Talc

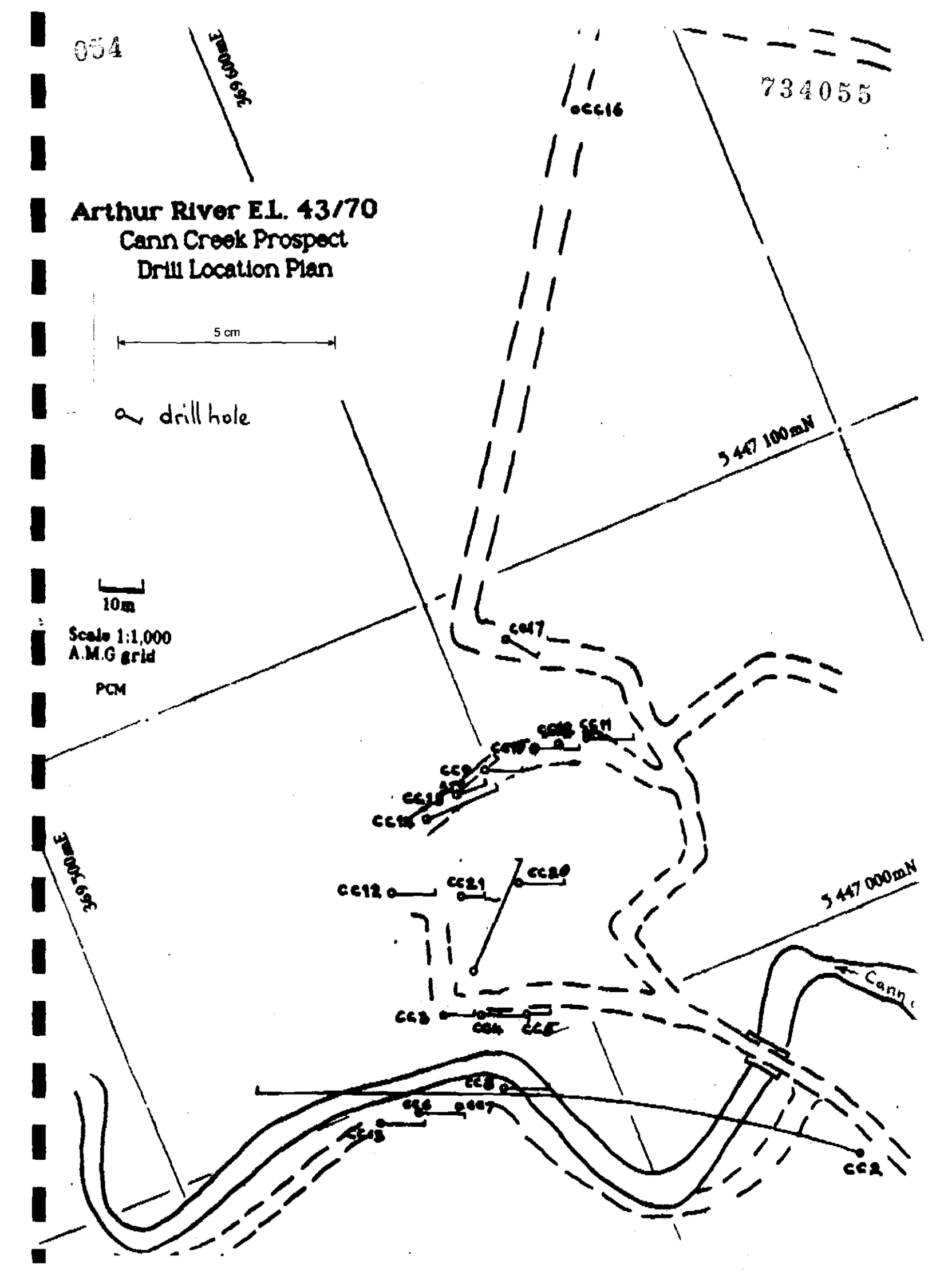
Interim report.

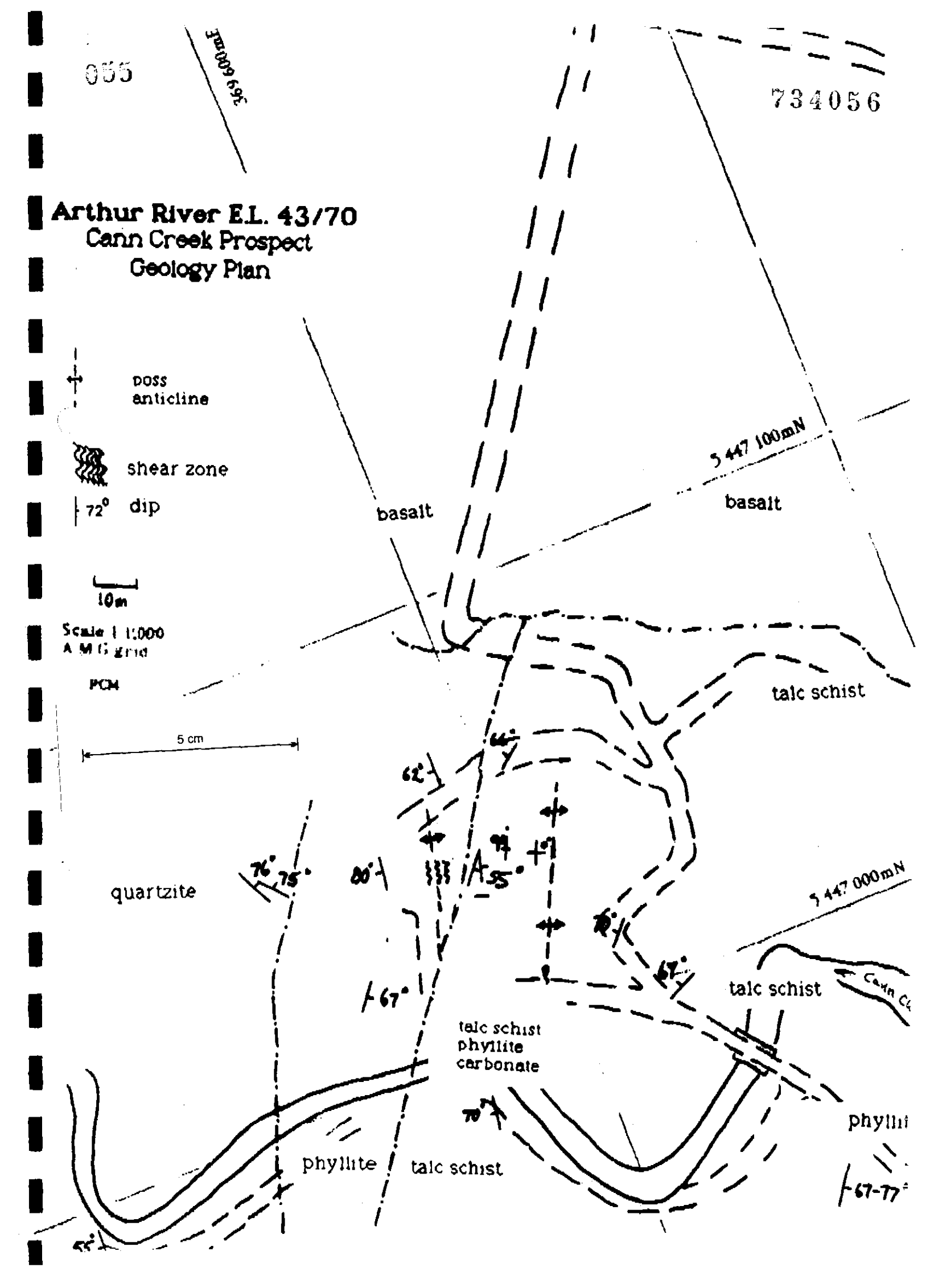
A percussion drilling program was conducted at the Cann Creek site to evaluate the extent and quality of magnesite. During the work observations were also made on the occurrence of talc and quartzite. Eighteen positions in the carbonate sequence (map attached) were drilled with a Atlas Copco percussion rig. Drill chips from some sections of the holes were submitted to Analabs laboratories for analysis. The drill logs (attached) and mapping (map shows possible positions for anticlines, and the carbonate zone franked by a silicious sequence to the west, and a talc rich one in the east) indicate that the deposit is of complex nature, being mixed carbonates interbedded with talc schist and "sericite" phyllite. Chemical results show that much of the carbonate is dolomitic.

High grade magnesite outcropping at the surface appears to be limited in extent. On the east end of the body there is structural evidence for a down fold, the drilling also struck penetration and recovery problems. A hole drilled sub horizontally into the outcrop only intersected about 12m of magnesite. There appears to be no continuous body of magnesite up to 100,000 tonnes. However further exploration down dip and deeper may prove fruitful.

734055

Arthur River E.L. 43/70
Cann Creek Prospect
Drill Location Plan




055
734056
Arthur River E.L. 43/70
Cann Creek Prospect
Geology Plan
poss anticline
shear zone
72° dip
10m
Scale 1:1000
PCM
5 cm
basalt
basalt
5 447 100mN
talc schist
quartzite
5 447 000mN
talc schist
talc schist
phyllite
carbonate
phyllite
talc schist
phylli
67-77

056

Tenement	CANN CREEK	E.L. 43/70		Logged by	Phillip Mackenzie				
Hole No.	**PD88CC3**								
Coodrinates		Azimuth	90	Drillers	MAXFIELD	Commenced	Apr-88	Depth	21m
		Inclination	-70	Drill type	Atlas Copco percussion	Completed			
DEPTH						33% HCl			
from (m)	to (m)	weathering			Chip Description	acid reaction	SAMPLE No.	from (m)	to (m)
0	3				no sample				
3	6				w & grey dolm, phyllite, mag?	mod to strong	30306	3	6
6	9				grey talc schist, grey carb, qtz	some	30609	6	9
9	12				talc schist, grey dolm	some	30912	9	12
12	15				w & grey carb, talc	mod some	31215	12	15
15	18				grey dolm, w & grey carb, talc, p	some	31518	15	18
18	21				grey sericite phyllite	minor			
					EOH				

Tenement	CANN CREEK	E.L. 43/70		Logged by	Phillip Mackenzie				
Hole No.	**PD88CC4**								
Coodrinates		Azimuth	90	Drillers	MAXFIELD	Commenced	Apr-88	Depth	30m
		Inclination	-70	Drill type	Atlas Copco percussion	Completed			
DEPTH						33% HCl			
from (m)	to (m)	weathering			Chip Description	acid reaction	SAMPLE No.	from (m)	to (m)
0	3	wth			no sample				
3	6				sericite, grey mags	minor			
6	9				grey mag, talc sch	minor	40609	6	9
9	12				grey carb, talc sch	minor	40912	9	12
12	15				d grey phyllite(schillered),carb	minor			
15	18				d grey phyllite(schillered),carb	minor	41518	15	18
18	21				d grey phyllite(schillered),carb	minor	41821	18	21
21	24				d grey talc, phyll, mage	minor	42124	21	24
24	27				grey & white carb, talc grey whit	minor	42427	24	27
27	30				grey & white carb, talc grey whit	minor	42730	27	30
					EOH				

Tenement	CANN CREEK	E.L. 43/70	Logged by	Phillip Mackenzie				
Hole No.	**PD88CC5**							
Coodrinates		Azimuth	Drillers	MAXFIELD	Commenced	Apr-88	Depth	15m
		Inclination	Drill type	Atlas Copco percussion	Completed			

DEPTH from (m)	to (m)	weathering	Chip Description	33% HCl acid reaction	SAMPLE No.	from (m)	to (m)
0	3		sericite phyllite, d grey carb	some			
3	6		sericite phyllite, silica, carb	some			
6	9		sericite phyllite	none			
9	12		phyllite, possible cavity	minor			
12	15		mud, phyllite, mags, talc, qtz, ca	minor			
			EOH				

Tenement	CANN CREEK	E.L. 43/70		Logged by	Phillip Mackenzie				
Hole No.	PD88CC6								
Coodrinates		Azimuth	90	Drillers	MAXFIELD	Commenced	Apr-88	Depth	30m
		Inclination	-70	Drill type	Atlas Copco percussion	Completed			
DEPTH						33% HCl			
from (m)	to (m)	weathering			Chip Description	acid reaction	SAMPLE No.	from (m)	to (m)
0	2				no sample				
2	3				talc schist, carb	moderate	60203	2	3
3	6				white talc, white mag, carb	moderate	60306	3	6
6	9				d grey & w mag dolm	moderate	60609	6	9
9	12				d grey & w mag dolm	moderate	60912	9	12
12	15				d grey & w mag dolm		61215	12	15
15	18				d grey & w mag dolm	strong	61518	15	18
18	21				d grey & w mag dolm	moderate	61821	18	21
21	24				grey & w mag, qtz	minor	62124	21	24
24	27				grey & w mag		62427	24	27
27	30				grey & w mag, sericite phyllite	minor	62730	27	30
					EOH				

Tenement	CANN CREEK	E.L. 43/70		Logged by	Phillip Mackenzie					
Hole No.	PD88CC7									
Coodrinates		Azimuth	90	Drillers	MAXFIELD	Commenced	Apr-88	Depth	6m?	
		Inclination	-70	Drill type	Atlas Copco percussion	Completed				
DEPTH						33% HCl				
from (m)	to (m)	weathering			Chip Description	acid reaction	SAMPLE No.	from (m)	to (m)	
0	3	wth			no sample, wet zone, yl br mud					
3	6				no sample, Abandoned					

Tenement	CANN CREEK	E.L. 43/70		Logged by	Phillip Mackenzie				
Hole No.	**PD88CC8**								
Coodrinates		Azimuth	90	Drillers	MAXFIELD	Commenced	Apr-88	Depth	30m
		Inclination	-70	Drill type	Atlas Copco percussion	Completed			
DEPTH						33% HCl			
from (m)	to (m)	weathering			Chip Description	acid reaction	SAMPLE No.	from (m)	to (m)
0	1				no sample				
1	3				grey siltst, w & grey carb, qtzite	minor			
3	6				grey siltstone	none			
6	9				siltst, sericite, mags				
9	12				l green grey talc sch, w mags	some			
12	15				l green grey talc sch, w mags				
15	18				l green grey talc sch, w mags				
18	21				grey mags, talc sch	mod-some	81821	18	21
21	24				grey & w mag dolm, talc sch	some	82124	21	24
24	27				grey & w mags	some	82427	24	27
27	30				grey & w mags	some	82730	27	30
					EOH				

Tenement	CANN CREEK	E.L. 43/70		Logged by	Phillip Mackenzie				
Hole No.	**PD88CC9**								
Coodrinates		Azimuth	90	Drillers	MAXFIELD	Commenced	Apr-88	Depth	24m
		Inclination	-70	Drill type	Atlas Copco percussion	Completed			
DEPTH						33% HCl			
from (m)	to (m)	weathering			Chip Description	acid reaction	SAMPLE No.	from (m)	to (m)
0	3	mod			l br talc sericiye sch, qtz				
3	6	mod			l br talc sch				
6	9	mod			l.br & grey talc sch	some			
9	12				grey talc sch	some			
12	15				w & grey mags, talc sch	some			
15	18				grey & w mags				
18	21				grey & w mags				
21	24				cavity fill-qtz, talc sch, mags				
					EOH				

Tenement	CANN CREEK	E.L. 43/70		Logged by	Phillip Mackenzie				
Hole No.	**PD88CC10**								
Coodrinates		Azimuth	90	Drillers	MAXFIELD	Commenced	Apr-88	Depth	9m
		Inclination	-70	Drill type	Atlas Copco percussion	Completed			
DEPTH						33% HCl			
from (m)	to (m)	weathering			Chip Description	acid reaction	SAMPLE No.	from (m)	to (m)
0	3	mod			l br wth sltst				
3	6	wth			l br wth talc sch	mod; Cl gas			
6	9				d grey & w mag	none	100609		
					abandoned, cavity				

Tenement	CANN CREEK	E.L. 43/70		Logged by	Phillip Mackenzie				
Hole No.	**PD88CC11**								
Coodrinates		Azimuth	90	Drillers	MAXFIELD	Commenced	Apr-88	Depth	30m
		Inclination	-70	Drill type	Atlas Copco percussion	Completed			
DEPTH						33% HCl			
from (m)	to (m)	weathering			Chip Description	acid reaction	SAMPLE No.	from (m)	to (m)
0	1				no sample				
1	3	wth			l br wth talc sch				
3	6				l br & grey wth talc sch				
6	9				grey talc sch	some	110609	6	9
9	12				grey talc sch, carb	some	110912	9	12
12	15				grey talc sch, carb	mod	111215	12	15
15	18				grey talc sch, carb	minor	111518	15	18
18	21				grey talc sch, sericite phyll,carb		111821	18	21
21	24				sericite phyllite, carb, qtz	mod	112124	21	24
24	27				grey dolm, talc sch, phyllite		112427	24	27
27	30				talc sch, carb, sparry calcite	strong	112730	27	30
					EOH				

Tenement	CANN CREEK	E.L. 43/70		Logged by	Phillip Mackenzie			
Hole No.	**PD88CC12**							
Coodrinates		Azimuth	90	Drillers	MAXFIELD	Commenced	Apr-88	Depth 30m
		Inclination	-70	Drill type	Atlas Copco percussion	Completed		

DEPTH from (m)	to (m)	recovery	weathering	Chip Description	33% HCl acid reaction	SAMPLE No.	from (m)	to (m)
0	3			sericite phyllite	none			
3	6		wth	sericite phyllite	none			
6	9							
9	12		wth	wth phyllite	none			
12	15							
15	18		grey	grey phyllite	minor			
18	21			grey phyllite, talc sch, carb	strong			
21	24			grey carb +talc schist	strong	122124	21	24
24	27			grey carb +talc schist	strong	122427	24	27
27	30			grey & white carb +talc sch	strong	122730	27	30
				EOH				

Tenement	CANN CREEK	E.L. 43/70		Logged by	Phillip Mackenzie				
Hole No.	**PD88CC13**								
Coodrinates		Azimuth	90	Drillers	MAXFIELD	Commenced	Apr-88	Depth	30m
		Inclination	-70	Drill type	Atlas Copco percussion	Completed			

DEPTH from (m)	to (m)	weathering	Chip Description	33% HCl acid reaction	SAMPLE No.	from (m)	to (m)
0	4		no sample				
4	6		grey dolm, w & grey mag, phyll	some			
6	9		sericite phyllite, carb	mod			
9	12		carb, talc	mod	130912	9	12
12	15		talc sch, carb				
15	18		sericite or talc, carb	strong			
18	21		grey dolm, talc schist	mild			
21	24		grey & w dolm mag	mild	132124	21	24
24	27		grey & w dolm mag		132427	24	27
27	30		dolm talcy	mild			
			EOH				

Tenement	CANN CREEK	E.L. 43/70		Logged by	Phillip Mackenzie				
Hole No.	**PD88CC14**								
Coodrinates		Azimuth	65	Drillers	MAXFIELD	Commenced	Apr-88	Depth	27m
		Inclination	-50	Drill type	Atlas Copco percussion	Completed			

DEPTH from (m)	to (m)	weathering	Chip Description	33% HCl acid reaction	SAMPLE No.	from (m)	to (m)
0	3	wth	wth br grey sltst	mild			
3	6	wth	l br wth phyllite				
6	9	wth	l br wth phyllite	none			
9	12	wth	br wth phyllite				
12	15	wth	l br yl talcy phyll				
15	18	wth	l br yl & grey talcy phyll	mild			
18	21		grey talc sch, grey dolm	mild	142124	21	24
21	24		white & grey carb	strong	142427	24	27
24	27		grey dolm, w mag	mild			
27	30		EOH				

Tenement	CANN CREEK	E.L. 43/70		Logged by	Phillip Mackenzie				
Hole No.	**PD88CC15**								
Coodrinates		Azimuth	63	Drillers	MAXFIELD	Commenced	Apr-88	Depth	12m
		Inclination	-52	Drill type	Atlas Copco percussion	Completed			

DEPTH from (m)	to (m)	weathering	Chip Description	33% HCl acid reaction	SAMPLE No.	from (m)	to (m)
0	10	wth	wth siltstone, clay				
10	12	wth	1 br wth talc sch, carb	mild			
12	15		abandoned				

Tenement	CANN CREEK	E.L. 43/70		Logged by	Phillip Mackenzie				
Hole No.	PD88CC15A								
Coodrinates		Azimuth	50	Drillers	MAXFIELD	Commenced	Apr-88	Depth	24m
		Inclination	-55	Drill type	Atlas Copco percussion	Completed			
DEPTH						33% HCl			
from (m)	to (m)	weathering			Chip Description	acid reaction	SAMPLE No.	from (m)	to (m)
0	8	wth			wth siltstone				
8	10	wth			1 be wth talcy sltst	Cl ges, slight			
10	12								
12	14								
14	16				grey talc sch, carb	mild	A151416	14	16
16	18				talc sch, carb	strong	A151618	16	18
18	20				talc sch, carb				
20	22								
22	24				1 br talc sch, grey dolm w mag	mild	A152224	22	24
					abandoned				

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Tenement	CANN CREEK	E.L. 43/70		Logged by	Phillip Mackenzie					
Hole No.	**PD88CC16**									
Coodrinates		Azimuth	vert	Drillers	MAXFIELD	Commenced	Apr-88	Depth	27m	
		Inclination	-90	Drill type	Atlas Copco percussion	Completed				
DEPTH						33% HCl				
from (m)	to (m)	weathering			Chip Description	acid reaction	SAMPLE No.	from (m)	to (m)	
0	24	wth			wth "basalt" clay					
24	27				d grey basalt					
					EOH					

Tenement	CANN CREEK	E.L. 43/70		Logged by	Phillip Mackenzie					
Hole No.	**PD88CC17**									
Coodrinates		Azimuth	120	Drillers	MAXFIELD	Commenced	Apr-88	Depth	12m	
		Inclination	-43	Drill type	Atlas Copco percussion	Completed				
DEPTH						33% HCl				
from (m)	to (m)	weathering			Chip Description	acid reaction	SAMPLE No.	from (m)	to (m)	
0	8	wth			clay, wth siltstone					
8	10				grey talc, carb	mod strong				
10	12				grey talc	mod				
					abandoned (wet)					

Tenement CANN CREEK E.L. 43/70 Logged by Phillip Mackenzie
Hole No. **PD88CC18**
Coodrinates Azimuth vert Drillers MAXFIELD Commenced Apr-88 Depth 30m
Inclination -90 Drill type Atlas Copco percussion Completed

DEPTH from (m)	to (m)	weathering	Chip Description	33% HCl acid reaction	SAMPLE No.	from (m)	to (m)
0	6	wth	no sample, wth, clay				
6	7		grey carb, talc schist	moderate			
7	12		no sample				
12	14		talc grey carb some white	mod			
14	16		talcy grey carb some white				
16	18		talc sch, grey dolm	mod	181618	16	18
18	20		l grey carb, talc sch	mild	181820	18	20
20	22		l grey carb, talc sch		182022	20	22
22	24		l grey carb, talc sch	mild	182224	22	24
24	26		w carb, sparry, talc	mod	182426	24	26
26	28		grey & w carb	mild	182628	26	28
28	30		grey & w carb	mod	182830	28	30
			EOH				

Tenement	CANN CREEK	E.L. 43/70		Logged by	Phillip Mackenzie				
Hole No.	PD88CC19								
Coodrinates		Azimuth	22	Drillers	MAXFIELD	Commenced	Apr-88	Depth	30m
		Inclination	-24	Drill type	Atlas Copco percussion	Completed			
DEPTH						33% HCl			
from (m)	to (m)	weathering			Chip Description	acid reaction	SAMPLE No.	from (m)	to (m)
0	2				grey and white magnesite some		190002	0	2
2	4				dolm		190204	2	4
4	6						190406	4	6
6	8						190608	6	8
8	10				white magnesite crystln	mild	190810	8	10
10	12						191012	10	12
12	14						191214	12	14
14	16						191416	14	16
16	18						191618	16	18
18	20				talcy schist, grey carb		191820	18	20
20	22						192022	20	22
22	24						192224	22	24
24	26						192426	24	26
26	28						192628	26	28
28	30				grey & w dolm, qtz	mod strong	192830	28	30
					EOH				

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Tenement	CANN CREEK	E.L. 43/70		Logged by	Phillip Mackenzie				
Hole No.	**PD88CC20**								
Coodrinates		Azimuth	90	Drillers	MAXFIELD	Commenced	Apr-88	Depth	30m
		Inclination	-70	Drill type	Atlas Copco percussion	Completed			
DEPTH						33% HCl			
from (m)	to (m)	weathering			Chip Description	acid reaction	SAMPLE No.	from (m)	to (m)
0	2				no recovery				
2	3	wth			wth talc sch, dol	some			
3	6	wth			wth talc sch, dol	some			
6	9				grey talc sericite sch, carb				
9	12				talc schist		200912	9	12
12	15				grey seri phyl, grey & w carb,qz	some			
15	18				grey seric, talc? carb				
18	21				grey seric, carb, qtz	some			
21	24				talc, setic, dolm, mags?	some	202124	21	24
24	27				grey seric phyll, mags	minor	202427	24	27
27	30				d grey seric phyll (schiller)EOH				

Tenement	CANN CREEK	E.L. 43/70		Logged by	Phillip Mackenzie				
Hole No.	PD88CC21								
Coodrinates		Azimuth	90	Drillers	MAXFIELD	Commenced	Apr-88	Depth	15m
		Inclination	-70	Drill type	Atlas Copco percussion	Completed			

DEPTH from (m)	to (m)	weathering	Chip Description	33% HCl acid reaction	SAMPLE No.	from (m)	to (m)
0	3	wth	wth talc /sericite, soft, br yl	minor			
3	6	wth	wth talc /sericite, soft, br yl	-			
6	9	wth	wth talc /sericite	minor			
9	12		white & grey mag breccia (80%)	major	210912	9	12
12	15		white & grey mag	major	211215	12	15
			EOH				

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HILMAC Pty Limited

Percussion drilling and geological results Arthur River E.L.43/70

Cann Creek Magnesite & Foya Talc

Author: Phillip Mackenzie

Date: 26 May 1988

Submitted to: Neil Thomas
Mineral Holdings P/L

Copies: -

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MINES
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23 SEP 1988
Doc. Ref.
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20.9.'88
REFERS
Resubmit to | Date

31 May 1988

OD 3/1/E/0 06676

Mr. T. Dickson
Chief Geologist
CRA Exploration Pty Ltd
PO Box 8093
NORTHLAND CENTRE Vic 3072

Dear Mr. Dickson

BENEFICIATION TESTING OF TALC

Enclosed is Amdel Report No. 06676 which describes mineralogical examination and preliminary flotation testing of a low grade talc sample from your deposit in Tasmania.

The work has shown that the low grade talc responds readily to flotation and a concentrate was produced containing 96% talc at a talc recovery of 42%.

The talc concentrate produced was of a pronounced grey colour due to the presence of finely divided opaques within the talc grains. Because of the fine size of the inclusions (minus 2 µm), further beneficiation to improve the colour of the talc is impracticable.

The final concentrate from flotation Test 2 has been forwarded to you by IPEC air transport for your information.

The poor colour of the talc would limit its commercial value and it is recommended that the marketability of the talc be assessed before undertaking further beneficiation testing.

As requested, work on this project has been terminated.

The sample remaining from this investigation will be retained until 31 July 1988 when, unless instructions are received to the contrary, it will be discarded.

amdel

Amdel thanks you for the opportunity to conduct this work and trust that we may be of service in the future.

Yours sincerely

P C Cameron

Peter M. Cameron
General Manager, International Operations Group

IMcP/kw
IMP5/1t06676.doc

CRA EXPLORATION PTY LIMITED

AMDEL REPORT 06676

BENEFICIATION TESTING OF TALC

Investigation and Report by: I.W. McPheat

General Manager, International Operations Group: Peter M. Cameron

SUMMARY

A low grade talc sample from a deposit in Tasmania was submitted for preliminary benification testing. The sample contained 35% talc. Major gangue minerals were dolomite and quartz which, together with the talc, comprised 99% of the sample.

The sample responded readily to flotation to produce a concentrate containing 96% talc. Corresponding talc recovery was 42%.

The talc concentrate produced was of a pronounced grey colour due to the presence of finely divided opaques within the talc grains. Because of the fine size of the inclusions (minus 2 μm), further beneficiation to improve the colour of the talc is impracticable.

The poor colour of the talc would limit its commercial value and it is recommended that the marketability of the talc be assessed before undertaking further beneficiation testing.

1. INTRODUCTION

CRA Exploration Pty Limited is investigating a low grade talc deposit in Tasmania. Mineralogical examination* of rock samples from the deposit identified the major gangue minerals as chlorite, dolomite and amphibole (tremolite).

Following discussion with Mr. T. Dickson of CRA Exploration on 23 February 1988, Amdel was commisioned to undertake a preliminary study to investigate the feasibility of beneficiating the low grade talc by flotation.

2. OBJECTIVES

The primary objective of the investigation was to examine the feasibility of upgrading the talc by flotation.

Because of the expected range of silicate minerals contained in the ore it was necessary to established an analytical procedure for assessing the talc content of beneficiation products.

A further objective was to determine the major mineral components in the ore and to assess the degree of grinding necessary to liberate the talc.

3. MATERIAL EXAMINED**

A 25 kg sample of the low grade talc was received for examination. The sample contained 35% talc.

4. MINERALOGICAL EXAMINATION

A sample of the talc, ground to minus 500 µm and sieved at 45 µm, was submitted for mineralogical investigation to determine the nature and composition of the major minerals and to use this information to establish a procedure for determining the talc content of beneficiation products. Liberation data was also to be sought..

The mineralogical work is described in Appendix A.

From previous work carried out on rock samples from the talc deposit* it had been expected that the talc sample submitted for beneficiation testing would contain amphibole and chlorite, and that these magnesian silicate minerals would complicate the determination of the talc content..

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* Report G 7298/88, dated 13 November 1987

** The results presented in this Report apply only to the sample submitted by the Client and described in the text. No guarantee either express or implied is given as to the applicability of the results to other samples.

The mineralogical study revealed that these gangue minerals were present in only trace amounts, and that talc, dolomite and quartz comprised 99% of the sample. From this information it was deduced that the mineral components of the talc sample could be calculated from CaO, MgO and SiO_2 assays, and the procedure for this calculation is given in Appendix A. Using this method the following normative mineralogy was calculated:

Mineral	Normative Mineralogy, %
Talc	35.1
Dolomite	56.8
Quartz	7.3
Others	0.8
Total	100.0

It was determined that the talc was generally well liberated in the 100 to 200 µm range.

5. FLOTATION TESTS

Two flotation tests were carried out using pine oil frother as the only reagent added. Flotation was carried out in an Agitair LA500 cell using Adelaide mains water. The flotation feed charge of 500 g was ground in a laboratory rod mill to a nominal sizing of 98% passing 100 µm.

In the first test flotation was restricted to roughing only. Four rougher stages were used, with pine oil being added to each stage.

The test details are given in Tables 1 and 2. Analyses of test products are given in Table 3.

The primary rougher concentrate assayed 87% talc, with a talc recovery of 59%. Combining the first two concentrates would reduce the grade of the concentrate to 85%, at a corresponding recovery of 79.7%.

Test 2 was carried out using the same general conditions as in Test 1, except that the first three rougher concentrates were combined and cleaned twice.

The details of the test are shown in Table 4. Flotation results and assays are presented in Tables 5 and 6 respectively.

The results of the two tests are compared in Figure 1. It can be seen that the effect of cleaning was to raise the talc content of the concentrate from 87% talc to 94% for the recovery of 60% talc. A 96% talc concentrate was produced in the final cleaning stage at a corresponding talc recovery of 42%.

6. ASSESSMENT OF FLOTATION CONCENTRATE

The second cleaner concentrate from Test 2, containing 96% talc, was of a pronounced grey colour. Microscopic examination of the concentrate in a tempory oil mount under transmitted light revealed that the talc grains contained very finely divided opaque inclusions, generally below 2 µm in size. The inclusions were very unevenly distributed throughout the talc grains. The inclusions were possibly iron oxides, but would require examination by electron-probe microanalysis for identification.

Because of the fine size of the inclusions, further beneficiation to improve the colour of the talc is impracticable.

7. CONCLUSIONS

The low grade talc sample containing 35% talc responded readily to flotation to yield a concentrate containing 96% talc. The corresponding talc recovery was 42%.

The talc concentrate was of a pronounced grey colour due to the presence of minus 2 µm opaque inclusions in the talc grains. Further beneficiation to improve the colour of the talc is impracticable.

8. RECOMMENDATIONS

The poor colour of the talc would limit its commercial value and it is recommended that the marketability of the talc be assessed before undertaking further beneficiation testing.

APPENDIX A

MINERALOGY OF LOW GRADE TALC SAMPLE

Investigation and Report by: Frank Radke

Manager - Geological Services: Dr. Keith J. Henley

1. INTRODUCTION

A talc sample sized at 45 μm was submitted by the International Operations Group for mineralogical analysis to establish a procedure to assess talc content of beneficiation products. Information on talc liberation was also requested. The size distribution of the sample is as follows :

+45 μm	63.0%
-45 μm	37.0%.

2. PROCEDURE

The bulk mineralogy and chemical composition of both size fractions was determined by X-ray diffraction and chemical analysis (Amdel Code ORE2/1) respectively. A polished thin section was cut of the +45 μm size fraction and microscopically examined in transmitted and reflected light. Temporary oil mounts of both the +45 μm and -45 μm size fractions were microscopically examined in transmitted light. The size on liberation of talc flakes was visually estimated.

It was originally intended to analyse talc and other magnesian silicate minerals (thought to be amphibole and chlorite) with the electron microprobe and use this data to calculate a mineralogy from the chemical analysis. The mineralogical data showed that talc is virtually the only magnesian silicate in this sample so a normative mineralogy was calculated in the following manner :

1. All CaO was assumed to be in dolomite and combined with a suitable proportion of MgO.

2. All MgO remaining after the production of dolomite was assumed to be in talc and combined with a suitable proportion of SiO_2.

3. All remaining SiO_2 was assumed to be quartz.

4. Other oxides (TiO_2, Al_2O_3, Fe_2O_3, Na_2O, K_2O and P_2O_5) were totaled as 'Others'.

5. The proportion of dolomite, talc and quartz were normalized to make 100% after the inclusion of 'Others'.

In the above calculations the following compositions were used for talc and dolomite.

Talc		Dolomite	
Oxide	%	Oxide	%
MgO	31.9	CaO	30.4
SiO_2	63.4	MgO	21.9
H_2O	4.7	CO_2	47.7

3. RESULTS

The bulk mineralogy as determined by X-ray diffraction analysis is given below using the listed semi-quantitative abbreviations.

+45 µm		-45 µm	
Dolomite	D	Dolomite	D
Talc	SD	Talc	SD
Quartz	A	Quartz	Tr-A
(?)Plagioclase	Tr(<1%)	(?)Plagioclase	Tr(<1%)
(?)Orthoamphibole	Tr(<1%)	(?)Chlorite	Tr(<1%)

D = Dominant. Used for the component apparently most abundant, regardless of its probable percentage level.

SD = Sub-dominant. The next most abundant component(s) providing its percentage level is judged above about 20.

A = Accessory. Components judged to be present between the levels of roughly 5 and 20%.

Tr = Trace. Components judged to be below about 5%.

Although both size fractions consist of dominant dolomite and sub-dominant talc, the +45 µm size fraction has a higher dolomite and a lower talc content than the -45 µm size fraction.

Microscopic examination of the size fractions confirms the X-ray diffraction results. The dolomite typically forms finely granular mosaics with a grain size below 0.1 mm. The talc generally forms well-developed flakes larger than about 0.1 mm in size. Most talc flakes are in the 0.1 to 0.2 mm size range and are generally liberated at that size. The -45 µm size fraction contains very well-liberated talc. The chlorite in these samples tends to have a translucent brownish colour. The amphibole could not be detected optically.

In reflected light traces of pyrite, goethite and leucoxene were noted. The pyrite and goethite are generally below 0.05 mm in size and the leucoxene is generally below 0.03 mm in size. The leucoxene is very unevenly distributed through the sample being concentrated in a few particles as fine disseminations. The pyrite and goethite are also unevenly distributed. Traces of tramp iron contamination were also noted.

The chemical analyses and calculated normative mineralogies of each size fraction are given in Table 1. The calculated mineralogies agree well with the bulk mineralogies determined by X-ray diffraction indicating they are a good estimation of the actual mineralogy. This calculation procedure may be used as long as significant proportions of other magnesian silicates are not present.

TABLE 1: ANALYTICAL RESULTS AND NORMATIVE MINERALOGY

Size Fraction	+45 µm	-45 µm	Total Sample(1)
Element	Chemical Analysis		
SiO_2	29.6	32.7	30.4
TiO_2	0.03	0.04	0.03
Al_2O_3	0.50	0.49	0.5
Fe_2O_3(2)	0.06	0.31	0.15
MnO	<0.01	<0.01	<0.01
MgO	23.6	25.8	24.3
CaO	19.0	16.2	18.0
Na_2O	0.05	0.05	0.05
K_2O	<0.01	0.03	0.01
P_2O_5	0.04	0.02	0.03
LOI	25.5	22.7	24.5
Totals	98.4	98.1	98.4
Mineral	Normative Mineralogy (%)		
Talc	30.6	42.9	35.1
Dolomite	59.8	51.6	56.8
Quartz	8.9	4.6	7.3
Others	0.7	0.9	0.8
Totals	100.0	100.0	100.0

(1) Calculated from the +45 µm and -45 µm size fractions.
(2) Total Fe as Fe_2O_3.

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TABLE 1

ject No.: 3/1/6/0-06676

t No.: 1

ple: Talc ore

e: 3/5/88

Test Object: Stage rougher flotation.
Preliminary test to assess response.
Pine oil frother, No collector
Rod mill grind ~98% -100μm

Grinding, Flotation Conditions and Reagents

Stage	Conditions				Reagent Additions, kg/t	
	Density % Sol.	Time (min)		pH		Pine Oil
		Cond.	Flo.			
Rougher 1		2	1½	9.6		0.04
Rougher 2		2	1½			0.04
Rougher 3		2	1			0.04

TABLE 2

TALC FLOTATION - TEST 1

Product	Weight %		Assay						Distribution, %					
			Talc %		Dolomite %		Quartz %		Talc		Dolomite		Quartz	
	Product	Cum.	Product	Cum.	Product	Cum.	Product	Cum.	Product	Cum.	Product	Cum.	Product	Cum.
Ro Conc 1	23.42	23.42	87.30	87.30	10.60	10.60	1.50	1.50	59.35	59.35	4.40	4.40	4.25	4.25
Ro Conc 2	8.80	32.23	79.40	85.14	16.40	12.18	3.60	2.07	20.29	79.65	2.56	6.95	3.83	8.08
Ro Conc 3	3.87	36.09	45.80	80.93	45.00	15.70	8.30	2.74	5.14	84.79	3.08	10.03	3.88	11.96
Ro Tail	63.91	100.00	8.20	34.45	79.50	56.47	11.40	8.27	15.21	100.00	89.97	100.00	88.04	100.00

File name: TALC1.REP

TABLE 3

ANALYSIS OF FLOTATION PRODUCTS - TEST 1

Product	Ro Conc 1	Ro Conc 2	Ro Conc 3	Ro Tail
	Assay.%	Assay.%	Assay.%	Assay.%
CaO	3.24	5.00	13.70	23.70
MgO	30.30	29.00	24.50	19.60
SiO2	57.10	54.10	37.40	16.30
TiO2	0.02	0.03	0.04	0.02
Al2O3	0.01 *	0.01 *	0.01 *	0.02
Fe2O3	0.28	0.37	0.67	0.70
MnO	0.01 *	0.01 *	0.01	0.01
Na2O	0.15	0.06	0.09	0.09
K2O	0.03	0.02	0.05	0.01
P2O5	0.03	0.04	0.05	0.03
LOI	9.35	12.20	23.50	37.70
Total	100.52	100.84	100.02	98.18

TABLE 4

Project No.: 3/1/6/0-06676

Test No.: 2

Sample: Talc ore

Date: 10/5/88

Test Object: General conditions as for Test 1. Four rougher concentrates produced. Rougher concentrates 1 to 3 combined and cleaned twice without additional reagents.

(a) Grinding, Flotation Conditions and Reagents

Stage	Conditions				Reagent Additions, kg/t	
	Density % Sol.	Time (min.)		pH		Pine Oil
		Cond.	Flot.			
Rougher 1		2	2½	9.4		0.04
Rougher 2		2	1			0.04
Rougher 3		2	1			0.04
Rougher 4		2	1			0.04
1st Cleaner			2	9.2		—
2nd Cleaner			1½			—

TABLE 5

TALC FLOTATION - TEST 2

Product	Weight %		Assay						Distribution, %					
			Talc %		Dolomite %		Quartz %		Talc		Dolomite		Quartz	
	Product	Cum.	Product	Cum.	Product	Cum.	Product	Cum.	Product	Cum.	Product	Cum.	Product	Cum.
2nd Cl Conc	16.12	16.12	96.00	96.00	3.50	3.50	0.00	0.00	41.88	41.88	1.02	1.02	0.00	0.00
2nd Cl Tail	8.56	24.67	88.10	93.26	11.20	6.17	0.00	0.00	20.41	62.29	1.73	2.75	0.00	0.00
1st Cl Tail	13.36	38.04	55.00	79.82	39.40	17.84	4.60	1.62	19.89	82.18	9.51	12.26	9.38	9.38
Ro Conc 4	2.76	40.80	41.10	77.20	50.30	20.04	7.20	1.99	3.07	85.26	2.51	14.77	3.04	12.41
Ro Tail	59.20	100.00	9.20	36.94	79.70	55.36	9.70	6.56	14.74	100.00	85.23	100.00	87.59	100.00

File name: TALC2.REP

TABLE 6

ANALYSIS OF FLOTATION PRODUCTS - TEST 2

Product	2 CJ Conc	2 CJ Tail	1 CJ Tail	4 Ro Conc	Ro Tail
	Assay.%	Assay.%	Assay.%	Assay.%	Assay.%
CaO	1.11	3.42	11.90	15.10	23.80
MgO	32.40	30.90	26.00	23.80	20.00
SiO2	60.00	56.10	39.20	32.80	15.30
TiO2	0.01 *	0.02	0.02	0.04	0.02
Al2O3	0.20	0.24	0.33	0.43	0.41
Fe2O3	0.16	0.26	0.51	0.70	0.59
MnO	0.01 *	0.01 *	0.01 *	0.01	0.01
Na2O	0.04	0.05	0.09	0.13	0.15
K2O	0.01 *	0.01 *	0.01 *	0.01 *	0.01 *
P2O5	0.11	0.11	0.11	0.12	0.12
LOI	6.40	9.65	21.70	26.70	38.50
Total	100.45	100.77	99.88	99.84	98.91

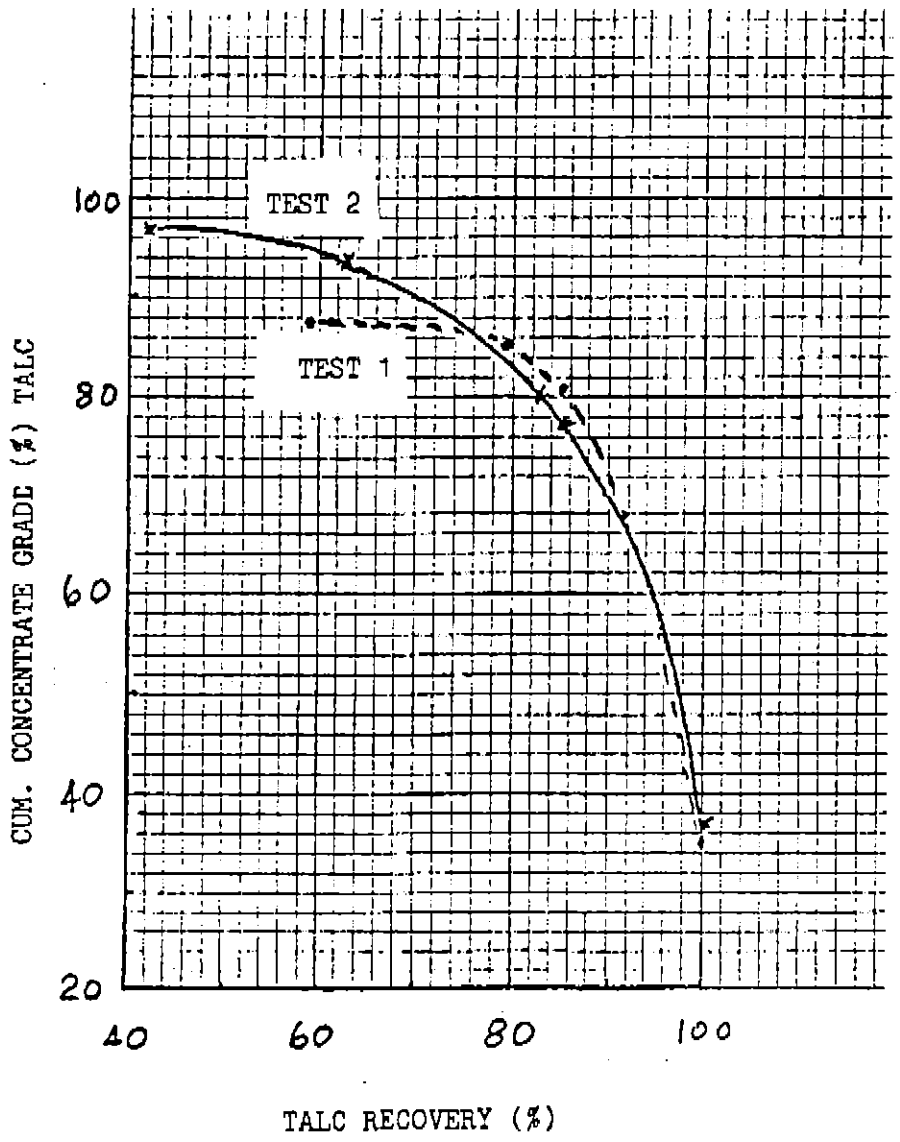

FIG. 1: TALC FLOTATION PERFORMANCE

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734094

13 November 1987

CRA Exploration Pty. Limited,
P.O. Box 138,
ROSNY PARK, TAS. 7018

ATT: MR. FRED FUNNELL

REPORT G 7298/88

YOUR REFERENCE:	DPO No. 35040
IDENTIFICATION:	1651401-10 (2 samples numbered 1651403)
MATERIAL:	Rock samples
DATE RECEIVED:	22 October 1987
WORK REQUIRED:	Chemical Analyses (9 Code MET5/4, 2 Code Ore2/1), X-Ray Diffraction (7 Code MB5) and Petrography (3 Code MA1.3)

Investigation and Report by: Frank Radke
X-Ray Diffraction by: Dr Roger Brown

Manager - Geological Services: Dr Keith J Henley

Keith Henley

for Dr William G Spencer
General Manager
Applied Sciences Group

c.c. CRA Exploration Pty. Limited,
P.O. Box 138,
ROSNY PARK, TAS. 7018
ATT: ADMIN. OFFICER

CRA Exploration Pty. Limited,
P.O. Box 656,
FYSHWICK, A.C.T. 2609
ATT: CHIEF GEOLOGIST INFORMATION SERVICES

bp

PETROLOGY OF TEN ROCK SAMPLES

1. INTRODUCTION

A total of nine rocks (samples 1651401-03) were submitted for petrographic examination, semi-quantitative mineralogy by X-ray diffraction and gold analyses by Amdel Code FA2. Three of the samples were submitted for petrographic examination, seven samples for X-ray diffraction analysis, seven samples for gold analysis and two samples for silicate analysis by Amdel Code Ore2/1.

2. ANALYTICAL RESULTS

The analytical results are given in Table 1. Two samples labelled 1651403 are submitted and both were analysed for gold. The gold analyses were done by Amdel Code MET5/4 due to the very low gold contents of these samples which are below the detection limit for Amdel Code FA2. All of the samples were analysed by Amdel Code Ore2/1 and are reported in Table 1 but only the two Ore2/1 analyses requested were charged.

3. X-RAY DIFFRACTION RESULTS

A portion of each of the samples submitted for X-ray diffraction analysis (samples 1651401-07) were finely powdered and examined in the X-ray diffractometer. Mineral proportions were estimated from peak intensities on the X-ray diffraction trace.

The results are given in Table 2 which lists the mineral detected in estimated decreasing order or abundance using the semi-quantitative abbreviations given. Two samples labelled 1651403 were examined by X-ray diffraction and exhibited slightly different mineralogies which is recorded in Table 2.

4. PETROGRAPHIC DESCRIPTIONS

SAMPLE: 1651401: TS46326

Rock Name:
Talc Schist

Hand Specimen:
This is a pale green to dull white rock with a schistose foliation.

Thin Section:
An optical estimate of the constituents gives the following :

	%
Talc	90
Dolomite	5
Chlorite	5
Rutile	Tr-1

This sample consists of talc flakes ranging up to 0.5 mm in size which exhibit a strong nematoblastic foliation and are intergrown with much smaller amounts of dolomite and chlorite which tend to be concentrated in elongate bodies oriented parallel to the foliation direction. The talc exhibits a very fine, fibrous texture forming individual lenticular bodies up to 0.3 mm wide which are oriented parallel to the foliation direction and consist of talc flakes with slightly variable orientations. Most of the talc forms fibrous textured flakes oriented parallel to the foliation direction but some lenticular talc bodies contain fine felted intergrowths of talc flakes.

The dolomite is concentrated in elongate lenticular bodies up to 0.5 mm wide where it forms granular mosaics with a typical grain size of about 0.1 mm. Most of the dolomite bodies are between 1 and 2 millimetres in length although some longer dolomite bodies are locally present. Talc occurs locally as interstitial intergrowths between the dolomite crystals in the lenticular dolomite bodies and locally minor amounts of chlorite are also intergrown with the dolomite.

Most of the chlorite is intergrown with the talc as very small lenticular bodies and elongate, discontinuous lamellae below 0.1 mm wide. Some chlorite also forms small individual flakes up to 0.2 mm long which are intergrown with the talc and oriented parallel to the general foliation direction. All of the chlorite in this rock is a colourless variety with low birefringence.

Traces of rutile form very small disseminated crystals which are typically between 0.01 and 0.03 mm in size. These rutile crystals have a translucent orange colour and tend to be concentrated within very narrow lamellae oriented parallel to the foliation.

This is a strongly foliated schistose rock comprised mainly of talc intergrown with smaller amounts of dolomite and chlorite which tend to be concentrated in elongate bodies oriented parallel to the schistose foliation.

SAMPLE: 1651402: TS46327

Rock Name:
Chlorite-Talc-Tremolite Schist

Hand Specimen:
This is a strongly foliated rock with a phyllitic texture and a greenish-grey colour. The rock exhibits reddish-brown limonitic staining on foliation planes.

Thin Section:
An optical estimate of the constituents gives the following :

	%
Chlorite	40
Talc	35
Amphibole (tremolite)	15
Rutile/leucoxene	5
Quartz	3
Limonite	2

This is a strongly foliated rock comprised mainly of fine intergrowths of talc and chlorite. Both the talc and chlorite exhibit a strong lepidoblastic foliation oriented parallel to a mineralogical banding defined mainly by a tendency for both the talc and chlorite to be concentrated within narrow lamellae with a parallel orientation. Both the talc and chlorite tend to form fibrous flakes although some of the talc in particular forms wider flakes with a more prismatic character. Both the talc and chlorite are concentrated in discontinuous bands and lamellae with a typical width between 0.2 and 0.8 mm. In general the talc bands tend to be wider and more continuous than the chlorite bands which tend to have a much more lenticular character. The chlorite is a colourless to very pale green weakly pleochroic variety with low birefringence which at least locally has an anomalous character.

A colourless amphibole which is most likely tremolite forms disseminated prismatic to acicular crystals up to 0.4 mm long which are generally intergrown with the talc. Some bands up to 0.3 mm wide consist of concentrations of tremolite. Most of the tremolite forms individual crystals oriented parallel to the foliation direction although a small proportion of the tremolite crystals are oriented at an angle to the foliation direction.

The rock contains a significant proportion of opaque to translucent aggregates up to 0.15 mm in size which would represent a titanium mineral such as rutile or leucoxene. This mineral would confirm the tentative identification of rutile in the X-ray diffraction trace. These rutile aggregates generally have irregular to slightly elongate shapes oriented parallel to the foliation direction. There is a tendency for these aggregates to be concentrated in vague elongage stringers oriented parallel to the foliation direction.

Minor quartz is present as very narrow linings along foliation lamellae which have a typical grain size and width of 0.1 mm. These quartz lamellae have a highly discontinuous character and tend to pinch out over short areas. The rock also contains much more continuous linings of opaque to translucent, limonitic iron oxides along foliation lamellae. These linings rarely exceed 0.1 mm in width and tend to be concentrated in the chlorite-rich lamellae. Much of the chlorite marginal to these lamellae has a translucent brown iron stained colour. To some extent the granular quartz tends to be concentrated along these limonite lamellae suggesting the two are associated with each other as a possible surface of weathering phenomenon.

This is a talc and chlorite-rich schist showing a moderate degree of iron staining along foliation lamellae. The rock also contains minor quartz which is associated with the limonitic staining and could also represent a surface cementation feature.

SAMPLE: 1651403: TS46328

Rock Name:
Talc-Dolomite Schist

Hand Specimen:
This is a medium grey coloured rock with a well-developed schistose foliation.

Thin Section:
An optical estimate of the constituents gives the following :

	%
Talc	45
Dolomite	45
Quartz	5
Chlorite	4
Opaques	1

This is a strongly foliated rock comprised of about equal proportions of talc and dolomite intergrown with smaller amounts of quartz and chlorite. The dolomite in particular tends to be concentrated in elongate granular bodies up to 1 mm wide separated by discontinuous and undulose talc-rich bands. The talc forms very small flakes below 0.1 mm long which exhibit a strong lepidoblastic foliation oriented parallel to the banding. This foliation is further emphasized by a tendency for opaques to be concentrated along very narrow discontinuous foliation lamellae. Chlorite is also generally intergrown with the talc as very narrow bands below 0.1 mm wide which also follow the foliation direction.

The dolomite generally forms granular aggregates with a typical grain size ranging up to 0.5 mm. These granular dolomite lenses have a recrystallised appearing texture and a very small proportion of the dolomite exhibits lamellar twinning believed to be due to mild deformational effects. Quartz is generally intergrown with the dolomite as finely granular, cherty textured aggregates with a typical grain size ranging up to 0.15 mm. The quartz generally occurs interstitial to larger dolomite crystals.

This is a strongly foliated metamorphic rock comprised mainly of talc and dolomite. The mineral proportions estimated from the thin section are somewhat different than those indicated from the X-ray diffraction analysis which gave much higher values for talc and lower values for most of the other minerals. The two X-ray diffraction traces done of different samples with this number also showed some variability indicating that this sample has highly variable mineral proportions.

TABLE 1: ANALYTICAL RESULTS

DDO 55041

734100

Analysis code ORE2/1

NATA Certificate

ICP

Results in percentages

	1651403 A	1651403 B	1651404	1651405	1651406
SiO2 %	47.9	33.4	48.2	48.6	55.8
TiO2	0.01	0.01	1.17	1.16	0.94
Al2O3	0.58	0.46	8.10	8.05	9.55
Fe2O3	0.21	0.10	8.70	10.5	7.80
MnO	<0.01	<0.01	0.10	0.16	0.08
MgO	27.0	25.2	25.6	20.6	18.2
CaO	8.65	15.4	0.59	3.18	0.05
Na2O	0.06	0.08	0.12	0.55	1.40
K2O	<0.01	0.02	0.07	0.12	0.22
P2O5	<0.01	<0.01	0.13	0.13	0.08
LOI	16.4	25.9	7.60	7.25	6.00
Totals	100.8	100.5	100.4	100.3	100.1
Au (ppm)	0.015	0.015	0.010	0.010	0.010

ICP.

	1651407	1651408	1651409	1651410
SiO2 %	49.1	96.6	15.2	13.3
TiO2	1.35	0.12	<0.01	<0.01
Al2O3	10.6	1.60	0.41	0.42
Fe2O3	10.9	1.28	0.94	1.51
MnO	0.09	0.02	0.15	0.17
MgO	17.9	0.19	38.8	39.2
CaO	0.99	<0.01	0.39	0.54
Na2O	0.72	<0.01	0.05	<0.01
K2O	0.19	0.31	0.01	0.07
P2O5	0.08	<0.01	<0.01	<0.01
LOI	7.90	0.85	43.7	44.5
Totals	99.8	100.9	99.6	99.7
Au (ppm)	0.005	0.015	0.005	<0.005

Total FE as Fe2O3

TABLE 2: MINERALOGY BY SEMI-QUANTITATIVE X-RAY DIFFRACTION ANALYSIS

1651401		1651402		1651403(1)		1651404	
T	D	C	CD	T	D	C	CD
Dol	A	T	CD	Dol	A-SD	T	CD
C	A	Am	A	Q	Tr-A	R?	Tr
		Q	A	C	Tr		
		R?	Tr				

1651405		1651406		1651407	
T	D	T	D	C	D
C	SD	C	SD	T	SD
Am	Tr-A	Q	A	Am	A
Q	Tr-A			Q	A

(1) Composite of two traces of two samples numbered 1651403. One sample (A) contained quartz and no chlorite and a second sample (B) contained chlorite and no quartz.

Mineral Key

Am	Monoclinic amphibole (green)
C	Chlorite
Dol	Dolomite
Q	Quartz
R	Rutile(?) (one peak only)
T	Talc

SEMIQUANTITATIVE ABBREVIATIONS:

D = Dominant. Used for the component apparently most abundant, regardless of its probable percentage level.

CD = Co-dominant. Used for two (or more) predominating components, both or all of which are judged to be present in roughly equal amounts.

SD = Sub-dominant. The next most abundant component(s) providing its percentage level is judged above about 20.

A = Accessory. Components judged to be present between the levels of roughly 5 and 20%.

Tr = Trace. Components judged to be below about 5%.