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ANNUAL REPORT
TO 28 SEPTEMBER 1993
ON
EXPLORATION LICENCE 26/91
ADAMSFIELD, TASMANIA
FOR
JERVOIS MINING N.L.
TRANSPARENCIES HELD

93-3492.

August, 1993

MINES		
FILE REF.	E26/91	
	- 2 SEP 1993	
DCC. REF.		
ORIGIN	FOR ACTION	FOR INFO
See File		
RECORD	DATE	

SUMMARY

Jervois Mining N.L. successfully tendered for part of the Adamsfield osmiridium field. After objections to the granting of the tenement by The Wilderness Society being ruled out by the warden, Exploration Licence 26/91 was granted on 28th September, 1992, covering an area of 19 square kilometres.

The target for exploration is Quaternary alluvial chromite and osmiridium within Adams Plain. Literature research of previous exploration indicated the location of potential gravel targets.

Forty holes were drilled for sixty seven metres using a hand held power auger. The auger had difficulty penetrating the gravel horizon. The samples (total 116) were collected on plastic sheets, logged, bagged and despatched to Melbourne.

Sixteen selected samples were sized and analysed for chromium and iron; platenoid and gold assays are still awaited. Head grades of the samples vary between 1.15 and 47.70 kilograms Cr_2O_3 per cubic metre.

A clay sample from beneath the gravel horizon was evaluated but proved to have little commercial value.

Further work programmes depend on the assay results currently being awaited.

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ACCOMPANYING PLANS

Title	Plan No.	Scale
Completed Auger Drill Hole Locations	AD-1	1:10,000
Cross Sections showing Auger Drilling, Lines 1A, 3A	AD-2	1:2,000 H 1:100 V
Cross Sections showing Auger Drilling, Lines 2, 4	AD-3	1:2,000 H 1:100 V

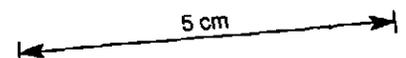
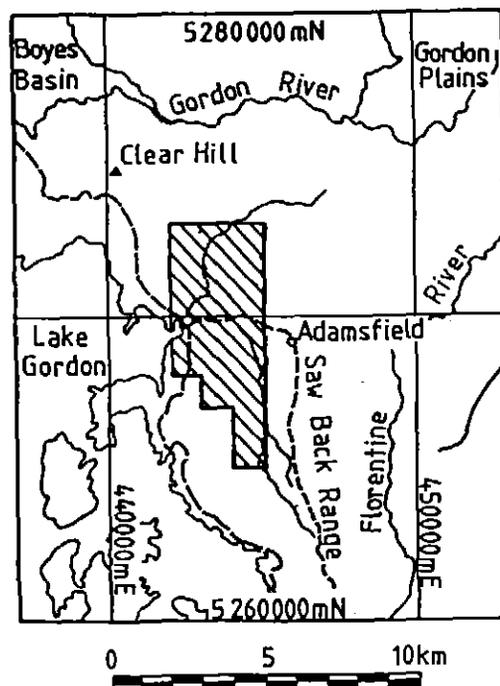
INTRODUCTION

Jervois Mining N.L. applied under the ETA System for part of ETA 264, covering the Adamsfield area, in August, 1991. Part of this application was considered successful and offered to Jervois, the remainder was offered to Helix Resources N.L.

In April, 1992, Objections to the Application were lodged on behalf of The Wilderness Society, Hobart. In July 1992, the warden ruled in favour of Jervois, and in August 1992 he ordered costs against The Wilderness Society.

Previous exploration work by Metals Exploration Ltd. was researched, especially in regard to the chromite potential of the alluvials, as well as the osmiridium content. Consideration was also given to the potential of the clay zone beneath the shallow gravels.

Field work was carried out during the year as per the Proposed Programme and Budget of August, 1991 on four of the twelve proposed lines for auger drilling.

TENEMENT

Exploration Licence 26/91 was granted on 28th September, 1992. It covers 19 square kilometres out of an original application area of 38 square kilometres. The tenement lies within the Adamsfield Conservation Area which, in turn, lies within a World Heritage Area.

There is a minimum expenditure commitment of \$45,000 during the first two years of the licence.

Adamsfield lies about 90 kilometres west north west of Hobart.

WORK COMPLETED

After the literature research had been completed and the programme of auger drilling formulated, a Stihl Hand-Held Power Auger was hired from the Mines Department drilling division in Hobart. The drill had a capacity to drill to about 3 metres. It was thoroughly cleaned before use.

The proposed work programme, involving augering on existing gridlines and using existing vehicular access, was approved by the Department of Mines on 26th February, 1993. The drilling programme commenced on 6th March, 1993 and was completed on 14th March, 1993.

Forty holes were completed for a total of sixty-seven metres of drilling. Samples were collected by removing the auger spiral string from the hole and scraping the sample onto plastic sheets spread around and next to the collar. A total of 116 samples were collected. The samples were geologically logged, bagged, and transported to Melbourne. The drill hole logs appear in the appendix.

The drill hole locations were picked up by chain and compass from the existing grid marks. The collar co-ordinates are AMG co-ordinates less the following prefix: 2- or 26- for northings and 44- for eastings.

Sixteen of the samples were selected for screening and sent for assay to AMDEL in Adelaide.

The samples, four from each line, were selected on the basis of their visual chromite content. The size fraction tables appear in the appendix.

One sample of clay was despatched to AMDEL for evaluation - a mineralogical analysis by X-ray diffraction. A second sample was delivered to Commercial Minerals Ltd. in Melbourne.

DISCUSSION

The assay results for chromium and iron appear in the appendix. The assaying was by alkaline fusion followed by measurement of total Cr and Fe by ICP.

The grade calculation tables also appear in the appendix. These tables show the grade of Cr in kilograms per cubic meter for each sample. The conversion to Cr_2O_3 is to multiply these figures by 1.46:

Drill Hole		Depth		kgCr ₂ O ₃ /m ³
N	E	From	To	
7055	4000	1.75	2.50	30.24
7105	4000	1.40	2.10	32.81
7205	4000	1.80	2.20	28.60
7255	4000	0.70	1.30	14.35
7175	4500	0.50	0.95	14.79
7225	4500	0.65	0.85	28.59
7325	4500	0.10	0.65	34.84
7475	4500	1.70	2.10	8.21
9000	4625	1.30	1.80	11.46
9000	4575	1.10	1.80	47.70
9000	4525	0.10	0.80	1.15
9000	4325	0.65	1.10	20.48
9500	4525	1.75	2.10	3.94
9500	4425	1.75	2.20	34.44
9500	4325	1.60	2.25	8.48
9500	4175	1.40	1.80	26.41

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The average of these selected samples gives a head grade of 21.66 kg Cr₂O₃ per m³. Half of the samples are being analysed for platenoids and gold, and these results are awaited.

Many of the drill holes bottomed in gravel (see drill logs and accompanying Sections) with the drill being unable to penetrate the hard boulders, or the recovery being poor in wet conditions. There is scope to greatly increase the volume of gravel material.

The evaluation of the clay sample by AMDEL proved the clay to be of little value, and Commercial Minerals Ltd. confirmed this result.

RECOMMENDATIONS

The results of the platenoid and gold assays are awaited. If these are encouraging then the rest of the samples collected should be sized and analysed. If those assay results are also encouraging, then the originally proposed drilling programme should be completed, but using a method that can penetrate the gravels more successfully.

Douglas McKenna & Partners Pt. Ltd.

Douglas McKenna & Partners Pty. Ltd.

27th August, 1993

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APPENDIX
Auger Drill Hole Logs

AUGER DRILL HOLE LOGS

LINE 1A (444000mE)

N	E	Sample		Description	Mineralisation (visual estimate)
		Depth	From To		
m	m				
70005	4000	0 - 0.10		Soil and grass	
		0.10-0.65		Brown clayey gravel to 5mm, some sand, damp	?3% Cr ₂ O ₃
		0.65-1.35		Green/brown clayey coarse sand, damp	
		1.35-1.75		Green/brown clayey coarse sand and gravel to 1.55m	visible Cr ₂ O ₃
		1.75-2.25		then pale green/brown clay Pale green/brown then grey clay	
70055	4000	0 - 0.10		Soil and grass	
		0.10-0.70		Pale grey/green fine sand minor coarse, damp	Trace Cr ₂ O ₃
		0.70-1.15		Pale grey/green fine sand to 0.9m then black humus and clay, damp	
		1.15-1.75		Pale grey/green fine clayey sand, damp	2-3% Cr ₂ O ₃
		1.75-2.50		Pale grey/green fine sand sl. clayey with coarse gravel to 30mm at base to 2.40m then pale grey/green clay, wet	5% Cr ₂ O ₃
70105	4000	0 - 0.10		Soil and grass	
		0.10-0.70		Pale grey/green fine sand sl. clayey, damp	3% Cr ₂ O ₃
		0.70-1.40		Minor grey/green fine sand, mostly black clay and humus, damp	
		1.40-2.10		Dark grey clay to 1.70m then gravel from fine sand to cobbles 50mm, wet, hard	3-5% Cr ₂ O ₃
70155	4000	0 - 0.15		Soil and grass	Trace
		0.15-0.70		Fine pale grey sand minor black clay, damp	Cr ₂ O ₃
		0.70-1.30		Black clay minor humus	
		1.30-1.90		Minor black clay then pale grey fine sandy clay, damp	1-2% Cr ₂ O ₃
		1.90-2.45		Pale grey/green fine sandy clay with coarse gravel to 40mm, from 2.35m, hard, wet	1-2% Cr ₂ O ₃
70205	4000	0 - 0.10		Grass and soil	
		0.10-0.70		Pale grey fine clayey sand to 0.55m then black clay and humus, damp	1% Cr ₂ O ₃
		0.70-1.35		Dark grey/black clay, damp	
		1.35-1.80		Dark grey/black fine sl. sandy clay to 1.60m then pale grey/brown medium fine sand, damp	3% Cr ₂ O ₃

	1.80-2.20	Light brown clayey medium/ coarse sand, some coarse gravel to 80mm, bottomed in gravel, wet	2-3% Cr ₂ O ₃
70255 4000	0 - 0.10	Soil and grass	
	0.10-0.70	Pale grey/light brown sl. clayey fine to medium sand to 0.55m then black clay	Trace Cr ₂ O ₃
	0.70-1.30	Minor dark grey sl. sandy clay then medium grey/brown clayey fine to medium sand, some gravel at base, bottomed in gravel	5% Cr ₂ O ₃
70305 4000	0 - 0.10	Soil and grass	
	0.10-0.70	Medium/pale grey minor brown sl. clayey medium sand, some humus	2% Cr ₂ O ₃
	0.70-1.40	Pale grey coarse sand then black humus/clay then grey and brown clay then pale grey fine sandy clay, damp	2-3% Cr ₂ O ₃ at top
	1.40-2.05	Pale grey fine sandy clay to 1.60m then pale grey clayey fine sand to medium grained at base with minor gravel, bottomed in gravel, wet	
70355 4000	0 - 0.10	Soil and grass	
	0.10-0.70	Pale grey/green fine/medium clayey sand, some black humus/clay	1% Cr ₂ O ₃
	0.70-1.45	Black clay minor humus minor dark grey sl. sandy clay, damp	
	1.45-1.80	Pale grey clay some fine sandy clay, damp	Trace Cr ₂ O ₃
	1.80-2.50	Pale grey clay some gravel on top of hard basement (no recovery 2.30-2.50m), wet	
70405 4000	0 - 0.10	Soil and grass	
	0.10-0.65	Light brown medium sand lesser black clay	
	0.65-1.10	Light brown fine clayey sand	Trace Cr ₂ O ₃
	1.10-1.75	Pale grey clayey medium sand to coarse gravel to 60mm	1% Cr ₂ O ₃
	1.75-2.50	Pale grey/white minor light brown/pale green sticky clay (with gravel contamination)	
70455 4000	0 - 0.10	Soil and grass	
	0.10-0.70	Pale/medium grey clay sl. sandy	
	0.70-1.40	Dark grey/black clay sl. sandy	
	1.40-2.05	Pale grey minor light brown clay	
	2.05-2.70	Pale grey sticky clay	

70505 4000 0 - 0.10 Soil and grass
 0.10-0.70 Dark grey/black sl. sandy clay,
 humus
 0.70-1.30 Black, brown, pale grey clayey
 fine to medium sand, minor
 gravel to 10mm at base,
 bottomed on hard basement

LINE 3A (444500mE)

N m	E AMG m	Sample Depth From To	Description	Mineralisation (visual estimate)
70125	4500	0 - 0.10 0.10-0.70	Black humus Black soil to 0.20m then medium grey clayey to pale grey fine sand, hard at base	Trace Cr ₂ O ₃
70175	4500	0 - 0.15 0.15-0.50 0.50-0.95	Soil, humus, grass Grey/brown clayey sand, damp Grey/brown/black sl. clayey sand, wet, hard boulders at base	Trace Cr ₂ O ₃ Trace Cr ₂ O ₃
70225	4500	0 - 0.10 0.10-0.65 0.65-0.85	Soil, humus, grass Grey brown clayey sand, damp Grey sand minor clay, wet, boulders at base	5% Cr ₂ O ₃
70275	4500	0 - 0.10 0.10-0.65 0.65-1.45	Soil, humus, grass Light brown, black sandy clay Light brown sandy clay to 1.25m then grey sand with minor gravel, boulders at base, damp	
70325	4500	0 - 0.10 0.10-0.65 0.65-1.35	Soil, humus, grass Light brown, grey sandy gravel to 0.40m then grey sl. clayey sand, damp Light brown sticky clay minor sand to 1.10m, then grey medium/fine clayey sand, coarser at base, cobbles at bottom, wet	5% Cr ₂ O ₃ 1% Cr ₂ O ₃
70375	4500	0 - 0.10 0.10-0.60 0.60-1.10	Soil, humus, grass Pale grey/green clayey fine sand to 0.40m then black peaty soil, damp Dark grey clay to 1.00m, then grey/green sand and gravel to 40mm, wet	5% Cr ₂ O ₃ at top
70425	4500	0 - 0.20 0.20-0.65 0.65-1.15	Grass and soil (swamp) Khaki clay, black humus, damp Khaki clay, gravel at base, damp	

70475	4500	0 - 0.15	Grass and soil	
		0.15-0.65	Soil to 0.40m then brown sandy clay	
		0.65-1.15	Light brown/grey fine clayey sand	
		1.15-1.70	Light brown/grey fine clayey sand to 1.40m then dark brown/black clay, damp	
		1.70-2.10	Dark brown/black clay to 1.90m then grey sandy gravel to 15mm, wet at base	2-3% Cr ₂ O ₃
70525	4500	0 - 0.10	Soil and grass	
		0.10-0.65	Peaty soil to 0.25m then brown sandy clay	
		0.65-1.35	Brown sl. clayey sand to medium gravel to 25mm, pink limestone basement at bottom	

LINE 2 (269500mN)

N	E	Sample	Description	Mineralisation
AMG	AMG	Depth		(visual
m	m	From To		estimate)
9500	4625	0 - 0.10	Soil and grass	
		0.10-0.65	Light/dark brown fine sand and gravel to 20mm, minor dark brown clay, damp	2-3% Cr ₂ O ₃
		0.65-1.25	Dark grey/brown sl. clayey sand and gravel to 20mm to 1.05m then black humus clay, wet	
		1.25-1.70	Black sticky clay, humus with trace fine sand, wet	
9500	4575	0 - 0.10	Soil and grass	
		0.10-0.65	Pale grey/green sl. clayey fine minor medium sand, minor black humus, damp	2% Cr ₂ O ₃
		0.65-1.25	Pale grey/green medium sand to 0.80m then black sticky clay, humus, wet	
		1.25-1.70	Black sticky clay minor humus, wet	
9500	4525	0 - 0.10	Soil and grass	
		0.10-0.65	Trace grey sand then brown/black clay	
		0.65-1.25	Grey/brown clay, damp	
		1.25-1.75	Black clay, damp	
		1.75-2.10	Pale grey/green fine clayey sand with gravel at base, hard, wet	3-5% Cr ₂ O ₃
9500	4475	0 - 0.10	Soil and grass	
		0.10-0.65	Black/brown clayey humus then mixed with pale grey sand	2-3% Cr ₂ O ₃
		0.65-1.25	Pale grey/brown sl. sandy clay and black clay, damp	

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		1.25-1.90	Pale grey/brown sandy clay with coarse gravel to 50mm at base, wet, hard bottom	1-2% Cr ₂ O ₃
9500	4425	0 - 0.10	Soil and grass	
		0.10-0.65	Black, dark grey clay and humus	
		0.65-1.30	Black clay, damp	
		1.30-1.75	Black, dark brown/grey sticky clay to 1.55m then light brown sandy gravel to 30mm, wet	5% Cr ₂ O ₃
		1.75-2.20	Light brown/grey poorly sorted gravel to 50mm, some coarse sand, sl. clayey, wet	+5% Cr ₂ O ₃
9500	4375	0 - 0.10	Soil and grass	
		0.10-0.65	Light/dark brown clay then medium brown clayey medium sand	
		0.65-1.20	Medium brown sl. clayey coarse sand minor light gravel to 10mm, damp to wet	2% Cr ₂ O ₃
		1.20-1.50	Pale grey/brown clayey sand minor light gravel to 10mm, wet	2% Cr ₂ O ₃
9500	4325	0 - 0.10	Soil and grass	
		0.10-0.65	Black humus, pale grey/brown clay	
		0.65-1.20	Pale grey/brown sl. sandy clay minor humus	Trace Cr ₂ O ₃
		1.20-1.60	Pale grey sandy clay	3-5% Cr ₂ O ₃
		1.60-2.25	Pale grey/brown/green clayey sandy gravel to 80mm, bottomed on hard gravel	5% Cr ₂ O ₃
9500	4275	0 - 0.10	Soil and grass	
		0.10-0.65	Soil and black humus	
		0.65-1.30	Black, dark grey clay, damp	
		1.30-1.70	Pale grey, light brown sl. sandy clay, hard bottom, wet	1-2% Cr ₂ O ₃
9500	4225	0 - 0.15	Soil and grass	
		0.15-0.65	Black lesser brown soil, humus, clay	
		0.65-1.35	Brown clayey fine to coarse (3mm) sand, damp	Trace Cr ₂ O ₃
		1.35-1.85	Brown coarse sand and gravel to 40mm to 1.75m then pale glutinous clay, wet	2-3% Cr ₂ O ₃
9500	4175	0 - 0.15	Soil and grass	
		0.15-0.70	Black soil, humus, clay	
		0.70-1.40	Black clay to 1.05m then pale grey/brown clayey fine to medium sand	3% Cr ₂ O ₃
		1.40-1.80	Light brown/grey sl. clayey sandy gravel to 40mm, wet	2-3% Cr ₂ O ₃
9500	4125	0 - 0.20	Soil and grass	
		0.20-0.70	Black, dark brown, soil, humus, clay	

0.70-1.20	Minor black clay then light brown medium to fine clayey sand, damp	2-3% Cr ₂ O ₃
1.20-1.55	Pale grey/brown sl. clayey medium fine sand, hard bottom	5% Cr ₂ O ₃

LINE 4 (269000mN)

N	E	Sample Depth		Description	Mineralisation (visual estimate)
AMG	AMG	From	To		
m	m				
9000	4625	0 -	0.10	Soil and grass	
		0.10-0.80		Black humus minor clay	
		0.80-1.30		Gradual transition from above to green clayey fine sand, damp	1-2% Cr ₂ O ₃
		1.30-1.80		Grey/green sl. clayey fine to coarse sand, minor gravel to 20mm	2-3% Cr ₂ O ₃
		1.80-1.90		No sample return in gravel	
9000	4575	0 -	0.10	Soil and grass	
		0.10-0.70		Light brown/grey clay	
		0.70-1.10		Light brown/grey clay, damp	
		1.10-1.80		Pale grey/green/brown coarse sandy gravel to 80mm, wet	5% Cr ₂ O ₃
		1.80-1.90		Pale grey sticky clay	Trace Cr ₂ O ₃
9000	4525	0 -	0.10	Soil and grass	
		0.10-0.80		Pale grey minor brown clay then pale grey sandy clay	
		0.80-1.25		Minor pale grey sandy clay then clayey fine sand to 1.15m then medium to coarse sand, hard gravel base, damp	2-3% Cr ₂ O ₃
9000	4475	0 -	0.10	Soil and grass	
		0.10-0.75		Black soil and clay to 0.55m then pale grey clay	
		0.75-1.20		Pale grey/brown clay to 1.10m then pale grey medium sand, hard bottom	
9000	4425	0 -	0.10	Soil and grass	
		0.10-0.75		Minor black clay then pale grey fine sl. clayey sand	1-2% Cr ₂ O ₃
		0.75-1.25		Pale grey fine to medium sand some dark grey/brown clay horizons, hard basement	1-2% Cr ₂ O ₃
9000	4375	0 -	0.10	Soil and grass	
		0.10-0.70		Black minor dark brown humus, clay	
		0.70-1.30		Minor dark brown clay then pale grey/brown fine to medium sand, hard basement	

9000	4325	0 - 0.10	Soil and grass	
		0.10-0.65	Medium brown clay to 0.55m then brown fine sand	Trace Cr ₂ O ₃
		0.65-1.10	Light/medium brown sl. clayey sand with 100mm gravel at base	3% Cr ₂ O ₃
		1.10-2.40	Pale grey plasticine clay	
9000	4275	0 - 0.10	Soil and grass	
		0.10-0.70	Black soil then grey/brown clayey sand with minor 30mm gravel at base	
		0.70-1.10	Coarse gravel to 50mm to 0.80m then pale grey plasticine clay, wet	
9000	4225	0 - 0.30	Grass and humus	
		0.30-0.70	Black humus and clay minor coarse sand at base	
		0.70-1.05	Minor pale grey/brown clay then light brown/grey clayey fine sand to coarse gravel to 50mm, wet	
		1.05-1.20	Pale grey clay	

APPENDIX
Size Fraction Tables

ADAMSFIELD

SAMPLES FOR INITIAL TESTING

SIZE FRACTIONS

SAMPLE NO.	7055N 4000E 1.75-2.50	7255N 4000E 0.70-1.30	7225N 4500E 0.65-0.85	7325N 4500E 0.10-0.65	9000N 4575E 1.10-1.80	9000N 4325E 0.65-1.10	9500N 4425E 1.75-2.20	9500N 4325E 1.60-2.25
WEIGHT (g)	6835	6745	3299	6531	13277	7969	4964	8014
VOLUME (ml)	5450	5450	2150	4850	9100	5800	3750	6150
FRACTION WEIGHTS (g)								
+6.4mm	754	150	156	1044	3171	1024	1870	3252
-6.4+3.2mm	314	94	236	332	1189	1337	539	1199
-3.2+1.0mm	1144	250	142	412	1882	1384	894	1274
UNDERSIZE	4582	6172	2742	4686	6978	4192	1623	2235
TOTAL WEIGHT	6794	6666	3276	6474	13220	7937	4926	7960
LOOSE S.G.	1.25	1.24	1.53	1.35	1.46	1.37	1.32	1.30

AV. LOOSE S.G. = 1.35

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ADAMSFIELD

FURTHER SAMPLES FOR TESTING

SIZE FRACTIONS

SAMPLE NO.	7105N 4000E 1.40-2.10	7205N 4000E 1.80-2.20	7175N 4500E 0.50-0.95	7475N 4500E 1.70-2.10	9000N 4625E 1.30-1.80	9000N 4525E 0.10-0.80	9500N 4175E 1.40-1.80	9500N 4525E 1.75-2.10
WEIGHT (g)	8284	9240	4916	4187	7049	6905	4137	3667
VOLUME (ml)	6950	6600	5000	3350	6750	5650	3250	3050
FRACTION WEIGHTS (g)								
+6.4mm	1544	1454	38	132	144	0	1359	160
-6.4mm	6730	7790	4871	4050	6884	6910	2773	3507
TOTAL WEIGHT	8274	9244	4909	4182	7028	6910	4132	3667
LOOSE S.G.	1.19	1.40	0.98	1.25	1.04	1.22	1.27	1.20

AV. LOOSE S.G. = 1.19

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APPENDIX
AMDEL Assay Results and Evaluation of Clay

Analysis code IC4E

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3AD1329

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Results in %

Sample	Cr	Fe
7055N-4000E +1-3.2mm	0.415	4.54
7055N-4000E -1mm	2.36	3.68
7255N-4000E +1-3.2mm	1.44	10.00
7255N-4000E -1mm	0.810	2.00
7225N-4500E +1-3.2mm	2.22	2.74
7225N-4500E -1mm	1.42	1.08
7325N-4500E +1-3.2mm	10.8	7.15
7325N-4500E -1mm	1.52	1.64
9000N-4575E +1-3.2mm	2.08	5.35
9000N-4575E -1mm	3.70	4.84
9000N-4325E +1-3.2mm	1.88	0.990
9000N-4325E -1mm	1.32	0.800
9500N-4425E +1-3.2mm	2.16	3.24
9500N-4425E -1mm	4.26	4.12
9500N-4325E +1-3.2mm	0.910	3.74
9500N-4325E -1mm	1.08	3.46
Detn limit	(0.005)	(0.005)

Analysis code IC 17

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Sample	Fe	Cr
7105N 4000E 1.4-2.1	8.00	2.32
7205N 4000E 1.8-2.2	6.20	1.66
7175N 4500E 0.5-0.95	1.14	1.04
7475N 4500E 1.7-2.1	0.860	0.465
9000N 4625E 1.3-1.8	2.46	0.770
9000N 4525E 0.1-0.8	3.88	0.065
9500N 4175E 1.4-1.8	3.98	2.12
9500N 4525E 1.75-2.1	1.56	0.235
Detn limit	(0.005)	(0.005)
Units	%	%



Amdel Limited
A.C.N. 008 127 802

MATERIALS SERVICES
Certified to AS 3901 / ISO 9001

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13 April 1993

Douglas McKenna & Partners Pty Ltd
GPO Box 1778Q
MELBOURNE VIC 3001

Attention Mr Alan Alexander

REPORT L498/93

CLIENT REFERENCE

Letter of 19 March 1993.

TITLE

Evaluation of Clay.

SAMPLE IDENTIFICATION

7455N 4000E, 2.1 - 2.7m.

WORK REQUESTED

Mineralogical analysis by X-ray diffraction.

Investigating Officers:

Robert J Allen and Michael Till.

John A Lackey
Acting Manager
Materials Services

1. INTRODUCTION

Mr Alan Alexander of Douglas McKenna and Partners Pty Limited, submitted to Amdel Limited for characterisation a sample of clay material.

It was agreed that in the first instance the mineralogical composition of the sample should be established by X-ray powder diffraction.

2. PROCEDURE

The clay was moist as received, and was dried to constant weight at 65°C. It was found to contain 34.4% moisture.

The dried sample was crushed to about -5mm by pestle and mortar and a sub-sample for X-ray diffraction was separated by riffing.

Portion of the crushed material was powdered finely and used to prepare an X-ray diffractometer trace which was interpreted by reference to Standard data available at Amdel.

A second portion of the finely powdered sample was weighed and dispersed in water with the aid of dispersants and an electric blender. It was then allowed to settle to yield a -2µm size fraction by the pipette sedimentation method. The resulting -2µm dispersion was examined by plummet balance to determine its solids content, and was then used to produce oriented clay preparations on ceramic plates. Two plates were prepared, both being saturated with magnesium ions, and one in addition being treated with glycerol. When air-dry, these were examined using the X-ray diffractometer. An additional diagnostic examination was carried out on the glycerol-free plate after addition of formamide.

3. RESULTS and DISCUSSION

The results are shown in Table 1, which shows:

- ▶ the bulk mineralogy to give a general idea of the overall composition and proportions
- ▶ the mineralogy of the -2µm fraction to provide more detailed information on the clay-type minerals

The proportion of the sample found to separate into the $-2\mu\text{m}$ size fraction, as determined by the plummet balance, was 42%. This figure relates only to the pre-treatment and dispersion conditions used.

The clay fraction of this sample contains predominantly fine muscovite mica and halloysite clay. The latter is similar to kaolinite in chemical composition, but tubular, rather than platy in crystal form.

Halloysite appears to find limited use in ceramics and refractories, and in special cases as a petroleum cracking catalyst and paper filler.

In the $-2\mu\text{m}$ fraction the high proportion of mica and significant content of fine quartz would probably limit the commercial possibilities of this material still further.

dt:3

TABLE 1: MINERALOGICAL COMPOSITION OF CLAY SAMPLE

	Estimated* Content
Bulk Mineralogy	
Muscovite (mica)	Dominant
Quartz	Sub-dominant
Halloysite	Sub-dominant
Chlorite	Trace
Yield of $-2\mu\text{m}$ material	42%
$-2\mu\text{m}$ Mineralogy	
Muscovite/illite	Co-dominant
Halloysite	Co-dominant
Quartz	Accessory
Chlorite	Trace

* Semi-quantitative estimates - explanation:

- Dominant** Used for the component apparently most abundant, regardless of its probable percentage level.
- Co-dominant** Used for two (or more) predominating components, both or all of which are judged to be present in roughly equal amounts.
- Sub-dominant** The next most abundant component(s) providing its percentage level is judged above about 20.
- Accessory** Components judged to be present between the levels of roughly 5 and 20%.
- Trace** Components judged to be below about 5%.

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FACSIMILE MESSAGE:

Date 7/4/93 Number of Pages 2
including cover sheet

To MR. ALAN ALEXANDER

Company DOUGLAS MCKENNA & PARTNERS

City/Country MELBOURNE / VICTORIA

Fax Number (03) 670 3691

From R. J. ALLEN Materials Services

MESSAGE:

Alan,
The results of X-ray diffraction study
of your clay are now to hand. Sorry for delay.

	Estimated Content
Bulk Mineralogy	
MUSCOVITE (Mica)	DOMINANT
QUARTZ	SUBDOMINANT
HALLOYSITE	SUBDOMINANT
CHLORITE	TRACE
Yield of -2µm 'clay'	42%
-2µm Mineralogy	
MUSCOVITE ('illite')	CODOMINANT
HALLOYSITE	CODOMINANT
QUARTZ	ACCESSORY
CHLORITE	TRACE - ACCESSORY

Thus the 'clay' fraction of this sample contains fine mica (muscovite) as well as HALLOYSITE clay (similar to KAOLINITE but TUBULAR - rather than PLATY crystal form)

Halloysite appears to find limited use in ceramics and refractories, and in isolated cases as petroleum-cracking catalyst and paper filler.

The high proportion of mica in the -2μ m fraction would probably limit the commercial prospects of this material still further. It is conceivable that it might be suitable for some ceramic and filler applications, but does not offer the broad range of possibilities of kaolinite or bentonite.

Yours faithfully

Bob Allen

APPENDIX
Grade Calculation Tables

GRADE CALCULATIONS-INITIAL TESTING

	Wt. (gms)	%Cr	gms Cr
7055N	4000E (1.75-2.50)		
	-1mm	4582g	2.36%
	+1mm-3.2mm	1144g	0.415%
	-3.2mm	5726g	1.97%
	+3.2mm	1068g	-
	Total	6794g	1.66%
	Vol. 5450ml i.e. 20.71kg/m ³		
7255N	4000E (0.70-1.30)		
	-1mm	6172g	0.810%
	+1mm-3.2mm	250g	1.44%
	-3.2mm	6422g	0.83%
	+3.2mm	244g	-
	Total	6666g	0.80%
	Vol. 5450ml i.e. 9.83kg/m ³		
7225N	4500E (0.65-0.85)		
	-1mm	2742g	1.42%
	+1mm-3.2mm	142g	2.22%
	-3.2mm	2884g	1.46%
	+3.2mm	392g	-
	Total	3276g	1.28%
	Vol. 2150ml i.e. 19.58kg/m ³		
7325N	4500E (0.10-0.65)		
	-1mm	4686g	1.52%
	+1mm-3.2mm	412g	10.8%
	-3.2mm	5098g	2.27%
	+3.2mm	1376g	-
	Total	6474g	1.79%
	Vol. 4850ml i.e. 23.86kg/m ³		
9000N	4575E (1.10-1.80)		
	-1mm	6978g	3.70%
	+1mm-3.2mm	1882g	2.08%
	-3.2mm	8860g	3.36%
	+3.2mm	4360g	-
	Total	13220g	2.25%
	Vol. 9100ml i.e. 32.67 kg/m ³		
9000N	4325E (0.65-1.10)		
	-1mm	4192g	1.32%
	+1mm-3.2mm	1384g	1.88%
	-3.2mm	5576g	1.46%
	+3.2mm	2361g	-
	Total	7937g	1.02%
	Vol. 5800ml i.e. 14.03 kg/m ³		

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GRADE CALCULATIONS-INITIAL TESTING

(Cont.)

	Wt. (gms)	%Cr	gms Cr	
9500N	4425E (1.75-2.20)			
	-1mm	1623g	4.26%	69.14g
	+1mm-3.2mm	894g	2.16%	19.31g
	-3.2mm	2517g	3.51%	88.45g
	+3.2mm	2409g	-	-
	Total	4926g	1.80%	88.45g
	Vol. 3750ml i.e. 23.59 kg/m ³			

9500N	4325E (1.60-2.25)			
	-1mm	2235g	1.08%	24.14g
	+1mm-3.2mm	1274g	0.910%	11.59g
	-3.2mm	3509g	1.02%	35.73g
	+3.2mm	4451g	-	-
	Total	7960g	0.45%	35.73g
	Vol. 6150ml i.e. 5.81kg/m ³			

Average of 8 samples 18.76kg/m³

GRADE CALCULATIONS - FURTHER TESTING

	Wt. (gms)	%Cr	gms Cr
7105N	4000E (1.40-2.10)		
	+6.4mm 1544g	-	-
	-6.4mm 6730g	2.32%	156.14g
	<u>Total 8274g</u>	1.89%	156.14g
	Vol. 6950ml i.e. 22.47kg/m ³		
7205N	4000E (1.80-2.20)		
	+6.4mm 1454g	-	-
	-6.4mm 7790g	1.66%	129.31g
	<u>Total 9244g</u>	1.40%	129.31g
	Vol. 6600ml i.e. 19.59kg/m ³		
7175N	4500E (0.50-0.95)		
	+6.4mm 38g	-	-
	-6.4mm 4871g	1.04%	50.66g
	<u>Total 4909g</u>	1.03%	50.66g
	Vol. 5000ml i.e. 10.13kg/m ³		
7475N	4500E (1.70-2.10)		
	+6.4mm 132g	-	-
	-6.4mm 4050g	0.465%	18.83g
	<u>Total 4182g</u>	0.45%	18.83g
	Vol. 3350ml i.e. 5.62kg/m ³		
9000N	4625E (1.30-1.80)		
	+6.4mm 144g	-	-
	-6.4mm 6884g	0.770%	53.01g
	<u>Total 7028g</u>	0.75%	53.01g
	Vol. 6750ml i.e. 7.85kg/m ³		
9000N	4525E (0.10-0.80)		
	+6.4mm -	-	-
	-6.4mm 6910g	0.065%	4.49g
	<u>Total 6910g</u>	0.065%	4.49g
	Vol. 5650ml i.e. 0.79 kg/m ³		
9500N	4175E (1.40-1.80)		
	+6.4mm 1359g	-	-
	-6.4mm 2773g	2.12%	58.79g
	<u>Total 4132g</u>	1.42%	58.79g
	Vol. 3250ml i.e. 18.09kg/m ³		

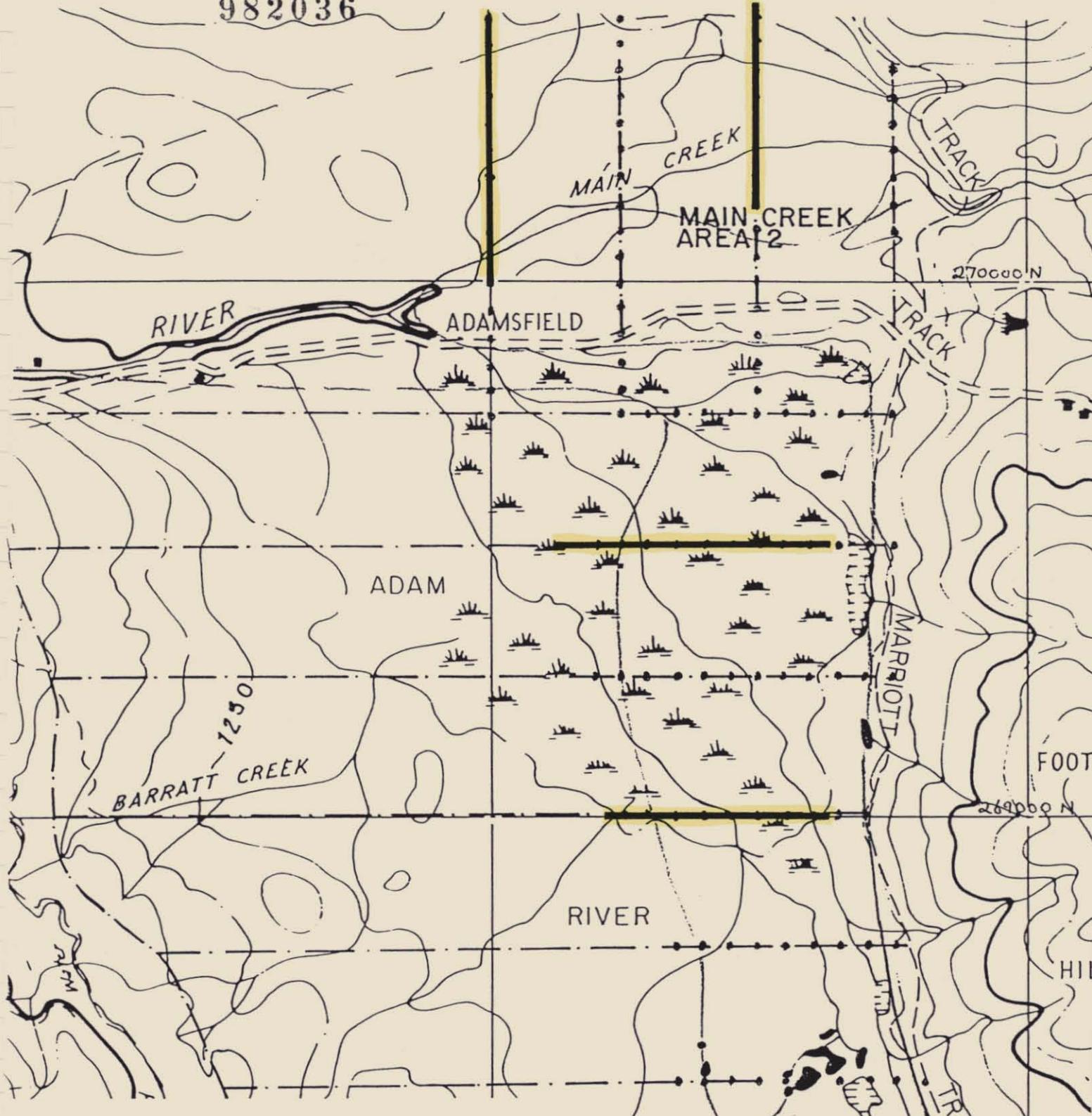
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GRADE CALCULATIONS - FURTHER TESTING
(Cont.)

	Wt. (gms)	%Cr	gms Cr
9500N	4525E (1.75-2.10)		
	+6.4mm	160g	-
	-6.4mm	3507g	0.235%
	<u>Total</u>	<u>3667g</u>	<u>8.24g</u>
	Vol. 3050ml	i.e. 2.70kg/m ³	8.24g
Average of 7 samples 12.35kg/m ³ (excluding 9000N 4525E [0.10-0.80])			

ACCOMPANYING PLANS

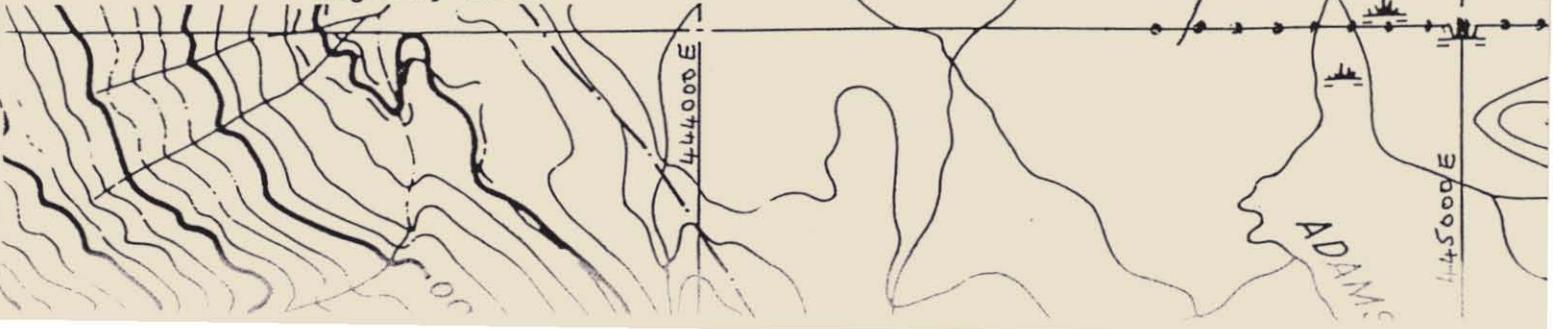
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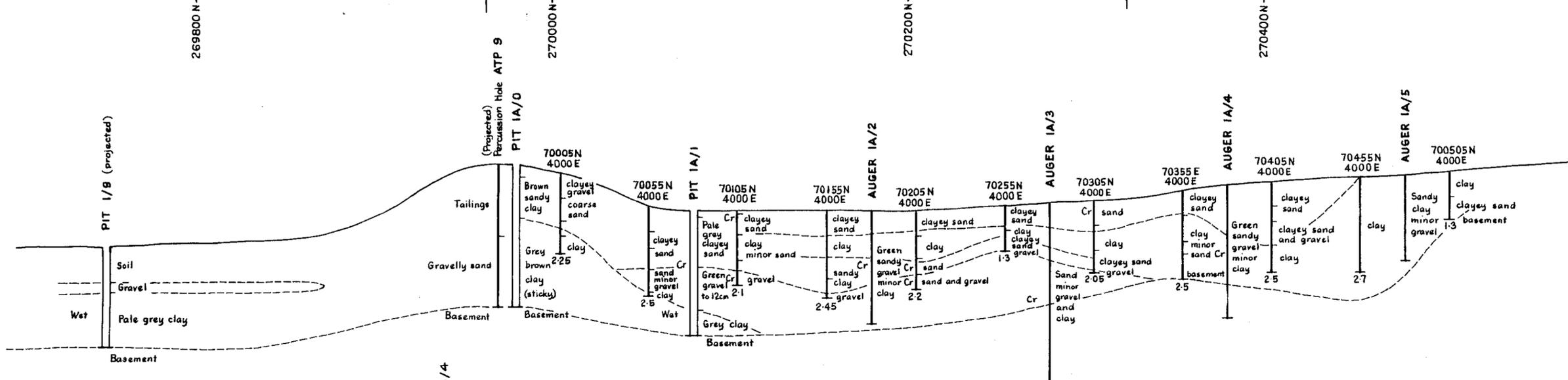


**JERVOIS MINING LIMITED
PLAN SHOWING COMPLETED
AUGER DRILL HOLE LOCATIONS**

- Approximate Outline of Cobble Wash
- Proposed Drill Hole Locations

Scale 1 : 10,000 Drg. No. AD-1
August, 1993



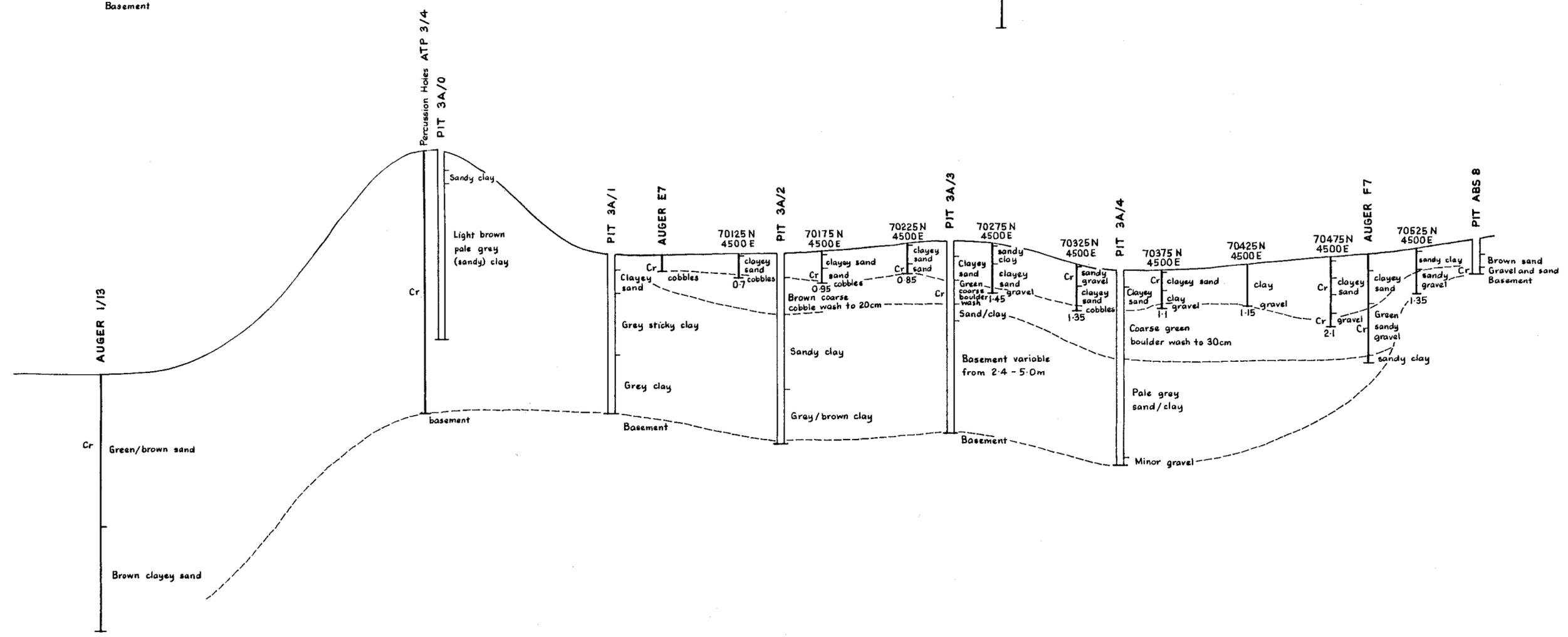
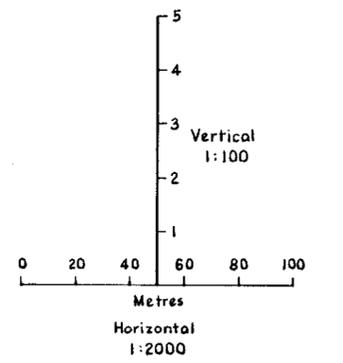


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- RL 370

LINE IA
444000 m E

- RL 365



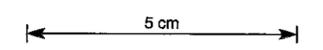
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LINE 3A
444500 m E

- RL 365

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