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E.L. 673 - MILLIGANS EAST

ANNUAL REPORT

FOR THE YEAR ENDING 1ST NOVEMBER, 1975

Distribution:
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Kununurra

By: P. d'Auvergne
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MG: 641

ABSTRACT

A brief shallow rotary drilling program to bedrock revealed no encouraging lead or zinc geochemistry for the subsurface rock units in the southwest corner of EL 673.

In the northwest corner of EL 673, exploration had been suspended during 1975 awaiting Government approval of joint venture proposals on EL's 247 and 246. Approval was granted late in 1975, and it is recommended integrated exploration on EL's 246, 247 and 673 be recommenced early in 1976.

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1.0 INTRODUCTION

Because of the irregular shape of the western boundary of EL 673, the EL can effectively be divided into two parts - that lying to the north of latitude 15°35'S and that lying south of this latitude.

Unfortunately, exploration on adjacent EL's 246 and 247 to the west and north of EL 673 respectively (see Figure 2) was not possible as Government approval of joint venture proposals on these properties was being awaited. Consequently, exploration on the northern part of EL 673 was somewhat hindered.

During 1973, mapping, limited rotary drilling and IP had yielded encouraging results in the northern part of EL 673.

During 1974, attention turned to the southern part where mapping had revealed a small fault protected block of dolomite, sandstone and bleached siltstone from which rock chip samples produced anomalous lead and zinc geochemistry. A brief IP program followed, but produced inconclusive results. A follow up program of shallow bedrock drilling was decided upon but, as no drill rig was available, this was programmed for early in 1975.

An aeromagnetic survey flown over the Bonaparte Gulf Basin in 1974 covered parts of EL 673, but only regional trends were recognisable and did not provide direct targets for work on EL 673.

2.0 EXPLORATION DURING 1975

Exploration on EL 673 during 1975 was limited to the southern part of the EL, where a brief geochemical program was undertaken. Twenty-five holes were drilled on lines approximately 1 km apart, with holes at 200 m centres along the lines. The holes penetrated 2-5 m into fresh bedrock, and the bedrock samples and the immediately overlying 2-6 m of weathered

material were analysed for lead and zinc.

3.0 RESULTS

Figure 2 shows the geology of the bedrock as encountered during drilling and figures 3 and 4 show the bedrock geochemistry for lead and zinc, respectively, for the first fresh sample of bedrock.

The outcropping dolomitic unit was found to be of very limited sub-outcrop extent, and was only found in holes on the southern and northern extremities of the area drilled. The sandstone tentatively identified as from either the Cockatoo or Enga Sandstone Formation (RAMDOHR, R, 1975) is re-interpreted, due to lack of intersections during drilling, as a sandstone lens within the dolomitic unit and therefore Burt Range Formation.

The dolomitic unit is overlain unconformably by a dark, highly carbonaceous calcareous shale and siltstone. This latter unit unconformably overlies the Cockatoo Formation locally. It may be a unit within the Burt Range Formation, but may also be part of the Milligans Beds Formation as it strongly resembles descriptions of the Milligans Beds from Spirit Hill bores numbers 1, 2 and 3 (see Figure 2 for approximate location), and also from the Spirit Hill No. 1 stratigraphic bore approximately 9 km to the north of the area drilled during 1975.

Rock chips collected from outcrops during 1974 revealed interesting geochemical values. A sample of the dolomitic unit yielded 28 ppm lead and 26 ppm zinc, while in a strong fault zone a limonitic sandstone yielded 40 ppm lead and 1,200 ppm zinc and a bleached siltstone assayed 3,200 ppm lead and 180 ppm zinc.

Assays of samples after drilling revealed similar values in the dolomites in outcrop and subsurface although, locally, zinc values are slightly higher (up to 220 ppm).

The sandstone sampled in outcrop in the fault zone was not intersected during drilling.

Assays of up to 182 ppm lead and 1,400 ppm zinc were found in the siltstone and shale unit. These assays are comparable with values in the bleached siltstone in the fault zone but the two geological units may or may not be equivalent. The siltstone in the fault may, in fact, be a cemented fault gouge, which may account for the high geochemistry. Generally, values in the shale/siltstone unit intersected during drilling are low, with the only high values of 1,600 ppm zinc (corresponding with 182 ppm lead) and 220 ppm zinc occurring at depth in holes NBM 4001 and 4002.

4.0 CONCLUSIONS AND RECOMMENDATIONS

Geochemical results in the dolomitic unit are too low to warrant follow-up.

Although several anomalous values are found in the carbonaceous shale unit, the potential of this unit is considered to be poor also. The elevated values in NBM 4001 and 4002 are not repeated in holes NBM 4003, 4004 or 4005 updip on the same line. Consequently, follow-up of the two elevated values is considered unnecessary.

It appears that the potential of EL 673 must lie in the northern part, i.e. north of $15^{o}35'S$.

During 1975, Government Approval of the EL 246 and EL 247 joint venture proposals was granted, and it is recommended that, during 1976, exploration in the northwest corner of EL 673 in the area of Rocky Knob (RAMDOHR 1973, 1975) be integrated with work on EL 246 and EL 247.

No IP is recommended at this stage, as previous experience shows only limited interpretation is possible without a full sub-surface

geological knowledge. Regular close spaced faulting, unconformities and facies changes make geological interpretation from the sparse outcrops hazardous, and it is recommended the geology be studied by a systematical geochemical approach during 1976. Such an approach proved invaluable during 1975 on EL 675 (d'AUVERGNE, P, 1976) where a much more complex geological picture than originally thought emerged as an extensive geochemical drilling program progressed.

5.0 BIBLIOGRAPHY

RAMDOHR, R. (1973), EL 673 - Milligans East Annual Report for the year ending 1st November, 1973 (MG:343), unpub.

RAMDOHR, R. (1975), EL 673 - Milligans East Annual Report for the year ending 1st November, 1974 (MG:508), unpub.

d'AUVERGNE (1976), EL 675 - Flapper Hill - Annual Report for the year ending 1st November, 1975 (MG:643), unpub.

6.0 EXPENDITURE

Details of expenditure on E.L. 673 for the period 1.11.74 to 31.10.75 are as follows:

	$
Salaries - residents	274.95
Salaries - temporary personnel	518.35
Accommodation & associated expenses	106.12
Motor vehicle expenses & rent	324.66
Land transportation	4.32
Air travel - personnel	929.79
Air freight	49.27
Sea transport	7.18
Maps, photographs, etc.	44.55
Photoprinting	2.74
Damages - compensation	128.00
Permit fees - rentals	48.00
Miscellaneous land base expenses	230.86
Mobilisation - demobilisation (drilling)	200.00
Mobilisation - demobilisation (geophysics)	846.71
Induced polarisation	731.87
Explosives	2.40
Mud products	1.36
Stationery & supplies	1.96
Other consumables	81.45
Consulting: S.N.P.A. - C.R.P.	21.61
Consulting: S.N.P.A. - others	80.97
Repairs and maintenance	26.45
Building rentals - storage	56.64
Communications	38.35
Taxes and rates	3.88
Geophysics - Lab. & Assoc. expenses	302.00
Geophysics Dept. - general expenses	22.00
Mineral Geology - Lab. & Assoc. expenses	1,555.00
Mineral Geology Dept. - general expenses	273.50
Administration	2,529.00
Direct management costs	23.00
Drafting and printing	542.07
Surveying	324.00
Mineral drilling	6,716.00
Analyses	138.16
	$17,187.17

APPENDIX

ROTARY DRILL LOGS NBM 4001 - 4025

AQUITAINE AUSTRALIA MINERALS PTY. LTD.

DRILLING LOG

PERMIT EL 673 Milligans East STATE Northern Australia	P.D.H. NBM 4001 Location L203 - 8W Azimuth Depression Vertical	Hole drilled by Davies Drilling Hole started early July 1975 Hole completed Hole logged by W. Morris

DEPTH (metres)	SAMPLE NUMBER	DESCRIPTION	ASSAYS Pb (%)	Zn (%)	
0-2		Orange yellow sandy soil.			
2-4		Yellow-orange sandy soil with minor clay fraction.			
4-6		Yellow-red clay with only minor sand and some quartzite gravel.			
6-8		Yellow sandy clay.			
8-10		Yellow sandy clay and minor gravel			
10-12		Yellow sandy clay			
12-14		Yellow sandy clay with minor gravels			
14-16 16-18		Gravel - minor clay fraction - grains < 4 mm.			
18-20		Yellow-red clay, minor sandy fraction.	.0070	.0068	
20-22		Tan clay.			
22-24		As above	.0024	.0040	
24-26		As above			
26-28		Unweathered black carbonaceous shale - contains minute plant fragments and pyrite bands (2-4mm thick). The shale is calcareous.	.0044	.0070	
28-30		Calcareous black carbonaceous shale	.0132	.0064	
30-32		As above but also minor pyrite.			
32-34		Calcareous black carbonaceous shale with small pieces of coal.			
34-36		As above.	.0182	.1400	
		EOH			

AQUITAINE AUSTRALIA MINERALS PTY. LTD.

DRILLING LOG

PERMIT EL 673 Milligans East STATE Northern Australia	P.D.H. NBM 4002 Location L203-6W Azimuth Vertical Depression	Hole drilled by Davies Drilling Hole started early July 1975 Hole completed Hole logged by W. Morris

DEPTH (metres)	SAMPLE NUMBER	DESCRIPTION	ASSAYS Pb (%)	Zn (%)	
0-2		Orange-yellow sandy soil			
2-4		Orange sand			
4-6		Sandy clay with minor gravel fraction			
6-8		Sandy clay with moderate gravel fraction			
8-10		As above			
10-12		As above			
12-14		Sandy clay with large gravel fraction - some pieces 1 cm.			
14-16		As above			
16-18		Brown clay -weathered shale	.0022	.0062	
18-20		As above			
20-22		As above			
22-24		As above	.0028	.0062	
24-26		As above			
26-28		As above	.0030	.0066	
28-30		Fresh material at 29m - calcareous black carbonaceous shale			
30-32		Black shale, slightly calcareous	.0062	.0220	
32-34		Black shale, slightly calcareous with more silty bands			
34-36		As above	.0040	.0072	
		EOH			

AQUITAINE AUSTRALIA MINERALS PTY. LTD.

DRILLING LOG

PERMIT EL 673 Milligans East STATE Northern Australia	P.D.H. NBM 4003 Location L203-4W Azimuth Vertical Depression	Hole drilled by Davies Drilling Hole started Early July 1975 Hole completed Hole logged by W. Morris

DEPTH (metres)	SAMPLE NUMBER	DESCRIPTION	ASSAYS Pb (%)	Zn (%)
0-2		Orange and black sandy soil		
2-4		Clayey sand - orange		
4-6		Clayey sand - yellow with minor gravel fraction		
6-8		Yellow clay		
8-10		As above		
10-12		As above		
12-14		Brown clay with minor sand fraction		
14-16		Gravel and clay -mainly quartzite pebbles (subangular)		
16-18		Yellow brown clay - weathered shale		
18-20		Brown clay - weathered shale		
20-22		As above	.0036	.0078
22-24		As above		
24-26		As above	.0018	.0092
26-28		Unweathered at 27m - calcareous black carbonaceous shale		
28-30		As above but includes minor pyrite patches and silty bands	.0024	.0078
30-32		As above		
32-34		Calcareous black carbonaceous shale with minor silty bands	.0026	.0072
		EOH		

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DRILLING LOG

PERMIT EL673 Milligans East STATE Northern Australia	P.D.H. NBM 4004 Location L203-2W Azimuth Vertical Depression	Hole drilled by Davies Drilling Hole started early July 1975 Hole completed Hole logged by W. Morris

DEPTH (metres)	SAMPLE NUMBER	DESCRIPTION	ASSAYS Pb (%)	Zn (%)	
0-2		Orange-brown sandy soil			
2-4		Yellow clayey sand			
4-6		Yellow sandy clay			
6-8		As above			
8-10		As above			
10-12		As above			
12-14		Brown-yellow clay - minor sand fraction			
14-16		Brown-yellow clay - minor gravel fraction			
16-18		As above	.0028	.0054	
18-20		Brown clay - weathered shale			
20-22		As above	.0030	.0060	
22-24		As above			
24-26		As above	.0026	.0094	
26-28		As above			
28-30		Unweathered at 29M - black carbonaceous shale and minor silty bands and sandy bands	.0058	.0070	
		EOH			

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DRILLING LOG

PERMIT EL 673 Milligans East

STATE Northern Australia

P.D.H. NBM 4005

Location L203-00

Azimuth Vertical

Depression

Hole drilled by Davies Drilling

Hole started early July 1975

Hole completed

Hole logged by W. Morris

DEPTH (metres)	SAMPLE NUMBER	DESCRIPTION	ASSAYS Pb (%)	Zn (%)	
0-2		Orange-yellow sandy soil			
2-4		Orange-yellow sandy soil with minor clay fraction			
4-6		Sandy clay			
6-8		As above			
8-10		Red orange clay			
10-12		Clayey gravel			
12-14		Brown clay and gravel			
14-16		Brown clay - weathered shale	.0026	.0056	
16-18		As above			
18-20		As above	.0034	.0080	
20-22		As above but fresh shale at 21m and some oxidised sandstone pieces			
22-24		As above	.0020	.0070	
		EOH			

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DRILLING LOG

PERMIT EL 673 Milligans East STATE Northern Australia	P.D.H. NBM 4006 Location L202-00 Azimuth Vertical Depression	Hole drilled by Davies Drilling Hole started early July 1975 Hole completed Hole logged by W. Morris

DEPTH (metres)	SAMPLE NUMBER	DESCRIPTION	ASSAYS Pb (%)	Zn (%)	
0-2		Brown orange sandy soil			
2-4		Yellow orange sandy clay			
4-6		Pale yellow very calcareous clay with coarser carbonate chips - may be calcrete			
6-8		As above			
8-10		Pale yellow calcareous clay with bleached carbonate ships			
10-12		As above but more clay			
12-14		White sandstone with clay cement - weakly calcareous	.0022	.0030	
14-16		Yellow brown clay	.0044	.0026	
16-18		Yellow clay with sandstone pieces	.0056	.0020	
18-20		Yellow clay with iron (Fe) stained sandstone pieces.	.0066	.0040	
20-22		Pale tan sandstone.	.0008	.0012	
		EOH			

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DRILLING LOG

PERMIT EL 673
Milligans East

STATE
Northern
Australia

P.D.H. NBM 4007

Location L202-2W

Azimuth Vertical

Depression

Hole drilled by Davies Drilling

Hole started early July 1975

Hole completed

Hole logged by
W. Morris

DEPTH (metres)	SAMPLE NUMBER	DESCRIPTION	ASSAYS Pb (%)	Zn (%)	
0-2		Yellow orange sandy soil			
2-4		Yellow brown sandy clay			
4-6		Very calcareous sandstone with yellow clay			
6-8		Sandy carbonate (bleached) with yellow clay - may be calcrete			
8-10		As above			
10-12		As above			
12-14		As above			
14-16		Sandstone pieces in clay with some carbonate material			
16-18		Yellow brown clay			
18-20		As above, but includes a moderate amount of sand.	.0016	.0160	
20-22		As above			
22-24		Unweathered black shale with white sandstone - slightly calcareous.	.0014	.0018	
		EOH			

AQUITAINE AUSTRALIA MINERALS PTY. LTD.

DRILLING LOG

PERMIT EL 673 Milligans East STATE Northern Australia	P.D.H. NBM 4008 Location L202 - 4W Azimuth Depression Vertical	Hole drilled by Davies Drilling Hole started early July 1975 Hole completed Hole logged by W. Morris

DEPTH (metres)	SAMPLE NUMBER	DESCRIPTION	ASSAYS Pb (%)	Zn (%)	
0-2		Yellow orange sandy soil			
2-4		Yellow brown sandy clay as above			
4-6		As above			
6-8		Yellow brown clay with minor gravel fraction			
8-10		Yellow clay - minor gravel			
10-12		Yellow calcareous clay - minor gravel			
12-14 14-16		Yellow calcareous clay with bleached white carbonate chips			
16-18		Yellow brown clay			
18-20		Brown clay - weathered shale	.0016	.0042	
20-22		Distinct red brown clay - weathered shale			
22-24		Brown clay - weathered shale	.0024	.0048	
24-26		As above			
26-28		Unweathered black carbonaceous shale - minor silty bands	.0034	.0100	
		EOH			

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DRILLING LOG

PERMIT EL 673
Milligans East

STATE

Northern Australia

P.D.H. NBM 4009
Location L202 - 6W
Azimuth
Depression Vertical

Hole drilled by Davies Drilling
Hole started early July 1975
Hole completed
Hole logged by W. Morris

DEPTH (metres)	SAMPLE NUMBER	DESCRIPTION	ASSAYS Pb (%)	Zn (%)	
0-2		Yellow orange sandy soil			
2-4		Yellow brown sandy clay			
4-6		As above			
6-8		Yellow brown clay with a moderate gravel fraction			
8-10		Yellow orange clay with minor gravel fraction			
10-12		As above			
12-14		Orange brown sandy clay			
14-16		Yellow clay			
16-18		Red brown clay - weathered shale	.0018	.0084	
18-20		Brown clay - weathered shale			
20-22		As above	.0024	.0046	
22-24		As above			
24-26		As above	.0022	.0140	
26-28		Unweathered shale at 27m - calcareous black carbonaceous shale with silty bands			
28-30		As above	.0020	.0260	
		EOH			

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DRILLING LOG

PERMIT EL 673 Milligans East STATE Northern Australia	P.D.H. NBM 4010 Location L202 - 7.7W Azimuth Depression Vertical	Hole drilled by Davies Drilling Hole started early July 1975 Hole completed Hole logged by W. Morris

DEPTH (metres)	SAMPLE NUMBER	DESCRIPTION	ASSAYS Pb (%)	Zn (%)	
0-2		Orange to black sandy soil			
2-4		Yellow orange sandy clay			
4-6		As above			
6-8		As above			
8-10		As above			
10-12		Yellow orange clay			
12-14		Yellow sandy clay			
14-16		Brown orange sandy clay with high gravel fraction			
16-18		Red orange clay - weathered shale			
18-20		Brown clay - weathered shale	.0018	.0066	
20-22		As above			
22-24		As above	.0018	.0056	
24-26		As above			
26-28		As above	.0008	.0050	
28-30		Unweathered black carbonaceous shale at 29M			
30-32		Very calcareous black carbonaceous shale with silty and sandy bands.	.0028	.0060	
		EOH			

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DRILLING LOG

PERMIT EL 673 Milligans East STATE Northern Australia	P.D.H. NBM 4011 Location L204 - 4W Azimuth Depression Vertical	Hole drilled by Davies Drilling Hole started early July 1975 Hole completed Hole logged by W. Morris

DEPTH (metres)	SAMPLE NUMBER	DESCRIPTION	ASSAYS Pb (%)	Zn (%)	
0-2		Orange sandy soil			
2-4		Orange sandy clay			
4-6		Yellow orange sandy clay with minor gravel fraction			
6-8		As above			
8-10		As above			
10-12		As above			
12-14		Yellow clay			
14-16		Yellow clayey sand - minor gravel			
16-18		Very calcareous gravel - Fe stained			
18-20		Yellow sandy clay			
20-22		Brown clay - weathered shale	.0020	.0048	
22-24		As above			
24-26		As above	.0018	.0044	
26-28		As above			
28-30		Unweathered slightly calcareous black carbonaceous shale with minor silty bands	.0028	.0046	

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DRILLING LOG

PERMIT EL 673
Milligans East

STATE
Northern Australia

P.D.H. NBM 4012
Location L204 - 2W
Azimuth
Depression Vertical

Hole drilled by Davies Drilling
Hole started early July 1975
Hole completed
Hole logged by W. Morris

DEPTH (metres)	SAMPLE NUMBER	DESCRIPTION	ASSAYS Pb (%)	Zn (%)	
0-2		Brown orange sandy soil			
2-4		Orange clayey sand			
4-6		Orange sandy clay			
6-8		Yellow sandy clay			
8-10		Yellow sandy clay with minor gravel fraction.			
10-12		As above			
12-14		As above			
14-16		As above			
16-18		Sandy clay with high gravel fraction			
18-20		Yellow clay - probably weathered shale			
20-22		As above	.0030	.0044	
22-24		Brown clay - weathered shale			
24-26		As above	.0028	.0038	
26-28		Unweathered black carbonaceous shale - only slightly calcareous - pyrite about 4% as bands in the shale			
28-30		Slightly calcareous black carbonaceous shale.	.0026	.0038	
		EOH			

AQUITAINE AUSTRALIA MINERALS PTY. LTD.

DRILLING LOG

PERMIT EL 673 Milligans East STATE Northern Australia	P.D.H. NBM 4013 Location L204 - 00 Azimuth Depression Vertical	Hole drilled by Davies Drilling Hole started early July 1975 Hole completed Hole logged by W. Morris

DEPTH (metres)	SAMPLE NUMBER	DESCRIPTION	ASSAYS Pb (%)	Zn (%)	
0-2		Dark brown sandy soil			
2-4		Orange yellow sandy clay			
4-6		As above			
6-8		Yellow sandy clay			
8-10		Orange yellow sandy clay			
10-12		As above			
12-14		As above			
14-16		Orange yellow sandy clay with large gravel fraction			
16-18		As above, but with higher gravel fraction - gravel is FeO indurated sandstone and may be lateritic			
18-20		Brown yellow clay - weathered shale			
20-22		Brown clay - weathered shale	.0012	.0056	
22-24		As above			
24-26		As above	.0016	.0068	
26-28		Unweathered weakly calcareous, carbonaceous, shale and minor interbedded siltstone.			
28-30		As above	.0038	.0082	
		EOH			

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DRILLING LOG

PERMIT EL 673 Milligans East STATE Northern Australia	P.D.H. NBM 4014 Location L204 - 2E Azimuth Vertical Depression	Hole drilled by Davies Drilling Hole started early July 1975 Hole completed Hole logged by W. Morris

DEPTH (metres)	SAMPLE NUMBER	DESCRIPTION	ASSAYS Pb (%)	Zn (%)	
0-2		Yellow orange sandy soil			
2-4		Yellow brown sandy clay			
4-6		As above			
6-8		As above			
8-10		Yellow orange sandy clay - minor gravel			
10-12		As above			
12-14		As above			
14-16		Yellow orange sandy clay with moderate gravel fraction			
16-18		Brown clay - weathered shale	.0016	.0054	
18-20		As above			
20-22		As above	.0018	.0058	
22-24		As above			
24-26		As above	.0014	.0046	
26-28		Unweathered dark carbonaceous shale with siltstone bands. The siltstone is more calcareous than the shale			
28-30		Dark carbonaceous shale with silty bands - very calcareous	.0022	.0052	
		EOH			

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DRILLING LOG

PERMIT EL 673 Milligans East STATE Northern Australia	P.D.H. NBM 4015 Location L204 - 4E Azimuth Depression Vertical	Hole drilled by Davies Drilling Hole started early July 1975 Hole completed Hole logged by W. Morris

DEPTH (metres)	SAMPLE NUMBER	DESCRIPTION	ASSAYS Pb (%)	Zn (%)	
0-2		Yellow brown sandy soil			
2-4		Yellow brown sandy clay			
4-6		As above			
6-8		As above			
8-10		Yellow brown sandy clay with minor gravel content			
10-12		As above, but with moderate gravel content.			
12-14		As above			
14-16		As above			
16-18		Sandy clay with high gravel content			
18-20		Brown clay - weathered shale			
20-22		As above	.0024	.0058	
22-24		As above			
24-26		As above	.0032	.0064	
26-28		Unweathered dark carbonaceous shale 27 m.			
28-30		As above	.0028	.0070	
		EOH			

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DRILLING LOG

PERMIT EL 673 Milligans East STATE Northern Australia	P.D.H. NBM 4016 Location L205 - 3E (seismic line) Azimuth Depression Vertical	Hole drilled by Davies Drilling Hole started early July 1975 Hole completed Hole logged by W. Morris

DEPTH (metres)	SAMPLE NUMBER	DESCRIPTION	ASSAYS Pb (%)	ASSAYS Zn (%)
0-2		Yellow to black sandy soil		
2-4		Yellow-brown sandy clay		
4-6		As above		
6-8		As above		
8-10		Yellow-brown sandy clay with minor gravel fraction		
10-12		Yellow sandy clay		
12-14		Brown clay		
14-16		Brown clay - weathered shale		
16-18		Red brown clay - weathered shale		
18-20		As above	.0016	.0066
20-22		Brown clay - weathered shale		
22-24		As above	.0014	.0080
24-26		Unweathered shale at 25M		
26-28		Dark carbonaceous shale - mildly calcareous with silty bands. Pyrite also in bands - less than 1%.	.0014	.0070
		EOH		

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DRILLING LOG

PERMIT EL 673 Milligans East STATE Northern Australia	P.D.H. NBM 4017 Location L205 - 5E (seismic line) Azimuth Depression Vertical	Hole drilled by Davies Drilling Hole started early July 1975 Hole completed Hole logged by W. Morris

DEPTH (metres)	SAMPLE NUMBER	DESCRIPTION	ASSAYS Pb (%)	Zn (%)	
0-2		Yellow-brown sandy soil			
2-4		Yellow-brown sandy clay			
4-6		As above			
6-8		As above			
8-10		Orange-brown sandy clay			
10-12		As above			
12-14		Gravel and brown clay			
14-16		Brown clay - weathered shale			
16-18		As above			
18-20		As above	.0018	.0086	
20-22		As above			
22-24		As above	.0014	.0100	
24-26		Unweathered dark carbonaceous shale at 25m.			
26-28		Dark carbonaceous shale-calcareous with silty bands	.0020	.0086	
		EOH			

AQUITAINE AUSTRALIA MINERALS PTY. LTD.

DRILLING LOG

PERMIT EL 673 Milligans East

STATE

Northern Australia

P.D.H. NBM 4018

Location L205 - 7E (seismic line)

Azimuth Vertical

Depression

Hole drilled by Davies Drilling

Hole started early July 1975

Hole completed

Hole logged by W. Morris

DEPTH (metres)	SAMPLE NUMBER	DESCRIPTION	ASSAYS Pb (%)	Zn (%)
0-2		Brown-orange sandy clay	.0006	.0022
2-4		Yellow clay with pieces of bleached white carbonate - probably calcrete		
4-6		As above		
6-8		As above		
8-10		Yellow clay		
10-12		As above		
12-14		As above	.0006	.0028
14-16		Brown clay - probably weathered shale		
16-18		As above		
18-20		As above	.0012	.0078
20-22		As above		
22-24		As above	.0014	.0054
24-26		As above		
26-28		Non oxidised shale at 27m - no chips, just dark grey drilling sludge. The shale is presumably very soft.	.0016	.0062
		EOH		

AQUITAINE AUSTRALIA MINERALS PTY. LTD.

DRILLING LOG

PERMIT EL 673 Milligans East STATE Northern Australia	P.D.H. NBM 4019 Location L205 - 9E (seismic line) Azimuth Vertical Depression	Hole drilled by Davies Drilling Hole started early July 1975 Hole completed Hole logged by W. Morris

DEPTH (metres)	SAMPLE NUMBER	DESCRIPTION	ASSAYS Pb (%)	Zn (%)	
0-2		Black soil			
2-4		Light yellow sandy calcareous clay			
4-6		as above			
6-8		as above			
8-10		as above			
10-12		as above			
12-14		Yellow clay			
14-16		Yellow brown clay			
16-18		Brown clay - weathered shale			
18-20		as above			
20-22		as above			
22-24		Brown clay with an oxidised sandstone horizon	.0008	.0054	
24-26		Brown clay - weathered shale			
26-28		as above	.0032	.0086	
28-30		Unweathered shale at 29m - grey drilling sludge			
30-32		Grey drilling sludge - shale is presumably very soft	.0004	.0046	
32-34		as above			
34-36		Grey calcareous sludge	.0008	.0050	
36-38		As above - carbonaceous material in drilling sludge			
38-40		As above			
40-42		As above			
42-44		As above	.0004	.0060	
44-46		Dark grey carbonaceous shale with calcareous silty bands			

AQUITAINE AUSTRALIA MINERALS PTY. LTD.

DRILLING LOG

PERMIT E.L. 673 Milligans East	P.D.H. NBM 4019	Hole drilled by Davies Drilling
STATE N.A.	Location L 205 - 9E (seismic line)	Hole started) early July 1975
	Azimuth	Hole completed)
	Depression Vertical	Hole logged by W. Morris

DEPTH (metres)	SAMPLE NUMBER	DESCRIPTION	ASSAYS Pb (%)	Zn (%)	
46-48		As above	.0010	.0056	
48-50		As above			
50-52		As above			
52-54		As above	.0008	.0106	
54-56		As above			
56-58		Dark calcareous carbonaceous shale with siltstone bands	.0004	.0056	
		EOH			

AQUITAINE AUSTRALIA MINERALS PTY. LTD.

DRILLING LOG

PERMIT EL 673 Milligans East STATE Northern Australia	P.D.H. NBM 4020 Location L205 - 11E (10M south of seismic line) Azimuth Depression Vertical	Hole drilled by Davies Drilling Hole started early July 1975 Hole completed Hole logged by W. Morris

DEPTH (metres)	SAMPLE NUMBER	DESCRIPTION	ASSAYS Pb (%)	Zn (%)	
0-2		Black sandy soil			
2-4		Grey calcareous clayey sand			
4-6		As above, but clay rich			
6-8		Grey Calcareous clay	.0014	.0036	
8-10		Yellow sandy clay			
10-12		Orange brown, light grey and whitish finely crystalline dolomite	.0010	.0016	
12-14		Pale grey finely crystalline dolomite			
14-16		Pale grey finely crystalline dolomite with fine silty bands and minor organic (carbonaceous) content. May also have minor limonite after pyrite.	.0006	.0018	
		EOH			

AQUITAINE AUSTRALIA MINERALS PTY. LTD.

DRILLING LOG

PERMIT EL 673 Milligans East STATE Northern Australia	P.D.H. NBM 4021 Location L205 - 12.4E (seismic line) Azimuth Depression Vertical	Hole drilled by Davies Drilling Hole started early July 1975 Hole completed Hole logged by W. Morris

DEPTH (metres)	SAMPLE NUMBER	DESCRIPTION	ASSAYS Pb (%)	Zn (%)	
0-2		Black sands and pale yellow calcareous clay			
2-4		Pale yellow grey, calcareous clay			
4-6		as above			
6-8		as above			
8-10		as above			
10-12		Yellow weathered dolomite and clay			
12-14		brown orange clay			
14-16		as above			
16-18		as above	.0018	.0056	
18-20		Brown clay and weathered dolomite			
20-22		Brown orange clay			
22-24		Brown orange clay with chips of weathered dolomite - some fresh. Pieces of FeO indurated sandstone	.0022	.0230	
24-26		Pale grey dolomite, slightly porous and finely crystalline	.0010	.0200	
		EOH			

AQUITAINE AUSTRALIA MINERALS PTY. LTD.

DRILLING LOG

PERMIT EL 673
Milligans East

STATE
Northern Australia

P.D.H. NBM 4022
Location L205 - 15E (seismic line)
Azimuth Vertical
Depression

Hole drilled by Davies Drilling
Hole started early July 1975
Hole completed
Hole logged by W. Morris

DEPTH (metres)	SAMPLE NUMBER	DESCRIPTION	ASSAYS Pb (%)	Zn (%)	
0-2		Brown sandy soil			
2-4		Brown-orange sandy clay			
4-6		Orange sandy clay			
6-8		Orange-brown clayey sand			
8-10		Yellow sandy clay			
10-12		Orange clay with sand and gravel			
12-14		Weathered sandy dolomite			
14-16		as above	.0008	.0046	
16-18		Weathered sandy dolomite with brown clay			
18-20		Sandstone - weakly calcareous	.0008	.0170	
20-22		Pale tan sandstone - weakly calcareous (may be dolomitic)			
22-24		Brown-tan sandstone weakly calcareous with brown clay sludge	.0032	.0096	
		EOH			

AQUITAINE AUSTRALIA MINERALS PTY. LTD.

DRILLING LOG

PERMIT EL 673 Milligans East STATE Northern Australia	P.D.H. NBM 4023 Location L205-17E (seismic line) Azimuth Vertical Depression	Hole drilled by Davies Drilling Hole started early July 1975 Hole completed Hole logged by W. Morris

DEPTH (metres)	SAMPLE NUMBER	DESCRIPTION	ASSAYS Pb (%)	Zn (%)	
0-2		Orange sandy soil			
2-4		Yellow sandy clay			
4-6		as above			
6-8		as above			
8-10		as above			
10-12		Red-yellow sandy clay			
12-14		Pink clay - probably from fault zone			
14-16		as above			
16-18		as above	.0020	.0016	
18-20		as above			
20-22		as above	.0008	.0016	
22-24		as above			
24-26		Pink clays with white quartz sandstone and some finer laminated siltstone	.0010	.0020	
26-28		as above			
28-30		Sandy material from white quartz sandstone			
		EOH			

AQUITAINE AUSTRALIA MINERALS PTY. LTD.

DRILLING LOG

PERMIT EL 673 Milligans East

STATE Northern Australia

P.D.H. NBM 4024

Location L201 - 10W

Azimuth Vertical

Depression

Hole drilled by Davies Drilling

Hole started early July 1975

Hole completed

Hole logged by W. Morris

DEPTH (metres)	SAMPLE NUMBER	DESCRIPTION	ASSAYS Pb (%)	Zn (%)	
0-2		Orange-brown sandy soil			
2-4		Orange clayey sand			
4-6		Yellow and orange sandy clay			
6-8		as above			
8-10		as above			
10-12		as above			
12-14		Yellow-orange sandy clay with high gravel fraction			
14-16		Yellow-brown clay - weathered shale			
16-18		as above			
18-20		as above	.0020	.0082	
20-22		as above			
22-24		Brown clay			
24-26		as above			
26-28		Unweathered dark, very calcareous, carbonaceous shale	.0024	.0064	
		EOH			

AQUITAINE AUSTRALIA MINERALS PTY. LTD.

DRILLING LOG

PERMIT EL 673 Milligans East STATE Northern Australia	P.D.H. NBM 4025 Location L201 - 6W Azimuth Depression Vertical	Hole drilled by Davies Drilling Hole started early July 1975 Hole completed Hole logged by W. Morris

DEPTH (metres)	SAMPLE NUMBER	DESCRIPTION	ASSAYS Pb (%)	Zn (%)	
0-2		Yellow-orange sand			
2-4		as above			
4-6		Yellow sandy clay			
6-8		as above			
8-10		as above			
10-12		as above			
12-14		Calcareous orange-yellow clay with chips of weathered carbonate	.0160	.0240	
14-16		as above			
16-18		as above	.0084	.0210	
18-20		as above			
20-22		Unweathered pale grey and yellowish carbonate - finely crystalline dolomite	.0012	.0028	

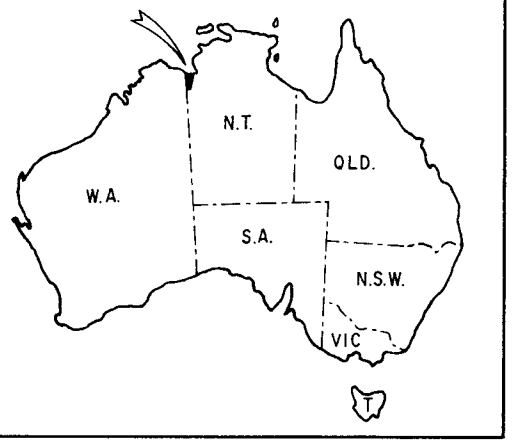
129°00'
129°15'
129°30'
15°00'
15°15'
15°30'
15°45'

W. A.
N. T.

EL 1031
KEEP INLET
EL 675
EL 893
FLAPPER HILL
LEGUNE
EL 675
EL 675
EL 675
EL 246
EL 247
EL 416
OCHRE MINE CLAIMS
EL 416
EL 247
EL 674
to Kununurra
EL 674
ALPHA HILL
EL 674
EL 246
EL 673
EL 673
SPIRIT HILL
EL 785
Keep River
EL 415
NIGLI GAP

Relinquished areas

LOCATION MAP



0 5 10 15 KILOMETERS

SCALE 1 : 250000

FIGURE 1

AQUITAINE AUSTRALIA MINERALS PTY LTD

LOCATION OF EL 673

MG 641 DRWG No. 12949

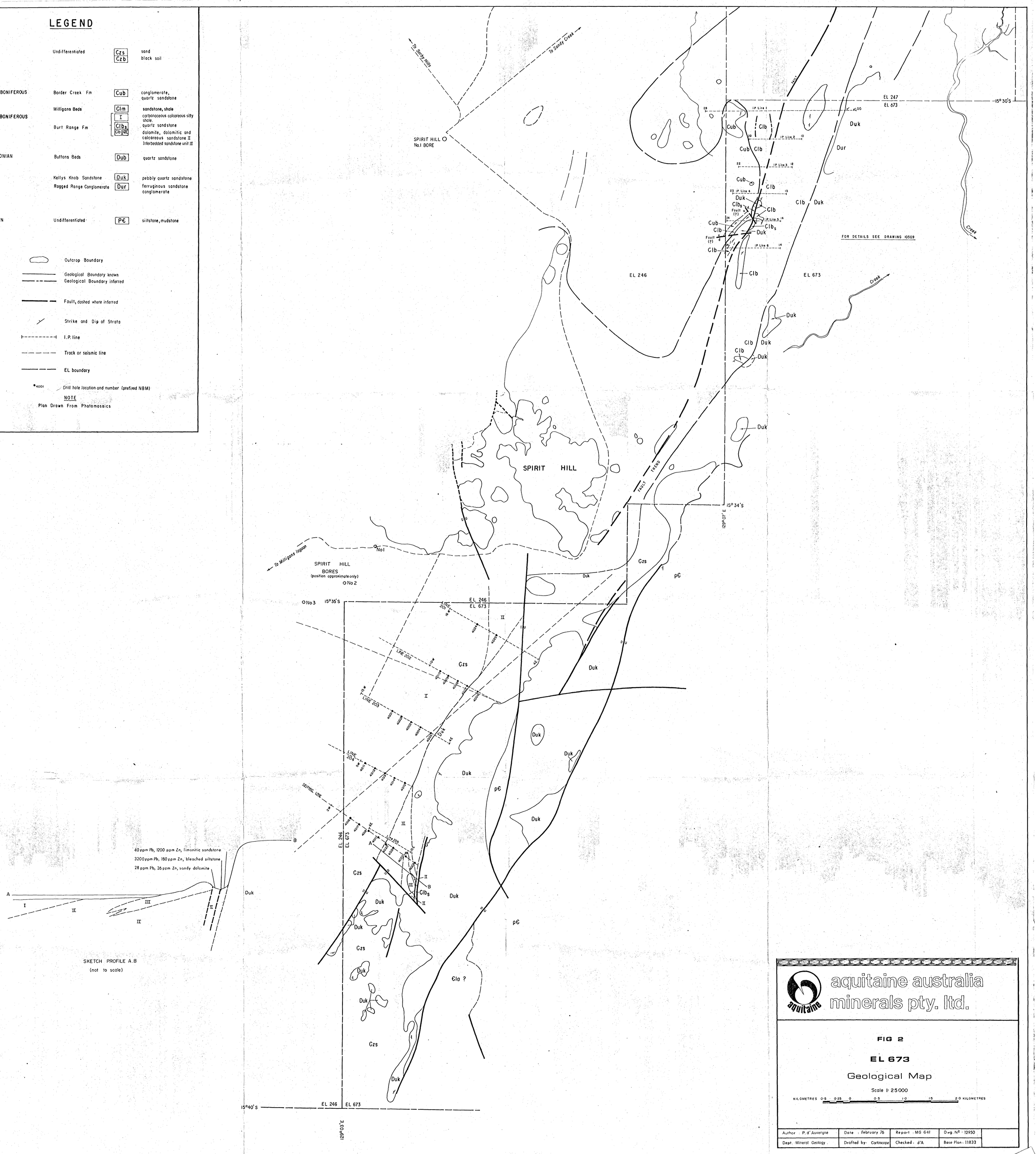
LEGEND

CAINOZOIC	Undifferentiated	Czs	sand
		Czb	black soil
UPPER CARBONIFEROUS	Border Creek Fm	Cub	conglomerate, quartz sandstone
	Milligans Beds	Clm	sandstone, shale
LOWER CARBONIFEROUS	Burt Range Fm	I	carbonaceous calcareous silty shale.
		Clb_s	quartz sandstone
		Clb	dolomite, dolomitic and calcareous sandstone II
			Interbedded sandstone unit III
UPPER DEVONIAN	Buttons Beds	Dub	quartz sandstone
	Kellys Knob Sandstone	Duk	pebbly quartz sandstone
	Ragged Range Conglomerate	Dur	ferruginous sandstone conglomerate
PRECAMBRIAN	Undifferentiated	P€	siltstone, mudstone

- Outcrop Boundary
- Geological Boundary known
- Geological Boundary inferred
- Fault, dashed where inferred
- Strike and Dip of Strata
- I.P. line
- Track or seismic line
- EL boundary
- •4001 Drill hole location and number (prefixed NBM)

NOTE

Plan Drawn From Photomosaics



SKETCH PROFILE A.B
(not to scale)

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FIG 2

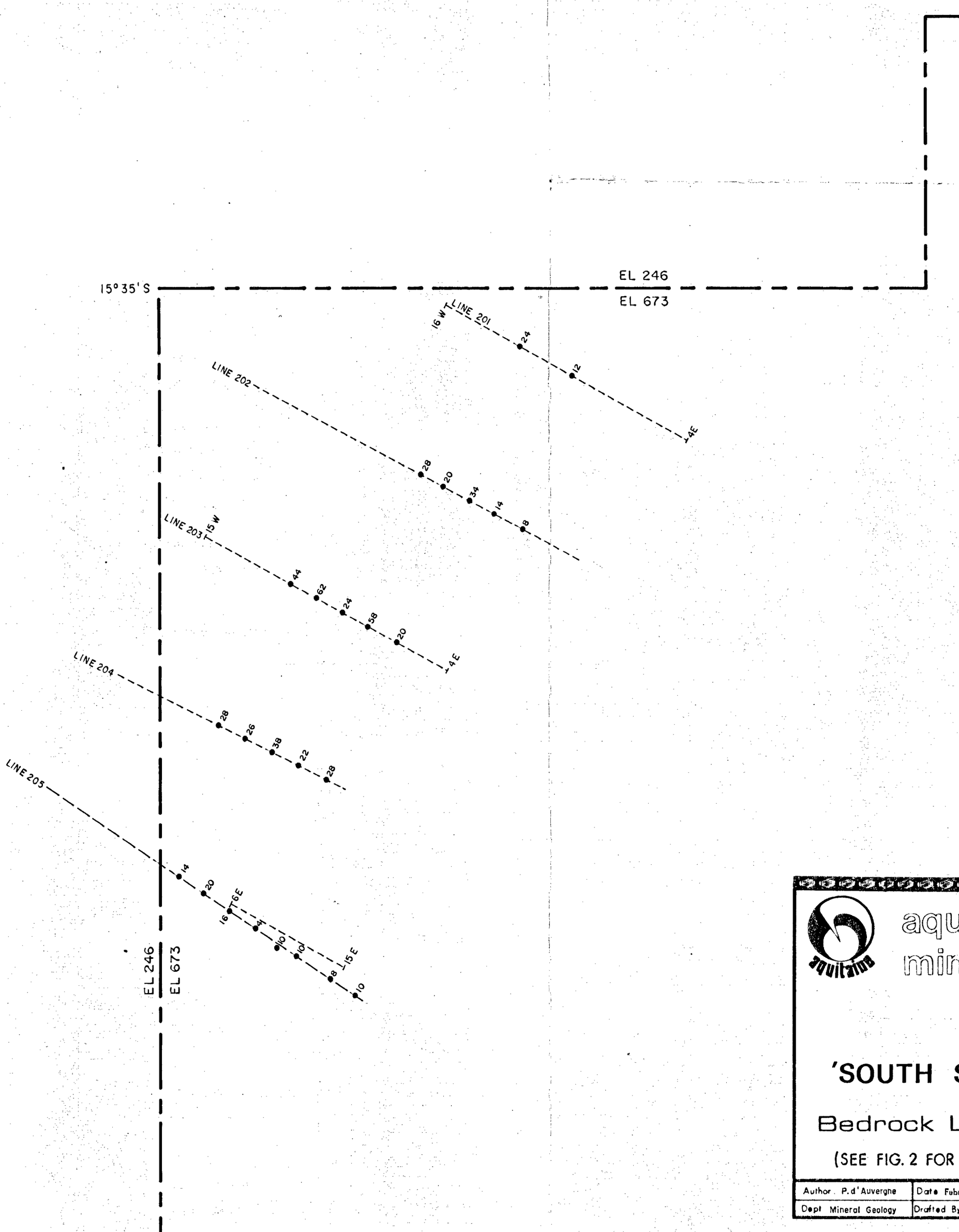
EL 673

Geological Map

Scale 1: 25000

KILOMETRES 0·5 0·25 0 0·5 1·0 1·5 2·0 KILOMETRES

Author : P. d'Auvergne	Date : February 76	Report : MG 641	Dwg. N° : 12950
Dept. : Mineral Geology .	Drafted by: Cartoscope	Checked : d'A	Base Plan : 11833



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EL 673

'SOUTH SPIRIT HILL AREA'

Bedrock Lead Geochemistry

(SEE FIG. 2 FOR DRILL HOLE NUMBERS & GEOLOGY)

Author P.d'Auvergne	Date February 76	Report No. MG 641	Dwg No 12951	Fig 3
Dept Mineral Geology	Drafted By Cartoscope	Checked d'A	Base Plan -	

15°34'S

15°35'S

EL 246

EL 673

16 W

LINE 201

64

29

4E

LINE 202

60

260

100

18

12

LINE 203

15 W

70

220

78

70

70

4E

LINE 204

46

38

82

52

70

LINE 205

70

86

6E

62

46

16

200

46

20

15 E

EL 246

EL 673

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EL 673

'SOUTH SPIRIT HILL AREA'

Bedrock Zinc Geochemistry

(SEE FIG. 2 FOR DRILL HOLE NUMBERS & GEOLOGY)

Author : P. d'Auvergne	Date February 76	Report No. MG 641	Dwg No. 12952	Fig 4
Dept Mineral Geology	Drafted By Cartoscope	Checked d'A	Base Plan	