14.5

EXPLORATION LICENCE 5009 RECOVERY CREEK

NEAR HAYES CREEK NORTHERN TERRITORY

REPORT FOR THE YEAR ENDING 6 JANUARY, 1988

PREPARED FOR OCEANIA EXPLORATION AND MINING N.L.

by
G.R. ORRIDGE
GEONORTH
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JANUARY, 1988

CONTENTS

A. SUMMARY

Exploration Licence 5009 is situated on the northeastern limb of a domal fold which pinches northwestwards into the Howley Anticline. The main exploration target is the Koolpin Formation which contains the strike extensions of the ore bearing horizons at Cosmo Howley gold mine situated some five kilometres to the west.

An initial programme of reconnaissance geology and geochemistry, and soil sampling of the Koolpin areas, was completed by Oceania Exploration and Mining in July/August 1987. A follow-up programme of detailed mapping and rock chip sampling was undertaken by Norgold Limited in December, 1987.

Exploration expenditures amounted to $25,850.

1. INTRODUCTION

Exploration Licence 5009 is situated 140 kilometres southeast of Darwin and 50 kilometres northwest of Pine Creek in the Tipperary 1:100,000 sheet area. Hayes Creek roadhouse is situated four kilometres southeast of the area.

The Exploration Licence was granted to Oceania Exploration & Mining N.L. for a two year term commencing 7 January 1987. It includes two one-minute square blocks with a total area of 6.7 square kilometres.

In July and August 1987 preliminary geological and geochemical surveys of the area were carried out by GEONORTH on behalf of Oceania Exploration & Mining N.L. This work is described in the body of this report.

Subsequently the Exploration Licence was included in a joint venture agreement between Oceania and Norgold Limited, and Norgold conducted follow-up mapping and sampling in December 1987. A report on this work is included as Appendix V to this report.

2. GEOLOGY AND MINERALISATION

2.1 Regional Setting

The Exploration Licence is in the Cullen Mineral Field which lies centrally within the Pine Creek Geosyncline. The geosyncline contains Early Proterozoic, dominently clastic sediments, and minor volcanics, which were folded and metamorphosed between 1870 and 1800 m.y. The sediments are intruded by pre-orogenic mafic sills and late synorogenic to post-orogenic granitoid plutons. The granitoids contact - metamorphosed the sediments and mafic intrusives to hornblende hornfels and albite-epidote hornfels facies. Largely undeformed Late Proterozoic, Palaeozoic and Mezozoic strata rest on the Early Proterozoic rocks with marked unconformity.

Table 1 summarises the stratigraphic succession in the area surrounding EL 5009.

Mineral deposits of the Cullen Mineral Field are of both epigenetic-hydrothermal type and stratabound-syngenetic type.

The hydrothermal types are by far the most numerous and show a broad regional zonation from uranium through tungsten, copper, tin, silver-lead to gold with increasing distance from granitoid contacts. Nearly all the deposits are in the granitoids or their contact metamorphic aurioles. They are commonly located within north to northwest trending shear zones and/or anticlinal hinge lines.

The hydrothermal gold deposits are widespread and occur in sulphide-bearing quartz veins, the dominent sulphides being pyrite and arsenopyrite. The most important host rocks are interbedded greywackes and slates which are best developed in the Mt. Bonnie and Burrell Creek Formations. In the axial zones of major anticlines these formations host quartz vein systems in fissure veins, saddle reefs and stockworks such as form the orebodies at Pine Creek, Goodall, Zapopan and Fountain Head among others. Relatively minor quartz - gold vein systems also occur in the Koolpin Formation, Gerowie Tuff and Zamu Dolerite.

TABLE 1 - SUMMARY OF STRATIGRAPHY

MESOZOIC	Jurassic to late Cretaceous		PETREL FORMATION	Quartz sandstone & minor conglomerate.
		unconformity		
PALAEOZOIC	Cambrian to Ordovician	DALY RIVER GROUP	TINDALL LIMESTONE	Limestone with chert bands and nodules.
			JINDARE FORMATION	Quartz sandstone.
		unconformity		
MID PROTEROZOIC		TOLMER GROUP	STRAY CREEK SANDSTONE	Quartzite and micaceous siltstone.
			DEPOT CREEK SANDSTONE	Quartz sandstone.
		unconformity		
EARLY PROTEROZOIC	Cullen Batholith		FENTON, BURNSIDE, MARGARET, SHOOBRIDGE AND CULLEN GRANITES	Granite, adamellite and granodiorite.
		folding metamorphism and granite intrusion		
			ZAMU DOLERITE	Quartz dolerite and amphibolite.
		FINNISS RIVER GROUP	BURRELL CREEK FORMATION	Feldspathic greywacke and siltstone.
		SOUTH ALLIGATOR GROUP	MT. BONNIE FORMATION	Feldspathic greywacke, siltstone, mudstone, black shale, tuff and banded iron formation.
			GEROWIE TUFF	Tuffaceous chert and siltstone.
			KOOLPIN FORMATION	Ferruginous and carbonaceous argillite, chert and banded iron formation.
	warping			
		MOUNT PARTRIDGE GROUP	WILDMAN SILTSTONE	Siltstone, carbonaceous shale and quartz sandstone.
			MUNDOGIE SANDSTONE	Feldspathic sandstone, micaceous quartzite, minor chert and conglomerate.
	warping			
		NAMOONA GROUP	MASSON FORMATION	Carbonaceous shale, siltstone, minor quartzite.

The syngenetic-stratabound deposits are relatively few in number. They include lead-zinc-silver (gold, tin) deposits associated with bedded sulphides in carbonaceous argillites of the South Alligator and Mt. Partridge Groups (e.g. Jessops, Mary River, Namoona), volcanogenic polymetallic (Pb, Zn, Ag, Au) sulphide lenses in Mt. Bonnie Formation (e.g. Mt. Bonnie Iron Blow); gold associated with banded iron formation in the Koolpin and Mt. Bonnie Formations (e.g. Cosmo Howley, Golden Dyke, Spring Hill).

The syngenetic deposits have in some cases probably been remobilised and locally enriched during metamorphism and deformation. Deep oxidation and lateritic weathering have also been factors in producing ore from metallurgically difficult or low grade primary mineralisation (e.g. Mt. Bonnie, Golden Dyke).

2.2 LOCAL GEOLOGY AND MINERALISATION

The Exploration Licence area lies on the northeastern margin of a complex dome-like fold, which has a core of Fenton Granite to the south, and pinches towards the northwest where it merges into the Howley Anticline (refer Figure 3).

The eastern part of the area is formed by northeasterly-dipping sediments of the Koolpin Gerowie Tuff and Mt Bonnie Formations, which form a series of steep ridges with good bedrock outcrop. In contrast the western parts are low undulating country, largely soil covered and underlain by Wildman Siltstone and Zamu Dolerite.

A large ridge of vein quartz occurs between the Koolpin Formation and Gerowie Tuff in the north; it is probably emplaced along a northwest-trending strike fault.

The area of the EL is not known to contain any significant mineralisation. The Koolpin Formation contains exhalative sediments (cherts, banded iron formations) and pyritic carbonaceous shales which are closely similar to those which host the Cosmo Howley stratabound gold orebodies some five kilometres to the west, and the area is considered to have potential for similar gold deposits. Siliceous ironstones of the Koolpin form strong ridges and extensive colluvial aprons which may conceal more recessive potentially auriferous horizons on the slopes of the ridges.

3. WORK CARRIED OUT

The exploration work completed consisted of photogeology, geological reconnaissance, drainage and rock-chip sampling, and soil sample traversing across the Koolpin Formation outcrop and sub-outcrop.

Figure 4 illustrates the geology, and also shows the locations for rock-chip and drainage samples. Soil sample traverse locations are shown in Figure 5.

Analytical results are given in Appendices I, II and III.

At each drainage sampling site samples were taken of minus 80 mesh active sediment to be analysed for Au, As, Cu, Pb, Zn, and also 5kg samples of minus 20 mesh sediment to be analysed for gold by cyanide leach.

Soil samples were taken at intervals of 12.5 metres on traverses 200 metres apart, at depths of 20-30cm. The minus 80 mesh soil fractions were analysed for gold, arsenic, copper, lead and zinc.

4. DISCUSSION OF RESULTS

Analyses of stream sediment bulk samples yielded maximum values of 1.95ppb Au. None of the minus 80 mesh sediment samples exceeded the detection limit of 0.05ppm Au; maximum values for other metals were 33ppm As, 60ppm Cu, 90ppm Zn and 62ppm Pb. None of these results are considered to be anomalous.

The maximum assay for rock chip samples was 0.05 ppm Au.

Soil sample analyses are summarised as follows:-

Au	-	all values below detection limit of 0.01ppm.	
As	-	range < 20 to 110 ppm	- 16 samples exceed nominal threshold of 39ppm
Cu	-	range 7 to 285ppm	- 10 samples exceed nominal threshold of 149ppm
Pb	-	range < 5 to 620ppm	- 3 samples exceed nominal threshold of 49ppm
Zn	-	range 5 to 1080 ppm	- 22 samples exceed nominal threshold of 300ppm

The higher arsenic values correlate with outcrops of banded iron formation in the Koolpin Formation. Some of the higher lead, zinc and copper values also occur in the same situation. This does not necessarily indicate significant mineralisation since the Koolpin typically shows high background values in these metals.

The values in gold and arsenic are low compared to other areas where the Koolpin Formation contains significant gold mineralisation (e.g. Golden Dyke area).

The results are discouraging but not necessarily conclusive in view of the lack of exposure of much of the Koolpin sequence. Accordingly a limited programme of more detailed mapping, rock chip sampling, and possibly trenching of the Koolpin Formation outcrop/sub-outcrop would be warranted before relinquishing the area.

APPENDIX I

Stream Sediment Samples Analytical Reports

ANALYSIS

SAMPLE MARK	Au ppm	Pb ppm	Zn ppm	As ppm	Cu ppm
MC100	<0.01	6	18	17	24
MC101	<0.01	8	22	14	20
MC102	<0.01	8	20	10	12
MC103	<0.01	8	22	<2	14
MC104	<0.01	4	12	5	6
MC105	<0.01	<4	16	<2	6
MC106	<0.01	<4	6	<2	2
MC107	<0.01	<4	28	2	6
MC108	<0.01	<4	10	5	4
MC109	<0.01	4	8	5	4
MC110	<0.01	<4	16	3	8
MC111	<0.01	6	26	<2	6
MC112	<0.01	<4	20	5	4
MC113	<0.01	6	16	<2	4
MC114	<0.01	<4	6	<2	4
MC115	<0.01	<4	8	2	4
MC116	<0.01	<4	20	<2	2
MC117	<0.01	<4	20	5	6
MC118	<0.01	6	20	2	10
MC119	<0.01	<4	26	<2	12
MC120	<0.01	<4	12	<2	<2
MC121	<0.01	<4	24	<2	8
DT100	<0.01	10	10	4	6
DT101	<0.01	6	10	8	6
DT102	<0.01	<4	20	2	<2
DT103	<0.01	<4	6	<2	<2
DT104	<0.01	10	18	8	26
DT105	<0.01	62	90	26	60
DT106	<0.01	18	46	33	44
DT107	<0.01	6	22	5	12
DT108	<0.01	8	44	24	30

METHOD : PM1/3, A2, X3

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LABORATORY REPORT

Client: GEONORTH
Address: 10-20 CAVENAGH STREET
DARWIN
N.T. 5790

Batch Number: 0055

Contact: DR. G. ORRIDGE

No. of Samples: 31
Date Received: 07/07/87
Date Completed: 23/07/87

Order No. VERBAL Sample Type: STREAM SEDIMENT

SAMPLE NUMBER	Element / Unit / Method	Au ppt PM216	S.Wt Kg			
MC 1		850	7.76			
MC 2		1500	7.26			
MC 3		200	7.48			
MC 4		1950	6.42			
MC 5		200	8.61			
MC 6		100	8.81			
MC 7		100	9.02			
MC 8		550	6.97			
MC 9		200	7.63			
MC10		900	7.48			
MC11		900	6.29			
MC12		150	6.30			
MC13		150	5.79			
MC14		<50	6.41			
MC15		450	7.42			
MC16		100	5.72			
MC17		300	6.63			
MC18		400	7.96			
MC19		650	6.24			
MC20		<50	7.05			
MC21		150	9.02			
MC22		150	7.15			
DT1		160	6.60			
DT2		400	9.40			
DT3		700	4.56			
DT4		<50	5.34			
DT5		1950	5.96			
DT6		1700	4.37			
DT7		1400	5.41			
DT8		400	4.20			
Detection Limit:		50				

Comments:

UNLESS NOTIFIED PULPS WILL BE DUMPED ON 07/01/88 AND SPLITS (IF ANY) ON 07/10/87

Signatory: A.J. Hutchinson.

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LABORATORY REPORT

ss: GEONORTH
10-20 CAVENAGH STREET
DARWIN
N.T. 5790

Batch Number: 0055

ct: DR. G. ORRIDGE

No. VERBAL Sample Type: STREAM SEDIMENT

No. of Samples: 31
Date Received: 07/07/87
Date Completed: 23/07/87

SAMPLE NUMBER	Element Unit Method	Au ppt PM21S	S.Wt Kg			
DT9		1950	5.13			
tion Limit:		50				

nents:

ESS NOTIFIED PULPS WILL BE DUMPED ON 07/01/88 AND SPLITS (IF ANY) ON 07/10/87

Signatory: A. J. Hinchcliffe.

APPENDIX II

Soil Sample Analytical Reports

EL 5009
SOIL SAMPLES

amdel
technology and enterprise

Amdel Limited
(Incorporated in S.A.)
P.O. Box 58
Berrimah, N.T. 5788

Telephone (089) 32 2637
Telex: AA85987

14th September, 1987

Our Ref : D177/88 Part 1

REPORT NUMBER : D177/88 Part 1

CLIENT : Geonorth

CLIENT REFERENCE : Order No : 10

REPORT COMPRISING : Cover Page
Pages 1-11

DATE RECEIVED : 21st August, 1987

A. Ciplys

Alan Ciplys
Manager
AMDEL Limited (N.T.)

ANALYSIS

SAMPLE MARK	Au (ppm) QC CHECKS	Au ppm	Cu	Pb	Zn	As
DT301		<0.01	195	50	12	<20
DT302		<0.01	75	20	6	<20
DT303		<0.01	100	15	6	<20
DT304	<0.01	<0.01	68	12	6	<20
DT305		<0.01	74	10	6	<20
DT306		<0.01	75	10	5	<20
DT307		<0.01	67	10	5	<20
DT308		<0.01	72	10	5	<20
DT309		<0.01	84	10	10	<20
DT310		<0.01	85	10	8	<20
DT311	<0.01	<0.01	62	16	16	<20
DT312		<0.01	80	20	25	25
DT313		<0.01	285	30	42	<20
DT314		<0.01	82	30	8	40
DT315		<0.01	74	30	8	40
DT316		<0.01	70	20	8	60
DT317		<0.01	60	10	11	30
DT318		<0.01	120	10	23	<20
DT319		<0.01	95	7	37	<20
DT320		<0.01	110	5	39	<20
DT321		<0.01	80	6	20	<20
DT322	<0.01	<0.01	55	7	16	<20
DT323		<0.01	80	17	14	<20
DT324		<0.01	65	5	9	<20
DT325		<0.01	45	6	9	<20

METHOD : PM1/3, A1/A2 -80 # FRACTION

ANALYSIS

SAMPLE MARK	Au (ppm) QC CHECKS	Au ppm	Cu	Pb	Zn	As
DT326	<0.01	<0.01	38	9	11	<20
DT327		<0.01	64	8	10	<20
DT328		<0.01	133	5	16	25
DT329		<0.01	86	8	12	<20
DT330		<0.01	68	11	12	<20
DT331	<0.01	<0.01	70	13	11	<20
DT332		<0.01	80	9	13	<20
DT333		<0.01	100	11	13	<20
DT334		<0.01	93	9	12	<20
DT335		<0.01	81	9	12	<20
DT336		<0.01	55	7	13	<20
DT337		<0.01	72	7	11	30
DT338		<0.01	97	11	11	55
DT339	<0.01	<0.01	158	24	13	45
DT340		<0.01	125	20	12	20
DT341		<0.01	112	17	19	30
DT342		<0.01	66	18	12	<20
DT343		<0.01	45	12	7	<20
DT344		<0.01	88	16	10	<20
DT345		<0.01	99	16	10	<20
DT346		<0.01	89	15	9	<20
DT347	<0.01	<0.01	150	12	14	<20
DT348		<0.01	190	11	20	<20
DT349		<0.01	200	11	19	<20
DT350		<0.01	115	13	13	<20

METHOD : PM1/3, A1/A2 -80 # FRACTION

ANALYSIS

SAMPLE MARK	Au (ppm) QC CHECKS	Au ppm	Cu	Pb	Zn	As
DT351		<0.01	LISTED NOT RECEIVED			
DT352		<0.01	87	10	7	<20
DT353		<0.01	117	11	9	<20
DT354	<0.01	<0.01	78	9	15	<20
DT355		<0.01	115	10	67	<20
DT356		<0.01	100	16	34	<20
DT357		<0.01	98	12	96	<20
DT358		<0.01	59	19	62	<20
DT359		<0.01	215	25	270	50
DT360		<0.01	225	16	27	30
DT361		<0.01	160	11	600	<20
DT362		<0.01	125	9	77	<20
DT363	<0.01	<0.01	105	8	25	<20
DT364		<0.01	140	8	890	<20
DT365		<0.01	115	9	39	<20
DT366		<0.01	100	10	17	<20
DT367		<0.01	81	15	310	<20
DT368		<0.01	160	11	180	<20
DT369		<0.01	94	10	135	<20
DT370	<0.01	<0.01	52	12	20	<20
DT371		<0.01	51	13	88	<20
DT372		<0.01	52	13	230	<20
DT373		<0.01	64	13	22	<20
DT374		<0.01	57	12	77	<20
DT375		<0.01	61	12	22	<20

METHOD : PM1/3, A1/A2 -80 # FRACTION

ANALYSIS

SAMPLE MARK	Au (ppm) QC CHECKS	Au ppm	Cu	Pb	Zn	As
DT401		<0.01	92	11	18	30
DT402		<0.01	89	11	11	<20
DT403	<0.01	<0.01	66	10	26	<20
DT404		<0.01	80	8	290	<20
DT405		<0.01	69	15	21	<20
DT406		<0.01	72	13	10	20
DT407		<0.01	180	22	19	40
DT408		<0.01	70	18	9	30
DT409		<0.01	63	19	7	30
DT410		<0.01	95	28	18	35
DT411		<0.01	230	28	1080	55
DT412	<0.01	<0.01	59	10	14	20
DT413		<0.01	64	620	310	<20
DT414		<0.01	60	75	64	<20
DT415		<0.01	63	61	210	<20
DT416		<0.01	55	40	28	<20
DT417		<0.01	44	12	13	<20
DT418		<0.01	16	11	105	<20
DT419		<0.01	15	26	200	<20
DT420	<0.01	<0.01	7	12	87	<20
DT421		<0.01	13	13	97	<20
DT422		<0.01	22	15	38	<20
DT423		<0.01	22	17	230	<20
DT424		<0.01	23	27	220	<20
DT425		<0.01	31	21	180	<20

METHOD : PM1/3, A1/A2 -80 # FRACTION

ANALYSIS

SAMPLE MARK	Au (ppm) QC CHECKS	Au ppm	Cu	Pb	Zn	As
DT426	<0.01	<0.01	45	14	86	<20
DT427		<0.01	54	19	220	<20
DT428		<0.01	52	30	390	<20
DT429		<0.01	41	23	310	<20
DT430		<0.01	29	11	300	<20
DT431	<0.01	<0.01	21	5	210	<20
DT432		<0.01	27	9	120	<20
DT433		<0.01	40	5	440	<20
DT434		<0.01	36	15	320	<20
DT435		<0.01	90	36	500	<20
DT436		<0.01	110	7	575	<20
DT437		<0.01	74	10	380	<20
DT438		<0.01	67	10	210	30
DT439		<0.01	44	21	230	60
DT440		<0.01	52	27	510	110
DT441	<0.01	<0.01	33	48	220	80
DT442		<0.01	insufficient samp. for base metal anal			
DT443		<0.01	65	76	360	80
DT444		<0.01	80	33	240	30
DT445		<0.01	60	34	350	20
DT446		<0.01	45	32	210	25
DT447		<0.01	39	24	270	20
DT448		<0.01	50	15	160	20
DT449	<0.01	<0.01	45	14	120	20
DT450		<0.01	36	12	125	20

METHOD : PM1/3, A1/A2 -80 # FRACTION

ANALYSIS

SAMPLE MARK	Au (ppm) QC CHECKS	Au ppm	Cu	Pb	Zn	As
DT451		<0.01	43	9	160	25
DT452		<0.01	56	20	105	25
DT453		<0.01	53	11	190	20
DT454		<0.01	50	7	145	<20
DT455	<0.01	<0.01	53	8	91	<20
DT456		<0.01	63	10	135	20
DT457		<0.01	120	13	300	<20
DT458	<0.01	<0.01	94	16	180	<20
DT459		<0.01	96	17	180	<20
DT460		<0.01	125	17	220	<20
DT461		<0.01	100	16	450	<20
DT462		<0.01	110	18	350	20
DT463		<0.01	70	22	150	45
DT464		<0.01	78	23	170	45
DT465	<0.01	<0.01	120	11	170	25
DT466		<0.01	63	6	200	<20
DT467		<0.01	79	5	290	<20
DT468		<0.01	75	5	210	<20
DT469		<0.01	100	8	105	<20
DT470		<0.01	32	10	140	<20
DT471		<0.01	11	6	135	<20
DT472		<0.01	10	5	140	<20
DT473		<0.01	20	<5	230	<20
DT474		<0.01	29	5	280	<20
DT475	<0.01	<0.01	52	7	290	<20

METHOD : PM1/3, A1/A2 -80 # FRACTION

ANALYSIS

SAMPLE MARK	Au (ppm) QC CHECKS	Au ppm	Cu	Pb	Zn	As
DT476		<0.01	21	7	120	<20
DT477		<0.01	39	5	81	<20
DT478		<0.01	40	7	120	<20
DT479		<0.01	73	14	210	<20
DT480		<0.01	30	7	170	20
DT481		<0.01	57	9	210	20
DT482	<0.01	<0.01	32	7	120	<20
DT483		<0.01	40	9	120	20
DT484		<0.01	45	5	190	<20
DT485		<0.01	LISTED NOT RECEIVED			
DT486		<0.01	52	10	68	<20
DT487		<0.01	53	13	170	20
DT488		<0.01	61	28	74	45
DT489		<0.01	LISTED NOT RECEIVED			
DT490	<0.01	<0.01	73	8	74	<20
DT491		<0.01	52	6	130	<20
DT492		<0.01	39	8	100	<20
DT493		<0.01	69	7	270	<20
DT494		<0.01	72	5	210	<20
DT495	<0.01	<0.01	47	<5	115	<20
DT496		<0.01	28	<5	130	<20
DT497		<0.01	21	<5	105	<20
DT498		<0.01	27	<5	130	<20
DT499		<0.01	29	7	140	<20
DT500		<0.01	30	7	230	<20

METHOD : PM1/3, A1/A2 -80 # FRACTION

ANALYSIS

SAMPLE MARK	Au (ppm) QC CHECKS	Au ppm	Cu	Pb	Zn	As
DT501		<0.01	32	9	250	<20
DT502	<0.01	<0.01	28	9	240	<20
DT503		<0.01	26	7	210	<20
DT504		<0.01	31	7	125	<20
DT505		<0.01	40	10	500	<20
DT506		<0.01	47	19	375	<20
DT507		<0.01	44	39	575	<20
DT508		<0.01	33	15	575	<20
DT509		<0.01	36	27	410	<20
DT510		<0.01	31	16	220	<20
DT511		<0.01	41	23	295	<20
DT512		<0.01	29	14	74	<20
DT513		<0.01	30	15	80	<20
DT514	<0.01	<0.01	57	10	10	<20
DT515		<0.01	50	7	8	<20
DT516	<0.01	<0.01	59	8	8	<20
DT517		<0.01	42	8	9	<20
DT518		<0.01	38	5	10	<20
DT519		<0.01	47	5	16	<20
DT520		<0.01	43	5	12	<20
DT521		<0.01	48	<5	10	<20
DT522		<0.01	46	<5	11	<20
DT523	<0.01	<0.01	68	<5	14	<20
DT524		<0.01	67	<5	16	<20
DT525		<0.01	49	<5	12	<20

METHOD : PM1/3, A1/A2 -80 # FRACTION

ANALYSIS

SAMPLE MARK	Au (ppm) QC CHECKS	Au ppm	Cu	Pb	Zn	As
DT526		<0.01	43	<5	9	<20
DT527		<0.01	65	5	9	20
DT528		<0.01	77	5	9	25
DT529	<0.01	<0.01	77	6	6	40
DT530		<0.01	76	6	7	35
DT531		<0.01	81	<5	5	30
DT532		<0.01	110	6	10	30
DT533		<0.01	73	5	7	25
DT534		<0.01	68	<5	7	<20
DT535		<0.01	56	5	6	<20
DT536		<0.01	58	<5	6	<20
DT537		<0.01	56	<5	6	<20
DT538		<0.01	84	38	40	<20
DT539		<0.01	44	21	27	<20
DT540	<0.01	<0.01	58	25	32	<20
DT541		<0.01	61	26	38	<20
DT542		<0.01	110	30	89	<20
DT543		<0.01	97	25	65	<20
DT544		<0.01	93	19	40	<20
DT545	<0.01	<0.01	80	11	12	<20
DT546		<0.01	79	8	8	<20
DT547		<0.01	68	7	10	<20
DT548		<0.01	52	7	10	<20
DT549		<0.01	50	6	13	<20
DT550		<0.01	58	6	16	20

METHOD : PM1/3, A1/A2 -80 # FRACTION

ANALYSIS

SAMPLE MARK	Au (ppm) QC CHECKS	Au ppm	Cu	Pb	Zn	As
DT551		<0.01	77	<5	19	20
DT552	<0.01	<0.01	53	<5	11	<20
DT553		<0.01	40	<5	10	<20
DT554		<0.01	76	6	8	<20
DT555		<0.01	115	<5	6	20
DT556		<0.01	56	<5	4	<20
DT557		<0.01	110	<5	11	<20
DT558		<0.01	125	5	11	20
DT559		<0.01	61	8	8	<20
DT560		<0.01	60	8	9	<20
DT561		<0.01	41	6	5	<20
DT562	<0.01	<0.01	33	6	4	<20

METHOD : PM1/3, A1/A2 -80 # FRACTION

APPENDIX III

Rock Sample Analytical Reports

ANALYSIS

SAMPLE MARK	Au ppm
MC208	<0.05
MC209	<0.05
MC210	<0.05
MC211	0.05
MC212	<0.05
MC213	0.05
MC214	0.05
MC215	<0.05
MC216	<0.05
MC217	0.05
MC218	0.05
MC219	0.08
MC220	0.05
MC221	<0.05
MC222	0.07
MC223	<0.05
MC224	<0.05
MC225	<0.05
MC226	0.06
MC227	<0.05
MC228	0.12
MC229	<0.05
MC230	0.46
MC231	0.14
DT200	0.08
DT201	<0.05
DT202	<0.05
DT203	<0.05
DT204	0.05
DT205	<0.05
DT206	<0.05
DT207	0.05
DT208	<0.05

METHOD : PM3/2

THE AUSTRALIAN MINERAL DEVELOPMENT LABORATORIES

FORM 38

REPORT AC D11/88

ANALYSIS PPM

Sample N°	Au							
DT 200	0·08							
201	<0·05							
202	<0·05							
203	<0·05							
204	0·05							
205	<0·05							
206	<0·05							
207	0·05							
208	<0·05							

METHOD PM3/2

322637

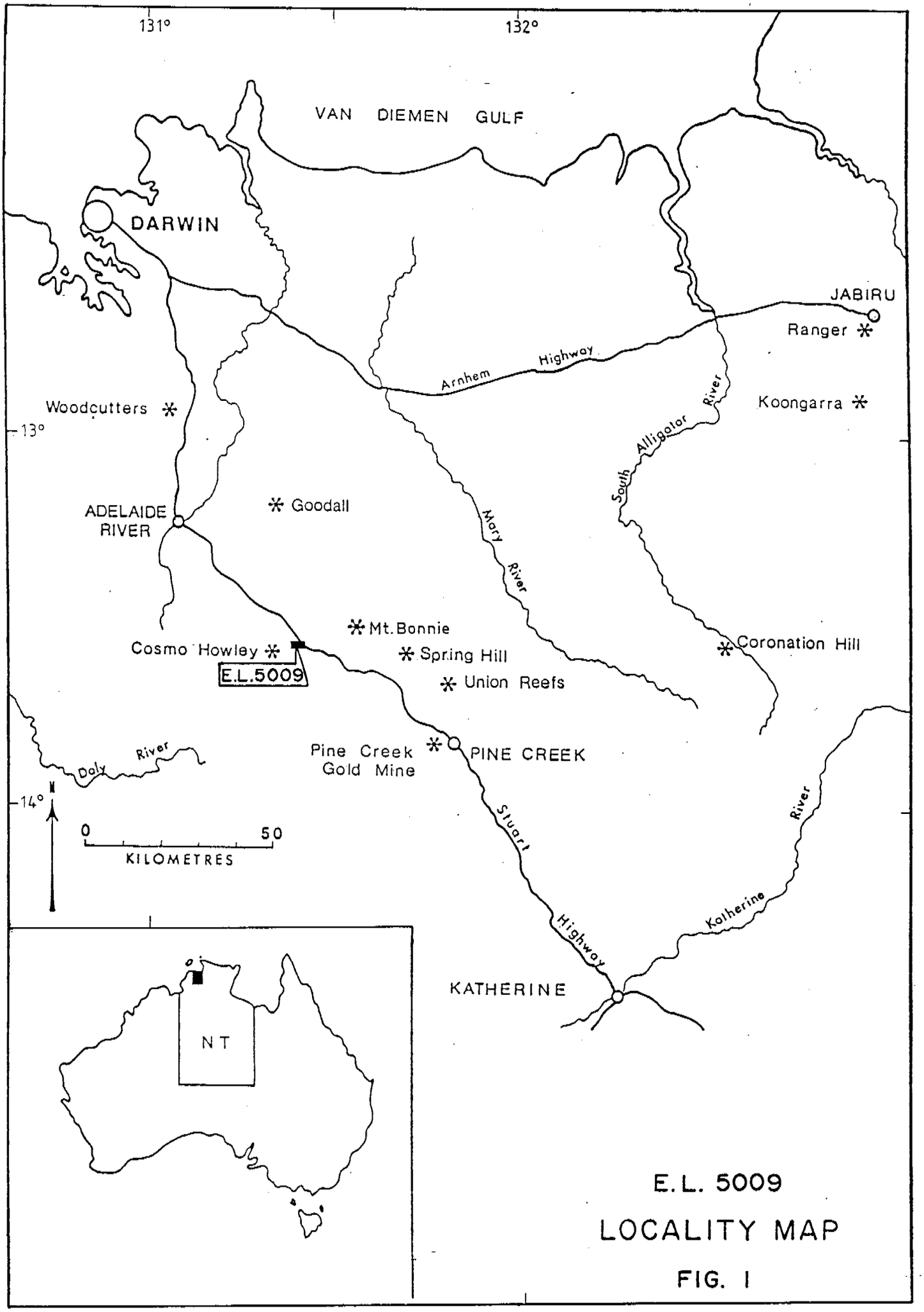
APPENDIX IV

Exploration Expenditures

EXPLORATION LICENCE 5009

Exploration expenditures by Oceania Exploration & Mining for the year ending 6th January 1987.

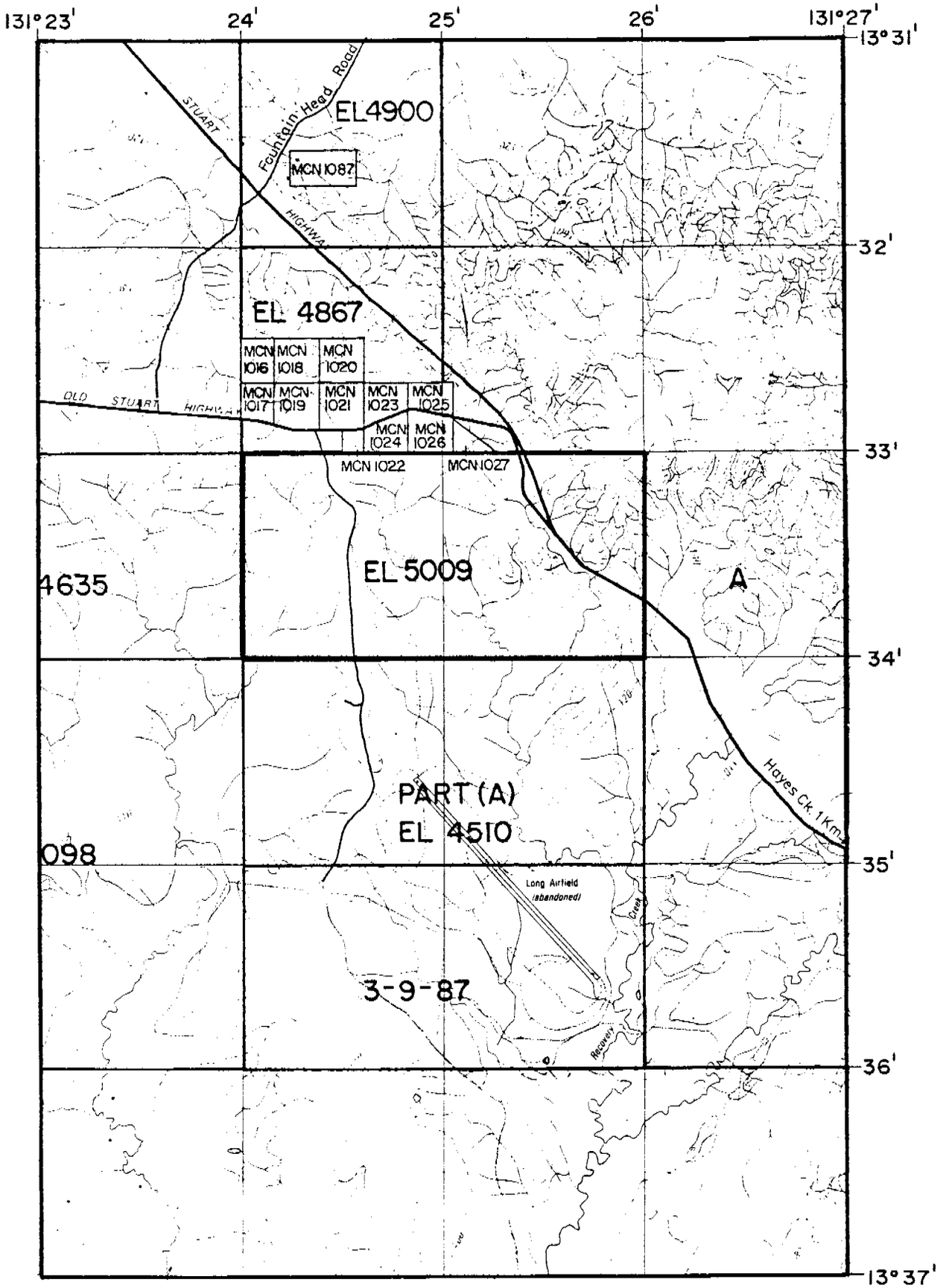
Geological consultants	2,950
Salaries and wages	4,000
Transport	1,814
Consumables	629
Travel and accommodation	2,260
Assay	3,370
Plan and report	257
	TOTAL $15,280



E.L. 5009

LOCALITY MAP

FIG. 1



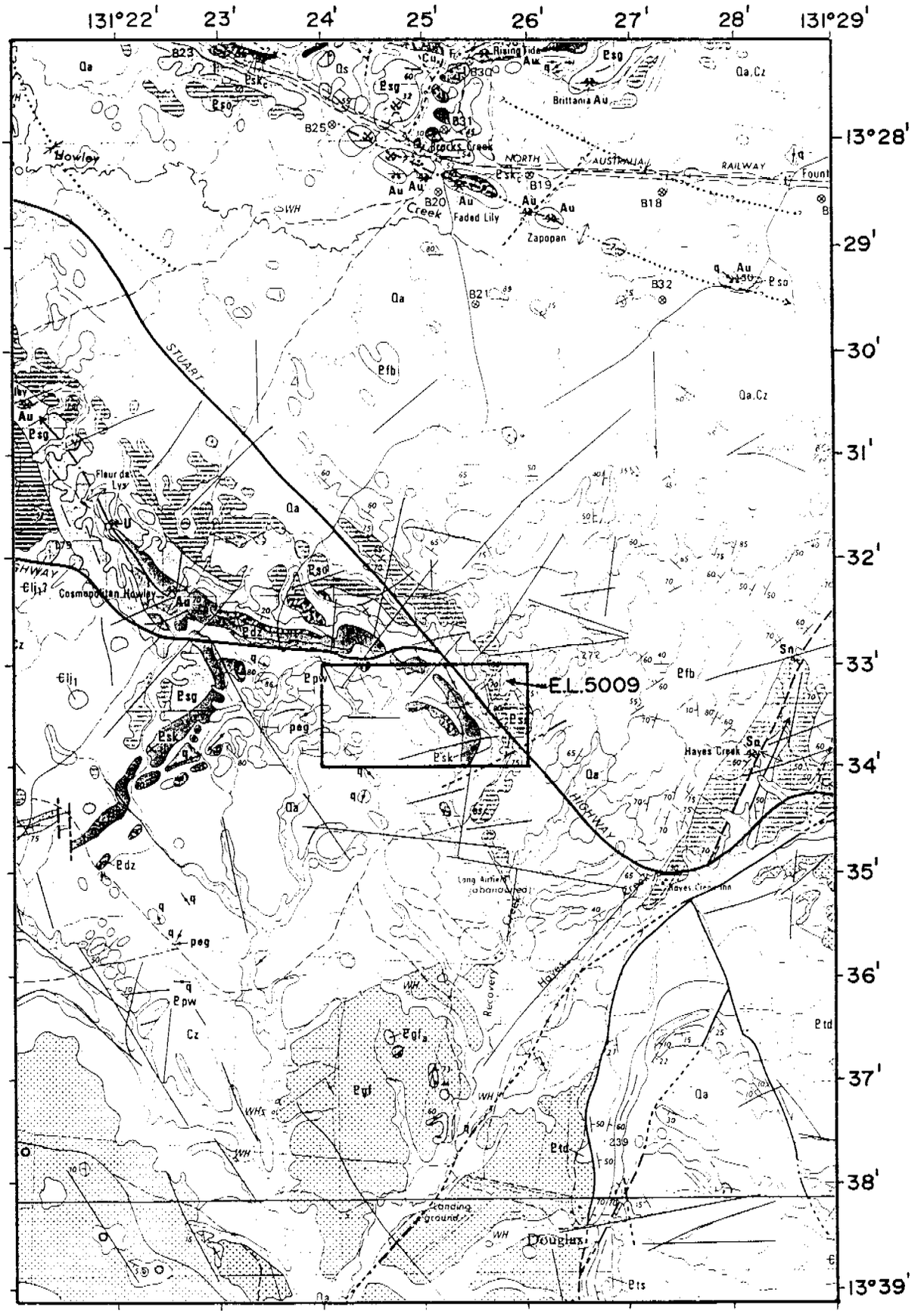
From D.M.E. Map 14/5-1

TENEMENT MAP
E.L. 5009
RECOVERY CK.

1:50 000

0 1 2 3 kms.

FIG. 2



CAINOZOIC

Cz	Soil.

EARLY PROTEROZOIC

Pdz	Zamu Dolerite.	Psg	Gerowie Tuff.
Pfb	Burrell Creek Fm.	Psk	Koolpin Fm.
Pso	Mt. Bonnie Fm.	Ppw	Wildman Siltstone.

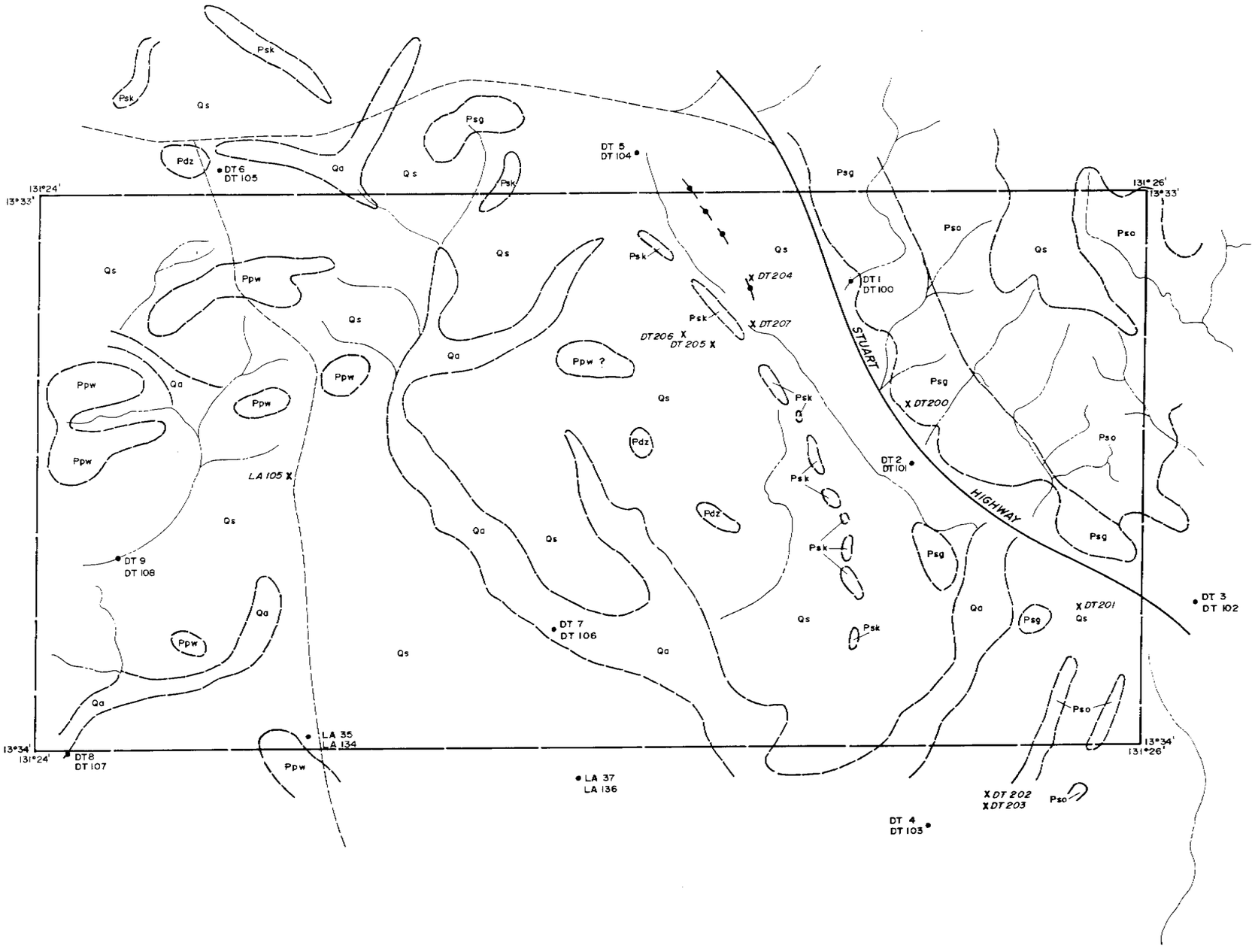
1:100000

0 1 2 3 4 5 kms

REGIONAL GEOLOGY

E.L.5009

FIG. 3



SOUTH ALLIGATOR GROUP

- Qa Alluvium
- Qs Soil
- Pdz Zamu Dolerite
- Pso Mount Bonnie Formation
- Psg Gerowie Tuff
- Psk Koolpin Formation
- Ppw Wildman Siltstone

- Quartz vein
- Geological boundary
- Minor road
- E.L. boundary (approximate)

- DT 4 / DT 103 — Stream sediment sample number
- X DT 203 — Rock chip sample number

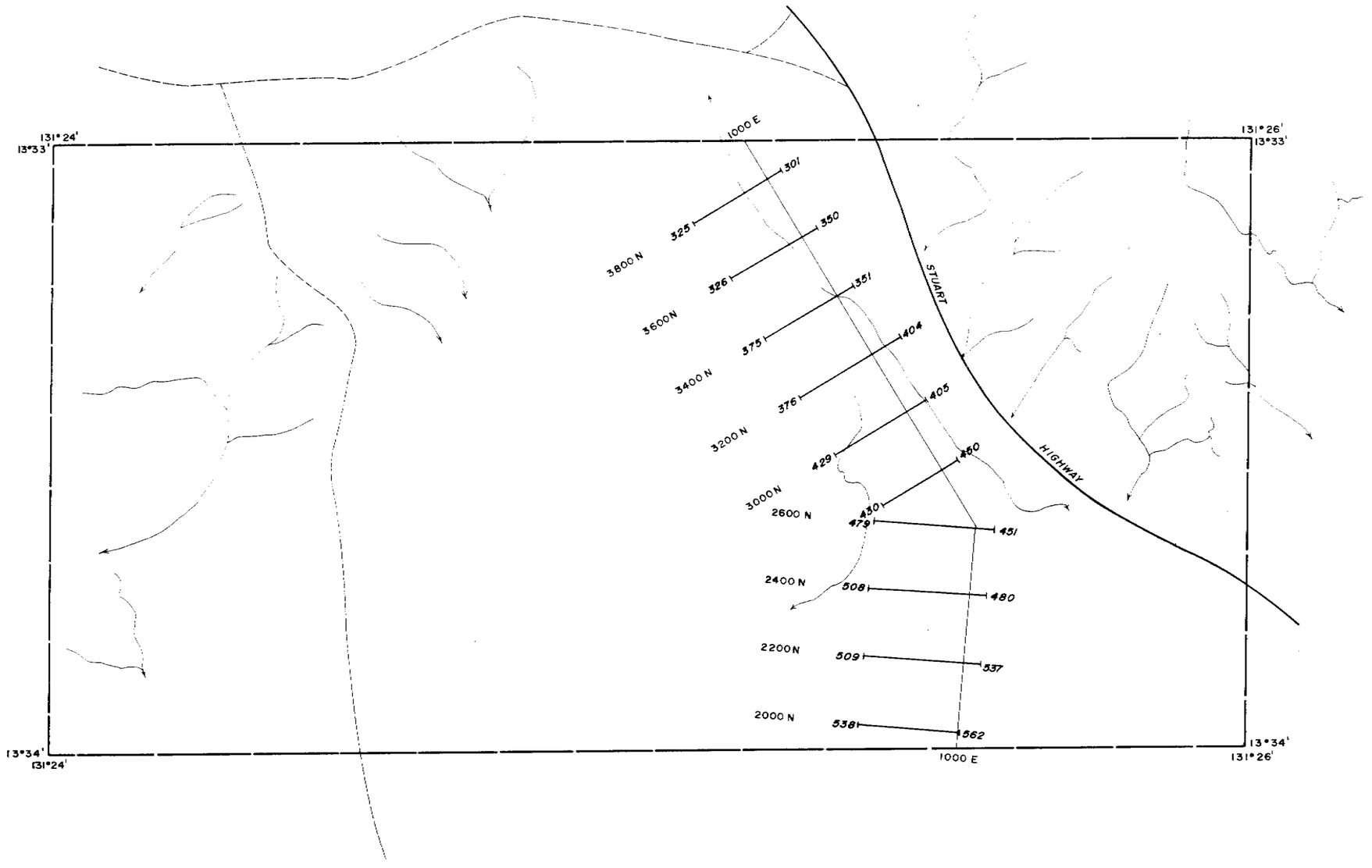
OCEANIA EXPLORATION & MINING N.L.

EXPLORATION LICENCE 5009
RECOVERY CREEK
GEOLOGY & SAMPLE LOCATIONS

GEOLOGIST: S. Searston DATE: JULY 1987

SCALE = 1:10,000 100 0 200 400m

FIG 4.



325 ——— 301 *Soil sample line - first and last numbers shown*
All sample numbers prefixed by DT

OCEANIA EXPLORATION & MINING N.L.

EXPLORATION LICENCE 5009
RECOVERY CREEK
SOIL SAMPLE GRID & SAMPLE LOCATIONS

GEOLOGIST: S. Searston DATE: October 1987

0 100 200 300 400 500m

FIG. 5

APPENDIX V

Supplementary Report by Norgold Limited

EXPLORATION LICENCE 5009

ANNUAL REPORT ON EXPLORATION

8.1.87 to 7.1.88

NORGOLD ACTIVITY, DECEMBER 1987

S Taylor
Norgold Limited
on behalf of the
Oceania Exploration/Norgold
"Howley" Joint Venture

CONTENTS

LIST OF FIGURES

1 INTRODUCTION

Exploration Licence 5009, within the Pine Creek 1:250,000 (SD52-8) and Tipperary 1:100,000 sheets (Figs 1, 2), was granted to Oceania Exploration on 8.1.87 for a period of two years. On 18.8.87 the EL, together with the adjacent titles ELs 5098 and 5099, was farmed out to Norgold Limited under the terms of the Howley Joint Venture Agreement.

Following initial geological mapping, rock chip sampling and soil sampling by Oceania Exploration, Norgold assumed management of the project and conducted a brief programme of detailed geological mapping and rock chip sampling in December 1987. The results of that programme, which was undertaken by geologist T Bates, are summarized in this report.

The exploration target in the EL is a gold deposit, similar to the nearby Cosmo Howley orebody, within equivalent Koolpin Formation stratigraphy on the eastern limb of the Howley Anticline.

2 EXPLORATION UNDERTAKEN

Following preparation of a 1:10,000 photogeological interpretation by consultant G Orrige (Fig 3), field checking to the west of the Stuart Highway lead to a number of modifications, which are incorporated in Fig 4. The prospective Koolpin Foramtion on the eastern limb of the Howley Anticline was then geologically mapped at 1:5,000 scale, using Oceania's established grid (Fig 5). During this work a total of 25 chip samples of outcrop and float were collected, as listed in Table 1, and plotted on Fig 5. The samples were submitted to Amdel, Darwin for the following analyses:

Element	Amdel Method	Detection Level ppm
Au	PM4/1, Fire assay with lead collection, furnace AAS	0.005
Cu, Pb, Zn	A1, AAS after perchloric acid digestion	Cu 2, Pb 5, Zn 2
Ag	A2, AAS after perchloric acid digestion	1
As, Sb, Mo, W	X1, XRF, pressed powder technique	As 2, Sb 4, Mo 4, W 10

3 RESULTS

3.1 Geological Mapping

The 1:10,000 geological mapping delineated the eastern limb of the Howley Anticline trending NNW-SSE through the eastern half of the licence area (Fig 4). West of the Stuart Highway the limb comprises Lower Proterozoic pelitic sediments and minor volcaniclastics of the Mt Partridge (Wildman Siltstone) and South Alligator (Koolpin Formation, Gerowie Tuff) Groups,

and also includes an extensive development of the Zamu Dolerite sill at several stratigraphic levels. In the extreme south of the EL northerly trending coarse grained pegmatite bodies were located.

More detailed 1:5,000 scale mapping of the Koolpin Formation within Oceania's gridded area subdivided it into a number of lithologically distinctive units, which are delineated in plan (Fig 5) and diagramatically shown in idealized section form in Fig 6. The most prominent outcropping units are two chert nodule horizons and a graphitic haematitic siltstone, which overlies the upper nodular horizon. Between the two nodular horizons occur poorly outcropping ferruginous siltstones and a thin unit of the Zamu Dolerite, which can be correlated with the stratigraphy hosting the economic gold mineralization at the Cosmo Howley deposit.

Immediately to the north of the EL there is a significant parasitic fold on the eastern limb of the Howley Anticline, but within the area mapped the Koolpin Formation is relatively undeformed and contains only small scale faulting and contortions. The only area of noteworthy structural complexity is a small kink in a nodular horizon, accompanied by small scale faulting and quartz veining, as shown in the inset to Fig 5.

Underlying the Koolpin Formation is the Wildman Siltstone which forms the core of the Howley Anticline in the EL. The unit predominantly comprises siltstones, which progressively become more graphitic towards the Koolpin Formation and also grade into phyllite then mica schist close to the contact with sills of the Zamu Dolerite.

Overlying the Koolpin in the mapped area are cherts, shales and tuff of the Gerowie Tuff sequence, which exhibit no noteworthy features.

3.2 Chip Sampling

At the date of compilation of this report the analytical results of the chip sampling had yet to be received from Amdel.

4 EXPENDITURE

Expenditure incurred by Norgold Limited in EL 5009, from assuming management of the project to 7.1.88, was $10,570, as detailed in Table 2.

5 PROPOSED EXPLORATION PROGRAMME

After the wet season it is proposed to costean the area of prospective stratigraphy between the two nodular horizons at 200 m intervals. If the costean results are sufficiently encouraging, the area will then be drill tested.

In addition, further reconnaissance geological mapping and chip sampling will be undertaken outside the gridded area, especially to the east of the Stuart Highway.

S Taylor

Sample No	Au (ppm)	Sample Type	Lithology
75743	Results	Rock chip - float	Haematitic siltstone, minor quartz
75744	Awaited	Rock chip	Fe-rich dolerite and siltstones at contact between them
75745		Float over 10 m along grid line 3800N	Haematitic siltstone
75746		Rock chip	Chert nodule horizon (western)
75747		Rock chip	Pyritic quartz from large outcrop (30 x 30 m)
75748		Float over 15 m along grid line 3000N	Haematitic/graphitic shale
75749		Rock chip	Fe-rich eastern chert nodule bed
75750		Float between chert nodule horizons	Fe-rich siltstone/ironstone
75751		Rock chip	Fe-rich siltstone, minor chert lenses
75752		Rock chip	Fe-rich crenulated phyllite
75753		Float 10 m along 2800N grid line	Siltstone
75754		Float 15 m along 2800N grid line	Haematitic/graphitic siltstone
75755		Rock chip	Quartz stockwork in ferruginous siltstone
75756		Float, area between chert nodule beds	Fe and silica rich siltstone
75757		Rock chip	Silicified Fe-rich siltstone with quartz veinlets
75758		Float, 2200N grid line	Banded Fe-rich siltstone/ironstone
75759		Rock chip	Silicified, veined, brecciated chert nodule bed
75760		Rock chip	Graphitic siltstone, brecciated, veined
75761		Rock chip	Quartz veined gossan above chert nodule bed
75762		Rock chip	Ferruginous and veined siltstone and chert nodule bed in fold axis; includes fault gouge and veins
75763		Float, 10 m along 2400N grid line	Fe-rich siltstone
75764		Float	Fe-rich siltstone
75765		Rock chip	Clay altered, veined siltstone
75741		Rock chip	Quartz
75742		Rock chip	Coarse quartz-muscovite pegmatite

EL 5009 - Howley Joint Venture

ROCK CHIP SAMPLES

TABLE 1

Item	$
Salaries	2,778
Wages	560
Field Living and Supplies	115
Accommodation and Meals	943
Fuel and Vehicle Charges	1,567
Travel	1,318
Geochemical Analyses	625
Consultant Charges	1,285
Subtotal	9,191
Plus Overheads (15%)	1,379
TOTAL	10,570

EL 5009 - NORGOLD EXPENDITURE TO 7.1.88

TABLE 2

FENTON
R.F. 1:50 000
MINING TENURE

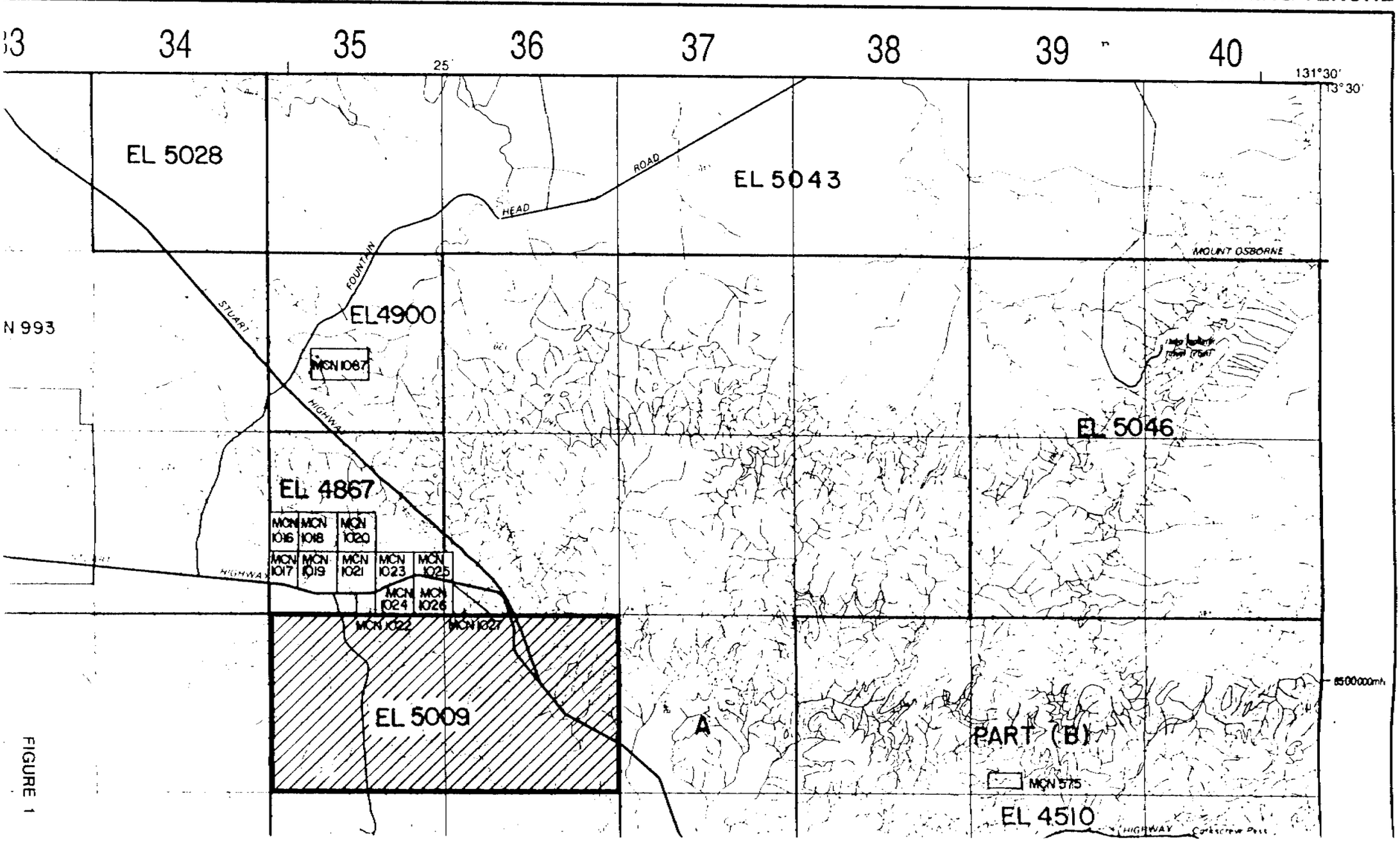


FIGURE 1

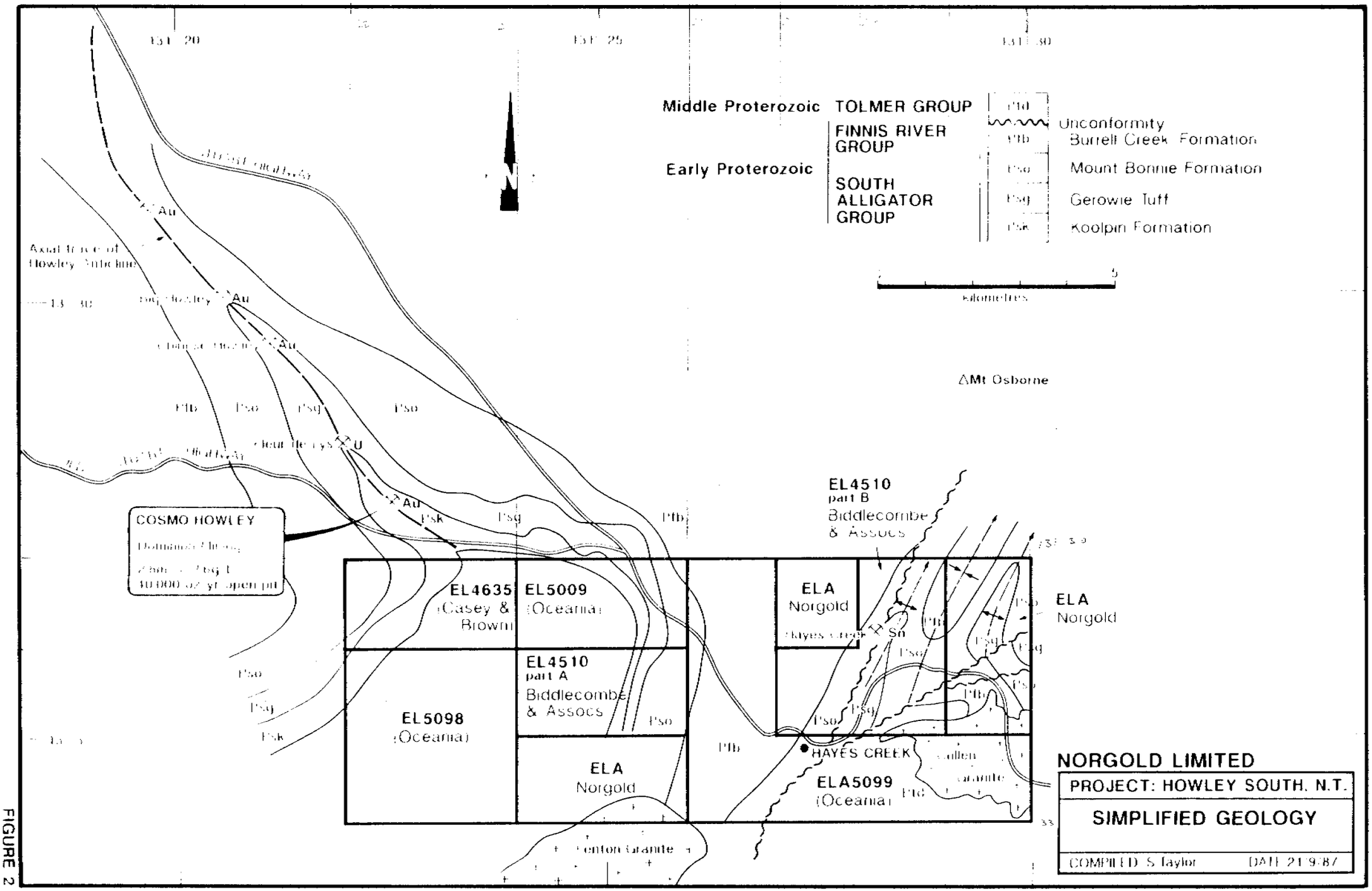

Middle Proterozoic
TOLMER GROUP
Unconformity
Burrell Creek Formation
Early Proterozoic
FINNIS RIVER GROUP
Mount Bonnie Formation
SOUTH ALLIGATOR GROUP
Gerowie Tuff
Koolpin Formation
kilometres
Mt Osborne
COSMO HOWLEY
EL4635 (Casey & Brown)
EL5009 (Oceania)
EL4510 part A Biddlecombe & Assocs
EL5098 (Oceania)
ELA Norgold
EL4510 part B Biddlecombe & Assocs
ELA Norgold
HAYES CREEK
ELA5099 (Oceania)
Fenton Granite
NORGOLD LIMITED
PROJECT: HOWLEY SOUTH, N.T.
SIMPLIFIED GEOLOGY
COMPILED S Taylor
DATE 21/9/87

FIGURE 2

Cosmo Howley Mine

OLD STUART HIGHWAY

STUART HIGHWAY

13°33'S

13°34'S

131°22'E

131°26'E

EL 4635

EL 5009

Scraped Area

Old fence line

Scale 1: 10000

0 2 Kms.

LEGEND

CAINOZOIC
- Qa — Quaternary Alluvium.
- Cz — Soils.

PALEOZOIC
- €O — Cambro-Ordovician.

EARLY PROTEROZOIC
- Pdz — Zamu Dolomite.
- Pso — Mt. Bonny Formation.
- Psg — Gerowie Tuff.
- Psk — Koolpin Formation.
- Ppw — Wildman Siltstone.

—·—·— Airphoto Bedding Trend

Airphoto lineament of uncertain origin. Usually major joints and fractures.

q<=====>q Quartz reef.

Prepared from 1:10000 scale enlargements of N.T. Government air photography, MRB 15/2323 1983 TIPPERARY Run 2, 112 & 114.

NORGOLD LIMITED

HOWLEY SOUTH PROJECT

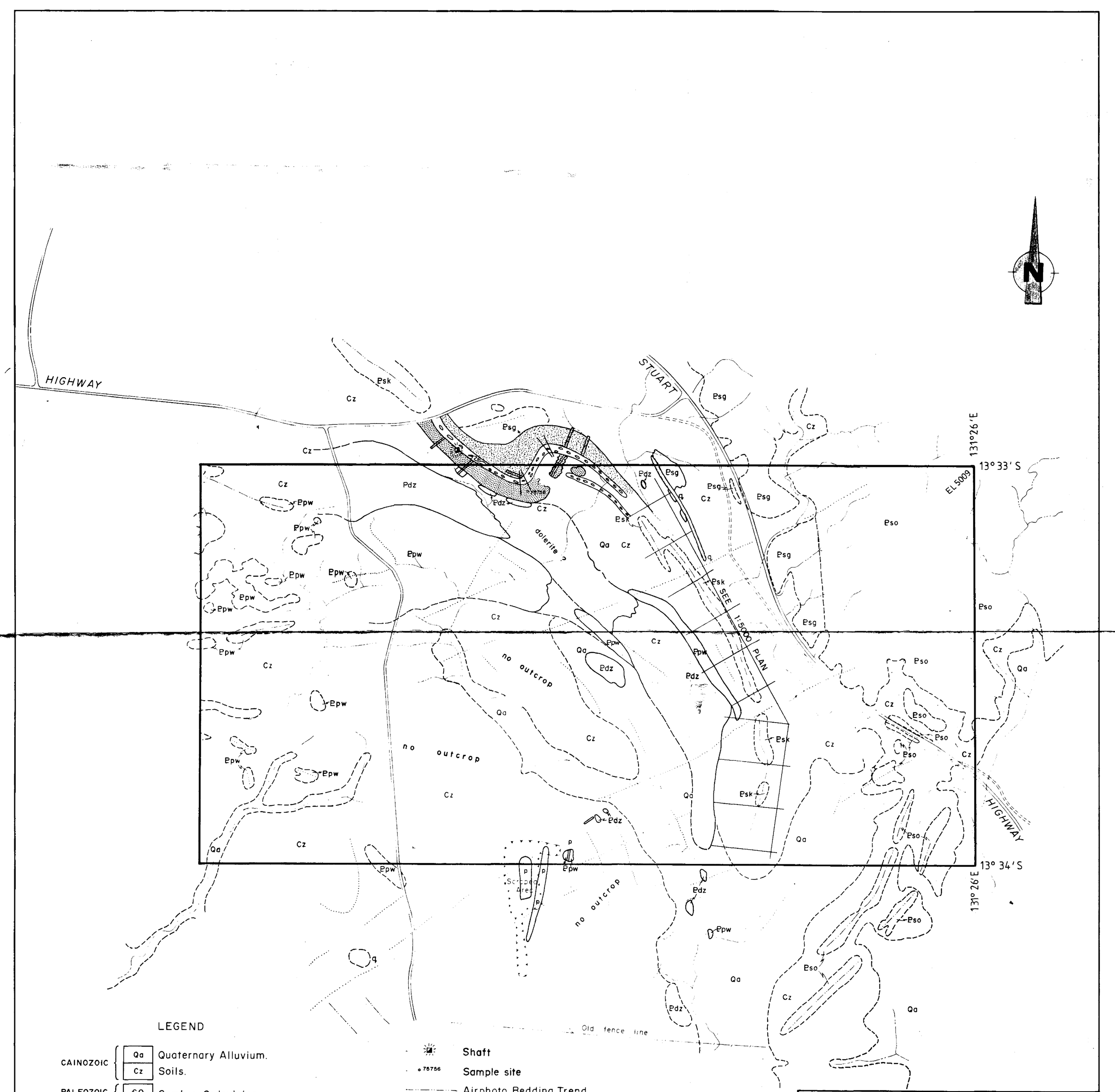
PHOTOGEOLOGICAL MAP

E.L.4635 & E.L.5009

Date: 11 DEC., 1987.
Geologist: G.ORRIDGE

CR87/49

FIGURE 3



LEGEND

CAINOZOIC	Qa	Quaternary Alluvium.
	Cz	Soils.
PALEOZOIC	€O	Cambro-Ordovician.
EARLY PROTEROZOIC	Pdz	Zamu Dolerite
	Pso	Mt. Bonnie Formation.
	Psg	Gerowie Tuff.
	Psk	Koolpin Formation Hematitic/graphitic siltstone Chert nodule horizon Purple siltstone/ferrouginous siltstone
	Ppw	Wildman Siltstone

- Shaft
- 75756 Sample site
- Airphoto Bedding Trend.
- Airphoto lineament of uncertain origin. Usually major joints and fractures.
- Costean
- p—p Pegmatite
- q—q Quartz reef.
- Shear

Prepared from 1:10000 scale enlargements of N.T. Government air photography, MRB 15/2323 1983. TIPPERARY Run 2, 112 & 114.

NORGOLD LIMITED

HOWLEY SOUTH PROJECT

GROUND CHECKED PHOTO GEOLOGICAL INTERPRETATION

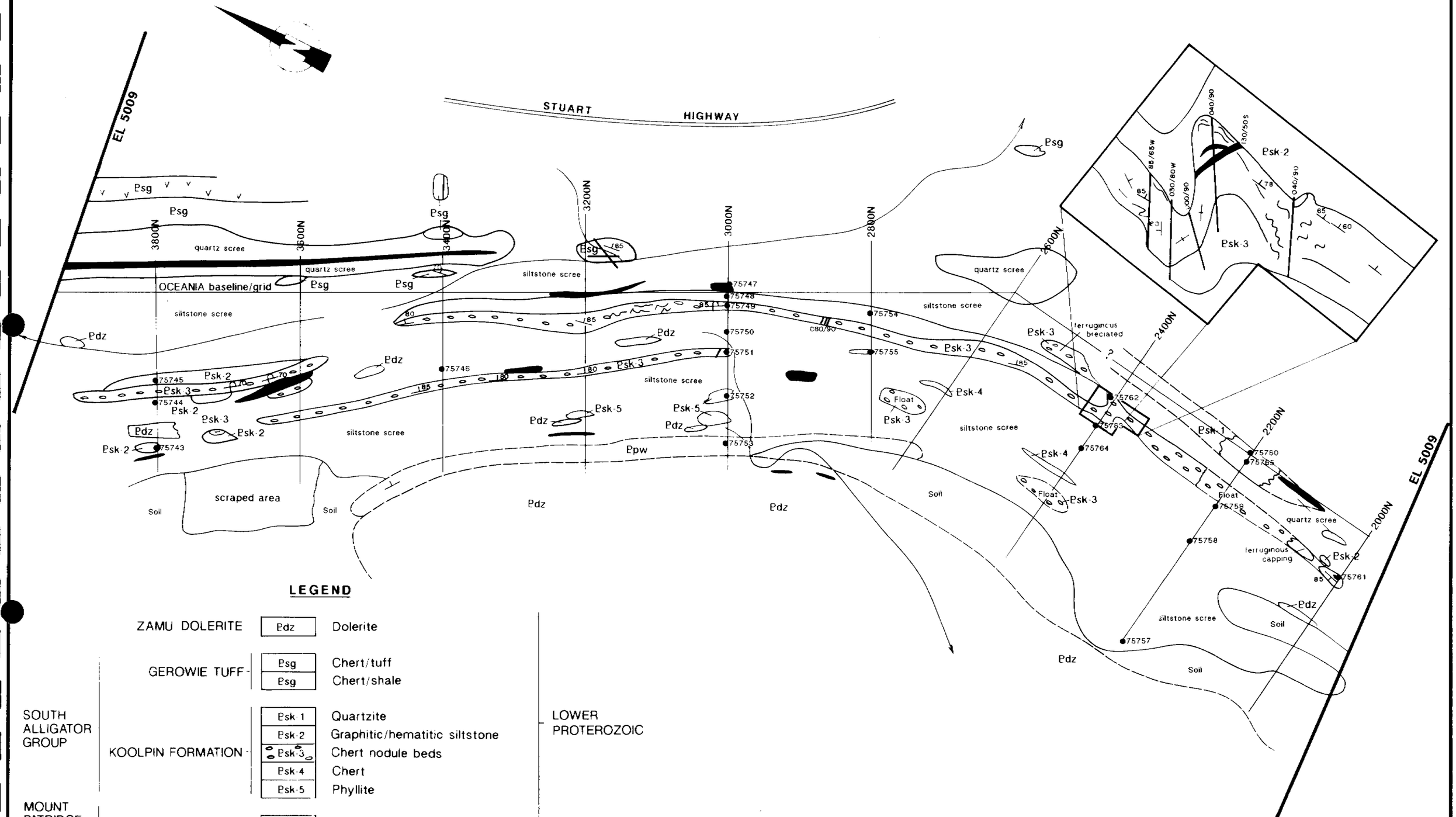
(INCORPORATING AMENDMENTS BY RECONNAISSANCE MAPPING BY T.BATES)

Date: 11 DEC., 1987. REVISION DATE: 1/2/88

Geologist: G.ORRIDGE SCALE: 1:10000

CR88/ 49

FIGURE 4



LEGEND

	ZAMU DOLERITE	Pdz	Dolerite
SOUTH ALLIGATOR GROUP	GEROWIE TUFF	Psg	Chert/tuff
		Psg	Chert/shale
	KOOLPIN FORMATION	Psk-1	Quartzite
		Psk-2	Graphitic/hematitic siltstone
		Psk-3	Chert nodule beds
		Psk-4	Chert
		Psk-5	Phyllite
MOUNT PATRIDGE GROUP	WILDMAN SILTSTONE	Ppw	Schist/phyllite, slightly graphitic

LOWER PROTEROZOIC

Quartz

040/90 Shear (strike/dip)

20 Dip

●75756 Sample site

0 200metres

SCALE: 1:5000

NORGOLD LIMITED

PROJECT: HOWLEY JOINT VENTURE	
E.L. 5009 **GEOLOGY OF GRIDDED AREA**	
COMPILED BY: T.BATES	DATE: 1/2/88

FIGURE 5

LEGEND

	ZAMU DOLERITE	Pdz	Dolerite-gabbro
	GEROWIE TUFF	v Psg v	Chert/tuff
		Psg	Chert/shale
SOUTH ALLIGATOR GROUP	KOOLPIN FORMATION	Psk-1	Quartzite
		Psk-2	Graphitic/hematitic siltstone
		Psk-3	Chert nodule beds
		Psk-4	Ferruginous siltstone
		Psk-5	Chert
MOUNT PARTRIDGE GROUP	WILDMAN SILTSTONE	Ppw	Siltstone phyllite schist
		/q/	Quartz

LOWER PROTEROZOIC

NORGOLD LIMITED

PROJECT: HOWLEY JOINT VENTURE

E.L. 5009

SCHEMATIC GEOLOGICAL SECTION

(NOT TO SCALE)

COMPILED BY T.BATES | DATE 1/2/88

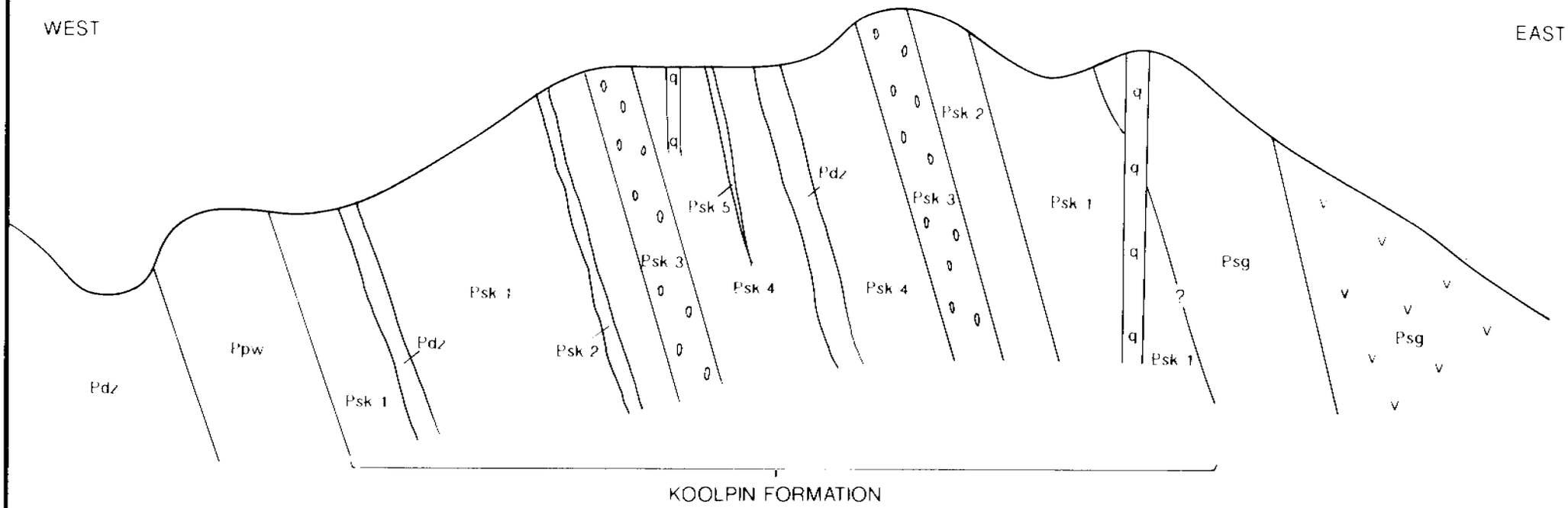


FIGURE 6