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GEOPEKO

A DIVISION OF PEKO WALLSEND OPERATIONS LIMITED
A.C.N. 000 081 434

EL 43/89 HOLDER RIVULET

~~RELIQUISHMENT~~ RELINQUISHMENT REPORT ?

INCLUDING REPORT ON EXPLORATION ACTIVITY

DECEMBER 1991 TO JUNE 1992

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Ian Mathison
Luke Vanzino
June, 1992

T270

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Department of Mines, Hobart

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Drawing	Title	Scale
2310	Folly - Sample Locations and Numbers	25,000

1.0 INTRODUCTION

1.1 Location and Access (Fig. 1)

EL 43/89, Holder Rivulet, is located in NW Tasmania approximately 25 km south of Port Latta.

Access within the EL is very good and is provided by a network of unsealed logging roads and the Savage River Pipe Line Road. Secondary access is provided by 4WD and walking tracks. The Arthur River cuts across the EL and is navigable by raft during the summer months.

1.2 Tenure and Land Usage

EL 43/89 of 233 km² was granted to Peko Exploration Ltd in January 1990. The EL was reduced to 83 km² in December 1990.

The EL consists predominantly of State Forest with approximately 1 km² of Private Property and 6 km² of Uncommitted Crown Land. The EL includes part of the Australian Heritage Commission Act Registered Entry, Savage River.

1.3 Regional Geology

Geopeko's block of Arthur River ELs lies within the Rocky Cape Region of NW Tasmania. The most interesting rocks in the area are those of the Precambrian Arthur Lineament. The Arthur Lineament is a north-east trending metamorphic belt consisting of highly deformed sediments, basic volcanics and dolomite. To the west of this belt lies the Rocky Cape Group, a thick shallow marine shelf sequence. The Rocky Cape Group contains Precambrian dolerite/gabbro dykes which have been emplaced into north-north west trending faults.

Previous explorers have assigned a sequence of interbedded sandstone and siltstone with associated basic volcanics and carbonates lying just west of the intensely deformed rocks of the Arthur Lineament to the Neasy Formation. Some workers question the validity of this formation. However, aeromagnetic maps show that the rocks of the Neasy Formation have a distinctive magnetic character. This unit has been retained for the purposes of this report.

Rocks assigned to the Oonah Formation and the Cleveland Waratah Association lie to the east of the Arthur Lineament. The Precambrian Oonah Formation is predominantly comprised of turbiditic quartz wacke and siltstone. The south eastern corner of the area is underlain by rocks of the Cleveland-Waratah Association that lie within the Dundas Trough. These rocks have been correlated with the Crimson Creek Formation and consist of basaltic, andesitic and tholeiitic lavas and volcanoclastic sediments.

The Precambrian-Cambrian rocks along the eastern edge of the area are in places overlain by Permian fluvio-glacial sediments and/or Tertiary basalt.

1.4 Known Mineral Deposits/Occurrences

There are a number of metallic mineral occurrences adjacent to the western, eastern and southern EL boundaries of Geopeko's Arthur River Project. (Green et Al 1988).

The deposits range from small, relatively insignificant workings, e.g. Victory Mine, Atlas Leases to large world class ore bodies e.g. Mt Bischoff, Savage River. In most cases, extensions of the prospective host formations can be continued into Geopeko's Arthur River EL's.

1.5 Previous Exploration

Geopeko report T247 (Virgoe and Mathison, 1990) summarizes previous exploration and describes the results of Geopeko's 1990 exploration program. Report T263 (Mathison, 1991) details 1991 exploration activity.

1.6 Scope of this report

The aim of Geopeko's exploration of EL 43/89, was to use water sampling, rock chip sampling, geological mapping and the results of previous exploration to delineate prospective and geochemically anomalous areas within the EL. Areas worthy of further investigation were to be followed up with more detailed exploration.

Follow up rock chip sampling and checks on the DMMR's water results in EL 43/89 revealed major problems with the DMMR's analytical techniques for stream water geochemistry. It was decided to suspend exploration until these problems were corrected. Consequently a waiver of expenditure commitment was sought and granted. Reconnaissance water sampling recommenced in December 1991 and was completed in February 1992. A temporary extension of the licence was negotiated to allow the results of 1992 sampling to be evaluated. A large part of the Arthur River Project area was selected for relinquishment after this interpretation. This report summarizes Geopeko's exploration activity in EL 43/89 from January 1990 to November 1991 and details exploration from December 1991 to June 1992.

2.0 EXPLORATION ACTIVITY UNDERTAKEN BY GEOPEKO - SUMMARY**2.1 January 1990 - November 1990** (Virgoe & Mathison 1990)***Water geochemistry***

Reconnaissance water samples were collected from streams across the accessible parts of the EL. Base metals and arsenic were determined using carbon rod AAS of acidified samples by ANALABS in Melbourne. Gold was determined by Dr Bill Baker of the Tasmanian Department of Mines using the Huminex technique. Both of these techniques are now known to have limitations or analytical problems. Nevertheless base metal values responded to major lithological variations and an anomalous gold value on Exploration Creek in EL 44/89 was supported by an alternative method used by ANALABS.

Compilation of Previous Exploration

Results of previous exploration activity were reviewed. No indications of base metal or gold mineralization were detected by previous exploration.

Geophysical Review

A review of public domain aeromagnetic and gravity data was conducted by Dr.D.Leaman. Both sets of data indicate that the Arthur Lineament rocks lie at depth under the eastern third of the EL.

2.2 December 1990 to November 1991 (Mathison 1991)

The EL was reduced to 83 km² in December 1990. Rock chip samples were collected from outcrop along west flowing tributaries of Neasy Creek, along Cann Creek, along an east - west section of Rachel Creek and from Holder Road. Sampling of Neasy Creek tributaries was to follow up a zone of anomalous gold in water reported by Dept of Mines analyses. Rock chip sampling here was disappointing with very low gold and base metal values. Repeat sampling and analyses showed the anomalous gold values to be spurious. The only rock samples warranting follow up were collected from Rachel Creek:

3.0 EXPLORATION - December 1991 to June 1992

3.1 Water Geochemistry

Regional water sampling of the Arthur River Project Area recommenced in December 1991. Sixteen water samples were collected from tributaries of the Arthur River within EL 43/89. Access was by raft.

Sample Collection

Water samples were collected from streams with a drainage area between 1 and 5 km². Occasional check samples were collected from streams with drainage areas up to 10 km² including two or more other samples. At each sample site pH of the water, water colour, float geology, outcrop geology, and vegetation type were recorded. Possible contamination from roads, forestry operations, mines, or farms was noted. Sample sites were marked with numbered aluminium tags and flagging tape. Three water samples were collected from each site:

1. A 100 ml sample of raw stream water was collected in a new 125 ml polyethylene sample bottle. Cu, Pb, Cd and Zn were determined by ICP-MS and As by graphite furnace AAS.
2. Au was extracted from one litre of water in the field onto a sachet of activated charcoal. Au was determined by neutron activation at Becquerel Laboratories.
3. Cu, Pb and Cd were preconcentrated on site by coprecipitation from one litre of water. Metal values were determined by CSIRO using voltammetry.(PDV)

All sample bottles were washed several times in the stream water before treating or collecting samples.

Statistical Analysis of Results

Cumulative frequency plots were made for PDV.Cu, PDV.Pb, ICPMS.Zn and GFAAS.As using the results of approximately 200 samples from the whole project area. The following anomalous levels were selected using inflexion points.

Element (DL)	1. Possibly Anomalous	% <1	2. Probably Anomalous	% <2
Cu (0.1)	1.5 ppb	85	3.0 ppb	95
Pb (0.05)	0.75 ppb	90	1.4 ppb	97
As (0.01)	0.16 ppb	80	0.30 ppb	97.5
Zn (0.1)	1.7 ppb	85	3.0 ppb	95
Au (0.1)	0.1 ppt	?		

Results (See Drawing 2310 and Appendix 1)

Locations of samples have been plotted onto 1:25,000 scale base maps. Print outs of sample details and results are appended as Appendix 1. Results are summarized below:

for 16 samples

Element	Possibly anomalous	Probably anomalous
Cu	-	-
Pb	-	-
Zn	3	-
As	11	1
Au	-	1

Discussion of Results

SN 22801 reported 74 ppt Au. A previous sample from this site was analysed using the Huminex technique and reported only 3.0 ppt. The Huminex technique has been shown to be unreliable in that it reported spurious gold. Whether it also shows no gold when gold is present is unknown. It is reported that elevated terraces of the Arthur River in this area carry alluvial gold.

The two elevated zinc values are barely above the minimum threshold and are not supported by lead or copper. They cannot be regarded as anomalous. The elevated arsenic values are similar to values reported for all other water samples from this area. An elevated background arsenic content for the Arthur Lineament rocks in this area appears likely. This is supported by elevated As values reported for rock chips from Rachel Creek. These are the only rock samples analysed for As from this area during this project.

Repeat Sampling and Analysis (Table 1)

Original 1990 water samples were analysed for Au using the Huminex method. (Tasmanian Dept of Mines or DMMR). These gold values were later found to be spurious. Repeat analyses on samples reporting anomalous gold were completed by the Dept of Mines in 1992 using a modified technique. Water samples were two years old at this time. Samples of water from the Rosebery area which are known to drain gold mineralization were analysed by both the Dept of Mines modified technique and the CSIRO technique with similar anomalous levels of gold.

A small group of samples from the original batch were sent to ANALABS environmental laboratories in Melbourne where they were analysed for Au, Cu, Pb and As using carbon rod AAS and Zn by ICP - OES. Au was preconcentrated using an organic solvent and all samples were acidified to a pH close to 1.0. These results are now known to be affected by contamination from the added acid - especially by Pb:

The remainder of the 1990 samples were analysed by ANALABS by carbon rod AAS after acidification with ARISTAR nitric acid for Cu, Pb, Zn and As.

Several creeks were resampled in October 1990. Selected samples were analysed for Au by neutron activation analysis after adsorption by activated charcoal. Others were analysed for Cu, Pb, Zn, As and some for Au by GF-AAS. Again gold was preconcentrated.

In 1992, some of the 1990 samples were analysed for Pb by the Dept of Mines.

1992 samples were analysed by the CSIRO and BECQUEREL using the techniques described in the section *Sampling* above.

Results are tabulated - Table 1.

Examination of the table reveals the extent of the analytical problems experienced. Many problems can be attributed to electronic noise when analytical instrumentation is operated close to the lower limit of detection. Others, especially with some early ANALABS Pb and Zn results, are due to base metal contamination in normal laboratory acids. There can be no doubt, however, that the early DMMR results are completely unreliable. The AAS was apparently suffering some interference on the gold signal from something in the stream water or something added during sample preparation. It is still uncertain whether low results from this set of results reliably indicates low gold content in the water sampled.

3.2 Rachel Creek - by Luke Vanzino

(See Fig 2 & Appendix 2)

The Rachel Creek lead (Fig 2) showing, is located in the bed of Rachel Creek at G.R 642478 (Folly 1:25 000 sheet).

The showing is hosted by dark grey to black slates and laminated siltstones which strike NNE and dip steeply to the west. Local reversal of dip azimuths suggest the presence of minor parasitic fold structures.

Two parallel right angle offsets in the creek direction are interpreted as rotational faults. A marked shallowing of dips between these E-W trending structures suggests block rotation.

The alteration mineralization outcrops as a 2 m wide zone, parallel to the local strike and spatially related to the inferred fault. The zone cuts the trace of the fault obliquely.

It is suggested that the mineralizing fluids have used the fault as a conduit and selectively seeped into a chemically receptive unit. This accounts for the stratiform nature observed.

3.3 Petrography (Appendix 3)

Ten rock samples from the Arthur River area were sent to Dr.J.Stolz at the University of Tasmania for petrology. Three of these came from EL 43/89. All descriptions are appended as all are relevant to this area.

4.0 CONCLUSIONS

- * Water sampling of EL 43/89 at the planned sample density was achieved. However, the unreliability of analyses during the early stages of the project considerably reduces the effectiveness of this cover. Only a thin strip along the Arthur River has been adequately covered.
- * Sections of the EL covered by rock chip sampling have been adequately tested at this stage.
- * The sections of EL 43/89 tested by Geopeko revealed no indications of significant mineralization. However, the wide spacing of the water samples collected was chosen to detect very large, near surface bodies of mineralization. A much closer spaced survey would be necessary to adequately test for smaller or deeper bodies.
- * The elevated As values reporting in water and rock samples from the Arthur Lineament have not been explained.
- * The source of the alluvial gold in the elevated gravels at Folly Hill and in the terraces of the Arthur River has not been located.

5.0 RECOMMENDATIONS

Due to current budgetary constraints, EL 43/89 should be relinquished.

5.0 ENVIRONMENTAL DISTURBANCE AND REHABILITATION

Exploration conducted by Geopeko between 1990 and 1992 has caused minimal environmental disturbance. Semi permanent samples markers left at sample sites are considered to be valuable reference points for future exploration. Walking tracks were cut to DHMR guidelines and should regenerate naturally. No rehabilitation has been necessary.

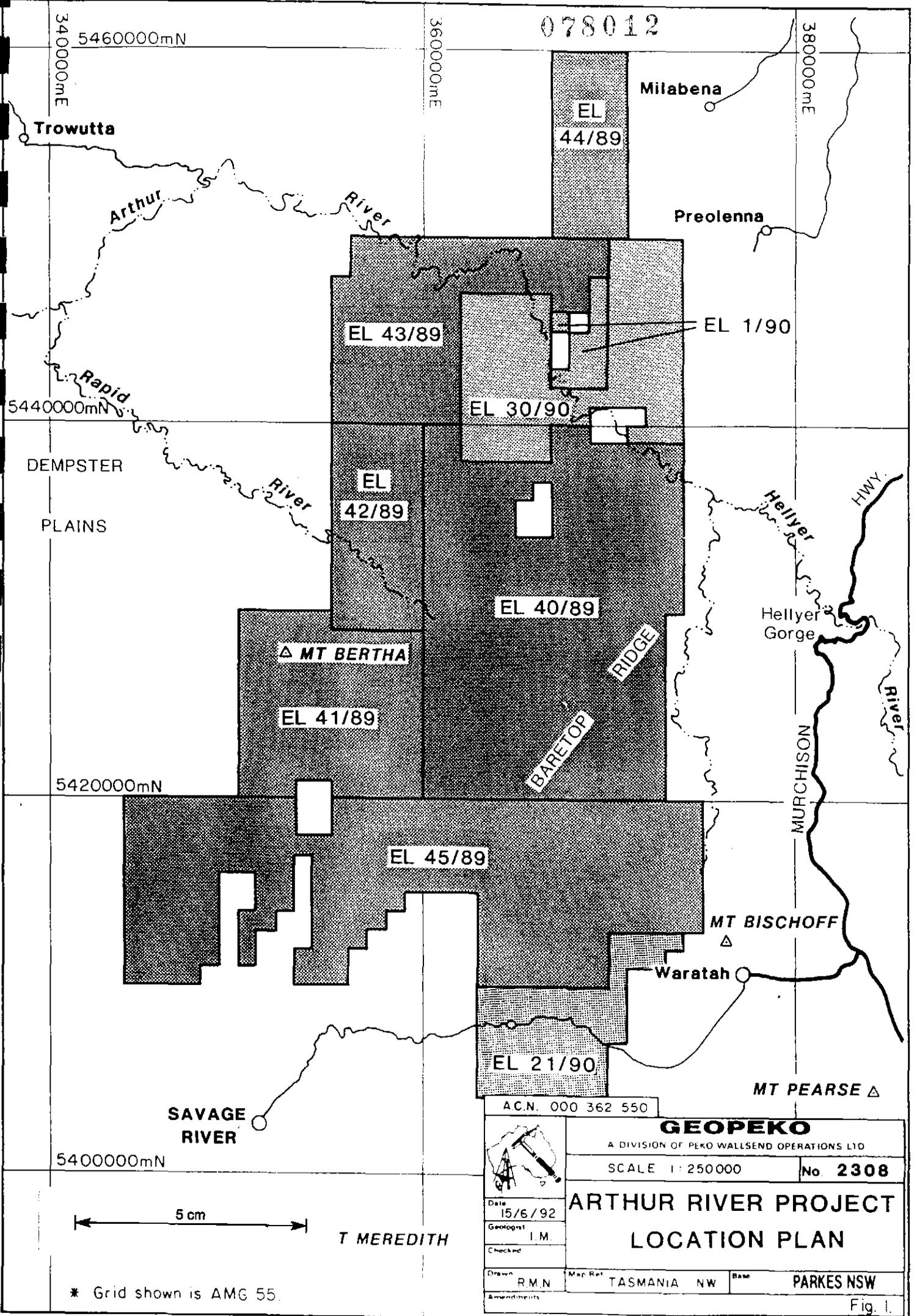
Jan Mathison

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MATHISON, I.J., VIRGOE, K. (1990) - Holder Rivulet EL 43/89 - Report on Exploration Activity - January 1990 to November 1990. Unpublished Geopeko report T247.

MATHISON, Ian (1991) - EL 43/89 Holder Rivulet - Report on Exploration Activity December 1990 to November 1991. Unpublished Geopeko report T263.



078012

5460000mN

3600000mE

3800000mE

Trowutta

Milabena

Preolenna

Arthur River

EL 44/89

EL 43/89

EL 1/90

5440000mN

EL 30/90

DEMPSTER PLAINS

EL 42/89

Hellyer HWY

EL 40/89

△ MT BERTHA

BARETOP RIDGE

Hellyer Gorge

EL 41/89

5420000mN

EL 45/89

MURCHISON

MT BISCHOFF

Waratah

EL 21/90

MT PEARSE △

SAVAGE RIVER

AC.N. 000 362 550

5400000mN

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SCALE 1:250000

No 2308



Date 15/6/92

Geologist I.M.

Checked

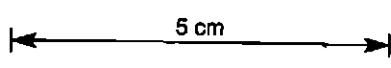
ARTHUR RIVER PROJECT LOCATION PLAN

Drawn R.M.N.

Map Ref TASMANIA NW

Base PARKES NSW

Amendments



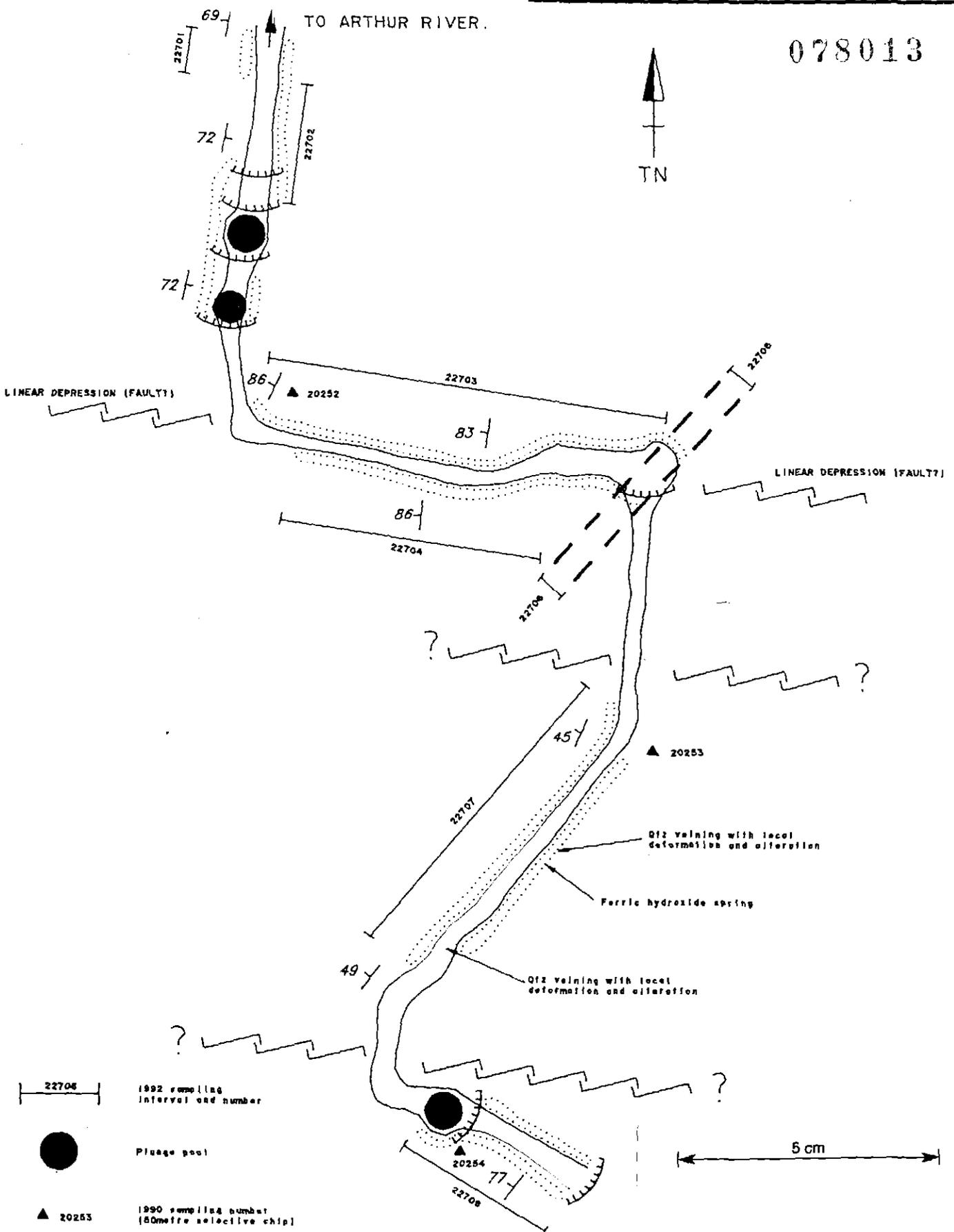
T MEREDITH

* Grid shown is AMG 55.

Fig. 1.

078013

TO ARTHUR RIVER.



- 1992 sampling interval and number
- Pluge pool
- 1990 sampling number (50metre selective chip)
- Waterfall
- fault (inferred)
- Outcrop
- Zone of alteration and mineralisation

Operator/Manager on behalf of Licence Holder PEKO EXPLORATION LIMITED
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	GEOPEKO		A DIVISION OF PEKO-WALLSEND OPERATIONS LTD. ACN 000 081 434
	SCALE 1:500		
PARKES		Project/ Towns	
ARTHUR RIVER PROJECT			
Doc	L.V.	RACHEL CK LEAD SHOWING.	
Carto	A. G. K.		
Checked			
Job No.	201_92		
Date	22.6.92		
BOOK Shelf No. 7915	Parkes Repr'l No.	Dwg No. 2304	Fig. 2.

Table 1 **ARTHUR RIVER PROJECT – WATER GEOCHEMISTRY**
 EL 43/89 – Repeat Sampling & Assays

Year Set	Number	1990	1992	1992	1990	1991	1990-1992	1990-1992	1990-1992	1990-1992	1992
		Au DMMR	Au CSIRO	Au Rp1 DMMR	Au AAS ANALABS	Au NAA BECQUEREL	Cu	Pb	Zn	As	Pb
		----- ANALABS AND CSIRO -----									
1990 orig	20051	13.2		4.1			1.6	<0.5	17	<0.5	
1990 Oct	21052					<2	2	0.2	10	0.5	
1990 orig	20052	47.2		6.5	<5		1.3	13.5	30	0.5	
1990 Oct	21051			11.6	<5		0.4	0.2	4.5	<0.5	
1990 orig	20076	596.4		1.6	<5		1.8	7.5	<10	<0.5	0.5
1990 Oct	21053			5.2	<5	<2	0.8	0.4	5	0.5	<0.1
1990 orig	20077	47		2.6	10		4.4	120	40	<0.5	0.3
1990 Oct	21054			7.6	<5	<2	0.7	0.5	5	0.5	0.2
1990 orig	20060a	47.2		2.6	<5		1.2	80	50	0.5	1.1
1990 Oct	21059			20.1							
1990 orig	20060b	47.2		2.6	<5		1.2	80	50	0.5	1.1
1990 Oct	21060			20.1							0.1
1990 orig	20060c	47.2		2.6	<5		1.2	80	50	0.5	1.1
1990 Oct	21061			20.1							0.4
1990 orig	20062	17.7		1.2			0.6	<0.5	3	<0.5	0.4
1990 Oct	21062										<0.1
1990 orig	20086	16.8		3.3			1.4	<0.5	8	<0.5	
1992 CSIRO	22410		<1				0.63	0.15	0.73	0.15	
1990 orig	20087a	67.1		4.1	<5		1.2	<1.0	<10	<0.5	
1992 CSIRO	22413		<1				0.63	0.32	1	0.24	
1990 orig	20087b	67.1		4.1	<5		1.2	<1.0	<10	<0.5	
1992 CSIRO	22802		<1				0.9	0.7	0.78	0.19	
1990 orig	20087c	67.1		4.1	<5		1.2	<1.0	<10	<0.5	
1992 CSIRO	22411		<1				0.63	0.15	1.2	0.19	
1990 orig	20088a	21.8		6.3			1	<0.5	7	<0.5	
1992 CSIRO	22414		<1				0.74	0.45	1	0.2	
1990 orig	20088b	21.8		6.3			1	<0.5	7	<0.5	
1992 CSIRO	22805		<1				1	0.6	1.76	0.14	
1990 orig	20088c	21.8		6.3			1	<0.5	7	<0.5	
1992 CSIRO	22804		<1				0.9	0.27	0.52	0.24	
1990 orig	20089	35.6		6.2	5		1	3.5	<10	<0.5	
1992 CSIRO	22417		<1				0.96	0.45	1.5	0.36	
1990 orig	20090	18.9		4.2			1	<0.5	8	<0.5	
1992 CSIRO	22418		<1				0.85	0.18	1.6	0.21	
1990 orig	20091	30.1		3.6	<5		3.3	12.5	<10	<0.5	
1992 CSIRO	22419		<1	3.5			0.37	0.29	1.7	0.13	
1990 orig	20123	7.6					1.2	4.5	3	<0.5	
1992 CSIRO	22801		74				0.33	0.4	0.85	0.1	

Note: Sample numbers with letters, eg 20088a, indicate composite samples.

Table 1 (ctd)

Year Set	Number	1990	1992	1992	1990	1991	1990-1992	1990-1992	1990-1992	1990-1992	1992
		Au DMMR	Au CSIRO	Au Rpt DMMR	Au AAS ANALABS	Au NAA BECQUEREL	Cu	Pb	Zn	As	Pb DMMR
		----- ANALABS AND CSIRO -----									
1990 orig 1992 CSIRO	20124a 22803	5.1	<1				0.9 0.9	2.5 0.33	3 0.34	<0.5 0.19	
1990 orig 1992 CSIRO	20124b 22412	5.1	<1				0.9 0.92	2.5 0.23	3 1.3	<0.5 0.21	
1990 orig 1992 CSIRO	20125 22415	5.8	<1				0.6 0.6	0.5 0.48	3 1.7	<0.5 0.2	
1990 orig 1992 CSIRO	20126a 22416	4.6	<1				1.3 0.5	0.5 0.15	4 1	<0.5 0.21	
1990 orig 1992 CSIRO	20126b 22806	4.6	<1				1.3 0.51	0.5 0.53	4 1.32	<0.5 0.15	

Note: Sample numbers with letters, eg 20088a, indicate composite samples.

APPENDIX 1
WATER GEOCHEMISTRY
SAMPLE DETAILS AND RESULTS

ARTHUR RIVER PROJECT - 1991-92 WATER SAMPLES

EL 43/89 - POLLY SHEET

SAMPLE NUMBER 22806

DATE 24/02/1992

EL43/89

MAP POLLY

ANG COORDS. 363600 mE 5448900 mN

VEGETATION MIXED FOREST

STREAM FLOW

SLOW

CONTAMINATION FROM

ROADS

LEVEL

AVERAGE

WATER COLOUR

CLEAR

WIDTH

1.0m

PH

5.50

DIRECTION

0°

DRAINAGE AREA

0.2 km²

GEOLOGY

OUTCROP

FLOAT 50 % Sphy banded

50 % Qtz

0 %

03/07/1992

ARTHUR RIVER PROJECT
WATER GEOCHEMISTRY - 1991-92 SAMPLES - CSIRO ANALYSES
BL 1/90, 30/90 & 43/89 - FOLLY SHEBT

SAMPLE NUMBER	-----ICPMS - RAW WATER -----				-PDV - Preconcentrated-				GF AAS	NAA	ICPMS	LOCATION	
	Cu ug/l	Pb ug/l	Cd ug/l	Zn ug/l	Cu ug/l	Pb ug/l	Cd ug/l	As ug/l	Au ng/l	Zn ug/l	BL	MAP	
22410	-0.50	-0.50	-0.50	0.73	0.63	0.15	0.20	0.15	-1.00	-10	43/89	FOLLY	
22411	-0.50	-0.50	-0.50	1.20	0.63	0.15	0.30	0.19	-1.00	-10	43/89	FOLLY	
22412	-0.50	-0.50	-0.50	1.30	0.92	0.23	0.40	0.21	-1.00	-10	43/89	FOLLY	
22413	-0.50	-0.50	-0.50	1.00	0.63	0.32	0.20	0.24	-1.00	-10	43/89	FOLLY	
22414	-0.50	-0.50	-0.50	1.00	0.74	0.45	-0.05	0.20	-1.00	-10	43/89	FOLLY	
22415	-0.50	-0.50	-0.50	1.70	0.60	0.48	-0.05	0.20	-1.00	-10	43/89	FOLLY	
22416	-0.50	-0.50	-0.50	1.00	0.50	0.15	-0.05	0.21	-1.00	-10	43/89	FOLLY	
22417	0.50	-0.50	-0.50	1.50	0.96	0.45	0.35	0.36	-1.00	-10	43/89	FOLLY	
22418	-0.50	-0.50	-0.50	1.60	0.85	0.18	-0.05	0.21	-1.00	-10	43/89	FOLLY	
22419	-0.50	-0.50	-0.50	1.70	0.37	0.29	-0.05	0.13	-1.00	-10	43/89	FOLLY	
22420	-0.50	-0.50	-0.50	0.80	0.41	-0.05	-0.05	0.11	-1.00	-10	1/90	FOLLY	
22421	-0.50	-0.50	-0.50	0.82	0.19	0.22	-0.05	0.17	-1.00	-10	30/90	FOLLY	
22422	-0.50	-0.50	-0.50	0.78	0.85	0.13	-0.05	0.14	-1.00	-10	30/90	FOLLY	
22423	0.67	-0.50	-0.50	1.20	1.20	0.27	-0.05	0.22	-1.00	-10	1/90	FOLLY	
22801	-0.50	0.65	-0.50	0.85	0.33	0.40	-0.05	0.10	74.00	-10	43/89	FOLLY	
22802	0.50	-0.50	-0.50	0.78	0.90	0.70	-0.05	0.19	-1.00	-10	43/89	FOLLY	
22803	-0.50	-0.50	-0.50	0.04	0.90	0.33	-0.05	0.19	-1.00	-10	43/89	FOLLY	
22804	-0.50	-0.50	-0.50	0.52	0.90	0.27	-0.05	0.24	-1.00	-10	43/89	FOLLY	
22805	-0.50	-0.50	-0.50	1.76	1.00	0.60	-0.05	0.14	-1.00	-10	43/89	FOLLY	
22806	0.55	-0.50	-0.50	1.32	0.51	0.53	-0.05	0.16	-1.00	-10	43/89	FOLLY	
22807	-0.50	-0.50	-0.50	0.85	0.47	0.14	-0.05	0.16	-1.00	-10	1/90	FOLLY	
22808	-0.50	-0.50	-0.50	-0.50	0.69	0.35	-0.05	0.16	-1.00	-10	30/90	FOLLY	
22809	0.50	-0.50	-0.50	-0.50	0.45	0.15	-0.05	0.17	-1.00	-10	30/90	FOLLY	

APPENDIX 2

ROCK SAMPLING

Sample Descriptions and Results

ARTHUR RIVER PROJECT - EL 43/89

DESCRIPTIONS OF ASSAYED ROCK SAMPLES - FOLLY SHEET

EL	MAP	NUMBER	TYPE	LITHOLOGY	DESCRIPTION
43/89	FOLLY	22701	ROCK CHIP	SLATE	Pyritic slates and laminated siltstones, subhedral to euhedral biogenic pyrite.
43/89	FOLLY	22702	ROCK CHIP	SILTSTONE	Laminated siltstones. Pyritic. Qtz rich layers interbanded with silty layers.
43/89	FOLLY	22703	ROCK CHIP	SLATElllllllllll	Black slates and laminated siltstones. Pyritic. Sample taken on northern side of fault.
43/89	FOLLY	22704	ROCK CHIP	SLATE	As for 22703. Sample taken on southern side of fault.
43/89	FOLLY	22705	ROCK CHIP	ALTERED SLATE	Zone of Alteration (goethite/limonite) and Mineralization(pyritic). Northern side of fault.
43/89	FOLLY	22706	ROCK CHIP	ALTERED SLATE	As for 22705. Southern side of fault.
43/89	FOLLY	22707	ROCK CHIP	SLATE	Laminated siltstones and black slates. Minor pyrite.
43/89	FOLLY	22708	ROCK CHIP	SLATE	Black slates, rarely pyritic.



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Telephone: (08) 416 5300 Facsimile: (08) 234 0321

078026

D. Gardner
Geopeko
PO Box 162
DEVONPORT
TAS 7310

FINAL ANALYSIS REPORT

Your Order No: 50081

Our Job Number : 2AD0622

Samples received : 02-MAR-1992

Results reported : 10-MAR-1992

No. of samples : 29

Report comprises a cover sheet and pages 1 to 3

This report relates specifically to the samples tested in so far as that the samples as supplied are truly representative of the sample source.

Note:

If you have any enquiries please contact Miss Anne Reed quoting the above job number.

Approved Signatory:

John Waters
Laboratory Manager - Adelaide

Report Codes:

N.A. - Not Analysed.
L.N.R. - Listed But Not Received.
I.S. - Insufficient Sample.

Distribution Codes:

CC - Carbon Copy
EM - Electronic Media
MM - Magnetic Media

APPENDIX 3
PETROGRAPHY

THIN SECTION DESCRIPTIONS FOR ROCKS FROM
THE ARTHUR METAMORPHIC COMPLEX

REPORT TO GEOPEKO

by

A.J. STOLZ

February 1991

c/- CODES
GPO Box 252C,
Hobart Tas 7001.

Thin Section Descriptions.

Sample 20262 Quartz-sericite-chlorite schist (Part S.N 21550) 30/90

<u>Mineralogy:</u>	mineral	percentage abundance
	quartz	18
	albite	20
	sericite	20
	chlorite	35
	epidote	3
	magnetite/hematite	2
	sphene	2

Thin Section:

This sample is composed of xenoblastic porphyroblasts (0.5 - 1 mm diameter) of plagioclase (albite/oligoclase) which commonly display albite twinning, and are characterised by rotational trails of epidote, chlorite and elongate quartz grains. The porphyroblasts occur in a strongly deformed matrix of chlorite, sericite, quartz, epidote, sphene and minor hematite/magnetite.

The matrix retains evidence of a strong S_1 ? cleavage which wraps around plagioclase porphyroblasts, together with a later S_2 crenulation cleavage depicted by cross-cutting plates of chlorite and sericite. Pods of quartz originally aligned parallel to S_1 have been partially recrystallised and enclose recrystallised sericite aggregates aligned parallel to S_2 .

The relatively high abundances of quartz and sericite in this rock are inconsistent with a basic volcanic or intrusive precursor unless it had experienced significant silicification and potassic hydrothermal alteration. It could also be a recrystallised metasediment (perhaps siltstone) although I tend to favour it being an altered basic volcanic. An analysis of the Ti/Zr value for rocks such as this would be useful for distinguishing between altered metabasic rocks and metasediments. In general the metabasic rock will retain its relatively high Ti/Zr value (ie. > 60). The relatively small amount of epidote has probably resulted from the breakdown of detrital

calcic plagioclase during metamorphism under greenschist facies conditions.

This sample has close textural similarities to 20271 although the latter contains less chlorite, and more sericite and quartz.

Sample 20263 calc-silicate metasediment Part S.N 21562. 30/90

<u>Mineralogy:</u>	mineral	percentage abundance
	quartz	60
	epidote	25
	amphibole	5
	sphene	8
	chlorite	1
	Fe-oxides	1

Thin Section:

The equigranular texture of this rock gives it a slightly igneous appearance in hand specimen, but in thin section it comprises a recrystallised aggregate of quartz, epidote, amphibole, chlorite, albite, leucoxene after sphene and minor hematite.

The quartz aggregates have broadly polygonal boundaries with very minor development of sutured margins. Scattered throughout the quartz-rich and feldspar-poor matrix are abundant aggregates of prismatic idioblastic epidote grains with subordinate prismatic crystals of amphibole and minor chlorite. The prismatic amphibole crystals are weakly aligned within the section and may describe a weak lineation. However, the epidote crystals appear to occur in random orientations often cross-cutting this direction.

The amphibole consists of purple-blue pleochroic cores typically rimmed with pale-green actinolite. The low birefringence, strong pleochroism and other optical features of these relict amphiboles are consistent with them being transitional compositions between actinolite and the sodic amphibole glaucophane.

Amphiboles of this composition are relatively common from the Arthur Metamorphic Complex. The partial retrogression to actinolite has occurred in response to a change from peak (amphibolite facies) to greenschist facies metamorphic conditions.

The epidote in this rock has a distinctive yellow-pink pleochroism which is consistent with a relatively Mn-rich composition.

The recrystallised mineralogy of this rock seems most consistent with an impure calcareous metasediment which originally contained appreciable quantities of quartz. This latter feature and the paucity of feldspar is inconsistent with a basic volcanic composition. The absence of sericite suggests a minimal pelitic component.

Sample 20264 Quartz-chlorite-sericite schist = SN 21570 30/90

<u>Mineralogy:</u>	mineral	percentage abundance
	quartz	70
	sericite	15
	chlorite	13
	magnetite/hematite	2

Thin Section:

This rock is composed of elongate aggregates of recrystallised quartz typified by strain extinction and sutured margins. The quartz pods are wrapped by strongly aligned sericite and chlorite which define the main S_1 cleavage. The S_1 cleavage has been partially translated by an oblique S_2 cleavage which has resulted in significant reorientation and recrystallisation of sericite and chlorite.

Both the sericite and chlorite exhibit significant Fe-staining by limonite probably precipitated by low temperature fluids migrating along the cleavage. The reddish material filling cavities is hematite and limonite possibly derived from remobilisation of Fe-oxides disseminated throughout the rock.

This rock most likely represents a metamorphosed psammo-pelitic sediment which last recrystallised under greenschist facies conditions. The origin of the cavities is uncertain, and their xenoblastic form gives no obvious clues of a specific porphyroblastic phase which has been selectively removed by weathering.

Sample 20265	Metadolerite	part SN 21527	1/90
<u>Mineralogy:</u>	mineral	percentage abundance	
	plagioclase	64	
	actinolite	15	
	chlorite	10	
	epidote	8	
	magnetite	3	
	sphene	<1	

Thin Section:

This sample consists of abundant xenoblastic to subidioblastic crystals of plagioclase (albite) typically 0.5 - 1.0 mm diameter, and subordinate idioblastic porphyroblasts of magnetite (up to 0.5 mm) and epidote in a matrix dominated by chlorite, actinolite and epidote with accessory granular sphene.

The plagioclase grains contain abundant tiny inclusions of granular epidote, with some chlorite and actinolite. The coarse idioblastic magnetite grains appear to be quite late and cross-cut plagioclase-matrix boundaries. The matrix chlorite and actinolite are weakly aligned to define a weak foliation, but there are numerous cross-cutting elongate grains which suggests some subsequent recrystallisation under low strain, possibly contact metamorphic conditions. There are also some relatively coarse-grained and randomly oriented chlorite and epidote grains in veins which trend subparallel to the original foliation direction.

Elongate pods of quartz are also aligned in this orientation. The pods also occasionally contain minor chlorite and hematite rimming magnetite. The quartz has been recrystallised to aggregates of strained grains which are elongate oblique to the trend of the elongation of the pod itself reflecting a later recrystallisation event.

The pods are likely to have been original vesicles in a shallow intrusive mafic rock, which were subsequently filled with silica.

Sample 20267

Quartz-sericite-chlorite schist

Part SN 20395

43/89

<u>Mineralogy:</u>	mineral	percentage abundance
	quartz	92
	sericite	5
	magnetite/hematite	2
	chlorite	<1
	tourmaline	trace

Thin Section:

This sample consists of xenoblastic quartz grains (0.2 - 0.5 mm) with sutured margins in a matrix of finer-grained quartz (0.01 mm) characterised by granoblastic polygonal textures. Strongly aligned and relatively widely separated trails of sericite (with minor chlorite) define a cleavage through the rock. There is considerable limonite staining along the cleavage planes. The finer-grained quartz occurs in close association with the cleavage planes indicating that they represent the sites of greatest recrystallisation and strain.

Throughout the rock are distributed ghost lithic fragments which consist of very fine-grained quartz, fine sericite and a higher modal proportion of opaques (possibly fine magnetite). These ghost lithic fragments are elongated in the cleavage plane and probably represent relatively fine pelitic lithic fragments in an original quartz-rich sandstone.

43/89

Sample 20268

Metadolerite

Part 21501

Cannock

<u>Mineralogy:</u>	mineral	percentage abundance
	plagioclase	50
	actinolite	22
	chlorite	13
	epidote	10
	sphene	3
	biotite	2

Thin Section:

Abundant xenoblastic to subidioblastic grains of plagioclase (albite), usually with simple twinning, are scattered through a matrix dominated by actinolite, chlorite and finer-grained epidote. The larger amphibole crystals have pale-green cores and dark green to blue-green pleochroic rims.

The prismatic actinolite and platy chlorite aggregates display a weak preferred orientation defining a weak cleavage. Randomly oriented platy crystals of biotite and fine granular aggregates of sphene are disseminated throughout the rock.

This rock most likely was a fine- to medium-grained andesitic to basaltic shallow level intrusive which has subsequently recrystallised under greenschist facies conditions. It has a very similar mineralogy, composition and textural features to 20265 and they may well be the same unit.

Sample 20269 Amphibolite = SN 21582 . Lyons R. Quarry
40/89

<u>Mineralogy:</u>	mineral	percentage abundance
	plagioclase	40
	amphibole	40
	epidote	10
	chlorite	5
	quartz	3
	sphene	2
	pyrite	trace
	magnetite	trace

Thin Section:

Subidioblastic porphyroblasts of plagioclase (0.2 - 0.5 mm) and similar sized but less common porphyroblasts of epidote occur in a strongly foliated and deformed matrix dominated by a blue-green to brown amphibole, prismatic to granular epidote, chlorite, quartz and sphene.

The plagioclase porphyroblasts are strongly poikiloblastic with abundant inclusions of fine prismatic epidote, amphibole and some quartz. These inclusions are frequently arranged in curved trails defining a strong rotational fabric, and indicating syn-deformational growth of the plagioclase porphyroblasts. However, some of the epidote is clearly replacing the plagioclase porphyroblasts due to the breakdown of the relatively calcic plagioclase during the amphibolite to greenschist facies retrogression.

Matrix amphibole and chlorite strongly wrap around the plagioclase and epidote porphyroblasts, whereas the few relatively large magnetite porphyroblasts appear to cut across the cleavage.

Patches rich in quartz with minor amphibole and epidote are flattened parallel to the foliation and individual quartz grains in these patches are elongate in the same orientation.

The blue-green to brown pleochroic amphibole has optical properties similar to the amphibole in 20263 and is probably a relatively sodic high-pressure amphibole.

This rock is an amphibolite which has been partially retrogressed to a greenschist facies assemblage. The original precursor was either a basic volcanic or intrusive rock (dolerite).

Samples 20265 and 20268 have a similar mineralogy and composition to 20269 but are less deformed. 20262 is a much more quartz- and sericite-rich rock and has a closer affinities with 20271 although it contains more chlorite and less sericite.

Neasy Creek Trib.

Sample 20270

Metabasalt/metadolerite

Part 21801 43/89

<u>Mineralogy:</u>	mineral	percentage abundance
	actinolite	35
	plagioclase	35
	epidote	10
	chlorite	10
	sphene	3
	sericite	3
	quartz	3
	pyrite	<1
	magnetite	<1
	Vein:	
	quartz	80
	epidote	20
	Vein:	
	quartz	72
	chlorite	25
	actinolite	3

Thin Section:

Sparse subidioblastic phenocrysts of plagioclase (0.5 - 1.0 mm) have been completely pseudomorphed by sericite and minor chlorite, whereas a few relatively large (0.5 - 1.0 cm) patches of chlorite appear to be pseudomorphs after original ferromagnesian phases (possibly clinopyroxene). These occur in a very weakly foliated matrix of actinolitic amphibole, chlorite, fine granular epidote and interstitial plagioclase with dispersed granules of sphene and minor patches of quartz. A few relatively coarse crystals (0.3 - 0.5 mm) of pyrite are scattered throughout the matrix.

The thin section examined is transected by two quartz-rich veins, one in which elongate quartz grains and prismatic epidote crystals are strongly aligned perpendicular to the vein walls and parallel to the weak cleavage. In the other vein, the quartz and chlorite is xenoblastic and exhibits no preferred orientation.

This rock has a basic composition and was originally probably a sparsely porphyritic fine-grained dyke rock or an extrusive. The presence of sericite and pyrite indicates some weak hydrothermal alteration.

Sample 20271

Quartz-sericite schist

Part SN 21559

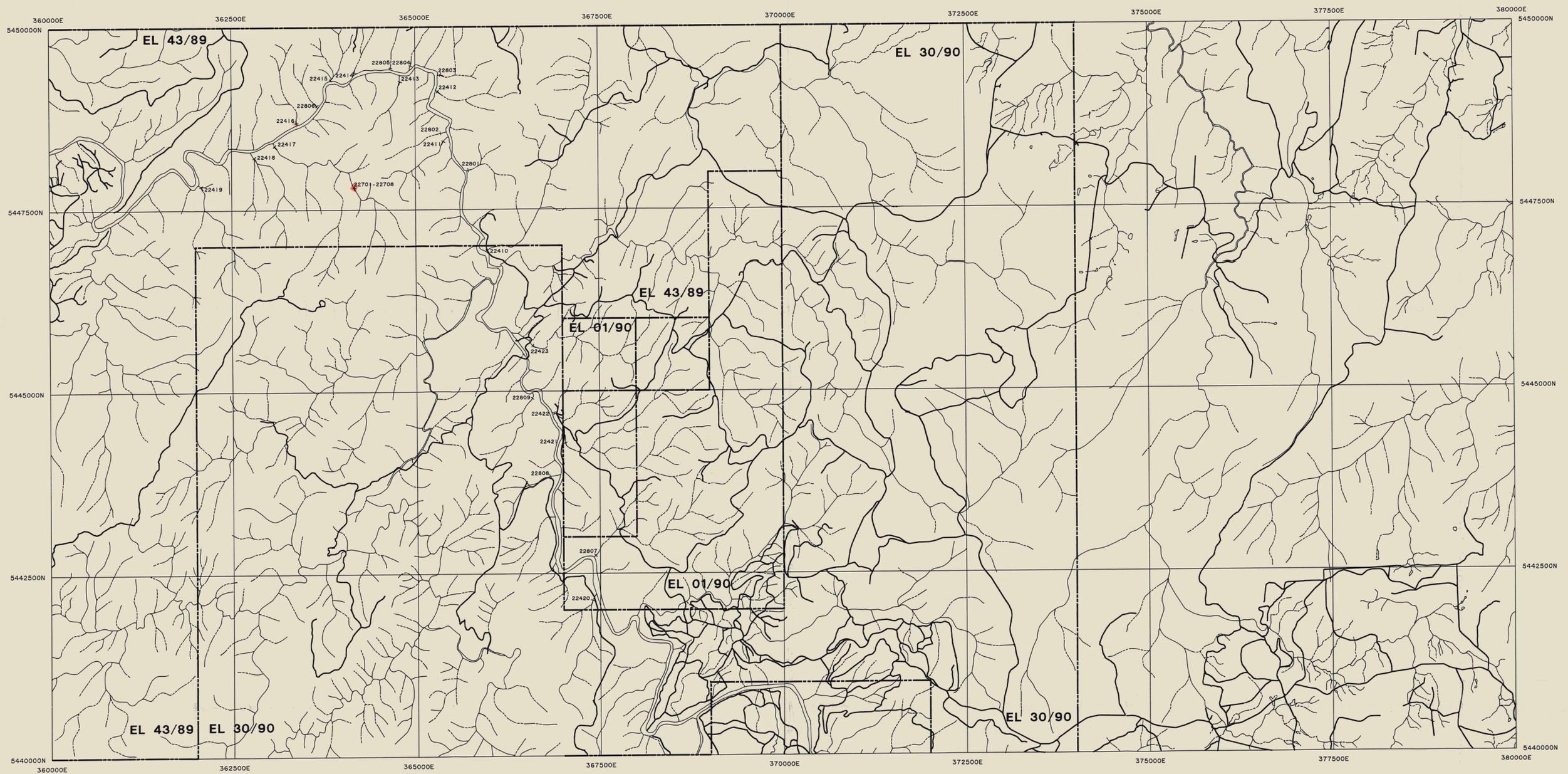
30/90

<u>Mineralogy:</u>	mineral	percentage abundance
	quartz	50
	sericite	40
	epidote	7
	sphene	2
	magnetite	1

Thin Section:

This rock consists of alternating relatively quartz-rich and sericite-rich layers which exhibit a moderate to strong S_1 foliation which has been refolded (S_2) producing a cross-cutting crenulation cleavage. Quartz-rich pods are composed of slightly elongate strained quartz crystals with sutured margins, and small amounts of sericite, sphene and magnetite. The sericite-rich bands also contain the bulk of the epidote, sphene and magnetite with minor dispersed aggregates of quartz grains.

This sample has closest similarities to 20262 with respect to textures and metamorphic history, although it contains much higher modal sericite and less chlorite. The very high sericite content combined with the presence of epidote, and absence of chlorite and albite is unusual, and suggests a peculiar very potassic whole-rock composition. This probably indicates some pre-deformation silicification and potassic hydrothermal alteration, possibly of a silicic volcanic.



LOCATION SYMBOLS

-  Location of Rock Chip sample
-  Location of Water sample

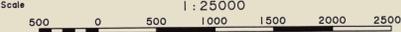
5 cm

078043

92-3364

1:25000 SHEET LAYOUT

3445	3645	3945
3444	3644	3844
3443	3643	3843

		GEOPEKO <small>A DIVISION OF PEKO WALLSEND OPERATIONS LTD A.C.N. 000 081 434</small>	
		Scale 1:25000 	
Geo. Client: D. G. Carth. R. M. N.		Project / Tenure FOLLY 3644	
Checked Date 12/3/92 Appended		SAMPLE LOCATIONS & NUMBER	
Job No. 82_92 Sheet 7915		DWG No. 2310	