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536001

FINAL REPORT ON E.L. 10/74

BLACK BLUFF

TASMANIA

J. PEMBERTON
JULY, 1983

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536002

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LIST OF PLANS

1. INTRODUCTION

Exploration Licence 10/74 is jointly held by Geopeko, Aquitane Australia and Union Oil Development Corporation. In February 1983 the licence was reduced from some 150sq km to 52sq km (see Pemberton, 1983). Location and areas of interest within the E.L. are represented by figure 1 and plan 1 respectively.

The area has previously been explored by Pickands Mather (1968), Tasminex (1973-74) and Union Oil (1974-75). Union Oil conducted regional and detailed stream sediment geochemistry combined with geological mapping and reconnaissance IP (see McGregor-Dawson, 1975).

Union Oil and Geopeko signed a joint venture agreement in 1977 with Geopeko assuming management. In 1980 Aquitane joined the joint venture. Previous Geopeko reports on the area include Van Den Bogaart and Buckland (1978), Herrmann (1980), Pemberton (1981) and Pemberton (1982).

The decision to relinquish the remaining 52sq km results from the unsuccessful follow up of the 1980 Dighem II survey.

2. SUMMARY

The area to be relinquished by Geopeko was explored in 1977/78, 1980/81, 1981/82 and part of 1983. During the first phase of exploration regional stream sediment sampling and geological mapping was undertaken in the Bond Range - Middlesex plains area. Two prospects (Mariner 1 and 2) were investigated during this initial program with 17km of gridding, geochemical sampling, mapping, magnetics, SP, IP and VLF-EM techniques. This exploration was directed towards discovering massive sulphide type mineralization within the base of the Mt Read volcanics.

In the 1979 season the Mariner 1,3,5 area was prospected intensively with extensions to the earlier grids, magnetics, geochemical sampling and geological mapping. Exploratory percussion drilling was attempted to penetrate the Tertiary Basalt but was unsuccessful. A zonal distribution of anomalous copper, lead, zinc and tin in the Mariner 1,3,5 area and high grade thermal metamorphism in the Mariner 4 area suggested that an extension of the Sn-W bearing Dalcoath granite was present at depth. The regional gravity compiled by Leaman supported this thesis and resulted in a changing exploration philosophy directed towards granite related Sn-W deposits.

A Dighem II survey was flown over the area in 1980. Follow up of this survey entailed stream sediment sampling and reconnaissance geological mapping. Mariners 6 and 7 were prospected in 1981/82 as a result of this work with mapping, gridding, geochemical sampling, magnetics and IP. Further work was done at Mariner 5 during this period with a gravity survey. The gravity data suggested a possible granite/volcanic contact overlain by basalt on the central part of the grid. No follow-up was carried out due to the uncertainty of the target.

In 1981-82 a grid was cut at Mariner 4 over the area of contact metamorphism and old Cu workings. Results were not encouraging from this prospect. At Mariner 6 a drill target was generated using the position of the old workings, a gold anomaly and an IP resistivity low. The hole was drilled to 97m without intersecting significant gold mineralization. The resistivity low was probably caused by valley fill Tertiary sediments.

Kauri Creek was sampled during early 1983 to investigate the Sn-W-Au potential in the Ordovician sediments. Although anomalous Au was present follow up sampling did not duplicate the earlier results.

3. INITIAL REGIONAL EXPLORATION

The first phase of exploration by Geopeko entailed mapping at 1:10000 and stream sediment geochemistry. Mt Read volcanics are exposed on the Bond Range and Middlesex Plains. Rock types vary from a basal biotite feldspar quartz porphyry through a sequence of lithic and vitric quartz plagioclase tuffs to a volcaniclastic sediment. Tabberabberan folding resulted in the anticlinal Bond and Black Ranges and synclinal Vale of Belvoir. Ordovician Mt Owen conglomerate and sandstones unconformably overlie the volcanics on the Bond Range while on the Middlesex Plains Tertiary basalt covers the porphyry.

A total of 126 -80 mesh stream sediment samples were taken to give a sample density of approximately 11 per sq km. All samples were analysed for Cu, Pb, Zn, Fe, Mn, Ag, Cd, Ba, As and Sn.

Four anomalous areas were present in the vicinity of the Fall and Iris Rivers and are covered by the Mariner 1,2,3 and 5 prospects. This work is detailed in the report by Van Den Bogaart and Buckland, (1978).

4. MARINERS 1,2,3 and 5.

Mariners 1 and 2 were gridded and prospected during the first season. Promising results at Mariner 1 led to a north easterly expansion of the grid which became Mariner 3. Tertiary basalt covered the eastern parts of the grid. Geophysical surveys indicated a strong (-180mV) SP anomaly with coincident VLF and IP anomalies. Two costeans were excavated over the anomaly with mineralization restricted to sparse quartz-pyrite-chalcopyrite veins cutting the porphyry. A drill hole was targetted using this data. The hole intersected quartz-biotite-feldspar porphyry with a sparsely distributed vein system similar to that of the costeans.

The geochemistry from the grids had a zonal distribution from west to east with Pb, Pb-Zn, Zn and Cu-Sn which indicated an epithermal vein system emanating from a Devonian granitic stock. These results led to the further extension of the grid to the east over the Tertiary basalt (Mariner 5). Various attempts were made to penetrate the basalt using geophysical methods (magnetics and SP) and percussion drilling. No success was achieved with those techniques (see Herrmann 1980).

In late 1980 a gravity survey was conducted over Mariner 5 in an attempt to locate the granite and a favourable drill target beneath the basalt. The survey indicated a gravity feature which could be attributable to an arcuate granite contact. A rough position of this contact could be determined but the insensitivity of the interpretation due to low density contrasts did not allow a drill hole to be sited with confidence (see Pemberton, 1982).

5. MARINER 6

A magnetic anomaly from the Dighem II survey adjacent to the major Kauri Fault and coincident with pre-World War 1 mining leases led to the investigation of Mariner 6 in early 1981 (see Pemberton, 1981).

Reconnaissance geology and stream sediment sampling led to the discovery of old drives, adits, shafts and water races in the Ordovician Owen conglomerate and pre-basalt Tertiary gravels, grits and clays. Basalt was found overlying one of the adits and is the cause of the magnetic anomaly.

The stream sediments and grab samples from the old workings were anomalous in Au. The best assay from the dumps had 68gm/tonne Au, 570ppm Bi, 110ppm Sn, 480ppm W, 1050ppm Cu, 440ppm Zn and 675ppm Pb.

A grid was established over the old workings and basalt. Auger and rock chip samples were taken and assayed for Cu, Pb, Zn, Ag, Au, Sn, W, Bi and Fe. Two areas of contourable Au anomalies were found. A dipole-dipole IP survey was completed on four lines with positive results coincident with one of the gold anomalies. These positive results led to the siting of a drill hole in late 1981.

A thick sequence of Tertiary basalts and sediments presented drilling problems because of their unconsolidated nature. The Owen conglomerate was brecciated and silicified with zones of hematite alteration. Assays of core had raised levels of Cu, Pb, Zn and Fe in the younger sediments compared to the Owen conglomerate.

The disappointing results of this drill hole downgraded the prospect and a second drill hole was cancelled.

6. MARINER 7

A grade 4 Dighem II anomaly in Cambrian volcanics led to the investigation of Mariner 7. In Union Oils original stream sediment and rock chip sampling program anomalous Pb was found in a stream and Cu, Zn in a crystal tuff in the vicinity of the Dighem II anomaly. The regional stream sediment survey conducted by Geopeko and a follow up survey confirmed the earlier results with up to 370ppm Pb in one sample. Reconnaissance geology revealed a zone of altered pyritic acid tuffs and grey tuffaceous siltstones in the vicinity of the Dighem II anomaly (see Pemberton, 1981).

In late 1981 a grid was cut to cover the Dighem II and stream sediment anomalies. A hand held power auger was used to take C horizon geochemical samples every 25m. Samples were assayed for Cu, Pb, Zn, Ag, Fe, and Mn. The grid was mapped at 1:2500 scale and three lines of IP were covered using the pole-dipole array because of steep terrain to the west.

The volcanics consist of a steeply dipping sequence of north-easterly striking crystal lithic tuffs and epiclastic sediments. A variety of chloritic and sericitic volcanics outcrop in the vicinity of the Dighem II anomaly. This area was regarded as highly prospective but the lack of a geochemical signature and the IP survey not having any response downgraded the anomaly.

Two areas of anomalous Pb geochemistry (950ppm and 805ppm) were associated with a chloritic quartz feldspar crystal tuff with high Fe content.

The work done on Mariner 7 does not satisfactorily explain the Dighem II anomaly. Given the small coverage of the IP survey and the lack of precision of the flight path recovery it is possible that the anomaly was not covered. It is also possible that the weak airborne response is attributable to instrumental noise.

7. MARINER 4

Initial interest in this prospect was generated by anomalous stream sediment geochemistry, two adits with trace copper mineralization in quartz veins and thermally metamorphosed Cambrian volcanics.

A 3km reconnaissance grid was cut and sampled using a power auger and mapped at 1:2500.

The two siliceous spines were thermally metamorphosed quartz porphyry with small amounts of corundum. A quartz feldspar biotite porphyry is the dominant lithology on the grid. In the vicinity of the old workings the porphyry is pyritic.

Geochemistry from the auger samples was disappointing and no further work was done.

8. REFERENCES

Herrmann, W., 1980: Progress Report on E.L. 10/74 Black Bluff - Tasmania. [81-1523]

McGregor - Dawson, J.L., 1975: Union Oil Devlopment Corporation Black Bluff (E.L. 10/74) Annual Report 1974/75 Field season Unpublished Report [75-1113]

Pemberton, J., 1981: Progress Report on E.L. 10/74 Black Bluff - Tasmania [81-1581]

Pemberton, J., 1982: Progress Report on E.L. 10/74 Black Bluff - Tasmania [82-1858]

Pemberton, J., 1983: Relinquishment Report on part of E.L. 10/74 Black Bluff - Tasmania [83-1895]

Van Den Bogaart, R and Buckland, G.L., 1978: Progress Report on Exploration Licence 10/74 Black Bluff - Tasmania [78-1264]

9. APPENDIX 1

GEOPEKO
A DIVISION OF PEKO-WALLSEND OPERATIONS LTD.

INTER-OFFICE MEMO

TO: R.R. LARGE DATE: 15-2-83

FROM: R. PERRING COPIES TO:

SUBJECT: E.L. 10/74 BLACK BLUFF - RESULTS OF KAURI CREEK DRAINAGE SAMPLING PROGRAM.

INTRODUCTION

Kauri Creek was sampled to investigate the potential for Devonian Granite related Sn-W magnetite skarn and Au in pyrite-quartz veins within the Ordovician Owen Conglomerate, Moina Sandstone and Gordon Limestone.

Kauri Creek (and tributaries) has a catchment area of 4.5sq kms, and broadly follows a major north-northeast trending fault-the Kauri Fault. The creek has deeply incised the Black Bluff Range resulting in the exposure of a considerable section of the Ordovician sequence.

Pyrrhotitic limestone (possibly Gordon Limestone) outcrops in the bed of Kauri Creek sixty metres from its confluence with the Lea River. Pyritic fine and medium grained quartz sandstones outcrop extensively in Kauri Creek from the Lea River to the Cave Creek confluences. Fine pink sandstones and pebble conglomerates outcrop north of the Kauri Creek-Cave Creek confluence. Quartz veining in the area is rare.

DRAINAGE SAMPLING - METHOD

A panned concentrate sample and stream sediment sample were taken at approximately 200 metre intervals along Kauri Creek and its tributaries from a total of 46 sites (see figure 2).

A full dish of unsieved gravel with an average weight of 8.0kg wet (7.5 kg dry) was panned down to give a concentrate with an average weight of approximately 25 grams. The samples were analysed by X.R.F. for tin and tungsten. A stream sediment sample was taken at each site and the -80 mesh fraction analysed by A.A.S. for Cu, Pb, Zn, Ag, Fe; by X.R.F. for Sn and W, and by fire assay (fusion - A.A.S.) for Au.

RESULTS

The range of assays received for each element are given below:

ELEMENT	LOWEST ASSAY	HIGHEST ASSAY
Cu	5ppm	20ppm
Pb	< 5ppm	130ppm
Zn	10ppm	120ppm
Ag	<0.5 ppm	1.0ppm
Fe	0.365%	3.75%
Sn (-80mesh)	all less than 4ppm	
Sn (pan conc)	< 3ppm	7ppm
W (-80 mesh)	< 4ppm	14ppm
W (pan conc)	< 10ppm	10ppm
Au	< 5ppb	940ppb

Copper-lead-zinc (see figure 2)

The weak base metal geochemistry is to be expected. The stream sediment samples consisted almost entirely of fine quartz resulting in limited adsorbtion of metal ions. The anomalous lead and zinc geochemistry (upto 130ppm Pb and 120ppm Zn) in the lower reaches of Kauri Creek may be related to the pyritic sandstone which outcrops immediately upstream from the anomalous sites. Two samples from the upper reaches of Kauri Creek are weakly anomalous in lead (70ppm and 80ppm). Copper geochemistry is very weak and shows little character.

Tin-tungsten (see figure 3 and 4)

The tin and tungsten geochemistry was very weak. Tin levels were below the limit of detection (<4ppm) in the -80mesh fraction of all stream sediment samples. All panned concentrates assayed less than 8ppm Sn. The highest tungsten assay was 14ppm W for the -80 mesh fraction of a stream sediment sample.

Gold (see figure 5)

Three stream sediment samples were anomalous (> 50ppb Au). One sample from Anteater Creek assayed 130ppb Au, a sample from Cave Creek assayed 160ppb Au, and one from Kauri Creek assayed 940ppb Au.

CONCLUSIONS AND PROPOSED FOLLOW-UP OF ANOMALIES

The weak tin and tungsten drainage geochemistry significantly downgrades the potential for the Ordovician sediments within the Kauri Creek catchment area being host to Sn-W skarn mineralization.

Samples of pyritic sandstone will be taken from Kauri Creek to determine to what extent this sandstone is contributing to the anomalous lead and zinc drainage geochemistry.

The sites of the three samples anomalous in gold will be resampled to confirm the results. Two stream sediment samples and two panned concentrate samples will be taken at each site to help overcome the problem of eratic gold geochemistry. The panned concentrates will be checked for visible gold. A panned concentrate and stream sediment sample will also be taken 100 metres above and below the anomalous sites.

R. PERRING

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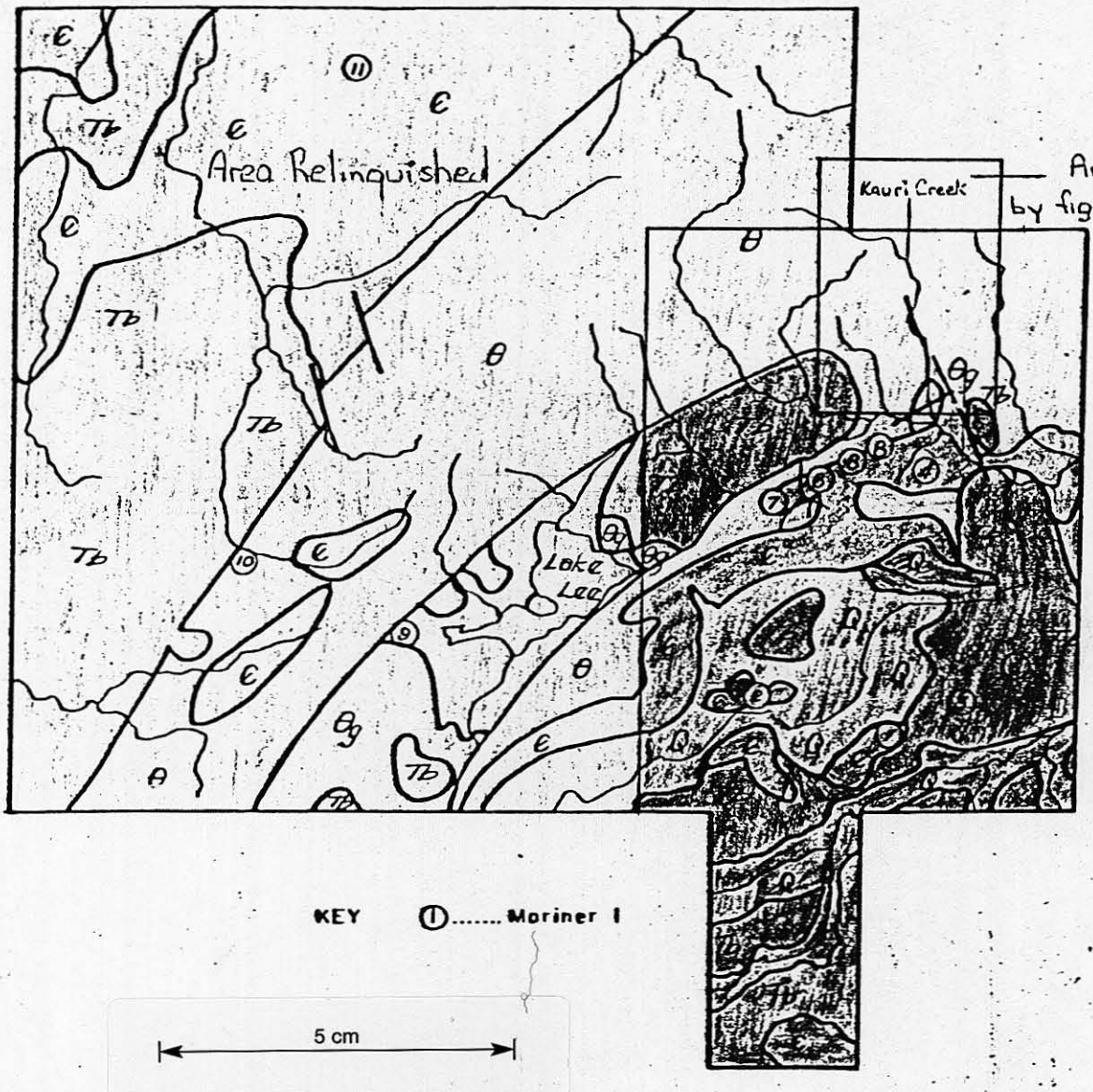
PROSPECT LOCATION MAP

E.L. 10/74 BLACK BLUFF



19 - 57 Quaternary alluvium
19 - 40 Tertiary basalt
19 - 38 Gordon? limestone
19 - 19 Ordovician sandstone and conglomerate
19 - 6 Cambrian volcanics

GEOPEKO
TASMANIA

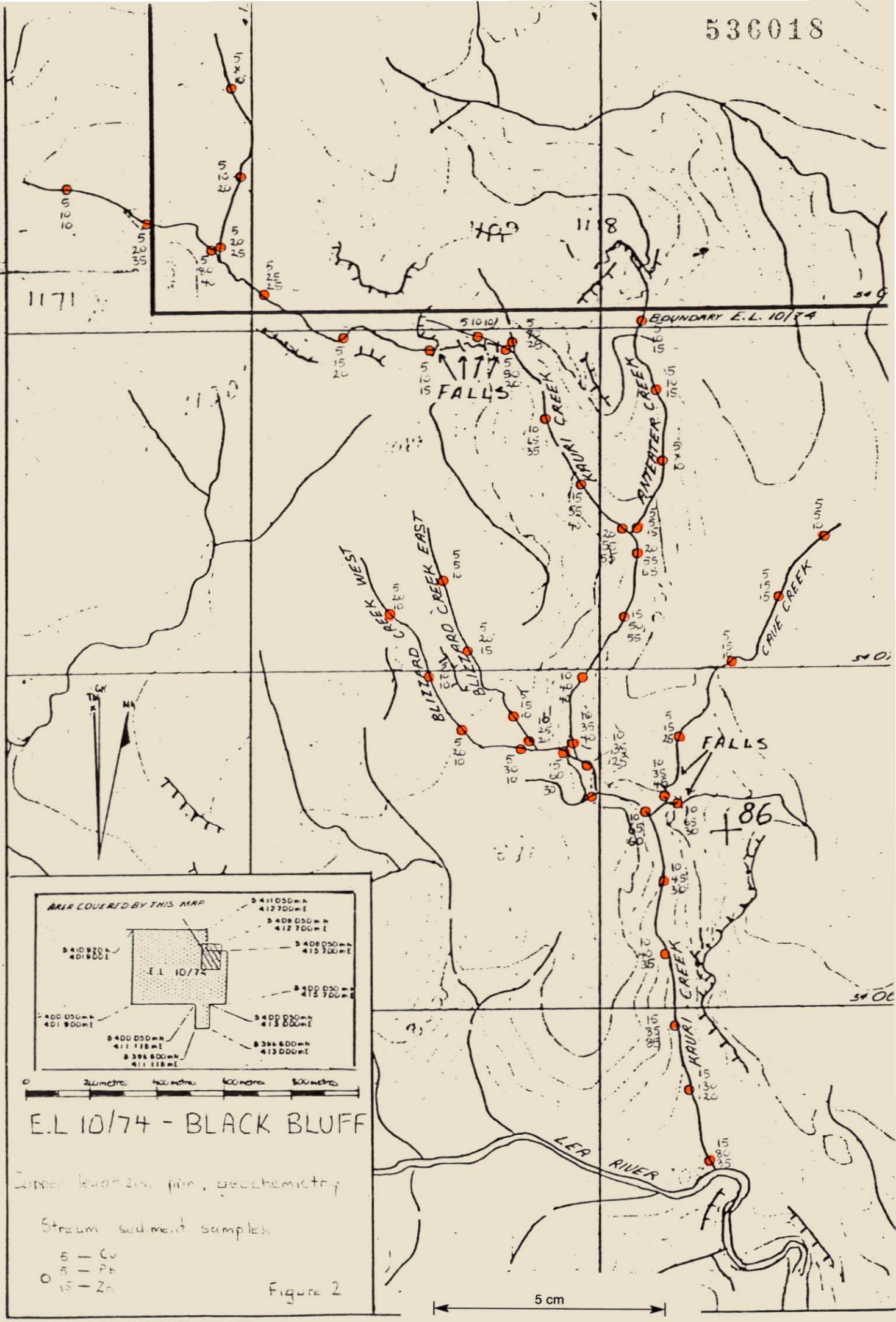
Scale 1:100 000

FIGURE 1

DATE
GEOL
DRWN
CHK'D

Geology

Figure 1


1171
1178
BOUNDARY E.L. 10/74
FALLS
KAURI CREEK
PANTEATER CREEK
BLIZZARD CREEK WEST
BLIZZARD CREEK EAST
CRUIE CREEK
FALLS
+86
KAURI CREEK
LER RIVER
AREA COVERED BY THIS MAP
E.L. 10/74
0
200 metres
400 metres
600 metres
800 metres
E.L 10/74 - BLACK BLUFF
Copper lead zinc pan geochemistry
Stream sediment samples
5 — Cu
5 — Pb
15 — Zn
Figure 2
5 cm

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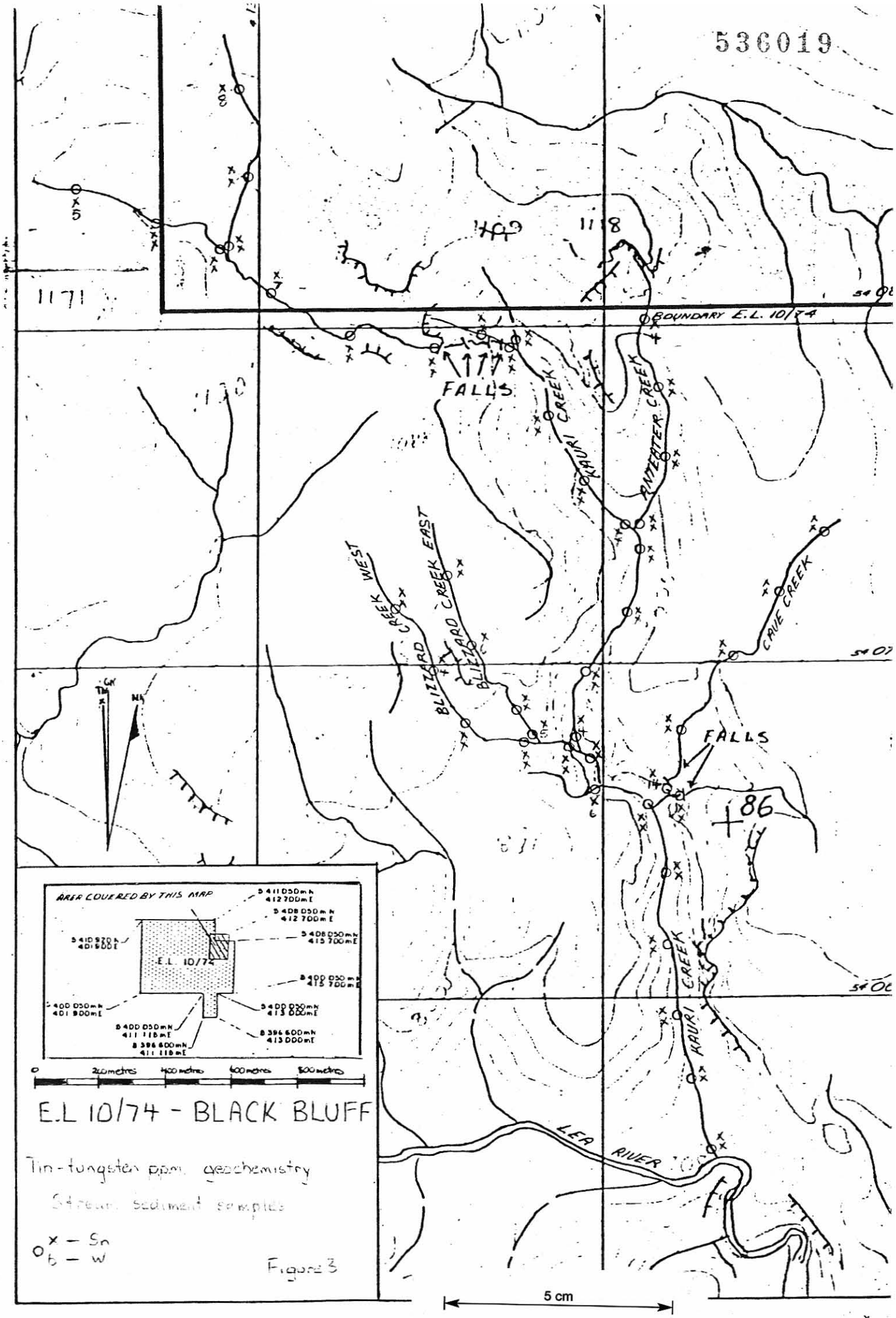
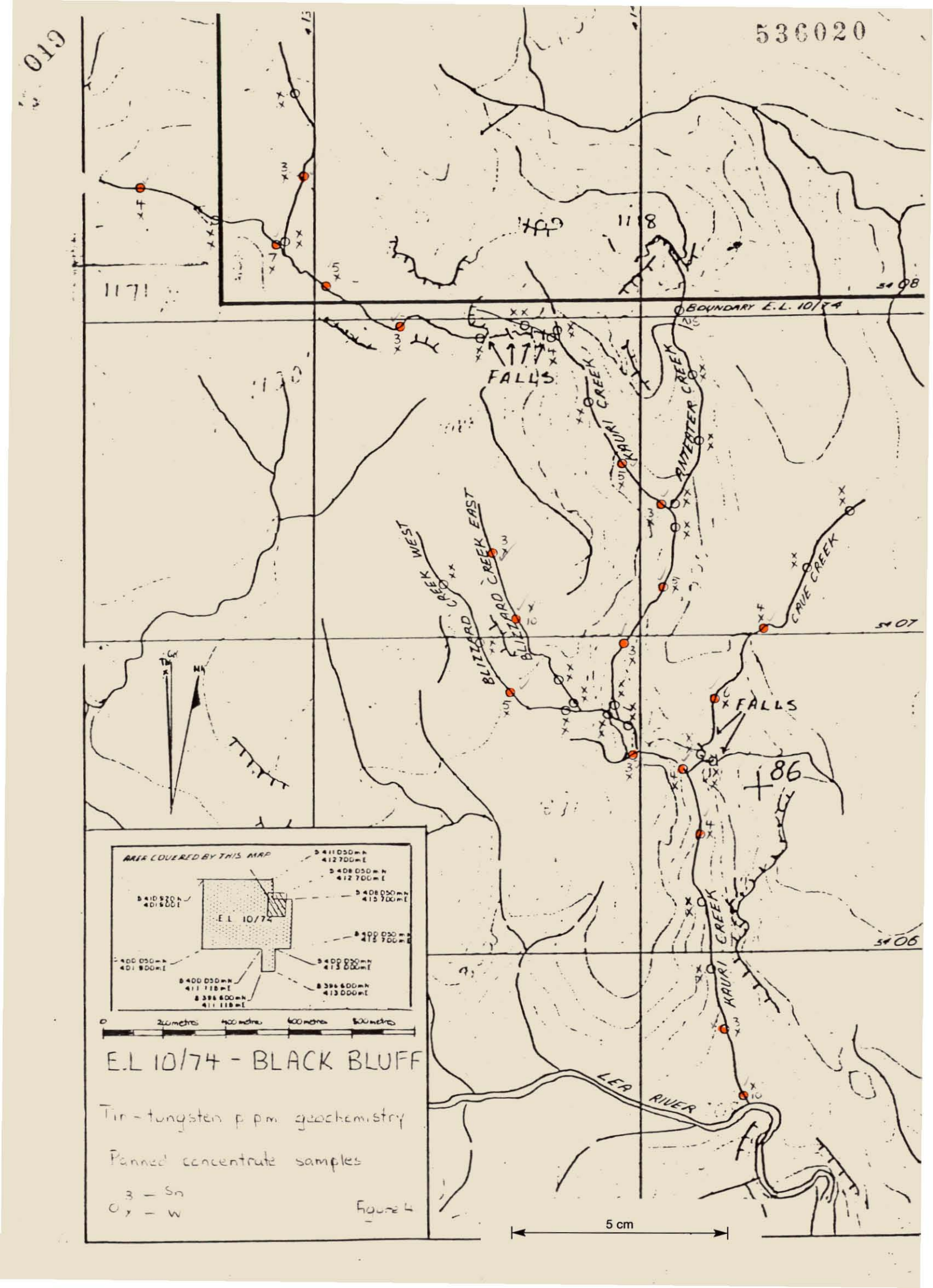
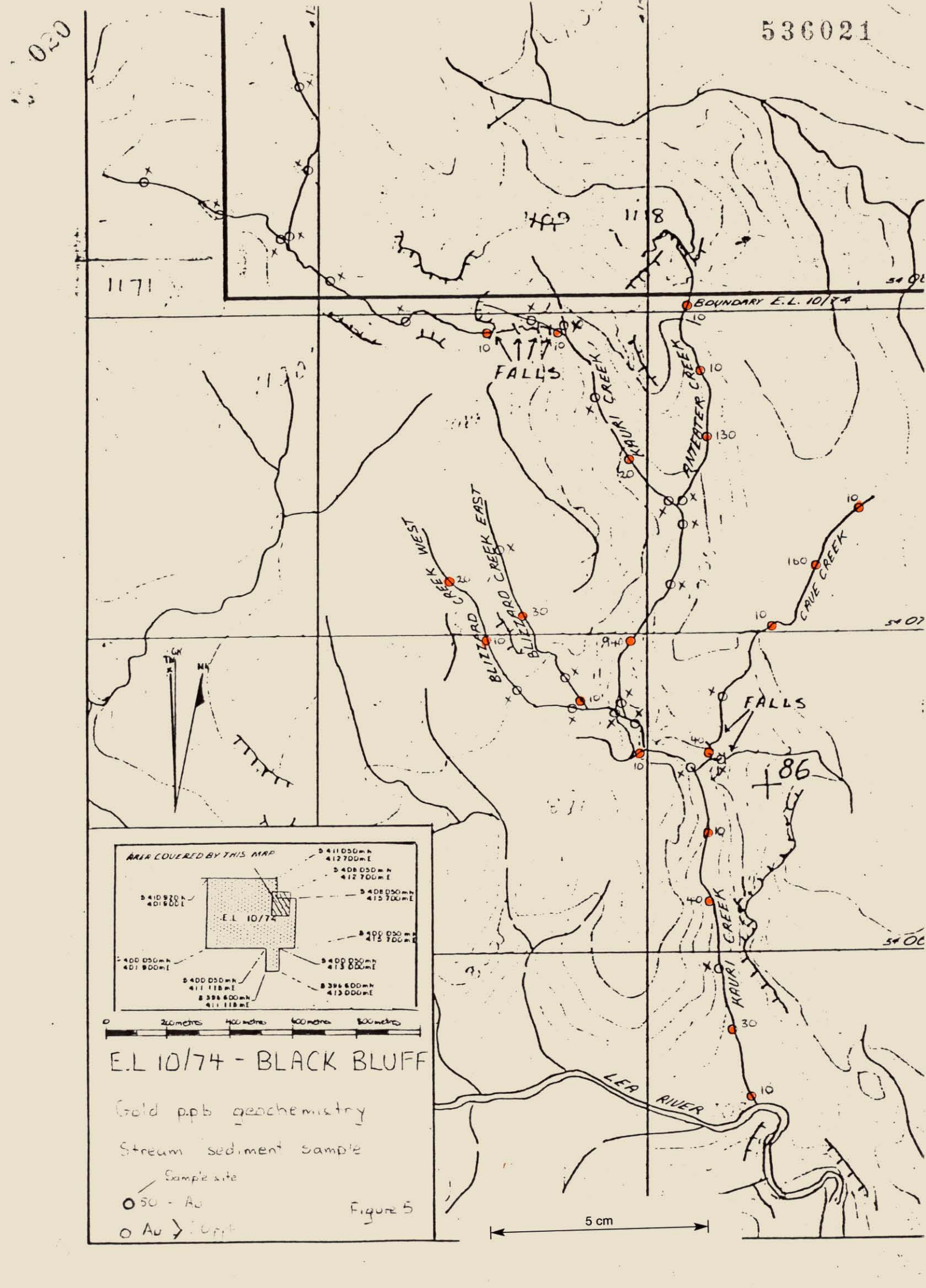
536019


1171
1172
1173
1178
BOUNDARY E.L. 10/74
FALLS
KAURI CREEK
ANTEATER CREEK
BLIZZARD CREEK WEST
BLIZZARD CREEK EAST
CRUE CREEK
FALLS
+86
KAURI CREEK
LEA RIVER
AREA COVERED BY THIS MAP
E.L. 10/74
0
200 metres
400 metres
600 metres
800 metres
E.L 10/74 - BLACK BLUFF
Tin-tungsten ppm geochemistry
Stream sediment samples
x — Sn
o — W
Figure 3
5 cm


536020
BOUNDARY E.L. 10/74
FALLS
KAURI CREEK
PANTHER CREEK
BLIZZARD CREEK WEST
BLIZZARD CREEK EAST
CAVE CREEK
FALLS
KAURI CREEK
LEA RIVER
5408
5407
5406
1171
1173
1178
AREA COVERED BY THIS MAP
E.L. 10/74
0
2 kilometres
4 kilometres
6 kilometres
8 kilometres
E.L 10/74 - BLACK BLUFF
Tin - tungsten p.p.m. geochemistry
Panned concentrate samples
3 — Sn
W — W
Figure 4
5 cm



E.L 10/74 - BLACK BLUFF

Gold p.p.b geochemistry

Stream sediment sample

Sample site

○ 50 - Au

○ Au > 50 p.p.b

Figure 5

021

GEOPEKO

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536022

INTER-OFFICE MEMO

TO: R.R. LARGE DATE: 30-3-83

FROM: R.J. PERRING COPIES TO:

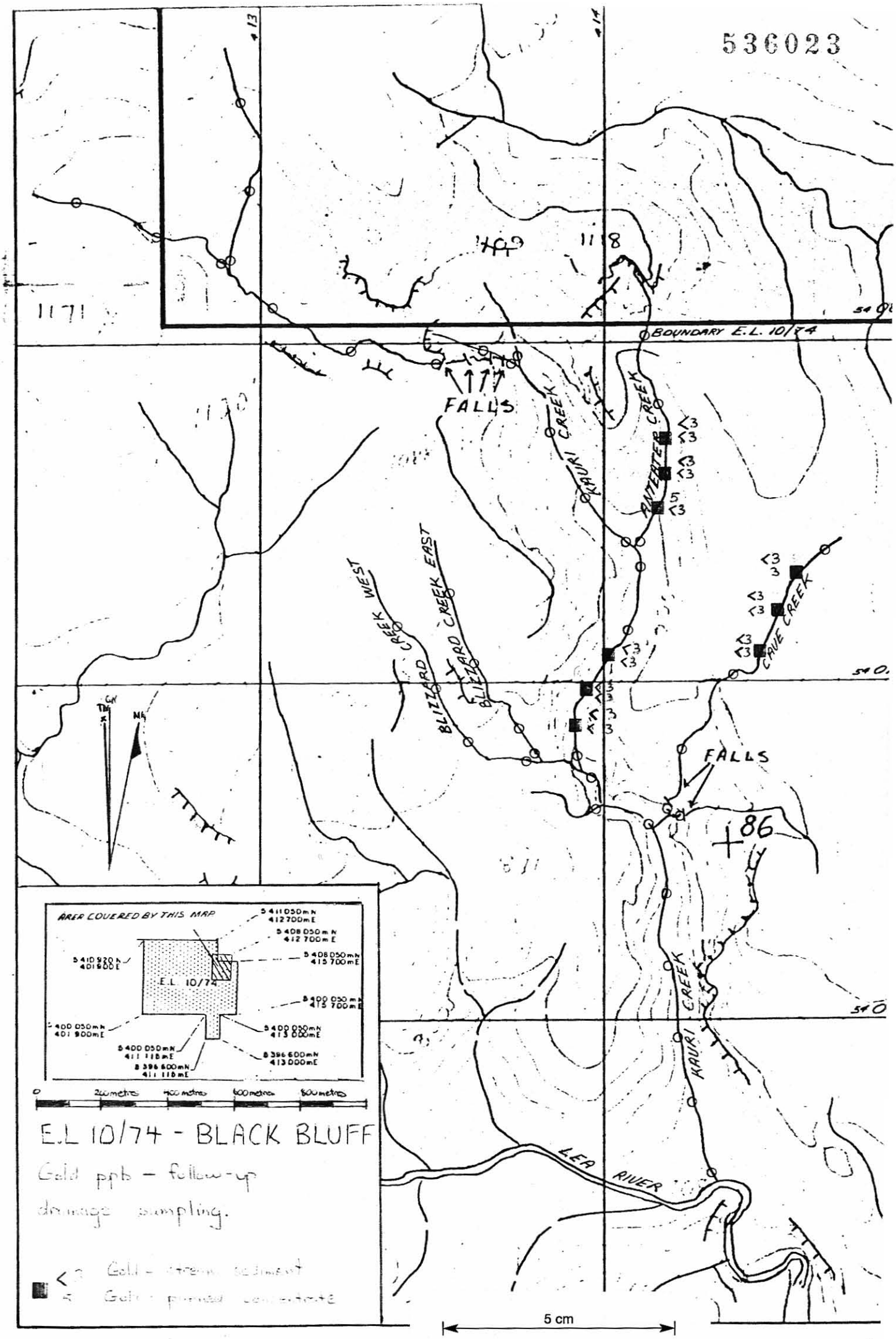
SUBJECT: E.L. 10/74 BLACK BLUFF - RESULTS OF KAURI CREEK FOLLOW - UP DRAINAGE SAMPLING PROGRAM.

Three stream sediment samples from Kauri Creek collected in November, 1982 were anomalous in gold. One sample from Anteaten Creek assayed 130ppb Au, a sample from Cave Creek assayed 160ppb Au, and one from Kauri Creek assayed 940ppb Au.

The sites of these three samples were resampled in March, 1983. A stream sediment sample and two panned concentrates were taken at each site as well as a stream sediment sample and panned concentrate sample 100 metres above and below the previously anomalous site.

The -80 mesh fraction of stream sediment samples and the total panned concentrate samples were analysed for gold using a carbon rod - A.A.S. method by A.L.S. in Brisbane. All samples assayed below 6ppb Au (see attachment).

The results for gold from the original survey must have been incorrect. Drainage sampling within Kauri Creek and its tributaries has down graded potential for economic gold mineralization in the Kauri Creek catchment area.


1171
1170
1118
BOUNDARY E.L. 10/74
FALLS
KAURI CREEK
ANTEATER CREEK
BLIZZARD CREEK WEST
BLIZZARD CREEK EAST
CAVE CREEK
FALLS
+86
KAURI CREEK
LEA RIVER
AREA COVERED BY THIS MAP
5 411 050mN 412 700mE
5 408 050mN 412 700mE
5 410 820 N 401 600E
5 408 050mN 415 700mE
E.L. 10/74
5 400 050mN 415 700mE
5 400 050mN 401 900mE
5 400 050mN 415 000mE
5 400 050mN 411 118mE
5 396 600mN 413 000mE
5 396 600mN 411 118mE
0 200 metres 400 metres 600 metres 800 metres
E.L 10/74 - BLACK BLUFF
Gold ppb - follow-up
drainage sampling.
Gold - stream sediment
Gold - panned concentrate
5 cm


Mariner 7.
1. Dighem II anomaly and Pb anomaly in stream sediment.
2. Grid 8·7 km.
3. C-horizon geochemistry at 25m intervals.
4. Pole-dipole I.P. survey
5. No anomalous results from geophysics but 2 spot Pb values of 950ppm and 805ppm
6. No further work although Dighem II anomaly not explained.
Mariner 6.
1. Dighem II magnetic anomaly and old workings.
2. Grid of 4·1km.
3. C-horizon geochemistry at 12·5m intervals.
4. Mapped at 1:1000.
5. Magnetics S.P. and I.P.
6. Contourable Au anomaly coincident with resistivity low and old workings.
7. Drill hole targetted and drilled to 96·75m without success.
Mariner 4.
1. Thermal metamorphism, old workings and anomalous stream sediment geochemistry
2. 3·2km gridding.
3. C-horizon geochemical samples at 25m intervals.
4. Mapped at 1:2500.
5. Discouraging results, therefore no further work.
Mariner 5.
1. Extension to Mariner 1 and 3.
2. 20·6 km gridding.
3. C-horizon geochemistry over inliers in basalt and panned concentrate geochemistry.
4. 2 short percussion holes did not penetrate basalt.
5. Ground magnetics and S.P.
6. Gravity survey located granite / porphyry contact.
Mariner 2.
1. Previous work by Tasminex and Union Oil. old Au workings.
2. 6·4 km gridding.
3. C-horizon geochemistry at 25 m centres.
4. Mapped at 1:5000.
5. No encouragement from the above work.
Alluvial Au mine
Mariner 1.
1. Previous work by Union Oil located an I.P. and geochemical anomaly.
2. 10·6 km gridding.
3. C-horizon geochemistry at 25m centres.
4. Mapped at 1:5000.
5. Ground magnetics; S.P., gradient array, I.P. and V.L.F.
6. Geochemical anomaly - peak values: 440 ppm Cu, <10 000 ppm Pb, 1400 ppm Zn, 240 ppm Sn, 15ppm Ag and 0·71% As.
7. S.P. anomaly (-50mV) coincident with gradient array and V.L.F.
Mariner 3.
1. Extension to N.E. of Mariner 1 following Geochemical anomaly.
2. 7km gridding.
3. Mapped at 1:5000.
4. S.P. anomaly (-180mV) coincident with I.P. and V.L.F.
5. Several Cu-Zn anomalies.
6. 2 costeans and 1 drill hole at 137·5m.
7. Results indicated zones of veinlets with pyrite - chalcopyrite and quartz.
Bare Mt.
Lake Lea
Black Bluff
Vale of Belvoir
Bond Range
Kauri Creek
Kauri Fault
Lea River
Cu Adit
Falls
MOUNTAIN
ROAD
E.L. 10/74 BOUNDARY
5 406 000 N
5 404 000 N
5 402 000 N
5 400 000 N
408 000 E
410 000 E
412 000 E
414 000 E
416 000 E

Structure:

- Fault
- Geological contact
- Anticline
- Syncline

Geology

- Holocene - Alluvium, glacial debris, swamp soil.
- Tb Tertiary - Basalts and sediments.
- Ordovician - Conglomerates sandstone and limestone.
- v Cambrian - Upper lithic, vitric tuffs and sediments.
- lower quartz feldspar biotite porphyry.

5 cm

GEOPEKO 536024

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Scale 1: 10,000.

25 0 25 50 75 100 125 150 175 200 225 250

metres

Interpreted By:	J.P.
Drawn By:	R. Tag
Date:	July
Approved By:	
Revision By:	Date:
Revision By:	Date:
Revision By:	Date:

DRAWING NO. 1.

SHEET NO. KT 10/74-3-RG

E.L. 10/74

BLACK BLUFF, TASMANIA

Summary Map of Geology and Prospect Locations

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83-2015