



EXPLORATION LICENCE 19/88

C. H. WHITEHEAD

ANNUAL REPORT 1988/89 (1ST YEAR)

89-2985

<b>MINES</b>	
File Ref. <u>EL 19/88</u>	
<u>10 JUL 1989</u>	
Doc. Ref.	
Action Officer	Initials
<u>REFER</u>	
<u>LETTER</u>	
<u>H. 7. '89</u>	
Resubmit to	Date

Cliff H. Whitehead  
3/7/1989

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EXPLORATION LICENCE NO 19/88

C. H. WHITEHEAD

MONTAGU RIVER - N.W. TASMANIA

ANNUAL REPORT - 1988/89

Circulation -  
Mines Department (1)  
C.H.W. (1)

Cliff H. Whitehead  
3rd July, 1989

Cliff H. WhiteheadExploration Licence 19/88Montagu RiverANNUAL REPORT 1988/89SUMMARY

Exploration Licence 19/88 was granted on the 8th August, 1988, and embraces an area of 70sq km of the Montagu River district in the NW extremities of Tasmania.

The licence was acquired over ground assessed to be geologically favourable for the possible potential of chromite, platinum, heavy minerals, tin and gold mineralisation. An initial two year programme of exploration and investigations was drafted to establish the validity of such potential.

Work to date, during the first year term of the licence, has consisted of a general literature review of past geologic/exploration/metallurgical test work, photogeology, regional reconnaissance geologic examinations, geochemical sampling (pan concentrates, surface soil/rock samples), and localised geological investigation of specific geological areas.

Photogeological/surface geologic reconnaissance, plus regional geochemical studies were successful in delineating the areas of chromite-bearing alluvial ground within the licence area. These were individually examined to provide a preliminary assessment of their grade and tonnage potential. Three alluvial areas, namely the "Walkers Gravel Pit", "Chromite Ridge" and "Salmon River Gravel Pit" areas were considered to be of sufficient grade/tonnage potential to justify detailed evaluations in the form of systematic surface sampling/logging, auger drilling and/or shallow percussion drilling. These investigations are either underway or planned.

Systematic regional geochemistry, in addition to delineating chromite bearing alluvials, also identified two locations of slightly anomalous platinum bearing material. However, the potential of gold and other "heavy mineral" assemblage in the areas alluvials was somewhat negative.

Future exploration will include an evaluation of the above mentioned chromite bearing alluvial locations, follow up work on the association of platinoids in some of the alluvials, and also an investigation of dolomite sequences in the western/northern extremities of the E.L. area.

EXPLORATION LICENCE 19/88 - C.H. WHITEHEADMONTAGU RIVER - N.W. TASMANIAANNUAL REPORT 1988-89TABLE OF CONTENTS

	<u>Page No</u>
Summary	
A. Over-review, E.L. 19/88	1
A.1. - Location/Land Tenure	1
A.2. - Previous Exploration/Investigations	1-2
B. Exploration Objectives - Philosophy	3
C. Exploration Programme	4
C.1. Work Completed	4-5
C.2. Discussion	5-8
D. Proposed Work Programme	9

## A. OVER-REVIEW, E.L. 19/88

### A.1. Location/Land Tenure

Exploration Licence 19/88 was granted on 8th August, 1988, covering an area of 70sq kms within the vicinity of the Salmon and Montagu Rivers in the Municipality of Circular Head - Districts of Wellington and Russell. No private land occurs in the licence area, which comprises State Forest.

As shown in Figure 1, the E.L. area occurs immediately north of the Arthur River, and is easily accessible from Smithton, either via Togari (Salmon River Road) or Edith Creek (Roger River Road and Leensons Road). The tenement itself is favourably transgressed by innumerable forestry tracks.

The licence area could topographically be described as gently undulating, with flat ridges separated by large areas of low lying swampy ground furnishing thick dense scrub.

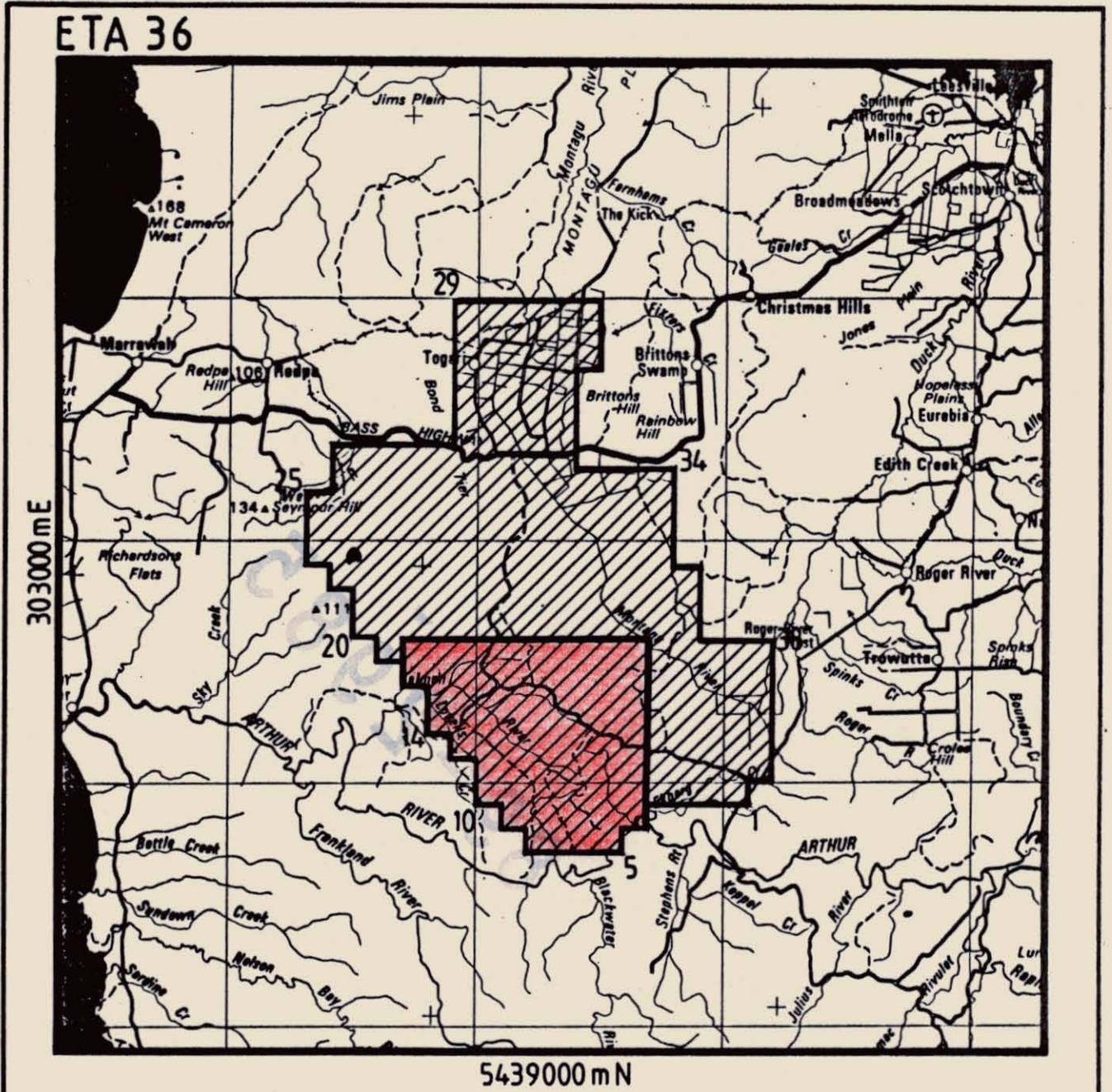
### A.2. Previous Exploration/Investigations

The tenement area in general appears to have received scant attention in the past, and been confined to the following:-

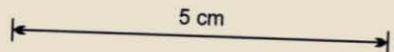
- Specific chromite bearing fluvial deposits at a location, now known as Walkers Gravel Pit, were investigated by the Department of Mines geologists and metallurgical laboratories (Launceston), both in 1956 and 1968.
- The chromite potential of specific areas of alluvial ground was likewise investigated by Quest Mining and Exploration N.L. (E.L. 5/68) and very briefly by Mineral Holdings (Australia) Pty Ltd.

EXPLORATION LICENCE 19/88

MONTAGU RIVER - C.H. WHITEHEAD.



= E.L. 19/88.



MONTAGU RIVER ETA 249 SKM  
 FORMERLY E.L. 12/86 (MINERALS)  
 Scale 1:250 000 20km  
 DEPARTMENT OF MINES TASMANIA

P.595

- 2 -

- The area embraced by E.L. 19/88 formed part of much larger regions investigated regionally by ANZECO (1971 and 72), CRAE (E.L. 1/77, 1977 to 1983) and more recently BHP (E.L. 12/86, 1987).

Overall, chromite has been the principal commodity of interest in the area in question, although other commodities investigated have been tungsten (Anzeco) and tin (CRAE). No metalliferous mining appears to have taken place in the area.

B. EXPLORATION OBJECTIVES - PHILOSOPHY

The area covered by E.L. 19/88 was specifically demarcated to evaluate the presence and possible economic potential of the following commodities/minerals:-

- chromite
- platinum group elements (platinum, palladium, iridium, osmium)
- heavy mineral sands (rutile, ilmenite, zircon, monzonite)
- gold and tin

However, the prime objective of the E.L. proposed work was to investigate the economic viability of known alluvial chromite deposits in the area, the aim being to assess the feasibility of developing small scale mining operations (50,000 to 150,000 tpa) over these resources.

E.L. 19/88 roughly coincides with the interpretative extent of chromite bearing alluvials/gravels within the Salmon River drainage area, north of the Arthur River. In this demarcated area, specific chromite bearing fluviatile deposits had been identified and previously investigated (see previous section).

Plan No 1/88 is an attempt at summarising the extent and nature, plus results of both past regional geochemical work, (Anzeco, CRA), and the location of specific chromite deposits investigated by Quest Exploration and B.H.P.

It was an objective of the proposed E.L. 19/88 exploration work to not only investigate and evaluate the main known previously examined locations of chromite bearing alluvial ground, but also to examine the other known but little investigated Tertiary alluvials, and also regionally appraise the possible chromite potential of large scale Quarternary alluvials.

## C. EXPLORATION PROGRAMME

### C.1. Work Completed

In brief, exploration work completed within E.L. 19/88 during the initial 10 months period of the 1st year term has consisted of the following:-

- Acquisition of available topographical plans, forestry maps and recent air-photographs of the licence area, with subsequent base-map preparation of the licence area, scale 1:25,000.
- Preliminary photogeologic interpretation of the licence area and its surrounding region.
- Literature Review. Acquisition and perusal of previous open-file exploration results/Department of Mines unpublished reports. Review of past results, in particular, those related to investigations and metallurgical test work on chromite bearing alluvial ground.
- General field reconnaissance and examination of alluvial chromite bearing areas in the E.L. Regional surface sampling of alluvial chromite ground, and analytical work on possible Cr<sub>2</sub>O<sub>3</sub>, Pt and Au anomalism.
- Initiation of detailed evaluations of three unconsolidated alluvial areas. Preliminary surveying, examination and sampling of the "Walkers Quarry" alluvial chromite deposit. This included a detailed review of past BHP and Department of Mines metallurgical test work on the alluvials from this area.
- Regional geological reconnaissance of the southern and western extremities of the E.L. area.

- 5 -

- Systematic geochemical pan concentrate sampling of the licence drainage. Samples were assayed for Cr<sub>2</sub>O<sub>3</sub>, Pt and Au content. Follow up detail geochemical sampling was initiated to investigate platinum anomalism.

## C.2. Discussion - Results to Date

The combined results of the literature review, photogeologic interpretation and reconnaissance geologic mapping, permitted a regional geologic interpretation of ground covered by the licence.

The tenement is located over the central-western section of the Southern Trough - a triangular shaped Cambrian basin developed on the Precambrian basement of the Rocky Cape Block.

The main geologic sequences are as follows:- (Please refer to Plan 2/88).

- Precambrian orthoquartzites and limestones.
- Cambrian sediments and basalts.
- Tertiary alluvial deposits.
- Quaternary alluvium.

The Precambrian basement geology is characterised by two distinct lithologies, namely older orthoquartzites and younger limestone sequences.

The orthoquartzites, although dominated by that rock type, the overall sequence includes slates (well cleaved, commonly micaceous, grey brown) and limestones (generally silicified and as crystalline cherts). The orthoquartzites themselves are massive, fine to medium grained and recrystallised. The overlying limestones could be Early Cambrian, and although outcrop is generally very poor, it covers the greatest proportion of the E.L. area. The rock is massive, brown and very siliceous-cryptocrystalline.

The Cambrian is exemplified by many lithologies including basalt, dolerite, limestone/dolomite, shale, siltstone and sandstone, with a predominance of shales and siltstones. The Cambrian as a whole trends NW-SE ( $340^{\circ}$ ) with photogeology showing numerous linears in that direction. However, a main central linear appears to represent a fault significantly dividing the area into west and east. The western section appears characterised by isoclinal folding with associated high angle shearing and thrusting, whereas the eastern section is characterised by a much more open fold style with limbs dipping at less than  $35-40^{\circ}$ .

Following reconnaissance mapping, it is believed the calcareous sequences belonging to the Precambrian/Cambrian groups should be examined in more detailed for dolomite occurrences.

General field reconnaissance and regional geochemical work was orientated to permit a delineation of the chromite bearing alluvials, especially their extent (tonnage), grade, physical nature (unconsolidated or cemented) and disposition (near surface or masked).

Alluvial ground in E.L. 19/88 can initially be subdivided into Tertiary and Quaternary types.

The Tertiary alluvials were found to be the most prospective for chromite content, and themselves were divisible into two types, namely:-

- Consolidated Alluvials, which are actually remnant alluvials to be found on the upper slopes and ridges. The alluvials themselves are composed of gravels and coarse sands which consist of quartz, quartzite, and chert, all poorly sorted, and subangular to subrounded in texture. Their main characteristic is their strong induration. Obviously this group of alluvials occupied a much greater area than at present exposed, and have subsequently been reworked to give a second group of alluvials, namely:

- 7 -

- Unconsolidated Alluvials, composed mainly of gravels, sands and quartz clastics, and is a much more mature, reworked sediment of fluvial disposition. The sequences are more orderly and gradational from gravels (2-5m thick), through to grit units, and coarse sand units (of similar thickness). These unconsolidated alluvials have a much higher heavy mineral chromite content than the previous group of alluvials, and the chromite shows favourability to a presence in the grit sequences.

The main drainage pattern of the licence area was systematically geochemically sampled, and collected pan concentrate samples assayed for chromite content. The results of these samples (assayed Department of Mines, Launceston) are itemised in Table No 1, and the location of sampling, plus previous Anzeco results shown on accompanying Plan 2/88. All individually known Tertiary alluvial areas, whether consolidated or unconsolidated in nature, were visited, examined and randomly sampled and panned to gain comparative results on grade variations, grade range and mineral size.

Regional pan concentrate assay results showed that the Quaternary alluvial ground, occupying the flat lying boggy sections of the licence were generally composed of mud and organic rich silt, and invariably showed low chromite values. These alluvials are of no further interest regarding chromite potential.

The Tertiary alluvials were classified into unconsolidated or consolidated categories.

Areas of unconsolidated Tertiary alluvials were:- Please refer Plan 1/88 and 2/88.

- Walkers Quarry (A).
- Salmon River Road Gravel Pit (B).
- Chromite Spur (C).
- Section K-L (D).
- Lovells Creek Road (2)

- 8 -

Consolidated Tertiary alluvial ground were found at:-

- Section E - Sapling Road.
- Sections I, K, O, P, Q and R (Quest and BHP).

Reconnaissance work on the unconsolidated alluvials showed the material to be readily susceptible to upgrading to a plus 35% Cr<sub>2</sub>O<sub>3</sub>, and quite often plus 45% Cr<sub>2</sub>O<sub>3</sub> content; and possess a favourable Cr:Fe ratio of plus 2.

Of the unconsolidated alluvials, those of Walkers Quarry, the Salmon River Road Gravel Pit and Chromite Spur, on the basis of grade, tonnage potential and disposition - justify more detailed investigations. All three deposits showed Cr<sub>2</sub>O<sub>3</sub> head grades ranging from 0.25% to 0.85%.

It is the intention to evaluate in detail all three above mentioned deposits, this work including geologic, metallurgical and mining/economic assessments. Such geologic work is currently underway at Walkers Quarry.

Previously mentioned regional pan concentrate samples were assayed for both platinum and gold content.

Au values were negative, but two samples PC 18 and PC 26 showed slightly anomalous platinum values of 0.03 and 0.60g/tonne respectively. More detailed follow up sampling has been completed in the vicinity of PC26 to ascertain its validity. None of the chromite bearing alluvials assayed for Cr<sub>2</sub>O<sub>3</sub> showed any platinum or gold values (Table No 2).

Other heavy mineral assemblage (e.g. ilmenite, rutile, monzanite) appeared low or negligible in all collected pan concentrate samples.

D. PROPOSED WORK PROGRAMME

Efforts will be continued to complete the original exploration objectives of the licence area, with special emphasis placed towards the following:-

- Detailed evaluations of the chromite potential at the three locations of unconsolidated Tertiary alluvials.
  - Walkers Quarry,
  - Salmon River Road Gravel Pit,
  - Chromite Ridge.

Studies have been commenced at the first named location. Work will consist of tonnage/grade assessments (involving either power auger drilling or air track drilling, possibly supplemented by backhoe trawling). If results continue to be encouraging, both sample test work and subsequent laboratory scale test work will be implemented.

- The potential and workability of chromite as a use in the pigment industry (brick and/or cement pigment) will be ascertained.
- The study of a platinoid association within Tertiary alluvials will be continued.
- An investigation of the extent and nature of dolomite sequences in the basement/Cambrian units will be made.



Cliff H. whitehead



015

## DEPARTMENT OF MINES

TABLE N<sup>o</sup>1.

615016

Launceston Office:  
 Chemical and Metallurgical  
 Laboratory,  
 287 Wellington Street,  
 LAUNCESTON 7249

TASMANIA

Enquiries:

Phone

Your ref.:

Our file:

C.H. Whitehead  
 Geo-Technical Services Pty Ltd  
 P.O. Box 177  
 Burnie 7320

18th November 1988

Attent Mr. C. WhiteheadReg. Nos 884081-099

Dear Sir,

Please find below results on samples submitted to  
 this laboratory.

<u>Reg. Nos</u>	<u>Description</u>	<u>Mass grams</u>	<u>Cr<sub>2</sub>O<sub>3</sub>%</u>	<u>Pt g/t</u>	<u>Au g/t</u>
884081	PC 10	146.4	5.4	<0.01	<0.02
884082	11	53.3	<0.1		
884083	12	116.5	8.9		
884084	13	166.3	10.2		
884085	14	175.5	10.1		
884086	15	143.5	9.5		
884087	16	145.6	3.5		
884088	17	247.2	39.6	<0.01	
884089	18	169.2	27.7	0.03	
884090	19	87.3	2.3	<0.01	
884091	20	134.6	9.1		
884092	21	158.0	23.4		
884093	22	122.7	2.6		
884094	23	180.4	13.1		
884095	24	120.3	8.9		
884096	25	92.9	3.2	<0.01	
884097	26	196.4	18.3	0.6	
884098	27	142.7	2.4	<0.01	
884099	28	147.7	2.1	<0.01	<0.02

Analyses by...

*[Signature]*  
*[Signature]*

Yours faithfully,

(P.L. James)  
 Chief Chemist & Metallurgist

Telephone (003) 44 2431

Fax (003) 44 6565

**ANALABS**

A Division of Macdonald Hamilton &amp; Co. Pty. Ltd.

**ANALYTICAL DATA**

SAMPLE PREFIX

REPORT NUMBER

REPORT DATE

CLIENT ORDER No.

PAGE

999.31.08.05465

14/06/88

24058

1 OF 1

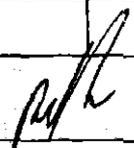
TUBE No.	SAMPLE No.	Pt	Au	Weigh	Cr203				
1	GP01	<0.008	<0.008	58.990	41.60				
2	GP02	<0.008	<0.008	104.50	33.20				
3	GP03	<0.008	<0.008	5.945	13.90				
4	GP04	<0.008	<0.008	68.005	2.95				
5	GP05	<0.008	<0.008	68.245	3.19				
6	GP06	<0.008	<0.008	35.660	5.36				
7	GP07	<0.008	<0.008	55.698	0.75				
8	GP08	<0.008	<0.008	42.064	5.49				
9	GP09	<0.008	<0.008	34.830	16.30				
10	GP10	<0.008	<0.008	52.811	6.69				
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23	DETECTION	0.008	0.008	0.001	0.05				
24	UNITS	PPM	PPM	GMS	PPM				
25	METHOD	311	309	199	406				

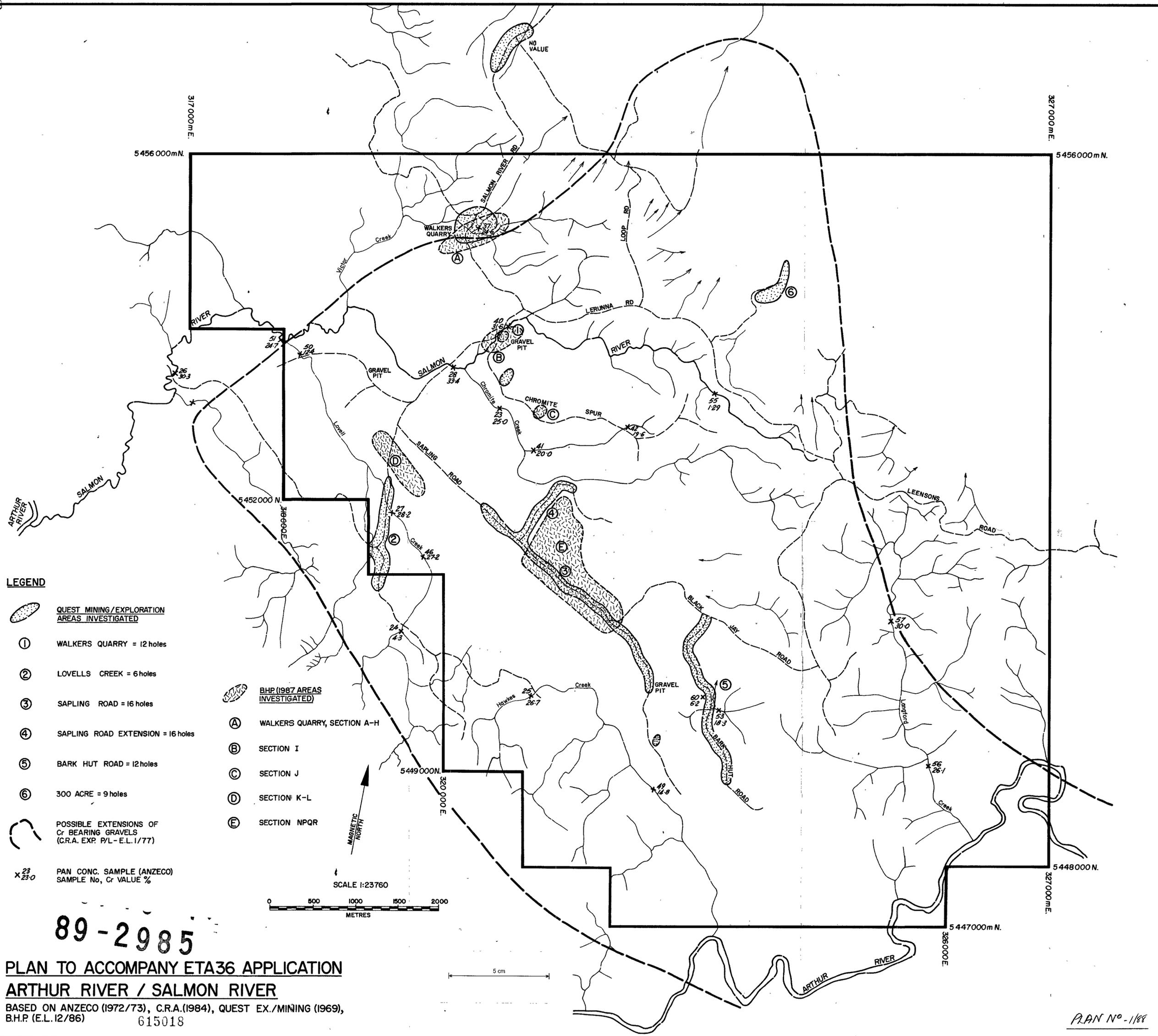
Results in ppm unless otherwise specified

T = element present, but concentration too low to measure

X = element concentration is below detection limit

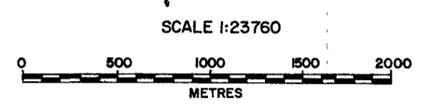
- = element not determined

AUTHORISED  
OFFICER




- LEGEND**
- QUEST MINING/EXPLORATION AREAS INVESTIGATED
  - ① WALKERS QUARRY = 12 holes
  - ② LOVELLS CREEK = 6 holes
  - ③ SAPLING ROAD = 16 holes
  - ④ SAPLING ROAD EXTENSION = 16 holes
  - ⑤ BARK HUT ROAD = 12 holes
  - ⑥ 300 ACRE = 9 holes
  - POSSIBLE EXTENSIONS OF Cr BEARING GRAVELS (C.R.A. EXP. P/L - E.L. 1/77)
  - x 23/23.0 PAN CONC. SAMPLE (ANZECO) SAMPLE No, Cr VALUE %

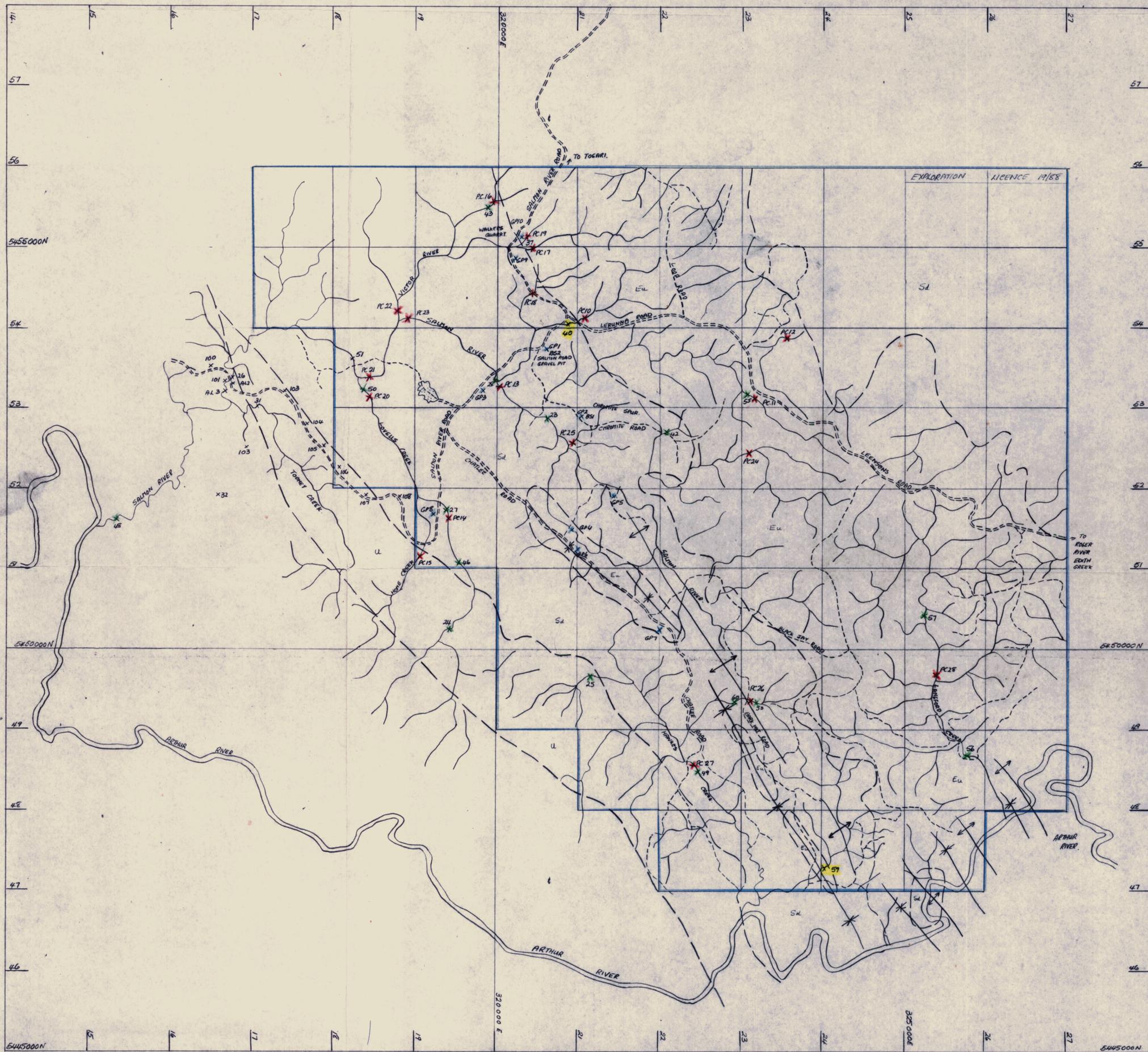
- BHP (1987 AREAS INVESTIGATED)**
- A WALKERS QUARRY, SECTION A-H
  - B SECTION I
  - C SECTION J
  - D SECTION K-L
  - E SECTION NPQR



**89-2985**

**PLAN TO ACCOMPANY ETA36 APPLICATION**  
**ARTHUR RIVER / SALMON RIVER**  
 BASED ON ANZECO (1972/73), C.R.A.(1984), QUEST EX./MINING (1969),  
 B.H.P (E.L.12/86) 615018

PLAN No-1/88



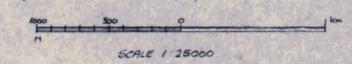
- Eu = CAMBRIAN UNDIFFERENTIATED
- Sd = PRECAMBRIAN SMITHTON DALRITIC
- U = PRECAMBRIAN SLTSTONES, GREYWACKE, QUARTZITE

GEOCHEMICAL SAMPLES.

- X PC 10-28 - PAN CONCENTRATE SAMPLES (1988)
- X GP 1-10 - GRANITE ALLUVIALS
- SS 1-2 - BULK SAMPLES
- X X 23-61 - PAN CONCENTRATE SAMPLES
- X 100-107 - SOIL SAMPLES

SAMPLE N°	CO <sub>2</sub> VALUE % ppm	SAMPLE N°	CO <sub>2</sub> VALUE % ppm
pc 10	5.4	23	25.0
pc 11	0.1	24	4.3
pc 12	8.9	25	26.7
pc 13	10.2	26	30.2
pc 14	10.1	27	28.2
pc 15	9.5	28	33.4
pc 16	8.5	31	2.57
pc 17	39.4	32	480
pc 18	27.7	37	24.6
pc 19	2.3	40	21.6
pc 20	9.1	41	28.0
pc 21	23.4	42	19.6
pc 22	2.6	43	22.4
pc 23	13.1	46	27.2
pc 24	8.9	47	15.8
pc 25	3.2	48	44.8
pc 26	18.3	49	12.4
pc 27	2.4	51	24.7
pc 28	2.1	53	18.8
		55	1.29
		56	26.1
		57	30.0
GP 1	41.60	59	6.5
GP 2	33.20	60	6.2
GP 3	13.90	61	4.0 ppm
GP 4	2.95	100	80
GP 5	3.19	101	320
GP 6	5.32	102	280
GP 7	0.75	103	1500
GP 8	5.09	104	640
GP 9	16.30	105	2600
GP 10	6.89	106	280
		107	520

- = E.L. AREA BOUNDARY
- = DRAINAGE
- = MAIN TRACKS
- = FOREST TRACK



EXPLORATION LICENCE 19/88  
 C.H. WHITEHEAD  
 MONTAGU - SALMON RIVERS.  
 REGIONAL GEOLOGY AND GEOCHEMISTRY

615019  
 DATE - MARCH 1989  
 SCALE 1:25,000  
 P.P.N. N° - 2187