

030

796001

88-2794

CRA EXPLORATION PTY LTD

MINES	
File Ref. <u>EL36/79</u>	
<u>-7 APR 1988</u>	
Doc. Ref.	
Action Officer	Initials
<u>LETTER</u>	
<u>DATED</u>	
<u>6. 4. 88</u>	
<u>REFERS</u>	
Resubmit to	Date

LOONGANA E.L. 36/79

REPORT ON EXPLORATION FOR THE

12 MONTHS TO 1 APRIL 1988



Author: F R Funnell

Date: 26 March 1988

Submitted to: T W Dickson

Accepted by:

Copies: CRAE Preston  
CRAE Canberra  
Department of Mines,  
Tasmania  
Billiton Australia



The contents of this report remain the property of CRA Exploration Pty. Limited and may not be published in whole or in part nor used in a company prospectus without the written consent of the Company.

The contents of this report remain the property of C.R.A. Exploration Pty. Limited and may not be published in whole or in part nor used in a company prospectus without the written consent of the Company.

REPORT NO: 14602

001

796002

CONTENTS

	<u>Page No</u>
1. SUMMARY	1
2. INTRODUCTION	1
3. CONCLUSIONS	2
4. RECOMMENDATIONS	2
4.1 Cattley North Prospect	2
4.2 Native Track Tier South Prospect	3
5. CATTLEY NORTH PROSPECT	3
5.1 Geology	3
5.2 Geophysics	5
5.3 Geochemistry	7
5.4 Drilling	8
6. NATIVE TRACK TIER SOUTH PROSPECT	9
7. REGIONAL GEOCHEMISTRY	10
8. REFERENCES	11
9. LOCATION	11
10. KEYWORDS	11
11. LIST OF PLANS	12
12. LIST OF APPENDICES	14

## 1. SUMMARY

A combined UTEM, soil geochemical anomaly was drill tested by DD87CN1 at the Cattley North prospect. This hole intersected a sequence of siltstones/shales whose true stratigraphic thickness was approximately eight metres and assayed 0.15% Zn. A ground magnetic survey and detailed geological mapping was also carried out. A series of major northwest-southeast trending faults were identified and new structural geology and lithology maps prepared.

The south-western quarter of the Cattley North grid was soil sampled and several areas of lead and/or zinc anomalism identified. Within the Cambrian sequence base metal anomalism appears to increase westwards.

Additional stream sediment samples collected from the Native Track Tier and Cattley North areas failed to identify any new prospective areas.

## 2. INTRODUCTION

This report describes work carried out on EL 36/79 Loongana for the year ending 1 April 1988.

The EL is the subject of a joint venture between Billiton Australia and CRA Exploration Pty Limited. In March 1985 CRAE began exploring the licence in conjunction with the neighbouring licences, EL 7/74 (Moina) and EL 8/77 (Riana).

EL 36/79 is divided into three separate blocks which are centred approximately 35 km south of Burnie and the dominant land use is logging and forest management (see Plans TASH 2954 and 2956).

003

3. CONCLUSIONS

1. The UTEM anomaly centred on 50440E, 20000N is thought to be due to shearing and alteration associated with a localized bedding flexure. At this stage none of the remaining UTEM anomalies warrant drilltesting.
2. Geological mapping and geochemical sampling has indicated that, of the Cambrian rocks exposed at Cattley North, a complex group of facies, -Ec, located on the western margin of the grid has the greatest potential to host a massive sulphide system.
3. The Native Track Tier South prospect has not been adequately tested and further fieldwork is required.
4. The lack of encouraging stream geochem results from the Native Track Tier area further downgrades the region.

4. RECOMMENDATIONS4.1 Cattley North Prospect

1. Downhole EM be carried out on DD87CN1 to confirm that the UTEM anomaly was intersected.
2. Carry out detailed soil geochemistry in the area of lead-zinc anomalism already defined on lines 20600N and 21000N.
3. The progress of the Department of Mines sub-basalt drilling programme be closely monitored.

004

#### 4.2 Native Track Tier South Prospect

1. Drillhole DDHCD1 be re-assayed for gold.
2. Detailed geological mapping and outcrop chip sampling be carried out over the prospect with particular attention being paid to the trachytic unit.
3. An EM survey be carried out over the prospect.

### 5. CATTLEY NORTH PROSPECT

#### 5.1 Geology

The prospect is centred on a window of Cambrian rocks which are surrounded by Ordovician conglomerates and Tertiary flood basalts. Geopeko were the first to map the area in detail and presented their work in report KI-76-5, Rogers (1978). S. Hunns remapped the prospect during the summer of 1986-87 and his work was reported in Von Strokirch (1987). The interpretation put forward by Hunns conflicted with the regional interpretation and because of unseasonally high river water levels several key river traverses were not completed. Consequently it was decided to remap the prospect with particular attention being paid to structural geology and the subdivision of the Cambrian.

The mapping has shown the prospect to be located on a moderately steeply dipping eastern limb of a major north-north-west trending anticline. Bedding is seen to be fairly uniformly orientated around 60.100 and the

005

sequence is upwards facing, see TASH 3526. It has not been possible to produce a plan showing the axial traces of the north-north-west trending fold structures because of complications caused by the effects of major, late stage, northwest-southeast trending faulting and refolding. The axial plane surface of the major structures is orientated on 85.100 and plunge shallowly north. These major fold structures are overprinted by minor east-west trending fold structures which have the effect of locally reversing the predominantly northerly plunge of the major structures. One isoclinal fold was located at 50250E, 21200N during a traverse of the Leven River. The structure had a wavelength of ten centimetres and could possibly be the product of an early isoclinal folding event.

The Cambrian volcanics of the Cattley North prospect are shown as an undifferentiated unit on the St. Valentines 1:50 000 geological sheet released by the Department of Mines. On the basis of the mapping carried out over the past year a subdivision of the Cambrian into five main facies groups has been proposed, see plan TASH 3695. It is felt the bulk of the sequence is epiclastic with lesser tuffaceous and intrusive components evident, see plan TASH 3538. A major northwest-southeast trending fault bisects the prospect and is clearly seen in the ground magnetics data and outcrop lithology plan.

The distribution of a partially fault bounded unit of epidiorite/pyroxene microdiorite were more closely defined, see plan TASH 3695. This unit has a variable magnetite content and is generally medium grained. The exact age of the intrusive is unclear however it has been suggested that the epidiorite may represent a Tertiary basaltic feeder pipe, Corbett. (pers. comm.).

006

## 5.2 Geophysics

The data from the UTEM survey carried out in January 1987 was examined by T. Von Strokirch who concluded, that, of the anomalies identified, the relatively shallow anomaly centred on 50440E, 20000N was the most likely to be due to a conductor. A ground magnetic survey was conducted over the Cattley North grid after the completion of the UTEM survey. The main aim of the survey was to use the ground magnetic data to assist in the interpretation of the EM data. Details of the ground magnetic survey are given below:

### Survey Parameters

The data were collected using a Geometrics G856 Magnetometer. The information was stored on a Toshiba 2100 laptop computer and processed in the field as the survey progressed. All the data were levelled to an arbitrary base station on the ring road at line 20200N.

The survey was conducted on the 200 metre spaced UTEM lines and readings were taken every 12.5 metres along line. The information on lines 19800N and 20000N is of poorer quality than elsewhere in the survey, due to an instrument malfunction.

### Interpretation

Profiles of the data over UTEM anomalies were examined in order to determine whether the postulated conductors might have been associated with contacts rather than

007

discreet conductors. The data were also gridded and contoured at CRAE's Sydney office in order to obtain any structural or geological information present, see TASH 3696.

The contour maps were not of high quality due to the early stage of development of the gridding and plotting packages. However some points of interest were noted. The first is the poor correlation of the magnetics with the mapped geology over a large mafic body microdiorite in the centre of the grid. Why only some portions of this body are magnetic and why the anomaly extends well outside the mapped boundaries remains unexplained.

The exact cause of a very pronounced linear magnetic high near the Roland Conglomerate contact to the east is also unexplained but may be linked to the presence of a magnetite bearing volcanic rich conglomerate. This anomaly is separated from the microdiorite by a sharply defined northwest striking area of low magnetic response possibly fault bounded. The southern boundary of the central magnetic anomaly is also rather abrupt and may indicate some structural control on the microdiorite.

A localised magnetic high in the southern part of the grid not far from DD87CN1 and the best gold geochemistry is due to an outcrop of tertiary basalt.

#### Conclusions

The ground magnetic survey outlines some major structures and was useful in confirming that a line of UTEM anomalies in the northeast of the grid were essentially contact related. However the two hundred

008  
metre line spacing was too great to allow between line extrapolation of any but the most major features and some levelling errors within the data further decrease its quality.

### 5.3 Geochemistry

Initial rock chip samples were collected from road and creek exposures during the course of geological mapping in an effort to define a zone of base metal or gold anomalism, see TASH 3496. Rocks collected from the south west quadrant of the grid gave the most encouragement. In this quadrant black shale/fine grained siltstone units regularly returned greater than 200 ppm lead and a rhyolitic intrusive? returned up to 0.21 ppm Au, 924 ppm Pb, 1100 ppm Ba and 1150 ppm As. Consequently it was decided to collect C horizon soil samples, at 20 metre intervals along grid lines over the south-western corner of the grid. Assay results for these soil samples are given on plans TASH 3570, 3571 and 3572. Gold values were uniformly low with a maximum of 0.05 ppm being recorded. The geological mapping identified a black shale rich sequence, CBS, see plan TASH 3695, which was expected to return elevated base metal levels in soils. However the soils overlying the shale sequence were found to be devoid of any significant base metal anomalism. The most significant base metal anomalies were recorded on lines 20600N and 21200N and are worthy of further follow up with more detailed soil geochemistry. A low order 100-200 ppm lead anomaly of dimensions 100m by 400m was noted to broadly parallel the regional lithological strike in the region of DD87CN1.

009

While bulk cyanide leach samples had been collected from the Cattley North area as a part of the regional programme the density of sampling over the actual Cattley North prospect was considered insufficient and additional samples were collected, see TASH 3534. Assay results for the cyanide leach and -80# stream sediment sampling is given on plan TASH 3576 and 3577. None of the bulk cyanide leach or -80# samples returned significantly anomalous gold with the maximum being 350 ppt. Sampling of the creeks draining Geopeko's original Challenger No. 1 anomaly returned elevated Zinc levels, 100 ppm, but could not match the 200 ppm Pb anomaly Geopeko obtained. Sample number 1198738 was collected from a small creek draining into the Leven River and returned the most uniformly elevated base metal levels, 35 ppm Cu, 75 ppm Pb, and 85 ppm Zn, see TASH 3576. Anomalous lead and zinc levels were noted in soils collected along line 20600N adjacent to this creek, maximum 660 ppm Pb and 240 ppm Zn.

#### 5.4 Drilling

Only one hole, DD87CN1, was drilled on the licence during the past year and it was designed to test a coincident UTEM and 100-200 ppm lead soil anomaly. The drillhole intersected a sequence of silicified dacitic tuffs/epiclastics and interbedded siltstones/sandstones, see plan TASH 3681. Strong shearing and potassic alteration was noted between 94.4 and 98.0. This interval contained approximately 2% disseminated pyrite and is thought to be the cause of the UTEM anomaly. Detailed drillcore logs, petrological data and a memorandum describing the drilling can be found in Appendix 1.

010

Gold assays were very disappointing with a maximum of 0.05 ppm recorded in a strongly chloritized dacitic epiclastic between 100.0 and 102.0 metres which also contained quartz-carbonate-sphalerite veining. Zinc assays were more interesting with 58-76m averaging 0.16% Zn and 388 ppm Pb. It should be noted that because of the flexure affecting the beds there has been an apparent thickening of the sequence. If the effects of this flexure are removed an intersection with a true stratigraphic width of approximately eight metres @ 0.16% Zn remains.

The zinc ratios were calculated for all anomalous, ( $x > 100$  ppm), unoxidized samples in DD87CN1 as per Huston and Large (1987). The authors consider that volcanogenic massive sulphide deposits are characterised by having a zinc ratio with a normal distribution with means ranging from 64 to 77 and standard deviations less than 15. In DD87CN1 the mean was found to be 77.6 and the standard deviation was 7.3. This suggests that mineralization seen in the drillhole may well be of a similar style to that seen at Rosebery.

#### 6. NATIVE TRACK TIER SOUTH PROSPECT

The Native Track Tier South prospect, previously known as Geopeko's Challenger No. 2 prospect was identified using stream sediment geochemistry. Subsequently, a minor grid was established over the area and limited soil sampling was carried out. Geopeko failed to establish the cause of the stream sediment anomaly. Shell took up the ground and carried out a series of IP, gravity and ground magnetic surveys over the area. Additional soil geochemistry was also completed.

011

Strong lead anomalies were recorded in soil samples, maximum 1200 ppm, which Shell geologists attributed to the presence of a trachytic unit. Petrological descriptions of samples of the trachyte note observing crystals of galena. It was noted during a review of the data that several lead anomalies are quite removed from outcropping trachyte. The clearest example of this is a north-west trending 200 to x>600 ppm lead anomaly centred on 411400mE, 5419000mN.

It also appears as if the one hole drilled on the prospect, DDHCD1 was collared just to the west of, and drilled away from an IP chargeability anomaly which assumedly was its target. This drillhole has not been assayed for gold and this should be carried out as soon as practicable. A detailed compilation of existing data should be undertaken. This should be combined with detailed geological mapping and sampling to better establish the distribution and geochemical character of the trachytic unit. Reconnaissance EM should be carried out in an effort to locate a massive sulphide body which may be associated with either lead anomalies in soils or the chargeability anomaly detected by the I.P. survey.

#### 7. REGIONAL GEOCHEMISTRY

A regional stream sediment sampling programme was conducted during 1986-87 and has been reported in von Strokirch (1987). During the year it was suggested that the trace of the Henty Fault may run near north-south beneath the basalt cover, between the Two Hummocks and Cattley North prospects. The major fault seen separating siliceous Ordovician sediments from the Cambrian sequence, just north of Native Track Tier was considered to possibly represent the northernmost section of the Henty Fault. Consequently it

was decided to sample the creeks draining this major fault structure in more detail. Sample number locations and assay results are shown on plan TASH 3356. No gold anomalism was detected in creeks draining the fault and only weakly anomalous, 65 ppm lead, base metal assays were returned. In view of the discouraging results it is recommended that no further work be carried out in this area.

8. REFERENCES

HUSTON D.L. & LARGE R.R. (1987) "Genetic and Exploration Significance of the Zinc Ratio (100 Zn/(Zn+Pb) in Massive Sulphide Systems." Economic Geology, Vol. 82, 001521-1539.

ROGERS M.C. (1976) "Loongana Area Tasmania. Progress Report Exploration Licence 2/76." Geopeko E-Z Joint Venture. Company Report No. KI-76-5.

Von STROKIRCH T. (1988) "Loongana E.L. 36/79 Report on Exploration for 12 Months to 1st April 1987" CRAE Internal Report 14399.

9. LOCATION

Burnie SK5503 1:250 000

Hellyer 8015 1:100 000

10. KEYWORDS

Cambrian, Ordovician, Acid Volcanics, Pyroclastics, Geochem Drainage, Geochem Rock, Geochem Soil, Geol Mapping Detailed, Geophys Magnetic, Drill Diamond.

11. LIST OF PLANS

<u>Plan</u> <u>TASh No.</u>	<u>Description</u>	<u>Scale</u>
2954	LOONGANA E.L. 36/79 Location Plan	1:1 000 000
2956	LOONGANA E.L. 36/79 EL & Prospect Location Plan	1:100 000
3356	LOONGANA E.L. 36/79 Regional Stream Sediment Sample Locations 1985-86 with Anomalous Results	1:25 000
3491	LOONGANA E.L. 36/79 Cattley North Prospect UTEM Channel 5 Data	1:10 000
3496	LOONGANA E.L. 36/79 Cattley North Prospect Sample Number Locations	1:10 000
3534	LOONGANA E.L. 36/79 Cattley North Prospect Stream Sediment Sample Number Locations	1:10 000
3536	LOONGANA E.L. 36/79 Cattley North Prospect Structural Geology	1:10 000
3538	LOONGANA E.L. 36/79 Cattley North Prospect Outcrop Lithology	1:10 000
3554	LOONGANA E.L. 36/79 Cattley North Prospect Soil Sample Location Plan	1:10 000
3570	LOONGANA E.L. 36/79 Cattley North Prospect Soil Geochemistry Cu-Pb-Zn (ppm)	1:10 000

014

3571	LOONGANA E.L. 36/79 Cattley North Prospect Soil Geochemistry Fe(%)-Mn-Mo (ppm)	1:10 000
3572	LOONGANA E.L. 36/79 Cattley North Prospect Soil Geochemistry Ag-As-Au (ppm)	1:10 000
3576	LOONGANA E.L. 36/79 Cattley North Prospect Stream Sediment Cu-Pb-Zn Geochemistry	1:10 000
3577	LOONGANA E.L. 36/79 Cattley North Prospect, Gold Geochemistry	1:10 000
3681	LOONGANA E.L. 36/79 Cattley North Prospect, DD87CN1 20 000N Section	1:500
3695	LOONGANA E.L. 36/79 Cattley North Prospect, Interpreted Lithology Plan	1:10 000
3696	LOONGANA E.L. 36/79 Cattley North Prospect, Ground Magnetic Contours with Interpreted Faults	1:5 000

015

12. LIST OF APPENDICES

- Appendix 1 Drillcore Logs, Petrological Report and Memorandum on DD87CN1.
- Appendix 2 Geochemical Ledgers - Cattley North Soil Sampling.
- Appendix 3 Geochemical Ledgers - Stream Sediment Samples.
- Appendix 4 Geochemical Ledgers and Petrological Report - Cattley North prospect - Outcrop and Float Samples.

APPENDIX 1

DRILLCORE LOGS, PETROLOGICAL REPORT AND MEMORANDUM

ON DD87CN1

01-017



# C.R.A. EXPLORATION PTY. LIMITED

(INC. IN N.S.W.)

1207 TASMAN HIGHWAY, CAMBRIDGE, TASMANIA 7170

P.O. BOX 138 796018

HELLERIE TOWER  
TELEGRAMS CRAEX  
TELEX: 4457124  
TELEPHONE 48 5499  
AREA CODE (062)

IN REPLY PLEASE QUOTE

FRF.W6.9.36/79

12 January 1988

Memorandum to: T W DICKSON

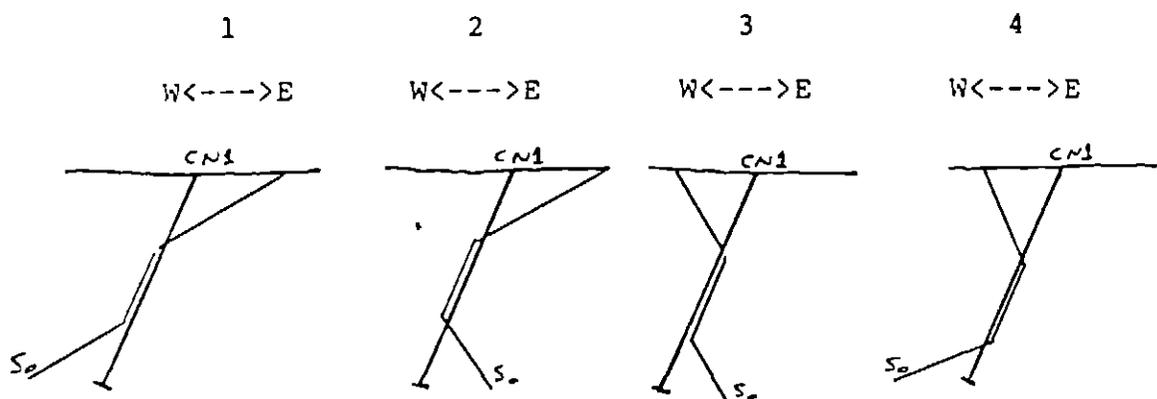
Copy to: FILE

From: F R FUNNELL

## CATTLEY NORTH DRILLING - LOONGANA E.L. 36/79

A UTEM survey was carried out over the Cattley North grid in January 1987. Examination of the channel five data defined several anomalies, see TASH 3491. These anomalies were modelled by Torbjorn von Strokirch who concluded that the relatively shallow anomaly centred on 50440E, 20000N was the most promising. Soil sampling (C horizon) was carried out at 20 metre spacing along grid lines. A weak Pb anomaly of 100-200ppm was delineated in soils overlying the UTEM anomaly and this anomalous zone was seen to parallel the regional lithological strike. Geological mapping carried out over the prospect had shown the anomaly to be located on moderately steeply dipping eastern limb of a major north-north west plunging anticline.

Drillhole DD87CN1 was collared on 50473E, 20009N and drilled at  $-65^{\circ}$  towards  $290^{\circ}$  (mag), see TASH 3681. The hole was designed to intersect the target between 70 and 80 metres. Lithologies encountered are shown on TASH 3681. The drillhole intersected a silicified sequence of Dacitic tuffs/epiclastics and interbedded siltstone/sandstones. The coarse dacitic intersected between 8.0 and 26.5m showed characteristics of both an epiclastic and a shallow intrusive and showed some evidence of brecciation. Minor shearing was noted at the contact between the coarse and finer dacitic units at 26.5m. A sequence of interbedded silts and shales were encountered between 60.0 and 101.5m. Over most of this interval bedding has been rotated into parallelism with the core axis. Analysis of the bedding/core axis angle presents four alternatives:



Surface mapping has shown sequence to be uniformly east dipping and upwards younging, consequently only solutions 3 or 4 can be correct. It is felt that number 3 best reflects the actual structure present as option 4 would require a major plunging inclined fold whose axial plane was orientated perpendicular to the core axis. During surface mapping no such folds were observed and no foliation perpendicular to the core axis was noted while logging the core. Between 94.4 and 98.0 strong shearing and fracturing was noted. This was associated with strong potassic alteration and approximately 2% disseminated pyrite. Stratigraphically below the shales is a sequence of dacitic epiclastics. This shearing and associated alteration is thought to be the cause of the UTEM anomaly.

Gold assays were very dissapointing with a maximum of 0.05 ppm recorded in a strongly chloritized dacitic epiclastic between 100.0 and 102.0 metres which also contained quartz-carbonate-sphalerite veining. Zinc assays were more interesting with 58-76m averaging 0.16% Zn and 440 ppm Pb while 88-100m averaged 0.15% Zn and 388 ppm Pb. It should be noted that because of the flexure affecting the beds there has been an apparent thickening of the sequence. If the effects of this flexure are removed an intersection with a true stratigraphic width of approximtely eight metres @ 0.16% Zn remains.

The zinc ratios were calculated for all anomalous, ( $x > 100$  ppm), unoxidized samples in DD87CN1 as per Huston and Large (1987). The authors consider that volcanogenic massive sulphide deposits are characterised by having a zinc ratio with a normal distribution with means ranging from 64 to 77 and standard deviations less than 15. In DD87CN1 the mean was found to be 77.6 and the standard deviation was 7.3. This suggests that mineralization seen in the drillhole may well be of a similar style to that seen at Rosebery, i.e. a volcanogenic massive sulphide system.

*F. R. Funnell*

F R FUNNELL

019

50430E

50450E

50470E

50490E

796020

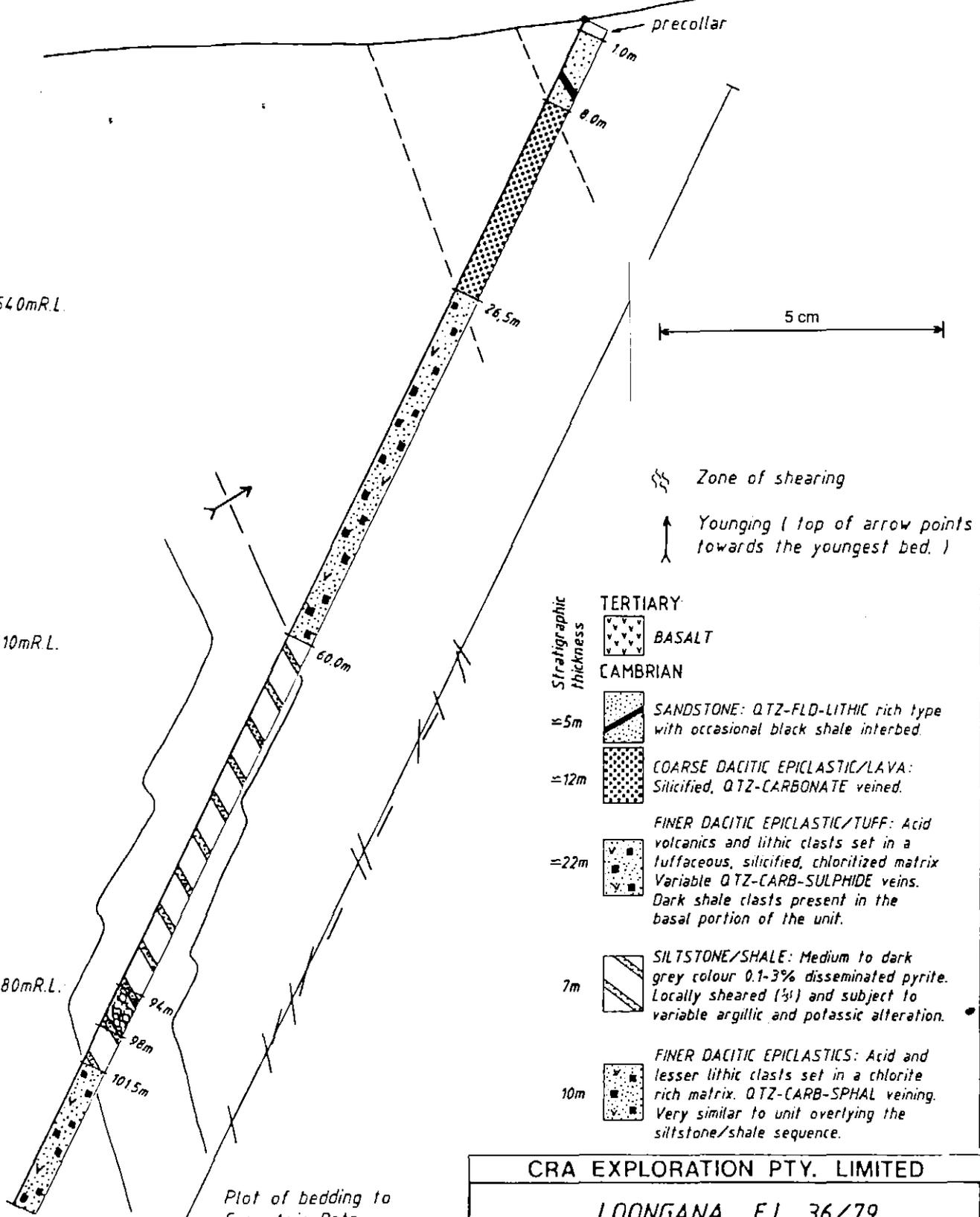
570mR.L.

540mR.L.

510mR.L.

480mR.L.

450mR.L.



Zone of shearing

Younging (top of arrow points towards the youngest bed.)

- TERTIARY**
- Stratigraphic thickness: 1.0m BASALT
- CAMBRIAN**
- Stratigraphic thickness: ≈5m SANDSTONE: QTZ-FLD-LITHIC rich type with occasional black shale interbed.
  - Stratigraphic thickness: ≈12m COARSE DACITIC EPICLASTIC/LAVA: Silicified, QTZ-CARBONATE veined.
  - Stratigraphic thickness: ≈22m FINER DACITIC EPICLASTIC/TUFF: Acid volcanics and lithic clasts set in a buffaceous, silicified, chloritized matrix. Variable QTZ-CARB-SULPHIDE veins. Dark shale clasts present in the basal portion of the unit.
  - Stratigraphic thickness: 7m SILTSTONE/SHALE: Medium to dark grey colour 0.1-3% disseminated pyrite. Locally sheared (3%) and subject to variable argillic and potassic alteration.
  - Stratigraphic thickness: 10m FINER DACITIC EPICLASTICS: Acid and lesser lithic clasts set in a chlorite rich matrix. QTZ-CARB-SPHAL veining. Very similar to unit overlying the siltstone/shale sequence.

Plot of bedding to Core Axis Data.

E.O.H. 115.5m

Collar co-ords : 50 473E  
 Local : 20 009N  
 Collar co-ords : 404 135mE  
 A.M.G. : 5 411 444mN  
 Dip & Azimuth : -65°  
 0m - 114m : 290° Mag.  
 Dip & Azimuth : -62°  
 114m - 115.5m : 286° Mag.  
 End of Hole : 115.5 m.

CRA EXPLORATION PTY. LIMITED

LOONGANA E.L. 36/79  
 CATTLEY NORTH PROSPECT  
 DD87 CN1  
 20 000N SECTION

REF.	SK55 - 3	( 8015 - 8115 )
SCALE	1 : 500	DRAWN R.T.
AUTHOR	F.R.F.	REPORT No.
DATE	7 - 1 - 1988	PLAN No. TASH 3681



# Australian Laboratory Services PTY. LTD.

Brisbane Head Office and Laboratory  
 32 Strand Street, Stafford, Q. 4053  
 P.O. Box 66, Everton Park, Q. 4053  
 Phone: (07) 352 5577. Telex: ALSEV 4224  
 Fax: (07) 352 6109.

Perth Office and Laboratory  
 16 Bassendean Road, Bayswater, W.A. 6051  
 Phone: (08) 272 2300. Fax: (08) 272 5748

Townsville Laboratory  
 21 Bombala Street, Garbutt, Q. 4814  
 Phone: (077) 79 9155 Fax: (077) 799 729

**CONSULTING ANALYTICAL CHEMISTS**  
**LABORATORY REPORT**

Charters Towers Laboratory  
 18 Drew Street, Charters Towers, Q. 4820  
 Phone: (077) 87 4155. Fax: (077) 87 4220.

Bendigo Laboratory  
 274 Victoria Street, Eaglehawk, Vic. 3556  
 Phone: (054) 46 1390. Fax: (054) 46 1389.

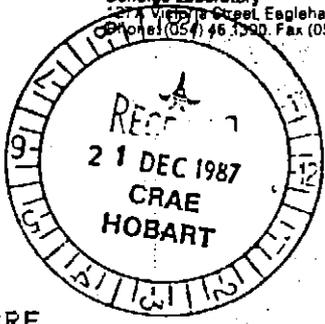
INCORPORATED IN QUEENSLAND

$$Zn \text{ ratio} = \frac{100 Zn}{Zn + Pb}$$

Client: **CRA EXPLORATION PTY. LTD.**  
 Address: **P.O. BOX 138 ROSNY PARK TAS 7018**  
 Mean 60-77 SD < 15

Contact: **MR. F. FUNNELL**

Order No.: **DPD 46258** Sample Type: **CORE**



Page 1 of 4

Batch Number: M057

No. of Samples: 54  
 Date Received: 07/12/87  
 Date Completed: 15/12/87

0087CML

SAMPLE NUMBER	Element Unit Method	Cu ppm IC582	Pb ppm IC582	Zn ppm IC582	Ag ppm IC582	As ppm IC582
1653801	73	15	60	160	1	7
1653802	86	15	15	95	1	<1
1653803	75	50	35	105	1	<1
1653804	95	5	5	100	1	1
1653805	80	10	15	60	1	1
1653806	96	30	<5	60	1	<1
1653807	91	45	5	50	1	<1
1653808	97	55	<5	75	1	<1
1653809	91	10	<5	85	1	<1
1653810	90	20	10	90	1	1
1653811	85	10	10	55	1	4
1653812	68	10	35	75	1	10
1653813	80	20	65	260	1	8
1653814	73	15	150	410	1	4
1653815	73	35	55	145	1	<1
1653816	68	20	65	135	1	1
1653817	48	30	105	95	1	2
1653818	67	20	40	80	1	1
1653819	69	25	40	90	1	<1
1653820	64	35	45	80	1	1
1653821	62	15	55	90	1	2
1653822	89	15	45	370	1	3
1653823	68*	20	230	480	1	5
1653824	76	5	40	125	1	3
1653825	59*	10	120	175	1	2
1653826	73	10	490	1300	1	10
1653827	78	10	620	2150	1	14
1653828	73	10	580	1550	1	14
1653829	79	25	390	1500	1	17
1653830	79	20	500	1850	1	20
Detection Limit:		5	5	5	1	1

Comments:

$\bar{x} = 76.45$   
 $\sigma_{n-1} = 14.24$   
 $\sigma_{n-1} = 14.11$

MRV = 60-77  
 $\sigma = < 15$   
 F-test

This Laboratory is registered by the National Association of Testing Authorities, Australia. The tests reported herein have been performed in accordance with its terms of registration. This Document shall not be reproduced except in full.



Signatory: *M. Finlayson*  
*Anonymous*

Registered Laboratory No. 825

39 pts  $\bar{x} = 77.59 \sigma_{n-1} = 7.23$



# Australian Laboratory Services PTY. LTD.

021 CONSULTING ANALYTICAL CHEMISTS  
 INCORPORATED IN QUEENSLAND  
**LABORATORY REPORT**

Charters Towers Laboratory  
 18 Drew Street, Charters Towers, Q. 4820  
 Phone: (077) 87 4155. Fax: (077) 87 4220.  
 Bendigo Laboratory  
 127A Victoria Street, Eaglehawk, Vic. 3556.  
 Phone: (054) 46 1390. Fax: (054) 46 1389.

Brisbane Head Office and Laboratory  
 32 Shand Street, Stafford, Q. 4053.  
 P.O. Box 86, Everton Park, Q. 4053.  
 Phone: (07) 352 5577. Telex: ALSEV 4234.  
 Fax: (07) 352 5109.  
 Perth Office and Laboratory  
 16 Bazaar Lane, Baywater, W.A. 6015.  
 Phone: (08) 272 2300. Fax: (08) 272 5757.  
 Townsville Laboratory  
 21 Bombala Street, Garbutt, Q. 4814.  
 Phone: (077) 79 9155. Fax: (077) 799 729.

Client: CRA EXPLORATION PTY. LTD.  
 Address: P.O. BOX 138  
 ROSNY PARK  
 TAS 7018  
 Contact: MR. F. FUNNELL  
 Order No. DPD 46258

Batch Number: M057

No. of Samples: 54  
 Date Received: 07/12/87  
 Date Completed: 15/12/87

Sample Type: CORE

SAMPLE NUMBER	Element Unit Method	Fe % IC582	Mn ppm IC582	Mo ppm IC582	Au ppm PM209	Au(R) ppm CHECKS
1653801		4.84	330	<5	<0.01	
1653802		4.67	410	<5	<0.01	
1653803		3.88	470	<5	<0.01	
1653804		2.82	630	<5	<0.01	
1653805		2.84	410	<5	<0.01	
1653806		3.00	430	<5	<0.01	
1653807		2.59	480	<5	<0.01	
1653808		3.27	480	<5	<0.01	
1653809		2.83	380	<5	<0.01	
1653810		3.20	600	<5	<0.01	
1653811		2.44	830	<5	<0.01	
1653812		2.84	620	<5	<0.01	<0.01
1653813		2.37	610	<5	<0.01	
1653814		2.69	780	<5	<0.01	
1653815		3.57	450	<5	<0.01	
1653816		3.42	450	<5	<0.01	
1653817		2.41	510	<5	<0.01	
1653818		2.70	410	<5	<0.01	<0.01
1653819		3.33	370	<5	0.01	
1653820		2.99	410	<5	0.02	
1653821		2.64	540	<5	0.01	
1653822		2.07	1100	<5	0.02	
1653823		2.00	950	<5	0.02	
1653824		2.81	630	<5	0.01	
1653825		4.35	540	<5	0.01	
1653826		4.02	490	<5	0.01	
1653827		1.88	680	<5	0.01	
1653828		1.82	410	<5	0.01	
1653829		3.52	940	<5	<0.01	
1653830		2.33	950	<5	0.01	
Detection Limit:		0.01	5	5	0.01	

Comments:



This Laboratory is registered by the National Association of Testing Authorities, Australia. The tests reported herein have been performed in accordance with its terms of registration. This Document shall not be reproduced except in full.

Signatory: *A. Finlayson*



# Australian Laboratory Services PTY. LTD.

022 CONSULTING ANALYTICAL CHEMISTS

INCORPORATED IN QUEENSLAND

## LABORATORY REPORT

**Charters Towers Laboratory**  
18 Drew Street, Charters Towers, Q. 4820  
Phone: (077) 87 4155 Fax: (077) 87 4220.  
**Bendigo Laboratory**  
127A Victoria Street, Eaglehawk, Vic. 3556.  
Phone: (054) 46 1390 Fax: (054) 46 1369.

**Brisbane Head Office and Laboratory**  
32 Shand Street, Stafford, Q. 4053.  
P.O. Box 68, Everton Park, Q. 4053.  
Phone: (07) 352 5577. Telex: ALSEV 400.  
Fax: (07) 352 5109.  
**Perth Office and Laboratory**  
16 Beasenden Road, Bayswater, W.A. 6015.  
Phone: (09) 272 2300. Fax: (09) 272 5700.  
**Townsville Laboratory**  
21 Bombala Street, Garbutt, Q. 4814.  
Phone: (077) 79 9155. Fax: (077) 799 729.

Client: CRA EXPLORATION PTY. LTD.  
Address: P.O. BOX 138  
ROSNY PARK  
TAS

7019

Batch Number: 1057

Contact: MR. F. FUNNELL

No. of Samples: 54  
Date Received: 07/12/87  
Date Completed: 15/12/87

Order No. DP0 46258

Sample Type: CORE

SAMPLE NUMBER	Element Unit Method	Cu ppm IC582	Pb ppm IC582	Zn ppm IC582	Ag ppm IC582	As ppm IC582
1653831	85	25	400	2200	1	26
1653832	81	70	240	1000	1	38
1653833	80	30	340	1200	2	32
1653834	79	35	400	1500	1	34
1653835	77	35	230	770	1	34
1653836	75	35	145	440	1	34
1653837	78	35	145	510	1	42
1653838	15	<5	<5	<5	1	<1
1653839	70	35	260	610	1	42
1653840	75	35	270	790	2	55
1653841	80	35	270	1050	2	44
1653842	83	25	470	2350	1	36
1653843	76	35	370	1200	2	55
1653844	76	15	500	1550	1	12
1653845	76	15	270	860	1	3
1653846	81	15	450	1900	1	16
1653847	80	15	165	650	1	9
1653848	58	10	310	430	1	5
1653849	42	10	75	860	1	5
1653850	86	10	120	720	1	5
1653851	83	15	165	780	1	7
1653852	78	15	270	930	1	6
1653853	83	10	190	950	1	7
1653854	83	15	185	920	1	6

Detection Limit:	5	5	5	1	1
------------------	---	---	---	---	---

Comments:

This Laboratory is registered by the National Association of Testing Authorities, Australia. The tests reported herein have been performed in accordance with its terms of registration. This Document shall not be reproduced except in full.

Signatory: *[Signature]*



Registered Laboratory No. 825



# Australian Laboratory Services PTY. LTD.

023

INCORPORATED  
IN QUEENSLAND

CONSULTING ANALYTICAL CHEMISTS

## LABORATORY REPORT

**Charlton Towers Laboratory**  
18 Drew Street, Charlton Towers, Q. 4820  
Phone: (077) 87 4155. Fax: (077) 87 4220.  
**Bendigo Laboratory**  
127A Victoria Street, Eaglehawk, Vic. 3556.  
Phone: (054) 46 1390. Fax: (054) 46 1389.

**Brisbane Head Office and Laboratory**  
32 Shand Street, Stafford, Q. 4053.  
P. O. Box 66, Everton Park, Q. 4053.  
Phone: (07) 352 5577. Telex: ALSEV 4224.  
Fax: (07) 352 5109.  
**Perth Office and Laboratory**  
16 Beasenden Road, Bayswater, W.A. 6017  
Phone: (09) 272 2300. Fax: (09) 272 578  
**Townsville Laboratory**  
21 Bombala Street, Gardulf, Q. 4814  
Phone: (077) 79 9155. Fax: (077) 799 729

Client: **CRA EXPLORATION PTY. LTD.**  
Address: **P.O. BOX 139  
ROSNY PARK  
TAS 7018**  
Contact: **MR. F. FUNNELL**  
Order No. **DPD 46258**

Page 4 of 4

Batch Number: **M057**

No. of Samples: **54**  
Date Received: **07/12/87**  
Date Completed: **15/12/87**

Sample Type: **CORE**

SAMPLE NUMBER	Element Unit Method	Fe % IC582	Mn ppm IC582	Mo ppm IC582	Au ppm PM209	Au(R) ppm CHECKS
1653831		2.28	1750	<5	0.02	
1653832		2.76	1900	<5	0.02	
1653833		3.74	930	<5	0.01	
1653834		4.21	750	<5	0.04	
1653835		2.95	900	<5	0.03	0.05
1653836		2.32	1600	<5	0.05	0.04
1653837		2.80	1850	<5	0.04	
1653838		<0.01	20	<5	0.04	
1653839		2.82	1500	<5	0.04	
1653840		3.25	2150	<5	0.04	
1653841		2.70	1750	<5	0.05	
1653842		2.36	1200	10	0.01	
1653843		2.80	1900	<5	0.05	
1653844		3.04	520	<5	0.04	
1653845		5.26	540	<5	0.01	
1653846		3.20	810	<5	0.03	
1653847		2.77	510	<5	0.05	
1653848		3.02	560	<5	0.01	
1653849		3.50	540	<5	0.02	
1653850		3.65	670	<5	0.02	
1653851		3.83	700	<5	0.01	
1653852		3.56	700	<5	0.02	
1653853		3.19	640	<5	0.02	0.01
1653854		3.49	640	<5	0.01	0.01
Detection Limit:		0.01	5	5	0.01	

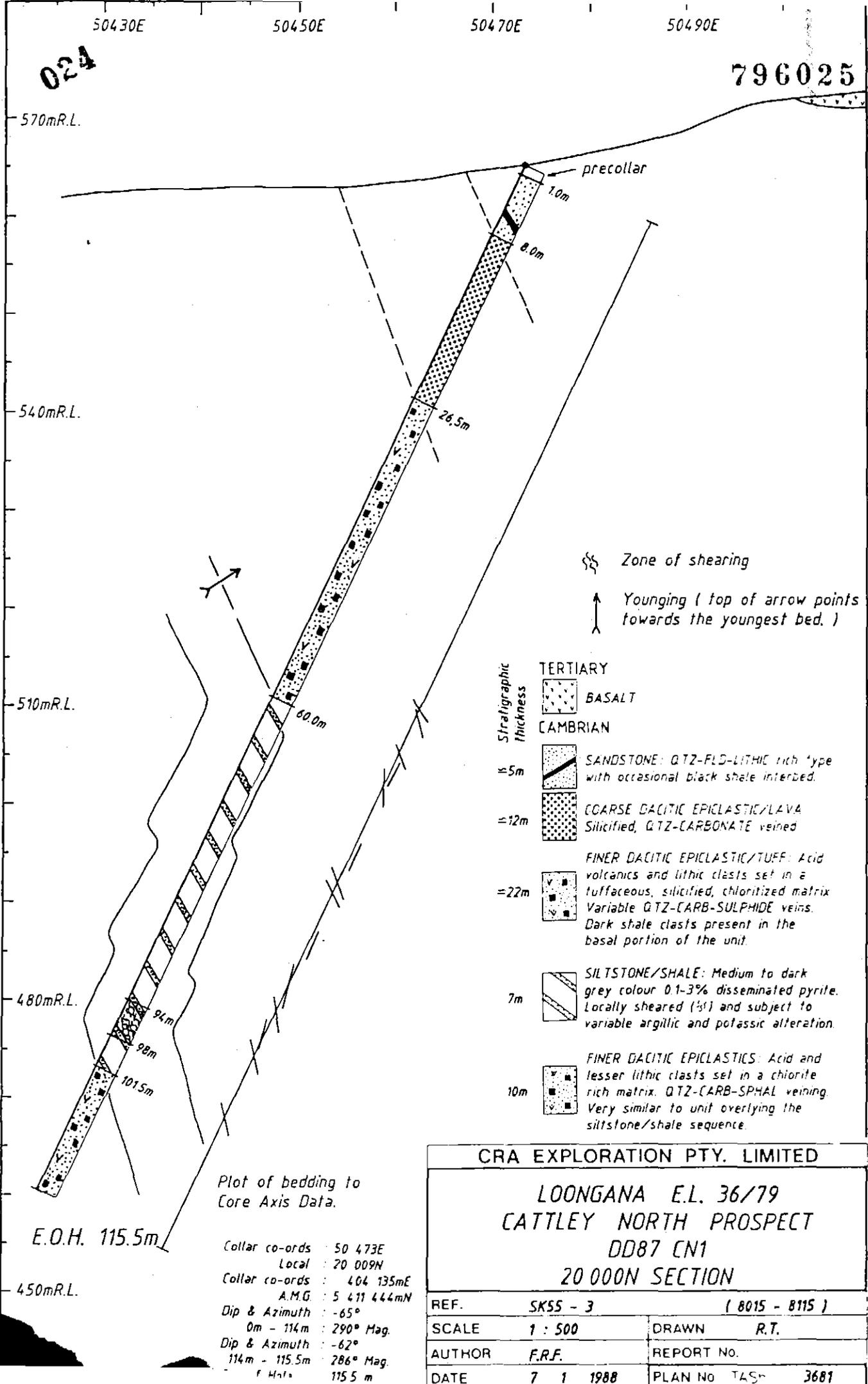
Comments:



This Laboratory is registered by the National Association of Testing Authorities, Australia. The tests reported herein have been performed in accordance with its terms of registration. This Document shall not be reproduced except in full.

Signatory: *A. J. Finlayson*

Registered Laboratory No. 825



024

796025

570mR.L.

540mR.L.

510mR.L.

480mR.L.

450mR.L.

pre-collar

1.0m

8.0m

26.5m

60.0m

94m

98m

101.5m

E.O.H. 115.5m

§§ Zone of shearing

↑ Younging (top of arrow points towards the youngest bed.)

- Stratigraphic thickness
- TERTIARY
    - BASALT
  - CAMBRIAN
    - ≅5m SANDSTONE: QTZ-FLD-LITHIC rich type with occasional black shale interbed.
    - ≅12m COARSE DACITIC EPICLASTIC/LAVA  
Silicified, QTZ-CARBONATE veined
    - ≅22m FINER DACITIC EPICLASTIC/TUFF: Acid volcanics and lithic clasts set in a tuffaceous, silicified, chloritized matrix. Variable QTZ-CARB-SULPHIDE veins. Dark shale clasts present in the basal portion of the unit.
    - 7m SILTSTONE/SHALE: Medium to dark grey colour 0.1-3% disseminated pyrite. Locally sheared (§§) and subject to variable argillic and potassic alteration.
    - 10m FINER DACITIC EPICLASTICS: Acid and lesser lithic clasts set in a chlorite rich matrix. QTZ-CARB-SPHAL veining. Very similar to unit overlying the siltstone/shale sequence.

Plot of bedding to Core Axis Data.

Collar co-ords : 50 473E  
 Local : 20 009N  
 Collar co-ords : 404 135mE  
 A.M.G. : 5 411 444mN  
 Dip & Azimuth : -65°  
 0m - 114m : 290° Mag.  
 Dip & Azimuth : -62°  
 114m - 115.5m : 286° Mag.  
 f Hole : 115.5 m

CRA EXPLORATION PTY. LIMITED			
LOONGANA E.L. 36/79			
CATTLEY NORTH PROSPECT			
DD87 CN1			
20 000N SECTION			
REF.	SK55 - 3	( 8015 - 8115 )	
SCALE	1 : 500	DRAWN	R.T.
AUTHOR	F.R.F.	REPORT No.	
DATE	7 1 1988	PLAN No	TASr 3681

796026

C.R.A. EXPLORATION PTY. LIMITED  
DRILL CORE LOG

SHEET No. 01

No. 36/70

20009N on 290° (mag)

DIAMOND

CO-ORDINATES 50473E AZIMUTH 286° (mag) DRILLERS RAIWEAS, TAMANA COMMENCED 18-11-1987 DEPTH 115.5m HOLE No. DRK7CN1

RL COLLAR 2.565m AS4 INCLINATION on -65° DRILL TYPE LONGYEAR 38 COMPLETED 22-11-1987 CASING LEFT 115m PVC DPO No(s) 46258

TENEMENT NAME LOONGANA

PLAN - MAP REFERENCE

DEPTH		Core Rec. (M)	Core Size	Graphic Log	CORE DESCRIPTION	SPECIAL FEATURES Weath, Alteration, Fracturing, Veining, Mineralization	Sample No.	From (M)	To (M)	Rec (M)	ASSAY VALUES (Analysed by A.L.S. P.R.I.S.)										
From (M)	To (M)										← ICS 82 →										
											SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>	CaO	PL	Zn	Ag	As	Fe%	Mn	M	
0.0	1.0	-	HW		PRECOLLAR																
1.0	4.0	0.8	HQ		SANDSTONE - Fine grained, Qtz 50%, Fid 20%, Lohu 20%, mica 10%																
4.0	8.2	1.2	HQ		SANDSTONE / SANDY SHALE																
8.20	9.00	0.8	HQ		COARSE DACITIC EPICLASTIC? A green-grey matrix composed of chert, plagioclase (both and chlorite contains large 6-30mm diam dots (dots) of feldspathic material. The clasts look agglutinated. A well defined foliation is seen (across core axis). Minor 2-5% disseminated pyrite, mainly in the clasts. Rock is strongly silicified and fractured (brecciated??) This unit 8.0 → 26.3m possibly a brecciated porphyritic dacitic volcanic which has been subject to strong silicification	1653801	8.00	10.00			20.01	15	60	160	1	7	4.84	330	45		
9.00	12.00	3.1	HQ		COARSE DACITIC EPICLASTIC? (Possibly brecciated lava) as above. Qtz vein 2-3m wide at 11.20m, vein qtz grey 2.5-3m wide and orientated at 60-70° to the CA.	1653802	10.00	12.00			20.01	15	15	95	1	<1	4.67	410	45		
12.00	15.00	3.0	HQ		COARSE DACITIC EPICLASTIC (Possibly brecciated lava). Petrological sample 1651860 taken from 14.0-14.1m. Strongly silicified Qtz-clay veins at 12.30, 13.20 and 14.50m	1653803	12.00	14.00			20.01	50	35	105	1	<1	3.88	470	45		
15.00	17.60	-	HQ		COARSE DACITIC EPICLASTIC/LAVA. Minor pyrite on fractures at 17.60m	1653804	14.00	16.00			20.01	5	5	100	1	1	2.82	630	45		
17.60	22.2	4.0	NQ		COARSE DACITIC EPICLASTIC/LAVA. 1% disseminated > selverite pyrite	1653805	16.00	18.00			20.01	10	15	60	1	1	2.84	410	45		
22.20	25.50	3.3	NQ		COARSE DACITIC EPICLASTIC LAVA, 0.5% disseminated pyrite at 23.80m - minor quartz vein	1653806	18.00	20.00			20.01	30	<5	60	1	<1	3.00	430	45		
25.50	26.30	0.6	NQ		COARSE DACITIC EPICLASTIC/LAVA Chlorite content increasing, silicification decreasing. Corresponds to increasing thinning and sheared development, fine grained disseminated pyrite approx 3%. Some Fe developed??	1653808	22.00	24.00			20.01	55	<5	75	1	<1	3.27	480	45		
26.30	26.50	0.1	NQ		SHEARED DACITIC EPICLASTIC/LAVA COARSE GRAINED TYPE. Strong chlorite development, fine grained disseminated pyrite approx 3%. Some Fe developed??	1653809	24.00	26.00			20.01	10	<5	85	1	<1	2.83	380	45		
26.5	27.5	1.0	NQ		FINER GRAINED EPICLASTIC/TUFF. Fragments of acid volcanics and lithic set in a chlorite rich matrix. Qtz-carbonate vein is seen at 60-70° to CA between 27.10 and 27.15. Foliation is orientated at 10° to CA	1653810	26.00	28.00			20.01	20	10	90	1	1	3.20	600	45		

796027

C.R.A. EXPLORATION PTY. LIMITED  
DRILL CORE LOG

SHEET No. 02

TENEMENT NAME..... LOONSA NA..... No. 36/79

PLAN - MAP REFERENCE.....

20009 N on 290° (mag) PLAN 0  
 CO-ORDINATES 50473 E AZIMUTH 286° (mag) DRILLERS DRILLERS TAS COMMENCED 18-11-1987 DEPTH 115.5 HOLE No. P.D. 802 N1  
 RL COLLAR 2565m ASL INCLINATION 62° DRILL TYPE LONG STEAS 28 COMPLETED 22-11-1987 CASING LEFT 115m PVC DPO No(s) 46258

DEPTH		Core Rec. (M)	Core Size	Graphic Log	CORE DESCRIPTION	SPECIAL FEATURES Weath, Alteration, Fracturing, Veining, Mineralization	Sample No.	From (M)	To (M)	Rec (M)	ASSAY VALUES (Analysed by A.L.S. (98/1))									
From (M)	To (M)										← ICS 82 →									
												Au	Cu	PL	Zn	A <sub>1</sub>	A <sub>2</sub>	Fe%	Mn	M
27.5	28.5	1.0	NQ		FINER GRAINED FELSIC EPICLASTIC / TUFF? Acid volcanic clasts 3-30mm diam generally 3-9mm diam some lathic and black shale clasts within a tuffaceous matrix. 4cm wide QZ-cab vein at 27.50m. Thin 2-5mm QZ-cab vein are common and few limpy pyrite selvages.		1653811	28.0	30.00			40.01	10	10	55	1	4	2.44	830	<5
28.50	34.50	7.4	NQ		FINER GRAINED FELSIC EPICLASTIC / TUFF. As above Silicified		1653812	30.0	32.00			40.01	10	35	75	1	10	2.84	620	<5
34.50	37.50	3.0	NQ		FINER GRAINED FELSIC EPICLASTIC / TUFF. Silicified, interbedded composition, acid volcanic clasts and lathic set in a tuffaceous matrix. Pot sample 1651861 collected from 34.6-34.7m		1653813	32.00	34.00			40.01	20	65	260	1	8	2.37	610	<5
					QZ-cabonite veins at 35.7 and 36.7m		1653814	34.00	36.00			40.01	15	150	410	1	4	2.69	780	<5
							1653815	36.00	38.00			40.01	35	55	145	1	<1	3.57	450	<5
37.50	43.50	6.0	NQ		FINER GRAINED FELSIC EPICLASTIC / TUFF. Silicified. A quartz-cabonite vein 5-10mm wide at 38.70m contains one slab of SALENA. White clay (KAOLIN?) vein to C.A. common and more pervasive alteration of feldspars noted.		1653816	38.00	40.00			40.01	20	65	135	1	1	2.42	450	<5
							1653817	40.00	42.00			40.01	30	105	95	1	2	2.41	510	<5
							1653818	42.00	44.00			40.01	20	40	80	1	1	2.70	410	<5
43.50	45.50	2.0	NQ		FINER GRAINED FELSIC EPICLASTIC / TUFF. Soil moderate clay content, in veins and replacements in places grades into the coarse grained type. Brecciated? As 44.50m see a 10cm wide QZ-Talc? vein with minor sphalerite present. Minor 2-5% disseminated pyrite throughout.		1653819	44.0	46.00			0.01	25	40	90	1	<1	3.33	370	<5
45.50	48.50	3.0	NQ		FINER GRAINED FELSIC EPICLASTIC / TUFF. Disseminated pyrite = 0.5%. At 48.30m a 10cm wide QZ-CARR vein.		1653820	46.00	48.00			0.02	35	45	80	1	1	2.49	410	<5
48.50	49.50	1.0	NQ		FINER GRAINED FELSIC EPICLASTIC / TUFF Increased pyrite now 1% as disseminations and clots in very fine grained.															
49.50	52.20	2.7	NQ		FINER GRAINED FELSIC EPICLASTIC / TUFF Pyrite 2% as disseminations and in selvages. QZ-CARR veins at 60-70' to C.A. QZ-CARR veins at 49.6, 51.0 and 51.5m contain occasional 1-2mm diam sphalerite crystals.		1653821	48.00	50.00			0.01	15	55	90	1	2	2.64	520	<5
52.20	55.30	3.0	NQ		FINER GRAINED FELSIC EPICLASTIC / TUFF. Pyrite 1% present as microcrystalline disseminations and coarse grained selvages. QZ-CARR-SCHM veining common 4-5/m. Calcite appears in patches.		1653822	50.00	52.00			0.02	15	45	370	1	3	2.07	1100	<5
							1653823	52.00	54.00			0.02	20	230	490	1	5	2.00	850	<5
							1653824	54.00	56.00			0.01	5	40	125	1	3	2.81	630	<5

796028

C.R.A. EXPLORATION PTY. LIMITED  
DRILL CORE LOG

SHEET No. 03

TENEMENT NAME LOON SANA No. 26/79

PLAN - MAP REFERENCE

CO-ORDINATES 20009N on 290°(avg) 50473E AZIMUTH 286°(avg) DRILLERS TAS COMMENCED 18-11-1987

DEPTH 115.5m HOLE No. D087CN2

RL COLLAR 565m ASL INCLINATION 62° DRILL TYPE LOON SANA 38 COMPLETED 22-11-1987

CASING LEFT 115m PVC DPO No(s) 46258

DEPTH		Core Rec. (M)	Core Size	Graphic Log	CORE DESCRIPTION	SPECIAL FEATURES Weath, Alteration, Fracturing, Veining, Mineralization	Sample No.	From (M)	To (M)	Rec (M)	ASSAY VALUES (Analysed by A.S. (C.R.A.S.))									
From (M)	To (M)										As	Cu	PL	Zn	Ag	As	Fe%	Mn	Mg	
55.3	57.50	2.2	NQ		FINE SANDY FELSIC EFFUSIVE. Some interbeds of inter mediate material? Shoring? Eduction sub parallel to C.A. Pyrite = 17% of core on microcrystalline diseminations and subveins. Strongly chloritized. Abundant QZ-CARB-TAC veins between 55.3 to 55.6m. At 55.4m see one vein of chalc. galena? 55.3m. At 55.9m see 3cm wide bed of black shale at 38° to C.A. = 50. At 56.5m see QZ veins at 75° to C.A. cross cut by white clay veins at 0° to C.A. Cf post dates QZ-CARB veins.		1653825	56.00	58.00		0.01	10	120	175	1	2	4.35	540	45	
57.50	59.90	2.4	NQ		FINE SANDY DACITIC EFFUSIVE. Silicified and chloritid ed. Microcrystalline pyrite diseminated = 0.5%. Occasional clasts of dark grey shale evident. Minor qtz veining.		1653826	58.00	60.00		0.01	10	490	1300	1	10	4.02	490	45	
59.90	60.00	0.1	NQ		At above shale frags suggest sequence is younging upwards.															
60.00	61.50	1.5	NQ		SHALE/SILTSTONE. Light to dark grey colour, 0.5% pyrite. At 60.1 So = 45° to C.A., 60.2m silt/shale interbeds give So = 0° to C.A.		1653827	60.00	62.00		0.01	10	620	2150	1	14	1.88	680	45	
61.50	63.50	1.9	NQ		SHALE/SILTSTONE. Light to dark grey colour. Increasing pyrite content, near 1% At 63.3m a QZ-PY-(chalc.) vein. At 63.4m So = 0° to C.A.		1653828	62.00	64.00		0.01	10	580	1550	1	14	1.82	410	45	
63.50	64.80	0.9	NQ		SHALE. Dark grey colour. Dark graphitic. Cleavage developed sub parallel to C.A. At 63.8 So = 18° to C.A. At 64.8 So = 20° to C.A. Strongly fractured with younging upwards? graded bedding.		1653829	64.00	66.00		<0.01	25	390	1500	1	17	3.52	940	45	
64.80	67.50	2.6	NQ		SHALE/SILTSTONE. Dark grey colour. Well developed slaty cleavage. Minor qtz veining, highly fractured with 2% disj. py.		1653830	66.00	68.00		0.01	20	570	1850	1	20	2.33	950	45	
67.50	73.30	5.5	NQ		SILTSTONE/SHALE. Medium-dark grey colour. Bedding very well defined by interbedded coarse and fine grained siltstones between 70 and 73.3m. Minor pyrite veining. Pyrite diseminated and near 1-3%. Fracturing less intense. So = 0° to C.A.		1653831	68.00	70.00		0.02	25	400	2200	1	26	2.28	1750	45	
							1653832	70.00	72.00		0.02	70	240	1000	1	38	2.76	1800	45	
							1653833	72.00	74.00		0.01	30	340	1200	2	32	3.74	930	45	
73.30	77.20	5.5	NQ		SILTSTONE/SHALE. Dark-medium grey colour. Interbedded/dotted. Dotted? epialtite between 73.3-73.6, 74.0-74.2, 74.4-74.7; 75.0-75.3m. So = 45° to C.A. at 75.1m (epialtite siltstone) and So = 50° to C.A. at 76m (from silt interbeds). Minor fracturing and QZ and carbonated mineral veining. Note much fracturing in post carbonate veining (disjunctive veins).		1653834	74.00	76.00		0.04	35	400	1500	1	34	4.21	750	45	
							1653835	76.00	78.00		0.03	35	230	770	1	34	2.95	900	45	

796029

C.R.A. EXPLORATION PTY. LIMITED  
DRILL CORE LOG

SHEET No. 04.....

20009 N On 290 (mag) DIAMOND  
CO-ORDINATES 50473 E AZIMUTH 114.286 (mag) DRILLERS DRILLERS CM COMMENCED 18-11-1987 DEPTH 115.5m HOLE NO. DDRT.C.M.I.  
RL COLLAR 565 INCLINATION 114.65 DRILL TYPE LONGYEAR '38 COMPLETED 22-11-1987 CASING LEFT 115 PVC DPO No(s) 46258

TENEMENT NAME LOONSANA No. 36/79  
PLAN - MAP REFERENCE

0388

DEPTH		Core Rec. (M)	Core Size	Graphic Log	CORE DESCRIPTION	SPECIAL FEATURES Weath, Alteration, Fracturing, Veining, Mineralization	Sample No.	From (M)	To (M)	Rec (M)	ASSAY VALUES (Analysed by A.G.S. (S.G.S.))									
From (M)	To (M)										16582									
												A.	C.	PL	Zn	Ag	As	Fe%	Mn	M
77.20	80.2	3.0	N9		SHALE/SILTSTONE. Dark grey colour Abundant microfracturing		1653836	78.00	80.00			0.05	35	145	440	1	34	2.32	1600	<5
80.20	82.3	2.0	N9		SILTSTONE. Dark grey colour Minor (0.5%) disseminated pyrite Rare carbonate veins 5-20mm wide		1653837	80.00	82.00			0.04	35	145	510	1	42	2.80	1850	<5
							1653838	82.00	84.00			0.04	<5	<5	<5	1	<1	10.01	20	<5
82.3	88.5	5.8	N9		SILTSTONE/SHALE. Light to dark grey colour Trace pyrite and laminations and blebs (0.01%) Bedding at 0-5° to C.A. Rare carbonate veins 2-5mm wide. Sharp structures visible		1653839	84.00	86.00			0.04	35	260	610	1	42	2.82	1500	<5
							1653840	86.00	88.00			0.04	35	270	790	2	55	3.25	2150	<5
							1653841	88.00	90.00			0.05	35	270	1050	2	44	2.70	1750	<5
88.5	91.7	3.2	N9		SILTSTONE/SHALE As above. S <sub>0</sub> = 9° to C.A. at 87m At 89.6, S <sub>0</sub> = 20° to C.A.															
91.7	92.0	0.3	N9		BRECCIATED SILTSTONE. Carbonate infills present.		1653842	90.00	92.00			0.01	25	470	2350	1	36	2.36	1200	10
92.0	93.10		N9		SHALE/SILTSTONE Laminated and light to dark grey in colour As 92.4m S <sub>0</sub> = 10° to C.A. Minor carbonate veining. As 93.1 a 5mm wide carbonate vein with country rock extracted within it.		1653843	92.00	94.00			0.05	35	370	1200	2	55	2.80	1900	<5
93.10	94.4	1.2	N9		SHALE/SILTSTONE As above															
94.4	98.4	3.6	N9		SILTSTONE/DACITIC EPICLASTIC INTER BEDS. Zone of flowage between 94.4 and 98m Most intense deformation evident between 96 and 98m Pot sample 1651962 taken 97.0-97.1m Has been subjected to strong potassic alteration and secondary SE/CY is developed. As 94.5m S <sub>0</sub> = 40° to C.A. (sed/epic contact). As 95.5m S <sub>0</sub> = 30° to C.A. 27. disseminated pyrite		1653844	94.0	96.0			0.04	15	500	1550	1	12	3.04	520	<5
							1653845	96.0	98.0			0.01	15	270	860	1	3	5.26	540	<5
98.4	101.5	2.0	N9		SILTSTONE/SHALE. Black-dark grey colour 0.5% pyrite disseminated throughout. At 98.7 and 98.8m S <sub>0</sub> = 02-CARB-SALINA- SPHALERITE veins Sphalerite = 17% of vein. Very idiomorphic + euhedral		1653846	98.00	100.00			0.03	15	450	1900	1	16	3.20	810	<5
							1653847	100.00	102.00			0.05	15	165	650	1	9	2.77	510	<5
101.5	103.5	2.0	N9		FINE GRAINED DACITIC EPICLASTIC (TUFF?) Strongly euhedral in places. Disseminated pyrite 2-17%. 101.9 and 102.4 = QZ-CARB veining which contains minor galena + sphalerite S <sub>0</sub> = 42° to C.A.		1653848	102.00	104.00			0.01	10	310	430	1	5	3.02	560	<5
							1653849	104.00	106.00			0.02	10	75	860	1	5	3.50	540	<5
103.5	106.5	3.0	N9		FINE GRAINED DACITIC EPICLASTIC (TUFF) Foliation sub-parallel to C.A. Veinlets euhedral 1-37% disseminated pyrite. QZ-CARB-SALINA-SPHALERITE veins at 106.2 & 106.5m veins orientated at 70° to C.A.		1653850	106.00	108.00			0.02	10	120	720	1	5	3.65	670	<5
106.5	115.5	9.0	N9		FINE GRAINED DACITIC EPICLASTIC. Rare disseminated sphalerite veins. At 110.7m see CARB/QZ/CY vein with SPHAL veins up to 2mm diam. Similar veining seen at 109.4m Some lithics noted		1653851	108.00	110.00			0.01	15	165	780	1	7	3.83	700	<5
							1653852	110.00	112.00			0.02	15	270	930	1	6	3.56	700	<5
							1653853	112.00	114.00			0.02	10	190	950	1	7	3.19	640	<5
							1653854	114.00	115.50			0.01	15	185	930	1	6	2.19	110	<5

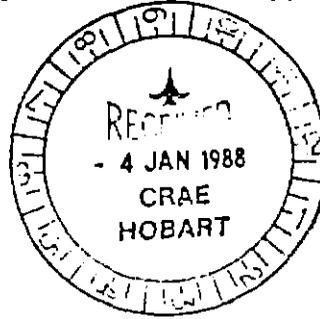
796030

029

CRA EXPLORATION PTY. LTD.

SAMPLE NUMBER	LOCATION		Sample Type	ANALYSES										Geological Observations			
	Easting	Northing		Cu	Pb	Zn											
1651860	404130	5411435	PET														DD87CN1 14.0 - 14.1m
1651861	404130	5411435	PET														34.6 - 34.7m
1651862	404130	5411435	PET														97.0 - 97.1m
DETECTION LIMIT																	
ANALYTICAL METHOD																	
Project : DD87CN1 (PET)				1 250 000 Sheet : BURNIE				AMG Zone : 55				Sheet No. : 01					
Tenement : LOONGANA				DPO's : 46263				Laboratory : AMOEL									
Area / Prospect :								Collected By : FRF					Date : 14-12-87				

22 December 1987



CRA Exploration Pty. Limited,  
P.O. Box 138,  
ROSNY PARK, TAS. 7018

ATT: FRED FUNNELL

REPORT G 7372/88

YOUR REFERENCE: D.P.O. No. 46263  
IDENTIFICATION: 1651852-1651862  
MATERIAL: Rock and core samples  
DATE RECEIVED: 16 December 1987  
WORK REQUIRED: Petrography (11 Code MA1.3) and  
Mineragraphy (1 Code MA2.2)

Investigation and Report by: Frank Radke

Manager - Geological Services: Dr Keith J Henley

A handwritten signature in cursive script that reads 'Keith Henley'.

for Dr William G Spencer  
General Manager  
Applied Sciences Group

c.c. CRA Exploration Pty. Limited,  
P.O. Box 138,  
ROSNY PARK, TAS. 7018  
ATT: ADMIN. OFFICER

CRA Exploration Pty. Limited,  
P.O. Box 656,  
FYSHWICK, A.C.T. 2609  
ATT: CHIEF GEOLOGIST INFORMATION SERVICES

bp

031

PETROLOGY OF ELEVEN ROCK SAMPLES

## 1. SUMMARY

Eleven samples submitted by CRA Exploration Pty. Limited for petrographic examination were given the following rock names.

<u>SAMPLE &amp; THIN SECTION NO.</u>	<u>ROCK NAME</u>
1651852: TSC49986	Kaolinised Sandstone
1651853: TSC49987	Argillaceous Sandstone
1651854: TSC49988	Hornfelsed Sandstone
1651855: TSC49989	Vesuvianite-Diopside Skarn
1651856: TSC49990	Quartz-Amphibole Skarn
1651857: TSC49991	Hornfelsed Quartzite
1651858: TSC49992	Hornfelsed Sandstone
1651859: TSC49993	Arsenopyrite Veined Breccia
1651860: TSC49994	Brecciated and Silicified (?)Dacite
1651861: TSC49995	Altered Tuff
1651862: TSC49996	Potash Metasomatised (?)Dacite

Samples 1651855 and 1651856 are calc-silicate skarns with variable mineralogy. Vesuvianite is abundant in sample 1651855 while amphibole is abundant in sample 1651856. Diopside and probable garnet occur in both samples. The samples termed hornfelsed sandstones also contain some calc-silicate minerals comprised mainly of amphibole. Biotite is also present in some of these samples. Locally these samples also contain a mineral tentatively identified as alunite although the fine grain size of this material makes positive identification difficult and confirmation by other methods would be required. Sample 1651853 contains minor biotite and possible alunite suggesting that it has been subjected to mild hornfelsing. Sample 1651852 contains only interstitial clay and appears to have been unaffected by such alteration.

Sample 1651859 is a quartz-rich breccia veined with arsenopyrite. The acicular sulphide noted in hand specimen is arsenopyrite.

Samples 1651860, 61 and 62 are all thought to be acid volcanic rocks which have been subjected to varying degrees of brecciation and alteration. Sample 1651861 still retains a well preserved tuffaceous texture in a matrix through which lithic clasts are disseminated. Both samples 1651860 and 1651861 are thought to have been subjected to strong silicification with some chlorite development. Sample 1651862 retains a remnant porphyritic texture but the original plagioclase phenocrysts have been completely replaced by muscovite/sericite. The matrix of this sample consists mainly of potash feldspar and chlorite which are thought to be of metasomatic origin. This sample also shows at least localised brecciation.

## 2. PETROGRAPHY AND MINERAGRAPHY

All of the thin sections have been stained with an alizarin red-S solution to distinguish calcite from other carbonates by staining it pink. In the petrographic descriptions calcite is used only for stained carbonate. Selected hand specimens were stained with sodium cobaltinitrite after a hydrofluoric acid etch to detect the possible presence and location of potash feldspar.

032

SAMPLE: 1651860: TSC49994

## Rock Name:

Brecciated and Silicified (?) Dacite

## Hand Specimen:

This is a fragmental, brecciated appearing rock containing angular pale grey clasts separated by a darker greenish-grey matrix which locally forms irregular patches and vein-like structures. Microchemical tests failed to detect any potash feldspar.

## Thin Section:

An optical estimate of the constituents gives the following :

	<u>%</u>
Cherty matrix	50
Plagioclase	20
Vein quartz	15
Chlorite	12
Sericite/clay	1
Rutile/leucoxene	1
Opagues	Tr-1

This sample consists mainly of plagioclase laths between 0.5 and 2 mm in size disseminated through a very fine-grained cherty textured matrix. The matrix is thought to consist mainly if not exclusively of finely granular, cherty textured quartz although at least some fine-grained plagioclase is also present. Testing of the hand specimen shows that the matrix contains no potash feldspar. The disseminated plagioclase laths produce a remnant porphyritic texture.

The plagioclase crystals tend to have broken characters which is due at least in part to fracturing. Some narrow veinlets lined with pale green chlorite transect the plagioclase phenocrysts. The plagioclase phenocrysts are generally quite fresh although they show some alteration to finely divided sericite/clay. Some of the groundmass plagioclase also shows incipient alteration to finely divided sericite/clay.

Chlorite occurs mainly as narrow fracture and vein fillings but also forms very fine flaky intergrowths with the felsic matrix. Within localised areas the rock has an intensely brecciated character containing feldspar crystals distributed through a chloritic matrix.

The rock is also transected by some granular quartz veins up to several millimetres wide. Smaller amounts of chlorite and very minor plagioclase are locally intergrown with the quartz. The plagioclase intergrown with the quartz veins has a totally unaltered character unlike most of the plagioclase which shows incipient alteration to finely divided sericite/clay. The chlorite intergrown with the quartz veins has a very pale green colour and low birefringence.

A translucent titanium mineral with high birefringence termed rutile/leucoxene forms small disseminated grains and aggregates below 0.1 mm wide. This material is generally intergrown with the chlorite. Minor opaques are also disseminated through the rock as small grains below 0.1 mm wide.

This is thought to be a porphyritic volcanic rock such as a dacite which has been subjected to brecciation and strong silicification producing a highly siliceous and cherty textured matrix. The rock is also transected by coarser grained quartz veins.

SAMPLE: 1651861: TSC49995

Rock Name:

Altered Tuff

Hand Specimen:

This is a mottled rock containing irregular dull white to pale grey patches up to about 1 cm in size distributed through a darker grey matrix. Microchemical tests show that some of the pale coloured patches contain localised concentrations of potash feldspar.

Thin Section:

An optical estimate of the constituents gives the following :

	<u>%</u>
Tuffaceous matrix	40
Lithic clasts	35
Plagioclase	10
Chlorite	5
Calcite	3
Sericite/clay	3
Muscovite	Tr-1
Opagues and semi-opaques	3

This sample consists mainly of volcanic lithic clasts up to several millimetres wide distributed through a vitrophyric, tuffaceous textured matrix. The matrix has been largely replaced by a very pale green chlorite intergrown with finely divided opaque material and finely granular quartz. The tuffaceous character of the matrix is produced by the presence of shard structures due to preferential replacement of shards by finely granular, clear quartz. Within some areas the interstitial matrix contains very well preserved shard textures.

The lithic clasts are all acid volcanic rock clasts and generally exhibit porphyritic textures containing disseminated plagioclase phenocrysts distributed through a finely granular, felsic matrix. Testing of the hand specimen show that at least some of these clasts contain potash feldspar but in most cases the matrix appears to have been largely replaced by finely granular quartz.

Chlorite occurs locally as irregular patches up to 1.5 mm wide. The chlorite in these patches forms moderately well-developed flakes with a pale green colour and very low birefringence. Calcite is also disseminated through the rock as granular textured patches up to 1 mm in size. Minor calcite also forms small disseminated grains and aggregates.

Some angular plagioclase crystals up to 0.5 mm in size are disseminated through the rock. Both these plagioclase crystals and the plagioclase phenocrysts and lithic clasts show alteration to finely divided sericite/clay. Traces of muscovite form small flakes up to 0.2 mm long which occur in the matrix and are thought to represent small flakes of muscovite of xenocrystic origin.

035

Opaques form very fine intergrowths with the chloritic matrix and small disseminated grains up to 0.2 mm wide. Opaques are also concentrated as narrow microstylolitic fillings within the interstitial matrix. Within some areas these microstylolites are very well-developed particularly marginal to lithic clasts.

This is thought to be a lithic tuff which has been subjected to pervasive chloritisation and silicification with the development of minor calcite and small amounts of sericite/clay. Despite the pervasive alteration a well preserved remnant tuffaceous texture is evident.

036

SAMPLE: 1651862: TSC49996

Rock Name:

Potash Metasomitted (?)Dacite

Hand Specimen:

This is a fine-grained grey to greenish-grey coloured rock with a weakly foliated texture believed to be due to deformational effects. Microchemical tests show that the rock contains abundant finely intergrown potash feldspar.

Thin Section:

An optical estimate of the constituents gives the following :

	<u>%</u>
Potash feldspar	55
Sericite/clay	20
Chlorite	20
Rutile/leucoxene	3
Calcite	1
Opagues	1

This sample consists mainly of highly altered pseudomorphs after feldspar laths disseminated through a fine-grained matrix comprised largely of potash feldspar with localised chlorite patches. The matrix contains very finely granular potash feldspar with a cherty texture and a grain size below 0.1 mm. This potash feldspar is intergrown with minor amounts of very finely divided sericitic phyllosilicates which locally form narrow vein-like structures and large chloritic patches. The chlorite patches range up to 1 mm in size and have highly irregular, angular shapes. The chlorite in particular tends to be concentrated in fragmental appearing areas separating angular clasts comprised of potash feldspar or pseudomorphs after feldspar laths. All of the chlorite has a pale green, weakly pleochroic colour and low birefringence.

The original plagioclase laths have been completely replaced by finely divided sericite/clay. These laths still retain euhedral to subhedral, prismatic shapes which locally have been modified by intense fracturing and brecciation. Minor amounts of calcite are locally intergrown with some of the pseudomorphs after original plagioclase crystals. It is thought that these altered plagioclase crystals represent disseminated plagioclase phenocrysts in an original acid volcanic rock.

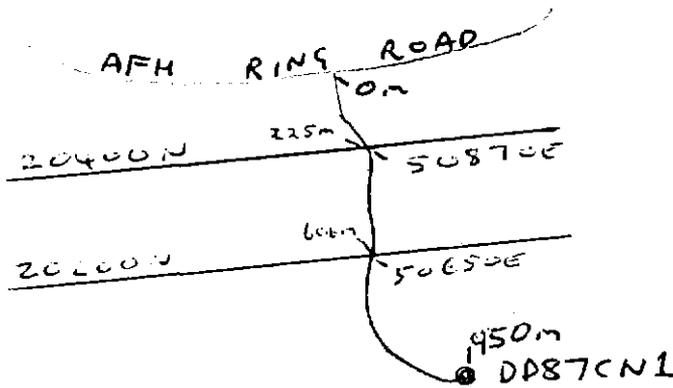
Minor rutile/leucoxene forms small disseminated grains and aggregates up to 0.2 mm wide. Most of the rutile/leucoxene is intergrown with chlorite. Minor opaques are also disseminated through the rock as small grains below 0.1 mm wide.

This is thought to be a porphyritic acid to intermediate volcanic rock such as a dacite which contained plagioclase phenocrysts disseminated through an essentially felsic matrix. The rock has been subjected to deformation as well as strong potash metasomatism producing a potash feldspar-rich matrix. The original plagioclase phenocrysts have been completely replaced by sericite/clay and chloritic alteration is associated with the intensely brecciated areas.

037

## CRA EXPLORATION PTY.LTD

Sketch plan

20400 crosses 50870E  
At 225metres

TENEMENT LOONSANA EL. 36/79 PROSPECT CATTLEY NORTH

Surveyed by DKW

Date 13-1-1987

Processed by FF

Opening Eastings 10000

Opening Northings 20000

Closing R.L. 1000

Closing Eastings

Closing Northings

Opening R.L.

FROM /m	TO /m	DIST. /m	SLOPE	AZIMUTH	EASTINGS RANDOM - NPT	NORTHINGS LOCAL SAID CO-ORDS	R.L.
0	20	20	+9	249	7981.6	19992.9	105.1
20	40	20	+10	267	9961.9	19991.9	106.6
40	60	20	+7	271	9942.0	19992.2	109.0
60	80	20	+6	259	9922.5	19988.4	111.1
80	100	20	+3	238	9915.0	20007.0	112.2
100	120	20	+1	235	9898.7	19995.5	112.5
120	140	20	-2	233	9882.7	19983.5	111.8
140	160	20	-2	221	9869.6	19968.4	111.1
160	180	20	-2	221	9856.5	19953.3	110.4
180	200	20	-2	236	9839.9	19942.1	109.7
200	218	18	+1	255	9822.5	19937.5	110.0
218	238	20	+4	337	9814.7	19955.8	111.4
238	258	20	+5	282	9795.2	19960.0	113.2
258	278	20	+2	293	9776.8	19967.8	113.9
278	298	20	+3	300	9759.5	19977.8	114.9
298	318	20	+4	277	9739.7	19980.2	116.3
318	338	20	+1	338	9732.2	19998.7	116.7
335	358	20	+5	228	9717.4	19985.4	118.4
358	378	20	-2	250	9698.6	19978.6	117.7
378	398	20	-12	290	9680.3	19985.3	113.6
398	418	20	-10	268	9660.6	19984.6	110.1
418	438	20	+2	218	9648.3	19968.8	110.8

038

## CRA EXPLORATION PTY.LTD

Sketch plan20200 crosses  
50650E

606metres

## TENEMENT

## PROSPECT

Surveyed by

Date

Processed by

Opening Eastings

Opening Northings

Closing R.L.

Closing Eastings

Closing Northings

Opening R.L.

FROM /m	TO /m	DIST. /m	SLOPE	AZIMUTH	EASTINGS	NORTHINGS	R.L.
438	458	20	#12	238	9631.7	19958.5	114.9
458	478	20	-15	255	9613.0	19953.5	109.8
478	498	20	-12	241	9595.9	19944.0	105.6
498	518	20	-19	238	9579.9	19933.9	99.1
518	538	20	-22	245	9563.1	19926.1	91.6
538	558	20	-28	276	9545.5	19928.0	82.2
558	578	20	-27	260	9528.0	19924.9	73.1
578	598	20	-20	227	9514.2	19912.0	66.3
598	618	20	-15	226	9500.3	19898.0	61.1
618	678	20	-20	270	9481.5	19898.6	54.3
678	698	20	-15	255	9462.9	19893.6	49.1
698	718	20	-4	239	9445.8	19883.3	47.7
718	738	20	-20	264	9427.1	19881.4	40.9
738	758	20	-12	281	9407.9	19885.1	36.7
758	778	20	-9	255	9388.8	19880.0	33.6
778	798	20	-6	252	9369.9	19873.9	31.5
798	818	20	-4	246	9351.6	19865.7	30.1
818	838	20	-7	236	9335.2	19854.6	27.7
838	858	20	-7	261	9315.6	19851.5	25.2
858	878	20	-8	262	9296.0	19848.8	22.4
878	898	20	-9	271	9276.7	19849.1	19.3
898	918	20	-2	199	9269.7	19830.2	18.6



040

APPENDIX 2

GEOCHEMICAL LEDGERS

CATTLEY NORTH SOIL SAMPLING

041

# CRA EXPLORATION PTY. LTD.

SAMPLE NUMBER	LOCATION		Sample Type	ANALYSES										Geological Observations	
	Easting	Northing		Cu	Pb	Zn	Ag	As	Fe%	Mn	Mo	Au	Au(R)		
653300	50000	20600	SOIL	<2	5	5	<1	4	0.31	20	<2	<0.01			
3301	50021		"	<2	5	5	<1	7	0.22	20	<2	<0.01			
3302	50042		"	<2	15	10	1	17	0.44	15	<2	<0.01			
3303	50063		"	<2	20	10	2	14	0.32	25	<2	<0.01			
3304	50084		"	5	40	5	3	16	0.27	10	<2	<0.01			
3305	50105		"	5	30	10	2	24	0.40	30	<2	<0.01			
3306	50126		"	10	200	20	5	135	0.74	30	<2	<0.01			
3307	50147		"	2	35	5	2	14	0.33	15	<2	<0.01	<0.01		
3308	50168		"	10	230	10	2	75	0.85	15	<2	<0.01			
3309	50189		"	10	195	10	2	75	0.95	25	<2	<0.01			
3310	50210		"	10	165	15	2	80	1.16	20	<2	<0.01			
3311	50230		"	40	520	90	8	135	4.13	95	<2	<0.01			
3312	50250		"	60	660	240	8	140	3.58	140	5	<0.01			
3313	50270		"	25	400	70	4	125	2.55	90	<2	<0.01			
3314	50290		"	15	210	50	3	48	1.34	35	<2	<0.01			
3315	50310		"	10	230	75	3	26	2.99	105	<2	<0.01			
3316	50330		"	<2	20	10	<1	6	0.49	20	<2	<0.01			
3317	50350		"	5	20	25	1	7	0.74	50	<2	<0.01			
3318	50370		"	5	145	30	1	50	1.50	40	<2	<0.01			
3319	50390		"	5	40	15	1	22	1.55	50	<2	<0.01			
DETECTION LIMIT				2	5	2	1	1	.01	5	2	.01			
ANALYTICAL METHOD				1CS80	1CS80	1CS80	1CS80	1CS80	1CS80	1CS80	1CS80	PH209			
Project : CATTLEY NORTH PL-2 <sub>a</sub> - A <sub>v</sub>				1 : 250 000 Sheet : BURNIE SK55-3 AMG Zone : 55				Sheet No. : 01							
Tenement : LOONSAANA EL. 36/79				DPO's : 35042				Laboratory : ALS (BRIS)							
Area / Prospect : CATTLEY NORTH : TASK 3554								Collected By : DW/SD		Date : 17-10-1997					

796042

# CRA EXPLORATION PTY. LTD.

042

SAMPLE NUMBER	LOCATION		Sample Type	ANALYSES										Geological Observations		
	Easting	Northing		Cu	Pb	Zn	Ag	As	Fe%	Mn	Mo	Au	Au/R			
1653320	50410	20600	SOIL	<2	45	15	2	32	1.84	35	<2	<0.01				
3321	50435		"	15	100	70	3	46	4.46	75	5	<0.01				
3322	50455		"	5	175	45	2	30	3.20	60	<2	<0.01				
3323	50480		"	15	820	40	2	13	0.64	55	<2	<0.01				
3324	50500		"	20	135	35	<1	7	0.42	50	<2	<0.01	<0.01			
3325	50520		"	35	45	100	3	46	6.57	930	2	<0.01	<0.01			
3326	50540		"	45	40	110	4	65	8.80	720	10	<0.01				
3327	50560		"	45	45	125	4	60	8.62	1750	10	<0.01				
3328	50580		"	40	35	105	4	60	9.17	980	10	<0.01				
3329	50610		"	40	40	105	4	55	8.87	930	10	<0.01				
1653330	50630		"	60	70	110	4	70	10.2	1850	10	<0.01				
3331	50650		"	45	45	90	4	60	9.12	1300	10	<0.01				
<del>1653267</del>	50670		"	10	40	25	3	7	4.32	110	2	<0.01				
1653268	50693		"	30	65	70	3	16	6.16	120	5	<0.01				
3269	50715		"	50	85	125	3	12	5.37	910	2	<0.01				
3270	50740		"	25	160	35	3	9	2.23	120	5	<0.01	<0.01			
3271	50762		"	30	195	35	3	13	4.46	55	5	<0.01	<0.01			
3272	50784		"	20	90	30	2	20	3.79	45	5	<0.01				
3273	50795		"	25	130	25	1	26	2.80	20	5	<0.01				
DETECTION LIMIT				2	5	2	1	1	.01	5	2	.01				
ANALYTICAL METHOD				1CS80	1CS80	1CS80	1CS80	1CS80	1CS80	1CS80	1CS80	1CS80	AM209			

796043

Project : CATTLEY NORTH Pb-Zn-Au	1 : 250 000 Sheet : BURNIE SK55-3 AMG Zone : 55	Sheet No. : 02
Tenement : LDONGANA EL 36/79	DPD's : 35042	Laboratory : ALS (BRISBANE)
Area / Prospect : CATTLEY NORTH TASH 3554		Collected By : DW/SD Date : 17-10-1987

043

CRA EXPLORATION PTY. LTD.

SAMPLE NUMBER	LOCATION			Sample Type	ANALYSES										Geological Observations	
	Easting	Northing	Cu		Pb	Zn	Ag	AS	Fe%	Mn	Mo	Au	Au(R)			
1653274	50816	20600	SOIL	10	360	15	1	17	0.73	30	<2	<0.01				
3275	50835		"	<2	10	10	<1	3	0.37	35	<2	<0.01				
3276	50858		"	5	20	30	1	9	1.64	135	<2	<0.01				
3277	50870		"	15	370	170	1	17	2.12	65	<2	<0.01				
3278	50890		"	25	55	105	1	16	4.41	105	<2	<0.01				
3279	50910		"	35	175	95	2	24	4.36	80	<2	<0.01	0.01			
3280	50930		"	20	100	45	2	18	5.14	195	<2	.02				
3281	50950		"	20	35	50	<1	9	4.08	560	<2	.01	<0.01			
3282	50970		"	45	90	100	3	48	6.75	450	5	.02				
3283	50990		"	50	90	105	3	44	6.11	310	2	.02				
3284	51010		"	45	70	95	3	36	5.92	1000	<2	.02				
3285	51030		"	35	80	85	2	28	4.85	360	<2	.01				
3286	51050		"	35	180	90	3	42	5.07	220	<2	<0.01				
3287	51070		"	40	135	90	3	42	4.95	230	<2	<0.01				
3288	51090		"	60	170	185	3	42	5.93	350	<2	<0.01	.01			
3289	51110		"	55	135	155	3	38	6.16	410	<2	<0.01	.01			
3290	51130		"	55	90	125	2	26	4.91	165	<2	<0.01				
3291	51150		"	55	90	105	3	48	6.10	230	2	<0.01				
3292	51170		"	25	65	25	2	36	3.38	70	<2	<0.01				
3293	51190		"	25	55	35	2	38	3.17	85	<2	<0.01				
DETECTION LIMIT				2	5	2	1	1	.01	5	2	.01				
ANALYTICAL METHOD				ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	FIREPAS				
Project : CATTLEY NORTH PL-Zn - Au				1 : 250 000 Sheet : BURNIE SK55-3 AMG Zone : 55				Sheet No. : 03								
Tenement : LOGONSANA EL. 34/79				DPO's : 35042				Laboratory : ALS (BRIS)								
Area / Prospect : CATTLEY NORTH TASH 3554								Collected By : DW/50 Date : 17-10-1997								

796044



# CRA EXPLORATION PTY. LTD.

045

LINE 20 000 N

SAMPLE NUMBER	LOCATION		Sample Type	ANALYSES										Geological Observations	
	Easting	Northing		Cu	Pb	Zn	Ag	As	Fe%	Mn	Mo	Au	Au (R)		
				IC 580			IC 580	IC 580							
1653393	50,000	20,000	SOIL	5	40	60	2	19	2.53	810	42	40.01			
3394	50016		"	5	60	175	2	20	2.56	2700	42	40.01			
3395	50033		"	10	70	240	2	26	3.39	650	42	40.01			
3396	50049		"	<2	20	55	2	14	2.94	250	42	40.01			
3397	50066		"	2	40	40	2	14	2.82	210	42	40.01			
3398	50083		"	2	20	30	1	10	2.13	170	42	40.01			
3399	50099		"	<2	20	15	1	8	2.30	60	42	40.01			
3400	50124		"	5	25	30	2	15	2.76	95	<2	40.01	<0.01		
1651951	50149		"	5	35	20	1	6	0.78	45	<2	40.01			
1952	50174		"	<2	35	20	1	9	0.66	35	<2	40.01			
1953	50199		"	<2	45	35	1	15	1.62	35	<2	40.01			
1954	50224		"	2	55	35	2	24	2.07	50	<2	40.01			
1955	50249		"	2	120	70	2	26	2.74	220	<2	40.01			
1956	50274		"	<2	65	35	1	9	0.63	20	<2	40.01	<0.01		
1957	50299		"	2	90	70	2	22	1.46	45	<2	40.01			
1958	50324		"	10	155	100	1	95	4.31	70	<2	40.01			
1959	50349		"	5	135	60	2	42	2.29	55	<2	40.01			
1960	50374		"	10	135	80	2	48	3.10	95	<2	40.01			
1961	50399		"	10	135	125	2	44	4.06	230	<2	40.01			
1962	50425		"	10	125	90	2	46	3.45	75	<2	40.01			
DETECTION LIMIT				2	5	2	1	1	.01	5	2	.01			
ANALYTICAL METHOD				ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	RM 209		
Project : CATTLEY NORTH PL-Z <sub>a</sub> -A <sub>u</sub>				1 : 250 000 Sheet : BURNIE SK55-3 AMG Zone : 55				Sheet No. : 01							
Tenement : LOGONSANA EL. 36/79				DPO's : 35042				Laboratory : ALS (BRIS)							
Area / Prospect : CATTLEY NORTH TASH 3554								Collected By : DW/SD Date : 17-10-1987							

796046



027

CRA EXPLORATION PTY. LTD.

SAMPLE NUMBER	LOCATION			ANALYSES										Geological Observations	
	Easting	Northing	Sample Type	Cu	Pb	Zn	Ag	As	Fe%	Mn	Mo	Au	Au (R)		
1653361	59000	20,200	SOIL	10	65	35	2	19	4.84	390	42	<0.01			
3362	50,020		"	5	145	40	2	30	1.90	65	<2	<0.01			
3363	50,040		"	10	250	50	4	120	2.48	100	<2	<0.01	<0.01		
3364	50,060		"	2	160	35	1	44	2.01	100	<2	<0.01			
3365	50,080		"	5	115	50	1	26	2.63	70	<2	<0.01			
3366	50,100		"	2	40	80	1	14	1.76	75	<2	<0.01			
3367	50,120		"	5	195	100	2	105	2.45	75	<2	<0.01			
3368	50,140		"	5	260	115	2	28	2.81	1500	<2	<0.01			
3369	50,160		"	10	195	160	2	28	2.96	510	<2	<0.01			
3370	50,180		"	5	105	85	2	42	2.02	95	<2	<0.01			
3371	50,200		"	<2	25	20	1	10	0.51	40	<2	<0.01	<0.01		
3372	50,220		"	<2	20	10	1	1	0.32	20	<2	<0.01			
3373	50,240		"	<2	70	50	3	38	1.98	85	<2	<0.01			
3374	50,260		"	15	270	230	4	60	2.75	50	<2	<0.01			
3375	50,280		"	5	55	115	2	26	2.43	60	<2	<0.01			
1653380	50,330		"	5	95	110	3	46	3.20	170	<2	<0.01			
3381	50,353		"	10	110	180	3	40	3.20	250	<2	<0.01			
3382	50,376		"	15	135	260	3	44	3.65	610	<2	<0.01			
3383	50,399		"	15	120	185	3	55	3.49	830	<2	<0.01			
3384	50,423		"	15	135	200	3	50	3.79	630	<2	<0.01			
DETECTION LIMIT				2	5	2	1	1	0.01	5	2	0.01			
ANALYTICAL METHOD				1CS80	1CS80	1CS80	1CS80	1CS80	1CS80	1CS80	1CS80	PM209			
Project : CATTLEY NORTH PL-2 <sub>a</sub> -A <sub>u</sub>				1 : 250 000 Sheet : BURNIE SK55-3 AMG Zone : 55								Sheet No. : 01			
Tenement : LOONSANA EL. 36/79				DPO's : 35042								Laboratory : ALS (BRIS)			
Area / Prospect : CATTLEY NORTH TASK 3554												Collected By : DW/SD		Date : 17-10-1987	

796048



049

# CRA EXPLORATION PTY. LTD.

SAMPLE NUMBER	LOCATION			ANALYSES										Geological Observations		
	Easting	Northing	Sample Type	Fe	MN	MO	AU	AUR Checks	Cu	Pb	Zn	Ag	As			
				Fe	MN	MO	AU	AUR Checks	Cu	Pb	Zn	Ag	As			
1653332	50000	20400	SOIL	3.44	180	<2	<0.01	<0.01	10	80	45	1	22			
333	50020		"	3.42	460	<2	<0.01		15	70	80	2	44			
334	50040		"	5.71	490	<2	<0.01		25	125	150	2	32			
335	50060		"	5.17	310	<2	<0.01		15	150	120	2	44			
336	50080		"	4.89	270	2	<0.01		15	85	100	3	48			
337	50100		"	5.92	165	5	<0.01	<0.01	10	135	80	3	70			
338	50120		"	5.71	310	5	<0.01		15	240	95	3	70			
339	50140		"	5.17	140	2	<0.01		5	120	65	3	55			
340	50160		"	3.11	80	<2	<0.01		5	140	50	2	40			
341	50180		"	2.11	40	<2	<0.01		5	130	35	2	50			
342	50200		"	1.45	40	<2	<0.01		2	80	25	1	26			
343	50220		"	0.89	35	<2	<0.01		<2	70	15	<1	10			
344	50240		"	1.52	65	<2	<0.01		2	45	20	1	18			
345	50260		"	2.61	60	<2	<0.01		2	60	20	2	32			
346	50280		"	2.65	80	<2	<0.01		2	80	20	2	30			
347	50300		"	5.28	145	5	<0.01		20	125	70	3	46			
348	50320		"	3.25	115	<2	<0.01		5	50	50	2	20			
349	50350		"	2.11	95	<2	<0.01		10	55	35	2	28			
350	50373		"	NR	NR	<2	NR		NR	NR	NR	NR	NR			
351	50396		"	1.74	65	<2	<0.01		<2	70	45	2	42			
DETECTION LIMIT				.01	5	2	.01		2	5	2	1	1			
ANALYTICAL METHOD				1C580	1C580	1C580	PM 209		1C580	1C580	1C580	1C580	1C580			
Project : CATTLEY NORTH PL-Z <sub>a</sub> -A <sub>v</sub>				1 : 250 000 Sheet : BURNIE SK55-3 AMG Zone : 55				Sheet No. : 01								
Tenement : LOONSAANA EL. 36/79				DPO's : 35042				Laboratory : ALS (BRIS)								
Area / Prospect : CATTLEY NORTH : TASK 3554				Collected By : DW/SO				Date : 17-10-1997								

796050



CRA EXPLORATION PTY. LTD.

051

SAMPLE NUMBER	LOCATION		Sample Type	ANALYSES										Geological Observations
	Easting	Northing		Cu	Pb	Zn	Ag	As	Fe%	Mn	Mo	Au	Au(R)	
1653201	50000	21,000	SOIL	40	35	90	3	9	9.93	860	22	20.01		
3202	50022		"	65	30	100	4	21	12.3	1200	22	20.01		
3203	50043		"	25	500	75	3	9	5.07	510	22	20.01		
3204	50064		"	30	260	100	3	12	9.39	330	22	20.01		
3205	50085		"	20	310	115	3	9	6.06	135	22	20.01		
3206	50106		"	10	370	100	3	15	4.78	110	2	20.01	20.01	
3207	50127		"	5	350	65	2	17	3.06	95	2	20.01		
3208	50147		"	10	230	200	2	42	5.77	470	2	20.01		
3209	50187		"	10	70	45	1	14	3.39	80	2	20.01		
3210	50207		"	10	450	230	2	24	3.37	145	2	20.01	20.01	
3211	50237		"	15	280	370	3	42	5.21	350	2	20.01		
3212	50277		"	15	200	230	3	44	5.12	370	22	20.01		
3213	50297		"	25	160	150	3	195	4.40	175	2	20.01		
3214	50318		"	20	240	240	3	115	5.78	430	22	20.01		
3215	50339		"	20	210	200	3	90	5.91	540	2	20.01		
3216	50360		"	20	250	200	3	95	5.13	320	2	20.01		
3217	50381		"	15	175	155	2	65	4.59	220	22	20.01		
3218	50402		"	10	200	120	3	85	4.96	185	2	20.01		
3219	50423		"	10	160	130	3	55	4.97	135	22	20.01		
3220	50444		"	15	210	160	3	60	5.14	230	22	20.01		
DETECTION LIMIT				2	5	2	1	1	.01	5	2	.01		
ANALYTICAL METHOD				1CS80	1CS80	1CS80	1CS80	1CS80	1CS80	1CS80	1CS80	R209		

790052

Project : CATTLEY NORTH PL-2 <sub>a</sub> - Au	1 : 250 000 Sheet : BURNIE SK55-3 AMG Zone : 55	Sheet No. : 01
Tenement : LOONSAANA EL. 36/79	DPO's : 35042	Laboratory : ALS (BRIS)
Area / Prospect : CATTLEY NORTH TASH 3554		Collected By : DW/SD Date : 17-10-1987

# CRA EXPLORATION PTY. LTD.

052

SAMPLE NUMBER	LOCATION		Sample Type	ANALYSES										Geological Observations	
	Easting	Northing		Cu	Pb	Zn	Ag	As	Fe%	Mn	Mo	Au	Au(B)		
1653221	50465	21000	SOIL	10	155	105	2	65	5.23	170	42	40.01			
3222	50486		"	25	300	180	3	110	6.02	250	5	40.01			
3223	50507		"	25	210	120	4	95	5.61	165	42	40.01			
3224	50528		"	15	90	90	3	36	4.21	260	42	40.01			
3225	50549		"	5	45	55	2	36	2.86	70	42	40.01			
3226	50570		"	10	20	35	2	24	1.45	80	2	40.01			
3227	50591		"	10	80	35	3	36	2.77	75	42	40.01			
3228	50612		"	15	115	30	4	42	2.99	100	42	40.01			
3229	50633		"	15	90	50	3	75	4.53	125	42	40.01			
3230	50654		"	15	95	45	4	55	4.36	100	42	40.01			
3231	50675		"	10	65	20	3	55	2.28	30	2	40.01	40.01		
3232	50696		"	5	65	10	2	44	2.00	15	42	40.01			
3233	50717		"	5	40	10	2	28	0.79	15	42	40.01			
3234	50738		"	5	30	5	2	22	0.69	20	2	40.01			
3235	50759		"	5	35	10	2	20	0.33	20	2	40.01			
3236	50780		"	5	25	10	2	11	0.80	15	2	40.01			
3237	50801		"	10	25	10	2	46	0.77	50	10	40.01			
3238	50822		"	2	10	5	1	9	0.16	5	2	40.01	40.01		
3239	50843		"	5	15	5	1	17	0.33	35	2	40.01			
3240	50864		"	5	15	5	1	8	0.16	20	2	40.01			
DETECTION LIMIT				2	5	2	1	1	0.01	5	2	0.01			
ANALYTICAL METHOD				1CS80	1CS80	1CS80	1CS80	1CS80	1CS80	1CS80	1CS80	1CS80	PM209		
Project : CATTLEY NORTH PL-2a-Au				1 : 250 000 Sheet : BURNIE SK55-3 AMG Zone : 55				Sheet No. : 02							
Tenement : LOONSAANA EL. 36/74				DPO's : 35042				Laboratory : ALS (BRIS)							
Area / Prospect : CATTLEY NORTH TASH 3554				Collected By : DW/SD				Date : 17-10-1987							

796053

053

## CRA EXPLORATION PTY. LTD.

SAMPLE NUMBER	LOCATION			ANALYSES										Geological Observations
	Easting	Northing	Sample Type	Cu	Pb	Zn	Ag	As	Fe%	Mn	Mo	Au	Au(r)	
1653241	50885	21000	SOIL	5	20	5	1	16	0.30	25	5	40.01		
3242	50906		"	5	15	5	1	9	0.29	15	5	40.01		
3243	50927		"	5	30	5	2	11	0.41	20	5	40.01		
3244	50948		"	5	25	5	2	5	0.33	25	5	40.01		
3245	50969		"	15	60	30	3	5	3.98	50	2	40.01		
3246	50990		"	15	85	30	3	4	4.11	35	2	40.01		
3247	51011		"	15	45	25	1	13	2.76	55	5	40.01		
3248	51032		"	20	55	30	3	13	5.13	75	5	40.01		
3249	51053		"	65	70	65	3	16	7.32	300	5	40.01		
3250	51073		"	35	40	60	3	24	4.28	530	2	40.01		
3251	51093		"	50	15	80	2	7	4.86	750	2	40.01		
3252	51113		"	45	60	125	3	16	6.32	930	2	40.01		
3253	51133		"	30	95	75	3	17	4.35	125	5	40.01		
3254	51153		"	45	125	95	3	19	5.96	390	2	40.01		
3255	51173		"	20	60	30	2	12	1.54	50	5	40.01		
3256	51193		"	25	100	85	2	18	3.34	40	5	40.01		
3257	51213		"	10	40	10	2	13	1.48	40	5	40.01		
3258	51233		"	15	40	60	2	11	1.97	35	5	40.01		
3259	51253		"	10	25	15	2	9	2.63	30	5	40.01		
3260	51273		"	5	50	10	1	9	1.76	30	5	40.01		
DETECTION LIMIT				2	5	2	1	1	0.1	5	2	0.1		
ANALYTICAL METHOD				16580	16580	16580	16580	16580	16580	16580	16580	PM209		
Project : CATTLEY NORTH PL-2A-AU				1 : 250 000 Sheet : BURNIE 5455-3 AMG Zone : 55								Sheet No. : 03		
Tenement : LOONSA NA EL. 36/79				DPO's : 35042								Laboratory : ALS (BRIS)		
Area / Prospect : CATTLEY NORTH TASH 3554												Collected By : DW/SD Date : 17-10-1987		

796054

054

# CRA EXPLORATION PTY. LTD.

SAMPLE NUMBER	LOCATION			ANALYSES										Geological Observations	
	Easting	Northing	Sample Type	Cu	Pb	Zn	Ag	As	Fe%	Mn	Mo	Au	Au(g)		
1653261	51293	21000	SOIL	10	60	25	2	10	3.08	55	5	40.01			
3262	51313		"	15	35	65	2	9	4.32	40	5	40.01			
			"												
			"												
			"												
			"												
			"												
			"												
			"												
			"												
			"												
			"												
			"												
			"												
			"												
			"												
			"												
DETECTION LIMIT				2	5	2	1	1	0.01	5	5	0.01			
ANALYTICAL METHOD				16580	16580	16580	16580	16580	16580	16580	16580	16580	PM2001		
Project : CATTLEY NORTH PL-Zn-Au				1 : 250 000 Sheet : BURNIE SK55-3 AMG Zone : 55				Sheet No. : 04							
Tenement : LOONGANA EL. 36/74				DPO's : 35042				Laboratory : ALS (BRIS)							
Area / Prospect : CATTLEY NORTH ; TASK 3554								Collected By : DW/SD				Date : 17-10-1987			

796053

# CRA EXPLORATION PTY. LTD.

055

SAMPLE NUMBER	LOCATION		Sample Type	ANALYSES										Geological Observations	
	Easting	Northing		Cu	Pb	Zn	Ag	AS	Fe%	Mn	Mo	Au	Au/R		
1653101	50000	20800	SOIL	60	45	135	4	<1	10.0	830	42	40.01			
3102	50019		"	25	25	130	2	<1	5.55	860	42	40.01			
3103	50038		"	40	15	135	2	<1	6.79	1550	42	40.01			
3104	50057		"	55	45	115	3	<1	10.8	2550	42	40.01	40.01		
3105	50076		"	15	220	75	1	3	3.84	2200	42	40.01			
3106	50095		"	10	120	50	1	5	3.34	150	42	40.01			
3107	50114		"	35	75	120	3	<1	7.70	1150	42	40.01			
3108	50133		"	35	75	105	2	<1	7.29	830	42	40.01			
3109	50152		"	40	55	120	3	<1	7.70	810	42	40.01			
3110	50171		"	40	30	95	3	<1	7.51	840	42	40.01			
3111	50190		"	30	95	130	3	5	6.33	1300	42	40.01			
3112	50209		"	25	45	110	3	<1	5.91	480	42	40.01			
3113	50228		"	25	65	105	2	2	5.17	620	42	40.01			
3114	50247		"	10	25	50	1	5	2.71	190	42	40.01			
3115	50266		"	10	85	75	1	28	3.29	330	42	40.01			
3116	50285		"	15	135	130	3	46	2.32	95	42	40.01			
3117	50345		"	10	170	70	3	34	2.25	50	42	40.01			
3118	50366		"	10	65	40	2	44	2.25	75	42	40.01			
3119	50387		"	2	35	20	1	28	1.28	25	42	40.01			
3120	50408		"	5	45	15	1	90	1.32	20	42	40.01			
DETECTION LIMIT				2	5	2	1	1	.01	5	2	.01			
ANALYTICAL METHOD				K580	K580	K580	K580	K580	K580	K580	K580	K580	PM209		
Project : CATTLEY NORTH PL-2a - Au							1 : 250 000 Sheet : BURNIE SK55-3 AMG Zone : 55					Sheet No. : 0 /			
Tenement : LGOONSANA EL. 36/74							DPO's : 35042					Laboratory : ALS (BRIS)			
Area / Prospect : CATTLEY NORTH ; TASK 3554												Collected By : DW/SD		Date : 17-10-1987	

790056

056

# CRA EXPLORATION PTY. LTD.

SAMPLE NUMBER	LOCATION		Sample Type	ANALYSES										Geological Observations		
	Easting	Northing		Cu	Pb	Zn	Ag	AS	Fe%	Mn	Mo	Au	Au(R)			
1653121	50429	201800	SOIL	5	90	20	2	24	0.63	20	<2	<0.01	.01			
3122	50450		"	5	70	15	2	85	1.19	15	<2	<0.01				
3123	50471		"	5	70	15	2	75	1.19	25	<2	<0.01				
3124	50492		"	5	50	10	1	34	0.68	15	<2	<0.01				
3125	50513		"	2	70	10	2	85	1.70	15	<2	<0.01				
3126	50534		"	<2	60	5	1	60	0.68	10	<2	<0.01				
3127	50555		"	2	95	10	2	180	1.04	20	2	<0.01				
3128	50576		"	2	50	10	1	85	0.70	20	5	<0.01				
3129	50597		"	2	20	10	1	4	0.19	20	<2	<0.01				
3130	50618		"	2	5	5	1	3	0.21	10	<2	<0.01				
3131	50639		"	2	25	5	1	8	0.20	15	<2	<0.01				
3132	50660		"	2	10	2	1	22	0.29	25	<2	<0.01				
3133	50681		"	2	<5	2	<1	8	0.27	15	<2	<0.01				
3134	50702		"	5	5	2	<1	7	0.28	20	<2	<0.01				
3135	50723		"	2	10	2	1	8	0.24	25	<2	<0.01				
3136	50744		"	2	5	2	1	4	0.24	45	<2	<0.01				
3137	50765		"	2	10	10	1	4	0.51	45	<2	<0.01				
3138	50786		"	2	5	10	<1	2	0.39	25	<2	<0.01				
3139	50807		"	5	5	10	1	3	0.31	15	<2	<0.01	<0.01			
3140	50828		"	5	<5	5	<1	3	0.20	25	<2	<0.01				
DETECTION LIMIT				2	5	2	1	1	.01	5	2	.01				
ANALYTICAL METHOD				1C580	1C580	1C580	1C580	1C580	1C580	1C580	1C580	PM29				
Project : CATTLEY NORTH PL-2a - Au				1 : 250 000 Sheet : BURNIE SK55-3 AMG Zone : 55				Sheet No. : 02								
Tenement : LOONSAANA EL. 36/79				DPO's : 35042				Laboratory : ALS (BRIS)								
Area / Prospect : CATTLEY NORTH TASH 3554								Collected By : DW/SO Date : 17-10-1997								

796057

057

CRA EXPLORATION PTY. LTD.

SAMPLE NUMBER	LOCATION		Sample Type	ANALYSES										Geological Observations
	Easting	Northing		Cu	Pb	Zn	Ag	As	Fe%	Mn	Mo	Au	Au(R)	
1653141	50848	20800	SOIL	2	10	<2	<1	9	0.16	15	<2	<0.01		
3142	50868		"	5	55	<2	1	12	0.44	15	<2	<0.01		
3143	50888		"	10	75	5	1	12	3.39	50	2	<0.01		
3144	50908		"	10	65	2	1	16	3.10	45	2	<0.01		
3145	50928		"	20	75	20	2	16	4.60	100	5	<0.01		
3146	50948		"	50	170	110	3	26	5.63	3750	<2	<0.01		
3147	50968		"	60	290	300	4	14	6.40	290	<2	<0.01		
3148	50988		"	NR	NR	NR	NR	NR	NR	NR	NR	NR		
3149	51008		"	NR	NR	NR	NR	NR	NR	NR	NR	NR		
3150	51028		"	20	130	35	2	20	4.77	90	2	<0.01		
3151	51048		"	20	185	40	2	22	4.48	45	5	<0.01		
3152	51069		"	10	180	20	1	19	1.85	70	5	<0.01		
3153	51090		"	25	145	55	2	26	3.63	40	2	<0.01		
3154	51111		"	15	50	35	2	16	2.02	45	10	<0.01		
3155	51132		"	10	25	15	2	10	1.19	40	2	<0.01		
3156	51153		"	5	55	35	2	12	1.69	25	5	<0.01		
3157	51174		"	5	35	15	2	11	1.35	30	5	<0.01		
3158	51195		"	10	140	30	3	13	5.37	35	2	<0.01	<0.01	
3159	51216		"	5	40	40	2	9	3.48	45	<2	<0.01		
3160	51237		"	5	25	25	1	12	1.92	30	2	<0.01		
DETECTION LIMIT				2	5	2	1	1	.01	5	2	.01		
ANALYTICAL METHOD				1C580	1C580	1C580	1C580	1C580	1C580	1C580	1C580	PM209		

Project: CATTLEY NORTH PL-Zn-Au	1: 250 000 Sheet: BURNIE 5655-3 AMG Zone: 55	Sheet No.: 03
Tenement: LOONSA NA EL. 36/79	DPO's: 35042	Laboratory: ALS (BRIS)
Area / Prospect: CATTLEY NORTH TASH 3554		Collected By: DW/SD Date: 17-10-1997

796058



059

APPENDIX 3

GEOCHEMICAL LEDGERS - STREAM SEDIMENT SAMPLES





Sample Number	LOCATION		SAMPLE DESC.					SITE DESCRIPTION							ROCK TYPE										METAL CONTENT ppm / %										Geological Observations						
	AMG Co-ordinates		S Type	Mesh	% Gravel	% Sand	% Silt	Organic	Width	Flow	Bank	Catchment	Vegetation	Staining	Contam.	Sit. Rating	Outcrop	Al ppt	Fe %	WTK	LOOK	Cu	Pb	Zn	Ag	Au	Fe%	Bi	Mn	Mo	Au ppm										
	East	North																																							
1198743	405975	5412950	-4	60	30	10	L	3	M	AW								<L	0			5																			
1198744	"	"	-80																			4.5	30	30	<1	8	1.24	<5	4.5	10	50-101										
1198745	406250	5413750	-4	60	30	10	L	3	F	AW								SS0	5.72																						
1198746	"	"	-80																			40	50	70	<1	8	3.60	<5	1000	5	<0.01										
1198749	406540	5415100	-4	60	30	10	L	4	M	AW								50	5.62																						
1198750	"	"	-80																			35	20	25	<1	7	0.90	<5	50	10	<0.01										
GEOCHEMICAL STREAM SEDIMENT SAMPLING LEDGER												DETECTION LIMIT					2	5	2	1	1	0.01	5	5	2	0.01															
												ANALYTICAL METHOD																													
Tenement Name: LOUNGANA EL 36/79												Project:					AMG Zone:					Sheet No: 02																			
Area / Prospect: CATHEY NORTH												DPO's: 35037					Laboratory: ALS (BRIS)																								
Map / Photo Ref: TASH												Sample No's: 1198743-750					Collected By: DW/SD/FF Date: 2-10-87																								

796063

796064

## CRA EXPLORATION PTY. LTD.

083

SAMPLE NUMBER	LOCATION		Sample Type	ANALYSES										Geological Observations
	Easting	Northing		Cu	Pb	Zn	Ag	As	Mn	Fe (%)	Ba	Au (ppm)	Au (ppt)	
1153360 361	407250	5418250	-4# -80#	10	45	90	<1	2	200	0.95	300	<0.005	Moderately incised; mod. flow; eucalypt rain forest; alluvial banks; 4m wide; 10% gravel, 50% sand, 40% silt; low organics. Dominant sst, quartzite + greywacke float; baser siltstone, vein quartz + conglomerate; Mn stain; greywacke %	
1153364 365	405350	5412750	-4# -80#	12	25	100	<1	6	280	1.05	370	<0.005	Weakly incised; mod-slow flow; rain forest; alluvial banks; 2m wide; Mn staining; 5% gravel, 50% sand, 45% silt; mod-high organics. Dominant sst; quartzite; vein quartz; volcanic sediment. Massive compact volc - mg. + small feldspar phenocrysts.	
1154456 457	412300	5413000	-4# -80#	24	18	80	<1	14	2350	4.30	650	0.005	50 Moderately incised; mod-fast flow; eucalypt; alluvial banks; 4m wide; Mn staining; 60% gravel, 30% sand, 10% silt; low organics. Dominant conglomerate; micaceous sst; quartzite; vein quartz; pyrite veins in conglomerate.	
1154458 459	412050	5413000	-4# -80#	8	65	100	<1	10	1380	3.05	460	<0.005	<50 Moderately incised; fast flow; eucalypt forest; 4m wide; 60% gravel, 30% sand, 10% silt; low organics; Mn staining. Dominant conglomerate; sst; vein qz; quartzite.	
DETECTION LIMIT														
ANALYTICAL METHOD														

Project : SHEFFIELD - MOINA

1 : 250 000 Sheet : BURNIE

AMG Zone :

Sheet No. : 1/3

Tenement : LOONCANIA EL 36/79

DPO's :

Laboratory : AMDEL

Area / Prospect : REGIONAL STREAM SEDIMENTS

Collected By : B. FITZPATRICK Date : JANUARY 1986

A. EDWARDS

796065

## CRA EXPLORATION PTY. LTD.

06A

SAMPLE NUMBER	LOCATION		Sample Type	ANALYSES										Geological Observations	
	Easting	Northing		Cu	Pb	Zn	Ag	As	Mn	Fe (%)	Ba	Au (ppm)	Au (ppt)		
1154460 461	418650	5407850	-4# -80#		4	20	8	<1	10	45	1.03	65	0.005	50	Moderately incised; rapid flow; rainforest; alluvial banks; 8m wide; 60% gravel, 35% sand, 5% silt; low organics. Dominant sst float; quartzite; vein quartz; siltstone, conglomerate; % of greywacke.
1154462 463	418950	5407700	-4# -80#	8	22	14	<1	8	55	1.15	<10	0.075	<50	Moderately incised; medium flow; rainforest; alluvial banks; 3m wide; 40% gravel, 45% sand, 15% silt, moderate organics. Dominant sst float; lower quartzite; vein quartz; siltstone & conglomerate; % of massive siltstone.	
1154476 477	407400	541700	-4# -80#	8	15	26	<1	6	550	2.16	110	0.005	50	Moderately incised; medium flow; rainforest; 4m wide; alluvial banks; Fe staining; 35% gravel, 45% sand, 20% silt; low organics. Dominant conglomerate float; sst; siltstone; vein quartz.	
DETECTION LIMIT															
ANALYTICAL METHOD															

Project : SHEFFIELD - MOINA

1:250 000 Sheet : BURNIE

AMG Zone :

Sheet No. : 2/3

Tenement : LOONCANIA EL 36/79

DPO's :

Laboratory : AMDEL

Area / Prospect : REGIONAL STREAM SEDIMENTS

Collected By : B. FITZPATRICK Date : JANUARY 1986

A. EDWARDS

796066

## CRA EXPLORATION PTY. LTD.

055

SAMPLE NUMBER	LOCATION		Sample Type	ANALYSES										Geological Observations	
	Easting	Northing		Cu	Pb	Zn	Ag	As	Mn	Fe (%)	Ba	Au (ppm)	Au (ppt)		
1154478 479	409150	5412050	-4# -80#	7	18	26	<1	10	135	2.52	55	<0.005	<50	Weakly incised; moderate flow; colluvial banks; 2m wide, eucalypt forest; Fe staining; 25% gravel, 55% sand, 20% silt; low organics. Dominant conglomerate; sst; vein quartz; quartzite	
1154480 481	409000	5412200	-4# -80#	7	22	17	<1	<2	115	1.32	25	<0.005	<50	Weakly incised; moderate flow; 2m wide; colluvial banks; Fe staining; 25% gravel, 60% sand, 15% silt; low organics. Dominant conglomerate; sst; quartzite + vein quartz	
1154482 483	409100	5412700	-4# -80#	5	24	18	<1	6	15	1.07	35	<0.005	<50	Mod-well incised; moderate flow; scrubland; 3m wide; colluvial banks; Fe staining; 25% gravel, 60% sand, 15% silt; low organics. Dominant conglomerate forest; % of quartzite; vein quartz	
DETECTION LIMIT															
ANALYTICAL METHOD															
Project : SHEFFIELD - MOINA				1:250 000 Sheet : BURNIE				AMG Zone :				Sheet No : 3/3			
Tenement : LOONGANIA EL 36/79				DPO's :								Laboratory : AMDEL			
Area / Prospect : REGIONAL STREAM SEDIMENTS												Collected By : B. FITZPATRICK Date : JANUARY 1986 A. EDWARDS			

796067

## CRA EXPLORATION PTY. LTD.

086

SAMPLE NUMBER	LOCATION		Sample Type	ANALYSES										Geological Observations	
	Easting	Northing		Cu	Pb	Zn	Ag	As	Mn	Fe (%)	Ba	Au (ppm)	Au (ppt)		
1153146 147	397450	5415200	-4# -80#	1 10		4 36	<1	6	180	2.00	50	0.10	50	Weakly incised; moderate flow; eucalypt rain forest; alluvial banks; 20% gravel, 50% sand, 30% silt, low organics. Dominant basalt float; minor vein quartz + quartzite cobbles.	
1153148 149	399550	5415100	-4# -80#	10	20	38	<1	4	165	2.60	65	0.10	<50	Weakly incised; moderate flow; eucalypt rain forest; alluvial banks; 40% gravel, 40% sand, 20% silt, moderate organics. Dominant quartzite and sandstone float; minor vein quartz.	
990789 790	402800	5416450	-80# -4#	12	14	74	<1	4	310	2.50	200	0.10	<50	Well incised; strong flow; 7m wide; eucalypt forest; alluvial banks; 50% gravel, 30% sand, 20% silt, low organics. Dominant dark grey to pale brown sst - micaceous; minor quartz; carbonaceous siltstone % - pyrite + chloropyrite (?) traces.	
990791 792	406000	5418450	-80# -4#	28	65	46	<1	20	240	3.25	50	0.005	100	Well incised; moderate flow; 4m wide; alluvial banks; eucalypt forest; 70% gravel, 25% sand; 5% silt; low organics. Dominant basalt float; lesser conglomerate float.	
990793 794	412150	5414550	-80# -4#	12	45	82	<1	10	1500	3.50	420	<0.005	50	Weakly incised; moderate flow; 4m wide; alluvial banks; eucalypt forest; 60% gravel, 35% sand; 5% silt; low organics.	
DETECTION LIMIT															
ANALYTICAL METHOD															
Project: SHEFFIELD - MOINA				1 250 000 Sheet: BURNIE				AMG Zone:				Sheet No.: 1			
Tenement: LOONGANIA EL 36/79				DPO's: 20 75 750								Laboratory: AMDL			
Area / Prospect: REGIONAL STREAM SEDIMENT SURVEY												Collected By: S. CAITHNESS Date: 12-12-85			

796068

## CRA EXPLORATION PTY. LTD.

083

SAMPLE NUMBER	LOCATION		Sample Type	ANALYSES										Geological Observations		
	Easting	Northing		Cu	Pb	Zn	Ag	As	Mn	Fe (%)	Ba	Au (ppm)	Au (ppt)			
																Dominant conglomerate float; lesser lithic tuff; minor feldspar porphyry and red-brown sandstone.
990795 796	411800	5412500	-80# -4#	14	15	24	<1	<2	85	100	45	<0.005			Weakly incised; moderate flow; 3m wide; alluvial to lag; cuestas at front; 50% gravel, 45% sand, 5% silt; moderate organics. Dominant conglomerate float; lesser highly weathered pale grey siltstone; minor fresh green-grey siltstone.	
DETECTION LIMIT																
ANALYTICAL METHOD																
Project : SHEFFIELD - MOINA				1 : 250 000 Sheet : BURNIE				AMG Zone :				Sheet No. : 2				
Tenement : LOONGANIA EL 36/79				DPO's 35 2 7 25 2 6								Laboratory : AMDEL				
Area / Prospect : REGIONAL STREAM SEDIMENT SURVEY												Collected By : S. CAITHNESS Date : 12-12-85				





PROJECT SHEFFIELD MOUND

GEOCHEMICAL SAMPLING LEDGER

DATES : 17 APRIL 1975

TENEMENT \_\_\_\_\_

LAB. ANDEI

AREA / PROSPECT REGIONAL SEDS

GEOLOGIST I. M. Clements

SAMPLE TYPE STREAM SEDIMENT

PAGE NO. \_\_\_\_\_

SAMPLE NUMBER	GRID REF.	ANALYSES														DPO NUMBER	GEOLOGICAL OBSERVATIONS	CORRESP. -80 MESH STREAM SAMPLE				
		Cu	Pb	Zn	Ag	As	Fe	Mn	Ba	Au (ppt)										STAIN	CONTAM	
990509	404750 <sup>E</sup> 541750 <sup>N</sup>																		ml/e	-	-80# s/s Small Med Flow Fairly uniform but slight gradient Channel - clay/silt rich. s/s - grey to dk grey mudstone sparingly micaceous float as above plus Tertiary basalt, buff quartz + shales with unstable iron	
990510	404750 <sup>E</sup> 541750 <sup>N</sup>																				CN Leach - 4# s/s	990509
990511	404375 <sup>E</sup> 541760 <sup>N</sup>																		ml/e	-	-80# s/s Small Med Flow Material washed, slight med. gradient. Channel - boulder bar, low silt-clay. Float - Tertiary basalt, grey micaceous shales, buff quartz ites	
990512	404875 <sup>E</sup> 541760 <sup>N</sup>																				CN Leach - 4# s/s	990510

METHOD  
DET. LIMIT

070

796071





CRA EXPLORATION PTY. LTD.

796074

013

SAMPLE NUMBER	LOCATION		Sample Type	ANALYSES										Geological Observations	
	Easting	Northing		Cu	Pb	Zn	Ag	As	Mn	Fe (%)	Ba	Au (ppm)	Au (ppt)		
1197585 586	397700	5411570	-80# -5#	9	4	22	<1	<2	120	1.29	30	<0.005 250	Weakly incised; moderate gradient; flowing; 2.5m wide; grass, trees + eucalypt forest; 80% gravel, 15% sand, 4% silt, 1% clay + organics. Dominant basalt float; lesser quartzite		
1197587 588	400400	5412250	-80# -5#	12	35	105	<1	2	360	2.82	280	0.010 450	Moderate gradient; flowing; 3m wide; trees + eucalypt forest; 70% gravel, 25% sand, 14% silt, 1% clay + organics. Dominant basalt; lesser quartzite; minor yellow chert		
1197589 590	400650	5412250	-80# -5#	26	56	100	<1	3	1860	5.04	310	0.010 350	Moderately incised; moderate gradient; 1.5m wide; flowing; trees + eucalypt forest; 70% gravel, 25% sand, 14% silt, 1% clay + organics. Common basalt float; lesser cherty quartzite, minor quartzite		
1197591 592	392750	5415600	-80# -5#	29	2	250	<1	4	445	8.72	140	<0.005 200	Moderately incised; moderate gradient; 5.0m wide; flowing; trees + myrtle forest; 50% gravel, 40% sand, 9% silt, 1% clay + organics. Dominant basalt float; minor yellow cherty siltstone		
1197593 594	390030	5413530	-80# -5#	45	6	195	<1	3	630	8.58	110	<0.005 300	Weakly incised; flowing; 2.0m wide; alluvial bars; grazing land; 70% gravel, 25% sand, 4% silt, 1% clay + organics. Dominant basalt float; minor cherty siltstone + sandstone		
1197595 596	390400	5413600	-80# -5#	78	23	330	<1	<2	780	9.54	110	0.020 150	Weakly incised; flowing; 1.5m wide; grazing land, trees + myrtle forest; high gradient; 80% gravel, 17% sand, 12% silt, 1% clay + organics. Dominant basalt float; minor yellow-green chert		
DETECTION LIMIT															
ANALYTICAL METHOD															

Project : SHEFFIELD - MOUNA	1 : 250 000 Sheet :	AMG Zone :	Sheet No. :
Tenement : LOONGANIA EL 36/79	DPO's :	Laboratory : ALS AMDEL	
Area / Prospect : REGIONAL STREAM SEDIMENT SURVEY		Collected By : P. TEMBY	Date :

796075

07A

## CRA EXPLORATION PTY. LTD.

SAMPLE NUMBER	LOCATION		Sample Type	ANALYSES										Geological Observations
	Easting	Northing		Cu	Pb	Zn	Ag	As	Mn	Fe (%)	Ba	Au (ppm)	Au (ppt)	
1142767 768	411300	5423900	-80# -4#	2	26	15	<1	<2	30	0.44	170	<0.005	<50	Moderately incised; strong flow; low organics; colluvial banks; logged eucalypt forest; 60% gravel, 35% sand, 5% silt Fine-med grained, well sorted sst float dominant; angular vein quartz; rounded qz pebbles; minor black shale + conglomerate
1142769 770	411100	5426200	-80# -4#	5	22	27	<1	2	210	1.74	110	<0.005	250	Moderately incised; strong flow; low organics; colluvial/alluvial banks; agricultural + eucalypt forest; 50% gravel, 40% sand, 10% silt Common grey-black basalt; lower fine-med grained tuffaceous volcanics; minor acid volcanics + conglomerate
1142771 772	409800	5423800	-80# -4#	8	43	39	<1	4	155	1.64	180	<0.005	<50	Moderately incised; mod-strong flow; low organics; colluvial banks; pine + logged eucalypt forest; 50% gravel, 40% sand, 10% silt Common mg, well sorted sst; lower tuffaceous volcanic sedit (andesitic); minor grey shale + conglomerate
1142773 774	411400	5424100	-80# -4#	4	10	23	<1	<2	62	0.77	110	<0.005	<50	Moderately incised; strong flow; low organics; colluvial banks; logged pine + eucalypt forest; 60% gravel, 35% sand, 5% silt Common mg tuffaceous sst; lower shale; minor vein quartz
1142775 776	410300	5419300	-80# -4#	6	42	110	<1	<2	560	1.87	440	<0.005	<50	Well incised; strong flow; low organics; colluvial banks; logged eucalypt forest; 60% gravel, 30% sand, 10% silt Dominant tuffaceous sedit; lower chloritically altered porphyritic volcanic; minor fg sediments; common qz; % in creek is med-coarse acid volcs - sericite + chlorite alter.
DETECTION LIMIT														
ANALYTICAL METHOD														

Project : SHEFFIELD - MOINA

1 : 250 000 Sheet :

AMG Zone :

Sheet No. :

Tenement : LOONGANIA EL 36/79

DPO's :

Laboratory : ALS  
AMDEL

Area / Prospect : STREAM SEDIMENT SURVEY

Collected By : S. CATHNESS

Date : 7-5-85

8-5-85

796076

075

## CRA EXPLORATION PTY. LTD.

SAMPLE NUMBER	LOCATION		Sample Type	ANALYSES										Geological Observations	
	Easting	Northing		Cu	Pb	Zn	Ag	As	Mn	Fe (%)	Ba	Au (ppm)	Au (ppt)		
1142777 778	406800	5421700	-80# -4#	3	8	10	<1	4	42	0.76	60	<0.005	<50	Moderately incised; strong flow; low organics; colluvial benches; logged eucalypt forest; 50% gravel, 40% s. d., 10% silt Dominant mg-fg. sediments; black mudstone/shale; clean white sst with minor qz veining; vein qz gravel	
1142779 780	407850	5418200	-80# -4#	3	31	24	<1	10	195	0.95	250	<0.005	<50	Well incised; strong flow; low organics; colluvial benches; eucalypt forest; 60% gravel, 35% sand, 5% silt Dominant mg. tuffaceous volcanic containing some large lithic clasts; minor conglomerate; vein qz + qz pebbles	
1142781 782	407700	5418000	-80# -4#	14	29	68	<1	3	405	3.08	260	<0.005	<50	Well incised; moderate flow; low organics; colluvial benches; eucalypt forest; 60% gravel, 30% sand, 10% silt Dominant mg. tuffaceous volcanic (qz rich); minor vein qz, porphyritic (qz) volcanic + conglomerate	
1142783 784	407900	5417450	-80# -4#	19	8	100	<1	<2	440	4.25	230	<0.005	<50	Weakly incised; low organics; strong flow; alluvial benches; eucalypt forest; 30% gravel, 60% sand, 10% silt Quartz gravel with minor tuffaceous sediment	
1142785 786	413900	5423000	-80# -4#	4	26	24	<1	3	285	1.10	370	0.005	<50	Weakly incised; mod. flow; low organics; alluvial benches; logged eucalypt forest; 50% gravel, 40% sand, 10% silt % of basic-intermediate, fg. tuffaceous volcanic; minor volcanic float; common qz float	
DETECTION LIMIT															
ANALYTICAL METHOD															
Project : SHEFFIELD - MONIA				1 : 250 000 Sheet :				AMG Zone :				Sheet No. :			
Tenement : LOONCIANIA EL 36/79				DPO's :								Laboratory : ALS AMDDEL			
Area / Prospect : STREAM SEDIMENT SURVEY												Collected By : S. CAITHNESS Date : 8-5-85			

796077

076

## CRA EXPLORATION PTY. LTD.

SAMPLE NUMBER	LOCATION			ANALYSES										Geological Observations		
	Easting	Northing	Sample Type to SEDS	Cu	Pb	Zn	Ag	As	Mn	Fe (%)	Ba	Au (ppm)				
												Stain	Contam.			
990575 576	410400	5419200	-80# -4#	9	32	110	<1	3	720	2.26	320	<0.005	<50	Log	1 1/2 m wide, strong flow, steep valley sides, fairly incised. Flc of fine grained intermediate volcanics. Gravel bar site.	
990577 578	409950	5418600	-80# -4#	3	52	88	<1	<2	375	0.63	390	<0.005	<50	Fe	1 1/2 m wide, strong flow, deeply incised. Gravel bar. Flout and abundance of fresh, unaltered, intermediate lavas plus occasional qz porphyries.	
990579 580	409100	5417300	-80# -4#	7	38	125	<1	5	420	2.83	390	<0.005	<50	vib	2 1/2 m wide, strong flow. Gentle valley. Very sand rich sed. Flout: felsic (fresh) lavas, minor grey shales and minor massive, chloritic lava.	
990581 582	409750	5416550	-80# -4#	11	25	94	<1	<2	315	3.13	260	<0.005	<50	vib	5 m, strong flow. Moderate valley. Gravel bar. No stain. Flout: quartzites, qz, shales and siltstones (buff, ochre, red) and felsic lavas.	
990583 584	411200	5415850	-80# -4#	8	14	43	<1	<2	210	2.30	110	<0.005	<50	Log	1/2 m wide, moderate flow. Gravel bar. Moderately steep valley. Flout: grey siltstones and hornitic grts.	
990585 586	411500	5415600	-80# -4#	9	6	49	<1	<2	320	2.54	75	<0.005	<50	Log	1 m wide, moderate flow. Boulder-gravel bar. Moderately steep valley. Flout: basalt, purple intermediate (coarse grained) volcanic qzite.	
DETECTION LIMIT																
ANALYTICAL METHOD																
Project : SHEFFIELD - MOINA				1 : 250 000 Sheet : BURNIE				AMG Zone : 55				Sheet No. :				
Tenement : LOONGANA EL 36/79				DPO's :								Laboratory : AMDEL				
Area / Prospect : REGIONAL STREAM SEDIMENT SURVEY												Collected By : <i>[Signature]</i> Date : 9. MAY. 85				

CRA EXPLORATION PTY. LTD.

796078

077

SAMPLE NUMBER	LOCATION			ANALYSES										Geological Observations		
	Easting	Northing	Sample Type	Cu	Pb	Zn	Ag	As	Mn	Fe (%)	Ba	Au (ppm)	Au (ppt)			
1141993 994	405800	5423800	-80# -4#	5	10	18	≤1	11	210	1.28	100	≤0.005	50	Moderately incised; slow flow; colluvial banks; low organics; logged eucalypt forest; 70% gravel, 25% sand, 5% silt. Dominant med. grained granite float; common rounded quartz; minor quartz-feldspar porphyry float; * unsure of location.		
1141995 996	409000	5423300	-80# -4#	7	2	10	≤1	≤2	96	0.79	35	≤0.005	100	Moderately incised; med. flow; low organics; colluvial banks; logged eucalypt + pine forest; 30% gravel, 60% sand, 10% silt. Dominant granite float; lower basalt float; minor sst float with quartz veins.		
1141997 998	409000	5423100	-80# -4#	10	39	41	≤1	9	155	1.41	220	≤0.005	100	Moderately incised; med. flow; low organics; alluvial banks; logged eucalypt + pine forest; 60% gravel, 35% sand, 5% silt. Common green, banded, med. grained quartzite with trace pyrite; minor conglomerate; minor shale; quartz pebbles.		
1141999 2060	409150	5422900	-80# -4#	6	33	62	≤1	7	225	1.98	340	≤0.005	100	Moderately incised; med. flow; low organics; logged eucalypt forest; colluvial banks; 60% gravel, 35% sand, 5% silt. Common purple, med. grained crystal tuff; minor shale; minor pyritic sst; minor conglomerate.		
1231505 506	421750	5416400	-80# -4#	16	6	56	≤1	4	485	3.47	100	0.015	≤50	Moderate flow; weakly incised (suspl); 1m wide, agricultural land; 45% gravel, 45% sand, 10% silt. Dominant basalt float; lower conglomerate + quartz.		
DETECTION LIMIT																
ANALYTICAL METHOD																

Project : SHEFFIELD - MOLINA	1 : 250 000 Sheet :	AMG Zone :	Sheet No. :
Tenement : LOONGANA EL 36/79	DPO's :		Laboratory : AMDEL
Area / Prospect : REGIONAL STREAM SEDIMENT SURVEY			Collected By : A. CRICK I. ROGERS
			Date : MAY 1985

CRA EXPLORATION PTY. LTD.

796079

SAMPLE NUMBER	LOCATION		Sample Type	ANALYSES										Geological Observations
	Easting	Northing		Cu	Pb	Zn	Ag	As	Mn	Fe (%)	Ba	Au (ppm)	Au (ppt)	
1231507 508	422200	5418000	-80# -4#	14	7	28	<1	<2	220	2.83	20	<0.05 <50	Slow flow; weakly incised; 1m wide; colluvial banks; agricultural land; boulder trap; 25% gravel; 60% sand, 15% silt. Basalt float; lesser quartz	
1231509 510	427400	5415600	-80# -4#	39	12	125	<1	<2	1420	8.24	310	0.165 <50	Well incised; mod flow; 1m wide; colluvial banks; agricultural land; 60% gravel, 35% sand, 5% silt; boulder trap. Dominant basalt float; quartz pebbles; sandstone pebbles	
1231511 512	427400	5415700	-80# -4#	47	6	125	<1	5	850	8.26	220	<0.05 <50	Moderate flow; moderately incised; 2.0m wide; colluvial banks; agricultural land; 60% gravel, 40% sand; boulder trap. Dominant basalt float; lithic sandstone	
1231513 514	427750	5415800	-80# -4#	37	5	120	<1	<2	1560	8.26	320	<0.05 <50	Moderate flow; moderately incised; 1.5m wide; colluvial banks; agricultural land; 50% gravel, 25% sand, 25% silt; boulder trap with bar. Basalt float with Fe staining	
1231515 516	428250	5417150	-80# -4#	36	16	130	<1	<2	1020	7.58	290	<0.05 <50	Moderate flow; well incised; 2.5m wide; agricultural + scrubby forest; 60% gravel, 30% sand, 10% silt; boulder trap. Basalt float - Fe staining; quartz; conglomerate	
1231549 550	417000	5416400	-80# -4#	<2	25	52	<1	3	400	3.79	360	<0.05 <50	Moderate flow; well incised; alluvial banks; 2.5m wide; forested. 65% gravel, 35% sand; gravel bar. Black shales; sandstone; siltstone; quartzite	
DETECTION LIMIT														
ANALYTICAL METHOD														

Project : SHEFFIELD - MOINA	1 : 250000 Sheet :	AMG Zone :	Sheet No. :
Tenement : LOONGANA EL 36/79	DPO's :	Laboratory : AMDEL	Collected By : A. CRICK I. ROGERS
Area / Prospect : REGIONAL STREAM SEDIMENT SURVEY			Date : MAY 1985

CRA EXPLORATION PTY. LTD.

796080

029

SAMPLE NUMBER	LOCATION		Sample Type	ANALYSES										Geological Observations
	Easting	Northing		Cu	Pb	Zn	Ag	As	Mn	Fe (%)	Ba	Au (ppm)	Au (ppt)	
1231551 552	424850	5416850	-80# -4#	12	23	84	<1	4	610	428	100	0.005	50	Moderate flow; well incised; alluvial br. bs; 0.5m wide; rain forest; 45% gravel, 45% sand, 5% silt, 5% organics; plunge pool Dominant basalt float; quartz; conglomerate; siltstone; Mn stain
1231553 554	425100	5416200	-80# -4#	39	4	100	<1	6	1020	784	270	<0.005	<50	Slow flow; colluvial br. bs; well incised; 1m wide; 45% gravel; 45% sand, 5% silt, 5% organics; log trap site Dominant basalt float; quartz
1231559 560	420500	5410250	-80# -4#	3	12	8	<1	4	26	0.76	35	0.005	<50	Moderate flow; weakly incised; 0.75m wide; alluvial br. bs; bog pool rain forest; 70% gravel, 25% sand, 5% silt; rock bar Basalt float; quartz; conglomerate; pink staining on quartz
1231561 562	423200	5409900	-80# -4#	4	20	60	<1	4	70	1.17	350	<0.005	50	Slow flow; weakly incised; alluvial br. bs; 0.5m wide; bog pool eucalypt forest; 65% gravel, 35% sand; rock trap Basalt; quartz; siltstone or mudstone
1197583 584	399500	5411550	-80# -4#	30	5	135	<1	<2	530	6.04	120	<0.005	250	Moderate gradient; weakly incised; flowing; 1.5m wide; tea tree + eucalypt forest; weak Fe staining; 60% gravel, 30% sand, 1% silt, 1% clay Dominant basalt float; lesser quartz sand; minor vein quartz + quartz feldspar porphyry; fuchsite (?) or prehnite (?)
DETECTION LIMIT														
ANALYTICAL METHOD														

Project : SHEFFIELD - MOINA	1 : 250 000 Sheet :	AMG Zone :	Sheet No. :
Tenement : LOONICANIA EL 36/79	DPO's :	Laboratory : AMDEL	Collected By : A. COCK T. ROGERS
Area / Prospect : REGIONAL STREAM SEDIMENT SURVEY			Date : MAY 1985

080

APPENDIX 4

GEOCHEMICAL LEDGERS AND PETROLOGICAL REPORT

CATTLEY NORTH PROSPECT - OUTCROP AND FLOAT SAMPLES

CRA EXPLORATION PTY. LIMITED

March 1985

1081

SAMPLE NUMBER	LOCATION						LOCAL GRID CO-ORDS.										METAL CONTENT ppm / %							Geological Observations		
	Co-ordinates AMG / Grid		LENGTH	WIDTH	Interval		MAJOR ROCK	MINOR ROCK	ALTERATION	VISIBLE	STRIKE	DIP	MINOR	MINOR	MINOR	GAMMA LOGS	Cu	Pb	Zn	Ag	Fe%	Bi	Mn		Mo	Au
	East	North			From	To																				
1198715	404688	5412400		0%			20800N	50640E									40	220	65	2	1.48	<5	70	10	0.16	Acid tuff, weak sericite/Fe staining.
1198716	404785	5411975		0%			20800N	50760E									<5	<5	<5	1	2.50	<5	110	<5	<0.01	Acid tuff, layered
1198717	405080	5411790		0%	10		20800N	5110-20E									10	<5	<5	<1	1.05	<5	65	<5	<0.01	Acid tuff / quartz sandstone, S <sub>1</sub> =80.230
1198718	405210	5411715		0%	10		20800N	51255-65E									<5	<5	<5	<1	0.83	<5	35	<5	0.01	Acid tuff / quartz sandstone
1198719	405315	5411880		0%	5		21000N	51270-51275									35	55	55	<1	1.96	<5	390	<5	0.02	Grey silt → shale
1198720	405120	5412000		0%	5		21000N	51035-40									50	20	35	1	5.95	<5	360	<5	<0.01	Grey silt → shale
1198721	405100	5412020		0%	5		21000N	51015-20									80	10	105	<1	5.39	<5	1100	<5	<0.01	Grey silt → shale
1198722	404575	5412320		0%	35		21000	50400-25									<5	220	10	<1	1.48	<5	55	<5	<0.01	Dark grey siltstone / shale / sandstone etc.

GEOCHEMICAL ROCK SAMPLING LEDGER	DETECTION LIMIT		2	5	2	1	0.01	5	5	2	<0.01	
	ANALYTICAL METHOD		ICSS81									
TENEMENT NAME : LOONSANA EL. 36/79	PROJECT :	AMG ZONE : 55					SHEET NO. : 01					
AREA / PROSPECT : CATTLEY NORTH	DPO# :	35036					LABORATORY : ALS (BRIS)					
MAP / PHOTO REF : TASK 3496	SAMPLE No. :	1198715 - 1198722					COLLECTED BY : FRF			DATE : 24-9-87		

796082

# CRA EXPLORATION PTY. LIMITED

March 1985

083

SAMPLE NUMBER	LOCATION						LOCAL GRID COORDINATES										METAL CONTENT ppm / %									Geological Observations	
	Co-ordinates AMG / Grid		LAPSE	S TYPE	RIBS	Interval	MAJOR ROAD	MAJOR FENCE	ALTERATION	VEIN	STYLE	MAJOR	MINOR	MINOR	GANGUE	LOGS	Cu	Pb	Zn	Ag	P.	Bi	Mn	Mo	Au		
	East	North																									From
1198723	405995	541280		4/5	5	0	5										<5	15	<5	<1	0.57	<5	30	<5	<0.01	Acid tuff, moderate chloritic alteration, mod sericite.	
1198724	405990	541280		4/5	5	5	10										<5	20	<5	<1	0.71	<5	30	<5	<0.01		
1198725	405220	5411470		4/5	4			20600N, 51390-94										45	30	60	<1	5.52	<5	200	<5	<0.01	Black shale, weak Fe staining
1198726	405580	5411375		4/5	20			20600N, 51580-60 E										<5	<5	<5	<1	2.28	<5	670	<5	<0.01	Qtz-sandstone.
1198727	404250	541188.5		4/5	5			Levee RW ≈ 21450-550										<5	5	10	<1	1.50	<5	880	<5	<0.01	Rhyolite intensive
1198728	404250	5411880		4/5	5			" ≈ 21450-600										<5	40	20	<1	2.35	<5	1050	<5	<0.01	"
1198729	406150	5415070		4/5													60	10	<5	<1	2.95	<5	105	<5	<0.01	Siliceous sandstone minor pyrite	
1198730	405725	5412330		4/5	2			21600N, 51380-82										<5	<5	5	<1	3.35	<5	320	<5	<0.01	Acid tuff/sediment strongly Fe stained.

GEOCHEMICAL ROCK SAMPLING LEDGER	DETECTION LIMIT	2	5	2	1	0.01	5	5	2	0.01
	ANALYTICAL METHOD	← ICS 81 →								
TENEMENT NAME: LOONIANA EL 36/79	PROJECT:	AMG ZONE: 55				SHEET NO.: 02				
AREA / PROSPECT: CATTLEY NORTH	DPO: 35036					LABORATORY: ALS (BRIS)				
MAP / PHOTO REF: TASK 3496	SAMPLE No.: 1198723					COLLECTED BY: FRF DATE: 25-9-87				

796083

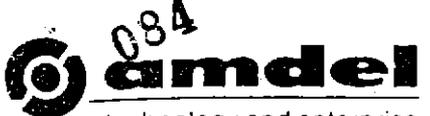
# CRA EXPLORATION PTY. LIMITED

March 1985

083

SAMPLE NUMBER	LOCATION						ROCK TYPE			MINERALISATION							METAL CONTENT ppm / %										Geological Observations
	Co-ordinates AMG / Grid		CAPSURE	S. TYPE	WIDTH (m)	Interval		MAJOR ROCK	MINOR ROCK	ALTERATION	VISIBLE	STYLE	MAJOR	MINOR	MINOR	GANGUE	LOG	Cu	Pb	Zn	Ag	As	Fe%	Mn	Mo	Au	
	East	North				From	To																				
1198672	404303	5412475			0/L													20	970	25	1	6	0.60	500	<2	<0.01	Gray shale, graphite in places S <sub>2</sub> = 60.240 and S <sub>3</sub> = 85.060 string.
GEOCHEMICAL ROCK SAMPLING LEDGER							DETECTION LIMIT							2	5	2	1	1	0.01%	5	2	0.01					
							ANALYTICAL METHOD							← ICS80 →					→ Pm201								
TENEMENT NAME : LOONSA NA							PROJECT :							AMG ZONE :							SHEET No. : 1						
AREA / PROSPECT : CATTLEY NORTH							DPO'S : 38750							LABORATORY : ALS (BRIS)													
MAP / PHOTO REF : TASH 3496							SAMPLE No. 1 : 1198672							COLLECTED BY : FF							DATE : 27/8/87						

796084



technology and enterprise  
Amdel Limited - Inc. in S.A.

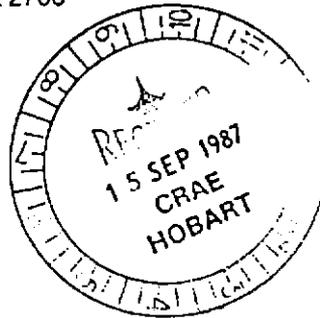
Amdel  
31 Flemington Street,  
Frewville, S.A. 5063  
Telephone: (08) 372 2700

796085

Address all correspondence to:  
P.O. Box 114,  
Eastwood, S.A. 5063

Telex: AA82520  
Facsimile: (08) 79 6623

10 September 1987



CRA Exploration Pty. Limited,  
P.O. Box 138,  
ROSNY PARK, TAS. 7018

ATT: MR. FRED FUNNELL

REPORT G 7209/88

YOUR REFERENCE:	DPO No. 38744 - CATTLE NORTH
IDENTIFICATION:	1198642, 644, 646, 656, 669, 670, 671
MATERIAL:	Seven rock samples
DATE RECEIVED:	26 August 1987
WORK REQUIRED:	Petrography (7 Code MA1.3)

Investigation and Report by: Frank Radke  
Manager - Geological Services: Dr Keith J Henley

for Dr William G Spencer  
General Manager  
Applied Sciences Group

c.c. CRA Exploration Pty. Limited,  
P.O. Box 138,  
ROSNY PARK, TAS. 7018  
ATT: ADMIN. OFFICER

CRA Exploration Pty. Limited,  
P.O. Box 656,  
FYSHWICK, A.C.T. 2609  
ATT: CHIEF GEOLOGIST INFORMATION SERVICES

bp

PETROGRAPHY OF SEVEN ROCK SAMPLES

1. SUMMARY

Seven samples submitted by CRA Exploration Pty. Limited for petrographic examination were given the following rock names.

<u>SAMPLE &amp; THIN SECTION NO.</u>	<u>ROCK NAME</u>
1198642: TSC49269	Altered Tuff
1198644: TSC49270	Tuffaceous Breccia
1198646: TSC49271	Altered Tuff
1198656: TSC49272	Altered Acid Volcanic Rock
1198669: TSC49273	Altered Rhyolite
1198670: TSC49274	Epidiorite
1198671: TSC49275	Altered Tuff

This suite of samples consist mainly of pyroclastic tuffaceous rocks which retain remnant tuffaceous textures despite pervasive alteration to cherty silica and secondary phyllosilicates. Some of the rocks also contain moderate amounts of carbonate including calcite, dolomite and probable siderite. Most of the rocks retain well preserved tuffaceous textures indicating a pyroclastic origin although a small number of samples (1198656, 669) lack such textures. It is considered likely they are also of pyroclastic origin. Sample 1198671 has a general detrital appearing character although the matrix contains well-developed remnant shards and could represent a waterlain tuff.

The only sample in this suite which is not of pyroclastic origin is sample 1198670 which is a shallow intrusive rock of approximately dioritic composition.

2. PETROGRAPHY

All of the samples described in this report have been stained with sodium cobaltinitrite after a hydrofluoric acid etch to detect the possible presence and location of potash feldspar. This staining is only mentioned where potash feldspar has been detected in the hand specimen.

The thin sections have been stained with an alizarin red-S solution to distinguish calcite from other carbonates by staining it pink. In the petrographic descriptions calcite is used only for stained carbonate. Some samples contain unstained carbonate which has tentatively been identified as either dolomite or siderite based on refractive indices.

SAMPLE: 1198642: TSC49269

Rock Name:  
Altered Tuff

Hand Specimen:

This sample consists of two small hand specimens both of which have aphanitic and undulose fine lamellar banded characters although they differ slightly in colour with one having a pale tan to pink colour and the other having a pale tan to greenish colour. Microchemical tests show that this sample contains no potash feldspar.

Thin Section:

An optical estimate of the constituents gives the following :

	<u>%</u>
Cherty matrix	75
Sericite/clay	20
Plagioclase phenocrysts	2
Carbonate	Tr
Zircon	Tr
Opagues and semi-opagues	3

The thin section was cut from offcuts from each sample and both samples have very similar characters being comprised of very fine-grained, cherty textured quartz intergrown with finely divided sericite/clay. The sericite/clay is concentrated in irregular shaped patches producing a banded, tuffaceous texture. The irregular angular and in some cases weakly vesicular to shard-like shapes of the sericitic patches produce a well preserved remnant tuffaceous texture. Most of these patches consist of very finely divided birefringent muscovite which forms felted, flaky aggregates although minor fibrous sericitic phyllosilicates are locally present and define a weakly developed preferred orientation parallel to the vague banding. Most of the cherty matrix has a very fine grain size below 0.05 mm although larger quartz grains ranging up to 0.1 mm in size are disseminated through the rock.

The sample also contains a small number of disseminated plagioclase phenocrysts ranging up to 1 mm in size. These phenocrysts tend to have subhedral, prismatic shapes and at least some exhibit well-developed polysynthetic twinning. In general these phenocrysts are very fresh showing no alteration to secondary phyllosilicates.

Traces of carbonate were noted as very small rhomb-shaped crystals below 0.1 mm wide intergrown with the cherty matrix. The carbonate is unaffected by the alizarin red-S stain and tends to have very high relief suggesting that it is siderite. Traces of zircon form disseminated crystals below 0.1 mm wide. Opagues occur as euhedral to anhedral grains and aggregates ranging up to 0.15 mm wide. Minor opaque to translucent iron oxides also occur locally as narrow fracture linings. Some translucent opagues form fine intergrowths with the matrix. The rock contains a small number of euhedral, square-shaped voids ranging up to 0.2 mm wide which could represent completely leached pyrite crystals.

This is a tuffaceous acid igneous rock which has been altered to finely granular cherty quartz and finely divided phyllosilicates but which still retains a well preserved, remnant tuffaceous texture.

SAMPLE: 1198644: TSC49270

Rock Name:  
Tuffaceous Breccia

Hand Specimen:  
A fragmental appearing rock with a massive character and a pale brown to green colour.

Thin Section:  
An optical estimate of the constituents gives the following :

	<u>%</u>
Cherty matrix	60
Sericite/clay	25
Carbonate (dolomite)	7
Calcite	5
Feldspar phenocrysts	Tr-1
Quartz phenocrysts	Tr
Zircon	Tr
Opagues and semi-opagues	2

This sample consists mainly of very finely granular, cherty textured quartz intergrown with finely divided phyllosilicates comprised largely of clay and fibrous, birefringent sericite. The fragmental texture noted in hand specimen is not readily apparent in thin section although textural differences exist between different areas of this sample suggesting a fragmental character. The rock also contains calcite and dolomite-rich patches and vein-like structures which to some extent are thought to fill the interstices between lithic clasts.

Within some areas the quartz and sericite form fine intergrowths with vague remnant tuffaceous textures including weakly developed shard shapes. Within some areas weakly foliated and banded textures most likely representing a compaction foliation are also present. Although vague remnant tuffaceous textures are evident within localised areas of the sample they are not as strongly developed as in sample 1198642. The matrix quartz generally has a very fine grain size of about 0.05 to 0.1 mm although within localised regions much finer grained cherty textured aggregates are present. The sericite generally occurs interstitially between the quartz or in small, irregular patches intergrown with the quartz. Most of the sericite has a fibrous texture and is intergrown with moderate amounts of weakly to moderately birefringent clay.

Both the carbonate and calcite tends to form coarsely granular aggregates up to 1 mm wide with a maximum grain size of about 0.5 mm. The calcite always forms xenomorphic crystals which are locally concentrated in vague elongate patches or vein-like structures. The dolomite occurs as both finely granular veined fillings and as larger crystals some of which exhibit well-developed rhomb shapes.

Minor quartz and feldspar are disseminated through the rock as larger crystals ranging up to 0.2 mm in size which are thought to represent remnant phenocrysts. Some of these phenocrysts have highly fractured and broken shapes while others are relatively undeformed.

Traces of zircon were noted as small disseminated crystals up to 0.1 mm wide. Opaques are disseminated through the rock as small grains and aggregates below 0.1 mm wide. Minor opaque to translucent iron oxides locally form narrow fracture linings which tend to have an undulose and discontinuous character.

This is thought to be a brecciated rock comprised mainly of tuffaceous clasts cemented by interstitial carbonate comprised of both dolomite and calcite.

SAMPLE: 1198646: TSC49271

Rock Name:

Altered Tuff

Hand Specimen:

A massive, fine-grained rock with a mottled, grey colour.

Thin Section:

An optical estimate of the constituents gives the following :

	<u>%</u>
Cherty matrix	60
Clay/sericite	25
Feldspar phenocrysts	5
Carbonate	5
Calcite	2
Quartz phenocrysts	2
Opagues and semi-opagues	2

This sample consists mainly of a very fine-grained, cherty textured matrix intergrown with phyllosilicates consisting of birefringent sericite as well as weakly birefringent clay and a pale green phyllosilicate which is possibly clay or chlorite. The matrix has a variable, irregular texture suggesting a fragmental, pyroclastic origin although well preserved remnant tuffaceous textures are not evident. Within some areas the clay forms irregular intergrowths with the chert which have a vague, tuffaceous texture.

The fragmental character of the rock is further emphasized by the presence of finely granular cherty clasts up to 1 mm in size as well as some angular patches up to 1 mm in size comprised of lamellar intergrowths of chert and fibrous phyllosilicates. It is possible that some of these lamellar intergrowths of chert and phyllosilicates represent altered mafic minerals.

Quartz and feldspar phenocrysts are disseminated through the rock as angular, broken appearing crystals up to 1 mm in size. The feldspar phenocrysts consist mainly if not exclusively of plagioclase. In general the plagioclase phenocrysts are quite fresh although locally they show some alteration to finely divided sericite.

An unstained carbonate forms finely granular aggregates and patches up to 1 mm in size. Most of this carbonate is thought to be dolomite although a very small proportion of the unstained carbonate has very high relief and could be siderite. Minor calcite is also present as small grains and granular aggregates which generally form intergrowths with the dolomite.

Opagues are disseminated through the rock as anhedral grains and aggregates up to 0.3 mm wide. Within some areas opagues form intergrowths with rhomb-shaped carbonate crystals which could represent partially altered siderite.

This is thought to be a pyroclastic rock which has been largely altered to finely granular cherty quartz and secondary phyllosilicates.

SAMPLE: 1198656: TSC49272

Rock Name:

Altered Acid Volcanic Rock - FINE ROCK

Hand Specimen:

An aphanitic rock with a massive character and a pale reddish-brown colour. Microchemical tests show that the matrix contains at least some finely intergrown potash feldspar.

Thin Section:

An optical estimate of the constituents gives the following :

	<u>%</u>
Felsic matrix	55
Sericite	20
Carbonate	15
Plagioclase phenocrysts	8
Opagues and semi-opagues	2

This sample consists mainly of a fine-grained matrix comprised of finely granular felsic minerals intergrown with finely divided sericitic phyllosilicates. Most of the felsic minerals in the matrix have a grain size below 0.1 mm although some larger quartz grains ranging up to 0.3 mm in size are disseminated through the matrix. Finely divided sericite forms interstitial intergrowths between the felsic minerals. Staining of the hand specimen shows that the matrix contains at least moderate amounts of potash feldspar but its fine grain size makes estimation of the relative proportions of potash feldspar and quartz difficult.

Plagioclase phenocrysts ranging up to 1.5 mm in length are disseminated through the rock and generally exhibit euhedral to subhedral, prismatic shapes. Locally the phenocrysts are concentrated into glomeroporphyritic aggregates up to 3 mm wide. The feldspar phenocrysts are generally quite fresh showing only incipient alteration to finely divided sericite although a small number of plagioclase phenocrysts show pervasive replacement by very finely divided sericite.

Carbonate is disseminated through the rock as granular patches up to 2 mm wide. Most of this carbonate has very high relief and is intergrown with minor amounts of translucent, reddish-brown iron oxides suggesting that it is siderite. A small proportion of the carbonate exhibits lower relief and is thought to be dolomite.

Some finely divided sericite forms irregular patches up to 1 mm in size intergrown with slightly coarser grained quartz. This quartz appears to be of secondary origin. It is possible that some of the larger quartz grains intergrown with the matrix are also of secondary origin.

Minor opaques are disseminated through the rock as small grains and aggregates up to 0.2 mm wide.

This is an acid volcanic rock of rhyolitic to rhyodacitic composition which shows pervasive alteration to secondary phyllosilicates and smaller amounts of carbonate believed to consist mainly of siderite.

SAMPLE: 1198669: TSC49273

Rock Name:

Altered Rhyolite

Hand Specimen:

This is a mottled pale tan to grey rock with irregular dark reddish-brown iron stained patches. The rock effectively has an aphanitic and massive texture. The rock shows slight textural variations between different areas producing a vague fragmental texture appearing to consist of angular clasts up to several centimetres in size. Microchemical tests indicate that within localised areas minor amounts of potash feldspar are intergrown with the matrix.

Thin Section:

An optical estimate of the constituents gives the following :

	<u>%</u>
Felsic matrix	55
Sericite/clay	30
Quartz phenocrysts	10
Opagues and semi-opagues	5

This sample consists mainly of a fine-grained felsic matrix comprised largely of granular quartz intergrown with finely divided sericitic phyllosilicates. Throughout most of this sample the matrix consists of quartz grains between 0.1 and 0.15 mm in size intergrown with interstitial finely divided sericite/clay. Within localised areas the matrix has a much finer grain size and could contain minor amounts of finely intergrown potash feldspar. Some of the sericite/clay forms irregular shaped patches up to 1 mm in size which tend to have elongate shapes and could represent altered lapillae.

Quartz phenocrysts ranging up to 2 mm in size are disseminated through the rock and typically exhibit subhedral to anhedral, embayed shapes. The rock contains a small number of sericite patches up to 1 mm in size which tend to have prismatic shapes and could represent completely altered feldspar phenocrysts.

Within localised areas the matrix contains moderate amounts of finely intergrown iron oxides which produces a translucent, reddish-brown character. This would represent the darker reddish-brown mottled areas noted in hand specimen. Minor opagues are also disseminated through the rock as small grains and aggregates up to 0.15 mm wide.

This is a rhyolitic volcanic rock most likely of pyroclastic origin which has been subjected to pervasive alteration to quartz and secondary phyllosilicates.

SAMPLE: 1198670: TSC49274

Rock Name:

Epidiorite

Hand Specimen:

A massive, fine-grained rock with a greenish-grey colour.

Thin Section:

An optical estimate of the constituents gives the following :

	<u>%</u>
Plagioclase	55
Hornblende	15
Chlorite	15
Epidote	5
Sericite	3
Quartz	2
Opagues and semi-opagues	5

This sample consists mainly of plagioclase laths ranging up to 0.8 mm long intergrown with interstitial mafic minerals. The plagioclase laths exhibit a random orientation forming an interlocking mosaic. Most of the plagioclase is quite fresh although it generally has a slightly turbid reddish-brown colour and also shows incipient alteration to finely divided sericitic phyllosilicates.

The mafic minerals consist of a weakly pleochroic green hornblende and a dark green chlorite which has an isotropic character. The chlorite in particular tends to form irregular patches up to 0.5 mm in size located interstitially between the plagioclase laths. At least some of the hornblende tends to form elongate, weakly prismatic crystals up to 1 mm long. The hornblende generally has a fibrous, slightly degraded appearing character.

Epidote is disseminated through the rock as small grains ranging up to 0.2 mm in size. Some of the epidote forms well-developed crystals with a pleochroic yellow colour and high birefringence but a significant proportion of the epidote forms very finely granular, turbid aggregates. Some pale brown coloured turbid aggregates are also disseminated through the rock and could represent finely divided epidote. Most of the epidote is intergrown with mafic minerals although smaller proportions of epidote form intergrowths with the plagioclase. Minor quartz is disseminated through the rock as angular interstitial fillings up to 0.2 mm in size located between the plagioclase laths.

Opagues form disseminated grains up to 0.5 mm in size as well as somewhat elongate, platy appearing crystals which could be ilmenite crystals.

This is a basic igneous rock of shallow intrusive origin whose original mafic minerals have been altered to chlorite and a secondary appearing weakly pleochroic bluish-green amphibole.

SAMPLE: 1198671: TSC49275

Rock Name:

Altered Tuff

Hand Specimen:

An aphanitic, pale grey rock. *angular as frags*

Thin Section:

An optical estimate of the constituents gives the following :

	<u>%</u>
Cherty matrix	75
Sericite/clay	15
Quartz grains	10
Zircon	Tr
Opagues and semi-opagues	1

This sample consists mainly of a strongly altered matrix now comprised of finely granular, cherty textured quartz intergrown with fibrous, sericitic phyllosilicates. A foliation is defined by a tendency for the fibrous phyllosilicates to be concentrated in discontinuous elongate bodies with a parallel to subparallel orientation. The matrix exhibits a very well preserved remnant tuffaceous texture including well preserved shards which have been replaced by slightly coarser grained and clearer cherty quartz.

Disseminated through the altered vitrophyric matrix are small quartz grains which generally range up to 0.15 mm in size although a very small number of larger quartz grains up to 0.4 mm wide are present. These quartz grains are more or less evenly distributed through the rock and appear to have a detrital origin. The quartz grains generally have angular, broken appearing shapes although some grains have rounded shapes. A small number of muscovite flakes up to 0.2 mm long are also disseminated through the rock and could be of detrital origin. Traces of zircon form small disseminated grains up to 0.1 mm wide.

Opagues are disseminated through the rock as anhedral grains and aggregates ranging up to 0.1 mm wide.

This is an altered tuffaceous rock with a very well preserved vitrophyric texture including shard textures which has survived despite pervasive alteration to finely granular chert and fibrous sericitic phyllosilicates. This rock is definitely of pyroclastic origin although it is difficult to determine whether it represents a fine-grained tuffaceous rock or a tuffaceous sedimentary rock such as a waterlain tuff.

CRA EXPLORATION PTY. LIMITED

March 1985

095

SAMPLE NUMBER	LOCATION						ROCK TYPE						MINERALISATION						METAL CONTENT ppm / %										Geological Observations
	Co-ordinates AMG / Grid		EXPOSURE	S. TYPE	WIDTH (m)	Interval		MAJOR ROCK	MINOR ROCK	ALTERATION	VISIBLE	STYLE	MAJOR	MINOR	MINOR	GANGUE	LOOK	Cu	Pb	Zn	Ag	As	Fe%	Mn	Ba	Au			
	East	North				From	To																						
1198624	405135	5410270	4/5		5												55	960	190	1	11	1.53	350	570	0.01	Acid soft, two cleavages, on early 80 270 and a later weaker 85.160. Moderate SE-CM development.			
1198625	200	280	4/5		5												5	110	20	1	5	0.95	45	3700	0.01	Grey shales, S <sub>0</sub> = 62.150 and young to the E. int.			
1198626	765	600	4/5		5												25	110	100	1	12	4.73	330	680	0.01	Interbedded chert / siltstone, tuffs. S <sub>0</sub> = 78.120, young E.			
1198627	890	715	4/5		5												110	185	165	1	10	4.93	790	1050	0.01	Folded black shales and siltstone. Axial plane on 70.070 and plunges 45° →			
GEOCHEMICAL ROCK SAMPLING LEDGER							DETECTION LIMIT										2	5	2	1	1	0.01%	5	10	0.01	135			
							ANALYTICAL METHOD										← IC 580 →										ARF 1 PH204		
TENEMENT NAME : LOONSANA							PROJECT :							AMG ZONE :							SHEET No. : 01								
AREA / PROSPECT : CATTLEY NORTH							DPO# : 38744/							LABORATORY : ALS (BRIS)															
MAP / PHOTO REF :							SAMPLE No. : 1198624 → 1198627							COLLECTED BY : FF/JM DATE : 11-8-87															

796096

# CRA EXPLORATION PTY. LIMITED

March 1985

SAMPLE NUMBER	LOCATION						ROCK TYPE							MINERALISATION							METAL CONTENT ppm / %										Geological Observations
	Co-ordinates AMG / Grid		EXPOSURE	S. TYPE	WIDTH (m)	Interval		MAJOR ROCK	MINOR ROCK	ALTERATION	VISIBLE	STYLE	MAJOR	MINOR	MINOR	GANOUÉ	LOGS	Cu	Pb	Zn	Ag	As	Fe%	Mn	Bi	Au					
	East	North				From	To																								
1198628	406020	5410805	CS		5												10	65	60	2	<1	5.02	380	500	0.01	Epipelagic cong → silt sized layers					
1198629	406115	705	CS		5												10	250	30	<1	5	1.49	90	70	0.01	Tuff/epipelagic So=75.120, 10m Vein Qz on 35.230					
1198630	215	820	CS		5												20	70	40	1	11	3.28	70	830	0.01	Intubedded silts & sands, graded bedding 3 Youngs SE. ie up. So=70.130.					
1198631	370	870	CS		5												20	50	45	<1	4	1.54	100	60	0.01	Milky Qz veins Epipelagic So=55.130					
1198632	370	870	YS		1												15	65	120	1	5	3.36	300	840	0.01	Chl rich epipelagic					
1198633	330	910	BS		1												10	25	15	<1	2	1.04	55	150	0.02	Sand sized epipelagic Qz veins on 30.080					

GEOCHEMICAL ROCK SAMPLING LEDGER		DETECTION LIMIT										2	5	2	1	1	0.01	5	10	0.01
		ANALYTICAL METHOD										← 1CS80 → XRF] MZU]								
TENEMENT NAME : LOONGANA					PROJECT :					AMG ZONE :					SHEET No. : 02					
AREA / PROSPECT : CATTLEY NORTH					DPO'S : 38744/					LABORATORY : ALS (BRIS)					COLLECTED BY : FF/JH DATE : 11-8-87					
MAP / PHOTO REF :					SAMPLE No. 1 : 1198628 → 1198633															

096

796097

# CRA EXPLORATION PTY. LIMITED

March 1985

SAMPLE NUMBER	LOCATION						ROCK TYPE		MINERALISATION										METAL CONTENT ppm / %							Geological Observations	
	Co-ordinates AMG / Grid		EXPOSURE	S. TYPE	WIDTH (m)	Interval		MAJOR ROCK	MINOR ROCK	ALTERATION	VISIBLE	STYLE	MAJOR	MINOR	MINOR	GANGUE	LOSS	Cu	Pb	Zn	Ag	As	Fe%	Mn	Ba		Au
	East	North				From	To																				
1198634	405455	5413405		C/S	5													35	310	340	2	75	4.85	1050	490	0.01	Black shale So=70.020, strong cleavage on 80.345
1198635	405070	5413410		C/S	4													15	50	85	1	16	4.02	500	630	0.01	Volcanic tuff/epiclastic Trace chl. Jointing on 80.070.
1198636	405145	5413315		C/S	5													15	100	300	2	13	3.08	740	1300	<0.01	Epiclastic felsic material.
1198637	405105	5413160		C/S	5													30	45	125	2	20	7.94	660	790	<0.01	Basic Igneous Rock Andesite
1198638	404970	5412820		C/S	1													35	35	210	2	13	4.62	860	640	<0.01	R.I.R. - Andesite
1198639	404740	5412680		C/S	1													45	45	760	1	12	6.70	380	1000	<0.01	Epiclastic cleavage on 80.290, 2nd cleavage on 70.180
GEOCHEMICAL ROCK SAMPLING LEDGER							DETECTION LIMIT										2	5	2	1	1	0.01	5	10	0.01		
							ANALYTICAL METHOD										← IC580 →							XRF1 PM209			
TENEMENT NAME : LOONGANA EL.							PROJECT :							AMG ZONE :							SHEET No. :						
AREA / PROSPECT : CATTLEY NORTH							DPO's : 38744 /							LABORATORY : ALS (BRIS)													
MAP / PHOTO REF :							SAMPLE No. : 1198634 → 1198639							COLLECTED BY : FF/TH							DATE : 12-8-87						

097

796098

# CRA EXPLORATION PTY. LIMITED

March 1985

SAMPLE NUMBER	LOCATION						ROCK TYPE		MINERALISATION							METAL CONTENT ppm / %								Geological Observations			
	Co-ordinates AMG / Grid		EXPOSURE	S. TYPE	WIDTH (m)	Interval		MAJOR ROCK	MINOR ROCK	ALTERATION	VISIBLE	STYLE	MAJOR	MINOR	MINOR	GANGUE	LOOK	Cu	Pb	Zn	Ag	As	Fe%		Mn	Ba	A-
	East	North				From	To																				
1198640	404705	5412655	E/S	S													20	180	60	<1	14	132	150	350	80.01	T. tabbed siliceous shales. No sulphides.	
1198641	404560	5412575	E/S	S													35	55	75	1	85	7.04	890	540	0.01	T. tabbed siliceous shales / epichlorites. S <sub>1</sub> 80.240 L <sub>1</sub> 80.150	
1198642	405920	5412970															25	35	75	1	7	3.31	300	560	80.01	Breccia. Chert 1-30cm diam. Chert-Rhyolite Frag Reclat S <sub>2</sub> = 90.290? Gen chert supported No sulphides.	
13/8/1987																											
1198643	405880	5412975	E/S	S	30	35											15	40	35	1	7	5.14	320	680	80.01	Very fine grained siliceous tuff / epichlorite? Strong leaching in 75.060.	
GEOCHEMICAL ROCK SAMPLING LEDGER							DETECTION LIMIT							2	5	2	1	1	0.01%	5	10	0.01					
							ANALYTICAL METHOD							←							ICS80						
TENEMENT NAME: LOONAWA							PROJECT:							AMG ZONE:							SHEET No.:						
AREA / PROSPECT: CATTLEY NORTH							DPO's: 38744/							LABORATORY: ALS (BRIS)													
MAP / PHOTO REF:							SAMPLE No. 1: 1198640 - 8643							COLLECTED BY: FF / SM							DATE: 12-8-87						

038

796099



# CRA EXPLORATION PTY. LIMITED

March 1985

100

796101

SAMPLE NUMBER	LOCATION						ROCK TYPE			MINERALISATION							METAL CONTENT ppm / %									Geological Observations	
	Co-ordinates AMG / Grid		EXPOSURE	S. TYPE	IDEN. Y-1	Interval		MAJOR ROCK	MINOR ROCK	ALTERATION	VISIBLE	STYLE	MAJOR	MINOR	MINOR	GANGUE	LOOSE	Cu	Pb	Zn	Ag	As	Fe%	Mn	Ba		Au
	East	North				From	To																				
1198649	405245	542995		CS		5	807	813										45	180	300	1	44	5.68	600	800	<0.01	Black shale /fg. silt So=80.230
1198650	405205	543005		CS		5	850	855										20	55	370	2	14	11.7	1550	700	<0.01	Diorite Andesite, Med Fine grained.
1198651	405385	542555		CS		5	273	278										20	90	45	2	26	4.44	130	830	<0.01	Epiclastic, fragments 1-10mm diam. Strong SE & Fe staining.
1198652	404435	542225		CS		1	10	11										10	160	95	1	32	5.07	195	750	0.01	Black shale
1198653	404460	542320		CS		1	113	114										15	120	80	1	32	3.84	340	830	<0.01	Black shale horizon So=35.070
14-8-1987																											
1198654	406020	542120		CS		5	278	283										10	40	70	1	4	3.96	185	590	<0.01	Felsic epiclastic with S/ratio comp. select py Cleavage 76.040
GEOCHEMICAL ROCK SAMPLING LEDGER							DETECTION LIMIT							2	5	2	1	1	0.01%	5	10	0.01					
							ANALYTICAL METHOD							← ——— TC 580 ——— →							XRF / PM209						
TENEMENT NAME : LOONSANA							PROJECT :							AMG ZONE :							SHEET No. :						
AREA / PROSPECT : CATTLE NORTH							DPO's : 38743							LABORATORY : ALS (BRISBANE)													
MAP / PHOTO REF :							SAMPLE No. : 1198649-1198654							COLLECTED BY : FF/JM							DATE : 13-8-87						

# CRA EXPLORATION PTY. LIMITED

March 1985

101

SAMPLE NUMBER	LOCATION						ROCK TYPE										MINERALISATION										METAL CONTENT ppm / %										Geological Observations
	Co-ordinates AMG / Grid		LITHOLOGY	S. TYPE	WIDTH (m)	Interval		MAJOR FOC	MINOR FOC	ALTERATION	VEIN	STYLE	MAJOR	MINOR	MINOR	GANGUE	LOG	Cu	Pb	Zn	Ag	As	Fe%	Mn	Ba	Au											
	East	North				From	To																														
1198655	405920	5411960	CS		3	492	495											25	30	40	1	2	3.37	360	1450	0.01	Basal epichlastic Frags 1-10mm diam.										
1198656	405800	5411880	TS		1	902												10	15	65	1	1	3.87	460	1000	0.01	Rhyolitic → Rhyodacitic comp. Rhyodacite? Pyroclastic										
18-8-1987																																					
1198657	405530	5411980	CS		5	25	30											70	140	240	1	2.6	3.33	70	610	0.01	Black shale, minor silt bands. S <sub>0</sub> = 85.100										
1198658	405545	5411945	CS		5	56	61											15	20	35	1	3	4.61	480	950	0.01	Felsic epichlastic Qtz frags Fe stained										
1198659	405495	5412010	CS		2	20	22											45	430	25	1	5.5	2.56	40	700	0.01	Black shale and interbedded silt										
1198660	406280	5412160	CS															10	50	75	1	4	4.16	135	1050	0.01	Felsic epichlastic pink felsic/siltstone										

GEOCHEMICAL ROCK SAMPLING LEDGER		DETECTION LIMIT		2	5	2	1	1	0.07	5	10	0.01			
		ANALYTICAL METHOD		← ICS80 →				XRF 1 Pmcex							
TENEMENT NAME: LOONGANA				PROJECT:				AMG ZONE:				SHEET No.:			
AREA / PROSPECT: CATTLEY NORTH				DPO's: 38743				LABORATORY: ALS (BRISBANE)							
MAP / PHOTO REF:				SAMPLE No.: 1198655-1198660				COLLECTED BY: FF/JM				DATE: 14/15-8-87			

796102

# CRA EXPLORATION PTY. LIMITED

March 1985

102

SAMPLE NUMBER	LOCATION						ROCK TYPE			MINERALISATION							METAL CONTENT ppm / %							Geological Observations			
	Co-ordinates AMG / Grid		EXPOSURE	S. TYPE	WIDTH (m)	Interval		MAJOR TOCCE	MINOR ROCK	ALTERATION	VISIBLE	STYRE	MAJOR	MINOR	MINOR	GANGUE	LOGS	Cu	Pb	Zn	Ag	As	Fe %		Mn	Ba	Au
	East	North				From	To																				
1198661	406320	5411570	4/s		5													10	35	115	2	1	6.25	530	720	<0.01	Basic epichlorite
1198662	405000	5409965	4/s		5	0	5											5	45	70	1	<1	3.93	40	360	<0.01	Fine grained siliceous tuff/epichlorite weak chd + strong chd.
1198663	405035	5411360	4/s		3													70	60	90	1	20	4.95	240	670	0.01	Black shale with minor silt beds
1198664	405010	5411430	4/s		4													70	115	35	1	11	1.79	40	770	0.01	Light green siltstone v.f.g.

GEOCHEMICAL ROCK SAMPLING LEDGER	DETECTION LIMIT	2	5	2	1	1	0.01	5	10	0.01	
	ANALYTICAL METHOD	← IC 580 →		← KRF 1 PM109 →							
TENEMENT NAME: LOONGANA	PROJECT:	AMG ZONE:				SHEET No.:					
AREA / PROSPECT: CATTLEY NORTH	DPO: 38743					LABORATORY: ALS (BRIS)					
MAP / PHOTO REF:	SAMPLE No.: 1198661 - 664					COLLECTED BY: FF/JH		DATE: 15-8-87			

796103

# CRA EXPLORATION PTY. LIMITED

March 1985

SAMPLE NUMBER	LOCATION						ROCK TYPE		MINERALISATION							METAL CONTENT ppm / %							Geological Observations														
	Co-ordinates AMG / Grid		EXPOSURE	S. TYPE	WIDTH	Interval		MAJOR ROCK	MINOR ROCK	ALTERATION	VISIBLE	SITE	MAJOR	MINOR	MINOR	GANGUE	LOGE	Cu	Pb	Zn	As	As		Fe%	Mn	Ba	Au										
	East	North				From	To																														
1198665	404420	5413174		CB	2	6	1											20	150	170	2	70	3.18	50	770	0.07	Black shale, $S_o = 47.120$ $I = 76.310$ . No sulphides.										
1198666	404400	5412070		S/S	2	120	122											15	640	30	2	360	2.74	60	340	0.13	Siliceous fine grained pale green rock. Signif. pyrite development (upto 5% of rock).										
1198667	404460	5411840		CS	5	450	455											25	140	10	2	1200	4.01	60	920	0.03	Rhyolitic outcrop. weak Jarosite staining.										
1198668	404470	5411860		CS	5	474	479											50	175	500	3	200	4.80	60	1250	0.01	Black shale, $S_o = 85.010$ no sulphides										
PETROLOGICAL DESCRIPTIONS REQ FOR																																					
1198669	404415	5411820		S/S		367																						Qz-porphyrty intrusive ?									
1198670	405100	5413150		S/S		720																						Andrite? Ident									
1198671	404400	5412070		S/S		120																						Basal epidote, trace P.									
GEOCHEMICAL ROCK SAMPLING LEDGER																	DETECTION LIMIT							2	5	2	1	1	0.01%	5	10	0.01					
																	ANALYTICAL METHOD							← IC580 →							KRF 1 P249						
TENEMENT NAME: LOONGANA EL.																	PROJECT:							AMG ZONE:							SHEET NO.:						
AREA / PROSPECT: CATTLE NORTH																	DPO'S:							LABORATORY: ALS (BRIS)													
MAP / PHOTO REF:																	SAMPLE NO.: 1198665 - 11986							COLLECTED BY: FF/JM							DATE: 20/8/87						

103

796104

## CRA EXPLORATION PTY. LTD.

SAMPLE NUMBER	LOCATION			ANALYSES										Geological Observations
	Easting	Northing	Sample Type	Cu	Pb	Zn	Ag	As	Fe	Mn	Pb	Bu	Au	
				ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	
1232901	405110	5412400	0% grab	10	10	260	<1	12	9.67	840	16	440	10	Andesite from quarry; biased towards magnetite zone
02	404790	5412620	"	15	70	155	<1	24	4.47	940	76	540	5	Andesite breccia at volc. contact, some strong weathering
03	404660	5412560	10m% grab	10	20	95	<1	4	2.22	75	12	440	<3	fine grained vitric? volc. leached, no sulfide noted.
04	404610	5412525	"	25	230	140	<1	65	3.69	85	240	650	<3	dk grey, and pale grey leached siltstone.
05	404960	5412485	"	10	185	85	<1	24	1.64	30	180	640	<3	Sericitic crystal volcanic, some laminated grey siltstone
06	404490	5412435	"	10	300	115	<1	20	2.46	1150	320	680	3	v. fine grained vitric? volcanic - hole, some grey siltstone
07	404440	5412360	5m% grab	10	110	90	<1	36	1.40	145	104	750	3	fine dk gray shale, laminated, no sulfide noted
08	404470	5412375	"	5	50	40	<1	16	3.00	650	48	520	3	similar to 905, less sericitic lithic? tuff
09	404460	5412280	15m% grab	20	60	120	<1	13	3.13	870	56	820	<3	fine grained (sandy matrix) lithic tuff with shale frags.
1232910	404450	5412250	3m% grab	5	95	80	<1	65	2.17	100	84	400	10	fine grained vitric(?) volc. with Fe staining, faint by smell
11	404420	5412155	80m% chip	15	760	55	1	520	2.81	40	776	280	65	" " " " with some shale frags.
12	404410	5412000	5m% chip	15	90	80	1	20	2.32	120	80	740	3	hyritic fine grained vitric volc, hyrite veins zone wide
13	404380	5411950	3m% chip	15	135	30	<1	120	2.30	35	132	250	60	Sericitic(?) crystal tuff with minor hyrite. unbiased towards hy.
14	404400	5411925	1m% chip	10	240	175	<1	55	2.68	70	228	330	40	More chloritic crystal tuff with dissem. hyrite 3%.
15	404395	5411890	20m% chip	10	195	45	<1	40	1.54	35	184	270	10	fine grained vitric? volc. trace dissem hyrite
16			10m% chip	80	880	180	6	330	4.11	40	924	740	50	sericitic qtz porphyry minor hyrite
17			3m% chip	40	860	80	8	620	3.23	30	832	1100	145	fractured qtz porphyry with minor hyrite - weathered.
18	404405	5411845	5m% chip	70	460	80	6	340	2.21	20	440	920	210	- - - - -
19			5m% chip	45	450	20	4	1150	3.66	25	436	1000	125	Dg Porphyry - minor pyrite, Anhydrous qtz, weak Fe stain
1232920			5m% chip	20	340	15	2	360	1.87	20	320	880	25	" " " " Vuggy py veins, Toronite stain
DETECTION LIMIT				2	5	2	1	1	0.01	5	4	10	3ppb	
ANALYTICAL METHOD				← ICS 80 → XRF 1 → PM25										
Project :	Sheffield - Moira			1 : 250 000 Sheet : SK 55-3				AMG Zone :				Sheet No. : 1		
Tenement :	Loongana 36/79			DPO's : 35016								Laboratory : A.L.S.		
Area / Prospect :	Cattley North											Collected By : WOS/FRE		Date : 19/2/87



CRA EXPLORATION PTY. LTD.

SAMPLE NUMBER	LOCATION		Sample Type	ANALYSES								Geological Observations
	Easting	Northing		Cu	Pb	Zn	Ag	As	Fe %	Mn	Au ppb	
154918	404410	5412140		15	70	70	1	11	2.05	70	<3	Crystal tuff containing large sulphide blebs or pools
154919	404415	5412120		15	400	35	1	350	2.15	30	25	Greenish(?) and silicified tuff containing coarse shale cherts
54920	404415	5412080		30	1000	60	3	1150	4.77	40	125	Coarse pyritic sulphide blebs (pools) in a green vitric tuff
154921	404400	5411900		210	1200	65	5	1050	3.92	40	270 *	Greenish crystal tuff float
154922 923	404420	5411830		15	280	20	5	620	2.17	30	10	Sulphidic quartz feldspar porphyry; mapped as green by Geopelco
				20	280	20	3	700	2.78	30	10	
154925 926	404840	5412580		20	195	90	2	34	3.05	40	5	Pyritic and silicified coarse epiclastic
				5	195	200	1	20	5.06	800	<3	
54927	405280	5412310		20	30	65	1	<1	4.34	350	<3	Highly ferruginous vitric tuff
DETECTION LIMIT				5	5	5	1	1	0.01	10	3	
ANALYTICAL METHOD				K586 → PL206								

Project: SHEFFIELD - MOINA      1:250 000 Sheet: BURNIE      AMG Zone:      Sheet No.: 1

Tenement: LOONCANIA EL 36/79      DPO's: 32019      Laboratory: ALS

Area / Prospect: DEPARTMENTAL OFFICE DML CHIO SANDHILL - CATHRYN NORTH      Collected By: S. CAULFIELD      Date: MAR APR

796108

107

## CRA EXPLORATION PTY. LTD.

SAMPLE NUMBER	LOCATION		Sample Type	ANALYSES								Geological Observations
	Easting	Northing		Cu	Pb	Zn	Ag	As	Fe (%)	Mn	Au (ppb)	
1055640	405350	5412355		5	<5	220	1	12	11.70	760	5	Ironstone veining with a dark green intermedialite tuffaceous volcanic
1055641	405350	5412245		5	<5	70	1	10	3.69	95	3	Highly ferruginous weathered vitric tuff (float)
1055642	405370	5412210		<2	<5	200	1	2	13.20	2750	5	Ferruginous veining through a chlorite + sericite altered tuff; possible minor shale
1055643	405410	5412160		5	15	140	1	4	8.55	245	<3	Ferruginous shale
1055644	405310	5411910		50	10	95	1	7	2.95	780	5	Interbedded shale + tuffaceous rock
1055645	406290	5412170		15	10	45	1	15	2.85	190	3	Ferruginous and silicified shale float
1055646	406290	5412090		5	50	290	1	16	8.03	175	3	Ferruginous quartz veins
DETECTION LIMIT												
ANALYTICAL METHOD												
Project : SHEFFIELD - MOINA				1 : 250 000 Sheet : BURRUE				AMG Zone :		Sheet No. : 1		
Tenement : LOONGANA EL 36/79				DPO's :						Laboratory : ALS		
Area / Prospect : RECONNAISSANCE ROCK CHIP SAMPLING - CATTLEY NORTH										Collected By : S. CATHNESS Date : JUNE 1986		

796109

109

B A S S

S T R A I T

SMITHTON

BURNIE

ULVERSTONE

DEVONPORT

DELORAINÉ

5 400 000mN



LOONGANA  
E.L. 36/79

ROSEBERY

ZEEHAN

S O U T H E R N

QUEENSTOWN

STRAHAN

5 300 000mN

O C E A N

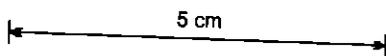
400 000mE

CRA EXPLORATION PTY. LIMITED

LOONGANA E.L. 36/79

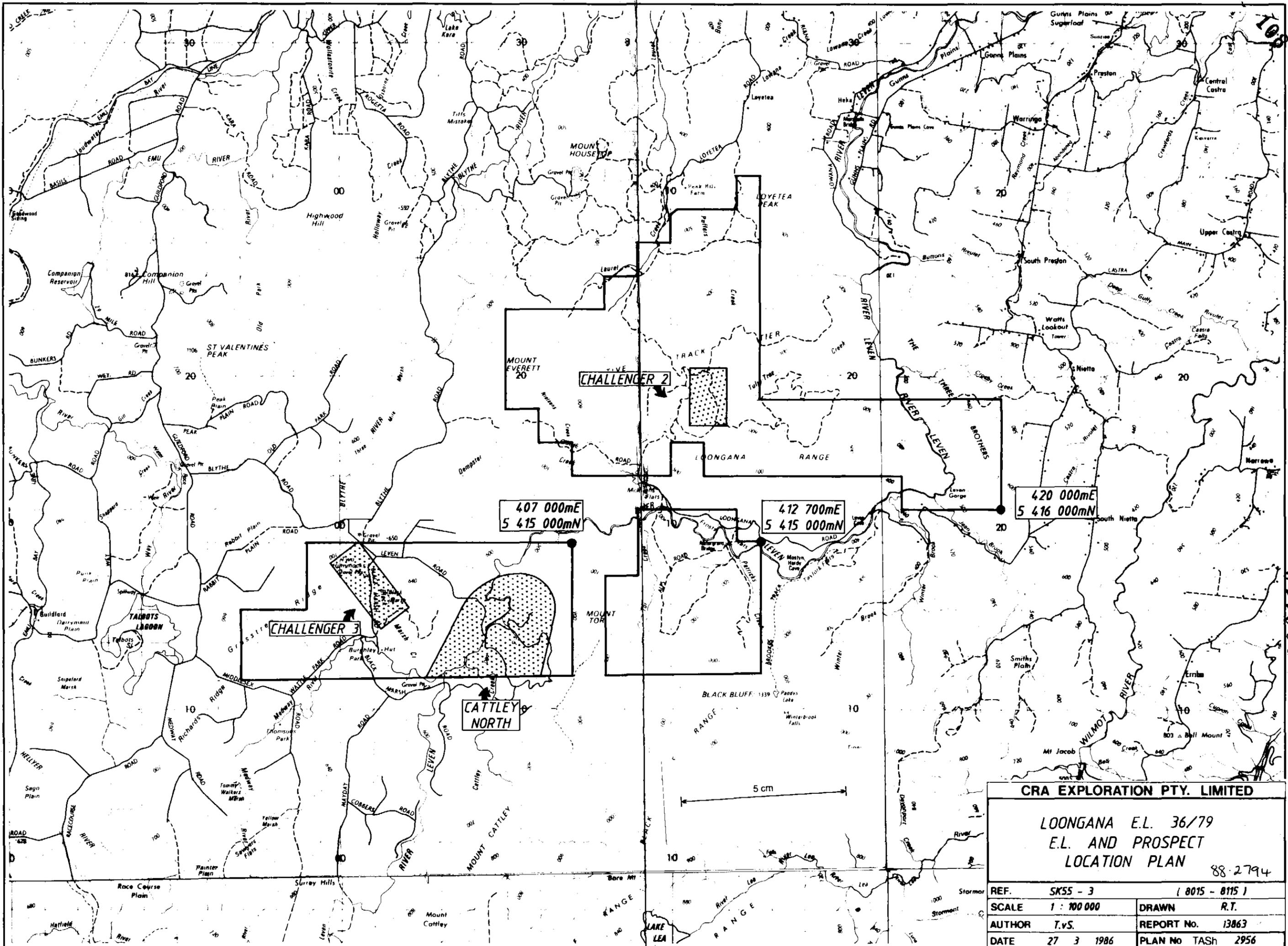
LOCATION PLAN

88-2794



300 000mE

REF.	SK55 - 3	( 8015 - 8115 )
SCALE	1 : 1 000 000	DRAWN R.T.
AUTHOR	T.v.S.	REPORT No. 13863
DATE	27 - 3 - 1986	PLAN No. TASH 2954

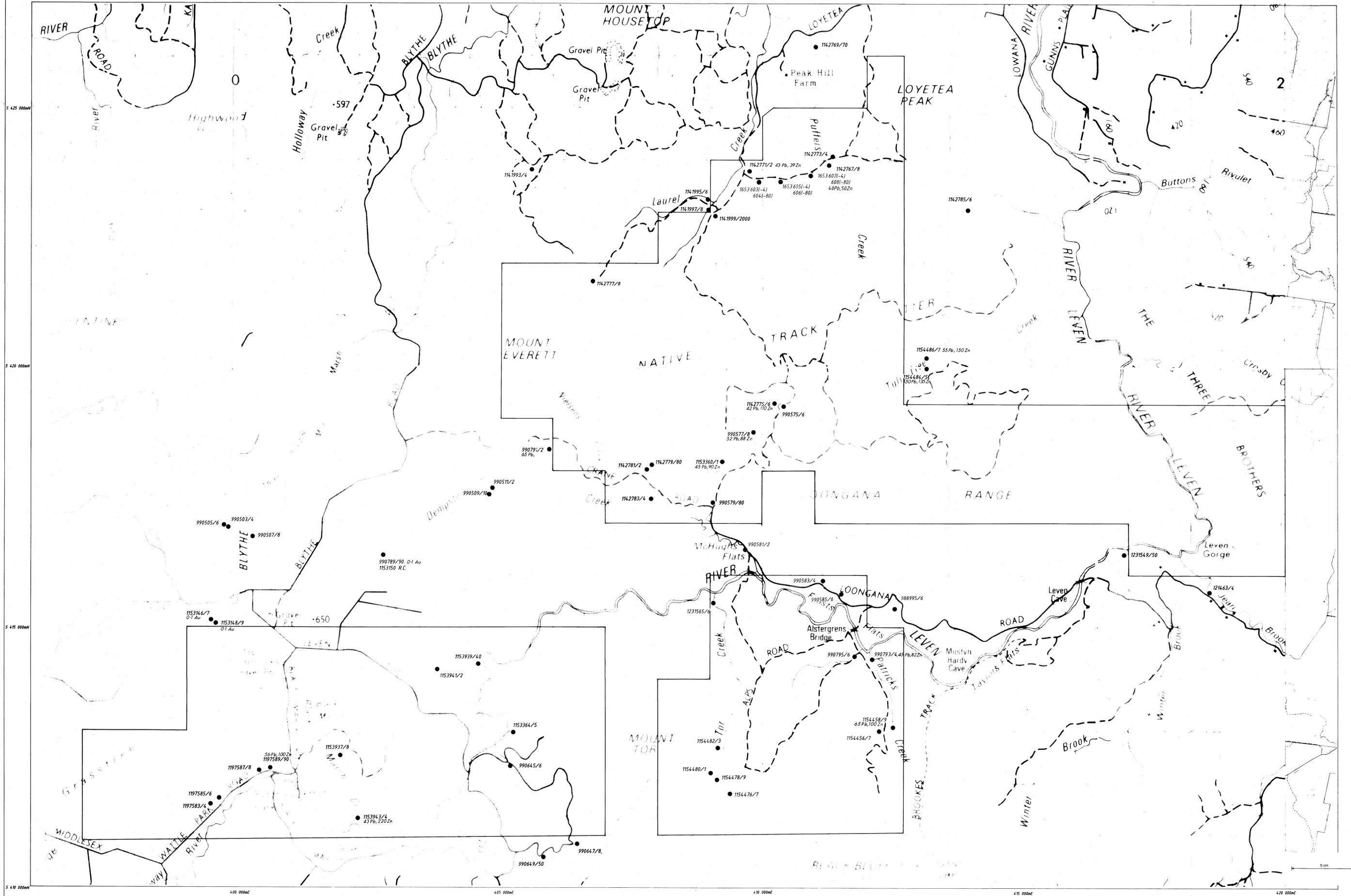


<b>CRA EXPLORATION PTY. LIMITED</b>	
<b>LOONGANA E.L. 36/79 E.L. AND PROSPECT LOCATION PLAN</b>	
REF. SK55 - 3	( 8015 - 8115 )
SCALE 1 : 100 000	DRAWN R.T.
AUTHOR T.V.S.	REPORT No. 13863
DATE 27 3 1986	PLAN No TASH 2956

796110

108

88-2794



6535 796111

\* NB \* EVEN No. — 4 mesh CYANIDE LEACH SAMPLE  
 ODD No. — 80 mesh SAMPLE

CRA EXPLORATION PTY. LIMITED	
LOONGANA E.L. 36/79	
CRAE REGIONAL STREAM SEDIMENT	
SAMPLE LOCATIONS 1985 - '86	
WITH ANOMALOUS RESULTS	
REF. SK55-3	DRAWN - R.T.
SCALE 1 : 25 000	REPORT No. 13863
AUTHOR S.J.C.	DATE 17-3-1987
PLAN No. 1ASB	PLAN No. 3355

# CATTLEY NORTH PROSPECT

E.L. 36/79 Boundary

5 416 000mN

5 412 000mN

5 410 000mN

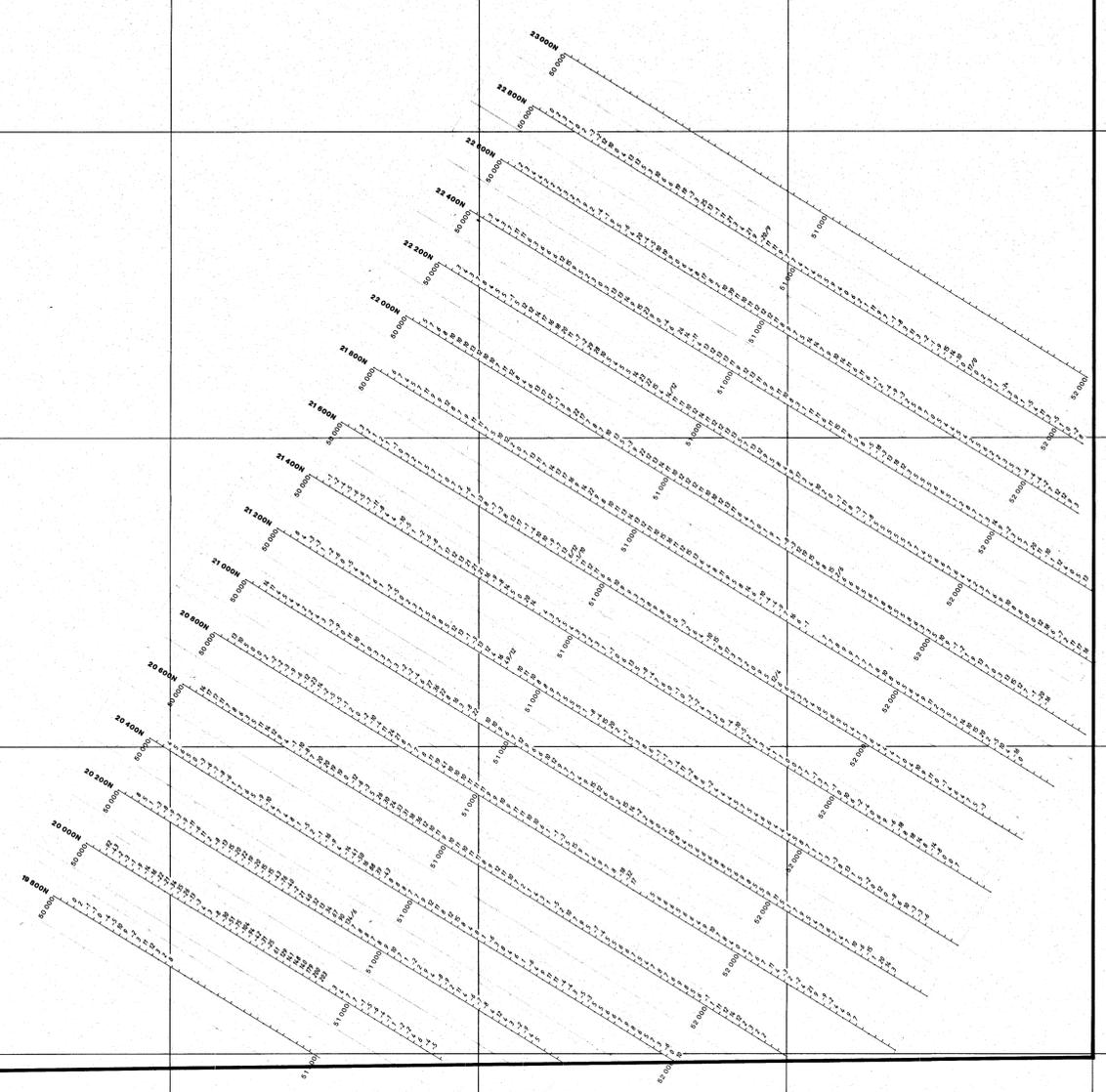
401 000mE

403 000mE

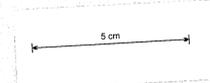
405 000mE

407 000mE

409 000mE

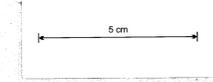
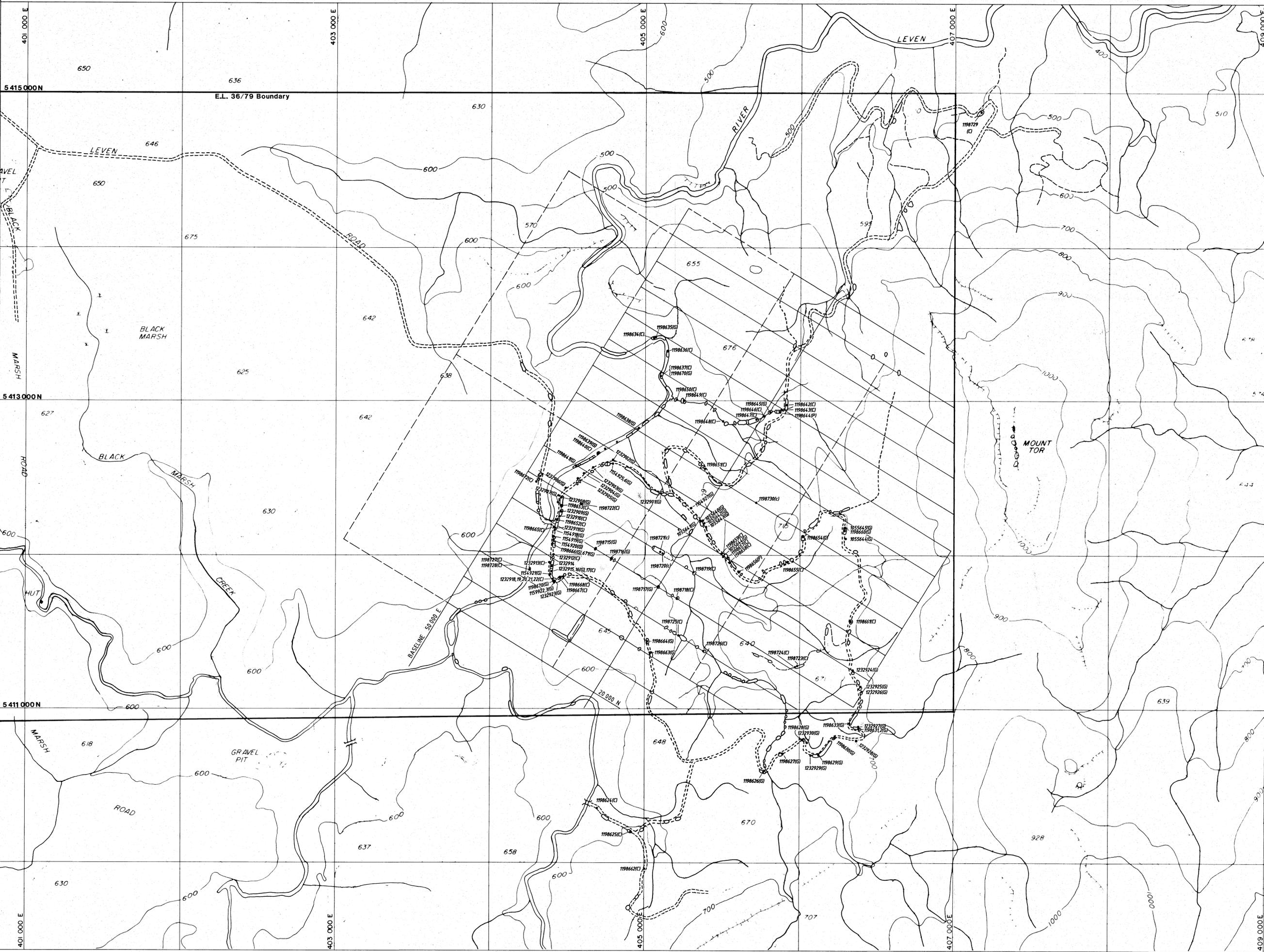


796112 6536



CRA EXPLORATION PTY. LIMITED			
LOONGANA E.L. 36/79			
CATTLEY NORTH PROSPECT			
U.T.E.M. CHANNEL 5			
8576			
REF.	SK55 - 3	( 8015 - 8115 )	
SCALE	1 : 10,000	DRAWN	R.T.
AUTHOR	T.V.S.	REPORT No.	
DATE	7 - 9 - 1987	PLAN No.	TASH 3491

# CATTLEY NORTH PROSPECT

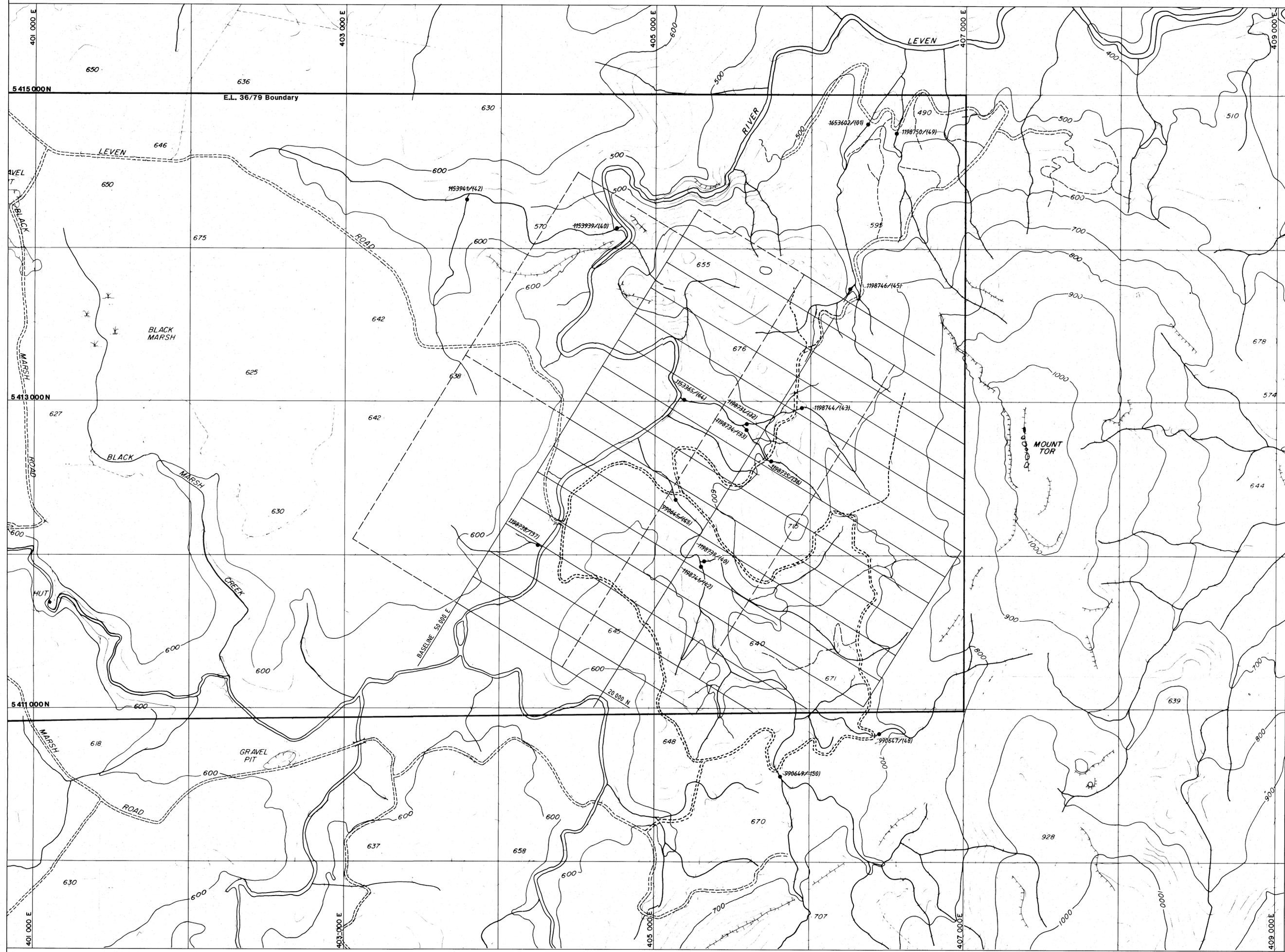


6537  
796113

- REFERENCE
- 1198654(C) Outcrop channel sample
  - 1198660(G) Outcrop grab sample
  - 1198644(P) Outcrop petrological sample

CRA EXPLORATION PTY. LIMITED			
LOONGANA E.L. 36/79			
CATTLEY NORTH PROSPECT			
SAMPLE NUMBER LOCATIONS			
REF	SK55 - 3	(8015 - 8115)	
SCALE	1 : 10 000	DRAWN	R.T.
AUTHOR	F.R.E.	REPORT No.	
DATE	14 - 9 - 1987	PLAN No.	TASh 3496

# CATTLEY NORTH PROSPECT



5 cm 796114

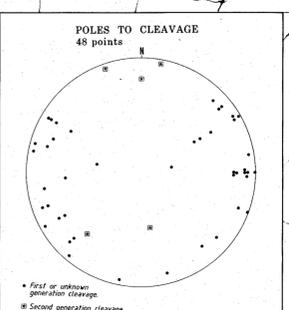
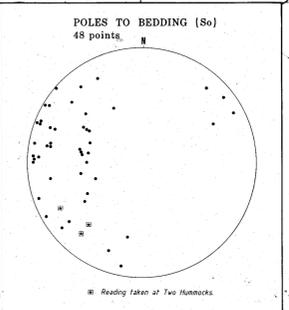
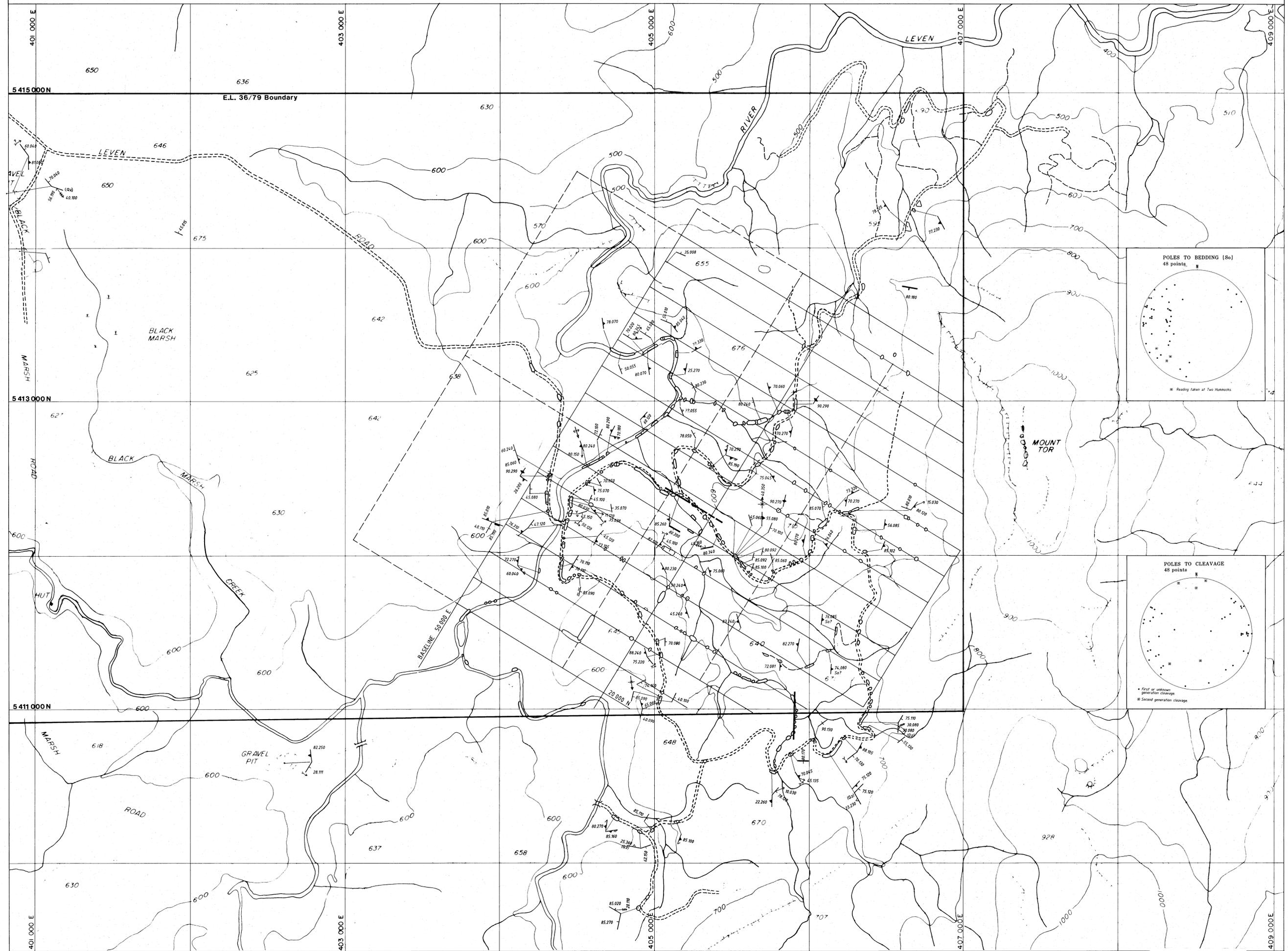
● 990647 / 148  
 1st. Sample Number - 80 mesh Stream Sediment Sample  
 2nd. Sample Number - 4 mesh Stream Sediment Sample

82.2794  
 CRA EXPLORATION PTY. LIMITED  
 LOONGANA E.L. 36/79  
 CATTLEY NORTH PROSPECT  
 STREAM SEDIMENT  
 SAMPLE NUMBER LOCATIONS

REF.	SK55 - 3	( 8015 - 8115 )
SCALE	1 : 10 000	DRAWN R.T.
AUTHOR	F.R.E.	REPORT No.
DATE	9 - 10 - 1987	PLAN No. TASH 3534

6538

# CATTLEY NORTH PROSPECT



- REFERENCE**
- Bedding; dip, dip direction.
  - Bedding; dip, dip direction; apparent dip of cleavage on bedding plane. (dip, dip direction).
  - Joint; dip, dip direction.
  - Foliation; generation unknown; dip, dip direction.
  - Foliation; First generation; dip, dip direction.
  - Foliation; Second generation; dip, dip direction. NOTE: Relative timing valid ONLY at point of observation.
  - Foliation; dip, dip direction, also showing plunge and plunge direction of the fold.

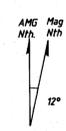
- Vein; dip, dip direction, (vein fill)
- Fault; dip, dip direction, also showing pitch and pitch direction of slickensides.
- Fault; position approximate.
- Zone of shearing.
- Facing; top of arrow towards youngest strata.
- Antiform; position accurate; showing the trend and plunge of the fold in addition to the dip, dip direction of the axial plane.
- Synform; position accurate; showing the trend and plunge of the fold in addition to the dip, dip direction of the axial plane.

- Vergence; showing antiform to left (looking down plunge) also showing plunge and plunge direction.
- Vergence; showing synform to left (looking down plunge) also showing plunge and plunge direction.

NOTE: FOR BOTH OF THE ABOVE THE NUMBER OF TICKS CORRESPOND TO THE FOLD GENERATION.

796115

5 cm

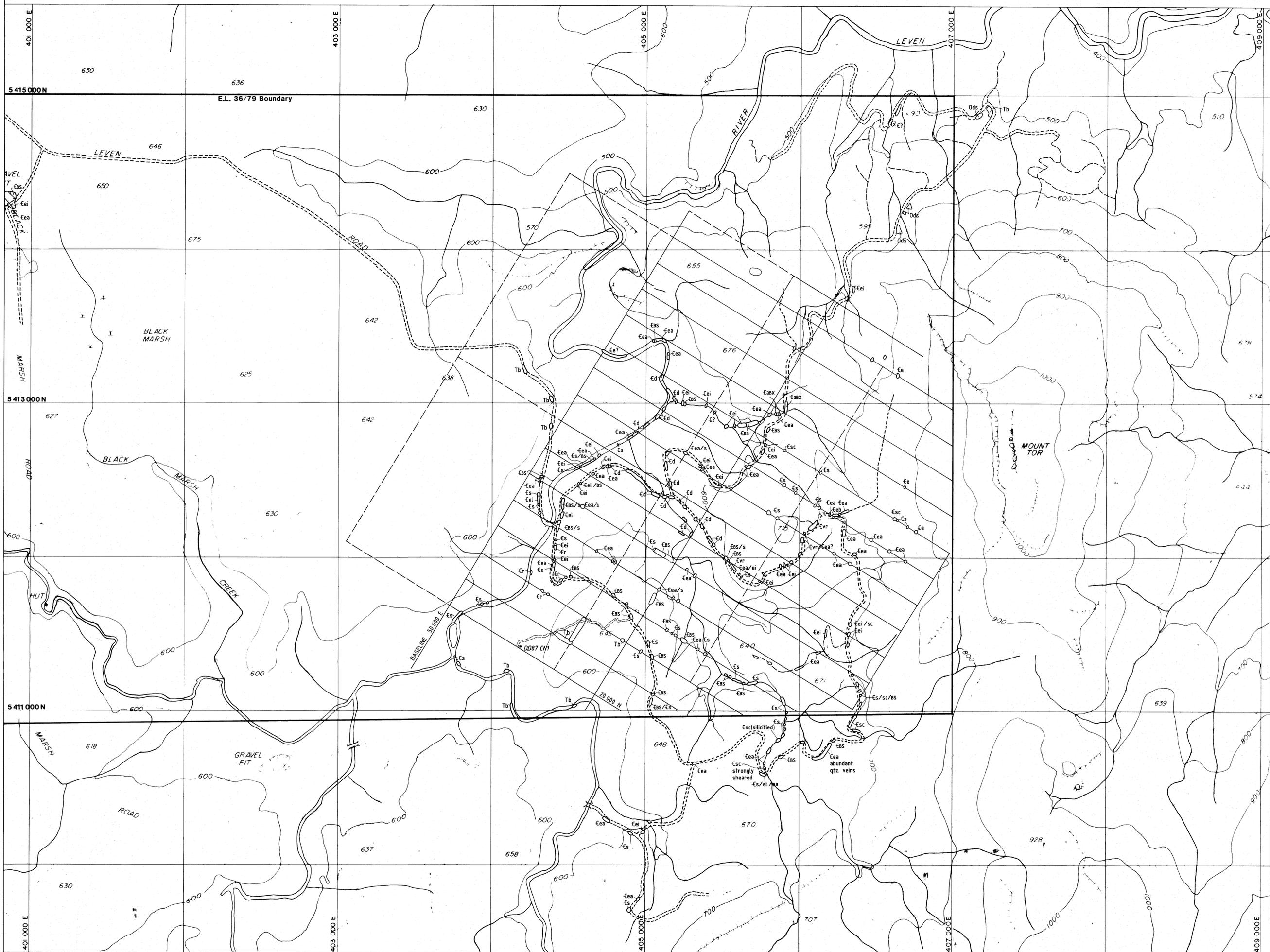


NOTE: All bearings given with respect to magnetic north.  
6539

88-2794  
CRA EXPLORATION PTY. LIMITED  
LOONGANA E.L. 36/79  
CATTLEY NORTH PROSPECT  
STRUCTURAL GEOLOGY

REF.	SK55 - 3	(8015 - 8115)
SCALE	1 : 10 000	DRAWN R.T.
AUTHOR	P.F.E.	REPORT No.
DATE	14 - 10 - 1987	PLAN No. TASH 3536

# CATTLEY NORTH PROSPECT



### LEGEND

<b>TERTIARY</b>	Tb	Basalt
<b>ORDOVICIAN</b>	Ou	Undifferentiated Ordovician siliceous sandstone and conglomerate. This includes units of Quartz sandstone and conglomerate (Ods) and dominantly siliceous conglomerate (Odc).
<b>LATE CAMBRIAN</b>	Eea	Conglomerate, rounded to angular quartzite and volcanic clasts set in a matrix of basic volcanic detritus which is occasionally strongly magnetic. Occasional black shale, chert, silt interbeds.
<b>MIDDLE CAMBRIAN</b>	Es	Undifferentiated detrital sediments, silt to sand sized material.
	Ebs	Black Shale: occasional interbeds of medium grey fine grained siltstone.

<b>MIDDLE CAMBRIAN (cont.)</b>	Evr	Rhyolitic / Rhyodacitic volcanoclastic. Pale pink colour, massive. Significant carbonate (15%) and sericite (20%).
	Eea	Acid epiclastic: white-cream colour, a QZ-FLD-SE-ICHL/CARB rock. Variable lithic component. Rare brecciated texture (Eabx).
	Eei	Intermediate epiclastic: grey-green colour, common chl. + sericite. Occasional interbeds of Es/bs.

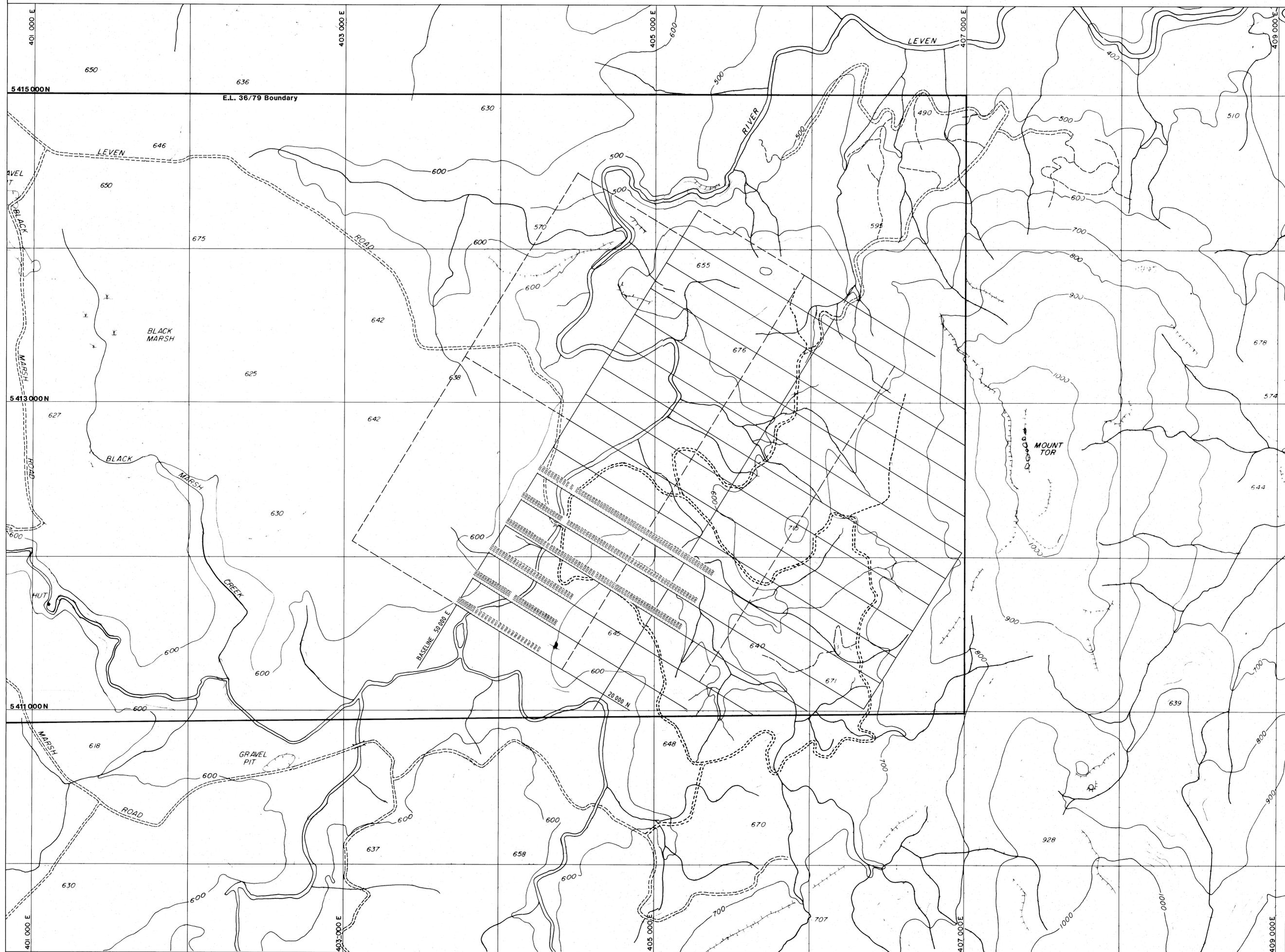
<b>IGNEOUS ROCKS</b>		
<b>TERTIARY</b>	Tb	Basalt
<b>MID - LATE CAMBRIAN</b>	Ed	Epidiorite: A Plag-Hb-Chl-Epidote rock with rare magnetite. fine to medium grained.
	Cr	Rhyolite: Subhedral embayed quartz phenocrysts up to 3mm diameter disseminated throughout. Sericitized and pyrite occurs as irregular disseminations.

796116

88-2794 CRA EXPLORATION PTY. LIMITED	
LOONGANA E.L. 36/79 CATTLEY NORTH PROSPECT OUTCROP LITHOLOGY	
REF. SK55 - 3	(805 - 815)
SCALE 1 : 10 000	DRAWN R.T.
AUTHOR F.R.F.	REPORT No.
DATE 21 - 10 - 1987	PLAN No. TASH 3538

6540

# CATTLEY NORTH PROSPECT



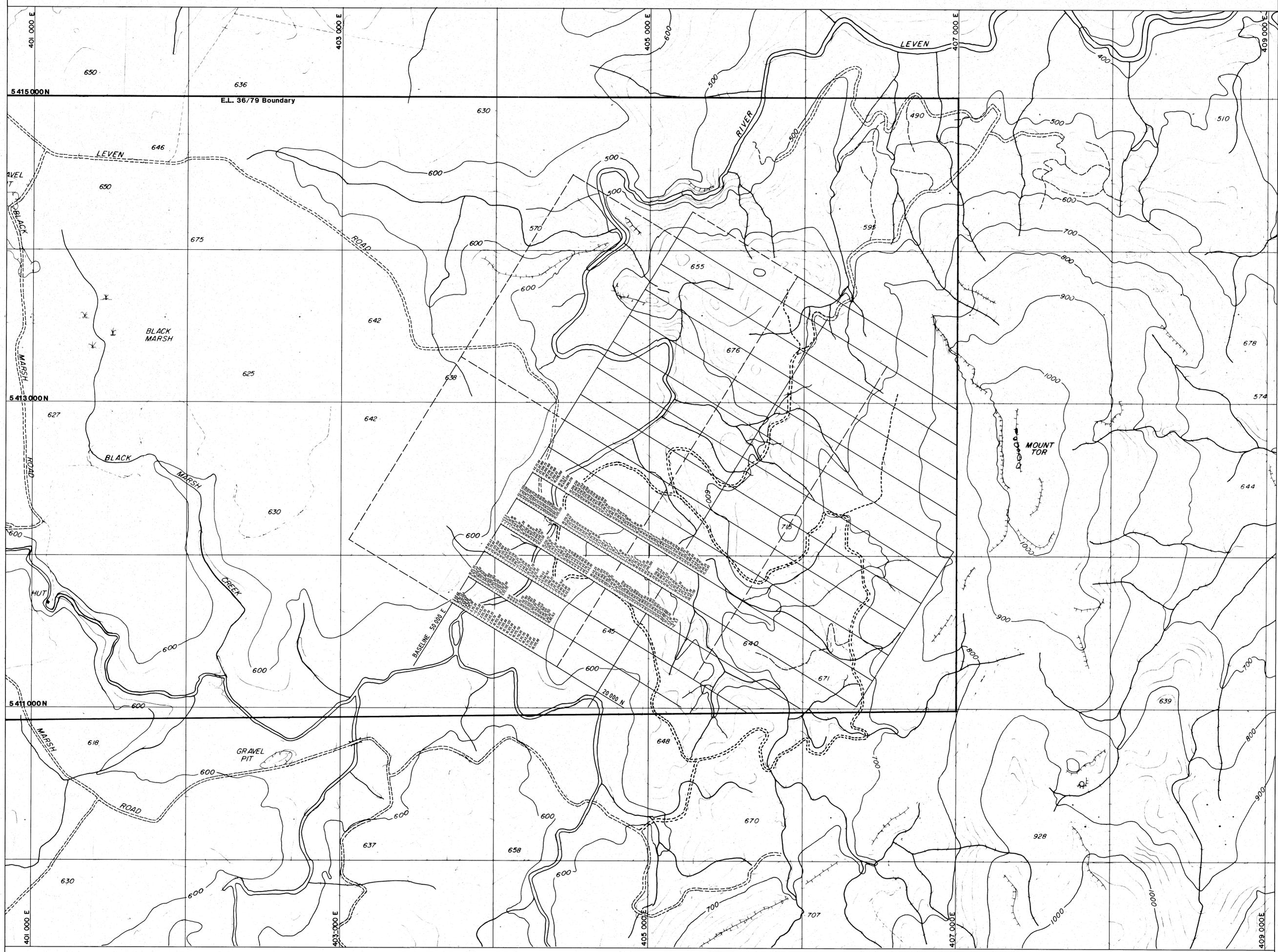
796117

5 cm

CRA EXPLORATION PTY. LIMITED	
LOONGANA E.L. 36/79	
CATTLEY NORTH PROSPECT	
SOIL SAMPLE	
LOCATION PLAN	
REF.	SK55 - 3 ( 8015 - 815 )
SCALE	1 : 10 000
AUTHOR	F.R.F.
DATE	4 - 11 - 1987
DRAWN	R.T.
REPORT No.	
PLAN No.	TASH 3554

6541

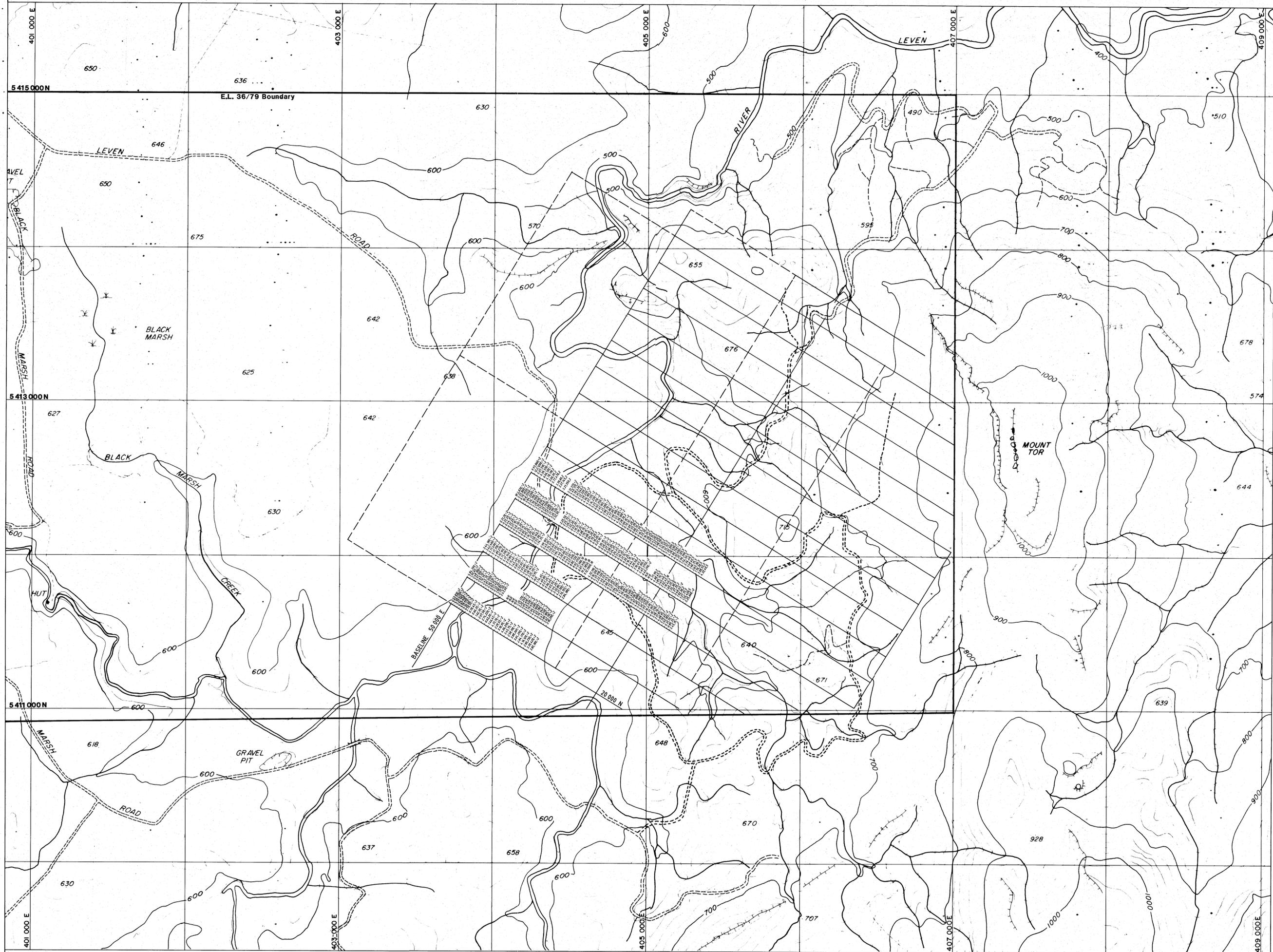
# CATTLEY NORTH PROSPECT



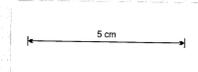
796118

CRA EXPLORATION PTY. LIMITED	
LOONGANA E.L. 36/79	
CATTLEY NORTH PROSPECT	
SOIL GEOCHEMISTRY	
Cu - Pb - Zn (ppm)	
REF.	SK55 - 3 (8075 - 8115)
SCALE	1 : 10 000
AUTHOR	F.R.F.
DATE	12 - 11 - 1987
DRAWN	R.T.
REPORT No.	
PLAN No.	TASH 3570

# CATTLEY NORTH PROSPECT



796119



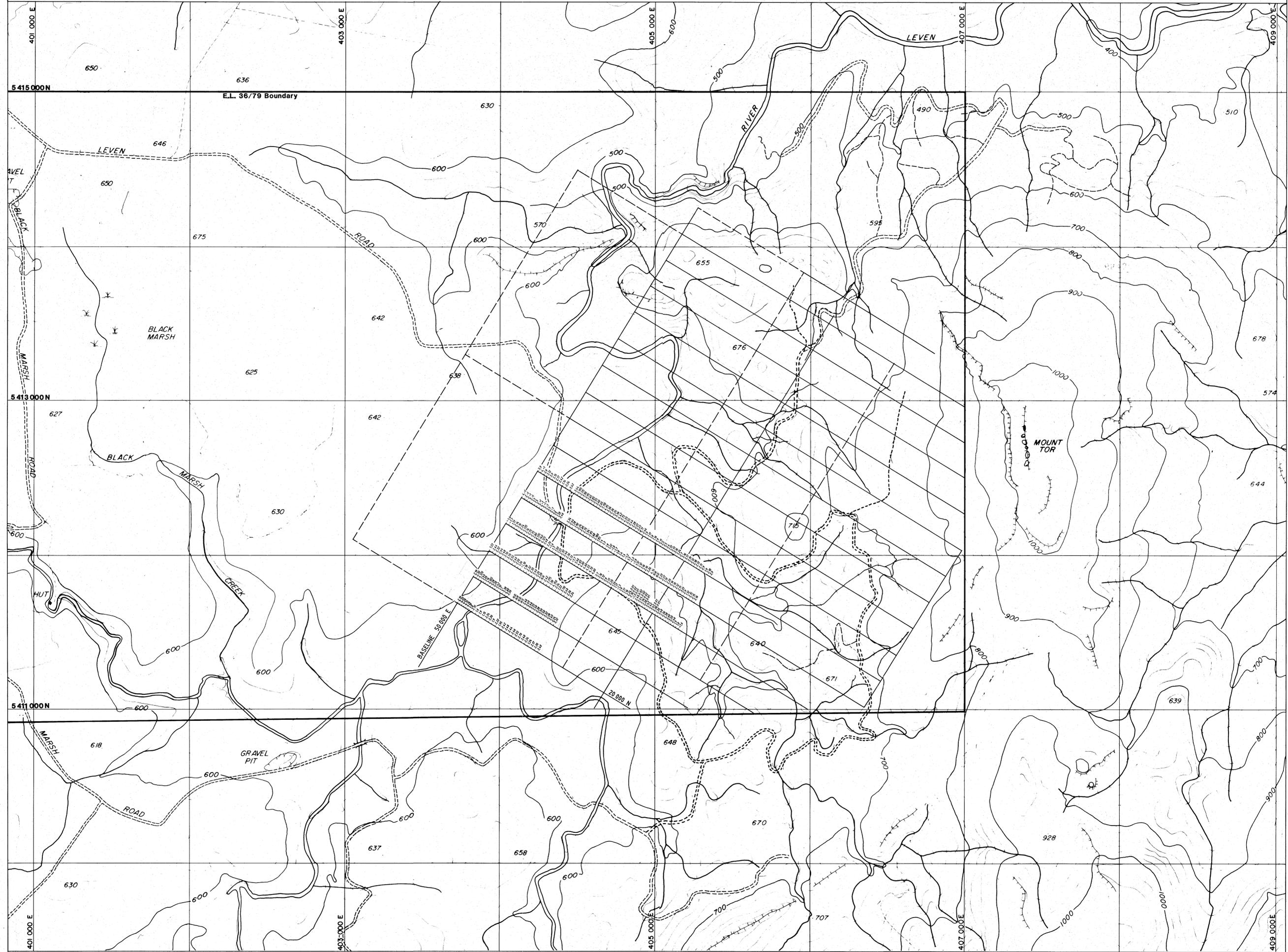
8512794

CRA EXPLORATION PTY. LIMITED  
 LOONGANA - E.L. 36/79  
 CATTLEY NORTH PROSPECT  
 SOIL GEOCHEMISTRY  
 Fe (%) - Mn - Mo (ppm)

REF.	SK55 - 3	( 8015 - 8115 )
SCALE	1 : 10 000	DRAWN R.T.
AUTHOR	F.R.F.	REPORT No.
DATE	12 - 11 - 1987	PLAN No. TASH 3571

6543

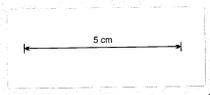
# CATTLEY NORTH PROSPECT



796120

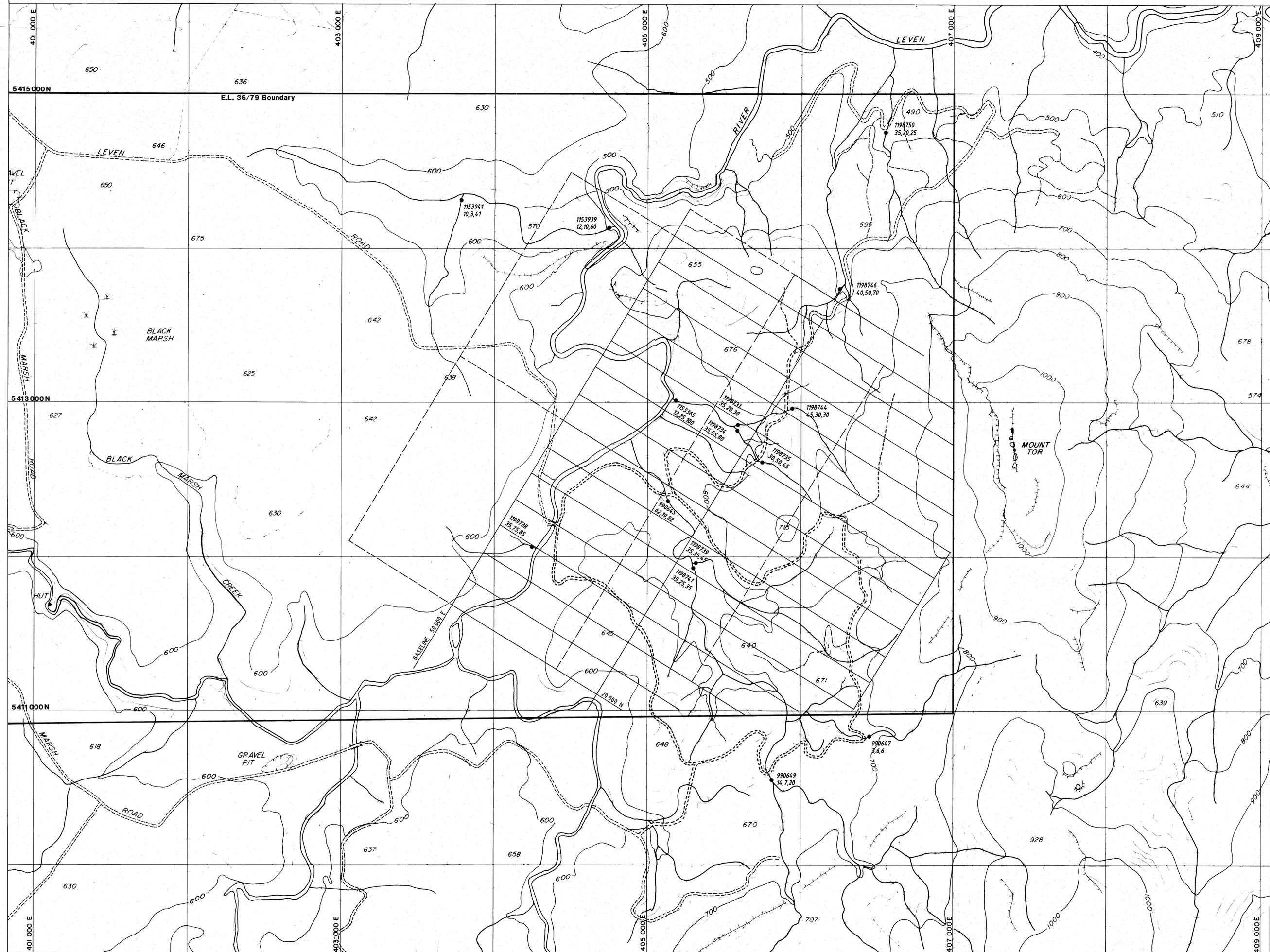
\* NOTE \*  
All Au results unless  
otherwise shown are <0.01ppm.

CRA EXPLORATION PTY. LIMITED			
LOONGANA E.L. 36/79			
CATTLEY NORTH PROSPECT			
SOIL GEOCHEMISTRY			
Ag - As - Au (ppm)			
REF.	SK55 - 3	( 8015 - 8115 )	
SCALE	1 : 10 000	DRAWN	R.T.
AUTHOR	F.R.F.	REPORT No.	
DATE	12 - 11 - 1987	PLAN No.	TASH 3572



6544

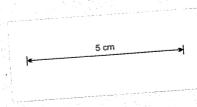
# CATTLEY NORTH PROSPECT



796121

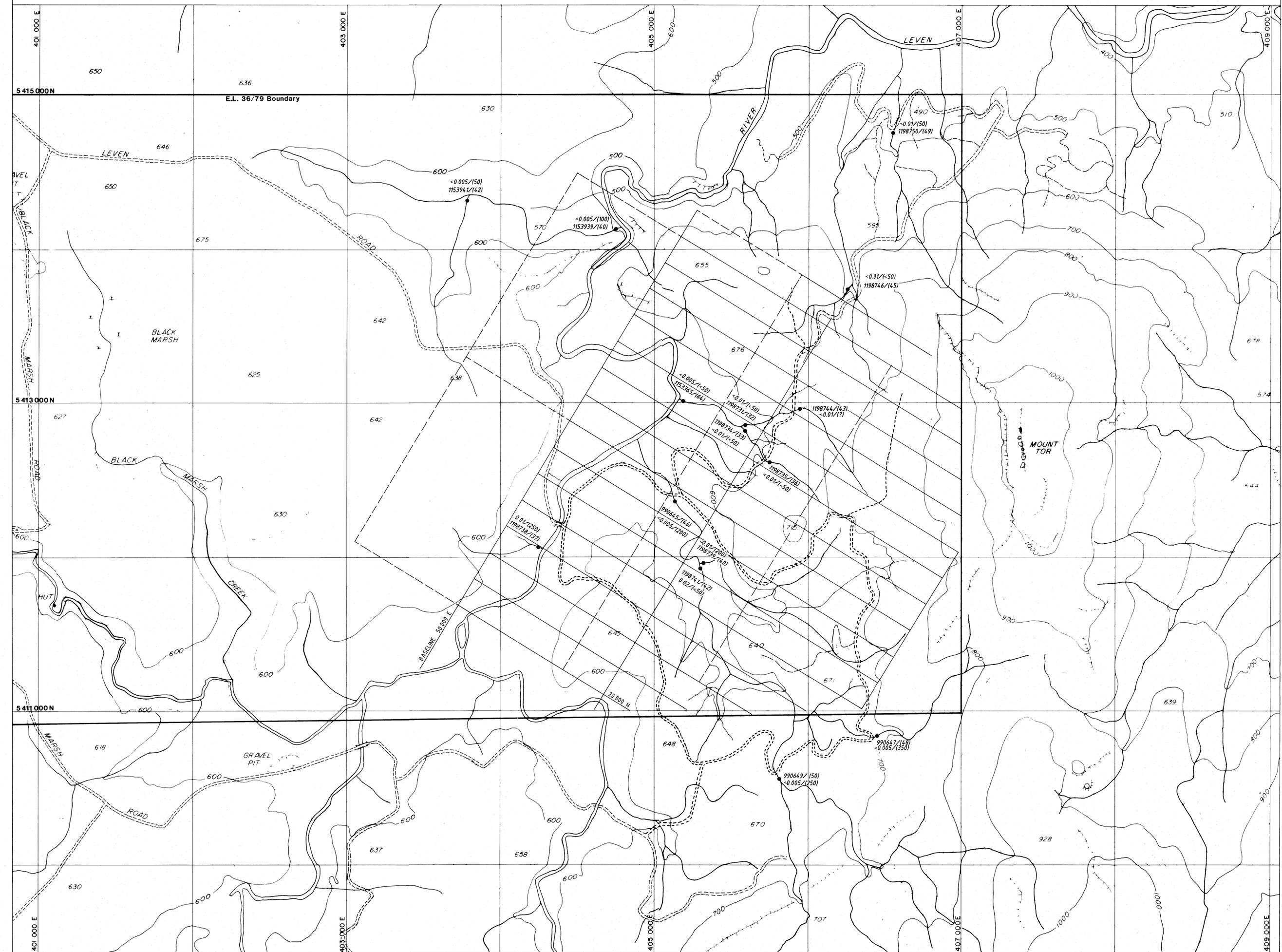
\* N.B. \*  
All results in ppm.  
For Gold results see  
plan No. TASH 3577

CRA EXPLORATION PTY. LIMITED	
LOONGANA E.L. 36/79	
CATTLEY NORTH PROSPECT	
STREAM SEDIMENT	
Cu, Pb, Zn Geochemistry	
REF. SK55 - 3	( 8015 - 8115 )
SCALE 1 : 10 000	DRAWN R.T.
AUTHOR F.R.F.	REPORT No.
DATE 13 - 11 - 1987	PLAN No. TASH 3576

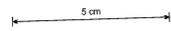


6545

# CATTLEY NORTH PROSPECT



\* NB. \* 796122  
For Cu - Pb - Zn results  
see plan No. TASH 3576.



● 990647 / (48)  
1st. Sample Number -80 mesh Stream Sediment Sample  
2nd. Sample Number -4 mesh Stream Sediment Sample

\*\* NOTE \*\*  
Assay results for -80 mesh Stream Sediment samples are given in ppm.  
Assay results for -4 mesh Cyanide Leach samples are given in ppt.

6546

CRA EXPLORATION PTY. LIMITED	
LOONGANA E.L. 36/79	
CATTLEY NORTH PROSPECT	
STREAM SEDIMENT	
GOLD GEOCHEMISTRY	
REF. SK55 - 3	( 8075 - 8115 )
SCALE 1 : 10 000	DRAWN R.T.
AUTHOR F.R.F.	REPORT No.
DATE 8 - 11 - 1987	PLAN No. TASH 3577

50430E

50450E

50470E

50490E

570mR.L.

540mR.L.

510mR.L.

480mR.L.

450mR.L.

precollar

1.0m

8.0m

26.5m

60.0m

94m

98m

101.5m

E.O.H. 115.5m

796123

5 cm

§§ Zone of shearing

↑ Younging ( top of arrow points towards the youngest bed. )

Stratigraphic thickness	TERTIARY
	 <b>BASALT</b>
	<b>CAMBRIAN</b>
±5m	 <b>SANDSTONE: QTZ-FLD-LITHIC rich type with occasional black shale interbed.</b>
±12m	 <b>COARSE DACITIC EPICLASTIC/LAVA: Silicified, QTZ-CARBONATE veined.</b>
±22m	 <b>FINER DACITIC EPICLASTIC/TUFF: Acid volcanics and lithic clasts set in a tuffaceous, silicified, chloritized matrix. Variable QTZ-CARB-SULPHIDE veins. Dark shale clasts present in the basal portion of the unit.</b>
7m	 <b>SILTSTONE/SHALE: Medium to dark grey colour 0.1-3% disseminated pyrite. Locally sheared (§§) and subject to variable argillic and potassic alteration.</b>
10m	 <b>FINER DACITIC EPICLASTICS: Acid and lesser lithic clasts set in a chlorite rich matrix. QTZ-CARB-SPHAL veining. Very similar to unit overlying the siltstone/shale sequence.</b>

Plot of bedding to Core Axis Data.

Collar co-ords : 50 473E  
 Local : 20 009N  
 Collar co-ords : 404 135mE  
 A.M.G. : 5 411 444mN  
 Dip & Azimuth : -65°  
 0m - 114m : 290° Mag.  
 Dip & Azimuth : -62°  
 114m - 115.5m : 286° Mag.  
 End of Hole : 115.5 m.

CRA EXPLORATION PTY. LIMITED

LOONGANA E.L. 36/79  
 CATTLEY NORTH PROSPECT

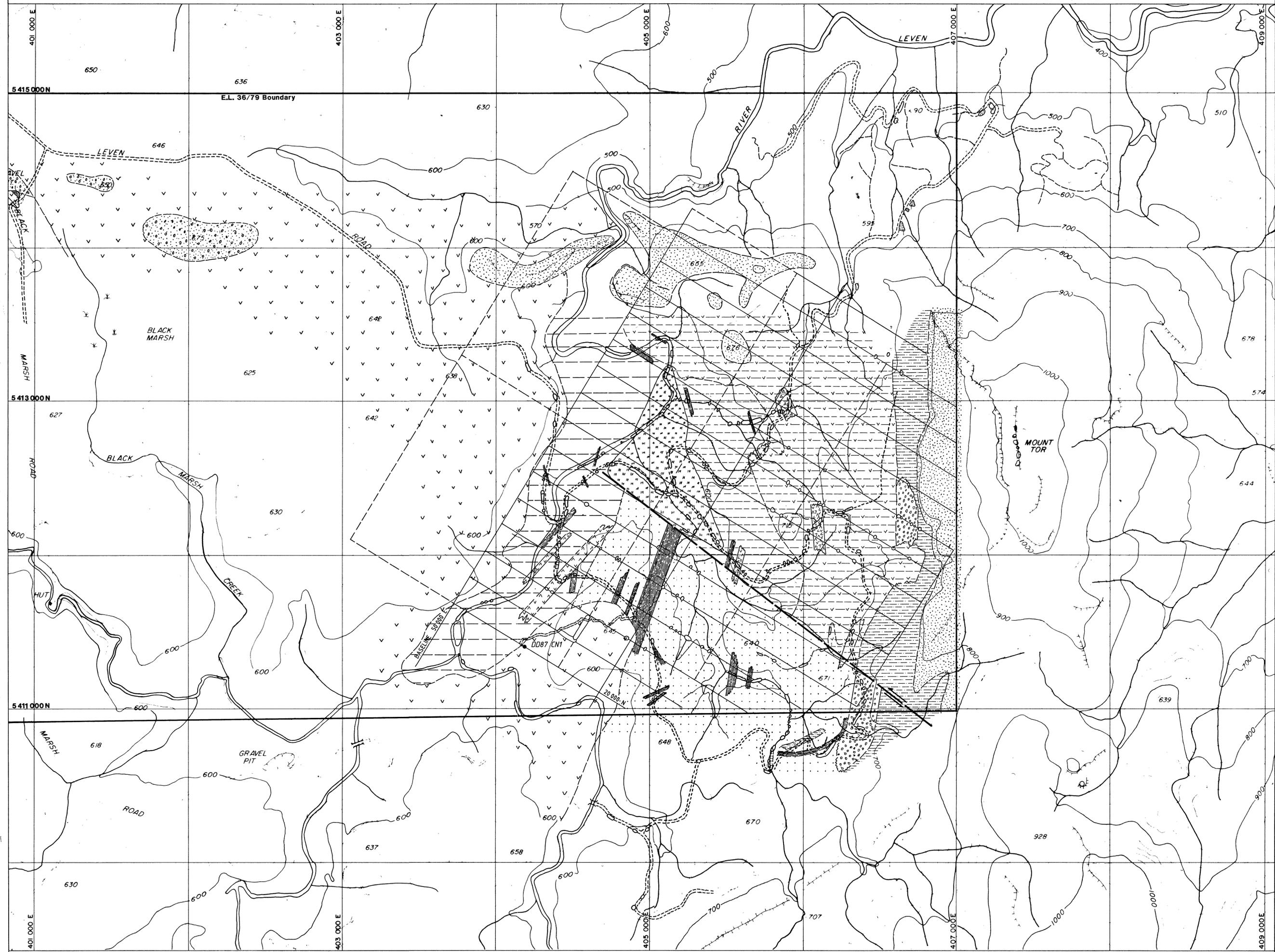
88-2794

DD87 CN1

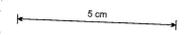
20 000N SECTION 6547

REF.	SK55 - 3	( 8015 - 8115 )
SCALE	1 : 500	DRAWN R.T.
AUTHOR	F.R.F.	REPORT No.
DATE	7 - 1 - 1988	PLAN No. TASH 3681

# CATTLEY NORTH PROSPECT



796124



Cambrian Intrusives: Ordovician Tertiary

- Basalt
- Undifferentiated Ordovician siliceous sandstone and conglomerate. Quartz sandstone and minor conglomerate. Some units of dominantly siliceous conglomerate (Odc)
- Epidorite: fine to medium grained. A Plag-Hb-Chl-Epidote rock with rare magnetite. Interpreted to be a shallow intrusive.
- Rhyolite: subhedral embayed quartz phenocrysts up to 3mm diam. disseminated throughout. Sericitized, patchy pyrite development

	Rhyolite/Rhyodacitic volcaniclastic. Pale pink colour, massive. Significant carbonate 15% and sericite 20%.
	Black shale: occasional medium grey fine grained siltstone interbeds.
	Conglomerate, rounded to angular quartzite/volcanic clasts of 1-15cm diam. Matrix is composed of basic volcanic detritus which is occasionally strongly magnetic. Occasional black shale/silt/chert interbeds. Undifferentiated detrital sediments, silt to sand sized grains.
	Acid epiclastic. White-cream colour, QZ-PLD-SE (CHL/CARB) rock. Variable lithic component. Occasional acid breccia. (triangular overprint)

- Intermediate epiclastic, grey-green colour, common chl & sericite. Interbeds of Es/EBS occasionally developed.
- Complex facies composed of interbedded Es/BS/ea/ei.
- Sedimentary unit, abundant black/grey shale/silt horizons, occasional beds of Eea or Eei noted.

	Epid
	Ee
	Es/BS

- Fault showing inferred sense of movement
- Geological Boundary - position accurate
- Geological Boundary - position approximate

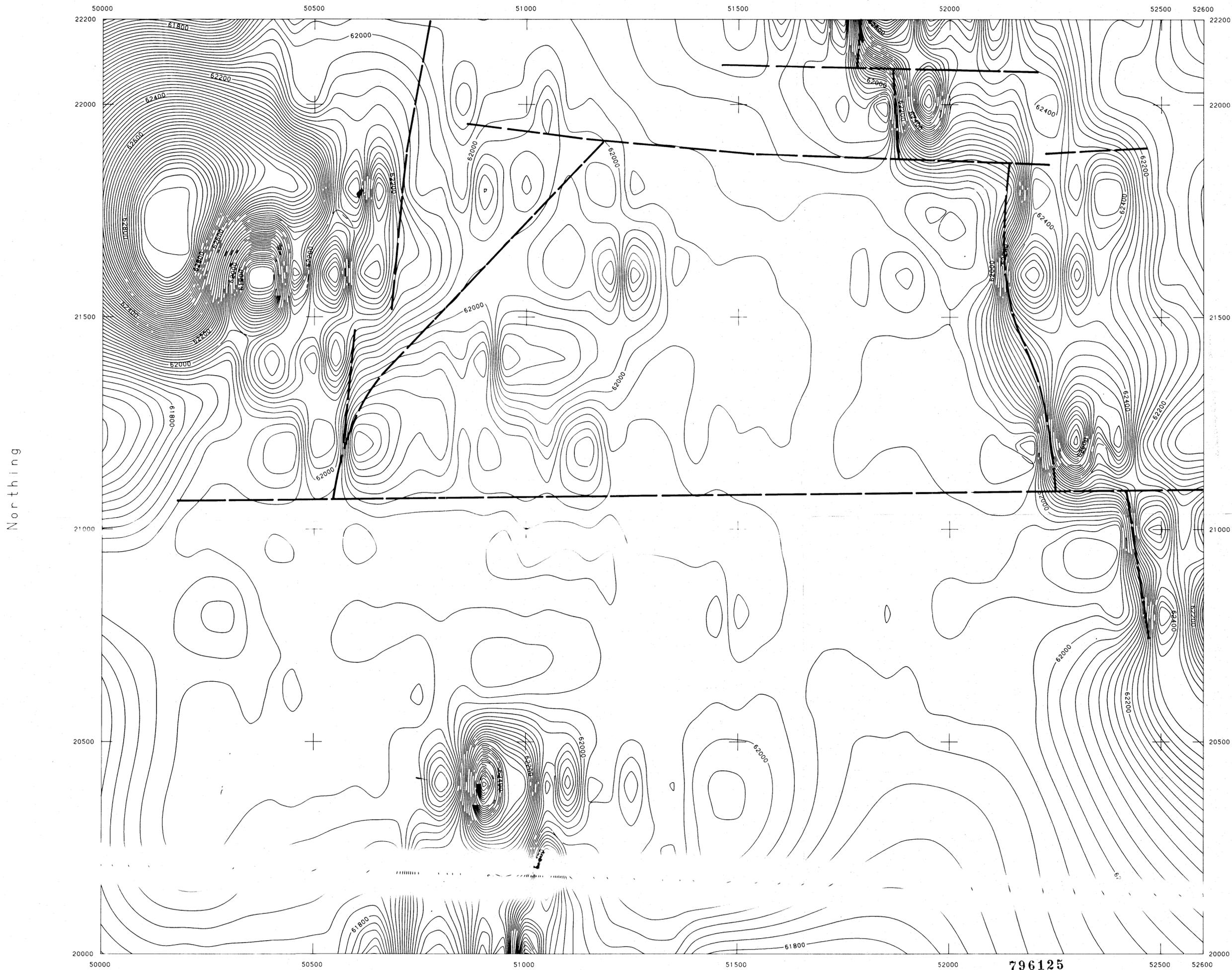
**CRA EXPLORATION PTY. LIMITED**

LOONGANA E.L. 36/79  
CATTLEY NORTH PROSPECT  
INTERPRETED LITHOLOGY PLAN

REF. SK55 - 3	( 805 - 815 )
SCALE 1 : 10 000	DRAWN R.T.
AUTHOR F.R.F.	REPORT No.
DATE 2 - 2 - 1988	PLAN No. TASH 3695

6548

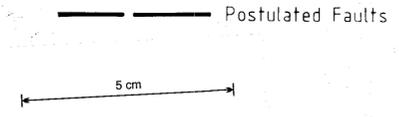
Catmago Ground Magnetics Data



Northing

Easting

796125



<b>CRA EXPLORATION PTY. LIMITED</b>			
88-2794 LOONGANA E.L. 36/79			
CATTLEY NORTH PROSPECT			
GROUND MAGNETIC CONTOURS			
WITH INTERPRETED FAULTS			
REF.	SK55 - 3	( 8015 - 8115 )	
SCALE	1 : 5000	DRAWN	R.T.
AUTHOR	T.v.S.	REPORT No.	
DATE	3-2-1988	PLAN No.	TASH 3696

6549