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C.R.A. EXPLORATION PTY. LIMITED

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E.L. 19/72 DIAL RANGE, NORTHWEST
TASMANIA,
PROGRESS REPORT

Author : T. M. Porter

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MICROFILMED

Submitted to : W. J. Atkinson

Copy to : Department of Mines,
Tasmania.

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1. SUMMARY AND CONCLUSIONS

E.L. 19/72 Dial Range embraces the Cambro-Ordovician Dial Range Trough and portion of the larger Fossey Mountain Trough to the south.

Geological mapping has resulted in the subdivision of the Cambrian volcano-sedimentary sequence into three stratigraphic groups. The lowermost of these is the Nietta Group comprising massive rhyolitic to rhyodacitic lavas and pyroclastics with minor intercalated pyritic shales. The Cateena Group which is inferred as being correlatable with the upper portion of the Nietta Group is made up of five alternating sedimentary and acid volcanic units. The Cateena Group represents an environment further removed from the centres of volcanism than the Nietta Group does.

The uppermost Radfords Creek Group unconformably overlies both the Nietta and Cateena Groups, and comprises intermediate volcanics and sediments.

All three units are represented in both troughs, although a higher percentage of the sequence is volcanic in the Fossey Mountain Trough than in the smaller Dial Range Trough.

A geochemical drainage sampling programme designed to detect stratiform Pb-Zn-Cu mineralisation with a good surface expression failed to yield any positive results from favourable stratigraphic positions.

Consequently the project must now be aimed at detecting economic mineralisation with little surface expression. This will involve detailed mapping and soil geochemistry over favourable sections of the Nietta Group.

2. INTRODUCTION

E.L. 19/72 of 626 km² (242 square miles) was initially pegged on October 18th, 1972 and granted for a six month period on December 8th. This area was renewed 'in toto' on June 8th, 1973, but on December 8th, 1973 was reduced to 245 km² (94 square miles) and renewed for a further six month period. The reduced area included the former E.L. 10/73 of 16.3 km² which was relinquished on the same date.

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This tenement was taken out primarily to explore for stratiform copper-lead-zinc mineralisation.

Geological mapping at a scale of 1:31 680 was carried out within the area embraced by E.L. 19/72. This work was largely original although the area covered by the Geological Survey Devonport 1:63 360 sheet was only subjected to minor refinement.

Within the Cambrian this work took the form of facies mapping which was then fitted into a stratigraphic framework.

The favourable sections of the Cambrian succession were subjected to geochemical drainage sampling at a density of around one sample per square kilometre.

Reconnaissance soil sampling was undertaken to test drainage anomalies near Nietta.

The mapping was carried out by T.M. Porter while the geochemical sampling was undertaken by P.J. Ashton.

3. GENERAL GEOLOGY

The oldest rock units embraced by E.L. 19/72 are of Proterozoic age. These form the basement for the Cambro-Ordovician Troughs.

To the east they are represented by Lower Adelaidean metamorphics of the Forth Nucleus which are considered to be correlatable with those of the Tyennan Block. These are overlain to the west by slates and quartzites of the Upper Adelaidean Burnie Beds which represent the Rocky Cape Group within this area.

Within E.L. 19/72 Cambro-Ordovician sedimentation is represented within two basins namely the Dial Range and Fossey Mountain Troughs. The Dial Range Trough represents a deep narrow embayment on the northern margin of the more extensive Fossey Mountain Trough to the south. These troughs are bounded to the west by a Precambrian high known as the "Rocky Cape Geanticline" while the Dial Range Trough is bounded to the east and the Fossey Mountain Trough to the north by the Forth Nucleus.

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Cambrian sedimentation within the portions of these basins embraced by E.L. 19/72 falls into three main stratigraphic groups, namely the lowermost Nietta Group, the Cateena Group which is equivalent to the upper portion of the former, and the uppermost Radfords Creek Group which overlies both the Cateena and Nietta Groups.

? No evidence for this presented.

The Cateena and Radfords Creek Groups were first mapped as such by Burns (1964) while the Nietta Group has been introduced during this programme.

Deposition of the Nietta and Cateena Groups was terminated by the Hardstaff Movement resulting in an unconformity of up to at least 20° with the overlying units.

Immediately above the Hardstaff unconformity a spilite/chert unit is found, occurring only in the Dial Range Trough where it is disconformably overlain by the Radfords Creek Group.

Radfords Creek Group sedimentation was in turn terminated by the Jukesian Movement which was followed by the Ordovician Roland Conglomerate, Moina Sandstone and Gordon Limestone.

Silurian siltstones and sandstones of the Eldon Group are found at Gunns Plains (see Plan No. T.844) while the Devonian is restricted to the spelean deposits of the Eugenana Beds.

In the northeastern portion of E.L. 19/72 coal measures of Permian age overlie older lithologies. These are in turn intruded by Jurassic dolerite dykes and sills.

Tertiary terrestrial to shallow water sediments are found in the southeastern portion of E.L. 19/72 where they underlie the Tertiary basalt flows which cover much of the area embraced by this tenement.

4. STRATIGRAPHY

4.1 Proterozoic

4.1.1 "Tyennan Metamorphics"

The mapping of these metamorphics has been transferred and summarised from Burns (1964).

4.1.1.1 Forth Metamorphics

These comprise micaceous quartzites, red-brown almandine schists and amphibolites and represent the lowest portion of the "Tyennan" metamorphics represented in the Forth Nucleus.

4.1.1.2 Ulverstone Metamorphics

These are of a lower metamorphic grade and are, overall, more siliceous than the Forth Metamorphics. They are made up of quartzites, chlorite and muscovite schists and a conglomerate.

4.1.2 Rocky Cape Group

Within E.L. 19/72 this group is represented by the Burnie Beds which unconformably overlie the "Tyennan Metamorphics". This break in sedimentation reflects the end of the Frenchman Orogeny. The Burnie Beds comprise alternating sandstone and mudstone grading to quartzite and slate. The succession is monotonous and repetitive. These beds are represented by a thin band on the western margin of the Forth Nucleus immediately below the Cambrian of the Dial Range and Fossey Mountain Troughs. They also form the exposed portions of the Rocky Cape Geanticline to the west of the Cambro-Ordovician Troughs. The Rocky Cape Group appears to have been deposited from bottom scouring density currents flowing from south to north within a deep basin on the western margin of a basement high represented by the Forth Nucleus.

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The top of the Proterozoic is marked by an unconformity reflecting the Penguin Movement.

4.2 Cambrian

4.2.1 Nietta Group

This group comprises massive rhyolitic to rhyodacitic to dacitic lavas and pyroclastics with some thin interbedded pyritic shale lenses which may represent a single, or only a very limited number of stratigraphic horizons. These volcanics outcrop on the southern margin of E.L. 19/72 and represent the oldest exposed Cambrian rocks within the title area.

These volcanics have not been fully mapped and the more intensive study planned will lead to their subdivision.

4.2.2 Cateena Group

This suite of acid volcanics and sediments is regarded as being equivalent to the upper portions of the Nietta Group but representing a sedimentary environment further removed from the more intense centres of volcanism. Mapping within this group has been on the basis of facies with a superimposed stratigraphic framework, shown on the accompanying maps by unit numbers. These units are therefore not strict stratigraphic or time units.

4.2.2.1 Lobster Creek Volcanics

This unit is not strictly speaking a member of the Cateena Group. It occurs as a core within the Cateena Group and appears to represent a combination of equivalents of the lower portions of the Nietta Group, in the form of massive pyroclastics, and intrusives possibly representing the source of volcanism within the Cateena Group. Lobster Creek Volcanics are found both within the Dial Range and Fossey Mountain Troughs.

4.2.2.2 Unit 2

This is the lowest stratigraphic unit mapped within the Cateena Group and comprises feldspathic sandstone, siltstone, tuffaceous mudstone, conglomerates and minor rhyo-dacitic tuffs. This unit includes the Isandula Conglomerate and the unnamed Unit No. 2 of Burns and is found in both basins. However although it is widespread in the Dial Range Trough where it rests upon Lobster Creek Volcanics near the centre of the basin and on Precambrian basement at the margins, it is found only towards the centre of Cateena sedimentation within the Fossey Mountain Trough and not on the margins. Chert like beds within this unit may be indurated mudstone or fine acid tuffs. Feldspathic sandstone is the dominant lithology of the unit which is up to 500 m thick within the Dial Range Trough.

4.2.2.3 Unit 3 - Kerrison Volcanics

This unit is almost exclusively composed of volcanic material. It grades from medium to coarse tuffs and lavas of rhyodacitic to rhyolitic composition. Some mudstones and fine grained tuffs with a cherty appearance are interbedded within the coarse volcanics. Unit 3 is well represented within the Dial Range Trough and the northwestern portions of the Fossey Mountain Trough where it is mappable as an almost continuous bed, although it has not been observed east of the Forth River (see Plan No.T.845) where it is probably masked by younger rocks.

The Kerrison Volcanics rest directly onto Proterozoic basement on the northern margins of the Fossey Mountain Trough. This unit attains a thickness of up to 120 m in the Dial Range Trough although it is considerably thicker in the Fossey Mountain Trough.

4.2.2.4 Unit 4

This unit is similar to Unit 2 although in general mudstone and siltstone predominate in the Dial Range Trough, with feldspathic sandstone dominating in the Fossey Mountain Trough. Unit 4 is bounded below by the volcanic facies of Unit 3 and above by similar volcanics of Unit 5. However in some areas such as the western half of the Dial Range Trough the overlying volcanics may be absent and hence a greater time span may be represented by the mapped Unit 4.

4.2.2.5 Units 5 and 6

These two units are described together as they are basically only facies variants and are in most areas partial equivalents. In general Unit 5 is present as a medium to coarse acid lava or tuff while Unit 6 is represented by mudstone to feldspathic sandstone and/or fine acid tuff or tuffaceous mudstone. Within the Dial Range Trough Unit 5 is present only on the southwestern margin where it occurs as a medium welded rhyolitic tuff with lesser lavas, while Unit 6 is composed of calcareous mudstone and lesser feldspathic sandstone with interbedded fine tuffs and tuffaceous mudstones with a cherty appearance. Here these two units are up to 425 m in thickness. Unit 5 is the Wilsonia Volcanics of Burns (1964). Within the Fossey Mountain Trough Unit 5 is represented by a medium tuff in the northwestern part, while a coarse tuff to lava is found towards the east. However in the southern part of the basin of Cateena sedimentation Units 5 and 6 are represented by a succession of -

- i) fine tuff with interbedded coarser fragmentals
- ii) medium pyroclastics with lesser interbedded fine tuffs
- iii) fine bedded cherty tuffs with minor medium grained tuffs.

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Unit 6 is almost invariably a fine chert-like rhyolitic tuff or indurated tuffaceous mudstone within the Fossey Mountain Trough. This has been correlated by Jennings (1958), apparently erroneously, with the Barrington Chert which occurs at a higher level within the Cambrian succession.

intype section?
(Devils Gate?)

Towards the northeastern margin of the trough both Units 5 and 6 are of this fine chert-like lithology with minor interbedded feldspathic sandstone and medium tuffs.

In general the fine tuffs of Unit 6 thicken in a compensatory manner when the coarse fragmentals of Unit 5 (when present) thin, and vice versa.

Cateena Group deposition was terminated by the Hardstaff Movement which resulted in an angular unconformity of up to 20° in the Dial Range Trough. Although this break has not been measured in the Fossey Mountain Trough, field relationships suggest a similar or greater angle.

4.2.3 Motton Spilite - Barrington Chert

Immediately following the Hardstaff Unconformity a chert-spilite unit is mappable. This is confined to the western half of the Dial Range Trough and is totally absent elsewhere within E.L. 19/72.

In general the Barrington Chert which comprises a finely bedded black or white chert is found at the base of the unit with the Motton Spilite overlying. The Motton Spilite is best developed in the eastern half of the basin and in one place rests directly on Cateena Group rocks, while the Barrington Chert attains its greatest thickness to the west with the Spilite being absent.

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4.2.4 Radfords Creek Group

This group disconformably overlies the Motton Spilite in the Dial Range Trough and is found unconformably (following the Hardstaff unconformity) above the Cateena and Nietta Groups within the Fossey Mountain Trough. As with the Cateena Group mapping has been on the basis of facies distribution although no definite stratigraphic framework has as yet been determined. The following facies have been mapped.

4.2.4.1 Intermediate Volcanics

Andesitic tuffs of the Radfords Creek Group occur within the southwestern corner of E.L. 19/72. These are in general medium grained and dark green with pale feldspar laths up to 3 mm across. These volcanics include some lava phases and grade in places to a dacitic composition. Interbeds of shale and feldspathic sandstone have been encountered within these volcanics. The Applebee Volcanics of Burns (1964) are mapped in this facies. Some monzonite intrusives have been encountered in areas occupied by these intermediates.

4.2.4.2 Conglomerate Facies

This facies has only a limited distribution within E.L. 19/72 and is probably a marginal facies of the Radfords Creek Group. The Sprent Formation of Jennings is part of this facies which is composed of a pebble to cobble conglomerate (to breccia in some areas) in which the clasts are commonly of Nietta Group acid volcanics or Barrington Chert, set in a matrix of feldspathic sandstone. Thin interbeds of feldspathic sandstone and siltstone are evident in some places.

4.2.4.3 Sandstone Facies

This facies comprises feldspathic sandstone present as both fine well laminated beds with intercalated siltstones, grading to massive poorly sorted varieties with interbedded conglomerate.

4.2.4.4 Mudstone Facies

This division is comprised of mudstone to siltstone with (commonly only slightly) lesser sandstone and minor conglomerate interbeds.

4.3 Ordovician

Deposition of the Radfords Creek Group was terminated by the Jukesian Movement thus ending the Tyennan Orogeny. This break is marked by a major regional unconformity which preceded the following Ordovician succession.

4.3.1 Roland Conglomerate

This unit has been mapped and defined on a facies basis as the predominantly conglomeratic member at the base of the Ordovician sequence. As such it may in places represent a basin margin or terrestrial equivalent of the Moina Sandstone. Portions of this member have been mapped at different times as the "Dial Conglomerate" (Jennings 1958) "Duncan Conglomerate" (Burns 1964) and Owen Conglomerate. It comprises a pebble to cobble and occasionally boulder conglomerate set in a medium to fine grained siliceous, commonly ferruginous matrix. The clasts are usually of Precambrian quartzites although cobbles of Barrington Chert and occasionally Cambrian volcanics are found. Sandstone beds are sometimes found within this unit. This member exhibits marked cross bedding and represents shallow water to terrestrial deposition.

4.3.2 Moina Sandstone

The Roland Conglomerate is overlain by a medium grained white to pink sandstone with some conglomeratic bands, representing a shallow marine transgression. Consequently it is more widespread and in most areas at the margin of depositional basins laps onto Proterozoic basement.

4.3.3 Gordon Limestone

Further transgression is reflected by a thick limestone unit at the top of the Ordovician sequence. This unit is best developed at Gunns Plains within E.L. 19/72 (see Plan No. T.844).

4.4 Silurian

A limited area of Silurian Eldon Group sandstone and siltstone is evident in the Gunns Plains district directly overlying the Gordon Limestone.

4.5 Devonian

The Eujanana Beds of Devonian age are restricted to the northeastern corner of E.L. 19/72 and comprise a boulder bed, mudstone and sandstone deposited as cave fill within the Gordon Limestone.

4.6 Permian

The Permian System is represented along the eastern margin of E.L. 19/72 and comprises the following units (after Burns 1964). These have not been differentiated on the accompanying plans.

4.6.1 Basal Conglomerate

0 to 55 m thick.

4.6.2 Spreyton Beds

Comprise alternating siltstone and pebbly bands and is from 48 m to 175 m thick and contains some thin oil shale beds.

4.6.3 Mersey Coal Measures

These are made up of a "Bottom Sandstone", "Coal Horizon" and "Top Sandstone" and range from 18.5 to 29 m in thickness.

4.6.4 Kelcey Tier Beds

This unit forms the top of the Permian and comprises mudstone and pebbly mudstone with bands of siltstone and sandstone.

4.7 Jurassic

This period is represented by a series of dolerite intrusions mostly as sills within the Permian sequence.

4.8 Tertiary

4.8.1 Tertiary Sediments

These are best represented within the southeastern corner of E.L. 19/72 where they comprise poorly consolidated sands, silts and pebble beds. Elsewhere they are present as deep leads beneath the overlying basalt.

4.8.2 Basalt

Olivine basalt flows are widespread throughout the E.L. and mask much of the underlying sequences.

5. STRUCTURE

Rocks within E.L. 19/72 have been subjected to number of periods of deformation most of which have produced a fold or fault pattern roughly in either a NW-SE or NE-SW direction.

The oldest tectonic movement reflected within the area is the Frenchman Orogeny which resulted in two stages of metamorphism initiating the Forth and Ulverstone metamorphics, respectively and was probably of Lower Adelaidean age.

The Frenchman Orogeny was succeeded by the Upper Adelaidean Penguin Orogeny which accompanied the deposition and resulted in the deformation of the Rocky Cape sediments. Two periods of deformation related to this orogeny are observable within the Rocky Cape Group and Burns (1964) suggests that the earlier may have been coincident with the second pulse of the Frenchman Orogeny.

The second deformational phase of the Penguin Orogeny terminated Rocky Cape deposition and resulted in the Penguin unconformity. This was followed by the Cambrian Tyennan Orogeny which accompanied the volcanism and sedimentation within the Dial Range and Fossey Mountain Troughs. Two main deformational pulses are evident, namely the Hardstaff and Jukesian movements which resulted in the conclusion of Nietta/Cateena Group and Radfords Creek Group deposition respectively. Folding during these movements was in a general N-S to NE-SW direction in the Dial Range Trough, parallel to the axis of the basin, while in the Fossey Mountain Trough it seems to have been roughly NW-SE.

Deposition of the Ordovician and Silurian ensued before the next major orogenic period, namely the Devonian Tabberabberan Orogeny. This took the form of at least two pulses, the first more intense in a NW-SE direction which is reflected by folding and faulting deformation. The second phase appears to have been less intense and in a NE-SW direction resulting in folding movements. These two phases resulted in interference structures such as the "basin" structure at Gunns Plains. The superimposition of the Tabberabberan pattern on Hardstaff and Jukesian structures within the Cateena Group in particular has led to some complex configurations.

No further significant deformation has been experienced within E.L. 19/72.

6. MINERALISATION

Few occurrences of base metal mineralisation are recorded and those inspected are hardly worthy of a mention.

6.1 Leven Valley

A number of small fracture fill occurrences within Radfords Creek Group sandstones and conglomerates have been recorded in the north-western corner of the E.L. in the Leven Valley (see Plan No. T.844). These carry minor amounts of pyrite although copper, lead, and zinc sulphides are supposedly also present.

6.2 Barrington

Several small copper, barites and lead-zinc occurrences are recorded between the Forth and Wilmot rivers near their confluence (see Plan No. T.844). These occur as thin quartz or barite veins within shales and feldspathic sandstones of the Radfords Creek Group and fine tuffs of the Cateena Group in this area. Gossanous outcrops are associated with some of these. A Mines Department soil grid over one of the more prospective of these - the Alma copper mine - failed to reveal any anomalous base metal levels.

6.3 Lower Wilmot

A small barite deposit was located within the Wilmot Valley 2 km west of Lower Wilmot (see Plan No. T.844). This occurrence takes the form of a few thin barite veins within Radfords Creek Group feldspathic sandstones and shales.

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6.4 McPhersons Copper

A minor copper occurrence within Cateena Group shales and volcanics is recorded in the banks of the East Gawler River 1 km east of Central Castra (see Plan No.T.844). No workings or signs of mineralisation were found in this area, although minor gossanous patches, which returned no anomalous assay levels, were seen within a one kilometre radius of this locality.

6.5 Preston

A small silver-lead working is recorded in the banks of the West Gawler River 3 km south of Preston (see Plan No.T.844). This occurrence was not located nor was any sign of base metal mineralisation observed.

6.5 Duncan and MacLarens Copper - Fork of the Gawler Copper

Two copper occurrences near the confluence of the East and West Gawler Rivers (see Plan No. T.842) are recorded within shales of Cateena Group Unit 4. No significant copper mineralisation was noted in the area.

7. GEOCHEMISTRY

7.1 Stream Sediment Geochemistry

Geochemical stream sediment sampling was undertaken over lithologies of the Cateena and Nietta Groups and certain sections of the Radfords Creek Group. Samples were collected on a 1 km² catchment basis over the areas outlined.

This work has returned only one set of anomalous levels worthy of follow-up sampling, although these are not in an area considered favourable to the occurrence of stratiform copper-zinc mineralisation. These were returned by samples from Crosby Creek draining Radfords Creek Group sediments and andesitic volcanics in the south-western corner of E.L. 19/72 (see Plan No. T.844). These samples returned levels of from 250 to 380 ppm Zn in contrast to a background of between 60 and 120 ppm elsewhere within the Radfords Creek Group. Elevated lead levels of 50 to 70 ppm accompanied these anomalies contrasting with a background of around 20 ppm. Copper levels are of a background order only.

No significant levels were obtained from the Cateena or Nietta Group units although a number of stratigraphic levels returned slightly elevated background values. Nietta Group volcanics returned background levels of 5 - 30 ppm Pb, 30-100 ppm Zn, 2-20 ppm Cu with a few samples giving zinc levels up to 110 ppm.

Cateena Group lithologies yielded the following background ranges; 5-20 ppm Pb; 40-100 ppm Zn, with levels of from 90 to 140 ppm from Units 5 and 6; 2-25 ppm Cu.

This sampling programme was considered to be sufficient to detect mineralisation with a good surface expression. It has apparently failed to reflect any such mineralisation.

7.2 Crosby Creek Anomalies

Following the receipt of four anomalous zinc drainage levels from Crosby Creek 3 km west of Nietta as detailed above, five soil lines were run to detect their source.

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KEYWORDS

Copper, lead, zinc, andesite, rhyolite, Tertiary, Jurassic, Permian, Devonian, Silurian, Ordovician, Cambrian, Proterozoic-Up., geochem-drainage, geochem-soil, geol. mapping-regional.

Locality: Burnie SK 55-3 1:250 000 map sheet

LIST OF PLANS

		<u>Scale</u>
T.841	E.L. 19/72, Dial Range, Tasmania. 'Penguin' Geological-Geochemical Plan.	1:31 680
T.842	E.L. 19/72, Dial Range, Tasmania. 'Ulverstone' Geological-Geochemical Plan.	1:31 680
T.843	E.L. 19/72, Dial Range, Tasmania. 'Devonport' Geological-Geochemical Plan.	1:31 680
T.844	E.L. 19/72, Dial Range, Tasmania. 'Castra' Geological-Geochemical Plan.	1:31 680
T.845	E.L. 19/72, Dial Range, Tasmania. 'Railton' Geological-Geochemical Plan.	1:31 680
T.846	The Crosby Creek Anomalies, E.L. 19/72, Dial Range, Northwest Tasmania. Follow-up Soil Sampling.	1:2000

NOTE: Transparencies held.

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C.R.A. EXPLORATION PTY. LIMITED
GEOCHEMICAL DRAINAGE SAMPLING LEDGER

D.P.O. 13446 (212630-35)
D.P.O. 13648 (244557-97)
D.P.O. 16901 (244552-98)

D.P.O. 13667 (244579)
D.P.O. 16906 (244613-15)

AREA Dial Range. EL 19/72.

SAMPLE Nos. 112630-75; 234397-97; 244579;
244552-4; 244561; 244569-77; 244573.
244612-65.

COLLECTED BY T.M.P., G.W.P., P.J.A.

SHEET No. 1

MAP OR PHOTO REFERENCE

ANALYSED BY Zinc Corp. Broken Hill.

DATE

Map or photo No.	No. Sample	Sediment				Channel				pH	Metal content, p. p. m.											Geological observations
		Gravel	Sand	Silt/mud	Organic	Flow	Width	Alluvial	Colluvial		Pb	Zn	Cu	Ni	Co	Cr	Mn	Ag	Mo	As	U	
S	212630	30	55	15	-	M	1	-	✓	-	72	380	15	30	23	10	1800	41	2	5	2	O/c interbedded Rhyo and Rhyo tuff and finely laminated dark grey mudstone. Float same.
"	212631	50	30	20	-	M	2	-	✓	-	8	100	12	46	29	49	1200	41	2	5	1	O/c as above. Float same plus basalt, conglom, sand/s.
"	212632	30	60	10	-	F	1	-	✓	-	53	370	9	2.6	21	10	2000	41	2	5	2	O/c grey mudstone with quartz veining. Float same plus Rhyo-dac tuff.
"	212633	65	30	5	-	F	1	-	✓	*	59 54	380 370	18 13	35 38	27 20	40 30	1540 1440	41	42	5	1	O/c dark grey mudst. with qtz veining. Float same plus Rhyo-dac tuff. Collected from pool of steep sloped waterfall.
"	212634	15	65	20	-	M	3	-	✓	-	37	250	12	38	24	30	1290	41	2	45	1	O/c as above. Float same plus conglom, qtz, rhyo and Rhyo-dac tuff, basalt.
"	212635	35	55	10	-	M	2.5	-	✓	-	17	74	5	30	21	60	2700	41	2	5	#3 3	O/c grey chert. Float same plus Rhyo-Rhyo-dac lava tuff, basalt.
"	212639	25	65	10	-	M	3	-	✓	-	35	182	14	27	24	10	2000	41	2	5	1	O/c dacite tuffs, lavas and carbonaceous mudst to shale. Float same.
"	234387	15	35	40	10	M	1.5	✓	-	-	16	90	55	37	53	30	1760	41	42	45	41	O/c nil. Float nil. Gravel white quartz and basalt.
"	234388	10	35	45	10	M	1.0	✓	-	-	10	95	12	25	15	30	320	41	42	45	41	O/c J-d tuff. No float.
"	234389	10	25	35	30	M	3.0	✓	-	-	26	65	5	17	11	10	380	41	42	45	1	O/c nil. Float nil. Gravel quartz and volcanic fragments.
"	244552	60	30	10	-	M	1.5	✓	-	-	20	103	14	24	20	40	1650	41	42	5	1	O/c nil. Float nil. Gravel chert.
"	244553	35	50	10	5	M	1.0	✓	-	-	12	52	5	9	9	20	1070	41	42	5	1	O/c nil. Float nil. Gravel chert.
"	244554	50	40	10	-	F	2.0	✓	✓	-	15	107	10	17	15	30	1480	41	42	5	1	O/c nil. Float acid volcanic.
"	244566	15	40	40	5	M	1.0	✓	✓	-	14	74	23	120	37	190	3000	41	42	45	1	O/c and float conglomerate.
"	244569	-	90	10	-	M	2.5	✓	-	-	24	68	20	22	15	60	320	41	42	45	1	O/c basalt. Float nil.
"	244570	20	50	15	5	M	2.0	✓	-	-	15	124	9	28	19	40	890	41	42	5	3	O/c nil. Float mainly chert, minor sandstone.
"	244571	-	5	90	5	M	1.0	✓	-	-	34	124	11	45	16	80	360	41	42	5	2	O/c chert. Float nil.
"	244572	50	40	10	-	M	1.0	✓	-	-	71	155	10	43	22	40	780	41	42	5	2	O/c nil. Float chert.
"	244573	15	70	15	-	F	1.0	✓	-	-	18	170	29	130	45	130	2100	41	42	5	2	O/c nil. Float chert.
"	244574	5	40	50	5	M	1.0	✓	-	-	20	114	17	77	45	130	1230	41	42	45	1	as above.
"	244575	60	30	10	-	M	1.0	✓	✓	-	10	112	19	79	29	90	730	41	42	45	1	O/c nearest chert. Float basalt, micaceous foliatic sandst.
"	244576	-	20	75	5	S	0.5	-	✓	-	29	97	13	59	23	80	830	41	42	10	1	O/c chert. Float chert.
"	244577	-	10	80	10	S	1.0	-	✓	-	22	83	14	31	41	50	2400	41	42	5	2	O/c nil. Float nil. Tolus mudstone.
"	244593	-	10	80	10	M	1.0	✓	-	-	14	57	11	28	10	100	600	41	42	5	1	O/c nil. Float nil.
"	234390	15	10	40	35	M	1.5	✓	-	-	16	84	6	23	10	40	570	41	42	45	1	O/c nil. Float nil. Gravel white quartz.
"	234391	-	-	75	25	S	2.0	-	✓	-	38	111	18	25	21	30	710	41	42	5	1	O/c R-d. tuff.
"	244612	20	70	10	-	F	2.0	✓	-	-	15	54	17	37	21	40	1050	41	42	10	2	O/c nil. Float micaceous sandstone, chert, acid volcanic?
"	244614	25	60	15	-	S	1.0	✓	-	-	13	38	7	10	4	20	150	41	42	45	2	O/c nil. Float chert, sandstone, acid volcanic?
"	244615	20	60	15	5	M	1.0	✓	✓	-	6	5	1	2	2	410	220	41	42	45	2	O/c chert. Float chert and very fine acid volcanic?

021

617022

AREA Dial Range Et 19/72

SAMPLE Nos. 244616 - 244649

COLLECTED BY P.J.A.

SHEET No. 2

MAP OR PHOTO REFERENCE

ANALYSED BY Zinc Corp. Broken Hill.

DATE 15/9/73

Map or photo No.	No. Sample	Sediment				Channel				pH	Metal content, p. p. m.												Geological observations
		Gravel	Sand	Silt/mud	Organic	Flow	Width	Alluvial	Cellular		Pb	Zn	Cu	Ni	Co	Cr	Mn	Ag	Mo	As	U		
S	244616	15	70	15	-	M	1.5	✓	✓	-	11	31	6	33	27	60	2300	1	<2	<5	2	O/c nil. Float acid volcanics (gty phenocrysts), chert.	
"	244617	25	70	10	5	M	1.5	✓	✓	-	12	107	13	67	50	60	2300	1	<2	<5	1	O/c nil. Float chert.	
"	244618	30	60	10	-	M	1.0	✓	✓	-	6	26	7	39	21	60	580	41	<2	<5	2	O/c nil. Float chert, volcanics?	
"	244619	25	65	10	-	F	2.0	✓	-	-	13	59	15	60	40	70	2700	41	<2	<5	1	O/c nil. Float basalt, acid volcanics?	
"	244620	5	75	20	-	M	2.0	✓	-	-	6	38	5	31	22	40	780	41	<2	<5	1	O/c nil. Float basalt, greywacke, chert.	
"	244621	35	55	10	-	M	1.0	✓	✓	-	13	59	26	63	43	60	3700	41	<2	25	2	O/c chert and acid volcanics. Float pyritic and in places gossanous acid volcanics. Greywacke, micaceous sp. chert.	
"	244622	40	50	10	-	S	0.25	-	✓	-	13	43	9	44	62	20	2100	41	<2	10	2	O/c acid volcanics. Float acid volcanics, chert.	
"	244623	35	60	5	-	F	0.5	✓	✓	-	11	28	5	20	14	40	940	41	<2	<5	2	O/c nil. Float acid volcanics, mudstone and chert.	
"	244624	-	40	40	20	F	1.0	-	✓	-	25	107	59	62	62	100	1760	41	<2	<5	1	O/c andesite? Float same [N.B. 2 shots of tin in Cr.]	
"	244625	35	55	10	-	M	1.5	✓	✓	-	11	61	4	4	4	<10	900	41	<2	<5	2	O/c nil. Float acid volcanics, muds? chert?	
"	244626	0	20	60	20	S	3.0	-	✓	-	20	100	18	51	36	70	3400	41	<2	5	1	O/c nil. Float nil. [Cr. dammed up and down stream.]	
"	244627	-	10	65	25	M	1.5	-	✓	-	17	31	15	19	13	40	330	41	<2	5	2	O/c nil. Float nil. [Cr. dammed upstream.]	
"	244628	-	20	60	20	M	1.5	-	✓	-	17	93	13	33	32	40	2400	41	<2	<5	1	O/c micaceous sandstone. Float nil. [Cr. dammed upstream.]	
"	244629	35	55	10	-	M	2.0	✓	✓	-	8	57	6	19	16	10	1290	41	<2	<5	2	O/c chert. Float micaceous sandstone, conglomerate, chert.	
"	244630	35	60	15	-	M	2.0	✓	✓	-	4	71	8	20	15	20	1250	41	<2	<5	2	O/c volcanics, Float same plus chert.	
"	244631	40	50	10	-	M	1.0	✓	✓	-	24	124	7	27	21	10	1540	41	<2	5	2	O/c volcanics, float volcanics, chert, sandstone?	
"	244632	40	55	5	-	M	1.0	✓	✓	-	13	54	6	35	32	50	1270	41	<2	5	1	O/c chert. Float Tb., chert, acid volcanic?	
"	244633	30	60	10	-	M	1.0	✓	✓	-	11	26	7	19	18	40	680	41	<2	10	2	O/c chert. Float chert and acid volcanics.	
"	244634	35	55	10	-	M	1.0	✓	✓	-	6	43	4	26	13	10	500	41	<2	<5	2	O/c chert. Float mostly chert, Tuff.	
"	244635	45	50	5	-	M	2.0	✓	✓	-	8	82	12	55	36	30	1540	41	<2	5	1	O/c nil. Float Tb., acid volcanics, chert, micaceous sand/s.	
"	244636	60	35	5	-	M	2.0	✓	✓	-	11	62	5	33	19	40	2200	1	<2	<5	2	O/c coarse sandstone. Float same plus chert.	
"	244637	30	60	10	-	M	2.0	✓	-	-	13	160	9	27	17	20	1410	41	<2	<5	2	O/c chert. Float sandstone, acid volcanics? chert.	
"	244638	50	45	5	-	F	2.0	-	✓	-	13	77	7	35	19	20	1270	41	<2	<5	2	O/c sandstone? Float acid volcanics? chert.	
"	244639	65	45	10	-	F	2.0	-	✓	-	8	107	10	30	10	20	1070	41	<2	<5	2	O/c coarse chert (possibly sand/s). Float chert.	
"	244640	50	40	10	-	M	1.0	✓	✓	-	14	33	3	6	10	40	950	41	<2	5	2	O/c coarse acid volcanic (gty phenocrysts). Float same	
"	244641	25	55	15	5	F	0.5	-	✓	-	13	93	32	120	64	150	1810	1	<2	<5	41	with chert and pyritic mudstone.	
"	244642	20	75	5	-	M	2.0	✓	✓	-	35	46	8	9	25	10	2900	41	<2	30	2	O/c nil. Float Tb.	
"	244643	25	70	5	-	M	1.0	✓	✓	-	12	71	13	91	42	70	1810	41	<2	<5	2	O/c chert. Float chert and acid volcanics. Deepfully Cr.	
"	244644	35	55	10	-	M	0.5	-	✓	-	11	54	3	19	18	10	7900	41	<2	<5	3	O/c chert. Float chert and Tb.	
"	244645	40	55	5	-	S	0.25	-	✓	-	29	98	9	66	48	60	4500	1	<2	<5	5	O/c chert. Float chert, coarse acid volcanic (gty phenocrysts).	
"	244646	20	70	10	-	M	0.5	-	✓	-	8	31	4	20	10	20	1710	41	<2	<5	3	O/c mudstone. Float mud/s, coarse acid volc. (gty phenocrysts).	
"	244647	20	70	10	-	M	2.0	✓	✓	-	13	80	25	110	50	160	1540	1	<2	<5	1	O/c Tb. Float Tb, mud/s, possible chert, coarse acid volc. (gty phenocrysts).	
"	244648	25	65	10	-	F	2.0	✓	✓	-	13	96	27	110	69	170	2100	1	<2	<5	41	O/c Tb. Float Tb.	
"	244649	20	70	10	-	F	3.0	✓	✓	-	12	90	23	110	53	170	1410	1	<2	<5	1	O/c chert, chert conglomerate. Float Tb. Acid volcanics (gty phenocrysts), chert.	

022

2

617023

AREA DIAL RANGE EL 19/72.

SAMPLE Nos. 244650 - 244682

COLLECTED BY P.J.A.

SHEET No. 3

MAP OR PHOTO REFERENCE

ANALYSED BY ZINC Corp. Broken Hill.

DATE 26/9/73

Map or photo No.	No. Sample	Sediment				Channel				pH	Metal content, p. p. m.											Geological observations
		Gravel	Sand	Silt/mud	Organic	Flow	Width	Alluvial	Colluvial		Pb	Zn	Cu	Ni	Co	Cr	Mn	Ag	Mo	As		
5	244650	20	70	10	-	F	3.0	✓	✓	-	15	74	2	14	12	10	2100	4	<2	<5	4	ok chert. Acid volcanic just downstream. (float acid volcanic and chert.
"	244651	35	50	10	5	S	0.5	-	✓	-	7	46	1	6	3	110	530	4	<2	<5	4	ok chert. Float chert and acid volcanics.
"	244652	40	50	10	-	M	1.0	✓	✓	-	22	107	6	22	18	20	2300	4	<2	<5	3	ok nil. Float mudstone, acid volcanic (possibly chert).
"	244653	35	55	10	-	M	1.0	✓	✓	-	15	46	7	15	8	20	2000	4	<2	5	4	ok nil. Float acid volcanics and chert.
"	244654	35	55	10	-	M	0.5	-	✓	-	15	38	7	35	22	70	1220	1	<2	5	3	ok chert. Float chert, acid volcanics.
"	244655	45	50	5	-	F	>5	-	✓	-	13	71	12	65	38	90	1190	1	<2	<5	2	ok acid volcanics, mudstone. Float same.
"	244656	25	65	10	-	F	3.0	-	✓	-	24	107	7	26	12	40	1020	4	<2	10	3	ok mudstone. Float mudstone, acid volcanics, chert.
"	244657	30	65	5	-	F	6.0	✓	✓	-	15	68	9	42	24	70	810	4	<2	5	2	ok chert. Float acid volcanics, mudstone, chert.
"	244658	30	65	5	-	F	0.75	✓	✓	-	13	82	19	98	60	130	2100	4	<2	<5	2	ok acid volcanic (qty phenocrysts). Float acid volcanic, chert, mudstone?
"	244659	25	65	10	-	F	0.75	-	✓	-	9	41	6	24	15	40	600	4	<2	<5	3	ok acid volcanic (qty phenocrysts). Float same, Tb.
"	244660	40	50	10	-	M	0.5	-	✓	-	11	50	5	28	27	40	1560	1	<2	<5	2	ok chert. Float chert.
"	244661	30	55	15	-	M	0.25	-	✓	-	13	62	18	75	57	100	1450	4	<2	<5	1	ok chert? Float chert? Tb.
"	244662	30	60	10	-	F	1.0	✓	-	-	14	80	18	73	42	70	1590	4	<2	<5	1	ok nil. Float Tb. and chert.
"	244663	15	65	15	5	S	0.25	-	✓	-	12	41	11	41	24	90	4800	4	<2	<5	1	ok volcanic? Float same.
"	244664	5	70	20	5	S	0.5	-	✓	-	18	103	30	110	57	130	1810	4	<2	<5	1	ok sandstone. Float nil.
"	244665	20	70	10	-	F	1.0	-	✓	-	15	100	43	160	86	170	1600	1	<2	<5	1	ok micaceous sandstone. Float same plus Tb.
"	244667	15	75	10	-	F	1.0	✓	✓	-	13	83	23	110	49	120	1370	4	<2	<5	1	ok mudstone, micaceous sandstone. Float Tb.
"	244668	35	50	10	-	M	0.5	-	✓	-	58	155	14	32	23	50	2700	4	<2	<5	2	ok conglomerate, mudstone. Float same.
"	244668	25	65	10	-	F	1.0	-	✓	-	11	80	10	57	30	60	1250	4	<2	<5	1	ok chert. Float chert.
"	244669	40	55	5	-	M	0.5	✓	✓	-	9	54	10	36	21	40	680	4	<2	<5	1	ok volcanics. Float volcanics, micaceous sandstone, mudstone.
"	244670	30	60	10	-	M	0.75	✓	✓	-	11	43	7	27	19	40	650	4	<2	<5	1	ok sandstone. Float sandstone, volcanics.
"	244671	30	65	5	-	M	0.5	-	✓	-	8	24	3	18	16	40	540	4	<2	<5	2	ok volcanics. Float volcanics, sandstone, chert?
"	244672	10	80	10	-	S	0.25	-	✓	-	8	26	1	8	12	20	450	4	<2	<5	2	ok volcanics. Float volcanics.
"	244673	35	50	10	5	M	1.0	✓	✓	-	8	50	10	23	12	30	760	4	<2	<5	1	ok sandstone. Float mudstone (possibly chert), volcanics.
"	244674	35	56	10	-	M	1.0	✓	✓	-	17	118	8	25	12	40	1600	4	<2	<5	1	ok sandstone.
"	244675	45	50	5	-	M	0.5	-	✓	-	22	102	8	13	11	30	260	4	<2	5		ok nil. Float volcanics, mudstone, sandstone.
"	244676	40	50	10	-	M	2.5	✓	✓	-	16	113	8	35	15	30	650	4	<2	10		ok chert. Float chert.
"	244676	40	50	10	-	M	2.5	✓	✓	-	16	113	8	35	15	30	650	4	<2	10		ok mudstone with Barite veins. Float same plus sandstone, possible volcanic.
"	244677	30	60	10	-	S	1.0	✓	✓	-	7	15	4	18	6	20	140	4	<2	10		ok sandstone and mudstone. Float sandstone.
"	244678	40	50	10	-	M	0.5	✓	✓	-	18	187	22	54	31	20	2100	4	<2	10		ok mudstone. Float mudstone, conglomerate, chert, Tb.
"	244679	40	50	10	-	M	1.0	✓	✓	-	17	104	4	22	24	20	1780	4	<2	5		ok mudstone? Float mudstone? volcanic?
"	244680	30	60	10	-	M	1.0	✓	✓	-	21	46	35	27	19	30	740	4	<2	15		ok conglomerate. Float conglomerate, chert, volcanic.
"	244681	20	60	20	-	M	0.5	✓	✓	-	9	46	11	24	18	30	830	4	<2	5		ok conglomerate. Float conglomerate.
"	244682	40	50	10	-	M	1.0	✓	-	-	28	176	11	42	42	40	1830	4	<2	10		ok chert? Float mudstone, sandstone, chert, Tb.

023

3

617024

AREA DIAL RANGE E-19/72.

SAMPLE Nos. 244683 - 244719.

COLLECTED BY P.J.A.

SHEET No. 4

MAP OR PHOTO REFERENCE

ANALYSED BY Zinc Corp. Broken Hill.

DATE 2/10/73

024

4

Map or photo No.	No. Sample	Sediment				Channel				pH	Metal content, p. p. m.											Geological observations
		Gravel	Sand	Silt/mud	Organic	Flow	Width	Alluvial	Colluvial		Pb	Zn	Cu	Ni	Co	Cr	Mn	Ag	Mo	As		
5	244683	50	40	10	-	S	0.5	-	✓	-	7	56	5	59	14	60	420	41	<2	<5	ok sandstone, mudstone. Float same.	
"	244684	30	45	25	-	M	1.0	✓	-	-	11	40	22	39	28	50	2300	41	<2	10	ok nil. Float chert, Om, sandstone, mudstone.	
"	244685	25	50	25	-	M	2.0	✓	✓	-	12	97	15	39	19	50	800	41	<2	15	ok nil. Float chert, sandstone, volcanic?	
"	244686	-	75	20	5	M	1.0	✓	✓	-	9	21	13	28	20	20	800	41	<2	5	ok nil. Float Om, mudstone, chert.	
"	244687	50	45	5	-	M	1.0	-	✓	-	* 35 26	42 38	10 85	10 12	7 9	20 20	90 90	41	<2	<5	ok conglomerate (O). Om? Float conglomerate, Om.	
"	244688	60	35	5	-	M	1.0	-	✓	-	9	17	13	10	5	30	80	41	<2	<5	ok Om. Float Om.	
"	244689	35	55	10	-	S	0.5	✓	✓	-	7	22	15	16	11	20	370	41	<2	10	ok nil. Float Om, sandstone, chert.	
"	244690	5	95	10	-	M	2.5	✓	-	-	9	88	5	22	16	20	810	41	<2	5	ok mudstone (possibly chert). Float mudstone, chert, volcanic.	
"	244691	20	70	10	-	M	1.5	✓	-	-	23	123	15	64	33	70	1540	41	<2	15	ok nil. Float sandstone, chert, mudstone.	
"	244692	25	65	10	-	M	1.0	✓	-	-	15	135	14	52	31	60	1370	41	<2	10	ok chert. Float sandstone, chert, Tb.	
"	244693	30	60	10	-	S	0.5	✓	✓	-	19	124	12	41	19	40	1510	41	<2	5	ok nil. Float mudstone, sandstone, chert.	
"	244694	40	50	10	-	M	2.0	✓	✓	-	9	76	9	56	26	50	1860	41	<2	10	ok nil. Float chert.	
"	244695	20	80	30	-	S	1.0	✓	✓	-	* 18 18	120 114	15 16	88 85	47 43	100 80	1660 1600	41	<2	10	ok chert. Float chert.	
"	244696	70	25	5	-	M	0.5	-	✓	-	6	32	3	10	18	410	2300	41	<2	5	ok chert. Float chert, mudstone, Tb., Volcanic?	
"	244697	65	30	5	-	F	1.0	-	✓	-	13	98	13	52	24	40	790	41	<2	5	ok mudstone, sandstone, Float mudstone, chert.	
"	244698	60	35	5	-	F	1.0	-	✓	-	11	85	8	38	21	40	1160	41	<2	5	ok chert. Float chert.	
"	244699	15	75	10	-	F	2.0	-	✓	-	6	71	6	17	14	50	650	41	<2	<5	ok sandstone. Float sandstone, chert.	
"	244700	30	60	10	-	F	2.0	✓	-	-	11	83	8	57	34	60	1050	41	<2	5	ok mudstone. Float chert, sandstone.	
"	244701	15	70	15	-	S	1.0	✓	✓	-	13	75	16	22	33	90	1350	41	<2	5	ok chert. Float chert, volcanic?	
"	244702	25	60	15	-	M	0.75	-	✓	-	15	52	15	27	19	40	430	41	<2	5	ok chert. Float chert.	
"	244703	20	65	15	-	M	1.0	-	✓	-	8	75	6	44	41	40	1090	41	<2	<5	ok nil. Float chert.	
"	244704	60	35	5	-	M	0.75	✓	✓	-	14	88	10	32	27	30	1800	41	<2	<5	ok nil. Float chert, volcanic?	
"	244705	30	60	10	-	M	0.5	-	✓	-	9	52	4	16	15	20	770	41	<2	<5	ok volcanic. Float volcanic, sandstone, chert.	
"	244706	5	60	35	-	M	2.0	✓	✓	-	8	59	7	28	17	20	300	41	<2	<5	ok nil. Float nil.	
"	244707	40	50	10	-	S	0.5	-	✓	-	9	32	5	22	19	20	1320	41	<2	<5	ok chert. Float chert, volcanic?	
"	244708	20	70	10	-	M	2.0	✓	-	-	* 6 8	78 76	150 140	35 37	28 26	30 20	1290 1240	41	<2	5	ok nil. Float volcanic, chert, (black, slightly pyritic).	
"	244709	40	50	10	-	M	2.0	✓	✓	-	7	66	8	42	24	20	730	41	<2	5	ok volcanic. Float volcanic, chert.	
"	244710	-	65	30	5	M	1.5	✓	✓	-	-	-	-	-	-	-	-	-	-	-	ok nil. Float nil.	
"	244711	10	80	10	-	M	2.0	✓	-	-	7	39	3	13	14	10	770	41	<2	<5	ok acid volcanic. Float volcanic (sp?) chert.	
"	244712	10	80	10	-	M	1.0	✓	-	-	7	36	2	9	11	10	1280	41	<2	5	ok volcanic, chert (m/s). Float acid volcanic.	
"	244713	30	60	10	-	M	2.0	✓	-	-	7	45	5	19	24	20	1540	41	<2	5	ok nil. Float black chert (m/s?), acid volcanic.	
"	244714	15	65	10	-	M	1.5	✓	✓	-	14	134	8	43	31	40	1300	41	<2	5	ok acid volcanic. Float acid volcanic, chert.	
"	244715	5	75	20	-	M	1.0	✓	✓	-	14	103	30	140	59	130	1460	41	<2	<5	ok chert. Float mudstone, chert, Tb.	
"	244716	10	80	10	-	M	2.0	✓	-	-	12	75	22	97	46	20	1620	41	<2	5	ok mudstone, Float mudstone, sandstone.	
"	244717	40	50	10	-	M	1.0	✓	✓	-	8	48	10	75	23	30	1570	41	<2	10	ok sandstone, mudstone. Float same.	
"	244718	15	65	10	-	M	0.5	✓	✓	-	15	118	25	130	61	140	1490	41	2	<5	ok sandstone? Float Tb.	
"	244719	60	35	5	-	M	1.0	✓	✓	-	16	56	8	27	17	20	2100	41	<2	<5	ok chert. Float chert, mudstone.	

617025

AREA NIETTA ANOMALIES

SAMPLE Nos. 234251 - 234284

COLLECTED BY T.M.P.

MAP OR PHOTO REFERENCE

ANALYSED BY ZINC CORP. BROKEN HILL

Grid Coordinate	Sample No.	Soil composition					Soil horizon	Sample		Bedrock	Metal content, p. p. m.										Geological observations							
		Rock %	Lignite %	Sand %	Silt %	Clay %		Depth (m)	Colour (Munsell) Chart No.		pH	Outcrop	Concatenated	Est. Depth to bedrock (m)	Pb	Zn	Cu	Ni	Co	Cr		Mn	Ag	Mo	As			
0m	234251	28	-	-	60	10	WB	60	2	-	✓	60	90	195	120	19	47										Andesite tuff - rock.	
10	234252	5	-	-	60	25	S	70	1	-	✓	70	89	195	74	23	22										Rotenundite tuff - rock	
20	234253	25	-	-	50	15	S	75	1	-	✓	75	850	182	58	20	23										As above.	
30	234254	10	-	-	50	30	S	70	1	-	✓	70	80	194	57	20	35										As above + black fracture filling	
40	234255	25	-	-	50	10	S	70	1	-	✓	70	96	240	62	36	26										As above.	
50	234256	30	-	-	50	10	S	60	1	-	✓	60	130	350	160	21	26										As above.	
60	234257	5	-	10	50	25	S	60	1	-	✓	60	430	200	150	25	60										As above.	
70	234258	5	-	-	50	30	S	60	1	-	✓	60	250	166	130	24	49										As above.	
80	234259	5	-	-	50	30	S	70	1	-	✓	70	160	200	170	25	36										As above.	
90	234260	20	-	-	50	10	S	60	1	-	✓	60	46	135	200	17	57										Granulite tuff - rock. Rock rotenundite tuff with black fracture filling.	
100	234261	5	-	-	50	20	S	80	1	-	✓	80	51	155	200	17	26										As above.	
110	234262	30	-	-	50	10	S	70	1	-	✓	70	130	260	140	20	30										As above.	
120	234263	20	-	-	50	10	S	80	1	-	✓	80	470	150	120	15	34										As above.	
130	234264	5	-	-	50	10	S	60	1	-	✓	60	140	320	140	20	54											As above.
140	234265	8	-	-	50	10	S	70	1	-	✓	70	130	210	120	17	29										As above.	
150	234266	5	-	-	50	10	S	70	1	-	✓	70	200	280	88	20	28										As above.	
160	234267	5	-	10	50	10	S	80	1	-	✓	80	48	124	62	17	34										As above.	
170	234268	5	-	-	50	10	S	80	1	-	✓	80	51	134	15	19	25										Rock rotenundite tuff. As above.	
180	234269	5	-	-	50	10	S	80	1	-	✓	80	56	146	10	17	25										As above.	
190	234270	1	-	-	50	10	S	80	1	-	✓	80	67	150	10	18	41										Sed possibly ex tuff.	
200	234271	1	-	-	50	10	S	80	1	-	✓	80	62	153	11	19	26										As above.	
210	234272	5	-	-	50	10	S	80	1	-	✓	80	59	149	10	18	25										Rock rotenundite tuff.	
220	234273	1	-	-	50	10	S	80	1	-	✓	80	54	162	14	21	25										Sed possibly ex tuff.	
230	234274	1	-	-	50	10	S	80	1	-	✓	80	57	161	15	20	26										As above.	
240	234275	1	-	-	50	10	S	80	1	-	✓	80	58	168	14	22	25										As above.	
250	234276	10	-	-	50	10	WB	80	1	-	✓	80	42	131	13	18	28										As above. Rock fine andesite tuff with black fracture filling.	
260	234277	0	-	-	50	10	S	90	1	-	✓	90	19	220	25	15	26										As above. Rock rotenundite tuff with black fracture fillings.	
270	234278	10	-	-	50	10	S	80	1	-	✓	80	23	200	70	12	27										As above.	
280	234279	20	-	-	50	10	S	100	1	-	✓	100	30	92	67	12	23										As above.	
290	234280	25	-	-	50	10	S	65	1	-	✓	65	51	126	56	13	48										As above.	
300	234281	20	-	-	50	10	S	70	1	-	✓	70	15	195	41	16	25										As above.	
310	234282	15	-	-	50	10	S	40	1	-	✓	40	24	198	46	13	27										As above.	
320	234283	30	-	-	40	10	WB	45	1	-	✓	45	27	174	48	13	27										As above.	
330	234284	20	-	-	60	10	WB	60	1	-	✓	60	30	210	38	13	33										As above.	

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617027

C.R.A. EXPLORATION PTY. LIMITED

GEOCHEMICAL SOIL SAMPLING LEGER

AREA. NETTA ANDMALES.

SAMPLE Nos. 212846 - 212850
234301 - 234325

COLLECTED BY. T.M.P.

ANALYSED BY ZINC CORP. BROKEN HILL.

MAP OR PHOTO REFERENCE

029

9

Grid Co-ordinate	Sample No.	Soil composition					Soil horizon	Sample		Bedrock		Metal content, p. p. m.										Geological observations			
		Rock %	Lignite %	Sand %	Silt %	Clay %		Depth (m)	Colour (Munsell) Chart No.	pH	Outcrop	Cancelled	Est. Depth in CM	Pb	Zn	Cu	Ni	Co	Cr	Mn	Ag		Mo	As	
390	212846	70	-	11	11	10	8	10YR 5/6	-	✓	-	12	55	48	12	16	-	-	-	-	4	-	-	fc sand tuff + hm. aug. feet.	
400	212847	50	-	11	11	10	8	10YR 5/6	-	✓	-	8	53	52	10	16	-	-	-	-	4	-	-	As above.	
410	212848	70	-	11	11	10	8	10YR 5/6	-	✓	-	8	41	56	10	13	-	-	-	-	4	-	-	As above.	
420	212849	50	-	11	11	10	8	10YR 5/6	-	✓	-	6	64	22	10	18	-	-	-	-	4	-	-	fc partly gas. sand tuff.	
430	212850	30	-	11	11	10	8	10YR 5/6	-	✓	-	9	74	32	15	24	-	-	-	-	4	-	-	As above.	
440	234301	30	-	11	11	10	8	10YR 5/6	-	✓	-	10	70	84	15	20	-	-	-	-	4	-	-	As above.	
450	234302	30	-	11	11	10	8	10YR 5/6	-	✓	-	6	50	7	9	15	-	-	-	-	4	-	-	As above.	
460	234303	25	-	11	11	10	8	10YR 5/6	-	✓	-	8	39	18	11	15	-	-	-	-	4	-	-	fc carbonate tuff.	
470	234304	30	-	11	11	10	8	10YR 5/6	-	✓	-	12	64	130	21	23	-	-	-	-	-	-	-	fc partly gas carbonate tuff.	
480	234305	20	-	11	11	10	8	10YR 5/6	-	✓	-	9	73	150	16	23	-	-	-	-	1	-	-	As above.	
490	234306	28	-	11	11	10	8	10YR 5/6	-	✓	-	8	65	46	15	19	-	-	-	-	1	-	-	As above.	
500	234307	25	-	11	11	10	8	10YR 5/6	-	✓	-	8	74	60	13	20	-	-	-	-	1	-	-	As above.	
510	234308	25	-	11	11	10	8	10YR 5/6	-	✓	-	10	59	89	12	17	-	-	-	-	1	-	-	As above.	
520	234309	25	-	11	11	10	8	10YR 5/6	-	✓	-	5	41	68	10	16	-	-	-	-	4	-	-	As above.	
530	234310	40	-	11	11	10	8	10YR 5/6	-	✓	-	60	22	35	64	13	15	-	-	-	4	-	-	Rock gas. grey lam. siliceous sh. covered by gas dust flat.	
540	234311	40	-	11	11	10	8	10YR 5/6	-	✓	-	12	33	37	8	8	-	-	-	-	4	-	-	As above.	
550	234312	10	-	11	11	10	8	10YR 5/6	-	✓	-	26	90	160	16	19	-	-	-	-	1	-	-	fc red dust.	
560	234313	25	-	11	11	10	8	10YR 5/6	-	✓	-	20	45	56	8	13	-	-	-	-	1	-	-	Rock gas. rotten sand tuff covered by heavy dust see	
570	234314	25	-	11	11	10	8	10YR 5/6	-	✓	-	30	15	96	120	13	23	-	-	-	1	-	-	Rock rotten tuff - dust cover	
580	234315	25	-	11	11	10	8	10YR 5/6	-	✓	-	60	14	193	100	14	20	-	-	-	1	-	-	As above.	
LINE 2.																									
0	234316	5	-	11	11	10	8	10YR 5/6	-	✓	-	10	27	112	14	15	-	-	-	-	1	-	-	Rock rotten sand tuff	
10	234317	1	-	11	11	10	8	10YR 5/6	-	✓	-	15	27	97	16	14	-	-	-	-	4	-	-	-	
20	234318	5	-	11	11	10	8	10YR 5/6	-	✓	-	90	35	123	28	13	-	-	-	-	1	-	-	Rock rotten sand tuff	
30	234319	5	-	11	11	10	8	10YR 5/6	-	✓	-	10	25	152	18	12	-	-	-	-	4	-	-	As above.	
40	234320	40	-	11	11	10	8	10YR 5/6	-	✓	-	70	24	95	11	14	-	-	-	-	4	-	-	As above.	
50	234321	25	-	11	11	10	8	10YR 5/6	-	✓	-	50	15	190	13	19	-	-	-	-	4	-	-	As above.	
60	234322	30	-	11	11	10	8	10YR 5/6	-	✓	-	19	19	157	10	16	-	-	-	-	4	-	-	As above.	
70	234323	30	-	11	11	10	8	10YR 5/6	-	✓	-	50	24	131	13	15	-	-	-	-	4	-	-	As above.	
80	234324	25	-	11	11	10	8	10YR 5/6	-	✓	-	60	20	162	7	16	-	-	-	-	4	-	-	As above.	
90	234325	20	-	11	11	10	8	10YR 5/6	-	✓	-	60	17	179	7	15	-	-	-	-	4	-	-	As above.	

617030

C.R.A. EXPLORATION PTY. LIMITED
GEOCHEMICAL SOIL SAMPLING LEDGER

DPO. 1367

030

AREA. NIETTA ANOMALIES.

SAMPLE Nos. 234326 - 234361

COLLECTED BY T.M.P.

MAP OR PHOTO REFERENCE

ANALYSED BY ZINC GRP. BROKEN HILL.

Grid Co-ordinate	Sample No.	Soil composition					Soil horizon	Sample		Bedrock		Metal content, p. p. m.										Geological observations		
		Rock %	Lignite %	Sand %	Silt %	Clay %		Depth (inches)	Colour (Munsell) Chart No.	Outcrop	Consolidated	Fe	Zn	Cu	Ni	Co	Cr	Mn	Ag	Mo	As			
100	234326	R	-	6	8	8	20	10	✓	13	68	4	7	19				4						to above
110	234327	U	-	6	8	8	40	10	✓	13	104	3	8	14				4						to above
120	234328	U	-	6	8	8	60	10	✓	13	86	3	8	12				4						to above
130	234329	U	-	6	8	8	80	10	✓	11	121	1	8	14				4						to above
140	234330	U	-	6	8	8	80	10	✓	12	72	2	8	15				4						to above
150	234331	R	-	6	8	8	80	10	✓	10	54	2	6	12				4						to above
160	234332	R	-	6	8	8	80	10	✓	10	92	2	6	13				4						to above
170	234333	R	-	6	8	8	50	10	✓	10	77	2	8	12				4						to above
180	234334	U	-	6	8	8	70	10	✓	15	152	3	10	15				1						Red water and tuff.
190	234335	U	-	6	8	8	80	10	✓	13	61	2	8	14				4						to above
200	234336	R	-	6	8	8	40	10	✓	40	13	75	3	8	14				4					to above
210	234337	U	-	6	8	8	40	10	✓	40	12	71	3	7	12				4					to above
220	234338	U	-	6	8	8	80	10	✓	50	13	60	2	8	11				4					to above
230	234339	U	-	6	8	8	60	10	✓	60	14	131	3	11	15				4					to above
240	234340	U	-	6	8	8	40	10	✓	40	11	92	2	9	14				4					to above
250	234341	U	-	6	8	8	60	10	✓	60	13	89	3	8	12				4					to above
260	234342	U	-	6	8	8	60	10	✓	60	15	94	3	7	14				4					to above
270	234343	U	-	6	8	8	60	10	✓	60	13	88	3	9	13				4					to above
280	234344	U	-	6	8	8	60	10	✓	60	14	78	3	9	14				4					to above
290	234345	U	-	6	8	8	60	10	✓	60	13	53	2	9	14				4					to above
300	234346	U	-	6	8	8	30	10	✓	30	13	57	3	6	14				4					to above
310	234347	U	-	6	8	8	40	10	✓	40	10	45	3	8	12				4					to above
320	234348	U	-	6	8	8	70	10	✓	80	15	24	5	6	8				4					to above
330	234349	U	-	6	8	8	50	10	✓	75	13	65	7	9	29				4					Red fine siliceous tuff.
340	234350	U	-	6	8	8	60	10	✓	75	15	58	5	12	17				4					Red fine sand tuff (bradyite?)
350	234351	U	-	6	8	8	60	10	✓	60	15	57	8	10	17				4					Red water green shale.
360	234352	U	-	6	8	8	60	10	✓	60	15	50	25	12	17				4					Red fine sand tuff.
370	234353	U	-	6	8	8	60	10	✓	60	15	41	19	9	8				4					Red water grey siliceous shale (and det.?).
380	234354	U	-	6	8	8	40	10	✓	40	20	24	14	10	14				4					to above
390	234355	U	-	6	8	8	50	10	✓	50	17	15	18	8	14				4					to above
400	234356	U	-	6	8	8	60	10	✓	60	12	16	11	9	3				4					to above
410	234357	U	-	6	8	8	40	10	✓	40	20	16	9	11	4				4					to above
420	234358	U	-	6	8	8	80	10	✓	80	17	18	13	10	14				4					to above
430	234359	U	-	6	8	8	40	10	✓	40	18	14	6	10	5				4					Red fine sand tuff.
440	234360	U	-	6	8	8	80	10	✓	80	15	15	8	11	5				4					Red shale.
450	234361	U	-	6	8	8	80	10	✓	80	21	6	15	8	8				4					to above.

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617031

C.R.A. EXPLORATION PTY. LIMITED
GEOCHEMICAL SOIL SAMPLING LEDGER

D.P.O. 13247 (6 234356) 6
D.P.O. 13246 (for 234392)

031

AREA NIETTA ANOMALIES

SAMPLE Nos. 234362 - 234396
234392 - 234399

COLLECTED BY T.M.P.

MAP OR PHOTO REFERENCE

ANALYSED BY ZINC CORP. BROCKEN HILL

Grid Co-ordinate	Sample No.	Soil composition					Soil horizon	Sample		Bedrock		Metal content, p. p. m.										Geological observations						
		Rock %	Lignite %	Sand %	Silt %	Clay %		Depth (inches)	Colour (Munsell) Chart No.	pH	Outcrop	Cancelled	Est. Depth (m)	Pb	Zn	Cu	Ni	Co	Cr	Mn	Ag		Mo	As				
460	234362	6	-	0	25	75	R	20	✓	20	57	53	39	28	14	-	-	-	-	-	-	-	-	-	-	-	Red grey siliceous shale.	
470	234363	50	-	0	25	75	R	20	✓	20	40	40	18	12	0	-	-	-	-	-	-	-	-	-	-	-	As above.	
480	234364	60	-	0	15	85	R	40	✓	40	42	78	35	20	14	-	-	-	-	-	-	-	-	-	-	-	As above.	
490	234365	20	-	0	15	85	R	30	✓	30	62	57	56	33	25	-	-	-	-	-	-	-	-	-	-	-	Red rather tuff.	
500	234366	20	-	0	15	85	R	30	✓	30	55	15	66	41	36	-	-	-	-	-	-	-	-	-	-	-	As above.	
510	234367	20	-	0	15	85	R	30	✓	30	60	20	15	91	57	-	-	-	-	-	-	-	-	-	-	-	As above.	
520	234368	15	-	0	15	85	R	60	✓	60	37	38	31	25	13	-	-	-	-	-	-	-	-	-	-	-	Reddish chert - Red	
530	234369	35	-	0	20	80	R	50	✓	50	26	44	16	12	10	-	-	-	-	-	-	-	-	-	-	-	As above.	
540	234370	6	-	0	25	75	R	40	✓	40	5	28	12	8	7	-	-	-	-	-	-	-	-	-	-	-	Red dark green lam. siliceous shale.	
580	234371	45	-	0	15	85	R	45	✓	60	17	38	16	13	10	-	-	-	-	-	-	-	-	-	-	-	As above.	
580	234372	40	-	0	20	80	R	50	✓	50	22	37	14	12	8	-	-	-	-	-	-	-	-	-	-	-	As above.	
590	234373	30	-	0	20	80	R	60	✓	51	51	62	23	21	5	-	-	-	-	-	-	-	-	-	-	-	Light green lam. siliceous shale with s/s.	
580	234374	20	-	25	15	60	R	50	✓	50	45	37	28	23	5	-	-	-	-	-	-	-	-	-	-	-	Red coarse sand tuff.	
580	234375	40	-	0	15	85	R	90	✓	50	37	77	26	38	22	-	-	-	-	-	-	-	-	-	-	-	Red rather tuff to argill.	
610	234376	25	-	0	15	85	R	100	✓	50	30	94	22	25	17	-	-	-	-	-	-	-	-	-	-	-	As above.	
620	234377	60	-	0	15	85	R	50	✓	50	36	100	19	24	20	-	-	-	-	-	-	-	-	-	-	-	As above.	
630	234378	30	-	0	15	85	R	90	✓	50	30	88	17	22	18	-	-	-	-	-	-	-	-	-	-	-	As above.	
640	234379	25	-	0	15	85	R	90	✓	90	24	37	20	25	21	-	-	-	-	-	-	-	-	-	-	-	Red rather fine tuff.	
650	234380	40	-	0	15	85	R	80	✓	80	44	90	26	23	26	-	-	-	-	-	-	-	-	-	-	-	Red grey lam. shale.	
660	234380	30	-	0	15	85	R	80	✓	90	20	60	16	19	15	-	-	-	-	-	-	-	-	-	-	-	As above.	
670	234382	80	-	0	15	85	R	60	✓	60	20	65	6	19	15	-	-	-	-	-	-	-	-	-	-	-	Red rather green chert.	
680	234383	35	-	0	15	85	R	60	✓	70	17	57	19	23	19	-	-	-	-	-	-	-	-	-	-	-	As above.	
680	234384	25	-	0	15	85	R	80	✓	60	13	50	20	19	13	-	-	-	-	-	-	-	-	-	-	-	Red grey lam. siliceous shale.	
715	234385	25	-	0	15	85	R	60	✓	60	55	52	18	17	16	-	-	-	-	-	-	-	-	-	-	-	As above.	
750	234386	30	-	0	15	85	R	80	✓	80	22	90	33	31	35	-	-	-	-	-	-	-	-	-	-	-	As above.	
LINE 3																												
0	234392	-	-	0	-	100	S	30	✓	80	110	110	73	19	29	-	-	-	-	-	-	-	-	-	-	-	-	-
10	234393	-	-	0	-	100	S	30	✓	80	120	112	78	19	35	-	-	-	-	-	-	-	-	-	-	-	-	-
20	234394	-	-	0	-	100	S	30	✓	80	80	138	78	16	37	-	-	-	-	-	-	-	-	-	-	-	-	-
30	234395	-	-	0	-	100	S	30	✓	150	150	142	89	18	51	-	-	-	-	-	-	-	-	-	-	-	-	Red tuff.
40	234396	-	-	0	-	100	S	30	✓	150	150	152	90	19	50	-	-	-	-	-	-	-	-	-	-	-	-	Red rather tuff + chert.
50	234397	-	-	0	-	100	S	30	✓	80	80	146	71	19	30	-	-	-	-	-	-	-	-	-	-	-	-	-
60	234398	-	-	0	-	100	S	30	✓	110	110	158	63	17	28	-	-	-	-	-	-	-	-	-	-	-	-	Red tuff (chert?).
70	234399	-	-	0	-	100	S	30	✓	100	100	149	71	19	20	-	-	-	-	-	-	-	-	-	-	-	-	As above.

617032

C.R.A. EXPLORATION PTY. LIMITED

GEOCHEMICAL SOIL SAMPLING LEDGER

D.P.O. 16939

AREA NIETTA

SAMPLE Nos. 245104 - 245126

COLLECTED BY P.J.A.

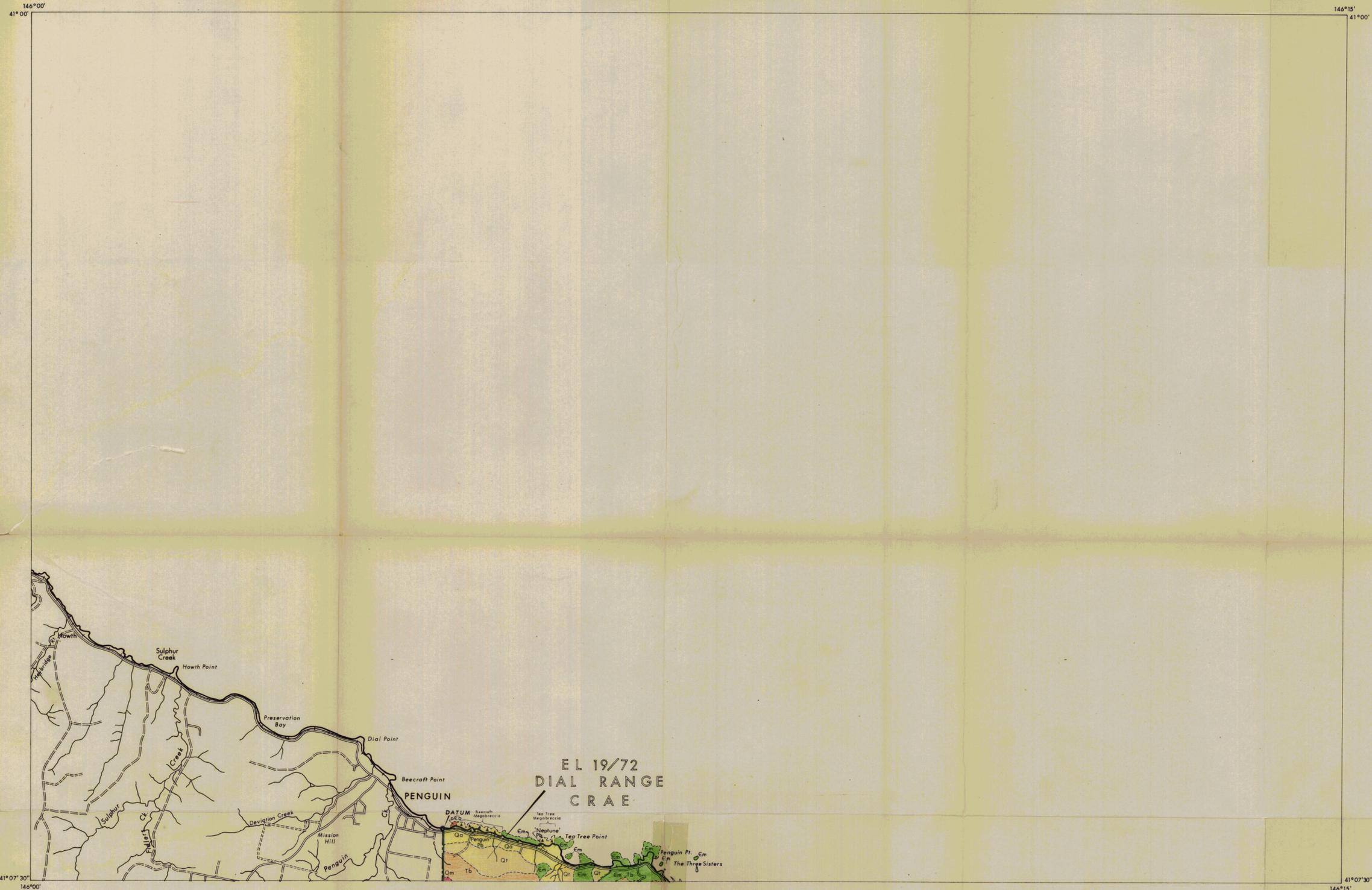
MAP OR PHOTO REFERENCE

[SOIL PROFILING EXERCISE]

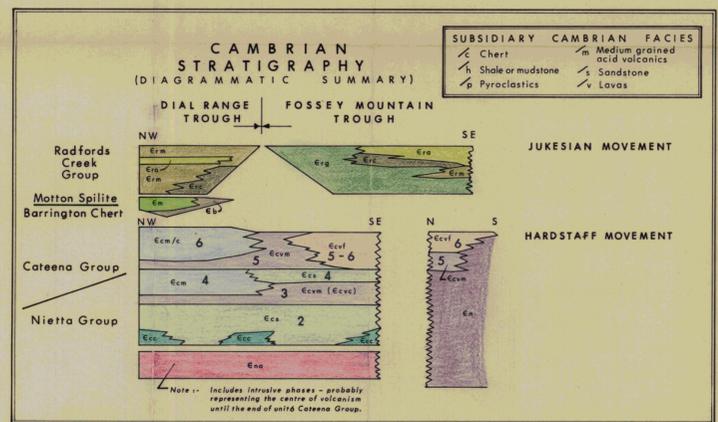
ANALYSED BY ZINC Comp LTD.

Grid Co-ordinate	Sample No.	Soil composition					Soil horizon	Sample		Bedrock		Metal content, p. p. m.										Geological observations				
		Rock %	Laterite %	Sand %	Silt %	Clay %		Depth (cm)	Colour (Munsell Chart No.)	pH	Outcrop	Concealed	Est. Depth (m)	Pb	Zn	Cu	Ni	Co	Cr	Mn	Ag		Mo	As		
	245104	✓	✓	✓	✓	✓	H	20	black dk brown	-	✓	-	70	12	20	7	5			1100	<1					humic zone, Cl Alt zone
	245105	✓	✓	✓	✓	✓	B	30	brown	-	✓	-	70	17	16	4	5			320	4					B horizon
	245106	✓	✓	✓	✓	✓	WB	50	brown	-	✓	-	70	14	11	5	7			470	4					WB horizon
	245107	✓	✓	✓	✓	✓	WB	70	yellow brown	-	✓	-	70	22	11	5	10			310	1					WB right on o/c
	245108	✓	✓	✓	✓	✓	H	20	black	-	✓	-	70	35	35	230	15			2700	4					humic zone DR167
	245109	✓	✓	✓	✓	✓	H/B	30	gray	-	✓	-	70	38	34	350	18			2800	<1					humic to B horizon
	245110	✓	✓	✓	✓	✓	B	50	gray	-	✓	-	70	35	32	370	16			2400	1					B horizon
	245111	✓	✓	✓	✓	✓	WB	70	gray	-	✓	-	70	17	12	360	19			130	1					WB right on o/c
	245112	✓	✓	✓	✓	✓	H	20	black	-	✓	-	80	4	2	4	4			210	4					Black humic zone - DR16
	245113	✓	✓	✓	✓	✓	B	40	gray light	-	✓	-	80	41	4	2	4			410	4					B horizon
	245114	✓	✓	✓	✓	✓	WB/B	80	gray	-	✓	-	80	2	4	4	<1			410	1					WB to B right on Bedrock
	245115	✓	✓	✓	✓	✓	H	20	black	-	✓	-	100	12	17	13	12			50	1					Humic zone, Seeds
	245116	✓	✓	✓	✓	✓	B	40	brown cream	-	✓	-	100	22	13	55	12			40	2					B horizon
	245117	✓	✓	✓	✓	✓	B/WB	60	brown	-	✓	-	100	33	15	120	20			40	1					B to WB horizon
	245118	✓	✓	✓	✓	✓	WB	80	creamy	-	✓	-	100	9	6	12	5			10	1					WB on bedrock
	245119	✓	✓	✓	✓	✓	H	20	black	-	✓	-	150	2	5	4	1			10	1					Humic zone DR26
	245120	✓	✓	✓	✓	✓	B	40	creamy brown	-	✓	-	150	2	4	4	4			10	1					B horizon
	245121	✓	✓	✓	✓	✓	WB	80	cream	-	✓	-	150	9	6	4	4			20	1					WB
	245122	✓	✓	✓	✓	✓	WB	130	cream	-	✓	-	150	12	8	4	5			20	4					WB on bedrock
	245123	✓	✓	✓	✓	✓	H/B	20	OR brown	-	✓	-	100	12	24	3	7			120	1					Humic to B horizon DR58
	245124	✓	✓	✓	✓	✓	B	30	brown	-	✓	-	100	9	30	2	7			130	1					B horizon
	245125	✓	✓	✓	✓	✓	B/WB	50	"	-	✓	-	100	7	13	2	7			40	1					B to WB horizon
	245126	✓	✓	✓	✓	✓	WB/B	70	brown	-	✓	-	100	9	9	4	16			30	1					WB to B horizon

PENGUIN



- ### LEGEND
- Quaternary**
 - Qa Alluvium (includes beach deposits)
 - Qs Sand gravel and clay of older coastal deposits
 - Ql Talus (Ql/partially exposed bedrock)
 - Tertiary**
 - Tm Zone of mass movement and talus
 - Tb Basalt flows
 - Ts Gravel sand and clay
 - Jurassic**
 - Jd Dolerite sills and dykes
 - Permian**
 - P Mudstone, sandstone, conglomerate and coal measures
 - Devonian**
 - Dv Eugena Beds - terrestrial sediments and cave fill
 - Silurian**
 - Sw Eldon group sandstone, shale and mudstone
 - Ordovician**
 - Og Gordon Limestone
 - Om Maina Sandstone
 - Oy Roland Conglomerate
 - Cambrian**
 - See "Cambrian facies" table
 - Es Serpentine
 - pEb Burnie Beds - slates and quartzites
 - Proterozoic**
 - pEc Ulverstone metamorphics - conglomerate schistose quartzite and quartz-sericite schist
 - pEt Forth Metamorphics - Quartzite, garnet schist and amphibolite
- ### CAMBRIAN FACIES
- Radfords Creek Group**
 - Era Intermediate volcanics - andesite and dacite
 - Erm Mudstone and siltstone - with lesser feldspathic sandstone plus minor conglomerate
 - Erg Feldspathic sandstone with lesser mudstone and conglomeratic greywacke. Includes some tuffaceous beds
 - Erc Conglomeratic greywacke with lesser feldspathic sandstone and mudstone
 - Motton Spillite**
 - Em Spillite with some intercalated mudstone and chert
 - Barrington Chert**
 - Eb Well bedded black or white chert
 - Ecm Mudstone with lesser feldspathic sandstone and minor conglomerate
 - Ecs Feldspathic sandstone with lesser conglomerate and mudstone
 - Ecc Mudstone conglomerate, conglomeratic greywacke or cobble conglomerate with lesser sandstone and minor mudstone
 - Ect Mudstone with tuffaceous horizons
 - Cateena Group**
 - Ecvf Fine indurated acid tuffs and tuffaceous siltstones present mainly as 'cherts'
 - Ecvm Medium grained rhyolitic to rhyodacitic tuffs with lesser lavas. Includes mudstones and sandstones in some areas
 - Ecvr Coarse rhyolitic to rhyodacitic lavas and tuffs with some interbedded mudstones and sandstones
 - Nietta Group**
 - Eha Massive rhyolitic pyroclastics and granodioritic to rhyolitic intrusives
 - Ea Massive rhyolitic to rhyodacitic lavas and pyroclastics plus minor pyritic shale lenses



- ### REFERENCE
- Geological boundary
 - Fault
 - Fault concealed
 - Synclinal axis - earlier, later
 - Anticlinal axis - earlier, later
 - Dip & strike of bedding
 - Cateena Group Unit number
 - Road
 - Track
 - Railway
 - River or stream
 - Boundary of original EL 19/72
 - Portion of EL retained upon reduction
 - Geochemical drainage sample location
 - Sample number
 - Pb in ppm
 - Zn in ppm
 - Cu in ppm

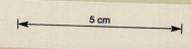


BURNIE	PENGUIN	DEVONPORT
NATONE	ULVERSTONE	RAILTON
LOVETEA	CASRA	PARADISE
LOONGANA	WILMOT	PARADISE

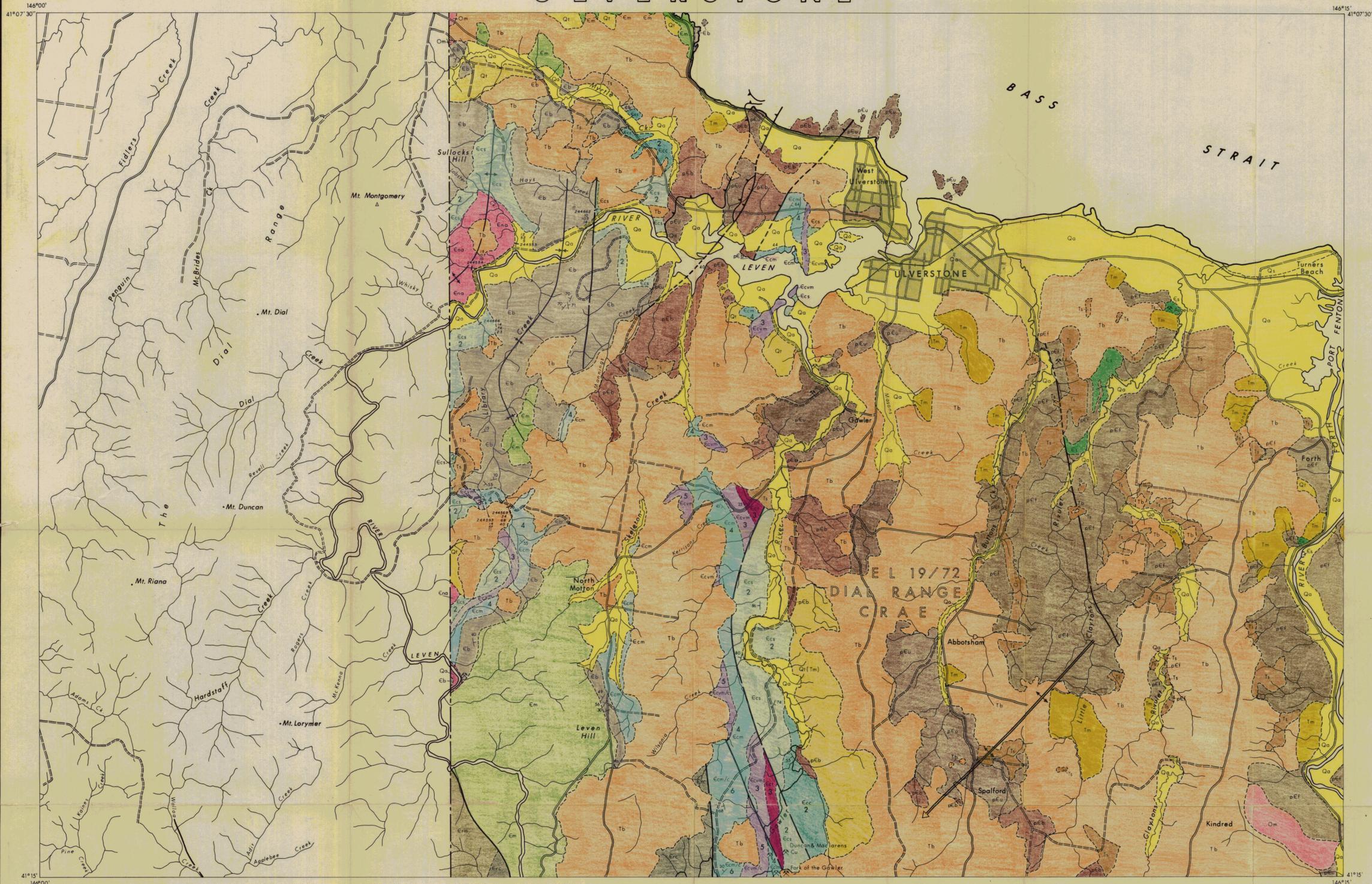
KEY TO ADJOINING SHEETS

Note: Topography from Tasmania Topographic Series produced by Lands and Survey Department Hobart - 1963
PENGUIN 8115-IV-N

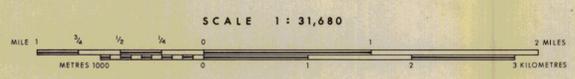
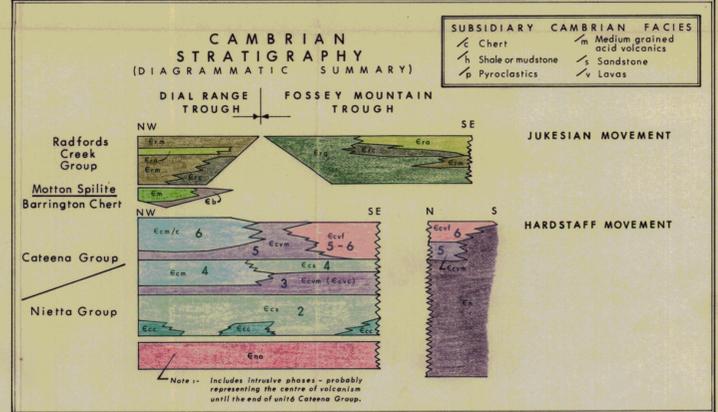
C. R. A. EXPLORATION PTY LIMITED
E.L. 19/72 "DIAL RANGE"
 NORTH WEST TASMANIA
PENGUIN
GEOLOGICAL GEOCHEMICAL PLAN
 GEOLOGIST: T.M. PORTER DATE: APRIL, 1974 REPORT NO: 7572 PLAN NO: T841
 REFERENCE 1:250,000 SHEET BURNIE SK55-3



ULVERSTONE

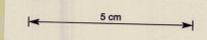


- ### LEGEND
- Quaternary**
 - Qa Alluvium (includes beach deposits)
 - Qc Sand gravel and clay of older coastal deposits
 - Qt Talus (Qt/partially exposed bedrock)
 - Tertiary**
 - Tm Zone of mass movement and talus
 - Tb Basalt flows
 - Tc Gravel sand and clay
 - Jurassic**
 - Jd Dolerite sills and dykes
 - Permian**
 - P Mudstone, sandstone, conglomerate and coal measures
 - Devonian**
 - Dv Eugena Beds - terrestrial sediments and cave fill
 - Silurian**
 - Ss Eldon group sandstone, shale and mudstone
 - Ordovician**
 - Oa Gardan Limestone
 - Om Maina Sandstone
 - Or Roland Conglomerate
 - Cambrian**
 - See "Cambrian Facies" table
 - Proterozoic**
 - pEb Burnie Beds - slates and quartzites
 - pEu Ulverstone metamorphics - conglomeratic schistose quartzite and quartz-sericite schist
 - pEh Forth Metamorphics - Quartzite, garnet schist and amphibolite
- ### CAMBRIAN FACIES
- Radfords Creek Group**
 - CrA Intermediate volcanics - andesite and dacite
 - CrM Mudstone and siltstone - with lesser feldspathic sandstone plus minor conglomerate
 - CrF Feldspathic sandstone with lesser mudstone and conglomeratic greywacke. Includes some tuffaceous beds
 - CrC Conglomeratic greywacke with lesser feldspathic sandstone and mudstone
 - Motton Spillite**
 - Em Spillite with some intercalated mudstone and chert
 - Barrington Chert**
 - Eb Well bedded black or white chert
 - Cateena Group**
 - Ecm Mudstone with lesser feldspathic sandstone and minor conglomerate
 - Ecs Feldspathic sandstone with lesser conglomerate and mudstone
 - Ecc Mudstone conglomerate, conglomeratic greywacke or cobble conglomerate with lesser sandstone and minor mudstone
 - Eca Mudstone with tuffaceous horizons
 - Ecv Fine indurated acid tuffs and tuffaceous siltstones present mainly as 'cherts'
 - Ecm Medium grained rhyolitic to rhyodacitic tuffs with lesser lavas. Includes mudstones and sandstones in some areas
 - Ecr Coarse rhyolitic to rhyodacitic lavas and tuffs with some interbedded mudstones and sandstones
 - Ena Massive rhyolitic pyroclastics and granodioritic to rhyolitic intrusives
 - Ena Massive rhyolitic to rhyodacitic lavas and pyroclastics plus minor pyritic shale lenses
 - Nietta Group**
 - Ena Massive rhyolitic to rhyodacitic lavas and pyroclastics plus minor pyritic shale lenses



Note: Topography from Tasmania Topographic Series produced by Lands and Survey Department Hobart - 1963
ULVERSTONE 8115 - IV - 5

C. R. A. EXPLORATION PTY LIMITED
E.L. 19/72 "DIAL RANGE"
 NORTH WEST TASMANIA
ULVERSTONE
GEOLOGICAL GEOCHEMICAL PLAN
 GEOLOGIST: T.M. PORTER DATE: APRIL 1974 REPORT NO: 7572 PLAN NO: T842
 REFERENCE 1:250,000 SHEET BURNIE SK55-3

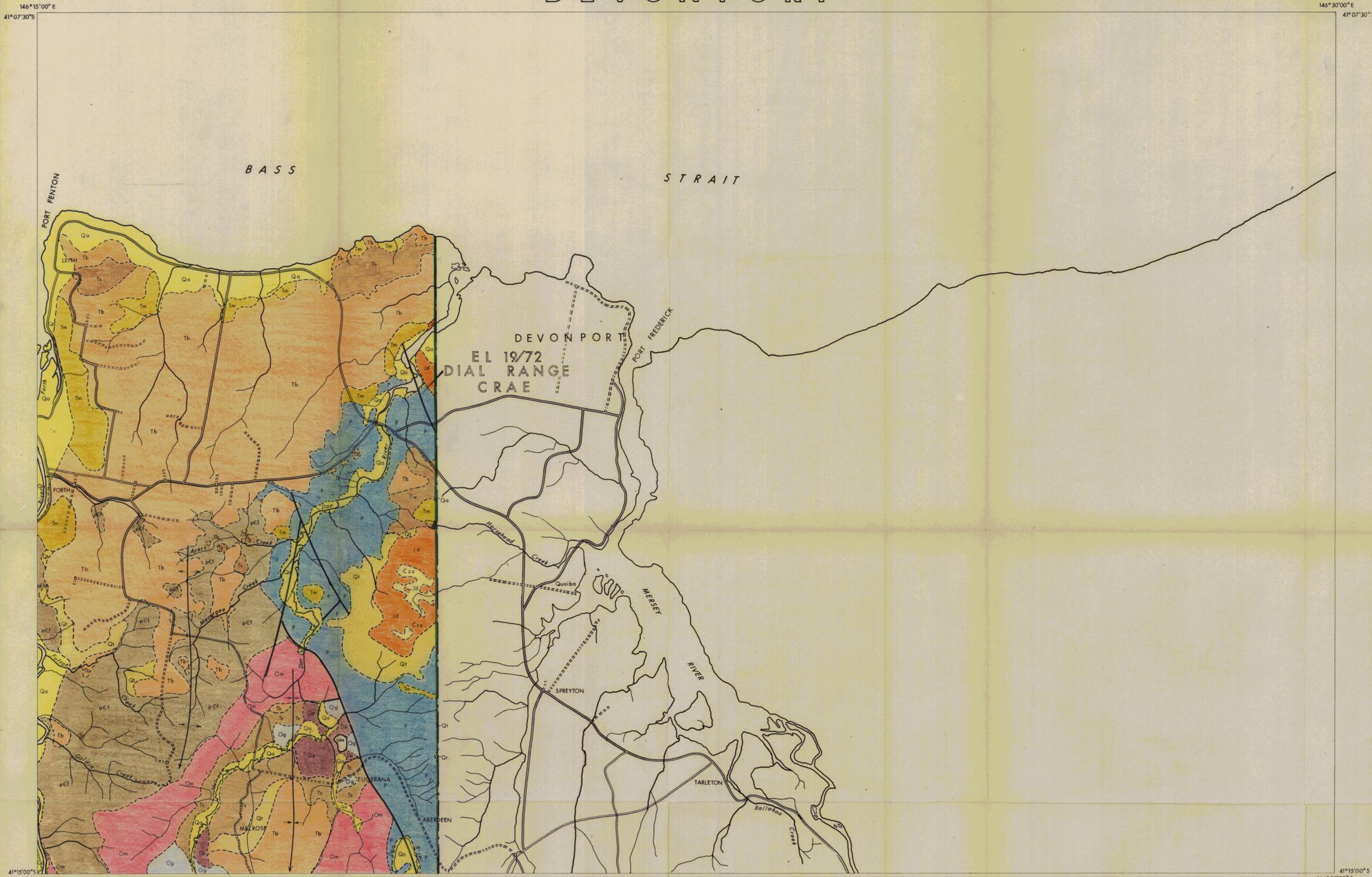


KEY TO ADJOINING SHEETS

BURNIE	PENGUIN
NATONE	ULVERSTONE
LOVETEA	CASTRA
LOONGANA	WILMOT
	PARADISE

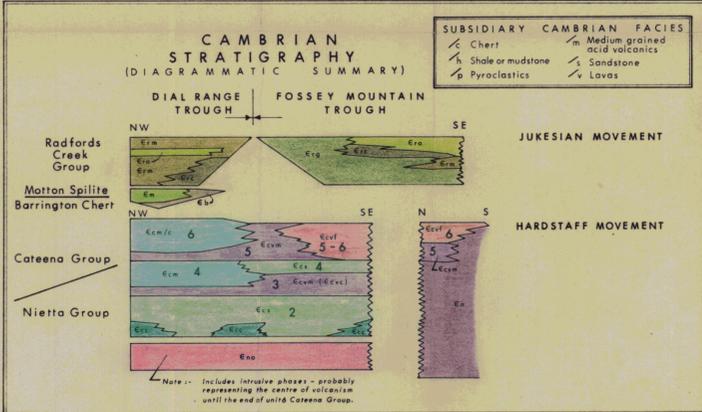


DEVONPORT

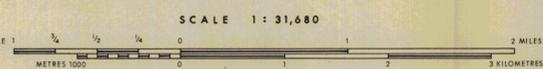


- ### LEGEND
- Quaternary
 - Qa Alluvium (includes beach deposits)
 - Qs Sand gravel and clay of older coastal deposits
 - Qt Talus (Qt/partially exposed bedrock)
 - Czs Sand, gravel and clay
 - Zm Zone of mass movement and talus Tw - Wesley Vale Sand
 - Tertiary
 - Tb Basalt flows
 - Ts Gravel sand and clay
 - Jurassic
 - Jd Dolerite sills and dykes
 - Permian
 - P Mudstone, sandstone, conglomerate and coal measures
 - Devonian
 - De Eugena Beds - terrestrial sediments and cave fill
 - Silurian
 - Se Eldon group sandstone, shale and mudstone
 - Ordovician
 - Og Gordon Limestone
 - Om Maina Sandstone
 - Or Roland Conglomerate
 - Cambrian
 - Es Serpentinite
 - Proterozoic
 - peb Burnie Beds - slates and quartzites
 - pev Ulverstone metamorphics - conglomerate schistose quartzite and quartz-sericite schist
 - pef Forth Metamorphics - Quartzite, garnet schist and amphibolite

- ### CAMBRIAN FACIES
- Radfords Creek Group
 - Era Intermediate volcanics - andesite and dacite
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 - Eic Conglomeratic greywacke with lesser feldspathic sandstone and mudstone
 - Motton Spillite
 - Em Spillite with some intercalated mudstone and chert
 - Barrington Chert
 - Eb Well bedded black or white chert
 - Cateena Group
 - Ecm Mudstone with lesser feldspathic sandstone and minor conglomerate
 - Ecs Feldspathic sandstone with lesser conglomerate and mudstone
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 - Ecd Mudstone with tuffaceous horizons
 - Ecvf Fine indurated acid tuffs and tuffaceous siltstones present mainly as 'cherts'
 - Ecvm Medium grained rhyolitic to rhyodacitic tuffs with lesser lavas. Includes mudstones and sandstones in some areas
 - Ecvc Coarse rhyolitic to rhyodacitic lavas and tuffs with some interbedded mudstones and sandstones
 - Ena Massive rhyolitic pyroclastics and granodioritic to rhyolitic intrusives
 - Nietta Group
 - En Massive rhyolitic to rhyodacitic lavas and pyroclastics plus minor pyritic shale lenses



- ### REFERENCE
- Geological boundary
 - Fault
 - Fault concealed
 - Synclinal axis - earlier - later
 - Anticlinal axis - earlier - later
 - Dip & strike of bedding
 - Cateena Group Unit number
 - Road
 - Track
 - Railway
 - River or stream
 - Boundary of original EL 19/72
 - Portion of EL retained upon reduction
 - Geochemical drainage sample location
 - Sample number
 - Pb in ppm
 - Zn in ppm
 - Cu in ppm



Note - Topography from Tasmania Topographic Series produced by Lands and Survey Department Hobart - 1963
DEVONPORT 8.115 - 1-5

C. R. A. EXPLORATION PTY LIMITED
E.L. 19/72 "DIAL RANGE"
NORTH WEST TASMANIA
DEVONPORT
GEOLOGICAL GEOCHEMICAL PLAN

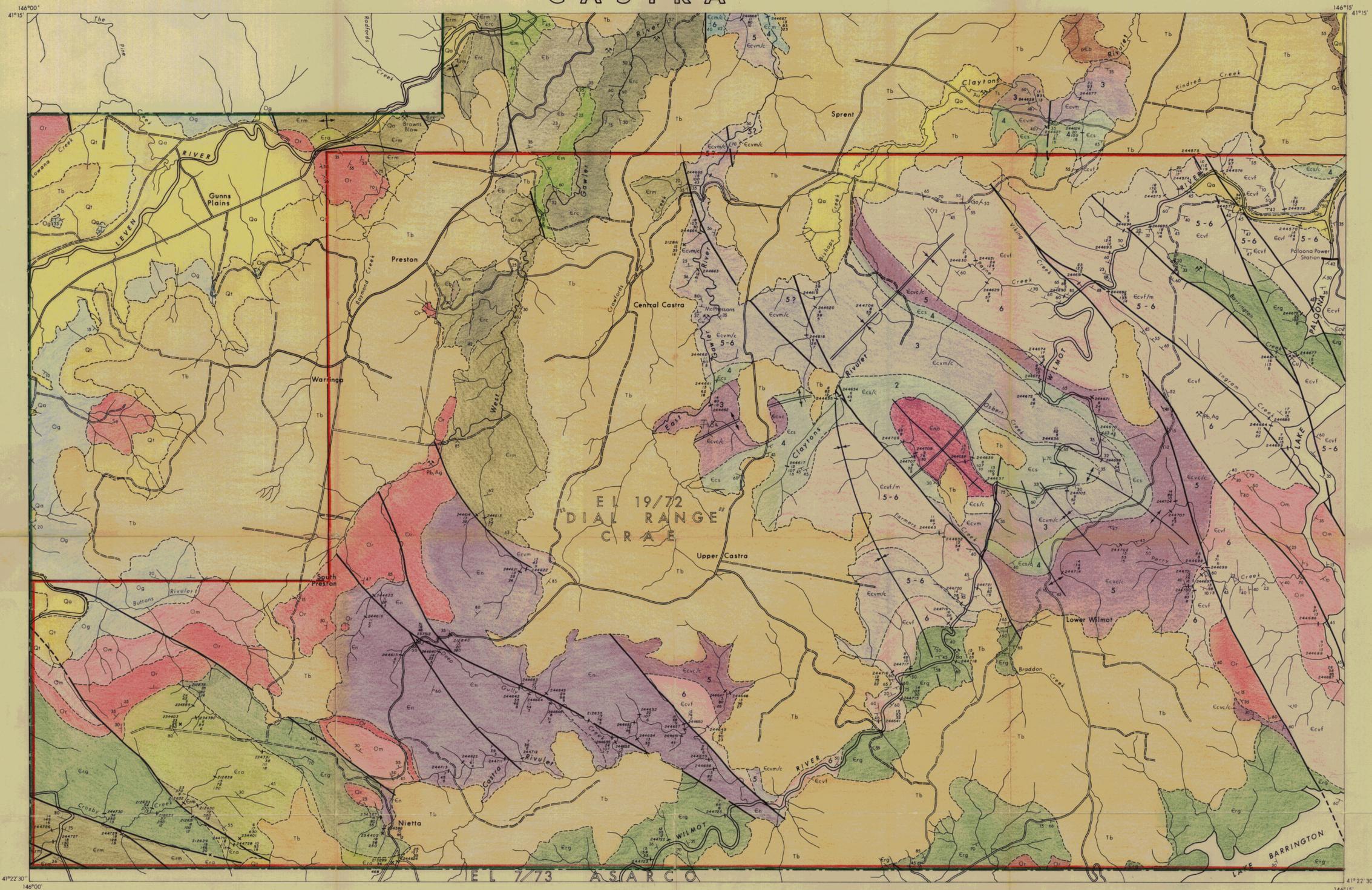
GEOLOGIST: T.M. PORTER DATE: APRIL, 1974 REPORT NO: 7572 PLAN NO: T 843
REFERENCE 1:250,000 SHEET BURNIE SK55-3

BURNIE	PENGUIN	
NATONE	ULVERSTONE	DEVONPORT
LOYTEA	CASTRA	RAILTON
LOONGANA	WILMOT	PARADISE

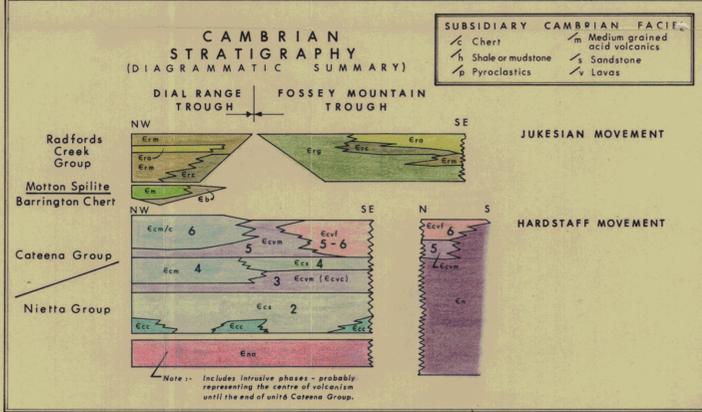
KEY TO ADJOINING SHEETS



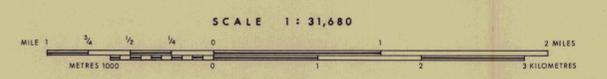
CASTRA



- ### LEGEND
- Quaternary**
 - Qa Alluvium (includes beach deposits)
 - Qs Sand gravel and clay of older coastal deposits
 - Qt Talus (Qt/partially exposed bedrock)
 - Tertiary**
 - Tm Zone of mass movement and talus
 - Tb Basalt flows
 - Ts Gravel sand and clay
 - Jurassic**
 - Jd Dolerite sills and dykes
 - Permian**
 - P Mudstone, sandstone, conglomerate and coal measures
 - Devonian**
 - De Eugena Beds - terrestrial sediments and cave fill
 - Silurian**
 - Se Eldon group sandstone, shale and mudstone
 - Ordovician**
 - Og Gordon Limestone
 - Om Maina Sandstone
 - Or Roland Conglomerate
 - Cambrian**
 - See 'Cambrian Facies' table
 - Proterozoic**
 - Ec Serpentinite
 - peB Burnie Beds - slates and quartzites
 - peU Ulverstone metamorphics - conglomerate schistose quartzite and quartz-sericite schist
 - peF Forth Metamorphics - Quartzite, garnet-schist and amphibolite
-
- ### CAMBRIAN FACIES
- Radfords Creek Group**
 - Era Intermediate volcanics - andesite and dacite
 - Erm Mudstone and siltstone - with lesser feldspathic sandstone plus minor conglomerate
 - Erg Feldspathic sandstone with lesser mudstone and conglomeratic greywacke. Includes some tuffaceous beds
 - Erc Conglomeratic greywacke with lesser feldspathic sandstone and mudstone
 - Motton Spillite**
 - Em Spillite with some intercalated mudstone and chert
 - Barrington Chert**
 - Eb Well bedded black or white chert
 - Cateena Group**
 - Ecm Mudstone with lesser feldspathic sandstone and minor conglomerate
 - Ecs Feldspathic sandstone with lesser conglomerate and mudstone
 - Ecc Mudstone conglomerate, conglomeratic greywacke or cobble conglomerate with lesser sandstone and minor mudstone
 - Ecd Mudstone with tuffaceous horizons
 - Ecv Fine indurated acid tuffs and tuffaceous siltstones present mainly as 'cherts'
 - Ecm Medium grained rhyolitic to rhyodacitic tufts with lesser lavas. Includes mudstones and sandstones in some areas
 - Ecv Coarse rhyolitic to rhyodacitic lavas and tufts with some interbedded mudstones and sandstones
 - Nietta Group**
 - Ena Massive rhyolitic pyroclastics and granodioritic to rhyolitic intrusives
 - En Massive rhyolitic to rhyodacitic lavas and pyroclastics plus minor pyritic shale lenses



- ### REFERENCE
- Geological boundary
 - Fault
 - Faults concealed
 - Synclinal axis - earlier - later
 - Anticlinal axis - earlier - later
 - Dip & strike of bedding
 - Cateena Group Unit number
 - Road
 - Track
 - Railway
 - River or stream
 - Boundary of original EL 19/72
 - Geochemical drainage sample location
 - Sample number
 - Pb in ppm
 - Zn in ppm
 - Cu in ppm



Note: Topography from Tasmania Topographic Series produced by Lands and Survey Department Hobart - 1963
 CASTRA 8115 - III - N

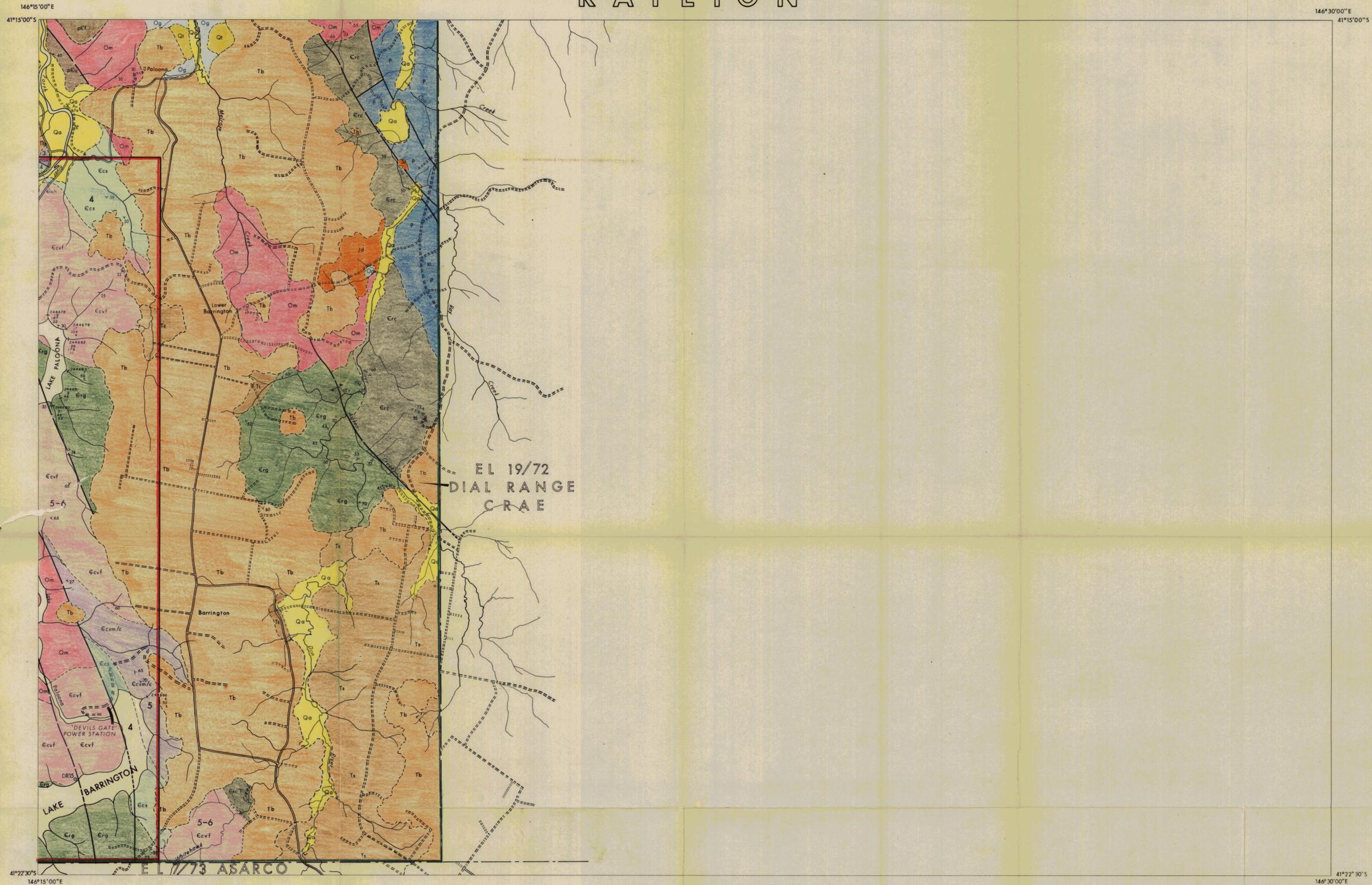
C. R. A. EXPLORATION PTY LIMITED
E.L. 19/72 "DIAL RANGE"
 NORTH WEST TASMANIA
CASTRA
GEOLOGICAL GEOCHEMICAL PLAN
 GEOLOGIST: T.M. PORTER DATE: APRIL, 1974 REPORT NO: 7572 PLAN NO: T844
 REFERENCE 1:250,000 SHEET BURNIE SK55-3

BURNIE	PENGUN	
NATONE	ULVERSTONE	DEVONPORT
LOYTEA	CASTRA	RAILTON
LOONGANA	WILMOT	PARADISE

KEY TO ADJOINING SHEETS



RAILTON

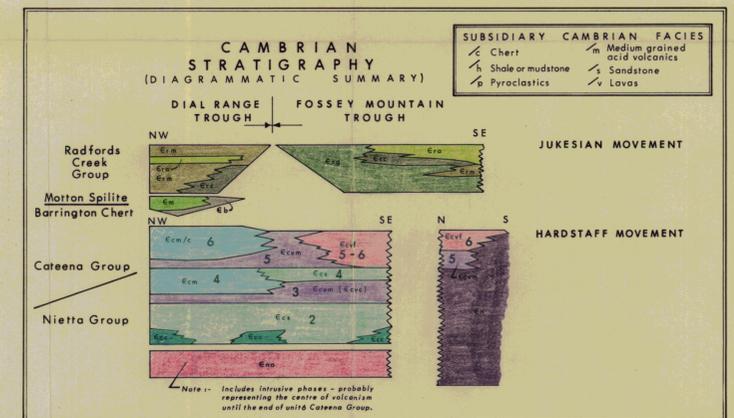


LEGEND

- Quaternary**
 - Qa Alluvium (includes beach deposits)
 - Qs Sand gravel and clay of older coastal deposits
 - Qr Talus (Qr/partially exposed bedrock)
- Tertiary**
 - Tm Zone of mass movement and talus
 - Tb Basalt flows
 - Ts Gravel sand and clay
- Jurassic**
 - Jd Dolerite sills and dykes
- Permian**
 - P Mudstone, sandstone, conglomerate and coal measures
- Devonian**
 - De Eugena Beds - terrestrial sediments and cave fill
- Silurian**
 - Se Eldon group sandstone, shale and mudstone
- Ordovician**
 - Og Gordon Limestone
 - Om Moira Sandstone
 - Or Roland Conglomerate
- Cambrian**
See "Cambrian Facies" table
- Proterozoic**
 - PEs Serpentinite
 - PEB Burnie Beds - slates and quartzites
 - PEU Ulverstone metamorphics - conglomerate schistose quartzite and quartz-sericite schist
 - PEF Forth Metamorphics - Quartzite, garnet schist and amphibolite

CAMBRIAN FACIES

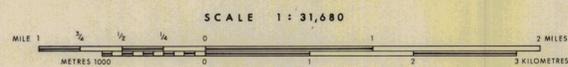
- Radfords Creek Group**
 - Erg Intermediate volcanics - andesite and dacite
 - Emc Mudstone and siltstone - with lesser feldspathic sandstone plus minor conglomerate
 - Ergc Feldspathic sandstone with lesser mudstone and conglomeratic greywacke. Includes some tuffaceous beds
 - Erc Conglomeratic greywacke with lesser feldspathic sandstone and mudstone
- Motton Spillite**
 - Em Spillite with some intercalated mudstone and chert
- Barrington Chert**
 - Eb Well bedded black or white chert
 - Ecm Mudstone with lesser feldspathic sandstone and minor conglomerate
 - Ecv Feldspathic sandstone with lesser conglomerate and mudstone
 - Ecc Mudstone conglomerate, conglomeratic greywacke or cobble conglomerate with lesser sandstone and minor mudstone
- Cateena Group**
 - Ecl Mudstone with tuffaceous horizons
 - Ecvf Fine indurated acid tuffs and tuffaceous siltstones present mainly as 'cherts'
 - Ecm Medium grained rhyolitic to rhyodacitic tuffs with lesser lavas. Includes mudstones and sandstones in some areas
 - Ecv Coarse rhyolitic to rhyodacitic lavas and tuffs with some interbedded mudstones and sandstones
- Nietta Group**
 - Ena Massive rhyolitic pyroclastics and granodioritic to rhyolitic intrusives
 - Ecp Massive rhyolitic to rhyodacitic lavas and pyroclastics plus minor pyritic shale lenses



REFERENCE

- Geological boundary
- - - Fault
- - - Fault concealed
- - - Synclinal axis - earlier, later
- - - Anticlinal axis - earlier, later
- - - Dip & strike of bedding
- - - Cateena Group Unit number
- == Road
- Track
- Railway
- River or stream
- Boundary of original EL19/72
- Portion of EL retained upon reduction
- Geochemical drainage sample location
- Sample number
- 244509 Pb in ppm
- 68 Zn in ppm
- 40 Cu in ppm

617043

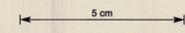


Note: Topography from Tasmania Topographic Series produced by Lands and Survey Department Hobart - 1963
RAILTON 8115 - II-N

C. R. A. EXPLORATION PTY LIMITED
E.L.19/72 "DIAL RANGE"
 NORTH WEST TASMANIA
RAILTON
GEOLOGICAL GEOCHEMICAL PLAN

GEOLOGIST: T.M. PORTER DATE: APRIL, 1974 REPORT NO: 7572 PLAN NO: T845

REFERENCE 1:250,000 SHEET BURNIE SK55-3



BURNIE	PENGUIN	
NATONE	ULVERSTONE	DEVONPORT
LOYETEA	CASTRA	RAILTON
LOONGANA	WILMOT	PARADISE

KEY TO ADJOINING SHEETS

PLAN No: T845

3674

LINE 2

Sample No.	Pb	Zn	Cu
234316	27	112	14
17	27	97	16
18	35	123	28
19	25	152	18
234320	24	95	11
21	15	190	13
22	29	157	10
23	24	131	13
24	20	162	7
25	17	179	7
26	13	68	4
27	13	104	3
28	13	86	3
29	11	121	1
234330	12	72	2
31	10	54	2
32	10	92	2
33	10	77	2
34	15	148	3
35	13	61	2
36	13	75	3
37	12	74	3
38	13	60	2
39	14	131	3
234340	11	92	2
41	13	89	3
42	15	94	3
43	13	68	3
44	14	78	3
45	13	53	2
46	13	57	3
47	10	45	3
48	15	29	5
49	13	65	7
234350	15	88	5
51	430	58	8
52	310	120	25
53	480	41	19
54	120	29	14
55	54	15	18
56	42	16	11
57	20	16	9
58	17	18	13
59	8	14	6
234360	15	15	8
61	20	21	10
62	57	53	39
63	40	40	18
64	42	78	35
65	62	137	56

Sample No.	Pb	Zn	Cu
66	51	105	66
67	160	210	91
68	37	88	31
69	26	44	16
234370	15	28	12
71	17	38	16
72	32	39	14
73	51	62	23
74	45	87	25
75	37	77	26
76	30	94	22
77	36	100	19
78	30	88	17
79	24	87	20
234380	44	90	26
81	20	60	16
82	20	68	16
83	17	59	19
84	13	50	20
85	15	52	18
86	32	90	33

LINE 4

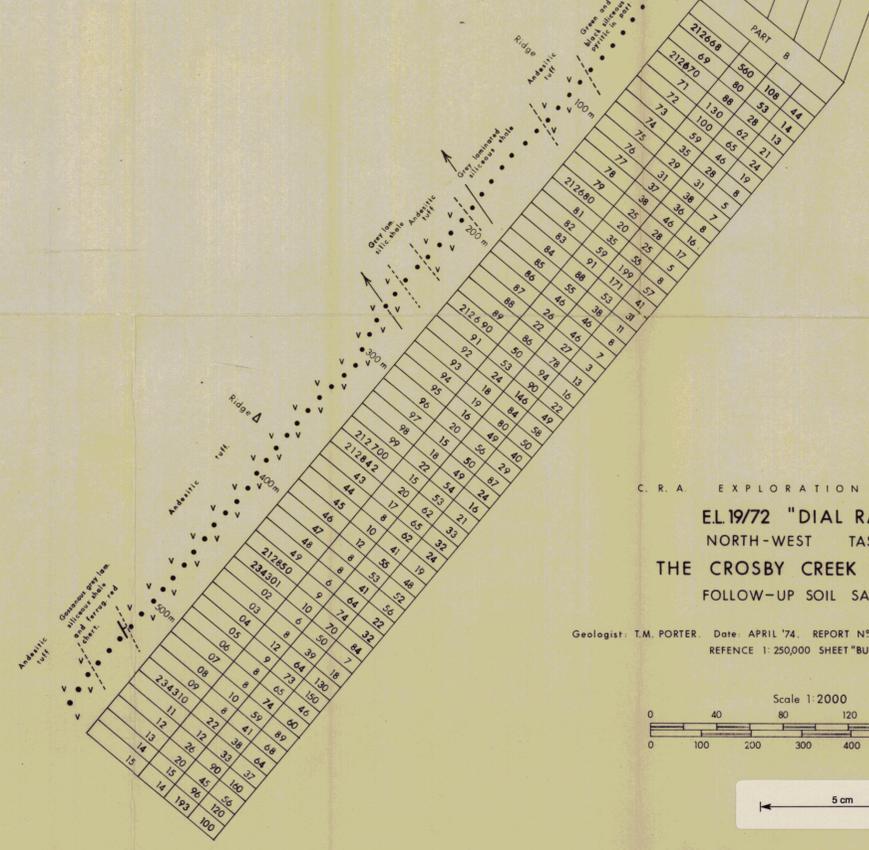
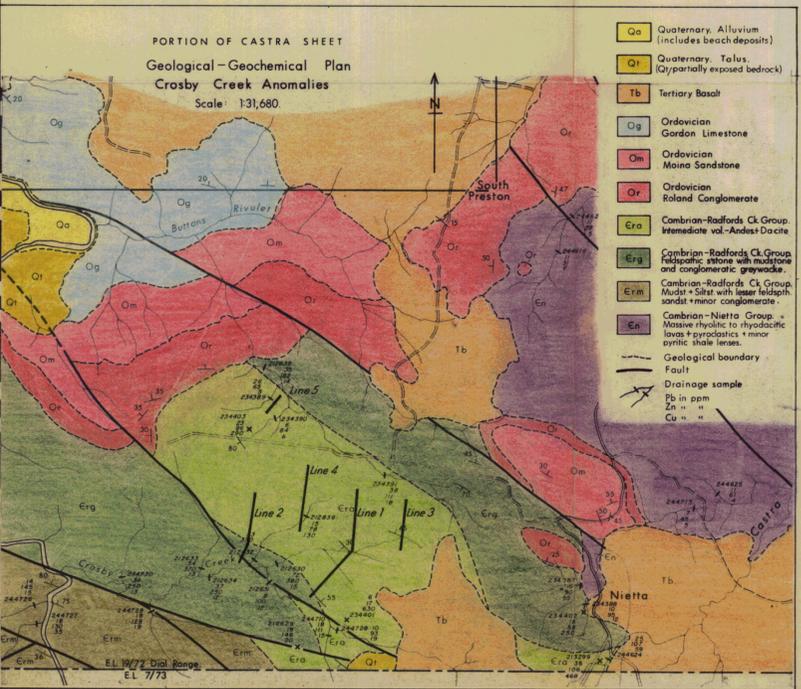
Sample No.	Pb	Zn	Cu
234226	78	109	24
25	100	117	78
24	100	112	78
23	75	83	65
22	62	54	40
21	61	59	40
234220	86	75	63
19	89	67	61
18	92	59	48
17	120	93	59
234216	150	131	78
234460	140	118	78
61	160	136	95
62	440	210	150
63	1210	450	200
64	260	260	120
65	110	250	87
66	65	193	32
67	58	151	19
68	42	151	22
69	43	128	22
234470	33	107	29
71	27	81	41
72	92	87	65
73	63	106	44
74	120	104	57
75	330	162	130
76	170	280	140
77	220	240	130
78	110	260	69
79	110	158	87
234480	120	167	53
81	110	170	48
82	110	170	29
83	110	162	29
84	170	310	22
85	58	167	18
86	140	220	25
87	150	370	26
88	110	155	21
89	170	220	25
234490	130	200	24
91	90	270	8
92	72	148	14
93	75	183	13
94	66	300	10
95	40	220	7
96	170	250	24
97	240	127	28
98	200	87	30
99	140	67	25
234500	130	100	22
234201	120	70	28
02	69	72	21
03	68	102	26
04	120	191	34
05	120	250	26
06	90	350	18
07	130	430	29
08	66	111	21
09	68	78	24
234210	84	92	32
11	69	39	16
12	26	37	17
13	60	44	20
14	49	84	12
15	38	64	12

LINE 1

PART B			
Sample No.	Pb	Zn	Cu
234251	86	188	130
52	89	195	74
58	80	182	58
54	80	194	59
55	96	240	62
56	130	350	160
57	430	200	150
58	250	166	130
59	160	200	170
234260	46	135	200
61	51	155	200
62	130	260	140
63	470	150	120
64	140	330	140
65	130	210	120
66	200	280	88
67	48	124	62
68	51	134	15
69	56	146	10
234270	67	150	10
71	62	153	11
72	59	149	10
73	54	162	14
74	57	161	15
75	58	168	14
76	42	131	13
77	19	220	25
78	20	210	76
79	30	92	61
234280	51	126	56
81	15	195	41
82	24	198	46
83	27	174	48
84	30	210	38
85	54	184	48
86	14	155	35
87	10	127	32
88	13	113	5
89	17	143	11
234290	15	115	8
91	83	148	16
92	36	77	4
93	66	110	4
94	58	78	2
95	57	41	2
96	48	73	2
97	60	104	3
98	62	135	9
99	90	127	17
234300	37	73	4
212653	48	80	7
54	60	107	9
55	61	146	20
56	37	260	13
57	40	280	20
58	32	182	16
59	13	177	4
212660	20	220	11
61	81	280	12
62	30	310	8
63	40	330	13
64	30	310	9
65	22	240	8
66	57	330	22
67	81	94	13

LINE 3

Sample No.	Pb	Zn	Cu
234459	110	148	78
58	110	142	75
57	90	96	55
56	140	146	82
55	110	136	80
54	110	142	71
234453	120	132	78
234392	110	140	73
93	130	142	78
94	130	138	78
95	150	162	89
96	150	158	90
97	130	146	71
98	110	153	63
99	100	144	71
234400	120	100	65
234404	170	93	55
05	170	112	23
06	140	72	17
07	180	93	34
08	240	140	37
09	550	149	85
234410	600	200	140
11	830	600	480
12	100	172	170
13	490	188	220
14	310	440	180
15	87	280	82
16	180	280	130
17	210	230	230
18	120	210	20
19	90	185	67
234420	16	177	97
21	140	240	50
22	66	250	110
23	78	250	140
24	47	180	33
25	80	220	80
26	61	186	73
27	49	230	50
28	230	270	130
29	270	290	150
234430	300	310	160
31	34	140	47
32	14	148	44
33	61	230	33
34	57	167	71
35	120	290	55
36	61	165	67
37	110	196	73
38	110	170	87
39	180	230	69
234440	72	136	71
41	86	123	75
42	58	129	71
43	74	140	87
44	87	188	150
45	870	280	230
46	380	230	160
47	290	610	230
48	260	210	190
49	160	167	130
234450	180	165	130
51	140	157	100
52	120	130	89



C. R. A. EXPLORATION P.T.Y. LTD.
EL19/72 "DIAL RANGE"
NORTH-WEST TASMANIA
THE CROSBY CREEK ANOMALIES
FOLLOW-UP SOIL SAMPLING

Geologist: T.M. PORTER Date: APRIL '74. REPORT N° 7572 PLAN N° T 846.
REFERENCE 1:250,000 SHEET "BURNIE" SK 55-3