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GEOCHEMICAL DRAINAGE SURVEY

OF THE

HEEMSKIRK AREA, E.L./7/68 (TASMANIA)

TO DECEMBER 31, 1968

MICROFILMED

by

GEOPHOTO RESOURCES CONSULTANTS,

BRISBANE, QUEENSLAND, AUSTRALIA

DECEMBER, 1968

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M E M O

TO : R.H. BARTON

FROM : J.H. RATTIGAN

February 13, 1969.

Attached is a summary of drainage geochemical results received from Heemskirk till December 31.

This work will be continued by follow up and increased density when the demands of line cutting, geophysics and Cobra drilling are reduced.

Rock geochemical testing of selected areas by Cobra drill, and by supporting University of Tasmania post graduate students in their own researches in the area, are proposed following completion of the drainage survey. Residual soil testing - except perhaps the "top bedrock" horizon offers little promise because of extreme leaching in granite areas.

J.H. RATTIGAN.

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CONTENTS

CONTENTS

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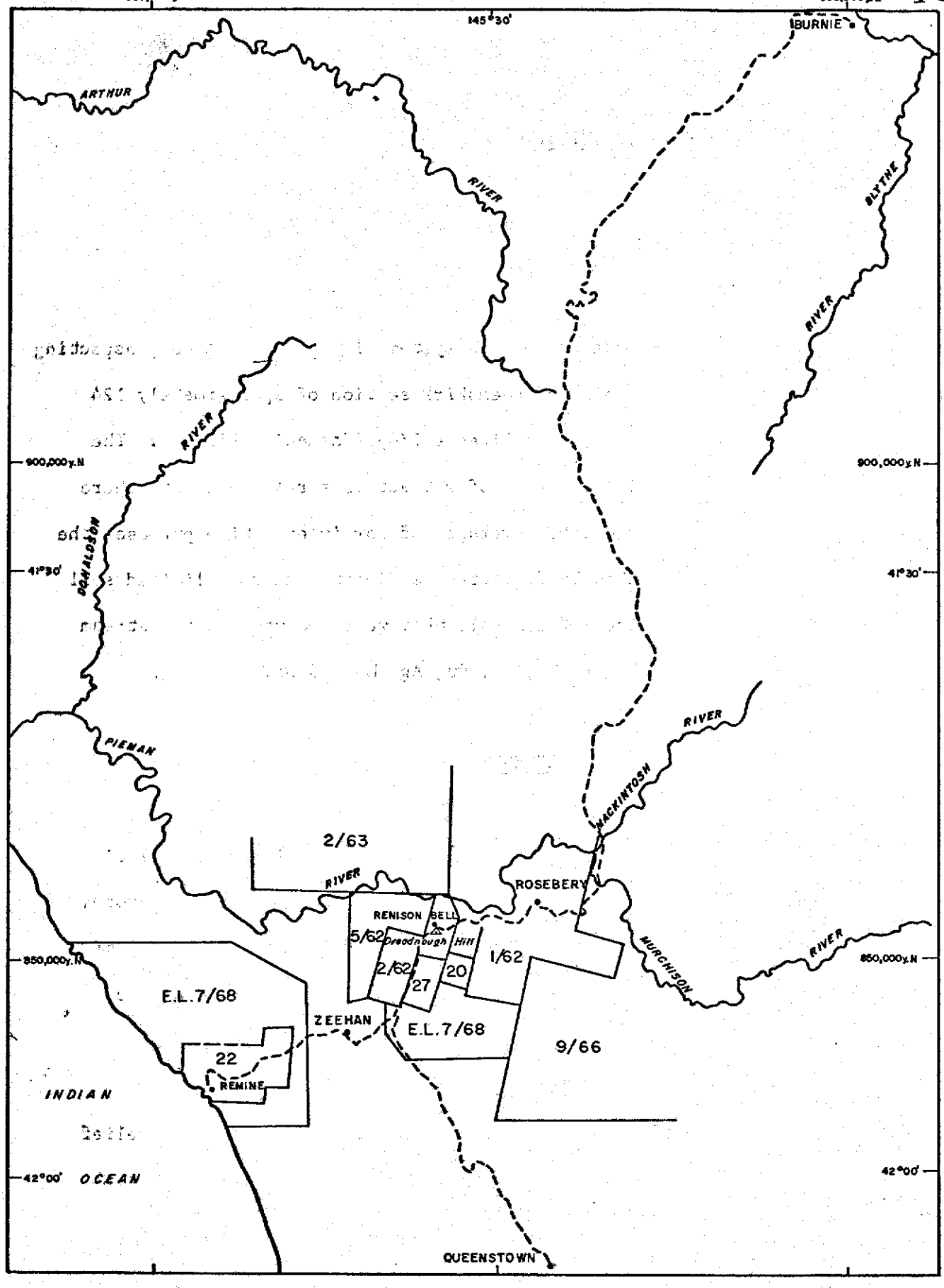

Plate I.

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INTRODUCTION

PURPOSE

The survey was undertaken as a systematic reconnaissance prospecting program for base metals within the Heemskirk section of approximately 124 square miles held under Exploration Licence 7/68 (Tasmania) Plate 1. The method employed was a drainage survey of wet active stream sediments where these existed. For more complete coverage and for interpretive purposes the wet samples were supplemented by dry stream sediments and some limited soil and rock geochemical testing. The metals that were analysed in the stream sediment and other samples were Pb, Zn, Cu, Ag, Mo and Bi.

THE PERMIT AREA - SITUATION AND ACCESS

The Heemskirk section of the permit (Plate 1) is an irregularly shaped area designed to encompass the Heemskirk pluton and a contact zone. The township of Zeehan lies 11 miles southeast of the eastern boundary of this section of the permit area, has road and rail access to the port of Burnie and provides normal services for field operations.

The terrain of E.L./7/68 is moderately rugged, ranging in relief from sea level to about 2,769 A.S.L. (Mt Agnew). The higher prominences

are granite forming the Heemskirk Range. A Tertiary surface, elevated and partly disrupted may be observed flanking the granitic high country.

Rainfall is high averaging 97 inches per annum, and is well distributed throughout the year with incidence least in January and February and greatest in July and August.

No sealed roads exist within the area nor is there any regular grid of roads, Access is by poorly graded secondary roads circumscribing the Heemskirk Range. Most of the slopes, ridges and flats can only be reached by four wheel drive vehicle, by motor cycle, horse or on foot. Access between the extremities of the area involves considerable travelling because of the absence of through routes.

GENERAL GEOLOGY

An outline of the geology of the area is presented in the explanatory report of Blissett (1962). In summary the region surveyed lies in the Zeehan 1:50,000 Quadrangle Queenstown 1:250,000 map sheet area. There are many published geological records relating to the area but many are repetitive and include little new contributions or are detailed on specialised aspects.

The oldest rocks of the area is the Oonah Quartzite and Slate, a

thick Pre Cambrian unit containing highly folded and fractured, interlayered quartzite and dark, pyritic slates. This unit is intruded by basic intrusives of Cambrian age and succeeded by a Lower to Middle Palaeozoic succession of the Dundas (Cambrian), Junee (Ordovician), and Eldon (Siluro-Devonian) Groups none of which units have any important distribution within the permit area.

High-level, Devonian granitic intrusives comprise the Heemskirk Granite, a complex body of acid adamellites and granites, with altered greisenized and mineralised zones.

A Jurassic dolerite sheet crops out to the northeast of the Permit. A Tertiary terrestrial and marine sediments partly with basalt cover, and Quaternary superficial deposits are prominent on the northern margin of the Heemskirk pluton.

GEOCHEMISTRY

ORIENTATION

Some preliminary orientation surveys on soils and stream sediments were made in West Tasmania both inside and without the permit area and these will be reported on in a final report when additional sampling and geochemical follow up work is completed. This orientation was designed

1. To determine a practical and economic sampling technique.
2. To derive a field preparation technique.

3. To decide the most suitable size fraction for analysis.

4. To determine the extent of anomalous dispersion trains about a known mineralised outcrop.

5. To determine the trace metal content of fresh rocks, weathered rocks, mineralised rocks and soils as the basis for interpretation of drainage data.

ROUTINE SURVEY

Wet and dry stream sediments weighing approximately 2 lbs were collected with plastic utensils. Care was taken in the case of wet samples to retain the greatest possible proportion of fines by using small-mouthed, plastic cylinders and plunging these into subaqueous mud-banks subject to active sedimentation.

Where streams had ceased to flow dry samples were collected from the most recently active sediment. All samples were dried at 110° C. They were sieved to give several of the fractions at the following approximate mesh sizings in plastic or stainless steel sieving materials.

1. + 20 mesh - rejected
2. - 20 mesh - sent for analysis for Mo and Bi
3. - 80 mesh - sent for analysis for Cu, Pb, Zn and Ag.

The analyses were carried out by routine methods of Atomic

Absorption spectrometry after acid extraction for Pb, Zn, Cu, Ag, Mo and Bi as set out in Sampey Exploration Services information circulars. The methods were those that could also be used in the rapid, systematic routine processing of large batches of samples and no extremes of sensitivity or special methods of analysis were sought in orientation of samples that could not be applied in a rapid exploration survey. The aim in sampling and analysis was to obtain consistent and reproducible results that could indicate target areas of anomalous mineralisation in routine exploration. Extreme sensitivity in analysis is not necessary for this purpose and can in fact be confusing as sampling practice and treatment does not justify this.

Included in samples sent for analysis during the preliminary orientation were replicate samples and when the problems of operational routine are considered, the results are reasonably comparable.

RESULTS

Average values for stream sediments of different provenance are shown on Table 2. The values for different rock types provide orientation data in that they give a measure of average background; those for mineralised granite refer to altered granite areas with disseminated sulphide replacements taken at Heemskirk and give an idea of levels of significance with respect to mineralisation. A threshhold for granite may lie somewhere between average background for granite and the values for mineralised areas in Table 2.

PROVENANCE

Oonah Quartzites and Slates

These show extremely low values for Cu, Pb, Zn, Silver and Bi compared with other rock units. No anomalies were found but it is probable that epigenetic sulphides localised in these rocks would present easily detectable anomalies.

Granites

Any values of metals significantly above those for unmineralised granite areas should by virtue of the values recorded for mineralised granite be detectable in drainage surveys.

Anomalies in Granite

While no strong anomalies were recorded in granitic areas, follow up of weak to moderate anomalies at A135 and A148 (Cu, Pb, Zn.), A58 (Pb-Zn) and A26 (Cu, Pb) is warranted. A stronger Pb-Zn anomaly is at A106.

A high molybdenum spot (50 ppm) occurs atA10 with weaker anomalous value to the northeast at A8 and A9. Moderate values (to 20 ppm) for Mo from

A16 to A20 inclusive should be followed up. Values for Bi above 30 ppm are worth checking in granite only. In Dolerite and basalt provenance Bi has a high background value. A wide area about A106 has weak to moderate Bi values. A67 (70 ppm) is a high Bi spot but has not been placed accurately on the field plans by the field party. A125 and A130 (50 ppm Bi) and areas about A146 deserve recheck.

Basalt

Shows a much higher background for Cu, Pb, Zn, Silver and Bi than other rocks and values in sediments of this provenance must be considered with this fact in view.

Dolerite

As with basalt Cu, Pb and Bi have higher background than in unmineralised granite and sedimentary units.

Cainozoic

Values in Cainozoic sediments differ little from those of Oonah Quartzite and Slates. Background for all metals tested is low.

RECOMMENDATIONS

1. Anomalous areas in granite should be followed up to check out recorded values and detail in the whole drainage pattern prior to testing of bedrock on the interfluves by rock geochemistry. Shallow emplaced

mineralised areas should show detectable stream sediment dispersion strains. Soils are strongly leached in this high rainfall area and would not provide good media for testing.

2. Areas south of A169 and south of A106 demand closer spaced coverage of stream samples and this work should be put in hand in 1969.

DR. J.H. RATTIGAN.

REFERENCES

Blissett, H. 1962, Explanatory Notes to Zeehan 1:63,360 sheet Tas. Dept. of Mines.

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TABLE 1

Trace values for metals in Stream Sediments, Heemskirk, Tasmania.

SAMPLE	CU	PB	ZN	AG	BI	MO
A 1	25	65	40	1	20	10
A 2	10	20	35	BLD	20	10
A 3	5	10	5	BLD	20	10
A 4	55	10	5	BLD	20	10
A 5	5	15	5	BLD	20	10
A 6	15	15	5	BLD	20	15
A 7	5	20	5	BLD	30	15
A 8	5	10	5	BLD	20	10
A 9	5	10	5	BLD	10	15
A 10	5	15	5	BLD	10	50
A 11	BLD	10	5	BLD	10	15
A 12	5	15	5	BLD	10	15
A 13	25	35	5	BLD	20	15
A 14	25	15	45	BLD	10	20
A 15	5	15	10	BLD	20	20
A 16	5	15	20	BLD	20	20
A 17	5	15	10	BLD	20	15
A 18	20	15	5	BLD	30	20
A 19	10	15	10	BLD	20	20
A 20	5	15	20	BLD	10	20
A 21	5	15	10	BLD	10	15
A 22	5	15	10	BLD	BLD	10
A 23	5	20	5	BLD	BLD	10
A 24	15	20	5	BLD	30	10
A 26	10	45	5	BLD	20	10
A 27	5	30	20	BLD	10	10
~~A 27B~~	~~5~~	~~20~~	~~20~~	~~BLD~~	~~BLD~~	~~20~~
A 28	5	25	15	BLD	BLD	20
A 29	10	45	10	1	10	15
A 30	10	100	35	1	40	15
A 31	10	20	10	1	20	15
A 32	15	40	65	1	10	15
A 33	10	40	20	1	BLD	20
A 34	10	40	25	1	20	20
A 35	10	55	50	BLD	20	20
A 36	10	30	15	1	10	20
A 37A	10	15	10	BLD	10	20
A 38	10	15	10	BLD	10	20
A 39	10	100	200	BLD	40	20
A 40	30	800	900	7	30	20
A 41	10	30	20	BLD	20	BLD
A 42	5	20	15	BLD	10	10
A 43	5	15	15	BLD	10	10
A 44	5	15	30	BLD	20	10
A 45	5	20	15	BLD	20	10
A 46	5	20	10	BLD	20	10
A 47	5	15	10	BLD	20	10
A 49	10	20	10	BLD	30	10
A 50	BLD	15	5	BLD	20	BLD
~~A 50B~~	~~BLD~~	~~35~~	~~35~~	~~BLD~~	~~20~~	~~BLD~~
METHOD	101B	101B	101B	101B	102	MO2

Analysis by Atomic Absorption Spectrometry
BLD - Below level of detection

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SAMPLE	CU	PB	ZN	AG	BI	MO
A 51	BLD	30	5	BLD	20	BLD
A 52	BLD	15	5	BLD	20	BLD
A 53	BLD	15	5	BLD	20	BLD
A 54	BLD	15	10	BLD	20	BLD
A 55	BLD	15	5	BLD	10	BLD
A 56	BLD	20	5	BLD	20	BLD
A 57	BLD	15	5	BLD	20	BLD
A 58	BLD	50	25	BLD	20	BLD
A 59	5	80	45	BLD	20	BLD
A 60	5	30	5	BLD	10	BLD
A 61	10	145	310	1	20	BLD
A 62	5	25	15	1	20	BLD
A 63	BLD	20	10	BLD	10	BLD
A 64	BLD	20	20	BLD	5	BLD
A 65	BLD	15	15	BLD	10	BLD
A 65B	BLD	20	15	BLD	10	BLD
A 66	BLD	15	10	BLD	10	BLD
A 67	5	10	5	BLD	70	BLD
A 68	BLD	15	10	BLD	20	BLD
A 69	BLD	20	5	BLD	20	BLD
A 70	BLD	20	25	BLD	10	BLD
A 71	BLD	25	10	BLD	10	BLD
A 72	BLD	20	5	BLD	20	BLD
A 73	BLD	15	5	BLD	10	BLD
A 74	BLD	10	5	BLD	BLD	BLD
A 75	BLD	10	5	BLD	BLD	BLD
A 76	BLD	10	5	BLD	BLD	BLD
A 77	BLD	10	10	BLD	20	BLD
A 78	BLD	15	20	BLD	20	BLD
A 79	BLD	20	5	BLD	10	BLD
A 80	BLD	20	5	BLD	10	BLD
A 81	5	30	10	BLD	10	BLD
A 82	45	30	160	BLD	60	BLD
A 83	55	40	145	1	70	BLD
A 84	5	25	10	1	20	BLD
A 85	5	25	5	BLD	10	BLD
A 86	70	35	150	1	80	BLD
A 87	45	40	90	1	70	BLD
A 88	40	40	80	1	BLD	BLD
A 89	10	30	30	BLD	20	BLD
A 90	5	30	5	BLD	10	BLD
A 91	BLD	20	10	BLD	20	BLD
A 92	BLD	15	10	BLD	10	BLD
A 93	5	20	5	BLD	20	BLD
A 94	5	20	5	BLD	20	BLD
A 95	BLD	20	5	BLD	30	BLD
A 96	BLD	10	5	BLD	20	BLD
A 97	BLD	10	5	BLD	20	BLD
A 98	BLD	15	5	BLD	30	BLD
A 99	BLD	15	5	BLD	30	BLD
A 100	BLD	10	BLD	BLD	30	BLD
METHOD	101B	101B	101B	101B	102	M02

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SAMPLE	CU	PB	ZN	AG	BI	MO
A101	BLD	10	BLD	BLD	50	BLD
A102	BLD	10	5	BLD	50	BLD
A103	BLD	15	5	BLD	30	BLD
A104	BLD	18	15	BLD	40	BLD
A105	5	15	10	BLD	30	BLD
A106	5	180	180	BLD	30	BLD
A107	10	10	10	BLD	30	BLD
A108	BLD	10	5	BLD	30	BLD
A109	5	15	5	BLD	30	BLD
A110	5	20	30	BLD	50	BLD
A111	5	20	10	BLD	30	BLD
A112	5	15	10	BLD	50	BLD
A113	5	25	5	BLD	40	BLD
A114	5	10	20	BLD	70	BLD
A115	15	10	15	BLD	30	BLD
A116	5	10	10	BLD	30	BLD
A117	5	15	10	BLD	50	BLD
A118	5	20	5	BLD	50	BLD
A119	BLD	10	BLD	BLD	20	BLD
A120	BLD	10	BLD	BLD	40	BLD
A121	5	5	5	BLD	10	BLD
A122A	5	10	BLD	BLD	10	BLD
A122B	5	15	BLD	BLD	20	BLD
A124	5	15	5	BLD	30	BLD
A125	5	15	BLD	BLD	50	BLD
A126	5	15	10	BLD	30	BLD
A127	5	15	5	BLD	30	BLD
A128	5	15	5	BLD	20	BLD
A129	5	15	5	BLD	30	BLD
A130	5	10	BLD	BLD	50	BLD
A131	BLD	15	5	BLD	20	BLD
A132	5	15	BLD	BLD	20	BLD
A134	5	15	5	BLD	20	BLD
A135	15	55	40	BLD	20	BLD
A136	5	10	10	BLD	40	BLD
A137	5	10	BLD	BLD	20	BLD
A138	5	10	BLD	BLD	20	BLD
A139	5	10	5	BLD	10	BLD
A140	5	10	10	BLD	20	BLD
A141	5	10	5	BLD	40	BLD
A142	10	15	5	BLD	20	BLD
A143	10	10	BLD	BLD	10	BLD
A144	5	15	10	BLD	20	BLD
A145	10	15	BLD	BLD	30	BLD
A146	20	15	10	BLD	40	BLD
A147	15	15	15	BLD	40	BLD
A148	20	30	10	BLD	BLD	BLD
A149	20	10	BLD	BLD	40	BLD
METHOD	101B	101B	101B	101B	102	M02

017

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SAMPLE	CU	PB	ZN	AG	BI	MO
A150	BLD	15	15	BLD	10	BLD
A151	10	15	5	BLD	10	BLD
A152	5	15	5	BLD	40	BLD
A153A	BLD	15	5	BLD	30	BLD
A153B	BLD	20	30	BLD	30	BLD
A154	BLD	15	10	BLD	10	BLD
A155	BLD	15	5	BLD	20	BLD
A156	BLD	15	5	BLD	30	BLD
A157	BLD	15	BLD	BLD	20	BLD
A158	10	15	15	BLD	10	BLD
A159	10	20	20	BLD	20	BLD
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A169	BLD	20	15	BLD	30	BLD
A170	BLD	15	10	BLD	30	BLD
A171	BLD	15	10	BLD	30	BLD
A172	15	15	5	BLD	20	BLD
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A177	BLD	15	5	BLD	20	BLD
A178	BLD	15	5	BLD	30	BLD
A179	BLD	20	5	BLD	20	BLD
A180	BLD	20	10	BLD	40	BLD
A181	BLD	20	BLD	BLD	30	BLD
A182	BLD	15	10	BLD	40	BLD
METHOD	101B	101B	101B	101B	102	M02

Table 2

Mean Trace Metal Values for Stream Sediments of Different Provenance.

Provenance of Stream Sediment	No. in Sample	Cu	Pb	Zn	Ag	Bi	Mo
Oonah Quartzite and Slates	20	<5	15	5	x	10	x
Unmineralised Granite	40	15	15	10	<1	20	x
Mineralised Granite	3	20	330	400	3	40	20
Dolerite	2	20	40	20	<1	25	10
Basalt	3	50	40	115	1	55	x
Cainozoic sediments	5	<5	15	5	<1	20	x

Values in p.p.m.

Levels of determination

Cu 5
Pb 5
Zn 5
Ag 1
Bi 10
Mo 10

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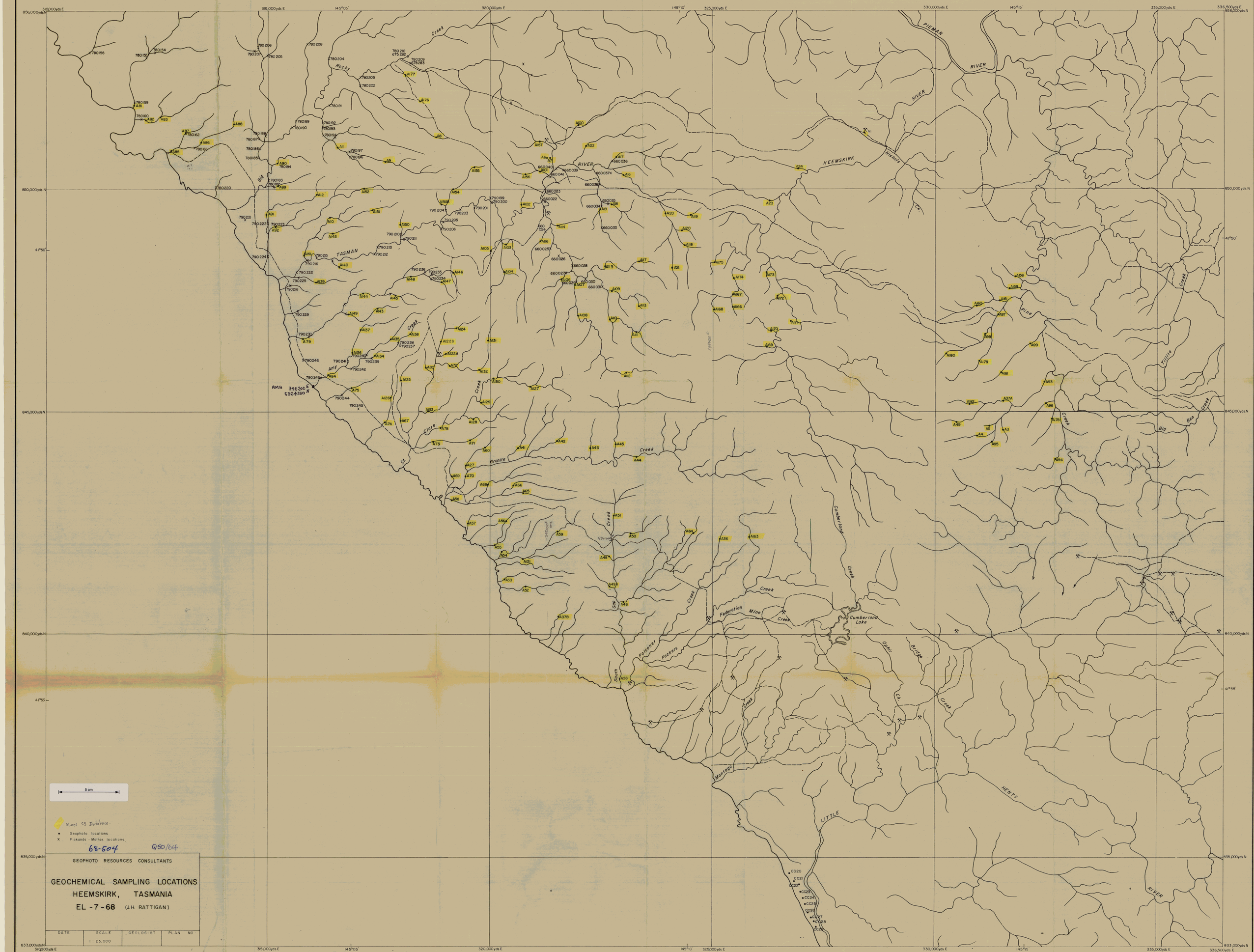

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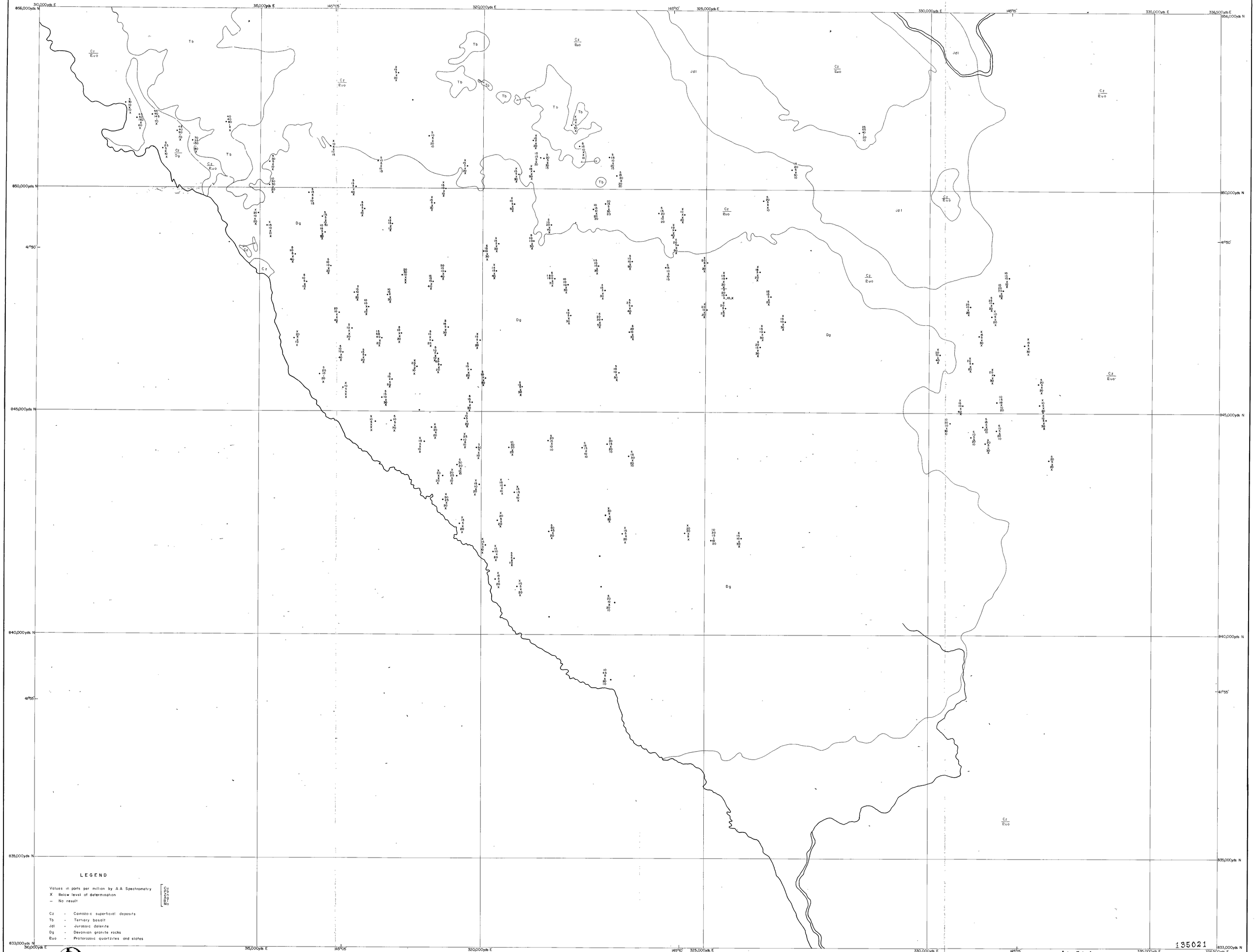

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