C.R.A. EXPLORATION PROPRIETARY LIMITED GOVT

Ref. No. N.T.267
HERMANNSBURG

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SUBJECT: NICKEL SEARCH - MT. HAY
AUTHORITY TO PROSPECT
2716, NORTHERN TERRITORY

AUTHOR: G. H. P. Tham

E: 29th July, 1971

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C.R.A. EXPLORATION PTY. LIMITED

29th July, 1971

Memorandum to : F. E. HUGHES

Copies to : C. L. Knight
E. C. Kostlin

From : G. H. P. Tham

Nickel Search - Mt. Hay Authority to Prospect 2716, Northern Territory

INTRODUCTION

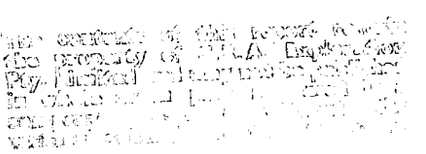
In the search for ultrabasics in the Alice Springs area 385 square miles were granted to the company in June, 1970. The A. to P. area covers one aeromagnetic anomaly (Bureau of Mineral Resources survey 1965(1)), with a maximum total magnetic intensity of 3,100 gammas. The area is partly covered by outcrops (Arunta Complex), partly by sand (alluvium). However, due to the presence of mafic and ultramafic rocks in the area, the outcrops extending west of the A. to P. area were also investigated.

The A. to P. expired on 7th June, 1971, but the area was re-applied for on 22nd June, 1971 in view of the possible uranium potential of the region.

The geochemical field work was initially carried out by a helicopter survey (October, 1970), followed by ground work in June, 1971.

GEOLOGY

The area was initially mapped by the B.M.R.(2) as part of the Arunta Complex. Later investigation has,



however, revealed less resemblance in lithology with the Arunta Complex generally in the vicinity (gneisses, amphibolites, mica-schists, etc.).

The outcrops consist of assemblages of black ferromagnesian and white felsic minerals in approximately equal proportions. They are free from foliation. Recrystallisation has occurred at a very high grade of metamorphism. Some garnet is present.

Three rock samples from the Mt. Hay-Mt. Chapple area have been described as pyroxene granulites.

PROCEDURES

Stream Sampling: (-80, +10 mesh) taken from helicopter covering approximately 80 square miles of outcrops with a density of 1 sample per 3 square miles.

Rock Sampling: collected from magnetically high areas.

Assays: for Cu, Ni, Pb, Zn, Co, Cr, Mo, W and U (-80 mesh) and analysed by The Zinc Corporation Limited and AMDEL (rock samples by spectrographic analysis). The coarse fraction (+10 mesh) from six of these samples was examined by Central Mineralogical Services for rock fragment and mineral identification (see attached CMS report number 70/12/15).

Follow-up Work: mainly tracing sources of the geochemical anomalies, by additional stream sampling and ground inspection of outcrops.

Water Sampling: collected from bores in the vicinity and analysed for U by The Zinc Corporation Limited.

Auger Test Drilling: (Gemco Auger Drill) carried out in an attempt to reach water table and/or bedrock. The drilling program was initiated on the strength of significantly anomalous uranium content in the water of a number of bores in the Napperby sheet area some 30 miles north of the present area, where Tertiary sediments overlie basement rocks. It was hoped to establish the southern margin of this Tertiary basin in the Mt. Chapple-Mt. Hay area. (?)Tertiary bedrock was encountered in two holes. Although no radioactivity was encountered by scanning the drill cuttings, samples collected over 6 feet intervals will be forwarded to The Zinc Corporation Limited for U and Th analyses, and the drillholes will be probed with a gamma logger. Evaluation will continue as results become available.

RESULTS

In terms of interpreting the stream sample values (-80 mesh) the total number of samples collected in the Arunta Complex of the Hermannsburg/Alice Springs 4 miles sheet area were taken into consideration. Of a total number of approximately 900 samples the top 5% of values, in terms of numbers, were considered probably anomalous (above the threshold), i.e. between 5% and 7.5%.

Eighty per cent of the samples from the Mt. Hay area appeared to be Ni anomalous (above the threshold = 22 ppm Ni) and 50% Cu anomalous (threshold at 15 ppm). Co and Cr followed the same pattern as Ni. No erratic values were recorded.

However, the subsequent field investigation did not show up anything worth further pursuit in this area.

The pyroxene granulite specimens consist mainly of 35% two-pyroxene, 45% plagioclase, 15% quartz. The remaining 5% was microcline, opaques (including magnetite), garnet and apatite. Traces of hornblende and biotite were also recorded. The coarse fraction (+10 mesh) was also described as two-pyroxene granulite.

All the mafic/felsic rocks were generally magnetic.

A uranium investigation of bore water was carried out in connection with auger drilling in June/July, 1971. Along the northern border of the outcrop 3 holes were sunk with a Gemco auger drill. Drill cuttings were sampled at 6 feet intervals, but analyses have not yet been received. The bore water samples examined by The Zinc Corporation Limited were not anomalous.

Karanji Bore	<1 ppb U
Anburla	1 "
Twin Bore	1 "
Mt. Hay Bore	<1 "
Valley Bore	1 "
Limestone Bore	2

CONCLUSIONS

Since the pyroxene granulite probably represents a basic igneous rock, a higher base metal content relative to the more acid rocks and metasediments of the Arunta Complex generally is a reasonable expectation.

No further work on the basement rocks in the area of the A. to P. is recommended, but it is proposed to continue investigations in the younger sediments in the search for uranium.

GHPT:ro's
Attach: Geochemical Sampling Ledger Sheets.

G. H. P. Tham

REFERENCES

(1) Bureau of Mineral Resources 1969 Total Magnetic Intensity, Hermannsburg Map Sheet No. F53/B1-79, 1969.

(2) Quinland, T., and Foreman, D. J. 1968 Explanatory Notes on the Hermannsburg 1:250,000 Geological Map Sheet SF53-13. B.M.R. 1968.

KEYWORDS

Ultrabasic, mafic, aeromagnetic anomaly, geochem.- stream sampling, pyroxene granulite, auger drilling, uranium, final report.

Locality: Hermannsburg SF53-13 1:250,000 map sheet.

PLANS

Plan No.	Title	Scale
N.T.787	A. to P. 2716, Mt. Hay, N.T. General Geology and Aeromagnetic Anomaly, with Bore Water Uranium Values.	1:250,000
N.T.788	A. to P. 2716, Mt. Hay, N.T. Sample Locality Plan.	1:46,000
N.T.789	A. to P. 2716, Mt. Hay, N.T. Sample Values for Pb, Zn.	"
N.T.790	A. to P. 2716, Mt. Hay, N.T. Sample Values for Cu, Ni.	"

APPENDICES

I Gemco Auger Drill Logs of Three Holes.

II Mineralogical Report on Six Samples - CMS Report No 70/12/15.

APPENDIX I

GEMCO DRILL LOG

Hole No.	Depth (ft.)	Geological Notes
H18	0 - 20	Sand.
	20 - 52	Silt with sand and/or coarse gravel.
	52 - 136	Clay.
H20	0 - 22	Sandy silt.
	22 - 36	Mn-pebbles, whitish silt, sand.
	36	Bedrock (limestone).
H21	0 - 10	Silt.
	10 - 44	Whitish clay, Mn-pebbles, silt.
	44	Bedrock (?siliceous rock).

No water was intersected during drilling

APPENDIX II

Mineralogical Report on 13 Samples - CMS Report No. 70/12/15

C.R.A. No.	CMS No.	Ultrabasics/ Basics	Others or Comments
197510	4847		Biotite (-quartz) rock; Actinolite rock; Epidote-actinolite-mica schist.
197512	4848	Uralitized gabbro/ microgabbro.	Amphibolite; Hornblende-pyroxene-granulite (+quartz and feldspar).
197513	4849	Devitrified glass (as in T.S. 4819) Altered gabbro.	
197524	4850		Hornblende-diopside-hypersthene-plagioclase-opaques-granulite; Granuloblastic garnet-plagioclase-diopside granulite.
197528	4851		Granulites (as for 197524).
197529	4852	A. to P. 2716, Mt. Hay	Granulites-opaques, spinel, pyroxene important.
197530	4853		Two-pyroxene granulites.
197532	4854		Two-pyroxene granulites.
197534	4855		Two-pyroxene granulites; Hornblende-pyroxene granulite.
197546	4856		Carbonate replacing a fractured garnet-pyroxene-plagioclase-quartz granulite; Amphibolite; Two-pyroxene granulite (diopside-hypersthene).
197550	4857	A. to P. 2714, Mt. Chapple	Two-pyroxene granulite
197553	4858		Garnet-pyroxene-plagioclase-quartz granulite; Actinolite-spinel rock; Two-pyroxene granulite.
197555	4859		Two-pyroxene granulites (one amphibolitised).
197556	4860		Two-pyroxene granulites (one with biotite); Amphibolite.

APPENDIX II

C.R.A. No.	CMS No.	Ultrabasics/ Basics	Others or Comments
197557	4861		Two-pyroxene granulite (one with retrogressive smokey blue amphibole rims on pyroxenes); Amphibolite.
197558	4862		Two-pyroxene granulite (one partly amphibolitised).
197559	4863		Pyroxene-hornblende granulite; Garnet-hypersthene-hornblende-biotite retrograded granulite.
197560	4864	A. to P. 2714, Mt. Chapple	Sheared and unsheared pyroxene granulite; Garnet-biotite-feldspar amphibolite facies rocks; Amphibolitised granulite.
197562	4865		No sample for T.S.
197606	4866		Biotite-quartz gneiss.
197608	4867		Biotite-quartz gneiss.
197619	4868		Hornblende-garnet-pyroxene-plagioclase-quartz rock (high grade metamorphics).
197625	4869	Porphyritic micro-gabbro (no olivine).	Two-pyroxene granulite (partial biotite retrogression).
197631	4870		Hornblende-pyroxene granulite; Amphibolite.
197648	4871	Altered gabbro (as for 197606).	
197649	4872	Altered gabbro (as for 197606).	
197650	4873	Altered gabbro (as for 197606).	

I. F. Scott, M. Sc.

ENSIGN
CRAE 16.

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GEOCHEMICAL DRAINAGE SAMPLING LEDGER

AREA MT. HAY NT SAMPLE Nos. 197520 - 197544, 545 COLLECTED BY G.T. / E.K. SHEET No. 1

MAP OR PHOTO REFERENCE HERMANNSBURG 4 MILES SHEET, ALICE SPRINGS DIST. PLAN No NT 788.789.790 ANALYSED BY ZINC CORP. LTD. DATE 19-7-71

Map or photo No.	No. Sample	Sediment: Gravel	Sediment: Sand	Sediment: Silt/mud	Sediment: Organic	Channel: Flow	Channel: Width	Channel: Alluvial	Channel: Colluvial	pH	Metal content, p.p.m: Pb	Zn	Cu	Ni	Co	Cr	Mn	Ag	Mo	As	U	W	Geological observations
	197520										4	19	1	6	2	10		<1	<2		10	<50	
	521										2	30	24	41	29	150		<1	<2		1	<50	
	522										4	31	22	48	25	130		<1	<2		1	<50	
	523										4	35	11	17	21	70		1	<2		1	<50	
	524										3	17	10	21	19	100		<1	<2		<1	<50	
	525										4	37	13	35	25	90		<1	<2		<1	<50	
	526										4	27	20	35	19	90		<1	<2		<1	<50	
	527										4	39	15	22	29	130		1	<2		1	<50	
	528										6	22	17	21	31	90		1	<2		<1	<50	
	529										4	26	15	28	25	160		<1	<2		<1	<50	
	530										4	32	15	31	27	220		<1	<2		1	<50	
	531										3	29	13	24	23	150		<1	<2		<1	<50	
	532										3	33	18	34	23	110		<1	<2		<1	<50	
	533										6	37	22	41	29	240		1	<2		1	<50	
	534										4	29	17	31	25	150		<1	<2		<1	<50	
	535										3	20	10	21	13	60		<1	<2		<1	<50	
	536										4	18	13	26	19	190		<1	<2		1	<50	
	537										2	25	11	26	15	90		<1	<2		<1	<50	
	538										2	24	14	28	21	130		<1	<2		<1	<50	
	539										4	33	18	34	25	130		<1	<2		1	<50	
	540										4	31	17	31	21	110		<1	<2		<1	<50	
	541										2	31	17	33	21	110		<1	<2		1	<50	
	542										4	33	18	37	23	100		<1	<2		<1	<50	
	543										4	35	18	35	21	100		<1	<2		1	<50	
	197544										6	29	20	29	21	150		<1	<2		1	<50	
	545										6	27	27	45	21	80		<1	<2		1	<50	

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M.304

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

AREA MT. HAY SAMPLE Nos. 197973-999, 198000, 099 COLLECTED BY G.T./C.M. SHEET No. 2

MAP OR PHOTO REFERENCE HERMANNSBURG 4 MILES SHEET, N.T. PLAN NO NT 788, 789, 790 ANALYSED BY ZINC CORP. LTD. DATE 19-7-71

Map or photo No.	No. Sample	Sediment: Gravel	Sediment: Sand	Sediment: Silt/mud	Sediment: Organic	Channel: Flow	Channel: Width	Channel: Alluvial	Channel: Colluvial	pH.	Metal content, p. p. m.: Pb	Zn	Cu	Ni	Co	Cr	Mn	Ag	Mo	As	Geological observations
	197973												17	12		100					
	974												19	12		100					
	975												17	28		100					
	976												20	34		80					
	977												19	32		120					
	978												17	32		100					
	979												17	32		100					
	980												16	32		120					
	981												16	34		100					
	982												17	40		100					
	983												14	44		130					
	984												14	44		130					
	985												19	42		120					
	986												19	42		130					
	987												19	42		120					
	988												20	46		130					
	989												22	46		130					
	990												16	36		120					
	991												22	48		120					
	992												20	44		120					
	993												19	44		130					
	994												25	51		130					
	995												18	31		110					
	996												18	31		110					
	997												18	35		100					
	998												21	40		100					
	999												23	42		100					
	198000												25	44		110					
	099												29	53		130					

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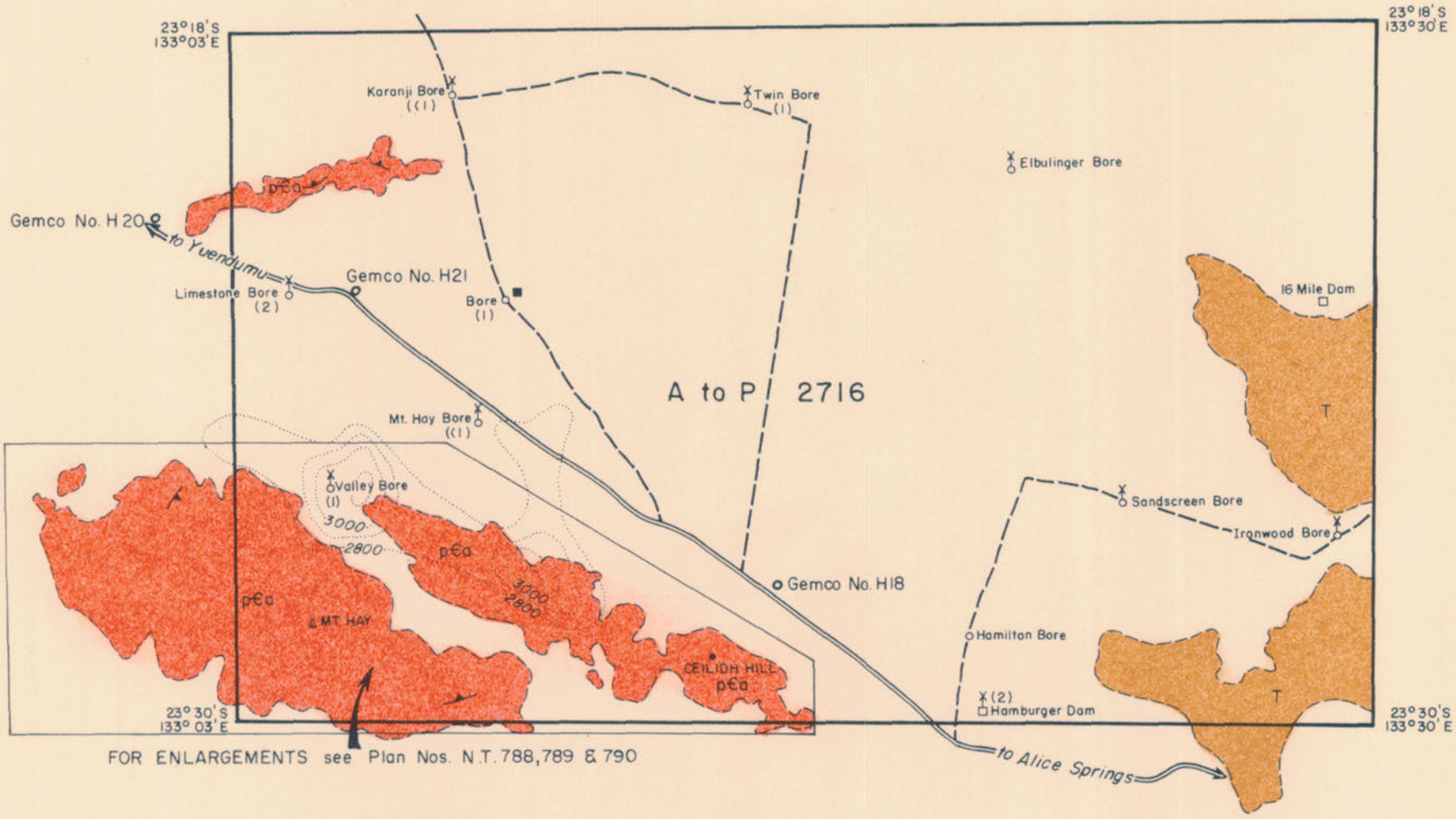
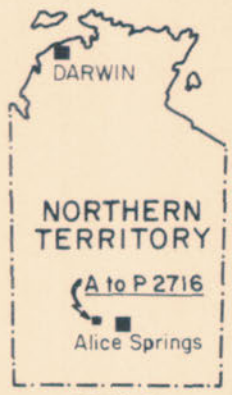


FOR ENLARGEMENTS see Plan Nos. N.T.788,789 & 790

LOCALITY DIAGRAM



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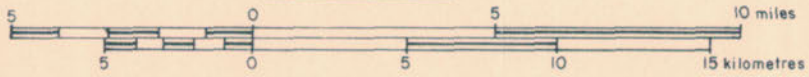
Approx. 1:30,000,000

SCALE BAR



LEGEND

- T — *Tertiary outcrops*
- p€a — *Precambrian crystalline basement (Arunta Complex)*
- (1) — *Water bore showing uranium content in p.p.b.*
- 3000 — *Aeromagnetic contour and value*
- *Geological boundary*

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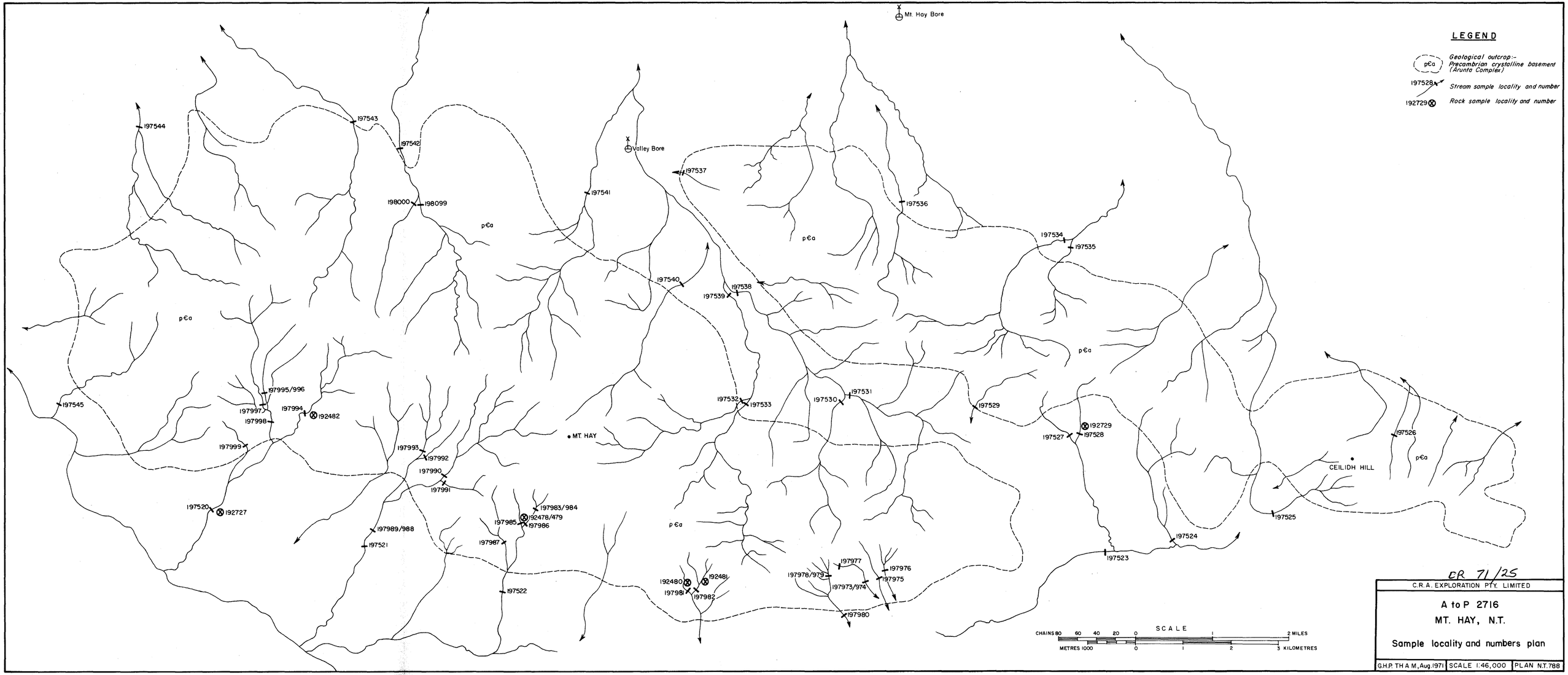
A to P 2716
MT. HAY, N.T.

Plan showing general geology, aeromagnetic anomaly and water bore uranium values

G.H.P. THAM, Aug. 1971	SCALE 1:250,000	PLAN N.T.787



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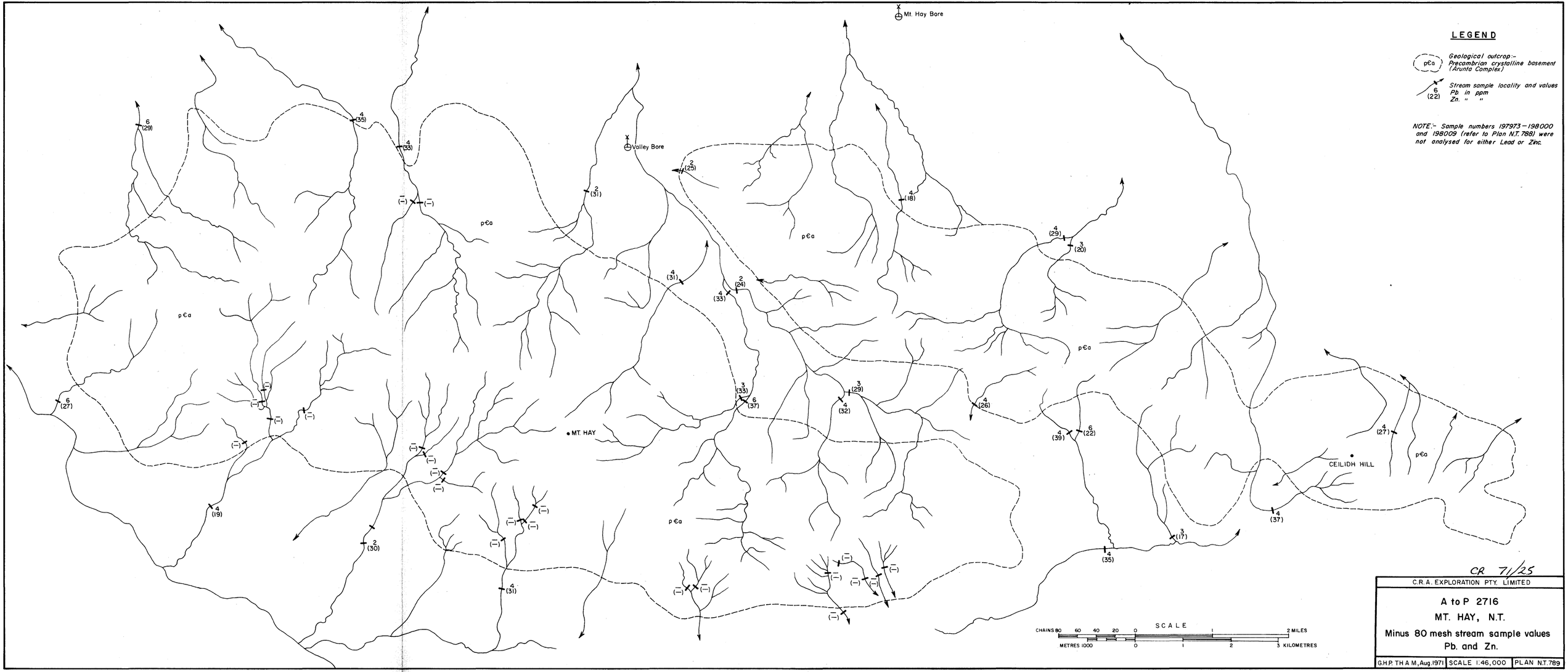
A to P 2716
MT. HAY, N.T.

Sample locality and numbers plan

G.H.P. THAM, Aug. 1971 | SCALE 1:46,000 | PLAN N.T.788



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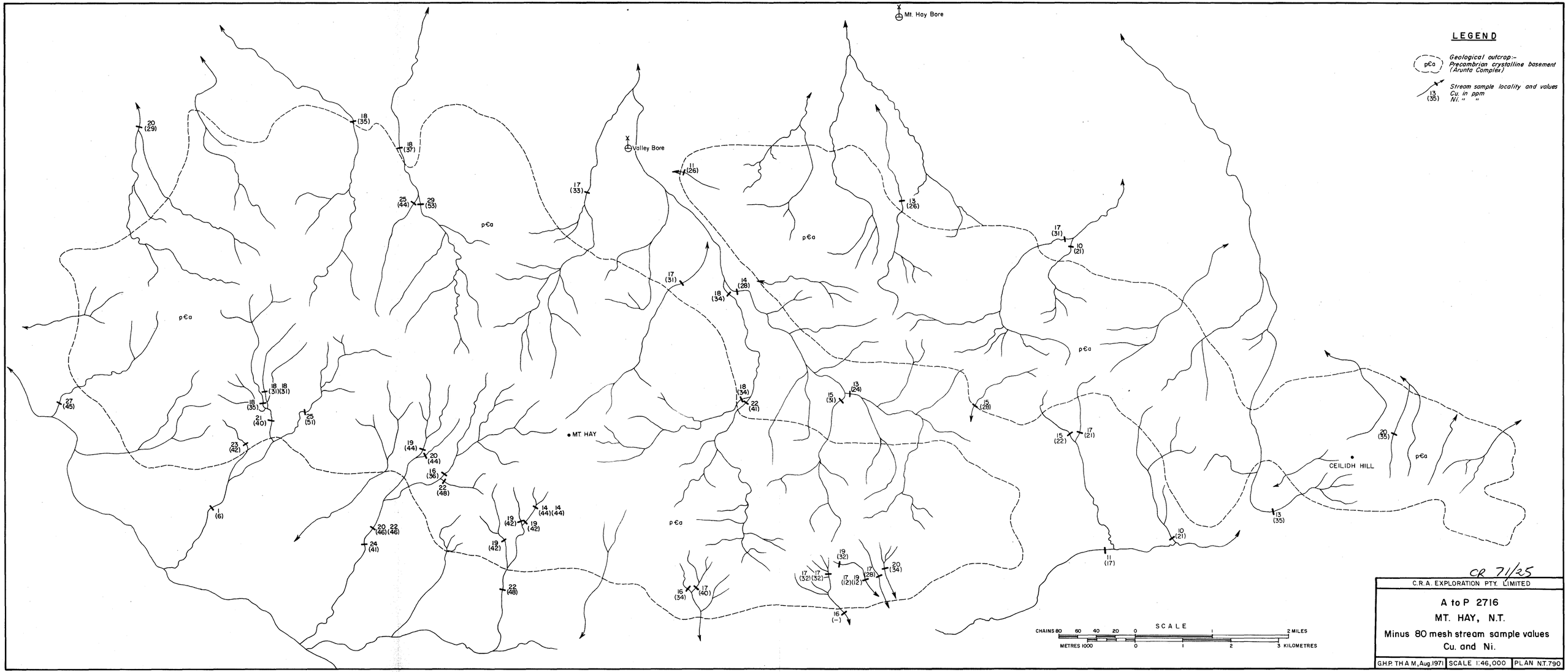
A to P 2716
MT. HAY, N.T.
Minus 80 mesh stream sample values Pb. and Zn.

G.H.P. TH A M, Aug. 1971 | SCALE 1:46,000 | PLAN N.T. 789



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C.R.A. EXPLORATION PTY. LIMITED

A to P 2716
MT. HAY, N.T.
Minus 80 mesh stream sample values Cu. and Ni.

G.H.P. THAM, Aug. 1971 | SCALE 1:46,000 | PLAN N.T.790