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REPORT ON

PROGRAM OF 1978

ON THE BON CLAIMS, YUKON TERRITORY

AQUITAINE COMPANY OF CANADA LTD.

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Abstract

Aquitaine Company of Canada Ltd. and Siebens Oil and Gas Limited in joint venture hold claims located in the northern Yukon covering uranium mineralization. The field program operated in 1978 was a continuation of efforts begun in 1977 on the uranium occurrence regarded as the most important of those discovered by the joint venture in the northern Yukon.

Detailed geologic mapping based on felsenmeer occurrences and scintillometer surveys outlined the stratabound mineralization over a strike length of 2.5 km. This horizon is fault-bounded to the south near the edge of the Tie Claims, while the northern extension is limited by an angular unconformity. The extensions of several fault repetitions and offsets of the mineralized unit noted on the showing have not been traced under surficial cover.

The mineralized unit unconformably overlies an upper member of the carboniferous Kayak Formation and is itself unconformably overlain by the Jurassic Kingak Formation. No identifiable fossils have been recovered from the mineralized horizon thus its age remains uncertain. The unit, comprised of chert-fragment breccia, chert-pebble conglomerate and sandstone, has been interpreted to be an immature clastic rock derived from a continental source lying in close proximity to the area of deposition. Chert clasts are suspected to have been derived from the Ordovician Road River Formation.

Analysis of the grab samples of weathered mineralized felsenmeer indicates U_3O_8 concentrations averaging 0.04%. As well, a relationship, supported by soil geochemistry, was noted between uranium and phosphorous

concentrations. Similar but weaker uranium-carbon, uranium-copper and possibly uranium-silver correlations were noted. Mineralization thus illustrates lithologic and elemental associations characteristic of both syngenetic and epigenetic uranium deposits.

While it is clear that the mineralized unit generally contains geochemically anomalous uranium concentrations, zones on the showing contain uranium concentrations exceeding this anomalous background level. Thus it is thought that syngenetic uranium concentrations, represented by the general anomalous background in the mineralized horizon, have been remobilized and concentrated. Fluid migration through original porosity under conditions favouring uranium accumulation or fault related modes are mechanisms potentially responsible for such enrichment.

Rusty weathering felsenmeer was noted to be coincident with these zones of highest uranium concentrations. It was hypothesized that variations in sulphide concentrations could indicate the same variations in uranium levels. I.P. surveys were performed to map sulphide concentrations. The concept that the non-uniformity of sulphide and uranium concentrations were related was supported by the coincidence of chargeability anomalies with scintillometer, radon and geochemical anomalies. It was concluded that resistivity methods could effectively be used to map the mineralized unit.

Induced Polarization Surveys should be continued to outline extensions of the mineralized unit and targets within it. Diamond drilling is necessary to test the mineralization and the sulphide-uranium relationship by which I.P. is expected to indirectly locate uranium mineralization. It is recommended that several sites off the claim block, where the presence of the mineralized unit is suspected, be examined in terms of the relationships that have been established on the BON claims.

1.0 Introduction

The BON and TIE claims cover uranium mineralization discovered in 1976 by Aquitaine Company of Canada Ltd. as operator of a joint venture in which Siebens Oil and Gas Limited holds 1/3 interest and Aquitaine Company of Canada Ltd. holds a 2/3 interest. The claims are located in the northern Yukon in the Barn Mountains near the headwaters of the Blow River. As a result of geological investigations the claim block was reduced in size from the original and subsequently was enlarged based on newly published information. It is now comprised of a total of 186 claims.

During reconnaissance programs in the northern Yukon, five types of uranium occurrences were discovered. Three of these have been only superficially examined and a fourth is regarded as insignificant. Investigations in 1977 on the remaining type, located on the BON claims and regarded as the most important, revealed significant anomalies convincing Aquitaine Company of Canada Ltd. (ACC) to extend its exploration of the BON claims. This continuation, commenced July 3, 1978, included detailed geologic re-mapping, a preliminary Induced Polarization survey and extended radon soil-gas and geochemical surveys and provided encouragement to persist with exploration of these claims. This report serves to describe the work performed in 1978 and documents the results and conclusions of that program.

2.0 Claim Data

The following claims were acquired to encompass the showing discovered and adjacent areas containing potential extensions of the mineralized unit:

Group	Number of Claims	Total Area (ha)	Claim Name	Tag Number	Recording Date	Expiry Date
Q-540	16	334	BON 46	YA 9231	Aug. 26/76	Aug. 26/86
			BON 48	YA 9233	"	"
			BON 50	YA 9235	"	"
			BON 52	YA 9237	"	"
			BON 54	YA 9239	"	"
			BON 56	YA 9241	"	"
			BON 58	YA 9243	"	"
			BON 65	YA 9250	"	"
			to	to		
			BON 70	YA 9255	"	"
			BON 87	YA 9272	"	"
			BON 89	YA 9274	"	"
			BON 91	YA 9276	"	"
Q-542	8	167	BON 88	YA 9273	Aug. 26/76	Aug. 26/86
			BON 90	YA 9275	"	"
			BON 91	YA 9276	"	"
			BON 92	YA 9277	"	"
			BON 94	YA 9279	"	"
			BON 96	YA 9281	"	"
			BON 98	YA 9283	"	"
			BON 100	YA 9285	"	"
Q-541	16	334	BON 60	YA 9245	Aug. 26/76	Aug. 26/86
			BON 71	YA 9256	"	"
			to	to		
			BON 80	YA 9265	"	"
			BON 91	YA 9276	"	"
			BON 93	YA 9278	"	"
			BON 95	YA 9280	"	"
			BON 97	YA 9282	"	"
			BON 99	YA 9284	"	"
(not grouped)	144	3010	TIE 1	YA 31226	July 7/78	July 7/81*
			to	to		
			TIE 144	YA 31369	"	"
(not grouped)	4	83	BON 227	YA 9412	Aug. 26/76	Aug. 26/81*
			BON 229	YA 9414	"	"
			BON 231	YA 9416	"	"
			BON 233	YA 9418	"	"

* claims renewed automatically by order in council without necessity of representation work. See "Governmental Intervention".

Figure 1 outlines the position and location of the Bon and Tie claims.

3.0 Location and Access

The BON and TIE claims lie centered about 68° 17' North latitude, 137° 50' West longitude on claim sheet 117A/7W near the northern tip of the Yukon Territory (see Figure 2). This locates the claims in the headwaters of the Blow River which drains into the Beaufort Sea lying 80 km to the north. The BON claims showing is about 160 air-kilometers due west of Inuvik. The most common route to the claims is by charter fixed-wing to Bonnet Lake and thence by helicopter, though access is available on an inconvenient indirect route through Old Crow which is located 110 km southwest of the claims.

To facilitate the operations on the BON and TIE claims and other claim groups in the area, a base camp has been established at Bonnet Lake. Crews are then positioned daily by helicopter. This enables the party to be supplied directly by fixed-wing from Inuvik, allowing efficient access, communication and servicing of camp and equipment.

4.0 Governmental Intervention

While 1978 field investigations were in progress; Northern Affairs Minister, Hugh Faulkner, announced, through an Order in Council dated July 5, 1978, the withdrawal from development of all land in the Yukon north of the Bell and Porcupine Rivers. According to the Minister, this land withdrawal reserved the area from further disposition to "allow us to determine how much of the area to dedicate to a national wilderness park and to other conservation purposes". A tentative date of announcement of the boundaries of a permanently reserved area is 1981, however this decision may well be postponed, according to recent government reports.

All of the claims held by the joint venture in the Bonnet Lake area are well within the withdrawn area. Thus the possibility that operations in this area might be permanently hampered or discouraged was the subject of policy discussions. Information from unofficial sources indicates that the claims under discussion will lie outside the confines of the wilderness areas or parks that will eventually be proposed.

At the instigation of Archer Cathro and Associates Ltd. an Order in Council was prepared and approved by the Canadian Parliament. It provides relief until 1981 from all assessment requirements on claims owned by ACC and by Archer Cathro within the withdrawn area (these being the only affected parties). This Order in Council titled (short title) Yukon Quartz Mining Act Work Relief Regulations (1979) allows that no representation or payment in lieu is required prior to the 1981 anniversaries of all claims lying within this withdrawn area.

While ACC is indebted to Archer Cathro and Associates Ltd. for their efforts in the preparation and approval of this Order in Council, ACC did not lobby for such action as it was decided by management that ACC was obliged to prove the value of any claims without undue loss of time. ACC had filed enough representation work to hold most critical claims beyond their 1981 anniversaries. Such a position as is now present in the northern Yukon is in many respects to ACC's advantage if it can be assumed that the claims in question could ultimately be developed without exceptional political complications.

5.0 History of Exploration on the BON and TIE Claims

Uranium mineralization was initially located by a reconnaissance spectrometer survey conducted by Aquitaine Company of Canada Ltd. as reported in 1976. To cover the discovery BON claims 1 to 270 were staked by contractor and were recorded August 26, 1976. This was part of a staking program that involved acquisition of the BON and NET claim blocks.

The program of the 1977 field season for the northern Yukon involved preliminary examination of the mineralization but primarily regional reconnaissance exploration in order to maintain the discovery advantage. The main exploration methods employed on the claims were spectrometer, radon, scintillometer, and stream-sediment geochemical surveys in addition to preliminary geological mapping and trenching. Airborne Spectrometer surveys outlined the extent of the mineralization apparent on surface and geologic mapping indicated that the mineralization was strata-bound. While stream sediment geochemical data was inconclusive and provided no useful information, scintillometer anomalies were coincident with radon anomalies showing peak values nearly fifty times those of background levels. Trenching attempts to reach bedrock proved unsuccessful.

As a result of the 1977 program, the size of the claim block was reduced as claims seen as having no potential were allowed to lapse. One block of 40 claims was renewed for 4 years, and another block of 8 claims was renewed for 1 year. Political uncertainty caused postponing of a planned diamond drilling program. Late in 1978, a geologic map of the Blow River area compiled by D.K. Norris of the Geological Survey of Canada was released. On the basis of the information published, the TIE 1 to 144 claims were staked by contractor to embrace a contact, thought to be related to mineralized unit, extending from the north and south boundaries of the BON claims. These were the last claims to be recorded as on July 6, 1978, all lands in this area were withdrawn from staking.

Thus all work performed by ACC in the northern Yukon in 1978 was performed on claims held by the joint venture.

6.0 Outline of Work Performed

The 1978 program evolved as a continuation of the work performed in 1977.

The following were performed over the area of the showing on a grid surveyed on the BON claims (see Figure 3):

1) remapping of geology at scale of 1:2,500
2) I.P. Survey
3) radon soil-gas survey
4) soil geochemical survey
5) multi-element analysis of mineralized felsenmeer

In addition, the geology of the BON and TIE claims was examined in a preliminary fashion.

The geology of the showing was re-mapped in detail as was required to allow interpretation, especially of geophysical data, to follow the mineralized unit where felsenmeer cover was obscured by soil or vegetation and to locate the mineralized unit in other localities where published information is incomplete or inaccurate.

An I.P. program was employed in an attempt to corroborate a correlation noted between sulphide and uranium concentrations. Also it was necessary to discern a method by which units could be mapped under overburden cover. Significant anomalies had been located with radon soil gas detectors in 1977. It was hoped that coincident I.P., radon and scintillometer anomalies could be outlined. Further, the reproducibility and capability of radon detectors to detect buried mineralization was to be tested. Soils over known mineralization were to be analyzed to determine if this method could be used regionally and mineralized felsenmeer samples were subjected to multi-element analysis in order that the mode of mineralization might be better known.

The following review of work performed and interpretations, conclusions and recommendations from this work will be organized to outline the geology and related conclusions, then the geophysical and geochemical surveys and results in light of the geological framework.

7.0 Geology

7.1 Basis and Scope of Investigations

The radioactive anomaly located on the BON claims was discovered by reconnaissance spectrometer surveys and a variety of geologic investigations have been made in an attempt to evaluate this anomaly. The showing was mapped in a preliminary fashion in 1977 in conjunction with radon and scintillometer surveys. In 1978 more detailed mapping was carried out on the area of the showing accompanying a continuation of radon surveys and an I.P. survey in order to appraise the nature and extent of the showing and to locate extensions of the mineralized zones. Cursory geological examinations were also made on the larger area of the BON and TIE claims. Information gained by investigations on the claims was used to locate the mineralized unit where published data is incorrect.

Several regional geologic maps have been published by the Geological Survey of Canada that include the area of the BON claims. The first relatively accurate map appeared in 1963 at a scale of 1:1,000,000 and was followed by a more accurate but generalized map at the same scale employing units grouped tectonically, published in 1969. The most detailed regional map was published by the Geological Survey of Canada in late 1978 at a scale of 1:250,000.

7.2 Geology of a Showing on the BON Claims

7.2.1 Introduction

The BON claims showing was mapped at a scale of 1:2,500 during the 1978 field season in order to assess the showing and to allow compilation and evaluation of more indirect surveying methods. This mapping covered a larger area at a more detailed scale than allowed by time during the 1977 field season.

The BON claims lie near the centre of a 300,000 square km area which escaped Wisconsin glaciation. There is no evidence that outwash deposits covered the area where the BON claims are located as piedmont surfaces are well developed and weathering has been extreme. Outcrop in the area of the showing occurs only along the crest of a hill upon which the showing is located. The upper flanks of this hill are felsenmeer and vegetation covered while the lower slopes stretching out to piedmont surfaces are virtually completely covered by tundra vegetation.

The geological map, then, is based on interpretation of felsenmeer occurrences as all contacts and structural elements are masked by recessive weathering zones. Felsenmeer has often been subjected to downslope movement or mechanical mixing and contacts appear gradational.

Mineralization causing the radioactive anomaly was recognized in 1977 to be strata-bound and has been traced for 2,500 meters across several offsets along the surveyed area. An additional isolated occurrence is situated on the BON claims approximately 1,500 meters northeast of the surveyed grid. Attempts to reach weakly weathered felsenmeer or bedrock by trenching have been unsuccessful due to the depth of weathered felsenmeer, thus only leached samples have been viewed.

The showing on the BON claims lies on the east flank of a local structure named the Hoidal dome (Norris 1978), while the surrounding BON and TIE claims encompass the north and eastern flanks of this structure (see "Geology of the BON and TIE Claims"). Geology of the showing (Figure 5) has been inferred from observation of felsenmeer on a grid measuring 2,000 meters by 1,000 lying on the east slopes of a prominent height of land. Cross-sections through the mapped area are depected on Figures 6A, B, C and D.

All lithologies mapped are clastic rocks. A thick basal unit of Carboniferous quartzite is unconformably overlain by a relatively thin sequence of rocks of probable Carboniferous age which include the mineralized unit. These units are in turn unconformably overlain by Lower Jurassic sandstones. The siliceous mineralized unit appears in felsenmeer as a mixture of a chert fragment breccia and chert pebble conglomerate.

This stratigraphic sequence is offset and repeated in the area mapped and thus faulting, oblique and parallel to strike of bedding, has been inferred. The southerly extension of the mineralized unit is apparently fault-bounded near the southern margin of the south TIE claims. North of the most northerly occurrence of the mineralized unit, Hettangian (Lower Jurassic) siltstones unconformably overlie basal units of the Carboniferous Kayak Formation thus the mineralized unit has been truncated due to erosion. Several structural or stratigraphic complexities have been noted in the mapped area. Conclusions drawn from data regarding these complexities are ambiguous. Conclusive evidence is likely to be obtained only by core drilling.

7.2.2 Stratigraphy and Lithology

All units mapped on the BON claims showing are clastic rocks. The lowermost units are probably Upper Carboniferous while the youngest, uppermost unit is Lower Jurassic. An angular unconformity forms the lower contact of this latter unit. Whether the mineralized unit and units designated "D" and "E" overlie other significant unconformities is uncertain as no identifiable fossils have been collected from them. The lithological characteristics of these units indicate a relationship to the underlying units, however, the age of these bracketed units remains uncertain.

While it is apparent that at least one of the major repetitions is due to faulting, it is likely that the minor repetitions inferred underlying the major thicknesses of the mineralized unit are sedimentary repetitions. Felsenmeer specimens from each such repetition are indistinguishable and their stratigraphic relationships are uncertain, thus all have been designated as a single unit.

The Table of Formations following, describes the units mapped, their stratigraphic relationships and correlation of these units with formations formally or informally recognized within the region. Unit thickness was estimated by measuring sections using a dip of 30 degrees. The units represented in felsenmeer and the estimated thicknesses of these units along two profiles have been listed. The profile along line 0 South provides a section having the maximum felsenmeer on the showing area. A fault repetition is illustrated. Data from a section through an isolated occurrence of mineralized felsenmeer at 1500 meters North illustrates the variability in units, as noted in detailed descriptions.

TABLE OF FORMATIONS

ERA	PERIOD	UNIT TITLE AND THICKNESS (m)	LITHOLOGY	FORMATION OF WHICH UNIT IS AN ELEMENT
Mesozoic	Lower Jurassic	H_{10+}	Carbonaceous sandstone	Kingak Fm (?)
Uncertain	ANGULAR UNCONFORMITY			
		$L_{3(?)}$	Black chert pebble conglomerate/breccia	Uncertain
		G_{25} (variable)	White chert pebble conglomerate/breccia with minor sandstone	
		$E_{0\ to\ 16}$	Porcelain-like rock (strongly weathered-quartzose rock?)	
		$D_{6+(?)}$	Rusty weathering sandstone	
	ANGULAR UNCONFORMITY			
Paleozoic	Lower Carboniferous	$B_{\text{thin interbeds}}$	Black shale interbedded with A and possibly overlying Unit A	Kayak Fm.
		A_{50+}	Quartzose sandstone conglomerate bed rare	

Measured Section

Line 0 South; 450 metres West to 750 metres East

(estimated dip 30^{o})

Unit Observed in Felsenmeer	Thickness (metres)
A	50
covered	18
A, E, G (mixed)	9
covered	3
D, A (inferred)	6
E	4
G	25
covered	9
A	22
A, D, E, G (mixed)	18
E	9
G	10

Measured Section

Line 1500 North; 1550 metres East to 1630 metres East.

(estimated dip 40^{o})

Unit Observed in Felsenmeer	Thickness (Metres)	Variation from Unit As Seen on Map Area
A + D	5	Coarser than E of previous section
E	5	Contains clasts of Unit A
E	16	Contains clasts of underlying unit E
G	12	Contains occasional clasts of E

Following is a description of the mapped units which are listed in the "Table of Formations":

Unit A - <u>Quartzose sandstone:</u>

Colour: white to light brown to light grey

Grain Size: fine-grained, occasionally medium-grained, rarely coarse-grained, rarely conglomeratic with small pebbles.

Grain Composition: predominantly quartz, occasionally rusty, weathered grains appearing in curvilinear pattern; coarse grains white to black chert and white sandstone

Grain Roundness and Sorting: well to sub-rounded, well sorted; in coarser beds subangular, medium sorting

Matrix and Porosity: silica cement, porosity low, pore filling pinkish and clay-like, commonly rusty giving speckled appearance

Weathering Characteristics and Occurrence: observed in outcrop, weathers blocky

Bedding Characteristics: Thick-bedded to massive

Sedimentary Structures: includes minor unconformities, rare low-angle cross beds

Stratigraphic Relationship: oldest unit mapped, associated with underlying Carboniferous coal, shale and conglomerate and includes rare plant fragments which are associated with fauna of the underlying Carboniferous Kayak formation. (Youngest dated indicated for Kayak is Early-Late Visean.) Upper contact seems abrupt though variable as contacts different units

Thickness (meters): 50 (as mapped; total thickness likely 100 meters)

Radioactivity (SPP-2 c/s): 15-25(25)

Origin: Shallow basin of moderate energy level closely associated with continental source and coal producing fauna. Interbedded carbonaceous lagoonal black shales indicate proximity to low energy lagoons.

Unit B - Black Shale:

Grain Size: shale, includes minor siltstone

Weathering Characteristics and Occurrence: recessive, seen only as small felsenmeer fragments - carbonaceous, occasional unrecognizable plant fragments

Is likely interbedded with Unit A. Could be represented in recessive-weathering zone overlying Unit A. Thus could be variable in thickness and upper surface could be an erosional unconformity.

Radioactivity (SPP-2 c/s): 70-90(100)

Origin: Shows a close relationship with lithology A and coal-forming environment, product of shallow confined basin or lagoon.

Unit D - Rusty-weathering Quartzose Sandstone:

Colour: tan to orange

Grain Size: very fine-grained

Grain Composition: primarily quartz but rusty weathering grains form a large proportion

Grain Roundness and Sorting: sub-rounded, well sorted

Matrix and Porosity: distinctively rusty, speckled, weathered to clays

Weathering Characteristics and Occurrence: concentric oxide zones in occasional felsenmeer fragments, recessive, seen only rarely as felsenmeer fragments, usually as rusty-coloured sandy soil

Stratigraphic Relationship: Appears to separate Units A and B from Units E and G but not always present. Uncertain.

Thickness (meters): 0-6 Could be erosionally thinned and truncated or faulted-out.

Radioactivity (SPP-2 c/s): 10-30(30)

Unit E - White Porcelain-like Rock

Colour: white

Grain Size: very fine-grained, altered to clay minerals, only weathered rock viewed

Matrix and Porosity: porous, is brittle and when tapped, sounds like porcelain

Weathering Characteristics and Occurrence: found only as small felsenmeer fragments occasionally with concentrix oxide zones or rusty surfaces

Sedimentary Structures: homogeneous

Radioactivity (SPP-2 c/s): 50-60(75)

Several exceptions to these characteristics were noted at a single isolated occurrence near grid location 1500 meters North, 1500 meters East.

1) lower beds contained clasts of underlying sandstone
2) higher beds contained clasts having same characteristics of matrix except were coarser grain size than matrix
3) appears to grade from a fine-grained quartz sandstone to a very fine-grained porcelain-like rock. Size of grains in clasts appears to follow a similar upward-fining pattern

Thickness (meters): 10

Stratigraphic Relationship: Underlies Unit G in all cases except where has been erosionally thinned or faulted-out near southwestern boundary of map. Contacts appear abrupt except as noted, where contains clasts of the underlying Unit A and has been eroded in part such that clasts of lithology E are contained in the overlying Unit G.

Origin: Uncertain; related to shallow, usually stable, low energy environment.

Unit G - Chert Pebble Conglomerate/Breccia

The unit is predominantly a breccia but a significant proportion is conglomerate. Finer-grained clastics form a minor constituent. Three types of clasts or rocks thus have been noted. However, as these rocks appear only as mixed felsenmeer fragments, it has not been possible to detail the relationship between clast types or the lithologies that they represent. Characteristics of each of these clast types is listed below, followed by a description of the general characteristics of the unit.

I Breccia of Lithified Chert

Predominant and appears to grade into type II

Colour: light grey to white

Grain Size: variable, sand to cobble (maximum diameter 10 cm.)

Grain Composition: chert, rarely sandstone

Grain Roundness and Sorting: subangular, poorly sorted

Matrix and Porosity: very low porosity, matrix very fine-grained brown to grey, siliceous

II Chert-Pebble Conglomerate

Colour: white to light grey

Grain Size: variable, sand to cobble (rarely over 10 cm. in diameter)

Grain Composition: chert and occasionally sandstone

Grain Roundness and Sorting: sub-rounded, occasionally well-rounded, commonly includes angular clasts

Matrix and Porosity: variable, sand grains to very fine-grained siliceous light brown to grey

III Sandstone

Forms only a minor proportion of Unit G

Colour: dark grey to white

Grain Size: very fine-grained to coarse-grained

Grain Composition: chert

Grain Roundness and Sorting: well rounded

Matrix and Porosity: matrix siliceous, overgrowths

Bedding Characteristics: thin-bedded

Sedimentary Structures: soft-sediment deformation, autobreccias (sedimentary breccia)

Unit G - Characteristics Representing Entire Unit

Matrix and Porosity: matrix siliceous, aphanitic, contains small chert fragments, and occasionally weathered clasts similar to Unit E, well cemented, low porosity, silica fracture fillings

Weathering Characteristics and Occurrence: Felsenmeer fragments observed only, newly fractured and fresh surfaces often rusty or orange-black coated.

Sedimentary Structures: generally featureless, finer-grained sediments illustrate autobrecciation and soft-sediment deformation

Stratigraphic Relationship: Lower contact with Unit E generally sharp except, as noted as an exception, where clasts of underlying Unit E are contained in Unit G. Is noted to thin and to be in contact with Unit A near southwest margin of map, and thickens to the east of this point. Cause could be basal faulting, erosional thinning or non-deposition. Uncertain. Upper contact is an angular unconformity usually with Unit H.

Thickness (meters): Generally approximately 25 meters though upper surface at point of maximum thickness is present-day weathering surface.

Radioactivity (SPP-2 c/s): 200-500(800)

Origin: Mode must include origin for chert breccias, chert pebble conglomerate and chert-grain sandstone. The common element is a chert source. All of the clastic rocks noted were likely derived from a common source. One hypothesis is most evident. A lithified, brittle subaerial source was eroded forming variably-sized fragments which were transported over a relatively short distance producing sedimentologically immature clasts and grains. Incorporated with the resulting breccia or extremely immature conglomerate are well-rounded chert and sandstone clasts which have been transported a considerable distance. Finer-grained sediments as beds and matrix were deposited with the coarser clasts. Clasts show no evidence of extensive reworking though Unit G does contain clasts of the underlying Unit E and finer-grained sediments show soft sediment deformation and autobrecciation. The environment satisfying these conditions would be a relatively sheltered but periodically disturbed continental or marine basin lying in close proximity to sediment sources of the variety discussed. The chert fragments may have been derived from the Ordovician Road River formation which in the Bonnet Lake area exhibits extensive thicknesses of massive chert.

Unit L - <u>Black Chert Fragment Breccia/Conglomerate</u>

Colour: black to dark grey

Grain Size: variable; sand to small pebbles

Grain Composition: chert, occasionally fine-grain sandstone

Grain Roundness and Sorting: sub-round to angular

Matrix and Porosity: matrix black siliceous, contains small chert fragments, grains

Weathering Characteristics and Occurrence: found only as rare felsenmeer fragments, weathers blocky

Stratigraphic Relationship: appears to overlie Unit G but noted only at upper contact of Unit G in SW area of map. May consist only of erosional remnants as overlying contact is angular unconformity with Unit H.

Thickness (meters): 0 to 3

Origin: Appears to be related to Unit G; clasts are similar composition but a different colour and size than Unit G. Source of clasts is likely Ordovician Road River Formation.

Unit H - <u>Carbonaceous Sandstone</u>

Colour: dark brown to dark grey

Grain Size: very fine-grained to fine-grained

Grain Composition: predominantly quartz

Matrix and Porosity: carbonaceous, argillaceous, porosity poor

Weathering Characteristics and Occurrence: occurs as platey felsenmeer

Stratigraphic Relationship: Distinctly overlies Unit G, contact is angular unconformity; Unit L appears as a thin erosional remnant occasionally present separating Unit G from Unit H. Contains fossils identified as Lower Jurassic.

Thickness (meters): not measured as becomes recessive and vegetation covered near its lower contact

Origin: Indicated as shallow marine by suite of fossils contained which have been positively identified, by representatives of the Geological Survey of Canada, as Pliensbachian.

7.2.3 Structure

The BON and TIE claims are situated near the Barn Mountains Uplift on the flanks of a related local structural high. The Barn uplift exhibits extreme structural relief which has resulted from movement along east-west trending, high-angle reverse faults. These faults cut Cretaceous strata indicating that deformation occurred during the Laramide Orogeny (Dyke, 1974). The structural situation on the area of the claims mapped likely reflects deformation related to this orogeny or pre-Laramide activity and similar structural relief occurs on the Hoidal Dome where Cretaceous sediments are not present.

The stratigraphic column outlined for units mapped on the BON claims showing includes a distinct succession of lithologies. Due to the lack of outcrop, stratigraphic relationships and explanations for inconsistencies along contacts can only be inferred. However, repetitions and offsets of the succession are easily recognizable and appropriate structural elements which can be correlated have been hypothesized. Listed are the observations and structural elements conjectured in explanation.

The major stratigraphic repetition depicted on cross-sections through the mapped area in Figures 6A, 6B and 6C have been explained by movement on an inferred north-south trending fault. The westerly block has been down-faulted and the structure can most plausibly be explained as an easterly-dipping reverse fault.

A second, more vaguely outlined repetition near 0 meters East on Figure 6B is thought to have resulted from movement along a branch of the fault causing the primary repetition. An alternative explanation for this repetition eliminates faulting and entails only correlation of the vaguely indicated recessive weathering succession near the grid point 0 North, 150 East with Units E and G lying to the south while the second repetition noted would correspond with the sequence of units near grid location 0 North, 0 East. This hypothesis is apparent when viewing the resistivity data (Figure 8) as it has been contoured. However, it does not provide an explanation for: the disappearance of Units E and D as Unit G is followed south along its most westerly position, the onlap of Unit H which in all likelihood postdates all other map units and the apparent off-setting of the most highly mineralized and resistant-weathering zone.

Off-setting of the most westerly succession has been explained by movement along an east-west trending fault, and similar oblique faulting has been inferred to explain the lateral variation noted along contacts. These displacements are not apparent in other repetitions as vegetation and soil cover increases on the eastern portion of the map area. The mineralized unit of the most westerly repetition is exposed as a dip slope on the showing at grid location 0 meters North, 0 meters West. To the north this exposure has been truncated by erosion and the southern extension of this unit is overlain by Unit 4. The eastern repetition of the mineralized unit, however, likely extends undercover both to the north and south as evidenced by the isolated occurrence of mineralized felsenmeer near the grid point 1500 meters North, 1500 meters East. The isolated occurrence of Units E and G near grid point 300 meters North, 50 meters East is viewed as an erosional remnant topping a down-faulted block and appears to be directly underlain by Unit A. Thus immediately to the south of this locality these units have been eroded and appear on a topographic high near grid point 0 meters North, 0 meters West. Analysis of structural data measured on Unit A as plotted, indicates the presence of a broad, gently south-easterly dipping syncline.

Several complexities involving Unit G have been observed but insufficient evidence exists to warrant supporting any single explanation. The mineralized unit appears to thin rapidly to the south only along the westernmost occurrence and this wedging is accompanied by an abrupt disappearance of Units E, D and G. Faulting rather than sedimentological variation can be evoked as a plausible explanation, however the resulting concentration of tectonic elements is decidedly unconvincing.

While most complexities can be satisfactorily resolved the amount of covered area and the lack of outcrop precludes an ambiguous hypothesis. Diamond drilling will be necessary for the clarification of stratigraphic and tectonic relationships.

7.3 Geology of the BON and TIE Claims

Following analysis of the mineralized unit on the BON claims showing, the BON and TIE claims were subjected to preliminary geological examination and several days were spent further evaluating the claims after the showing was remapped and the stratigraphic relationships of the mapped units were ascertained.

Several published maps outline the geology of the area of the BON and TIE claims. Geological Survey of Canada Map 10-1963 (Norris, 1963) was superceeded by Geological Survey of Canada Open File 399 (Young et al 1969) which was in turn updated by the release of Open File 499 (Norris 1978). Open File 399 employed units based on tectonic nomenclature while the more recent publication utilized formally recognized formations.

The TIE claims were staked to cover an unconformity, revealed on Open File 499, to which mineralization had been related. Information acquired during preliminary investigations of this contact revealed no trace of the mineralized unit beyond the previously recognized limits. Thus the unit has been traced along a strike length of 2,500 meters stretching from grid location 2,000 meters South to grid point 500 meters North. An isolated occurrence of felsenmeer on the inferred contact at grid point 1,500 meters North 1,500 meters East included the mineralized lithology.

Further examinations on a reconnaissance scale of the BON and TIE claims were unable to further expose the mineralized unit. However it was found that the contact and geology, as published in Geological Survey of Canada Open File 499 (Norris 1978) was essentially correct and this information has been duplicated in part as Figure 4A. A Legend, published separately, has been attached as Figure 4B. As the unconformity is projected northerly, successively older rocks are seen to lie in contact with Jurassic rocks. At a point, approximately 1.5 km. north of the most northerly located occurrence of the mineralized unit and 3 km. north of the BON claims showing, Hettangian (Lower Jurassic) rocks, presumably of the Kingak Formation, unconformably overlie lower members of the Carboniferous Kayak Formation. Thus the mineralized and associated units have been eroded at this locality and are absent along the northern continuation of this contact. To the south, the mineralized unit is abruptly terminated, evidently by faulting trending nearly perpendicular to the strike of the unit. Fossilferous beds, noted as underlying the mineralized unit, are present south of this truncation. Correspondingly the mineralized unit may extend undercover beyond presently known limits.

In summary, the mineralized unit has been traced where felsenmeer cover is significant. Though the unit cannot be extrapolated northward, several interpolations and southern extensions from fault repetitions of this unit can be anticipated. Indirect detection methods will be required to locate these zones.

8.0 Mineralization

The radioactive anomaly, discovered during airborne spectrometer surveys, resulted from mineralized felsenmeer which has been the subject of exploration activity detailed in this report. Preliminary surveys indicated anomalous uranium values were stratabound and confined to a unit described as a chert pebble conglomerate/breccia. Several trenches were dug but none were able to penetrate the felsenmeer to expose bedrock, and as the area was not glaciated during Wisconsin period of glaciation, leaching and weathering have been extensive.

The mineralized unit has been traced along a strike length of 2,500 meters. Several offsets and repetitions have been noted in the area of the showing that have been mapped in detail. An isolated occurrence of mineralized felsenmeer is situated about 2,000 meters northwest of the showing. Only the southerly extension of one repetition of the mineralized unit has been mapped. This extension has been outlined by felsenmeer only because it follows a topographic high where a felsenmeer cover exists. The locations where other extensions would be expected are vegetation covered piedmont surfaces. Sections measured across the showing indicate that the thickness of the mineralized unit ranges from 10 to 25 meters.

The entirety of the exposure of this unit appear to contain anomalous uranium concentrations but where the felsenmeer is thinnest felsenmeer boulders tend to be smallest thus are more likely to be leached, so observations based on felsenmeer samples may not represent bedrock characteristics. Uranium concentrations, as measured by scintillometer (SPP-2), vary significantly over the mineralized felsenmeer, ranging from 300 counts per second (c/s) to over 800 c/s. Assays of grab samples of more highly radioactive zones show U_3O_8 concentrations of approximately 0.04%. Analysis of mineralized material collected in 1978 illustrated a strong correlation between U_3O_8 values and phosphate, carbon and copper concentrations (see Figure 17). It had been noted empirically that the zones of rusty weathering of the mineralized felsenmeer corresponded to those zones where radiometric values were highest. It was hypothesized that variations in sulphide concentrations were related to similar variations in uranium concentrations. I.P. surveys (see Figure 9), attempted with this association in mind, show a strong relationship between chargeability or sulphide content and mineralization when juxtaposed with scintillometer measurements (Figure 16). Mineralization may be related to faulting as illustrated by the coincidence of spectrometer, I.P. chargeability and radon anomalies which encompass an inferred fault zone which is itself indicated by resistivity data.

Lithologies noted in the mineralized unit include chert pebble conglomerate, breccia and rarely finer-grained clastics. Stratigraphic relationships are not apparent due to the mixing of felsenmeer and mineralization does not appear to be associated with one particular lithology. Clasts and grains are predominantly chert, while quartzite clasts form a minor constituent. The matrix and pore filling of these generally poorly sorted clastics is siliceous, microcrystalline, and ranges from light to dark brown in colour, often appearing rusty, porous and strongly weathered. Quartz overgrowths are common and post-depositional fractures are quartz filled. Porosity in unweathered rock is likely extremely low. Fine-grained sediments show evidence of soft sediment deformation and autobrecciation.

The presence of sulphides in felsenmeer samples is indicated by rusty stains, rusty grains and vug and fracture coatings. Microscopic euhedral pyrite grains were noted on a freshly broken, slabbed felsenmeer specimen but these disseminated grains represented a minute proportion of the rock. Rusty oxide, commonly coating felsenmeer fragments, likely contains other elements noted as anomalous (Figure 17; see "Assays").

Boitriodal iron ozide and specularite were observed as fracture and vug coatings. It can be concluded that at least a portion of the sulphides present are secondary, indicating that primary or fracture porosity was sufficient to allow fluid migration.

The lithologic and elemental associations are characteristic of both syngenetic and epigenetic uranium deposits and evidence for any of several trapping and reconcentration mechanisms have been suggested. Anomalous uranium concentrations could have been bound with phosphate or metallic complexes during sedimentation. Early fluid migration may have been responsible for remobilization and concentration of uranium corresponding to the formation of sulphides as noted or in-situ carbon or phosphates. Post lithification fractures in the host rocks have been observed and faulting has been inferred dividing zones of highest sulphide and uranium concentrations. Thus concentration or reconcentration of uranium might have resulted from mechanisms accompanying faulting and fracturing. Samples of fresh rock will be necessary to allow examination of mineralization and sulphides to judge the validity of any conjecture concerning the origin of the mineralization on the BON claims.

9.0 Geophysical Surveys

9.1 Introduction

The realization that there was some sort of association between radioactivity and sulphide staining led to the decision to use the Induced Polarization technique to indirectly trace the radioactivity through the overburden covered areas. Initially a test line was run over the best radioactive showing and this work confirmed that a moderate I.P. anomaly was closely associated with the radioactivity.

It is unlikely that the overburden in the survey area exceeds 10 meters and generally is in the 2 to 3 meter range. Some boulder fields exist that presented contact problems to the I.P. crew. The presence of permafrost resulted in large apparent resistivity values. Resistivities seem to be a factor of ten above the normal range for the type of rocks in the survey area. The permafrost did not present contact problems since the thawed active layer allowed us to make good electrical contact with the earth.

All of the I.P. work was done in the pole - dipole electrode configuration. The test work was done with a 20 meter dipole with readings taken at N = 1, 4 and 6 or 20 meter, 80 meter and 120 meter between the pole and the dipole. The N = 1 readings seem to be affected by near surface variations in overburden, permafrost and boulders, whereas the N = 4 readings were much smoother. At N = 6 the signal to noise level was poor, thus we decided to do the reconnaissance of the property in the N = 4 mode, however the dipole size was increased to 25 meters. At N = 4 and with a 25 meter dipole the data is clearly representative of the bedrock in the 25 to 50 meter depth range.

9.2 Equipment and Location of the Survey

The survey employed a Scintrex I.P.R. 8 and a Scintrex 2.5 KVA Transmitter. Figure 7 outlines the location of survey lines.

9.3 Results

Chargeability and resistivity data has been plotted on Figures 8 and 9 respectively, and a profile of test resistivity and chargeability data is illustrated by Figure 10.

The chargeability values have been contoured at 10, 15, 20, 25 and 30 milliseconds. Background values are in the 3 to 5 millisecond range. The resistivity data has been contoured at 1000, 2000, 3000, 4000, 10,000, 20,000, 50,000 and 100,000 ohm-m.

The main I.P. anomaly correlates with a zone of very high resistivity which probably is a result of permafrost and more importantly cementing of the pore spaces during some form of chemical alteration. A sharp reduction in resistivity values on the north boundary of the survey indicate a sharp break in lithology or faulting. The low resistivity zone centered around 3 + 50E on line 2S is also probably a fault striking obliquely across the grid.

The shape of the decay curve suggests the mineralization is fine-grained as fine-grained mineralization discharges faster than coarse-grained mineralization.

The 20 millisecond contour accurately outlines the mineralized areas, however it is likely the mineralization is in multiple zones that pinch and swell within the 20 millisecond contour.

9.4 Conclusions

If one assumes that permafrost has uniformly affected the survey area then the resistivity plan map is a good reflection of the geology. One should keep in mind that the effect of permafrost has been to increase the resistivity around a factor of ten above what is normal for these sedimentary rocks.

Cementing of the pore spaces seems to be the most likely explanation for the tremendous increase in resistivity in the area of the I.P. anomalies. This cementing implies some form of chemical alteration taking place.

The magnitude of the Induced Polarization anomalies probably results from an increase in the sulphide content of 3 to 5 percent by volume

A perusal of the chargeability and radioactivity maps shows that a strong correlation exists, thus one can be fairly confident in using the chargeability map to extrapolate the areas where uranium mineralization is likely to be encountered in a drill hole or trench.

10.0 Geochemistry

10.1 Soil Sampling Survey

10.1.1 Introduction

Soil samples were collected in conjunction with radon surveys over a showing on the BON claims. Concentrations of uranium were measured. The purpose of the soil sampling program was to test the ability of soil uranium concentrations to respond to mineralization on the extensively weathered setting of the showing. In addition, it was hoped that a relationship between phosphate and uranium concentrations could be established. If these goals were fulfilled, soil sampling could ultimately be used in an attempt to extend the present limits of the mineralized zone.

As weathering has been extensive in the sampled area, it was expected soil uranium concentrations would be moderated as a result. Downslope displacement of anomalies was predicted. Though it can be presumed that arctic soils are shallow and usually poorly formed, it was anticipated that the extensively weathered horizons on the BON claims showing would reflect bedrock mineralization.

10.1.2 Description and Location of Survey

Soil samples of the B horizon were augered from a depth of between 20 and 40 cm. at 20 meter intervals. Two profiles were sampled as indicated in Figure 11. All analyses were performed by Loring Laboratories of Calgary. Uranium was measured by fluorimetry, phosphorous by colourimetric or gravimetric methods and fluorine by specific ion electrode.

10.1.3 Results

Analytical data has been presented in the form of profiles on Figures 12A and 12B. Figure 13 illustrates the relationship between uranium and phosphorous concentrations. Concentrations of U_3O_8 in the samples varied from 0.2 ppm to 119.0 ppm, P_2O_5 values ranged from 0.11% to 8.5% while the level of fluorine concentration generally lay below the detection limit, thus no relationship involving fluorine could be determined. The large amount of variation in uranium and phosphate levels allows anomalies to be positively recognized from background fluctuations.

Anomalies indicated by both elements concur with the mapped position of the mineralized unit. As well, inflection points on either side of the plotted anomalies lie close to the inferred position of the contacts of this unit indicating that migration of the studied elements has been minimal. Of interest is an anomaly on profile 300 meters south occurring over an inferred fault zone.

It is apparent that an excellent correspondence exists between uranium and phosphate concentrations.

10.1.4 Conclusions and Recommendations

The correspondence of anomalous U_3O_8 and P_2O_5 levels in soil samples with the location of the mineralized unit and radon anomalies confirm that soil sampling can be used to locate the mineralized zone, at least in the area of the showing. Profiles should be run over adjacent areas where the surficial cover thickens over presumed extensions of the mineralization to determine if soil surveys can be used to locate this mineralization concealed under the piedmont surface.

Uranium mineralization is likely, at least in part, bound in complexes or compounds with phosphorous, as witnessed by the close correspondence between uranium and phosphate concentrations. Such a relationship may be of value where phosphate is more mobile than uranium and thus more easily detected.

Anomalies indicated from analysis of soil samples are likely more easily reproducible than those shown by radon soil gas measurements. As well, soil samples can be obtained more rapidly and under a larger range of field conditions than can samples of soil gas.

It is recommended that soil surveys be implemented on a trial basis in an attempt to locate the mineralized zone in conjunction with Induced Polarization surveys. Additionally, soil surveys should be used in the reconnaissance of areas off the claims where the presence of the mineralized unit is suspected.

10.2 Assays for Comparison of Elemental Concentrations

10.2.1 Introduction

Mineralized felsenmeer samples from the BON claims have been assayed for uranium as reported in 1976 and 1977. Values ranged from 0.03% U_3O_8 to 0.05% U_3O_8. No areas of felsenmeer with uranium concentrations exceeding these levels were discovered in 1978. The area of the Yukon in which the BON claims lie was not glaciated during Wisconsin times thus has been intensely weathered. Surface rock would be expected to have been strongly leached and uranium values are likely not representative of those from the underlying bedrock.

During examination of the mineralization, a relationship between radioactive levels and rusty weathering felsenmeer was noted. During the 1978 field season grab samples chosen from felsenmeer of the mineralized unit were assayed in an attempt to reveal relationships between uranium concentrations and the concentrations of other elements. Levels of the following elements were analyzed: uranium, thorium, phosphorous, fluorine, carbon, manganese, copper, nickel, zinc, vanadium.

10.2.2 Results, Conclusions and Recommendations

The results and comparison of multi-element assays performed on mineralized samples from the BON claims are presented in Figure 17. The most striking positive correlation involves the phosphorous and uranium values. This relationship is supported by analysis of soil samples collected over the showing as illustrated in Figure 13. Carbon values show a moderate positive correlation with uranium values, while the concentrations of the other elements considered do not seem to be related to uranium concentrations in the complex studied. Though variations in copper and nickel values do not correspond with uranium values it is important to note that concentrations of these elements, and particularily copper, are anomalously high in samples where uranium values are highest. Though silver values were not examined, results from 1977 assays showed anomalous values and perhaps this metal follows a similar pattern.

The strong relationship illustrated between uranium and phosphorous values and the weaker correspondence of carbon, copper and (nickel) concentrations with uranium assays has been simply interpreted to suggest that uranium could be bound in complexes or trapped with compounds of these elements. Copper values strengthen the view that uranium mineralization may be associated with sulphides. There is no evidence to allow the determination of whether the mineralization is epi- or syngenetic but mechanisms for the trapping of remobilized uranium are present.

On the basis of the relationships observed and noted above, it is recommended that future geochemical surveys in the area of the BON claims be designed to consider phosphorous and copper values in addition to uranium. Anomalous concentrations of these elements may be an indication of uranium mineralization.

11.0 Radon Surveys

11.1 Introduction

Soil gas radon measurement was attempted on the BON claims showing in 1977, using both Alpha Meter and EDA Emanometer instrumentation. Results were encouraging - anomalies ranging up to 20 times background level were noted over areas of mineralized felsenmeer. It was planned that these radon surveys would be continued in 1978 to test the reproducibility of such measurements as well as the hope that such surveys would indicate covered extensions of the mineralized horizon.

11.2 Radon Surveys Employing Alpha Meters

11.2.1 Introduction

Of the two radon measuring instruments used on the BON claims in 1977, the Alpha Meters were used most extensively. A small rectilinear grid and 5 profiles totalling approximately 315 sample stations were surveyed on the grid on the BON claims that year.

Results and conclusions from the 1977 surveys are summarized below:

1) Significant soil gas anomalies were detected over areas of mineralized felsenmeer.
2) Such anomalies may be due simply to surface concentrations of uranium as evidenced by the similarity in the magnitude of soil gas radon and soil uranium anomalies.
3) Anomalies were displaced downslope from the location of mineralized felsenmeer. These anomalies are attributed to the emanations from

radioactive elements pooled near the base of slope in surface water and sediments. Water movement is restricted by permafrost to surface flow or percolation through an active layer of maximum thickness of about one meter. Permeability might allow gas migration from greater depths.

4) Anomalies were indicated in areas where presence of the mineralized horizon was inferred and only scantily represented by felsenmeer, but where the thickness of material covering bedrock was shallow.

5) It was concluded that a 24 hour observation period was sufficient to produce results that could be duplicated.

6) The medium in which the meters were planted significantly affected observations. Measurements from sites, where coarse fragments were a major constituent, were extremely erratic and of little value.

Brief radon surveys were conducted in 1978 for the purpose of testing the annual reproducibility of observations and the above conclusions, and in an attempt to use radon measurements to outline, on a limited scale, extensions of the mineralized horizon.

11.2.2 Description and Location of Survey

A total of approximately 230 sites were sampled along profiles on the grid over the showing on the BON claims; as outlined in Figure 14A. The sampling interval was usually 10 meters but was increased to 20 meters where lines were reconnaissance in nature.

Two of the profiles duplicated a portion of the previous years work while the remaining three lines were located in an attempt to determine the location of extensions of the mineralized unit.

11.2.3 Equipment and Mode of Operation

Alpha Meters, as designed for soil gas radon measurements, consist of a tube approximately 5 cm. in diameter and 35 cm. in length containing a silicon diffused junction alpha detector and the necessary electronics to measure and record pulse counts and elapsed time. The survey was carried out by planting these meters in holes about 30 cm. deep. Care was taken to minimize the disturbance of soils of sampling sites while augering holes, so that soil gas radon concentrations would rapidly reach equilibrium.

Experimentation revealed that a 24 hour counting period was sufficient to allow duplication of results. Anomalous observations were rechecked with a different meter. Of the total of 40 meters available, between 2 and 6 of the meters were not functional at any one time.

11.2.4 Results

Data has been plotted in the form of profiles as shown on Figures 14L to 14H. Background radon levels were significantly lower than those recorded in the previous year, but as anomalies ranging up to 40 times these levels, they were easily distinguishable from background variation. Anomalies were repeated on lines duplicating the previous year's survey and were generally of an equal or greater magnitude. Mineralized zones were well outlined.

Significant anomalies were indicated on Lines 0 meters North and 500 meters North, near the base of slopes of mineralized felsenmeer where geology is uncertain and no significant mineralization has been located.

Significant anomalies are indicated on Lines 100 meters North and 200 meters North, at the base of slopes where faults have been inferred but where no felsenmeer exists, thus the geology is uncertain. Anomalies on Lines 0 meters North, 500 meters North and 300 meters South exist under similar conditions but in addition lie at the base of slopes which are covered by mineralized felsenmeer.

11.2.5 Conclusions and Recommendations

Though all values seemed reduced from levels noted in 1977 surveys, anomalies are clearly duplicated. This variation can be attributed to differences between meteorological and thus ground conditions from 1977 to 1978.

Mineralization is clearly indicated by radon anomalies however scintillometer measurements illustrate this fact adequately in the areas surveyed. Though most other anomalies are likely caused by emanations from radioactive elements concentrated in water and sediments at the base of slopes covered by mineralized felsenmeer, many of these anomalies are coincident with inferred faults. Unfortunately, the contradictory nature of these explanations precludes the use of these anomalies as evidence supporting coincident anomalies indicated by geophysical, geochemical and spectrometer data.

In summary, all the conclusions drawn from the surveys of 1977 are supported by similar surveys conducted in 1978. Radon surveys were unsuccessful at locating covered extensions of the mineralized horizon primarily because it is uncertain that that unit is present on test locations where anomalies were not obtained.

It is recommended that radon surveys be discontinued unless special circumstances warrant their use. Such circumstances would include ideal ground conditions especially suited for radon migration or such cases where radon detecting meters can provide quantitative estimates of mineralization. Methods, more suitable than radon mapping, have been found that are able to trace the mineralized horizon.

11.3 Radon Surveys Employing the EDA Emanometer

11.3.1 Introduction

Soil gas radon surveys employing the EDA Emanometer were initiated on the BON claims in 1977 and continued during 1978. A small grid and one profile totalling approximately 75 sampling stations were surveyed in the 1977 season as detailed in the report for that year. Results were very encouraging and duplicated those obtained through the use of Alpha Meters where the surveys overlapped. It was concluded however that radon surveys employing Alpha Meters were more efficient and reliable than those involving the EDA Emanometer.

The primary disadvantages of the EDA Emanometer were noted to be its unreliability due to its short integration period, its inefficiency because of the required set-up and counting, thus waiting time. As preliminary soil sampling was planned along selected lines of the grid surveyed on the BON claims showing, it was decided that it could be effectively combined with a radon survey employing the emanometer. Annual reproducibility of results from the emanometer survey of the previous years could be demonstrated and simultaneous soil gas radon and soil uranium concentrations could thus be correlated.

11.3.2 Description and Location of Survey

Two profiles were sampled as outlined in Figure 15A. One line duplicated the profile of the previous year. Sample stations were located at 10 meter intervals and a total of approximately 150 observations were recorded.

Soil gas was evacuated through a hollow probe and pumped into a zinc-sulphide phosphor coated scintillation cell. The concentration of the thorium radon daughter product can be distinguished from the concentration of the uranium radon daughter. Observations for $Radon_{222}$ are integrated over a 5 minute period.

11.3.3 Results

Data has been presented as profiles on Figures 15B to 15G. Background values were significantly lower than those recorded the previous year, but anomalies were easily distinguishable above background variations.

The major anomalies noted from the surveys of the previous year were repeated but the magnitude and location of the anomalies varied. Most anomalies approximate those indicated by soil surveys and mapped locations of the mineralized horizon with one notable exception. This radon anomaly appears at the base of a slope on Line 0 meters North between 275 and 400 meters East where significant mineralization or anomalous soil uranium concentration was noted.

11.3.4 Conclusions and Recommendations

While results of the previous year's work were not duplicated, it is evident that the same anomalies were revealed and thus the same conclusions can be made. The variation in readings between the two surveys can be attributed to variations in the thickness of the active layer and soil water content. These radon surveys well outline mineralization but anomalies appear to be consistently displaced downslope.

Anomalies occurring where no significant mineralization has been noted during geologic, mapping, soil or scintillometer surveys, seem to be located at the base of slopes or in drainages coincident with inferred faults. Two explanations are offered. Anomalous concentrations of radon gas could emanate from water and surface sediments pooled at these locations. While it is unlikely that radon gas could be transported in water over the necessary distances required to produce such concentrations, soluble parent products could be concentrated. Alternatively, anomalous concentrations of radon gas could be emanated from faults and related fractures.

In light of the conclusions listed above it is apparent that radon surveys employing the EDA Emanometer have effectively outlined mineralization. It is recognized, however, that more suitable methods are available for tracing the mineralized unit, thus it is recommended, as with surveys involving Alpha Meters, that radon surveys be limited to circumstances where special conditions are prevalent.

12.0 General Conclusions and Recommendations

While conclusions from each survey employed to evaluate the mineralization located on the BON claims are listed in detail in their respective chapters, significant conclusions can be drawn from a compilation of these results. These summaries are accordingly, the basis of recommendations for further investigations on those claims.

Geologic mapping in conjunction with radiation detection methods have confirmed that mineralization is stratabound (concluded from program of 1977). Resistivity surveys appear to be a suitable method for mapping the mineralized unit as characteristic resistivity values correspond with the positioning of this unit as noted on the geologic map based on felsenmeer occurrences. Both surveys indicate the mineralized unit extends over a strike length of 2.5 km., has been repeated and offset due to faulting and extends beyond the survey boundaries under soil and vegetation cover.

Several structural complexities have been noted. Supporting data is ambiguous and information required to resolve these uncertainties is likely available only through diamond drilling.

Though scintillometer, radon and geochemical surveys (including those from 1977) concur that mineralization is present over a wide area, they also confirm that the highest uranium concentrations are confined to several well-defined areas on the showing. These zones straddle inferred faults and are coincident with areas of rusty-weathering felsenmeer and anomalies outlined by an Induced Polarization survey conducted over the area of the showing. Chargeability data therefore supports the notion that there is a positive relationship between sulphide and uranium concentrations.

Assays of soil and weathered rock illustrated associations between uranium and several elements and thus clues to the trapping mechanisms which may have resulted in uranium mineralization. The validity of these relationships and the correlation between sulphide and uranium concentrations noted can only be estimated until unweathered rock is available for analysis.

On the basis of the results and conclusions of the surveys under discussion the following recommendations are made:

1) Induced Polarization surveys should be detailed and expanded to outline targets within the mineralized unit and extensions of this unit.
2) Diamond drilling should be employed to evaluate the mineralization, to test the presumed relationship between sulphide and uranium concentrations and to evaluate the importance of other trapping mechanisms noted.
3) Geological investigations based on mapped data should be used to outline areas beyond claim boundaries where the presence of the mineralized unit is suspected and where geophysical and geochemical surveys could be conducted.
4) Reconnaissance geochemical soil and water surveys should be conducted employing analysis of elements observed to be correlative with uranium concentrations. These soil and stream sediment surveys might be useful in exposing extensions of the mineralized unit.
5) Radon surveys should be discontinued and should be employed only when special circumstances warrant their use.

REFERENCES

Bamber, E.W. and Waterhouse, J.B. Carboniferous and Permian Stratigraphy and Paleontology, Northern Yukon Territory, Canada. Bull. of Can. Petrol. Geol., vol 19, No. 1, March 1979, pp. 29-250.

Dyke, L.D., 1974. Structural Investigations in Barn Mountains, Northern Yukon Territory. Geol. Surv. Can., Paper 74-1, Part A, pp. 303-308.

Frebold, H. and Poulton, T.P., 1977. Hettangian (Lower Jurassic) Rocks and Gaunas, Northern Yukon Territory. Can. Jour. Earth Sci., vol. 14, No. 1, pp. 89-101.

Hughes, O.L., 1972. Surficial Geology of Northern Yukon Territory and Northwestern District of Mackenzie, Northwest Territories. Geol. Surv. Can., Paper 69-36, 11 pp.

Jeletzky, J.A., 1975. Jurassic and Lower Cretaceous Paleogeography and Depositional Tectonics of Porcupine Plateau, Adjacent Areas of Northern Yukon and Those of Mackenzie District. Geol. Surv. Can., Paper 74-16, 52 pp.

Lenze, A.C. and Perry, D.G., 1972. The Neruokpuk Formation of the Barn Mountains and Driftwood Hills, Northern Yukon; its Age and Graptolite Fauna. Can. Jour. Earth Sci., 9, pp. 1129-1138.

Norris, D.K., et al., 1963. Geology of Northern Yukon Territory and Northwestern District of Mackenzie. Geol. Surv. Can., Map 10-1963.

Norris, D.K., 1972. Structural and Stratigraphic Studies in the Tectonic Complex of Northern Yukon Territories, North of Porcupine River. Geol. Surv. Can., Paper 72-1B, pp. 91-99.

Norris, D.K., 1974. Structural and Stratigraphic Studies in the Northern Canadian Cordillera. Geol. Surv. Can., Paper 74-1B, pp. 343-349.

Norris, D.K., 1978. Geologic Maps of Yukon Territory and Northwest Territories. Geol. Surv. Can., Open File 499.

Poulton, T.P., 1978. Internal Correlations and Thickness Trends, Jurassic Bug Creek Formation, Northeastern Yukon and Adjacent Northwest Territories. Geol. Surv. Can., Paper 78-1B, pp. 27-30.

Yourath, C.J., Myhr, D.W., Young, F.G., 1969. The Geology of the Beaufort-Mackenzie Basin. Geol. Surv. Can., Open File 251.


138°00
137°45'
137°30'
68°30'
MT
FITTON
Ck
1000
1500
1500
TIE CLAIMS
2969
BON CLAIMS
2000
2000
68°15'
TIE CLAIMS
Bonnet
Lake
68°10'
138°00'
137°45'
137°30'
FIGURE No. 1
SCALE 1:50,000
1 1/4 inch to 1 mile approximately
MILES 1 0 1 2 3 MILES
METRES 1000 500 0 1000 2000 3000 4000 METRES
AQUITAINE COMPANY OF CANADA LTD.
YUKON TERRITORY
MAP SHEET 117A/7 & 117A/2
STAKING SKETCH SHOWING
TIE AND BON MINERAL CLAIMS
DATE: AUGUST 1978
SCALE: 1:50,000

INDEX MAP

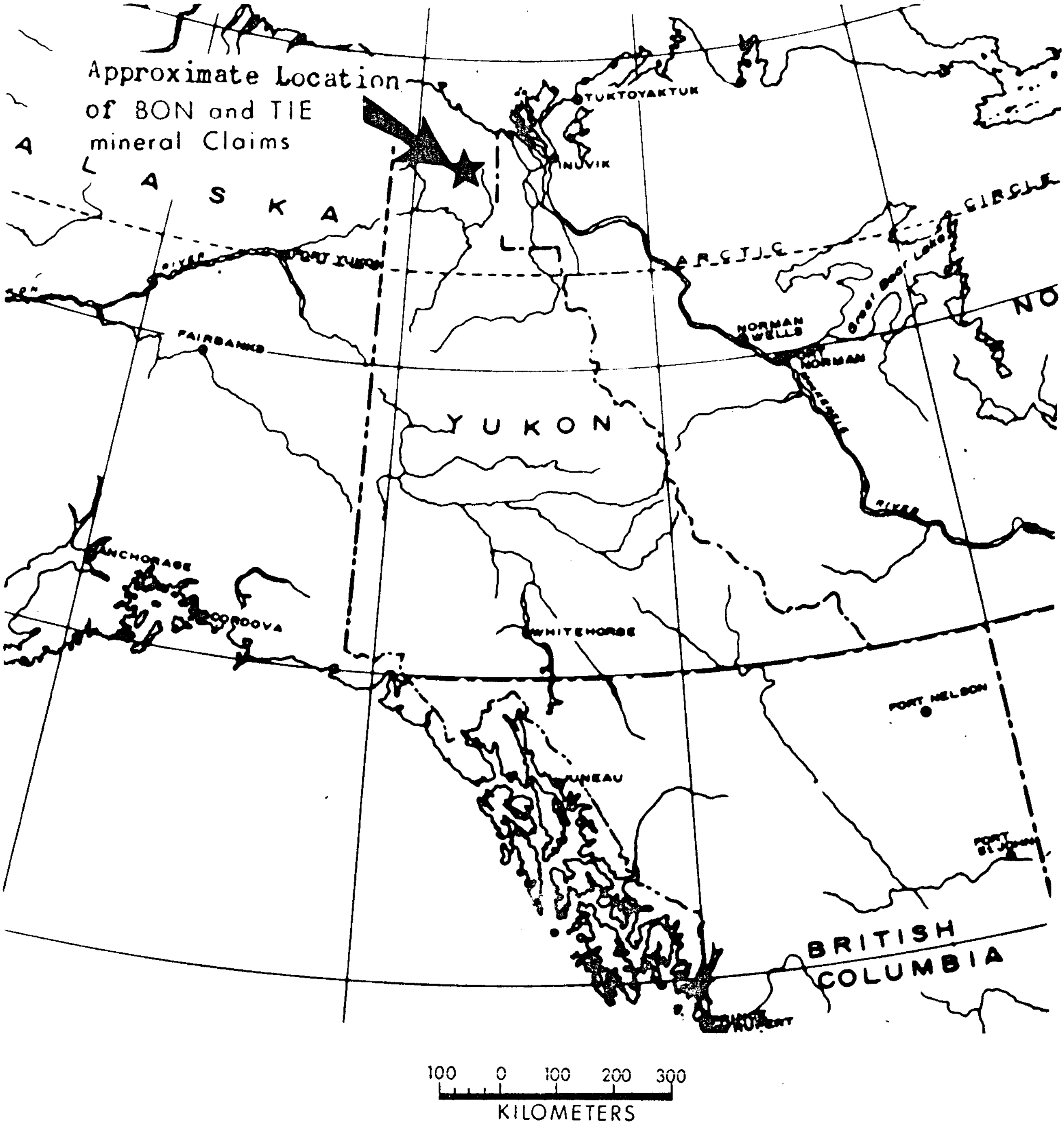


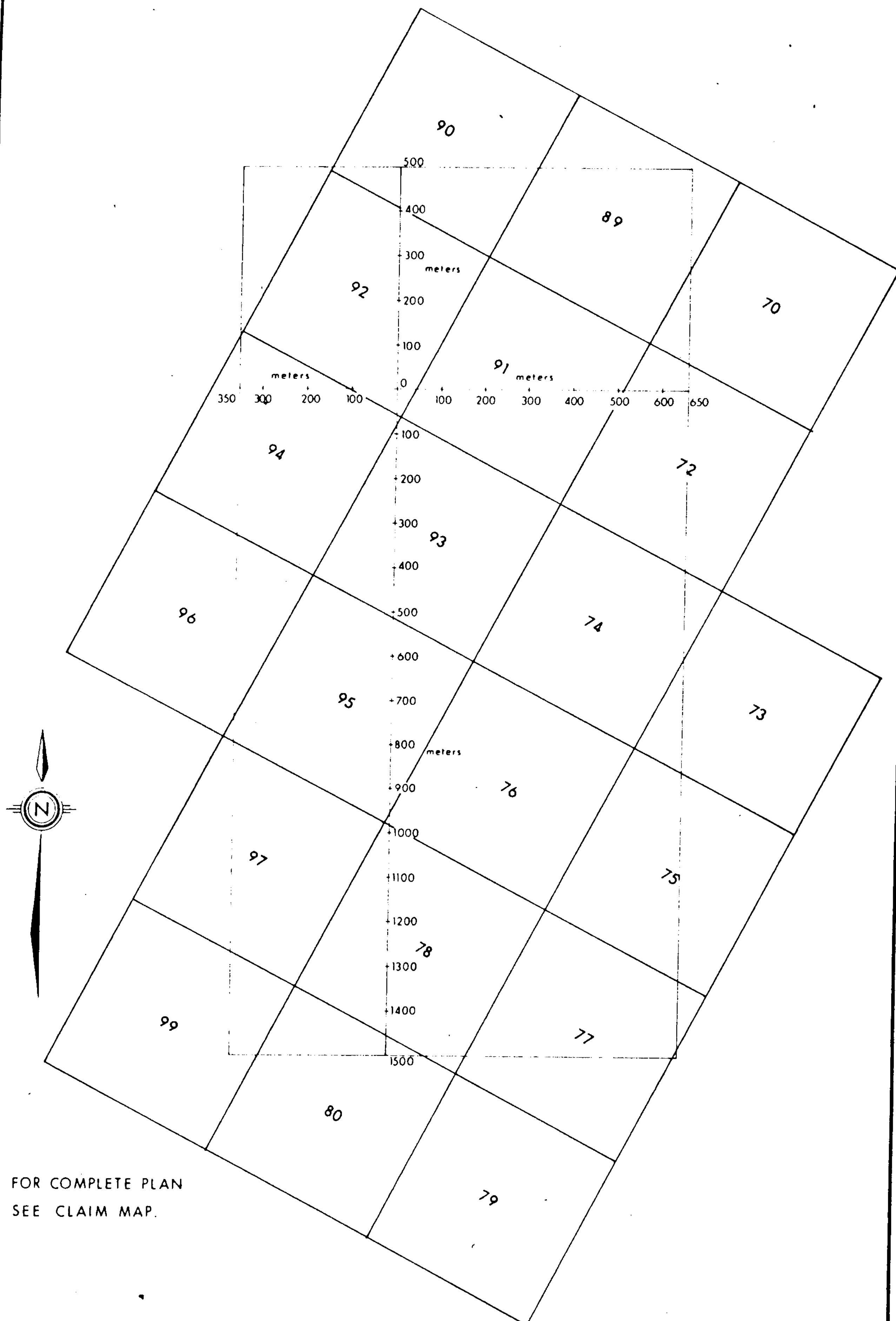
Fig. No. 2

AQUITAINE COMPANY of CANADA Ltd.

PROPERTY LOCATION MAP

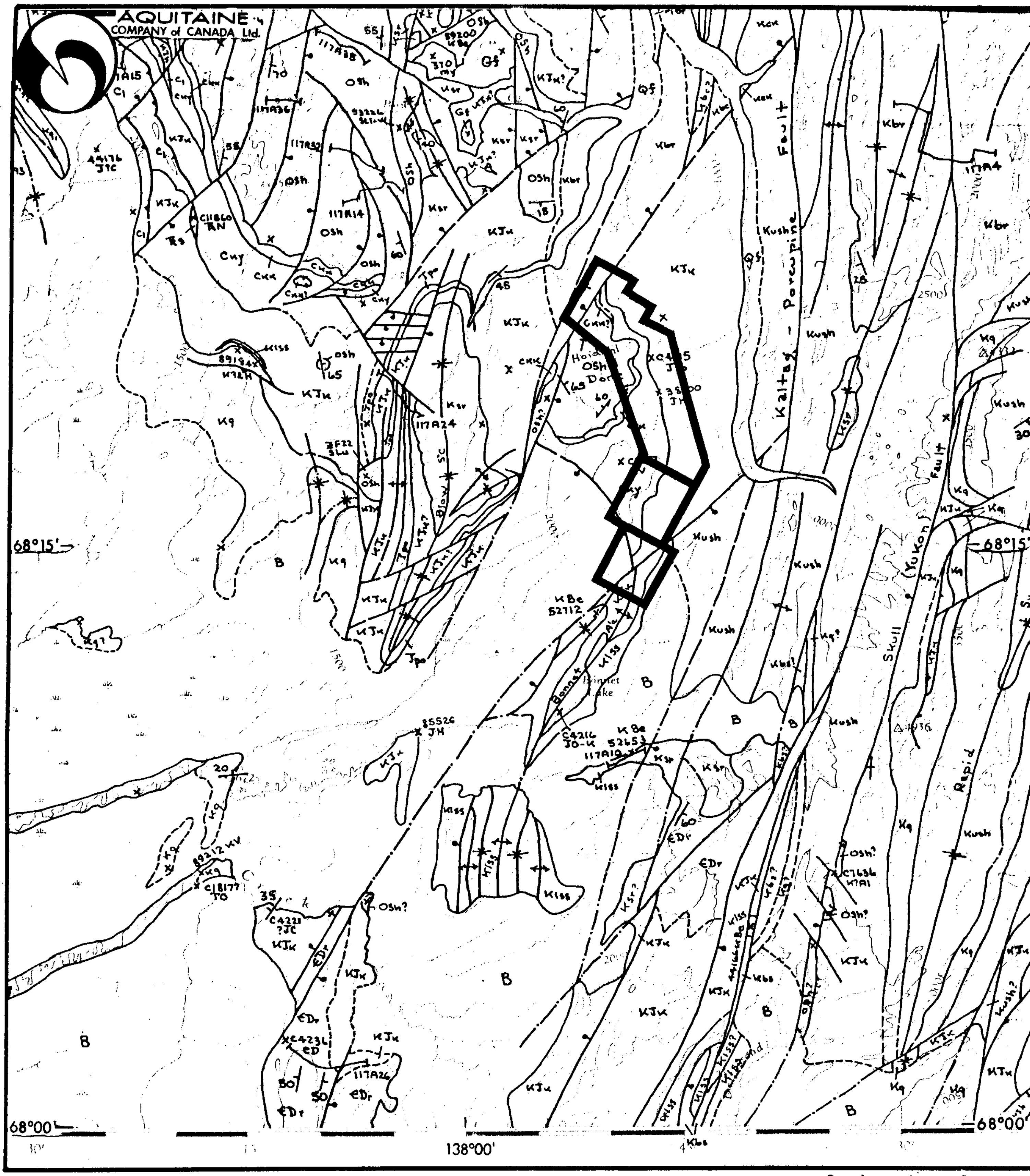
DATE AUGUST 1978 | SCALE

GRID POSITION ON BON CLAIMS



FOR COMPLETE PLAN
SEE CLAIM MAP.

Fig. No: 3



GEOLOGY OF A PORTION OF BLOW RIVER NTS 117 A INCLUDING THE BON AND TIE CLAIMS

HELD BY AQUITAINE CO OF CANADA LTD.

(Excerpted from G.S.C. Open file 499 by D.K. Norris)

See Legend Fig. 4B

Fig. No. 4 A

AQUITAINE COMPANY OF CANADA LTD.

LEGEND TO ACCOMPANY Fig. No. 4 A

COMPOSITE LEGEND
OPERATION PORCUPINE PROJECT AREA

- Qf Fluviatile deposits of modern floodplains and low terraces
- Qff Fluviatile deposits of fans and fan aprons
- Qgf Glaciofluvial deposits
- Ql Lacustrine deposits and other fluviatile deposits
- Qmm Hummocky or ridged moraine in area of mountain glaciation
- Qml Hummocky or ridged moraine in area of Laurentide glaciation
- Qd Rock slide debris
- Qm Marine and estuarine deposits
- p Pediment surfaces, mostly with thin cover of colluvium and/or organic deposits
- Cg Gypsum intrusions

Time scale (left column)

Quaternary; Tertiary; Cretaceous (Upper Cretaceous, Lower Cretaceous); Jurassic; Triassic; Permian; Carboniferous; Devonian (Upper Devonian, Middle Devonian, Lower Devonian); Silurian and Devonian; Ordovician and Silurian; Upper Cambrian and Ordovician; Upper Cambrian; Middle Cambrian; Lower Cambrian; Hadrynian; Helikian; Helikian and Aphebian

1
Romanzof and Barn Uplifts / Old Crow - Babbage Depression / Rapid Depression / Kugaluk Homocline / Beaufort Shelf

- Tl unnamed clastics and peat nm
- Tr Reindeer Formation m & nm; shale — Tak Aklak Member nm; clastics and coal
- Kmc Moose Channel Formation m & nm, sandstone and mudstone (?) — Kmc Monster Formation nm, clastics
- Kti Tent Island Formation m; Kcc Cuesta Creek Member m, clastics
- (Moose Channel Formation: upper sandstone nm, middle shale nm, lower sandstone nm)
- unconformity
- Kbc Boundary Creek Formation m, shale
- disconformity
- Kbr unnamed shale, sandstone and phosphatic iron
- Kusd "upper sandstone division" m; Kdc unnamed conglomerates; disconformity
- Kush "upper shale-siltstone division" m
- Kq "white and coaly quartzite" m & nm; Kql sandstone; Kq2 siltstone; Kq3 sandstone
- Kbs "bluish grey shale" m
- KJls "lower sandstone division" m & nm
- KJu Jurassic and Lower Cretaceous clastics undivided (includes Bug Creek Formation)
- KJk Kingak Formation m; shale
- disconformity
- TRs Shublik Formation m; limestone and siltstone
- disconformity
- Ps Sadlerochit Formation m; undivided clastics
- disconformity
- Cw Wahoo Formation m; limestone
- Ca Alapah Formation m; limestone
- Ckp Kayak Formation nm & m; clastics, limestone and coal
- Cks Kekiktuk Formation nm & m; conglomerate and sandstone
- Cl Lisburne Group undivided
- angular unconformity
- Sedgwick Granite; Fitton Granite; Old Crow Granite; Schaeffer Granite; unnamed Granite; Bare Lake Syenite
- €Or Road River Formation m; unnamed shale and quartzite (m) in Barn Uplift
- €um unnamed volcaniclastics and limestone m (undivided Lower and Upper Cambrian)
- angular unconformity?
- Pr Neruokpuk Formation ?= PR Tindir Gp.; clastics and carbonates. Numbering of units does not imply stratigraphic order; Pm1, phyllite and quartzite; Pm2, limestone and phyllite; Pm3, phyllite and quartzite; Pm4, siltstone; Pm5, phyllite and quartzite; Pm6, phyllite; Pm7, quartzite (base not seen)
- Gr basic dyke

2
Taiga-Nahoni Fold Belt / [illegible] Basin / Eagle Fold Belt

- Ksd unnamed sandstone and shale m; Kmo Monster Formation nm; Kso clastics undivided
- Ks2 unnamed sandstone and shale m
- Ks1 unnamed shale m
- Ksb unnamed sandstone m
- Kbc Boundary Creek Formation m; shale
- Ksr unnamed shale m; Kar Arctic Red Formation m; Ksm Sharp Mountain conglomerate
- angular unconformity
- Kusd "upper sandstone division" m
- Kush "upper shale-siltstone division" m
- Kq "white and coaly quartzite" m & nm
- KJls "lower sandstone division" m & nm (includes Kq and Kbs in central Richardson Mountains)
- KJh Husky Formation m; KJnb North Branch Formation m; sandstone
- Jbc Bug Creek Formation m & nm; sandstone
- disconformity
- TRid unnamed Triassic clastics and carbonates m (includes Ladinian beds in Taiga-Nahoni Fold Belt)
- disconformity
- Pt Takhandit Formation m; limestone and chert (includes unnamed Permian clastics southeast of Hungry Lake)
- Pjc3 Jungle Creek Formation m; sandstone
- Pjc2 Jungle Creek Formation m; shale
- Pjc1 Jungle Creek Formation m; carbonates and clastics
- PJC Jungle Creek Fm. undivided; PC Permian and Carboniferous undivided
- disconformity
- Cel Ettrain Formation m; shale and limestone; Cef Ettrain Formation m; limestone and shale
- Pcl "unit 2" m; carbonates and clastics
- Chr2 Hart River Formation m; siltstone; Chr Hart River Formation undivided; Chr1 Hart River Formation m; shale and limestone
- Ml "unit 1" m; shale
- disconformity?
- Dus unnamed shale m; Dt "Tuttle" sandstone
- Du undivided Upper Devonian clastics
- Dca Canol Formation m; black siliceous shale
- disconformity
- Do Ogilvie Formation m; limestone
- Dk Cranswick Formation m; limestone
- DmS Michelle Formation m; limestone and shale
- €Ou unnamed carbonates m; €Or Road River Formation m
- disconformity?
- €lu unnamed Upper Cambrian clastics m
- disconformity
- €mr Middle Cambrian clastics undivided
- €lr Jones Ridge limestone m
- angular unconformity
- Pt Tindir Group, undivided clastics, volcanics and carbonates (base not seen)

3
Richardson Anticlinorium / Bonnet Plume Basin

- Kbp2 Bonnet Plume Formation nm; sandstone, shale and coal
- disconformity
- Kbp1 Bonnet Plume Formation nm; conglomerate and sandstone
- angular unconformity
- Kush unnamed shale and sandstone
- TRid unnamed Triassic clastics and carbonates m
- disconformity
- Ml unnamed shale m; Mcg1 unnamed conglomerate nm; Mc unnamed clastics and coal? nm
- disconformity?
- Dus unnamed shale m
- Du2 unnamed Upper Devonian sandstone m?
- Du1 unnamed Upper Devonian shale m?
- Dca Canol Formation m; black siliceous shale
- Du undivided Upper Devonian clastics
- disconformity
- Dsh unnamed shale m
- Dk Cranswick Formation m; limestone
- Da Arnica Formation m; dolomite
- SDd orange and grey dolomite m
- SOu unnamed carbonates m; €Or Road River Fm. m; €Or1, 2, 3 shale and limestone; €Or2 debris flows
- OSs Mount Kindle Formation m; dolomite
- disconformity?
- €lu unnamed Upper Cambrian clastics m
- angular unconformity
- €m2 unnamed Middle Cambrian carbonates and clastics m
- €m1 unnamed Middle Cambrian conglomerates m
- €m Middle Cambrian undivided
- €l unnamed Lower Cambrian limestone m; €la bioherms
- unconformity
- H3 unnamed carbonates and clastics in Knorr Range
- H5 unnamed clastics and carbonates in Knorr Range
- disconformity
- Hr2 Rapitan Group, mudstone and dolomite
- Hr1 Rapitan Group; diamictite
- disconformity
- H2 unnamed carbonates, shale and gypsum undivided; Hd basic dyke
- Hk Katherine Formation, sandstone and dolomite
- Ht Tsezotene Formation; sandstone and dolomite (base not seen)
- HG unnamed orange dolomites
- H1b unnamed orange dolomite; H1a unnamed orange and grey dolomite; H1 undivided grey dolomite; Hd basic dyke
- angular unconformity?
- HO unnamed phyllitic argillites, carbonates and quartzites (base not seen)
- unnamed phyllitic argillites, breccias and quartzites (base not seen)

4
Aklavik Arch

- Tg unnamed gravels in eastern Old Crow Plain
- Tr Reindeer Formation m; shale
- Kti Tent Island Formation m
- Ksr unnamed sandstones in Porcupine River m
- disconformity
- Kusd "upper sandstone division" m
- Kush "upper shale-siltstone division" m
- disconformity
- Kq "white and coaly quartzite" m & nm
- Kbs "bluish grey shale" m
- Klsd "lower sandstone division" m & nm (includes Kq and Kbs in Aklavik Range area)
- KJh Husky Formation m; shale
- Jpo Porcupine Formation m; sandstone
- KJk Kingak Formation m; shale
- Jbc Bug Creek Formation m & nm; Jbc3 upper sandstone; Jbc2 middle siltstone; Jbc1 lower sandstone and shale
- KJu Jurassic and Lower Cretaceous clastics undivided
- disconformity
- P3 unnamed Permian clastics m (includes Jurassic clastics)
- P2 unnamed Permian limestone m; Pjc Jungle Creek Fm
- P1 unnamed Permian clastics m
- P0 unnamed Permian
- P Permian rocks undivided
- disconformity
- Ce1 Ettrain Formation m; shale and limestone; Ce2 Ettrain Formation m; limestone and shale
- Cl Lisburne Group undivided carbonates and clastics
- Chr Hart River Formation?
- Ckk Kekiktuk Formation nm & m; conglomerate and sandstone
- disconformity
- Du undivided Upper Devonian clastics
- disconformity
- Do Ogilvie Formation m; limestone
- SDd limestone and dolomite m
- SOu unnamed carbonates m; €Or Road River Formation m
- €?Ov Vunta Formation m; limestone
- disconformity?
- €? dolomite and limestone
- unconformity
- €l unnamed Lower Cambrian carbonates and clastics m
- Pt Tindir Group; undivided clastics, carbonates and volcanics (base not seen)
- ? unnamed carbonates and clastics at Bat Pass; ? = unnamed carbonates and clastics in Campbell Uplift

5
Peel Platform / Mackenzie Fold Belt

- Kbc Boundary Creek Formation m; shale
- Ktr Trevor Formation m; sandstone
- Kar Arctic Red Formation m; shale and siltstone; Kht Martin River Formation m
- Kusd "upper sandstone division" m
- Kush "upper shale-siltstone division" m
- disconformity
- Ml "unit 1" m; shale
- Mc unnamed clastics and coal nm
- disconformity?
- Dus unnamed shale Tm
- Du2 unnamed Upper Devonian sandstone Tm
- Du1 unnamed Upper Devonian shale Tm (may include Canol Formation)
- Dca Canol Formation m; black siliceous shale
- disconformity
- Dh Hume Formation m; limestone
- Dsh unnamed shale m
- Do Ogilvie Formation m; limestone
- Dk Cranswick Formation m; limestone
- Da Arnica Formation m; dolomite
- SDd orange and grey dolomite m
- OSk Mount Kindle Formation m; dolomite
- disconformity
- €Of Franklin Mountain Formation m; dolomite and shale
- disconformity
- €sk Sekwi Formation m; carbonates and clastics (includes Backbone Ranges Formation in 106 F)
- Hs Sheepbed Formation; shale
- Hk Keele Formation; carbonates and clastics
- disconformity
- Hr2 Rapitan Group; mudstone and dolomite
- Hr1 Rapitan Group; diamictite and iron formation
- Hr0 unnamed dolomite and quartzite
- Hr Rapitan Group undivided
- angular unconformity
- H2b Redstone River Formation?
- H2a Little Dal Formation?; H2 undivided
- Hk Katherine Formation; sandstone and dolomite
- Ht Tsezotene Formation; shale, sandstone and dolomite (base not seen)

D.E. Norris, Mar. 1, 1977

Fig. No. 4B

LEGEND

MESOZOIC

JURASSIC

LOWER JURASSIC OR YOUNGER

KINGAK FORMATION (LOWER MEMBER)

H — Sandstone, fine grained, carbonaceous, weathers dark grey to brown

PALEOZOIC

CARBONIFEROUS

UPPER CARBONIFEROUS (?)

L — Chert fragment conglomerate / breccia, weathers dark grey to black.

G — Chert pebble conglomerate / breccia, weathers light grey to white

E — Porcellanite, porous fine grained, kaolinized (?) weathers dull white

D — Sandstone, rusty recessive weathering

LOWER CARBONIFEROUS

KAYAK FORMATION (UPPER MEMBER)

B — Shale, black, recessive weathering, interbedded with A or D

A — Sandstone, quartzose, resistant, weathers light grey

OBSERVED ONLY AS FELSENMEER

KEY TO SYMBOLS

Geologic contact - (defined)

Geologic contact - (approximate)

Geologic contact - (inferred)

Limit of significant felsenmeer cover

Fault (approximate)

Fault (inferred)

NOTE

Geology has been inferred from observation of felsenmeer cover Downslope movement, mechanical mixing and vanable weathering characteristics etc. of felsenmeer tend to unavoidably mask or displace geologic contacts.
Consequently, all geologic contacts have been only indirectly observed, and thus the degree of certainty of geologic contacts as noted in the "Key to symbols" is one step removed from the degree of certainty that would be normally associated with these symbols

As detailed topographic information is not available for the map area see cross-sections for geological interpretation. Only one unit was seen in outcrop and the rest were observed only as felsenmeer.
Outcrop of unit A is present sparsely along the northwest rim of this map as illustrated by structural data.
For base information refer to "Felsenmeer map of A showing on the Bon Claims."

INDEX MAP

100 75 50 25 0 50 100

METRES

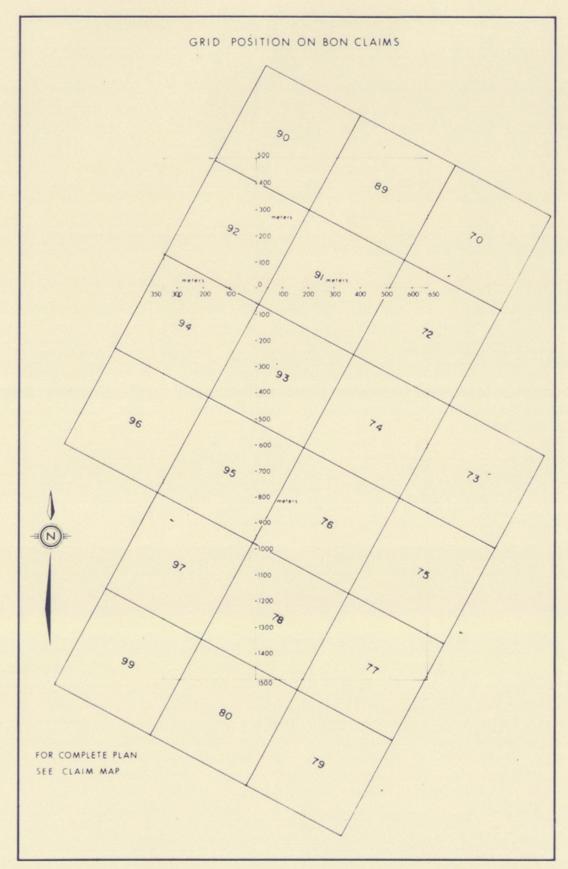


Fig. No. 5

AQUITAINE COMPANY OF CANADA LTD.

GEOLOGY OF A SHOWING ON
THE BON CLAIMS
YUKON TERRITORY

Scale: 1:2,500 or 1cm = 25m

Date: August 1978

AQUITAINE COMPANY OF CANADA LTD.

GEOLOGICAL CROSS-SECTION ALONG LINE 0 N. THROUGH A SHOWING ON THE BON CLAIMS YUKON TERRITORY, 1978.

LEGEND

MESOZOIC

JURASSIC

LOWER JURASSIC OR YOUNGER

KINGAK FORMATION (LOWER MEMBER)

- H — Sandstone, fine grained, carbonaceous, weathers dark grey to brown

PALEOZOIC

CARBONIFEROUS

UPPER CARBONIFEROUS (?)

- L — Chert fragment conglomerate / breccia, weathers dark grey to black
- G — Chert pebble conglomerate / breccia, weathers light grey to white
- E — Porcellanite, porous fine grained, kaolinized (?) weathers dull white
- D — Sandstone, rusty recessive weathering

LOWER CARBONIFEROUS

KAYAK FORMATION (UPPER MEMBER)

- B — Shale, black, recessive weathering, interbedded with A or D
- A — Sandstone, quartzose, resistant, weathers light grey

OBSERVED ONLY AS FELSENMEER

KEY TO SYMBOLS

- Geologic contact - (defined)
- Geologic contact - (approximate)
- Geologic contact - (inferred)
- Limit of significant felsenmeer cover
- Fault (approximate)
- Fault (inferred)

NOTE:

(1) GEOLOGICAL INTERPRETATION HAS BEEN DERIVED FROM OBSERVATIONS OF FELSENMEER ONLY. SEE NOTES ON "GEOLOGY OF A SHOWING ON THE BON CLAIMS"

(2) TOPOGRAPHIC SURFACE IS APPROXIMATE ONLY AND HAS BEEN SKETCHED TO INCLUDE INTERPRETATION. THUS, VERTICAL SCALE IS APPROXIMATE.

(3) DIP ANGLE IS INFERRED ONLY. FELSENMEER OUTLINES AND THE DIP OF BEDS IN UNIT "A" HAVE BEEN USED TO ESTIMATE THE DIP OF BEDDING AND CONTACTS. CONTACTS SKETCHED ARE APPARENT DIPS.

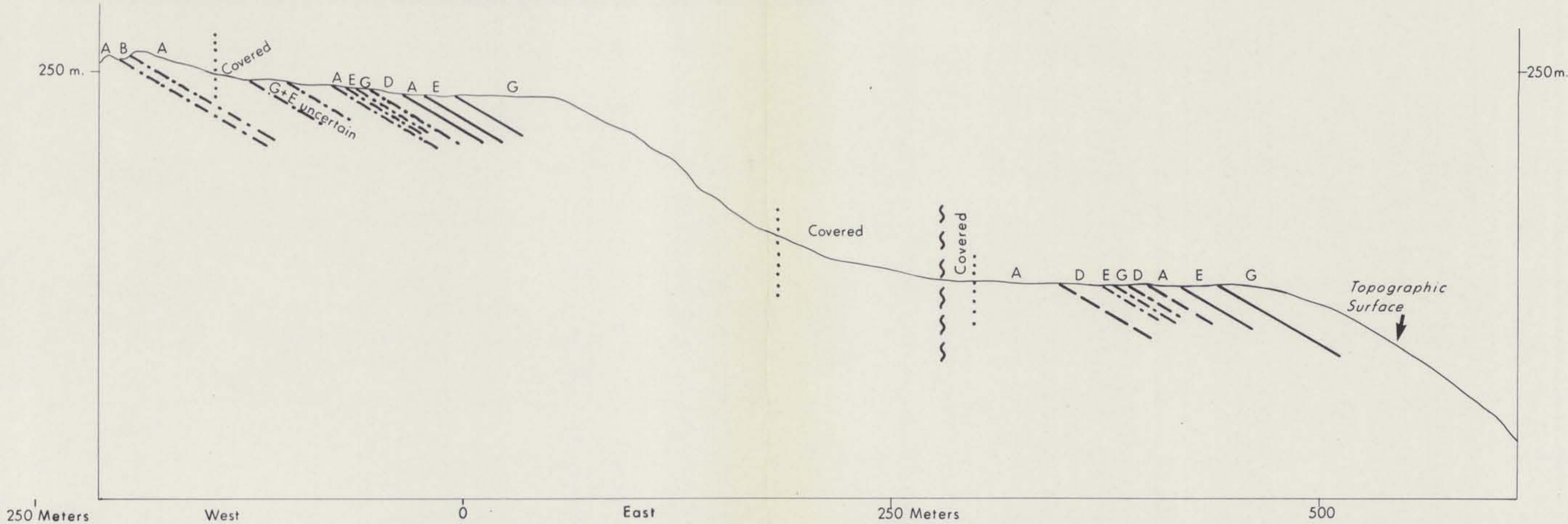


Fig. No. 6A

AQUITAINE COMPANY OF CANADA LTD.

GEOLOGICAL CROSS-SECTION ALONG LINE 800 S. THROUGH A SHOWING ON THE BON CLAIMS YUKON TERRITORY, 1978.

LEGEND

MESOZOIC

JURASSIC

LOWER JURASSIC OR YOUNGER

KINGAK FORMATION (LOWER MEMBER)

- H — Sandstone, fine grained carbonaceous, weathers dark grey to brown

PALEOZOIC

CARBONIFEROUS

UPPER CARBONIFEROUS (?)

- L — Chert fragment conglomerate / breccia, weathers dark grey to black
- G — Chert pebble conglomerate / breccia, weathers light grey to white
- E — Porcellanite, porous fine grained, kaolinized (?) weathers dull white
- D — Sandstone, rusty recessive weathering

LOWER CARBONIFEROUS

KAYAK FORMATION (UPPER MEMBER)

- B — Shale, black, recessive weathering, interbedded with A or D
- A — Sandstone, quartzose, resistant, weathers light grey

OBSERVED ONLY AS FELSENMEER

KEY TO SYMBOLS

- Geologic contact (defined)
- Geologic contact (approximate)
- Geologic contact (inferred)
- Limit of significant felsenmeer cover
- Fault (approximate)
- Fault (inferred)

NOTE:

(1) GEOLOGICAL INTERPRETATION HAS BEEN DERIVED FROM OBSERVATIONS OF FELSENMEER ONLY. SEE NOTES ON "GEOLOGY OF A SHOWING ON THE BON CLAIMS"

(2) TOPOGRAPHIC SURFACE IS APPROXIMATE ONLY AND HAS BEEN SKETCHED TO INCLUDE INTERPRETATION. THUS, VERTICAL SCALE IS APPROXIMATE.

(3) DIP ANGLE IS INFERRED ONLY. FELSENMEER OUTLINES AND THE DIP OF BEDS IN UNIT "A" HAVE BEEN USED TO ESTIMATE THE DIP OF BEDDING AND CONTACTS. CONTACTS SKETCHED ARE APPARENT DIPS.

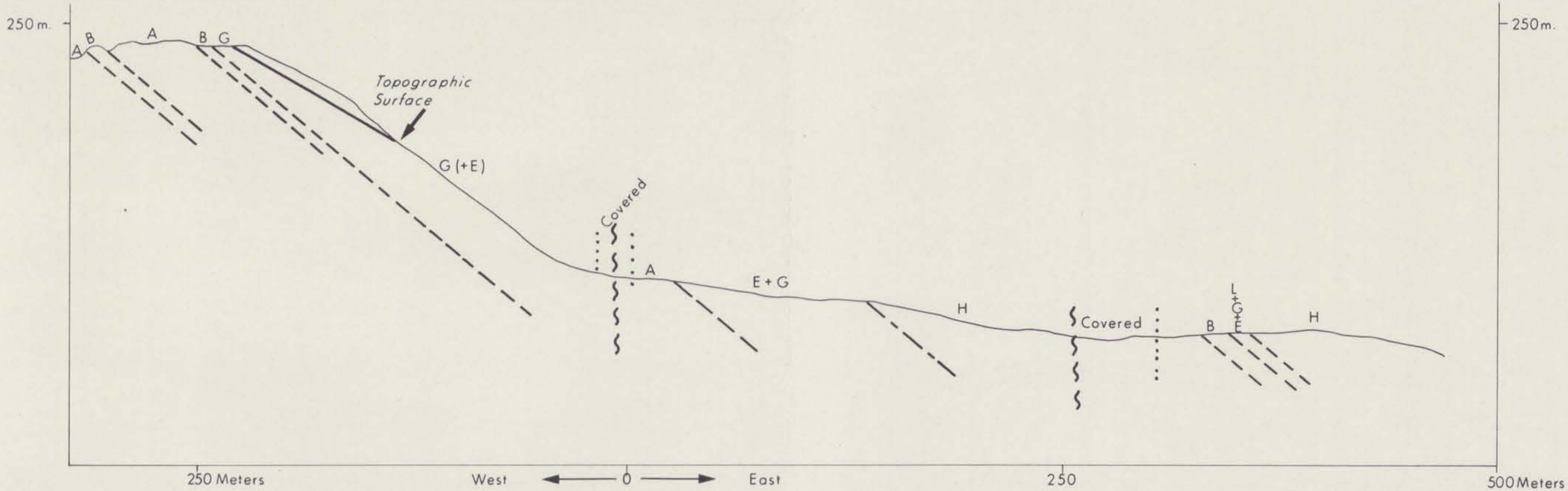


Fig. No: 6B

AQUITAINE COMPANY OF CANADA LTD.

GEOLOGICAL CROSS-SECTION ALONG LINE 300 N. THROUGH A SHOWING ON THE BON CLAIMS YUKON TERRITORY, 1978

LEGEND

MESOZOIC

JURASSIC

LOWER JURASSIC OR YOUNGER

KINGAK FORMATION (LOWER MEMBER)

- H — Sandstone, fine grained, carbonaceous, weathers dark grey to brown

PALEOZOIC

CARBONIFEROUS

UPPER CARBONIFEROUS (?)

- L — Chert fragment conglomerate / breccia, weathers dark grey to black
- G — Chert pebble conglomerate / breccia, weathers light grey to white
- E — Porcellanite, porous fine grained, kaolinized (?) weathers dull white
- D — Sandstone, rusty recessive weathering

LOWER CARBONIFEROUS

KAYAK FORMATION (UPPER MEMBER)

- B — Shale, black, recessive weathering, interbedded with A or D
- A — Sandstone, quartzose, resistant, weathers light grey

OBSERVED ONLY AS FELSENMEER

KEY TO SYMBOLS

- Geologic contact - (defined)
- Geologic contact - (approximate)
- Geologic contact - (inferred)
- Limit of significant felsenmeer cover
- Fault (approximate)
- Fault (inferred)

NOTE:

(1) GEOLOGICAL INTERPRETATION HAS BEEN DERIVED FROM OBSERVATIONS OF FELSENMEER ONLY. SEE NOTES ON "GEOLOGY OF A SHOWING ON THE BON CLAIMS"

(2) TOPOGRAPHIC SURFACE IS APPROXIMATE ONLY AND HAS BEEN SKETCHED TO INCLUDE INTERPRETATION. THUS, VERTICAL SCALE IS APPROXIMATE.

(3) DIP ANGLE IS INFERRED ONLY. FELSENMEER OUTLINES AND THE DIP OF BEDS IN UNIT "A" HAVE BEEN USED TO ESTIMATE THE DIP OF BEDDING AND CONTACTS. CONTACTS SKETCHED ARE APPARENT DIPS.

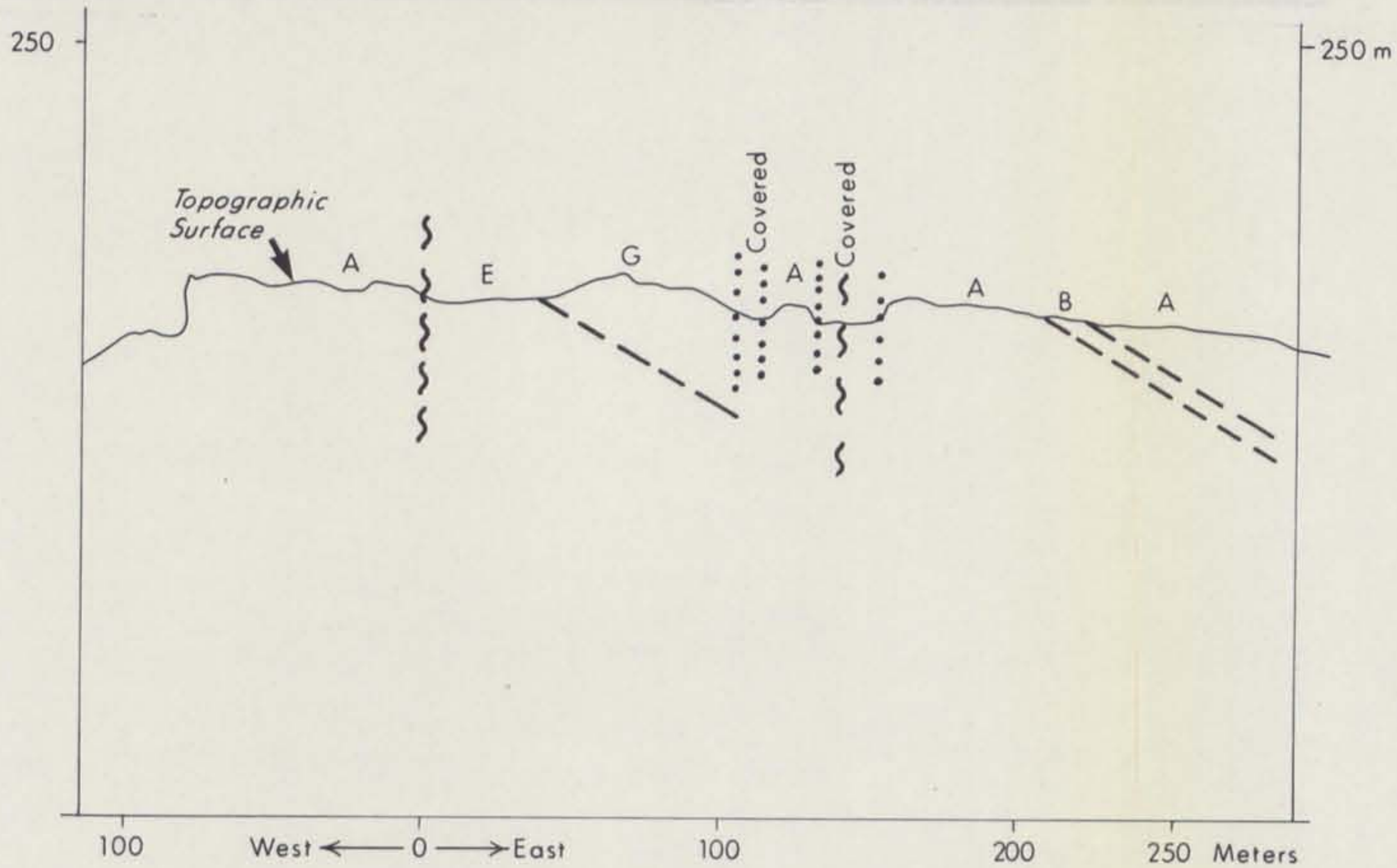


Fig. No: 6 C

AQUITAINE COMPANY OF CANADA LTD.

GEOLOGICAL CROSS-SECTION ALONG LINE 100 E. THROUGH A SHOWING ON THE BON CLAIMS YUKON TERRITORY, 1978

LEGEND

MESOZOIC
- JURASSIC
  - LOWER JURASSIC OR YOUNGER
  - KINGAK FORMATION (LOWER MEMBER)
  - [H] Sandstone, fine grained, carbonaceous, weathers dark grey to brown

PALEOZOIC
- CARBONIFEROUS
  - UPPER CARBONIFEROUS (?)
  - [L] Chert fragment conglomerate / breccia, weathers dark grey to black
  - [G] Chert pebble conglomerate / breccia, weathers light grey to white
  - [E] Porcellanite, porous, fine grained, kaolinized (?) weathers dull white
  - [D] Sandstone, rusty recessive weathering
  - LOWER CARBONIFEROUS
  - KAYAK FORMATION (UPPER MEMBER)
  - [B] Shale, black, recessive weathering, interbedded with A or D
  - [A] Sandstone, quartzose, resistant, weathers light grey

OBSERVED ONLY AS FELSENMEER

KEY TO SYMBOLS

- Geologic contact - (defined)
- Geologic contact - (approximate)
- Geologic contact - (inferred)
- Limit of significant felsenmeer cover
- Fault (approximate)
- Fault (inferred)

NOTE:

(1) GEOLOGICAL INTERPRETATION HAS BEEN DERIVED FROM OBSERVATIONS OF FELSENMEER ONLY. SEE NOTES ON "GEOLOGY OF A SHOWING ON THE BON CLAIMS"

(2) TOPOGRAPHIC SURFACE IS APPROXIMATE ONLY AND HAS BEEN SKETCHED TO INCLUDE INTERPRETATION. THUS, VERTICAL SCALE IS APPROXIMATE.

(3) DIP ANGLE IS INFERRED ONLY. FELSENMEER OUTLINES AND THE DIP OF BEDS IN UNIT "A" HAVE BEEN USED TO ESTIMATE THE DIP OF BEDDING AND CONTACTS. CONTACTS SKETCHED ARE APPARENT DIPS.

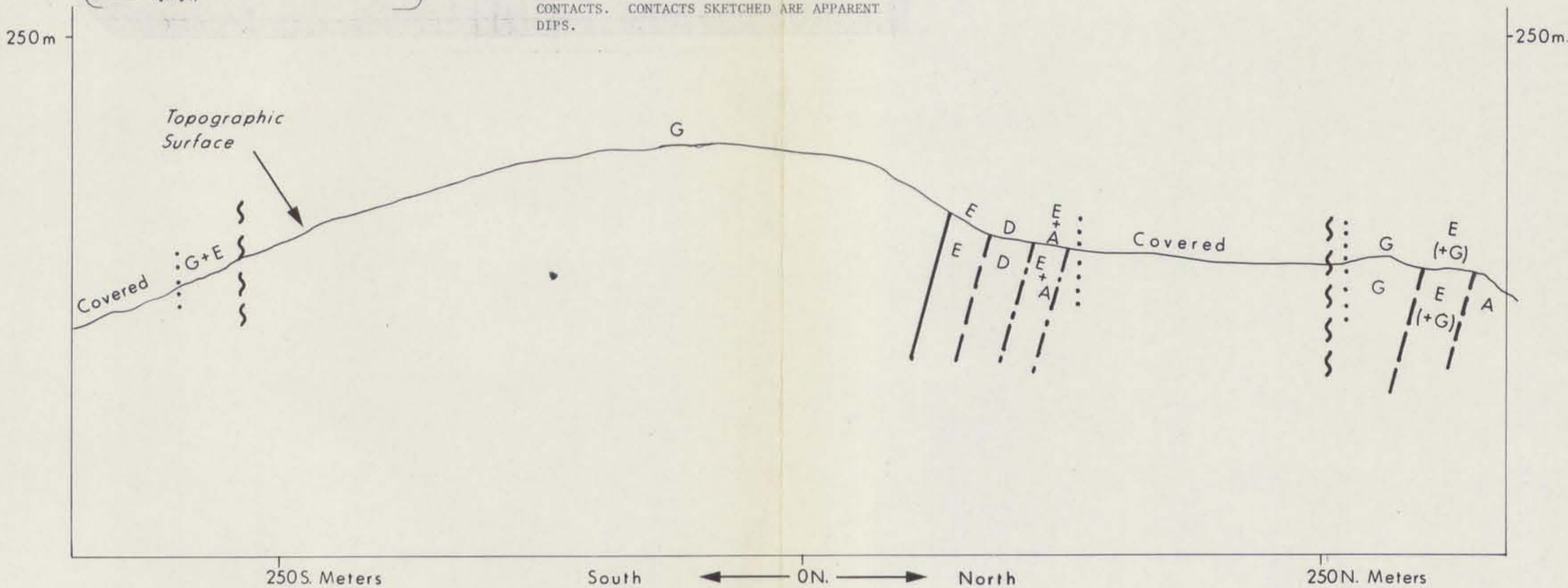
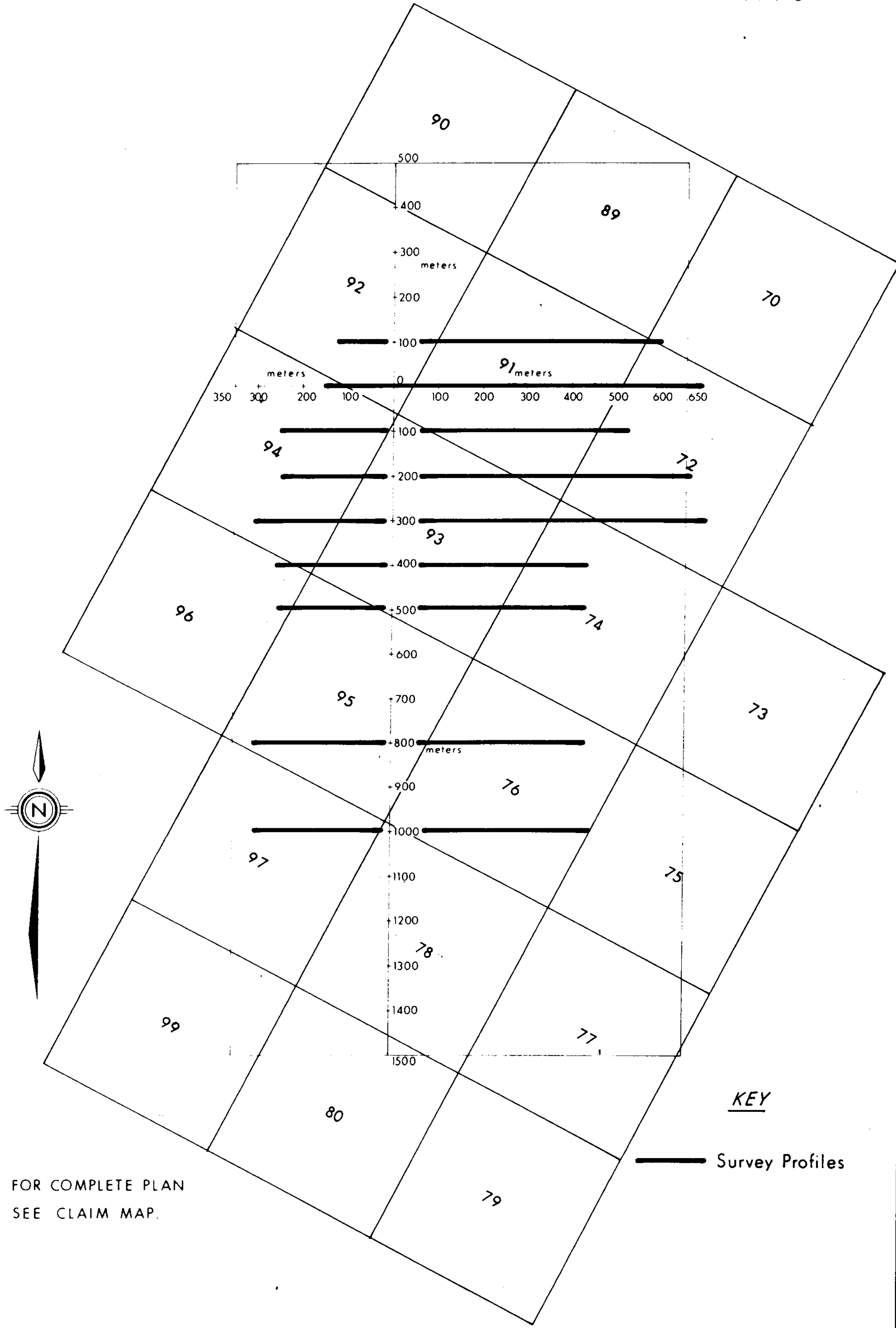


Fig. No. 6 D

GRID POSITION ON BON CLAIMS

OF INDUCED POLARIZATION SURVEY 1978



FOR COMPLETE PLAN SEE CLAIM MAP.

Fig No: 7

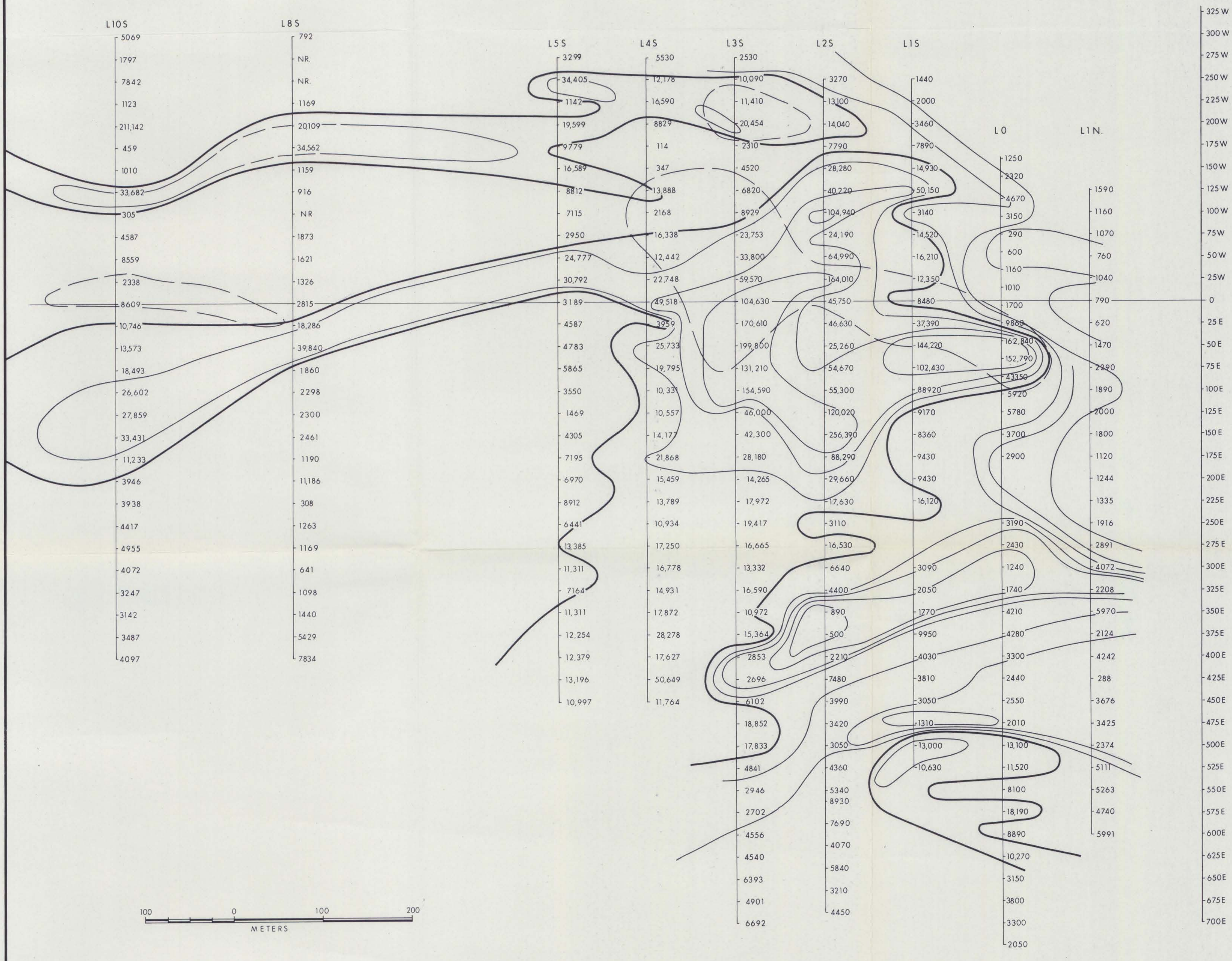


Fig. No. 8

AQUITAINE COMPANY of CANADA Ltd.

INDUCED POLARIZATION SURVEY
APPARENT RESISTIVITY PLAN
BONNET LAKE, YUKON
(VALUES IN OHM - M)

POLE-DIPOLE ARRAY a = 25m. N = 4

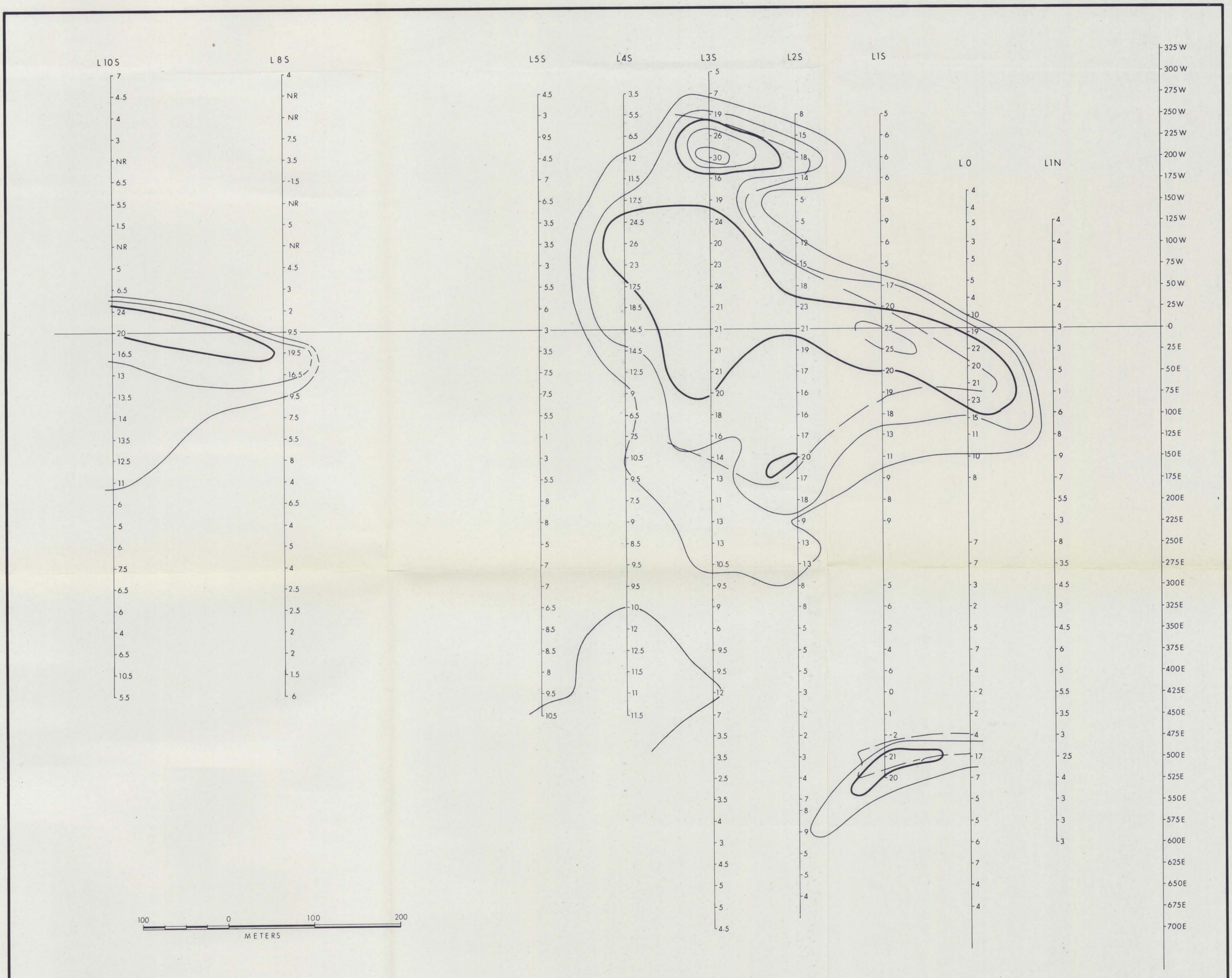


Fig. No. 9

AQUITAINE COMPANY of CANADA Ltd

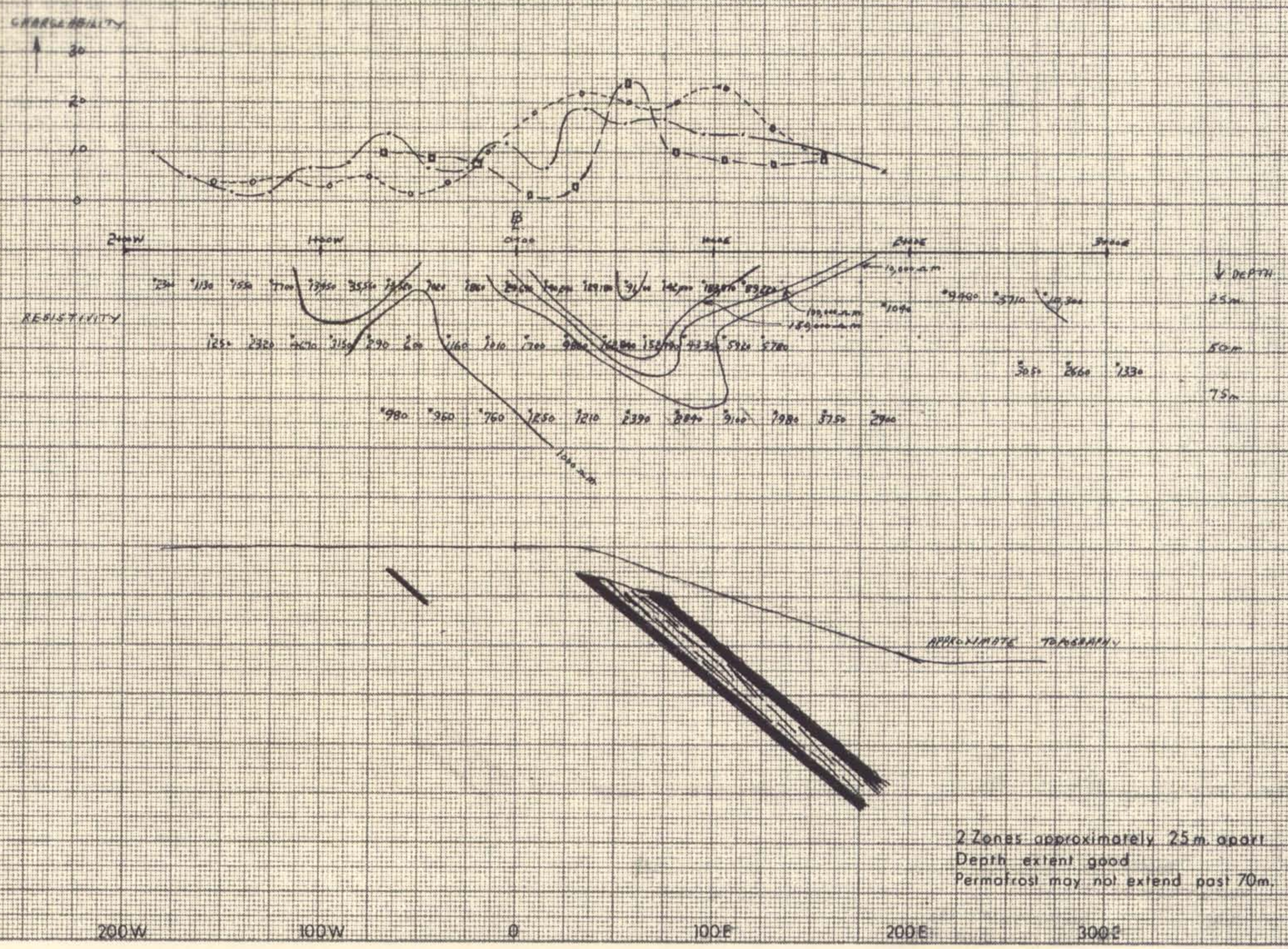
INDUCED POLARIZATION SURVEY

CHARGEABILITY PLAN

BONNET LAKE, YUKON

(VALUES IN MILLISECONDS)

POLE-DIPOLE ARRAY a=25m. N=4



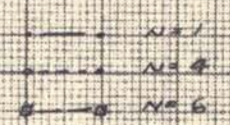


Fig. No 10

AQUITAINE COMPANY OF CANADA LTD.

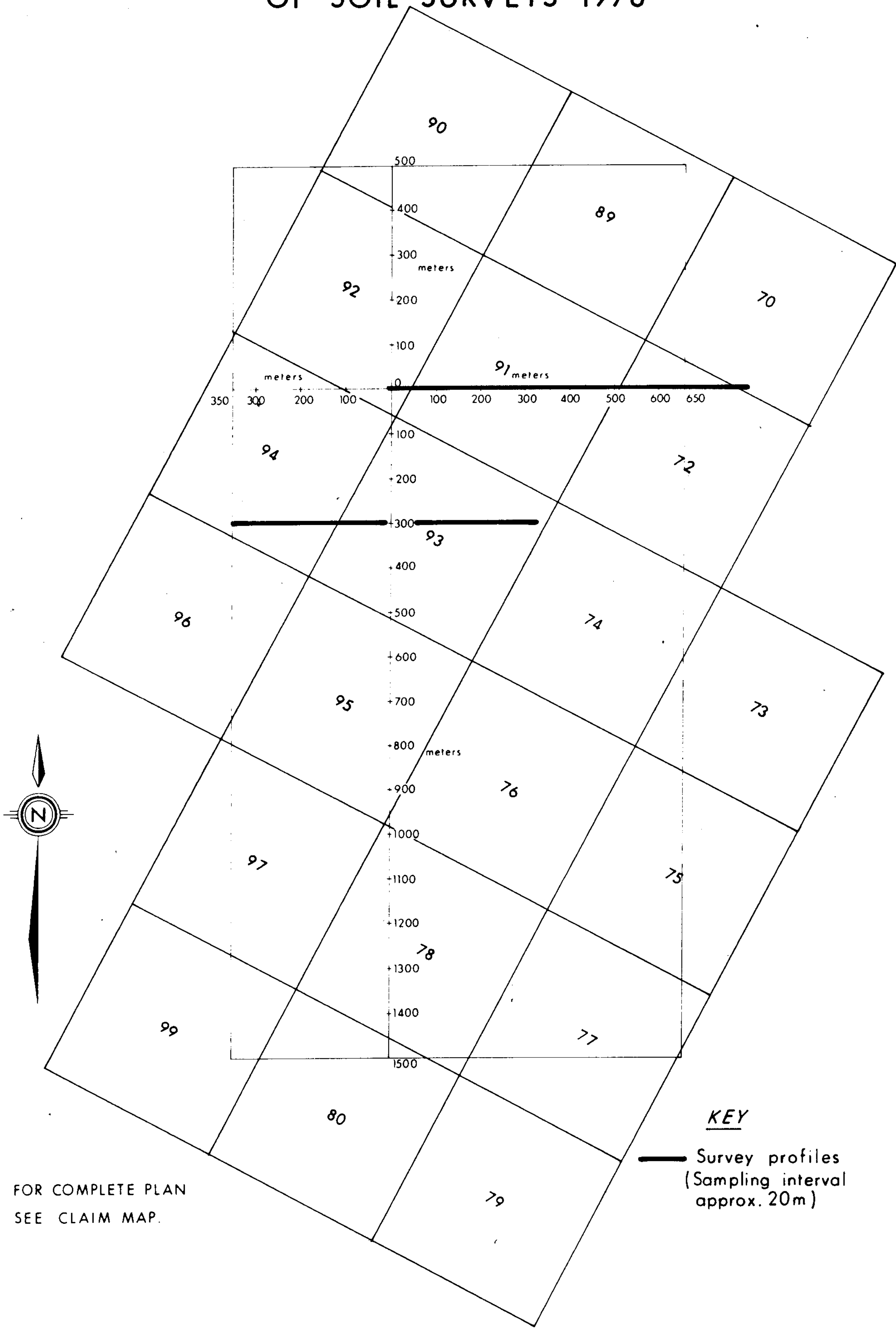
TEST I.P. AND RESISTIVITY — BON CLAIMS

SCALES:
1cm = 25m.
1cm = 10 MILLISECONDS

LINE 0+00

SURVEY BY AQUITAINE	PLOTTED BY: G.H.
DATE JULY, 1978	A.F.E AX-28

GRID POSITION ON BON CLAIMS
OF SOIL SURVEYS 1978



FOR COMPLETE PLAN
SEE CLAIM MAP.

Fig No: 11

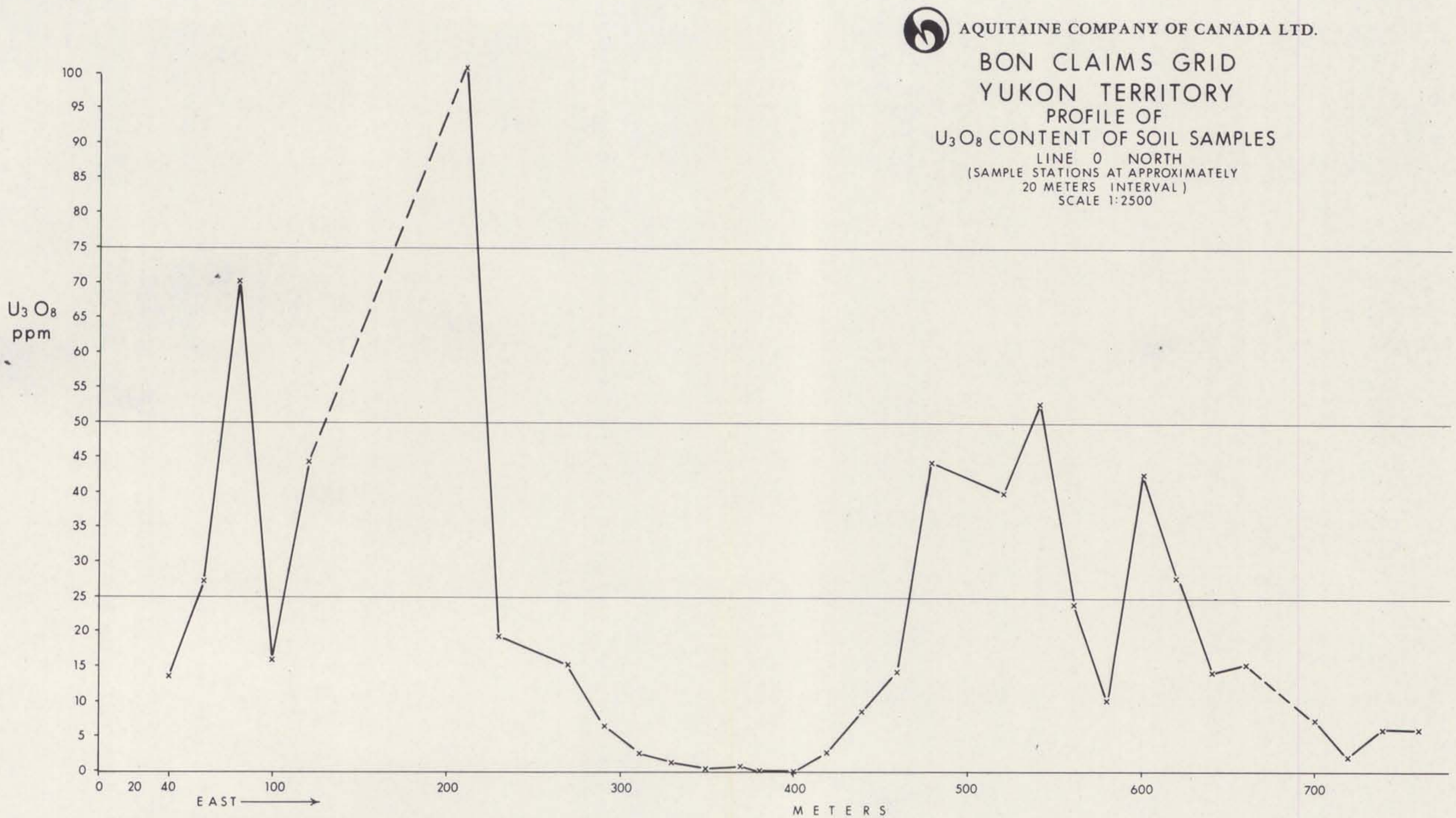
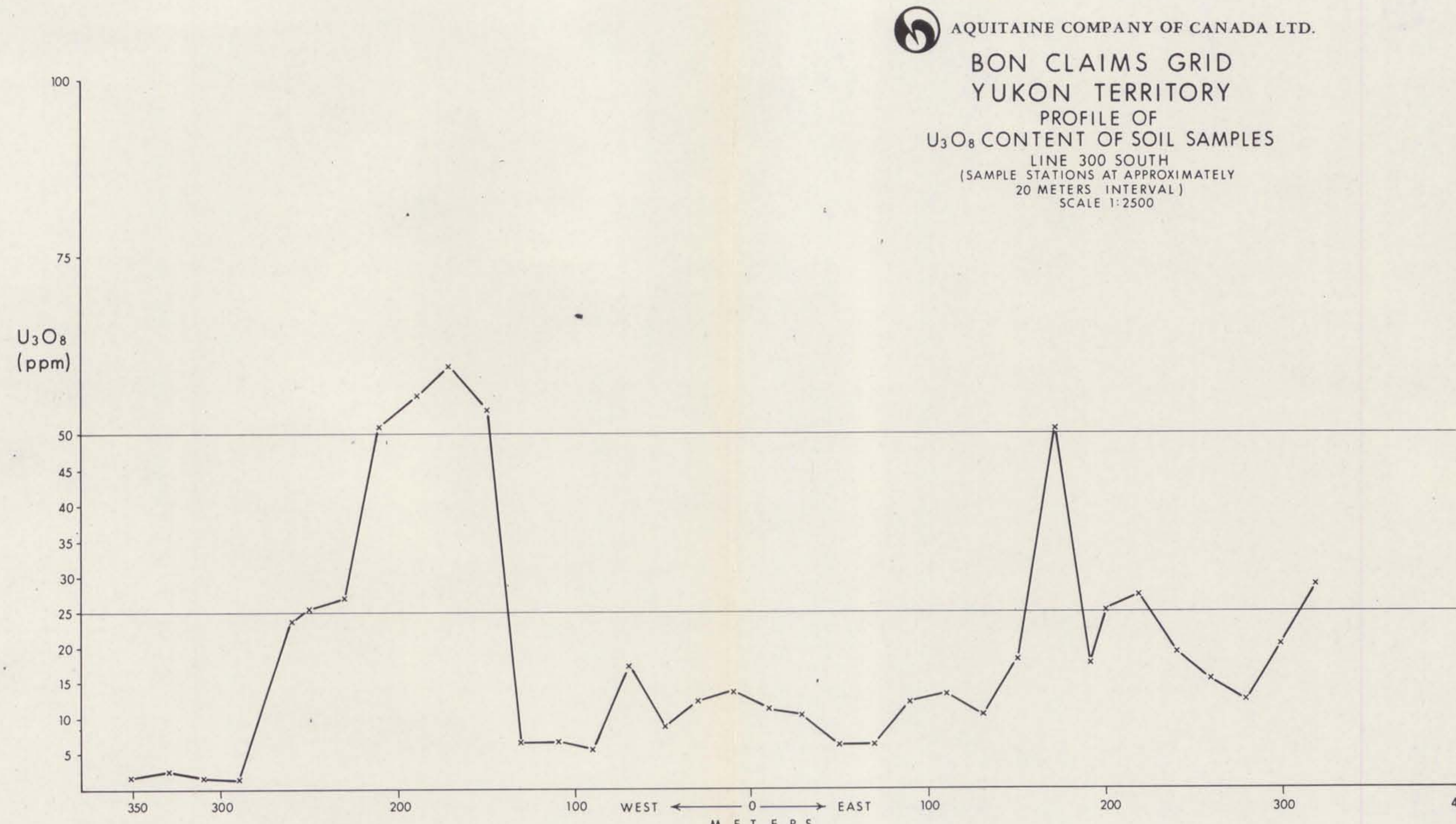

AQUITAINE COMPANY OF CANADA LTD.
BON CLAIMS GRID
YUKON TERRITORY
PROFILE OF
U_3O_8 CONTENT OF SOIL SAMPLES
LINE 0 NORTH
(SAMPLE STATIONS AT APPROXIMATELY
20 METERS INTERVAL)
SCALE 1:2500
U_3O_8 ppm
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
0 20 40 100 200 300 400 500 600 700
EAST
METERS

Fig. No: 12 A



AQUITAINE COMPANY OF CANADA LTD.
BON CLAIMS GRID
YUKON TERRITORY
PROFILE OF
U_3O_8 CONTENT OF SOIL SAMPLES
LINE 300 SOUTH
(SAMPLE STATIONS AT APPROXIMATELY
20 METERS INTERVAL)
SCALE 1:2500
U_3O_8
(ppm)
100
75
50
45
40
35
30
25
20
15
10
5
350
300
200
100
WEST
0
EAST
100
200
300
400
M E T E R S

Fig. No: 12 B

AQUITAINE COMPANY OF CANADA LTD.

BON CLAIMS SHOWING
SOIL SAMPLING SURVEY
U_3O_8 CONTENT VERSUS P_2O_5 CONTENT

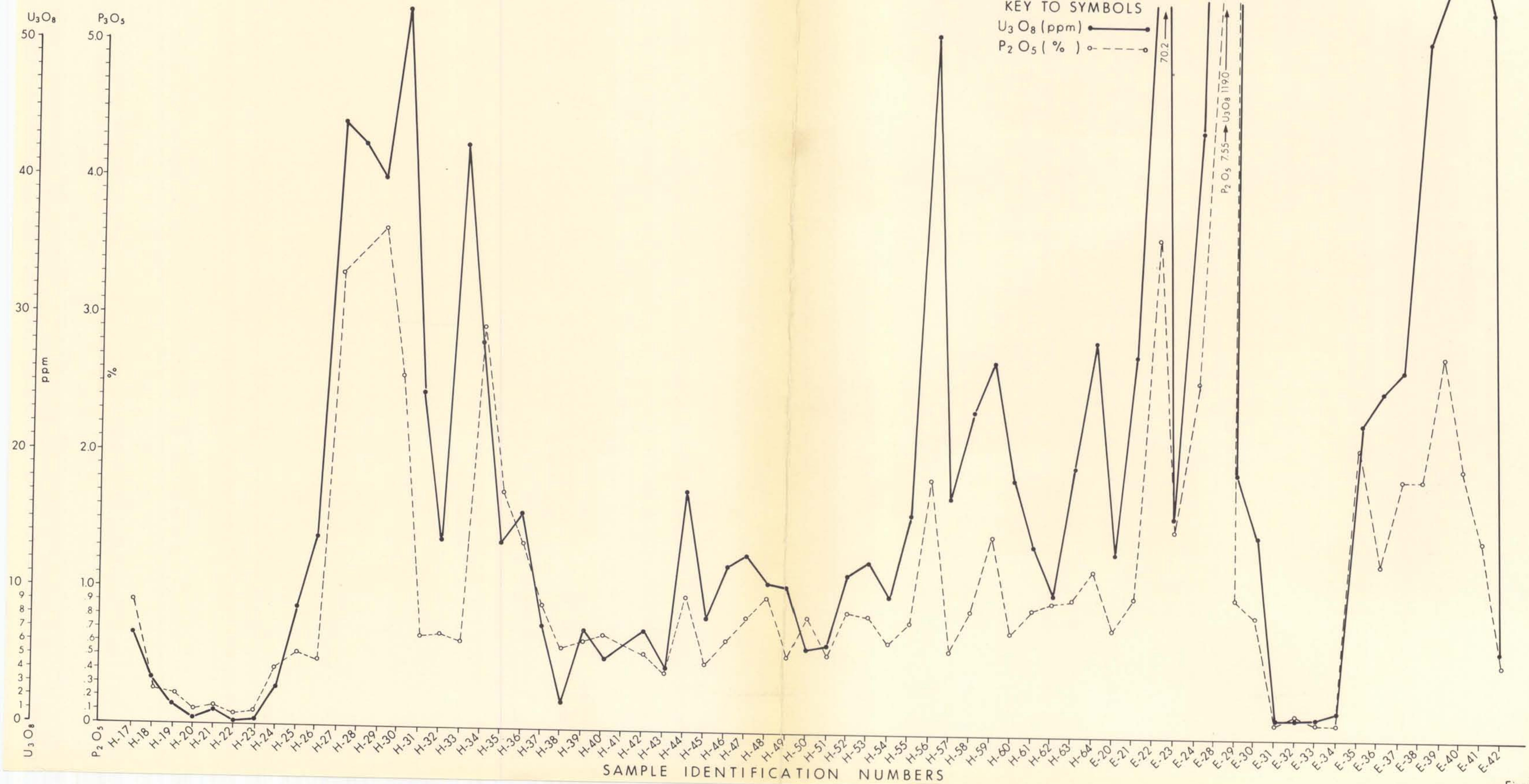
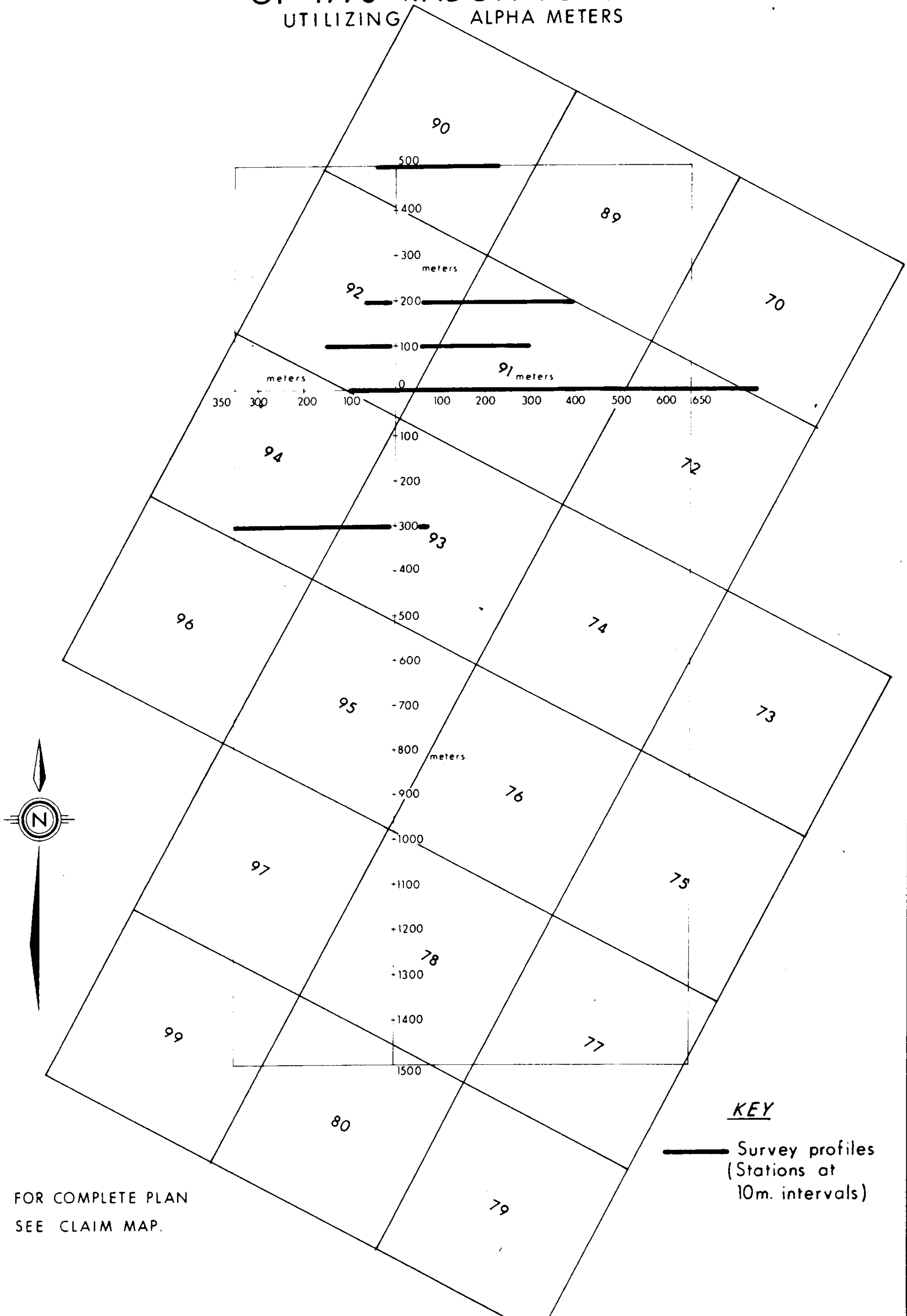


Fig. No: 13

GRID POSITION ON BON CLAIMS

OF 1978 RADON SURVEY

UTILIZING ALPHA METERS

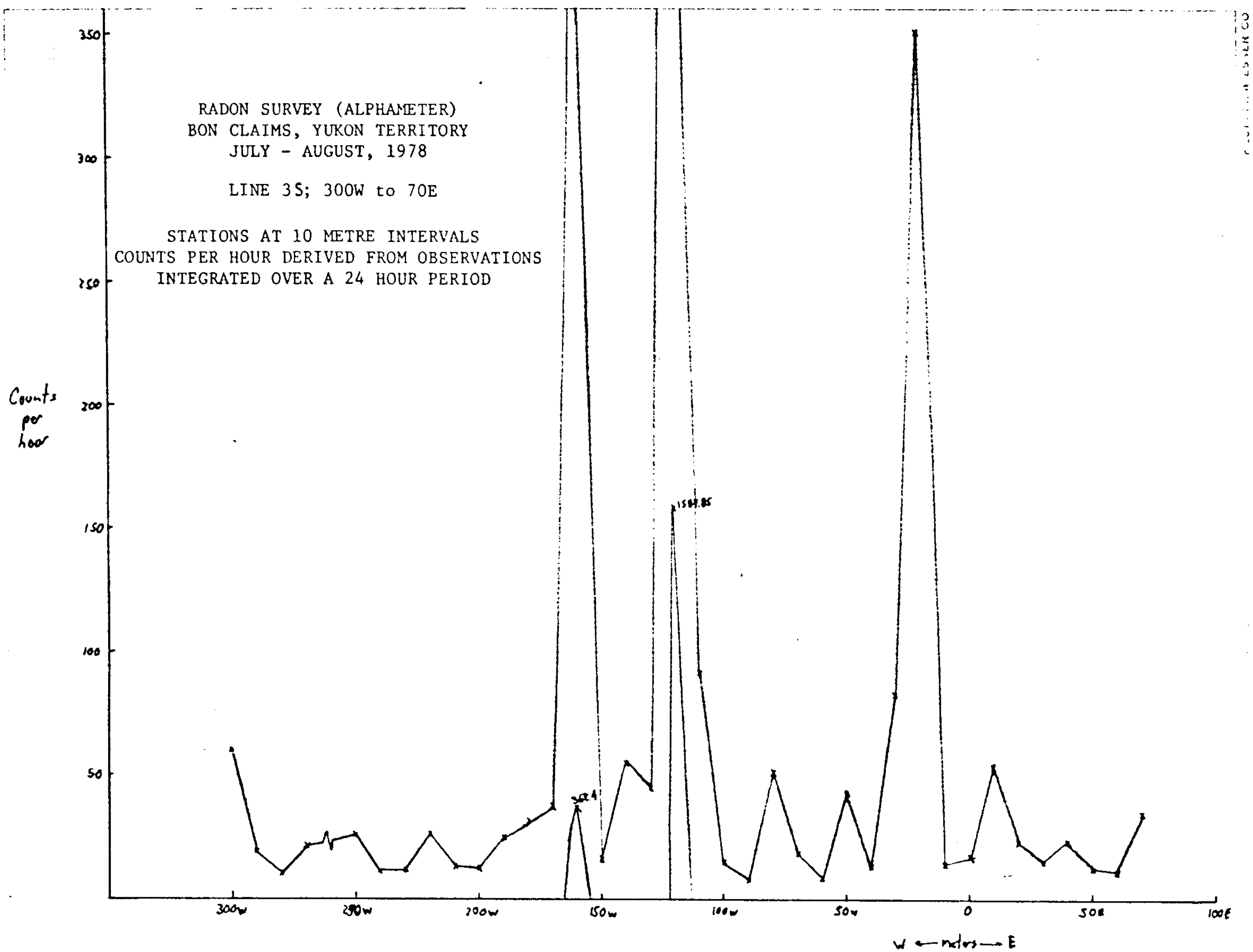


KEY

Survey profiles (Stations at 10m. intervals)

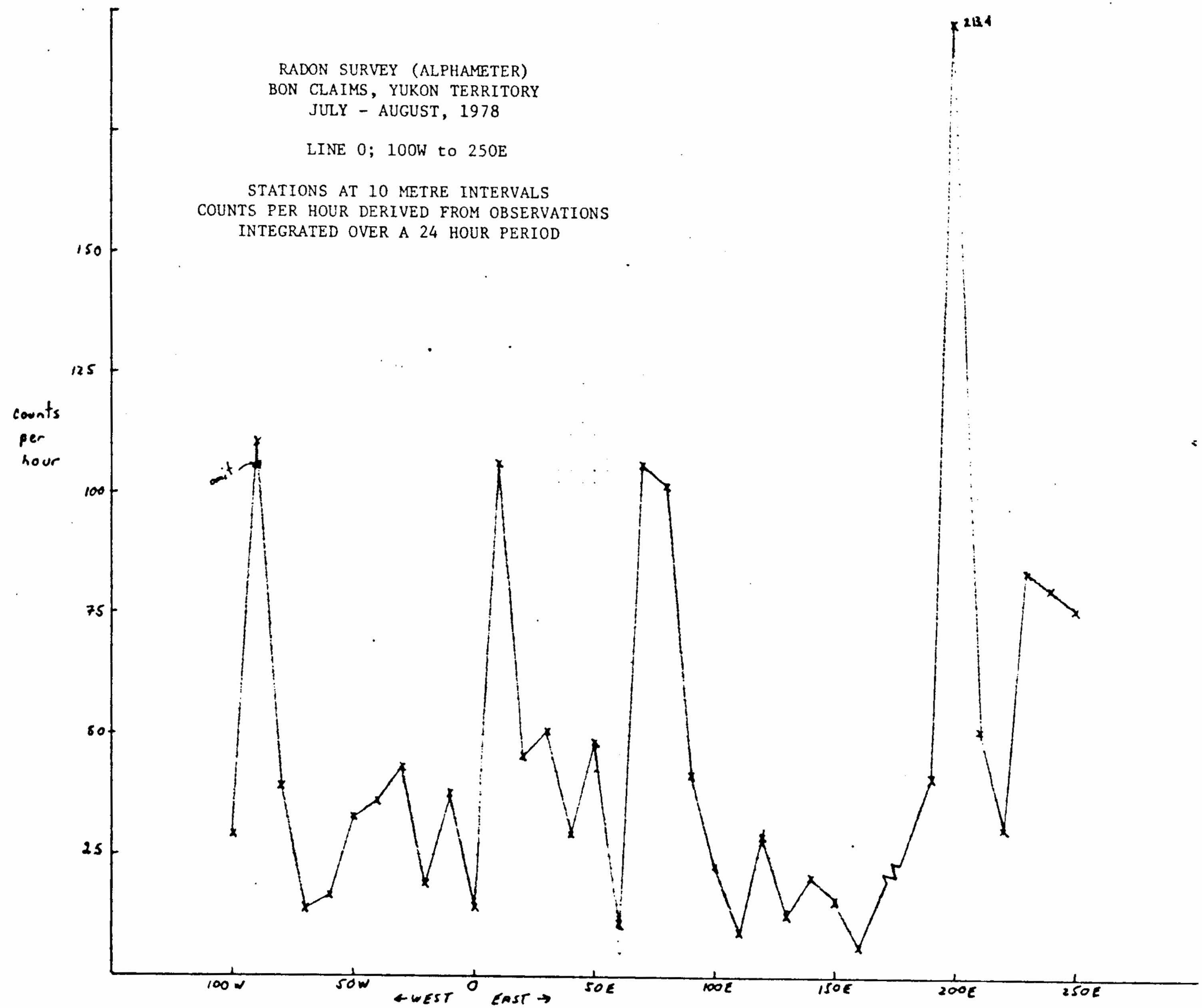
FOR COMPLETE PLAN SEE CLAIM MAP.

Fig. No: 14 A



RADON SURVEY (ALPHAMETER)
BON CLAIMS, YUKON TERRITORY
JULY - AUGUST, 1978
LINE 3S; 300W to 70E
STATIONS AT 10 METRE INTERVALS
COUNTS PER HOUR DERIVED FROM OBSERVATIONS
INTEGRATED OVER A 24 HOUR PERIOD
Counts per hour
350
300
250
200
150
100
50
300W
250W
200W
150W
100W
50W
0
50E
100E
W ← meters → E

Fig. 14 B



RADON SURVEY (ALPHAMETER)
BON CLAIMS, YUKON TERRITORY
JULY - AUGUST, 1978
LINE 0; 100W to 250E
STATIONS AT 10 METRE INTERVALS
COUNTS PER HOUR DERIVED FROM OBSERVATIONS
INTEGRATED OVER A 24 HOUR PERIOD
counts per hour
150
125
100
75
50
25
omit
213.4
100 W
50 W
0
50 E
100 E
150 E
200 E
250 E
← WEST
EAST →

Fig. 14 C

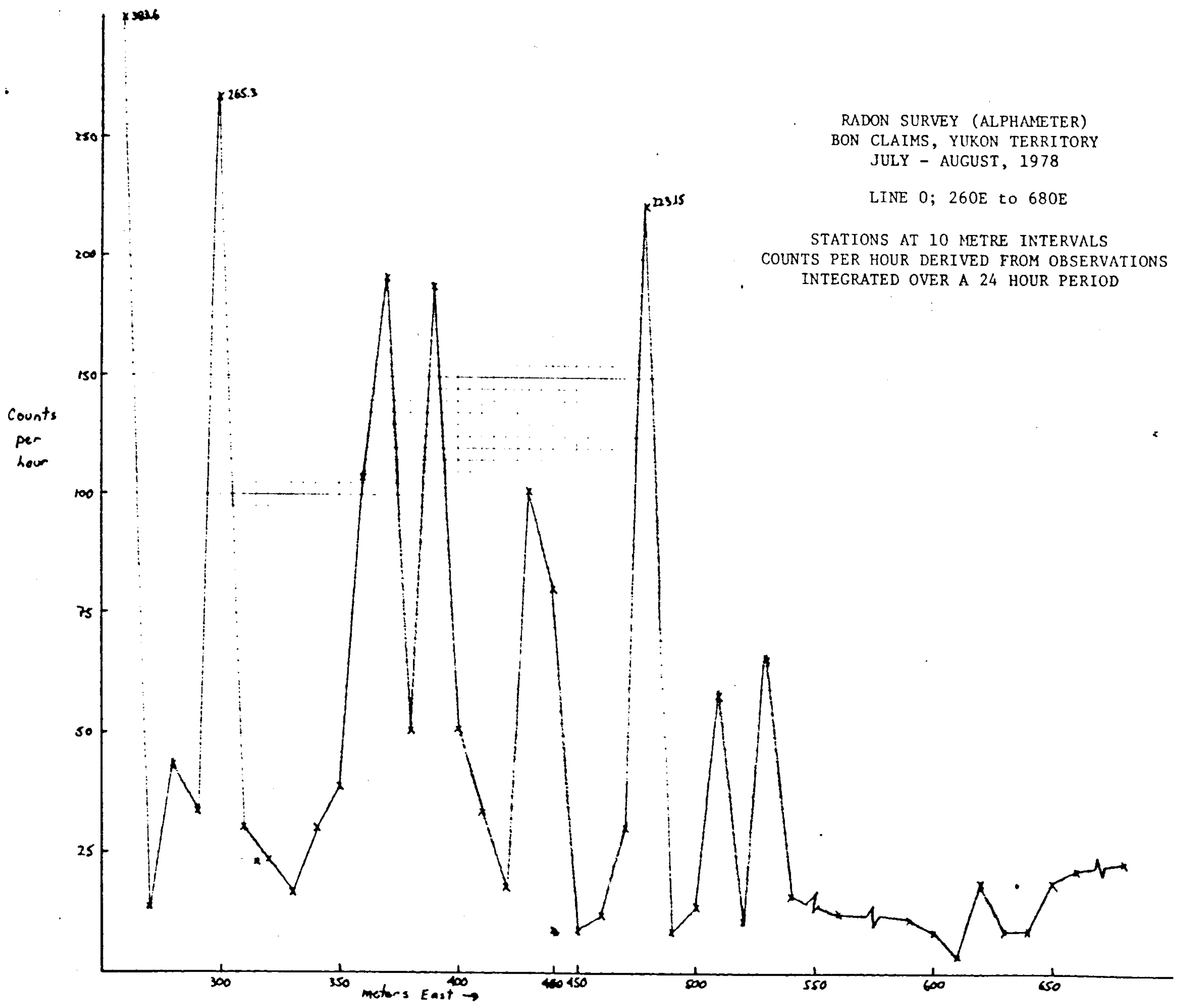
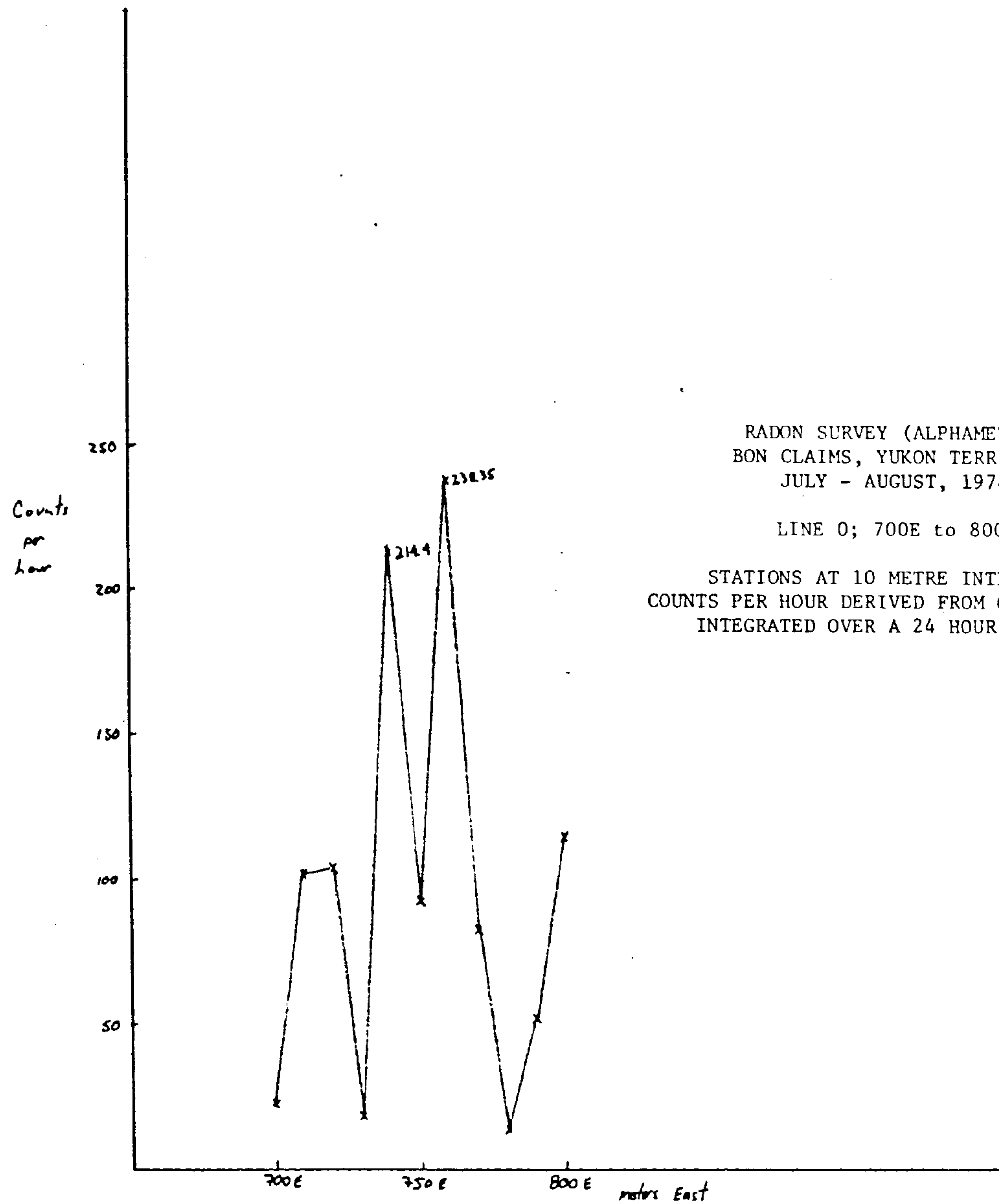

RADON SURVEY (ALPHAMETER)
BON CLAIMS, YUKON TERRITORY
JULY - AUGUST, 1978
LINE 0; 260E to 680E
STATIONS AT 10 METRE INTERVALS
COUNTS PER HOUR DERIVED FROM OBSERVATIONS
INTEGRATED OVER A 24 HOUR PERIOD
Counts per hour
meters East →
383.6
265.3
223.15
250
200
150
100
75
50
25
300
350
400
450
500
550
600
650

Fig. 14 D



RADON SURVEY (ALPHAMETER)
BON CLAIMS, YUKON TERRITORY
JULY - AUGUST, 1978

LINE 0; 700E to 800E

STATIONS AT 10 METRE INTERVALS
COUNTS PER HOUR DERIVED FROM OBSERVATIONS
INTEGRATED OVER A 24 HOUR PERIOD

Fig. 14 E

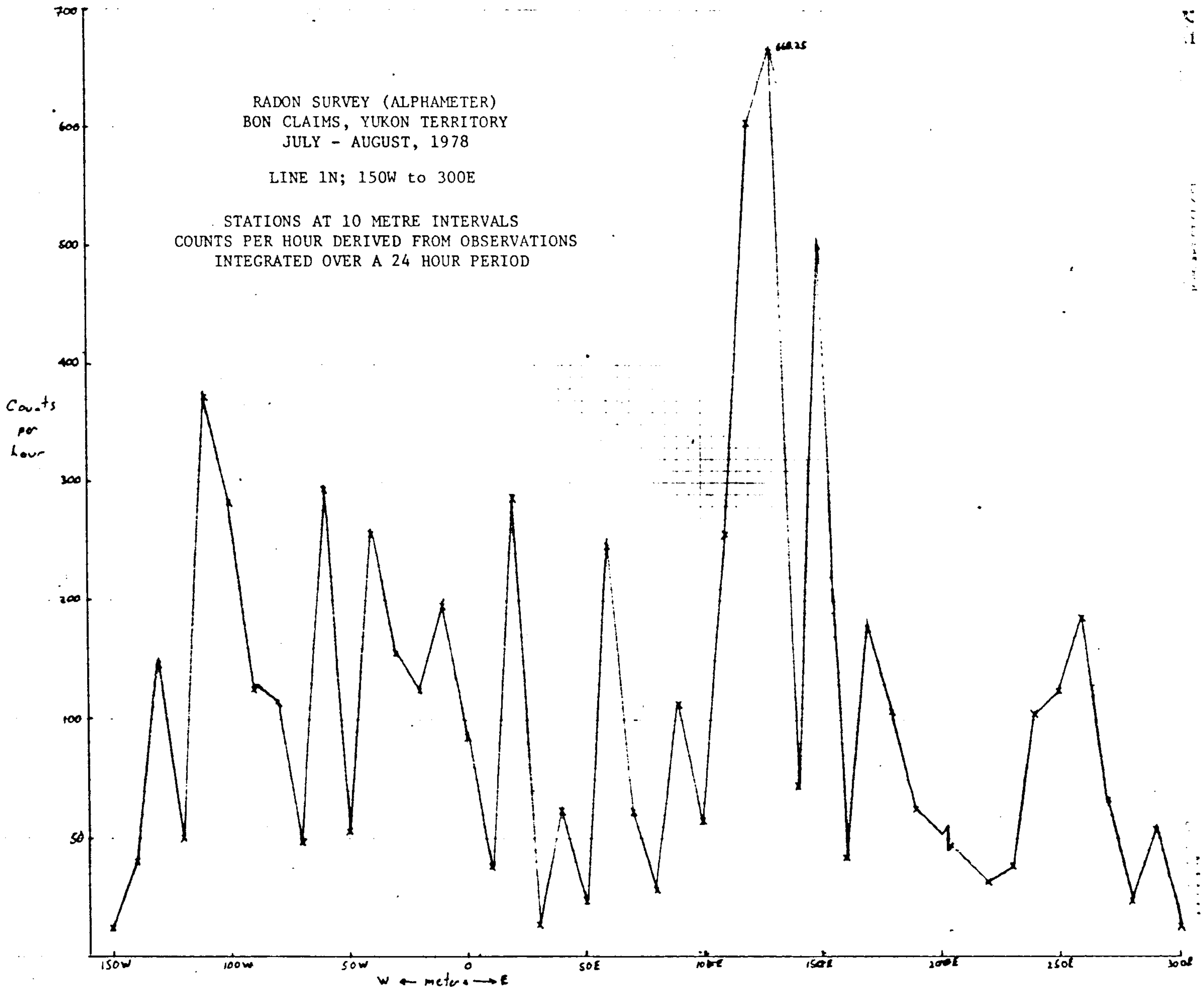
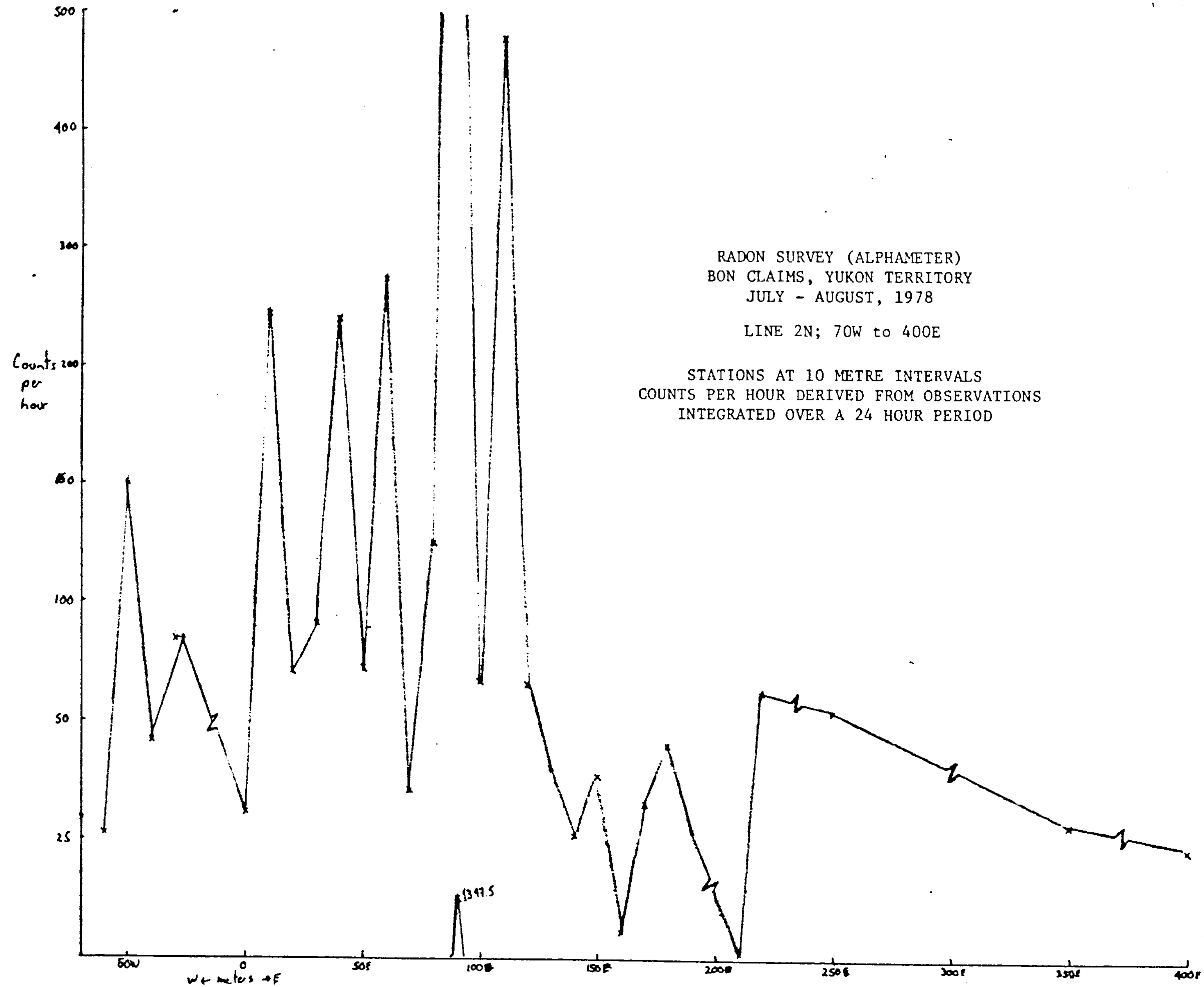

RADON SURVEY (ALPHAMETER)
BON CLAIMS, YUKON TERRITORY
JULY - AUGUST, 1978
LINE 1N; 150W to 300E
STATIONS AT 10 METRE INTERVALS
COUNTS PER HOUR DERIVED FROM OBSERVATIONS
INTEGRATED OVER A 24 HOUR PERIOD
Counts per hour
W ← metres → E
150W
100W
50W
0
50E
100E
150E
200E
250E
300E
700
600
500
400
300
200
100
50

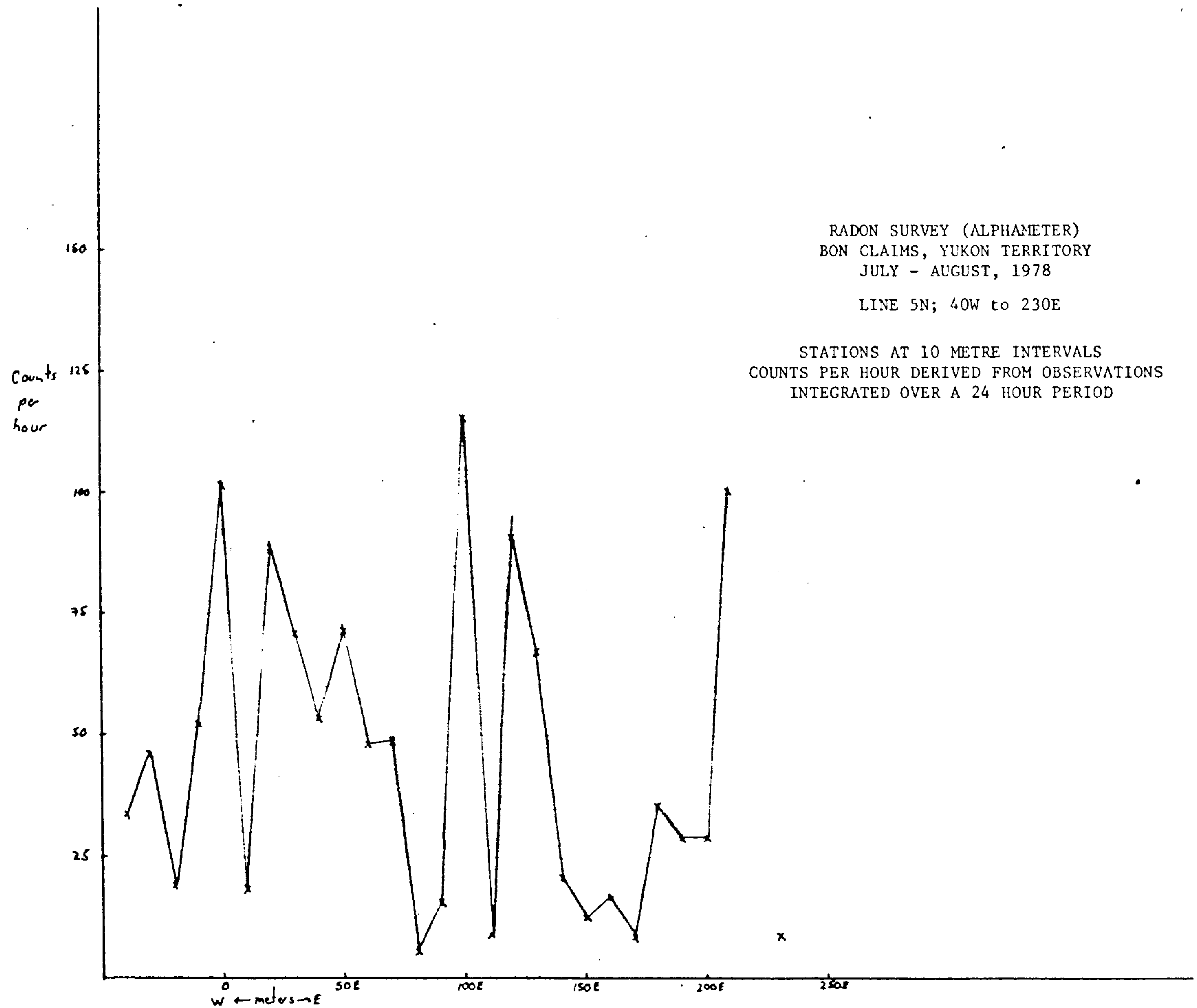
Fig. 14F



RADON SURVEY (ALPHAMETER)
BON CLAIMS, YUKON TERRITORY
JULY - AUGUST, 1978

LINE 2N; 70W to 400E

STATIONS AT 10 METRE INTERVALS
COUNTS PER HOUR DERIVED FROM OBSERVATIONS
INTEGRATED OVER A 24 HOUR PERIOD



RADON SURVEY (ALPHAMETER)
BON CLAIMS, YUKON TERRITORY
JULY - AUGUST, 1978
LINE 5N; 40W to 230E
STATIONS AT 10 METRE INTERVALS
COUNTS PER HOUR DERIVED FROM OBSERVATIONS
INTEGRATED OVER A 24 HOUR PERIOD
Counts per hour
150
125
100
75
50
25
0
50E
100E
150E
200E
250E
W ← meters → E

Fig. 14 H

GRID POSITION ON BON CLAIMS

OF 1978 RADON SURVEY

UTILIZING THE EDA EMANOMETER

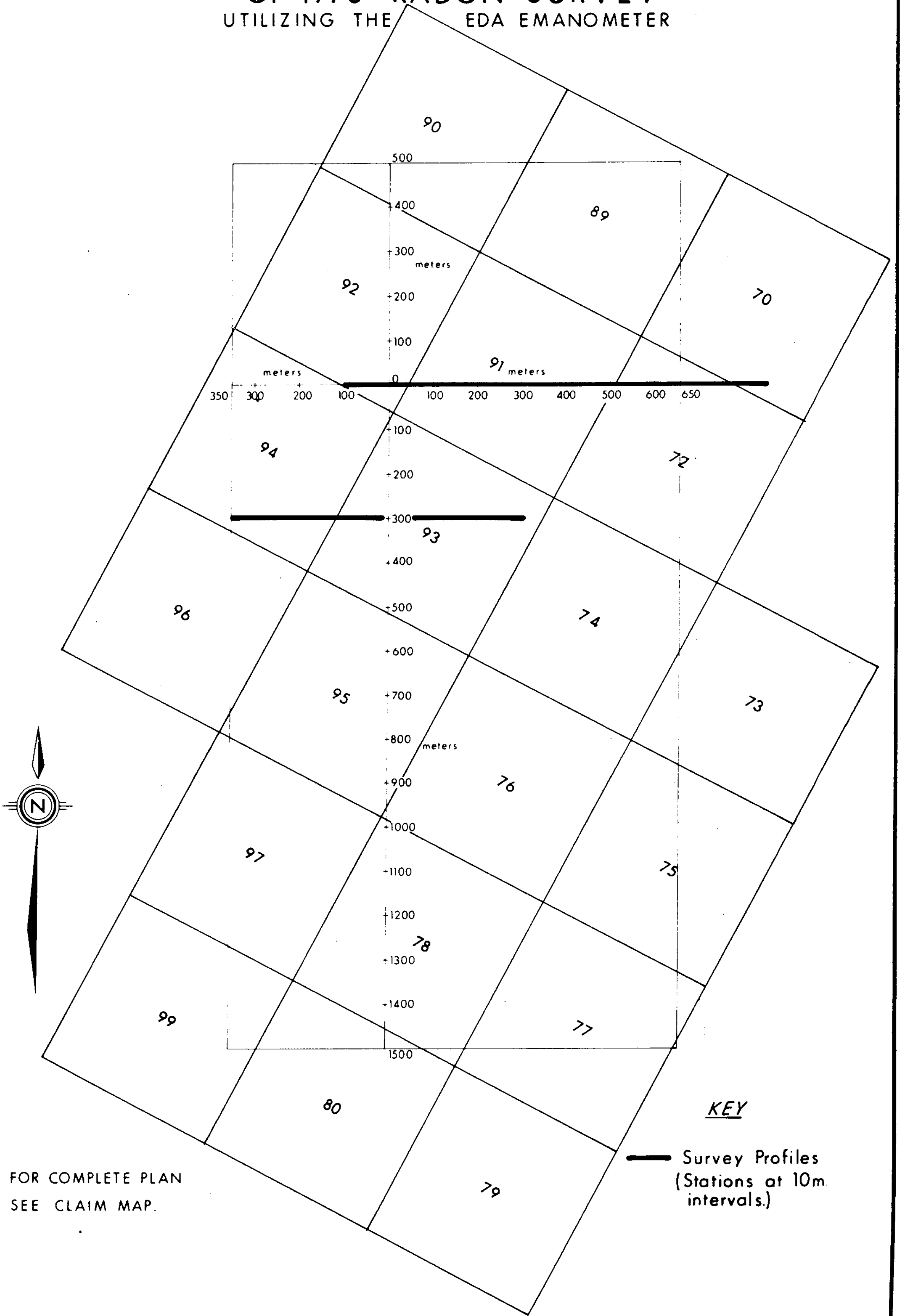


Fig.No: 15A

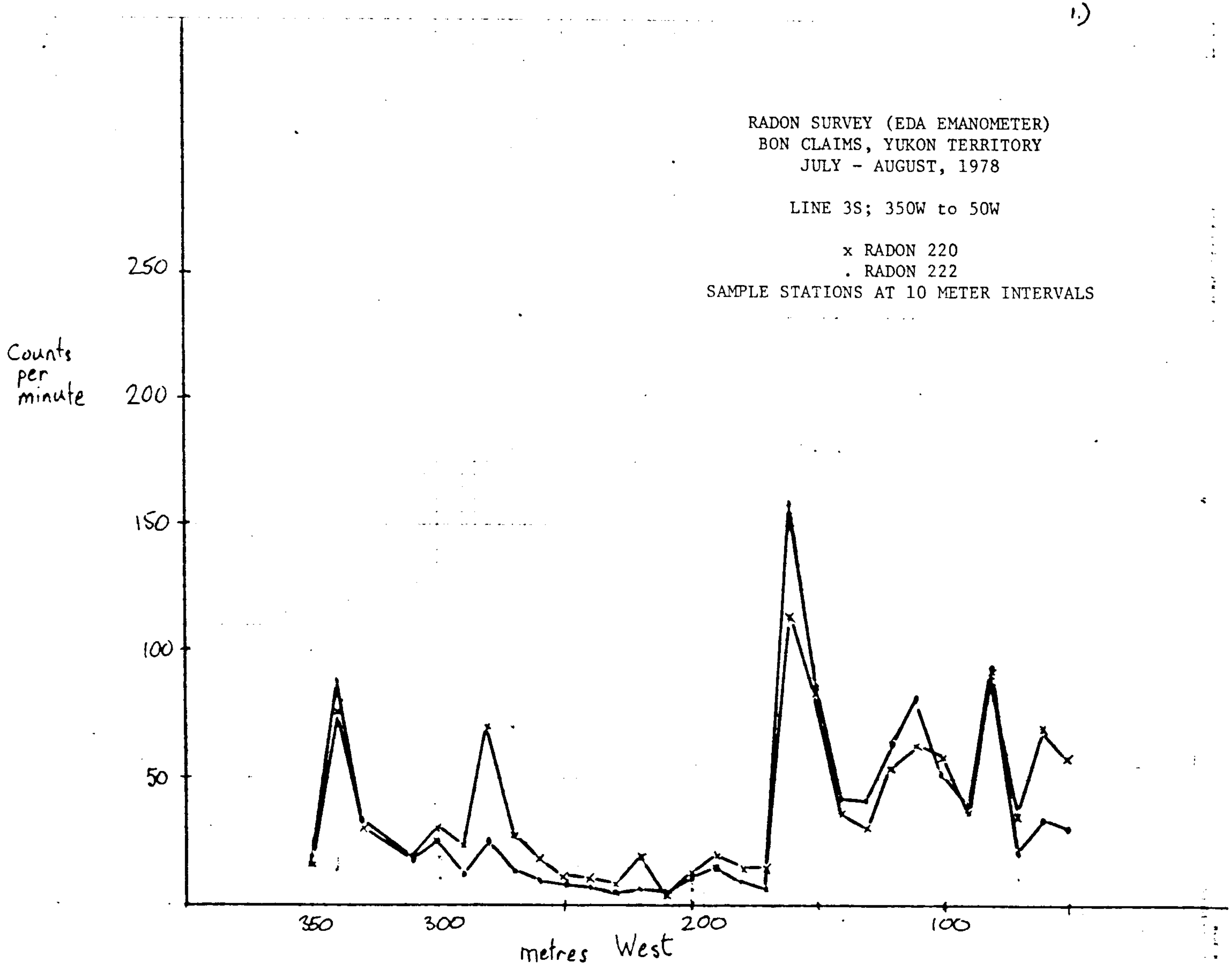

1.)
RADON SURVEY (EDA EMANOMETER)
BON CLAIMS, YUKON TERRITORY
JULY - AUGUST, 1978
LINE 3S; 350W to 50W
x RADON 220
. RADON 222
SAMPLE STATIONS AT 10 METER INTERVALS
Counts per minute
250
200
150
100
50
350
300
200
100
metres West

Fig. 15 B

2)

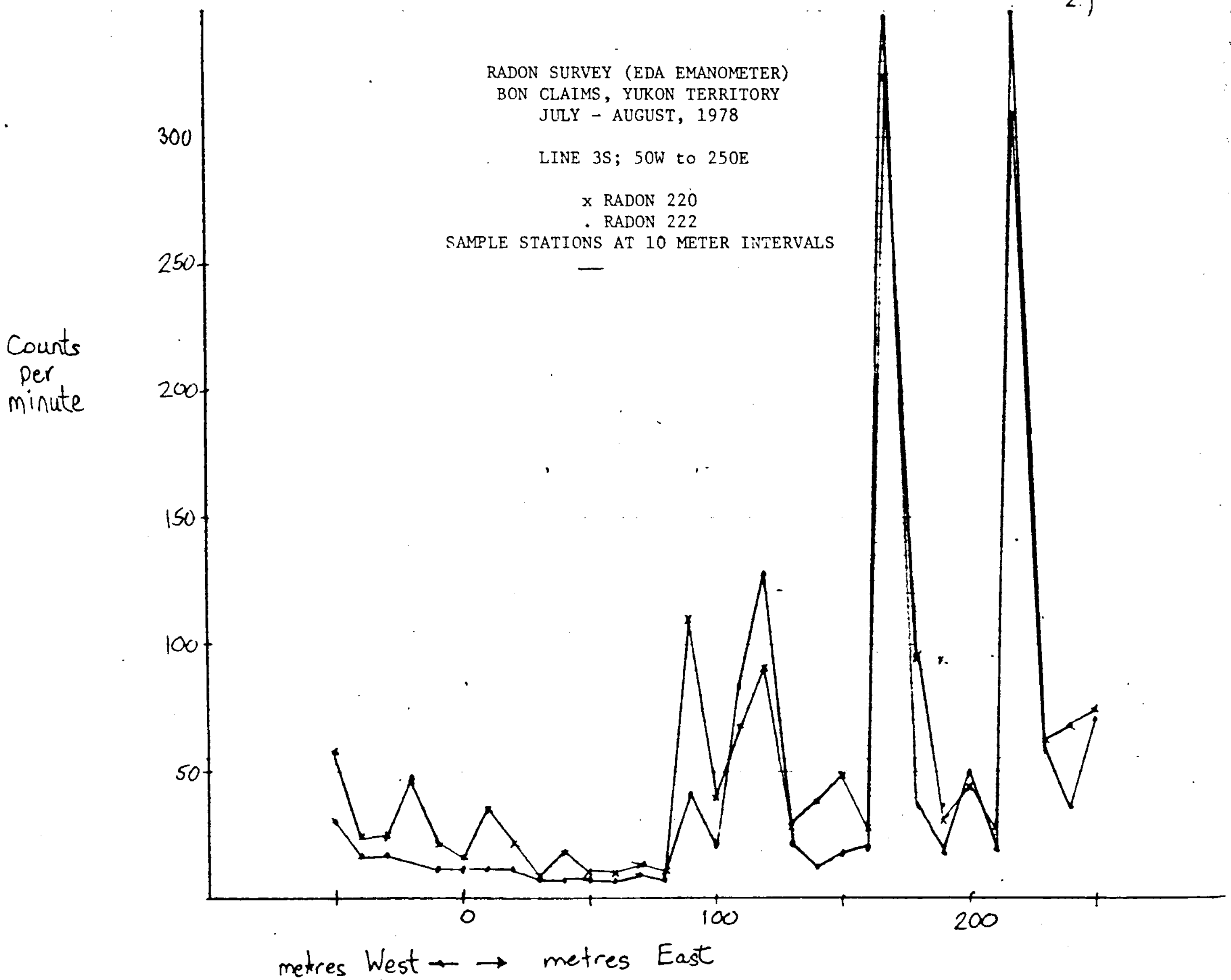
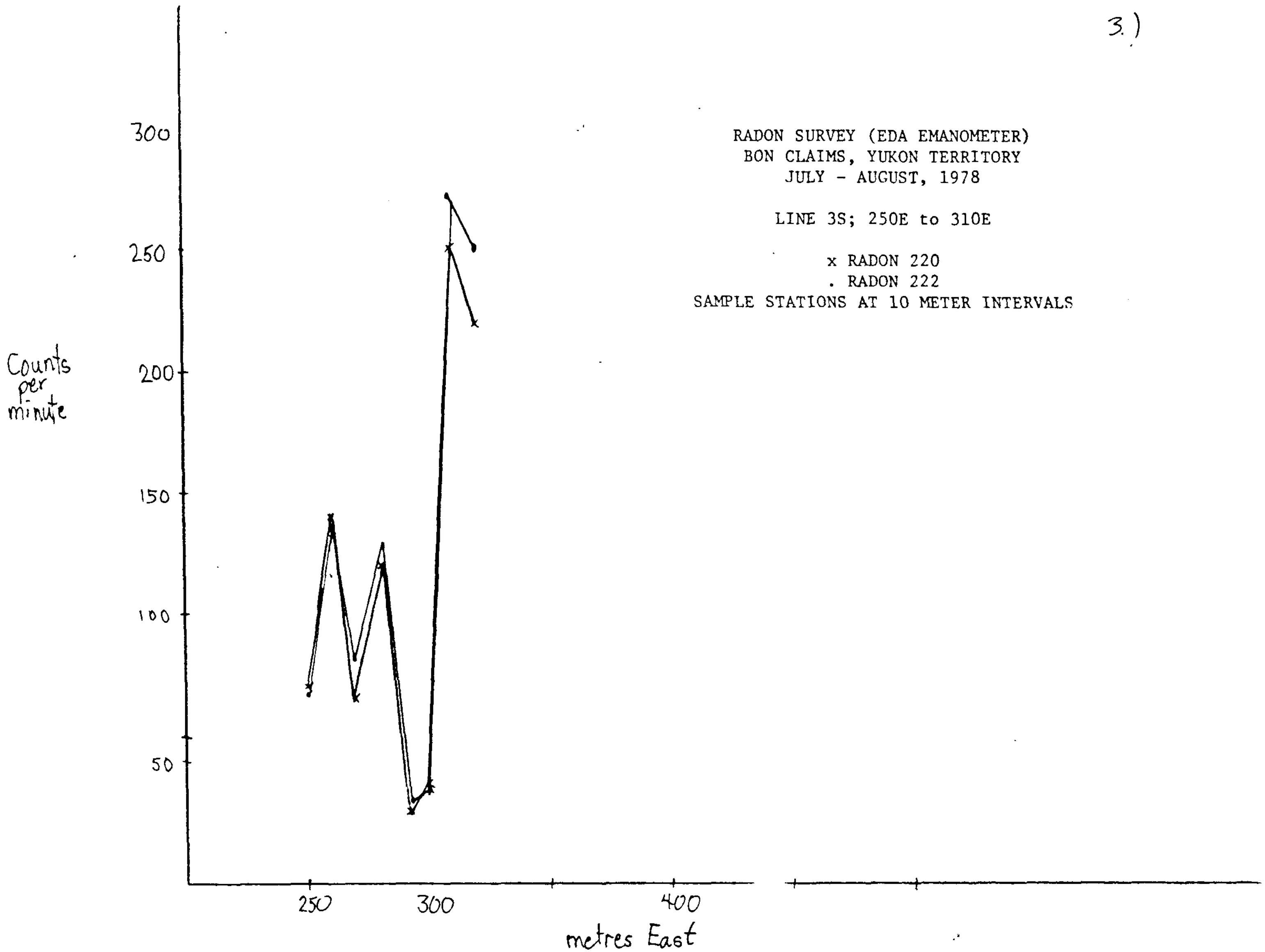

RADON SURVEY (EDA EMANOMETER)
BON CLAIMS, YUKON TERRITORY
JULY - AUGUST, 1978
LINE 3S; 50W to 250E
x RADON 220
. RADON 222
SAMPLE STATIONS AT 10 METER INTERVALS
Counts per minute
300
250
200
150
100
50
0
100
200
metres West ← → metres East

Fig. 15 C

3.)



RADON SURVEY (EDA EMANOMETER)
BON CLAIMS, YUKON TERRITORY
JULY - AUGUST, 1978
LINE 3S; 250E to 310E
x RADON 220
. RADON 222
SAMPLE STATIONS AT 10 METER INTERVALS
Counts per minute
300
250
200
150
100
50
250
300
400
metres East

Fig. 15 D

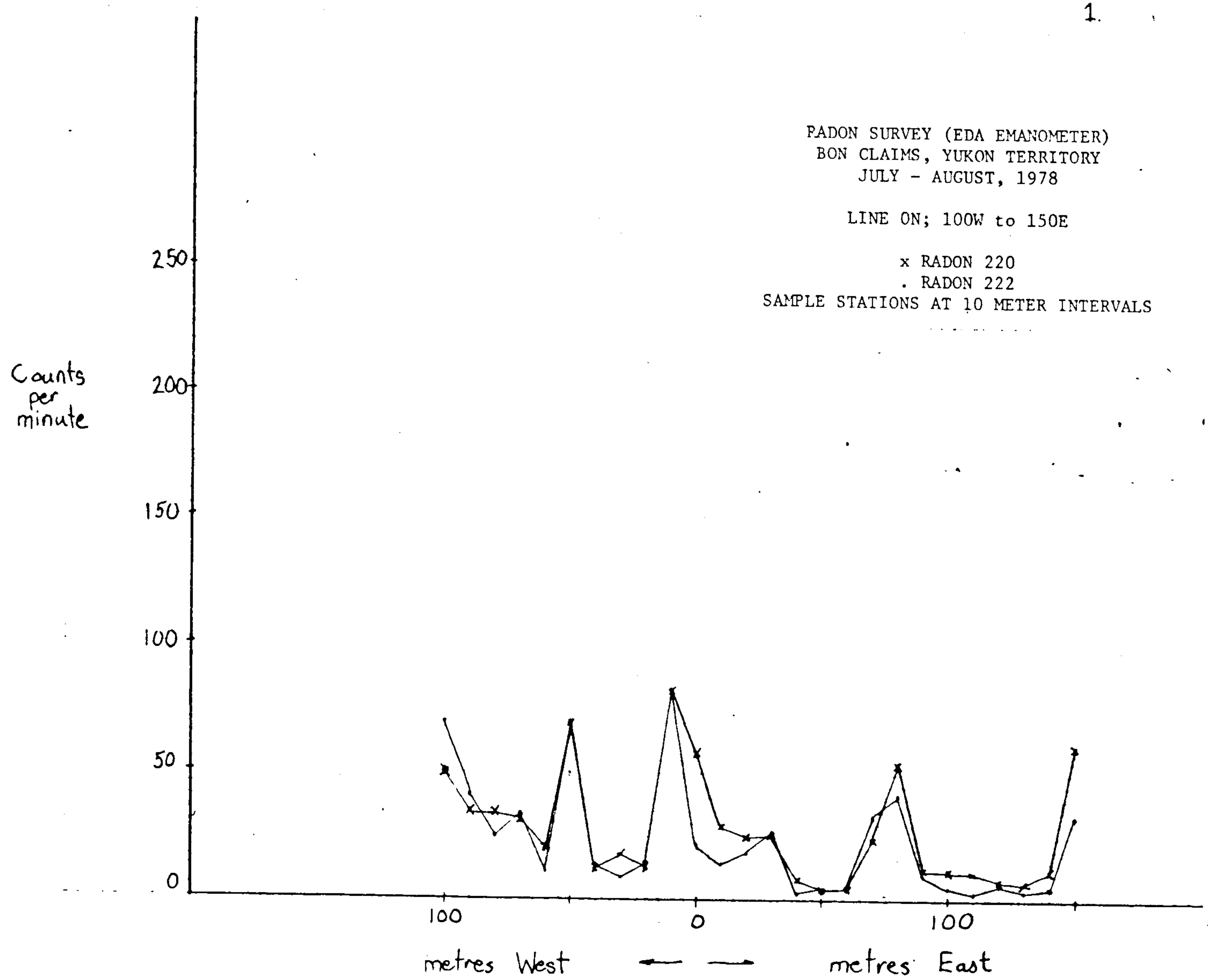

RADON SURVEY (EDA EMANOMETER)
BON CLAIMS, YUKON TERRITORY
JULY - AUGUST, 1978
LINE ON; 100W to 150E
x RADON 220
. RADON 222
SAMPLE STATIONS AT 10 METER INTERVALS
Counts per minute
250
200
150
100
50
0
100
0
100
metres West
metres East

Fig. 15 E

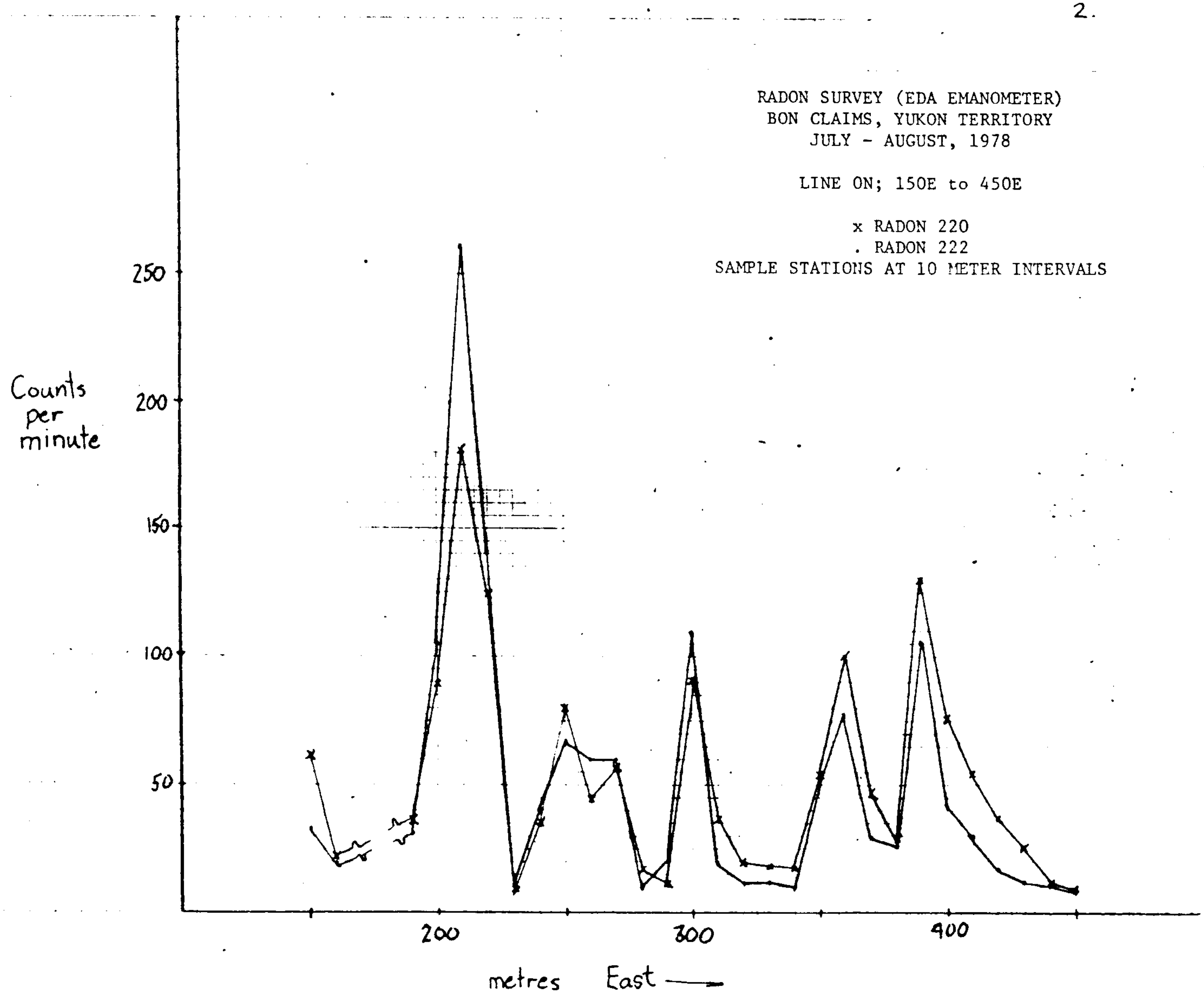

RADON SURVEY (EDA EMANOMETER)
BON CLAIMS, YUKON TERRITORY
JULY - AUGUST, 1978
LINE ON; 150E to 450E
x RADON 220
. RADON 222
SAMPLE STATIONS AT 10 METER INTERVALS
Counts per minute
250
200
150
100
50
200
300
400
metres East

Fig. 15 F

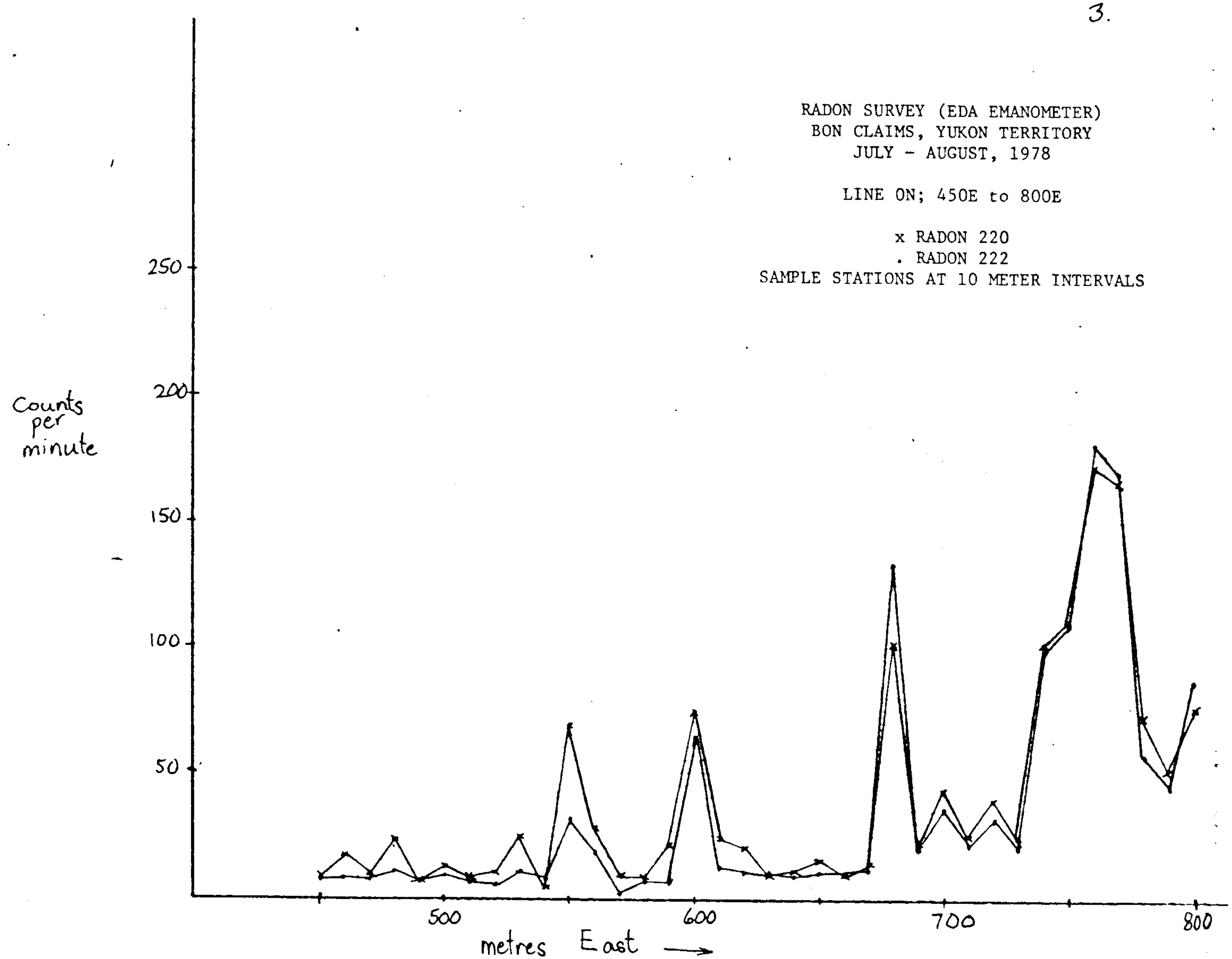
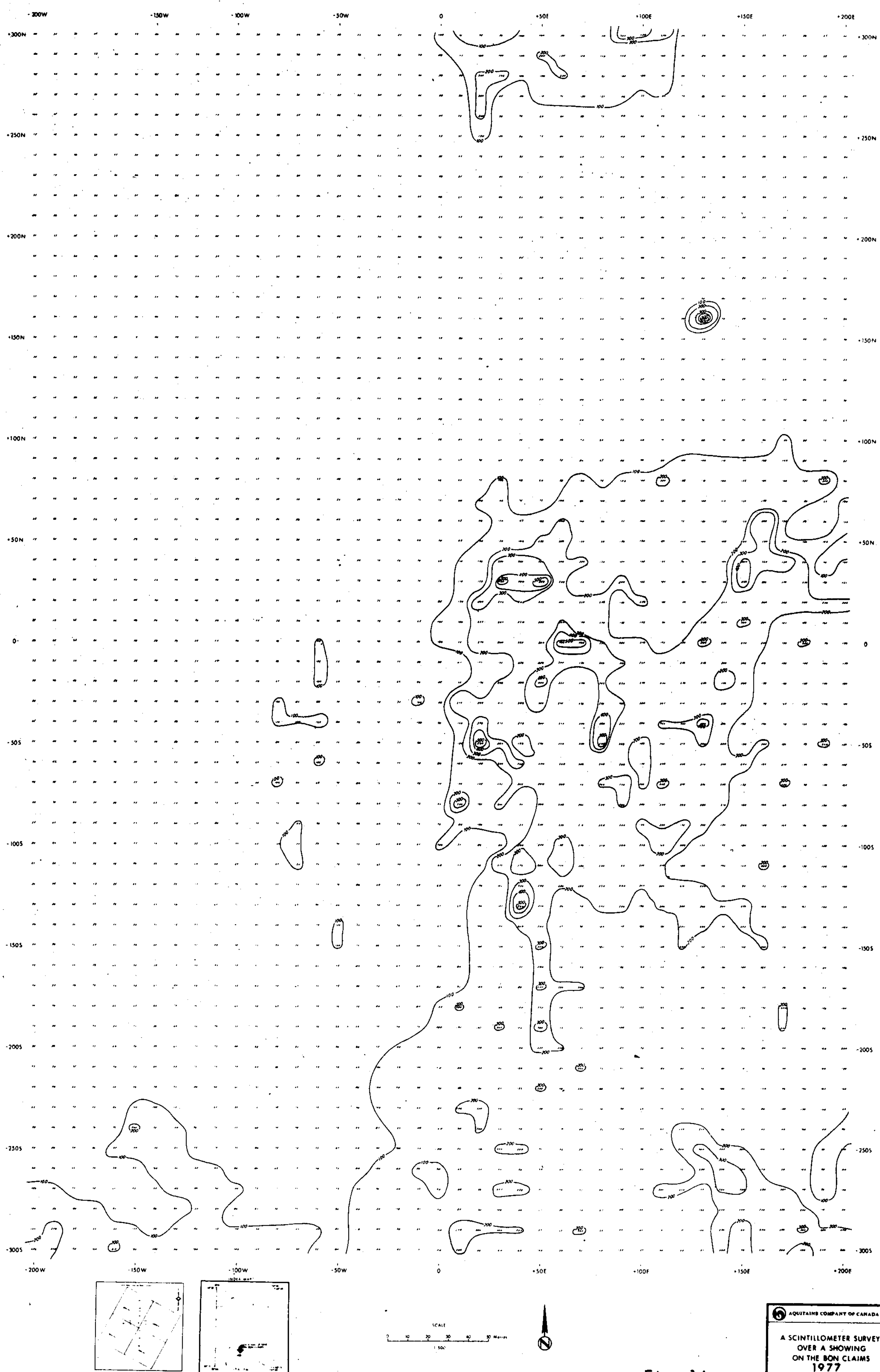

RADON SURVEY (EDA EMANOMETER)
BON CLAIMS, YUKON TERRITORY
JULY - AUGUST, 1978
LINE ON; 450E to 800E
x RADON 220
. RADON 222
SAMPLE STATIONS AT 10 METER INTERVALS
Counts per minute
250
200
150
100
50
500
600
700
800
metres East

Fig. 15 G

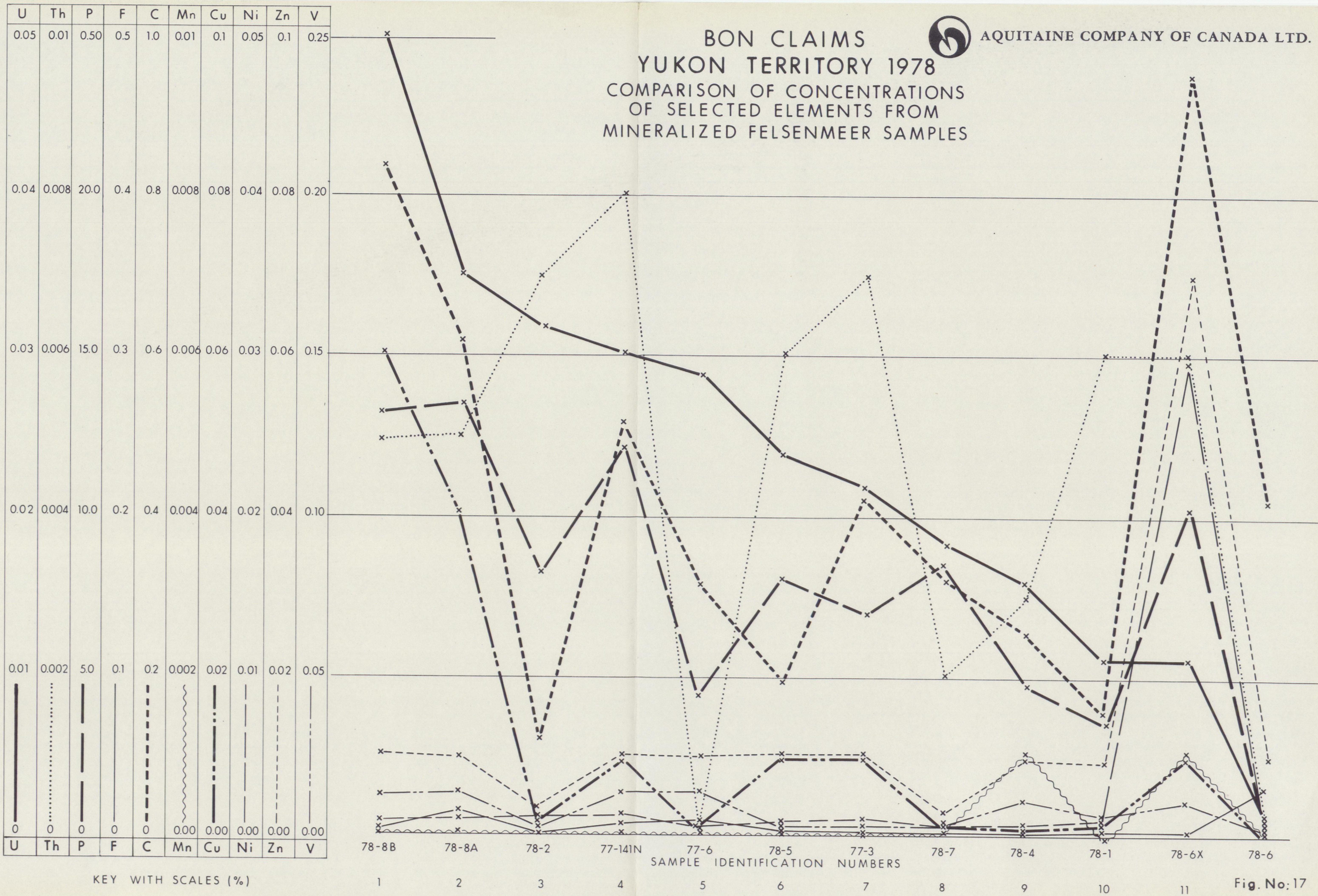


AQUITAINE COMPANY OF CANADA LTD.

A SCINTILLOMETER SURVEY
OVER A SHOWING
ON THE BON CLAIMS
1977

DATE	NTS	FIGURE NO
AUG 1977	[illegible]	

Fig. 16



BON CLAIMS
YUKON TERRITORY 1978
COMPARISON OF CONCENTRATIONS OF SELECTED ELEMENTS FROM MINERALIZED FELSENMEER SAMPLES

AQUITAINE COMPANY OF CANADA LTD.

Fig. No: 17