DU PONT OF CANADA EXPLORATION LIMITED

TENAS PROJECT

Report of 1977 Activities and Results on the MAL, BAR, TENAS and BELL Claims for Welcome North Mines Limited

by K. A. MacLean, P.Eng.

Vancouver, BC January 31/78

DU PONT OF CANADA EXPLORATION LIMITED

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TENAS PROJECT

REPORT OF 1977 ACTIVITIES AND RESULTS

ON THE

MAL, BAR, TENAS AND BELL CLAIMS

FOR

WELCOME NORTH MINES LIMITED

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TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

LIST OF FIGURES

1.0 INTRODUCTION

1.1 DESCRIPTION OF PROGRAMME

The 1977 work included a gravity survey, geological mapping, geochemical soil sampling and the drilling of one short diamond drill hole on the claim group which includes the MAL, BAR, TENAS and BELL claims. The work was extended to cover the T claims staked during 1976 and 1977 by Du Pont of Canada Exploration Limited. The claims are held by Du Pont on behalf of the Tenas Joint Venture between Western Mines Limited and Du Pont. The WOP claims were optioned from Teck Mining Corporation and R.E. Chaplin by Du Pont and form part of the joint venture holdings.

Welcome North is entitled each year to a report on the field work carried out on their claims, and that is the purpose of this writing. The pertinent parts of reports by other writers to the Tenas Joint Venture are included in this compilation.

The costs of drilling a hole on TENAS 8 could be applied as assessment work credit on any claims grouped according to the provisions of the Yukon Quartz Mining Act, consequently the expiry dates on the TENAS claims and the BELL fractional claims now have a common expiry date of January 27, 1981.

This report is a compilation of several reports, which were submitted as part of the requirements for filing assessment work on the T claims; these are listed in the reference section. No recommendations are presented to Welcome North as it is the intention of this report to merely transfer data between the two parties to the agreement.

A detailed expenditure statement will be issued to Welcome North by Du Pont concerning the 1977 expenditures, but the following totals are provided to indicate the levels of funds spent during the year on the various claim groups.

TENAS, BELL	$28,000
BAR	5,000
MAL	7,000
	$40,000

1.2 LOCATION AND ACCESS

The location of the various claim blocks is shown on the accompanying fold-out map. The project area is centred approximately 10 km north of the community of Ross River, Y.T. The mouth of Tenas Creek, a centrally located feature, lies at $62^{\circ}03'$N, $132^{\circ}20'$W. The North Canol Road (Highway 8) traverses the south-eastern boundary of the claims and provides access to adjacent claims. The north-western claims may be reached by old tractor roads which are in a moderate state of disrepair, but which are still suitable for tracked vehicles. The fastest access to more remote parts of the claims is by helicopter from Ross River. Claims north and west of the centre line of the highway are in the Whitehorse Mining District.

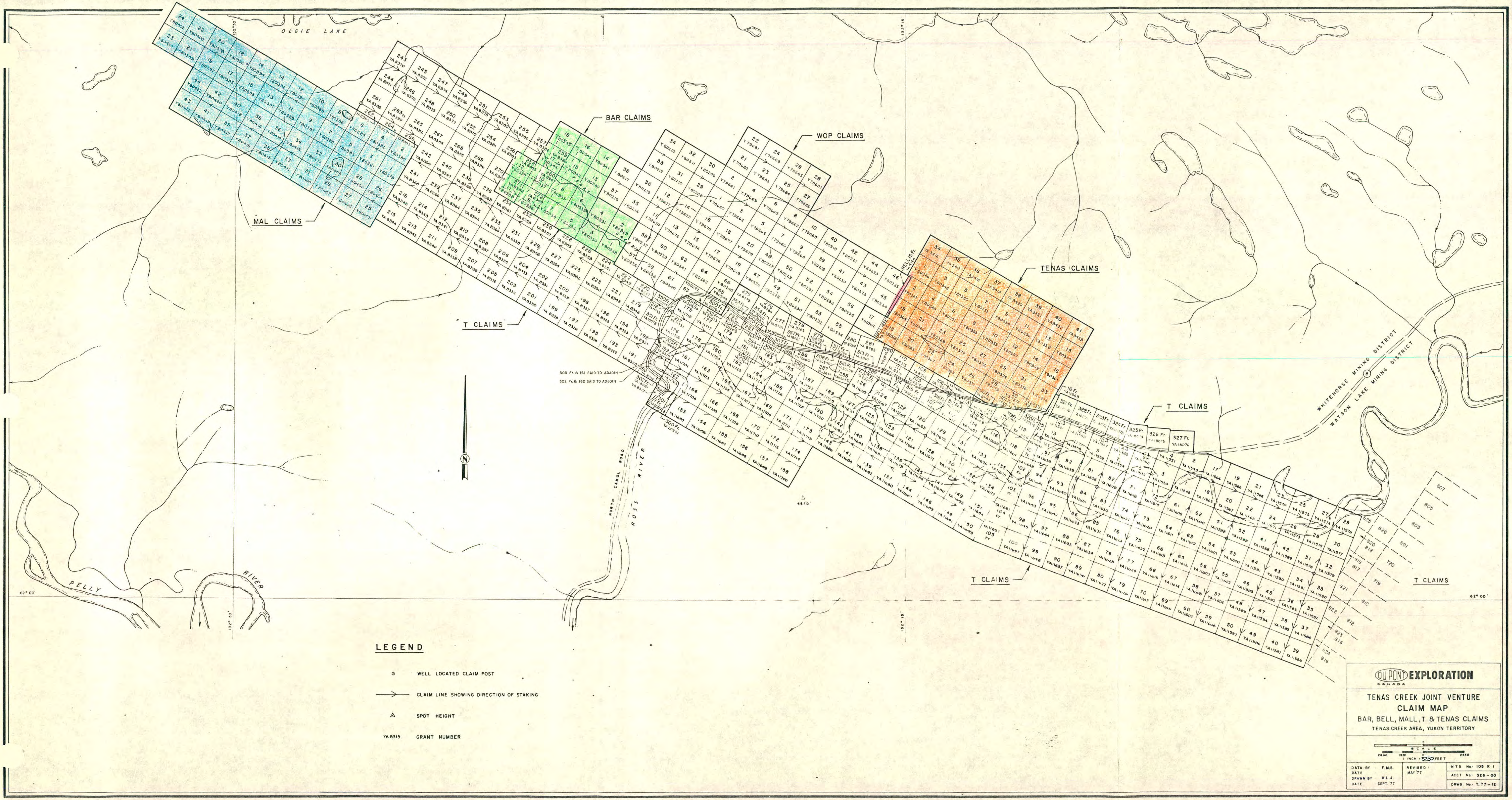
1.3 CLAIM MAP (following page)

1.3.1 List of Claims

Welcome North-Du Pont option

Claim	Grant Number	Expiry Date (at time of option)	Present Expiry Date
BAR 1-18	Y80328-Y80345	August 17, 1979	Aug 17, 1979
MAL 1-44	Y80379-Y80422	August 27, 1979	Aug 27, 1979
TENAS 1-33	Y80346-Y80378	August 27, 1979	Jan 27, 1981
TENAS 34-41	YA3416-YA3423	August 25, 1980	Jan 27, 1981
BELL 15 Fr, 16 Fr	YA4124-YA4125	December 8, 1977	Jan 27, 1981

Work was filed during November, 1977 which changed the expiry dates of the TENAS claims and BELL Fractions to January 27, 1981. No work was filed on the BAR and MAL claims and their expiry dates remain unchanged.


OLGIE LAKE
MAL CLAIMS
BAR CLAIMS
WOP CLAIMS
TENAS CLAIMS
T CLAIMS
T CLAIMS
T CLAIMS
T CLAIMS
303 Fr. & 161 SAID TO ADJOIN
302 Fr. & 162 SAID TO ADJOIN
NORTH CANOL ROAD
ROSS RIVER
PELLY RIVER
WHITEHORSE MINING DISTRICT
WATSON LAKE MINING DISTRICT
62° 00'
132° 30'
132° 15'
LEGEND
WELL LOCATED CLAIM POST
CLAIM LINE SHOWING DIRECTION OF STAKING
SPOT HEIGHT
YA 8315 GRANT NUMBER
DU PONT EXPLORATION
CANADA
TENAS CREEK JOINT VENTURE
CLAIM MAP
BAR, BELL, MALL, T & TENAS CLAIMS
TENAS CREEK AREA, YUKON TERRITORY
SCALE
2640 1320 0 2640
1 INCH = 5280 FEET
DATA BY F.M.S.
DATE
DRAWN BY K.L.J.
DATE SEPT. '77
REVISED MAY '77
N.T.S. No: 105 K 1
ACCT No: 328-00
DRWG. No: T. 77-12

1.4 TOPOGRAPHY AND VEGETATION

Most of the claims lie in a broad valley containing the Ross River and a tributary, Tenas Creek. River elevations are approximately 800 m a.s.l., while steep valley sides rise through a series of narrow benches to 1300 m a.s.l. The Ross River and Tenas Creek valleys are locally swampy with many oxbow lakes and meander scars. Benches and terraces are evident and occasionally have significant, prominent outcrops which form bluffs or knobs. Depth of overburden in two drill holes on two different benches on the south side of the river was less than 15 m, while the hole on TENAS 8 had a similar depth at the base of a steep slope.

Vegetation consists of willows, alder and spruce in the valley bottoms, stands of spruce of moderate size interspersed with buckbrush and low vegetation on north-facing slopes and open grassy areas with patches of tall poplars on south-facing, permafrost-free slopes and terraces.

Outcrop is relatively sparse, as can be seen on the geological maps.

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2.0 GEOLOGY

2.1 INTRODUCTION

A discussion of the geology will be broken down into descriptions of important units, followed by generalized regional overview and geologic history.

Regional geologic, and particularly structural, interpretations are greatly impeded by the lack of outcrop since extrapolation of features beteen outcrops is highly tenuous.

2.2. GEOLOGIC HISTORY

Hypabyssal andesites, andesite flows and tuffs, followed by intercalated extrusive andesite and rhyolitic tuffs, laid down in a subaqueous basin, were later overlain by greywackes and phyllites derived from the weathering of the continental platform found further to the northeast.

Following deposition of the greywackes, conglomerates then intercalated red and green cherts were deposited. Later, some Jurassic volcanic rocks of andesitic and basaltic composition were deposited. These younger cherts and volcanics were dominantly found in the south central section of the mapped area.

The youngest known rocks found in the area are Cretaceous intrusions of quartz monzonite and quartz feldspar porphyry. These rocks are found mostly in the northern part of the mapped area.

2.2.1. Table of Formations

Map Unit	Age	Type	Description
1	Cretaceous	Granitic rocks	Intrusive contacts into sediments and volcanics. Quartz monzonite and quartz monzonite porphyry Disseminated pyrite and traces of malachite. Mostly along northern edge of clai[m] blocks.
		Intrusive contact with younger rocks	
2	Jurassic	Red Chert, green chert, green basalts, andesites Rhyolitic fragmentals. Red and green slates conglomerates.	
3	Unknown	Andesite	Fine grained massive pale to dark green andesite flows. Calcareous matrix. Pyrite cubes. Local serpentine and talc alteration, chloritic alteration. Intercalates with Unit 4 Local small domes of andesitic composition.
4	Unknown	Rhyolites	Consider as proximal sediments. Sporadic occurrence. Local pods intercalates with andesites and distal phyllites. Massive foliated or bedded in textures. Sedimentary structures. Calcareous locally.
5	Unknown	Distal Sediments	
		Greywacke	dark grey, phyllitic, pyritic, cherty.
		Pearly grey phyllites.	thinly laminated, micaceous, occ graphitic
		Phyllitic argillites.	quartz veins and sulphide pods and veins.

2.3 GRANITICS - UNIT 1

The youngest rocks in the area are Cretaceous intrusives related to the large batholith to the north. Along the main contact, intruded sediments and volcanics are metamorphosed and riddled with aplitic, porphyritic and pegmatitic dykes. Quartz veins and lenses also become prominent as the intrusive contact is approached. Composition appears to be that of a quartz monzonite, and textures vary considerably. Outcrops at the north ends of lines 8900 and 9300 E expose intrusives invaded by aphanitic rhyolite dykes along N-S fractures.

Quartz feldspar porphyry is composed of euhedral, doubly-terminated quartz crystals, potassium feldspar, hornblende and biotite in a fine to medium grained feldspathic or pale green/grey aphanitic groundmass. Disseminated pyrite can be seen and locally traces of malachite are present.

In the north central part of the Mal group a tongue of the quartz feldspar porphyry intrudes into andesite, and is split by a north-south trending fault producing 2 small scarps 5 m high and up to 20 m wide. The andesites and sediments adjacent to the intrusion have been metamorphosed to either a quartz mica schist with large biotite grains defining a pronounced schistosity, or to a thinly banded gneiss consisting mainly of quartz, some feldspars and biotite.

2.4 JURASSIC ROCKS - UNIT 2

Jurassic rocks which overly the older sedimentary package consist of volcanics and minor sediments which are easily distinguished from other units in the area. As granites bound sediments to the north, Jurassic rocks bound them to the south; the southwestern portion of the 1977 survey grid covers a considerable area of these rocks which tend to form resistant ridges.

Rock types included in this unit are red chert (jasper), green volcanics ranging from rhyolite to basalt, and conglomerate. Red chert makes up the majority of outcrop, volcanics and conglomerate being subordinate in exposed extent.

Jasper is the most easily recognized as it tends to be massive, brick-red, and shot with milky white quartz veins which sometimes carry minor black hematite. Green chert has been seen inter-layered with jasper, which, along with an intimate association with volcanics, is suggestive of an igneous origin.

A 2 m high scarp at the south end of line 700W reveals massive jasper overlain by a green fragmental unit of sheared pale rhyolite and darker andesite, which is in turn overlain by a unit of sheared, mixed red and green slates. Foliations and contacts are close to flat-lying. Other outcrops of pale green rhyolite may show bomb-like, sheared fragments up to 10 cm in length. More basic volcanics are found between lines 300 and 900E on the south side of the river, where they are very fine grained black to dark green basalts and andesites.

Conglomerate, the basal unit of the Jurassic formations, is rather limited in outcrop extent, appearing mainly near the major curve in the Canol Road west of the Ross River near Tenas Creek.

Well-rounded pebbles within the dark grey/black conglomerate are often elongate, about 2 mm to 5 cm in diameter, and are embedded in a matrix of sandy greywacke. One outcrop showed coarse, sandy layers with fine (less than 5 mm) pebbles alternating with coarser layers with much large pebbles. Many clasts are felsic, often with considerable pyrite; black, slaty clasts are also not uncommon, and one andesitic fragment was seen. Outcrops are usually massive, but may take on a pronounced fracture cleavage. This unit is also seen to lose its pebbly character near line 300W (south end) where it becomes a massive, dark grey rock with anastamosing quartz/carbonate veinlets.

2.5 ANDESITE - UNIT 3

The andesite unit is distributed across the entire area, with large areas of outcrop located in the southeast quadrant of the Wop group and the adjacent T group, in the T group south of Thunder Pickle Creek, and in the eastern half of the Mal group.

The rocks can vary appreciably across the area, ranging from a medium grained hypabyssal equivalent in the cores of the volcanic domes, through massive flow-type greenstones, to an andesitic tuffaceous material further out on the dome flanks where this member intercalates with rhyolites, rhyolitic tuffs and some proximal phyllitic sediments.

The subunit most commonly found appears to be a fine grained, massive, pale to dark green, andesitic greenstone, likely of flow origin. Texturally, it is unvaried throughout, but a calcareous matrix, complete with calcite and/or siderite veinlets, is common, as are euhedral pyrite cubes which may be particularly associated with the carbonates. Small pods and spots of alteration to serpentine and talc may locally be found around inclusions of a black, more basic basaltic material. In a few cases this alteration has developed small patches of serpentine asbestiform minerals.

Chlorite characterizes a much more common alteration assemblage, and leads to an increasing degree of foliation in the rock. This may partially reflect a larger tuffaceous, slightly less resistant component, of the andesites. Grey to green, foliated metaandesite, with a well-developed fracture cleavage and a higher carbonate and chlorite content most likely represents the original andesite tuff, which now has a more phyllitic texture. This member intercalates with pale green, banded to massive, rhyolitic tuffs and/or a pearly dark grey phyllitic argillites of Unit 4.

The andesite dome matrix material is evident in a few locations across the area. South of Thunder Pickle Creek, a medium to coarse grained intrusive-textured rock outcrops with the massive andesites. Here a pale green to dark grey mottled texture is produced by biotite, amphibole and pyroxene crystals distributed through a matrix of plagioclase and minor quartz. The mafic minerals tend to be well chloritized. Overall the texture is gabbroic and locally hornblende becomes sufficiently dominant to produce amphibolite. Disseminated pyrite is almost always present throughout all phases and produces limonite weathering surfaces and fracture coatings. This core material grades very quickly into the massive flow type andesites.

A similar dome of andesitic material outcrops for 2/3 of the way around and on top of a hill located on line 3050E, at 1650N. Here a massive green andesite, in part displaying a hypabyssal texture, composes the crest of the hill and represents the core, dome matrix material. Flanking this, both in the sense of the hill and in relation to the dome, is a series of rocks, each of which intercalates with its successor, composed of andesitic greenstones of probable flow origin, calcareous andesitic tuffs, local pods of rhyolitic tuffs, and finally, grey graphitic and calcareous phyllites. These rocks appear to exhibit well the nature of the local andesitic domes distributed through the field area.

In the southeast quadrant of the Wop grid the core rocks seem slightly less basic than those south of Thunder Pickle Creek, never having enough hornblende to produce amphibolitic rocks. These rocks are also well chloritized perhaps accounting for the less amount of noticeable pyroxenes and amphiboles.

2.6 RHYOLITES - UNIT 4

A minor constituent of the proximal sedimentary package is the felsic volcanic member which can be either massive, foliated and/or banded in texture and rhyolitic in composition. The rocks are quite sporadic throughout the field area and appear to occur as localized bands or pods intercalating with both the andesites and the more distal grey phyllites.

The massive variety, observed only on the south side of Ross River tends to be pale grey to white, highly siliceous with small quartz eyes, and often contains much disseminated euhedral pyrite cubes producing a limonitic weathering. Locally this member may take on a slight foliation and develop pale green to chalky white alteration bands composed of chlorite, talc, and perhaps sericite. This more phyllitic member becomes calcareous in part due to thin calcite veinlets.

The banded rhyolites seen only on the north side of Ross River are very fine grained showing well developed bedding as well as other sedimentary structures such as load casts and graded bedding. Alternating light and dark bands often displayed differential weathering indicating carbonate-rich layers. Staining showed that the layers between calcic and potassic composition. The rock is very hard and quite siliceous, often having the typical, powder white, weathered surface of rhyolites. Small scale folds with amplitudes in the order of tenths of metres showed up very well in these rocks.

2.7 DISTAL SEDIMENTARY UNIT - UNIT 5

The distal sediments form a medium to very fine grained, laminated unit, composed mainly of a dark grey, turbiditic, phyllitized wacke, and a dark grey, fissile, argillaceous phyllite which hosts the only mineralization observed in the area.

They are exposed throughout the field area and appear to develop during periods of relative volcanic quiescence on the flanks of and in pockets peripheral to the andesitic dome centres. Due to the fairly small size of some of the domes these rocks may be found quite close to a massive andesite, possibly to the exclusion of the normally intervening, proximal sediments. Rhyolites and rhyolitic tuffs may intercalate with this unit but they are considered more proximal in origin and, hence, rock descriptions in this section are limited to the grey phyllite and greywackes.

2.7.1 Greywacke

2.7.1.1. Lithology and distribution

A major portion of the distal sediments are dark grey phyllitic greywackes. In hand specimen samples are seen to be composed of quartz and biotite; thin section examination confirms the composition, showing mica and elongate quartz aligned in a herring-bone manner. Grain size is usually fine, but gritty, medium grained components are common. Biotite varies in amount, is usually concentrated along cleavage planes, and lends rocks a schistose character when coarse-grained. Foliations vary in intensity from less than 1 mm to 6 cm, and infrequently are absent altogether when rocks take on a massive, cherty appearance. Colour may also vary on a small scale from dark to light grey, to greys with green or pink tinges. Iron-staining is not uncommon, and occurs to varying degrees, often a result of fine, visible disseminated pyrite occurring along foliation planes and/or fracture surfaces. Quartz veining is frequently seen as fine stringers parallel to foliations, but may also occur as larger (up to 10 cm wide) veins.

The major occurrence of these sediments is on the south-facing slope of the Ross River valley, north of the Canol Road. In the far western corner of the Mal claims porphyritic dykes intrude rocks which are similar to these grey-wackes, but are highly deformed and should more properly be termed gneisses and schists. However, alteration here resembles portions observed below the major intrusive contact north of the Canol Road (see below "Intrusive Effects), and small areas of recognizable greywacke were seen.

Outcrops around 200S on line 5900W reveal medium grey, slaty, unphyllitized argillites assumed to be less metamorphosed equivalents of the main greywacke unit.

2.7.1.2 Intrusive effects

The intrusion of Unit 1 has resulted in slight alterations of the sediments which become more evident as one approaches the intrusive contact. Phyllites may take on a gneissic appearance either as fine (2 mm) light and dark (some pure biotite) bands or as wide (2 cm) alternating bands of coarse biotite and milky quartz. Finer-grained gneisses may appear to be augened.

Another common product of the intrusion is a coherent, silicic sediment which has lost its foliated appearance in favour of a massive, undirected texture. It was on the surface of a sample such as this that blue kyanite crystals (1 cm in length) were seen.

2.7.1.3 Structures

As mentioned earlier, thin section study reveals a herring-bone structure of quartz and biotite. This texture may be interpreted as a primary alignment of components which has been modified by foliations perpendicular to it. This secondary foliation has altered originally plan surfaces into chevron patterns, the apices of which form the major foliation direction seen in the field.

Lineations, foliations and minor warping are the major macroscopic structural features within the greywackes. Lineations were not always measured because of their frequent inconsistency, but they can be quite regular and easily visible on cleavage surfaces.

Foliations were described briefly above on a small scale, but on a larger scale they can be seen to trace a major warp on the north side of the Canol Road. Lineations tracing the axis of this warp ($52^{\circ}/35^{\circ}$W) are visible along a folded surface of 0.5 metre amplitude above station 1780N along line 4550E. Foliations east of the general axis area usually strike northwest; to the west strikes are more northeasterly.

In foliations north of the Canol Road create a dip slope along the hillside, minor warping perpendicular to major foliations is easily visible. Frequencies are normally around 2 metres; amplitudes 10 cm.

2.7.2 Distal Sediments

2.7.2.1 Pearly grey phyllites, phyllitic argillites

This member of the distal sedimentary package generally consists of a thinly laminated, dark grey to silver pearly grey, graphitic and argillaceous shale which is intercalated with a grey to white, medium to fine grained siliceous siltstone. These rocks are usually sheared and phyllitized with slickensided graphitic or micaceous laminae developing along shear planes or as indepenant thin bands a few millimeters to a few centimeters thick. The high graphite content produces a grey-black oily lustre while the development of micaceous-sericitic partings produces the common pearly grey lustre. Normally they are quite calcareous and contain disseminated pyrite throughout as discrete grains or as thin laminae, producing very rusty weathering lamelae. Quartz is commonly present as small eyes, stringers or veins, or even large gashes and boudins up to 60 cm across in areas of more intense faulting. Calcite and/or siderite is associated with the quartz and locally may become dominant in veins. The siltstone member may become much coarser and richer in quartz fragments, as in the area of 6150W on the baseline where it appears to grade towards a graphitic wacke member, suggesting an oscillatory relation between the grey phyllites and the wackes.

Structurally, these graphitic phyllites are either flat lying or dip gently in a general sense. However, in small scale, there are abundant crenulations only a few millimeters in amplitude, as well as many tight isoclinal folds up to 2 cm in amplitude. Any quartz veins present suffer this recumbent folding as well, and, in areas of more intense distortion, may develop boudinage structures, or individual quartz grains may be stretched in the core of some anti-formal structures. Shearing can be intense and appears to be subparallel to the original sedimentary banding, however this is difficult to see clearly due to the slaty cleavage developed in response to the compressive shear forces.

Outcrops of this unit occur sporadically across the area with clusters in the Mal group, in the northern part of the Wop group, and, as mentioned, in the T group in the vicinity of Thunder Pickle Creek.

2.8 MINERALIZATION

No exposures of economic mineralization were seen during the geologic mapping of the subject claims.

2.9 DRILLING

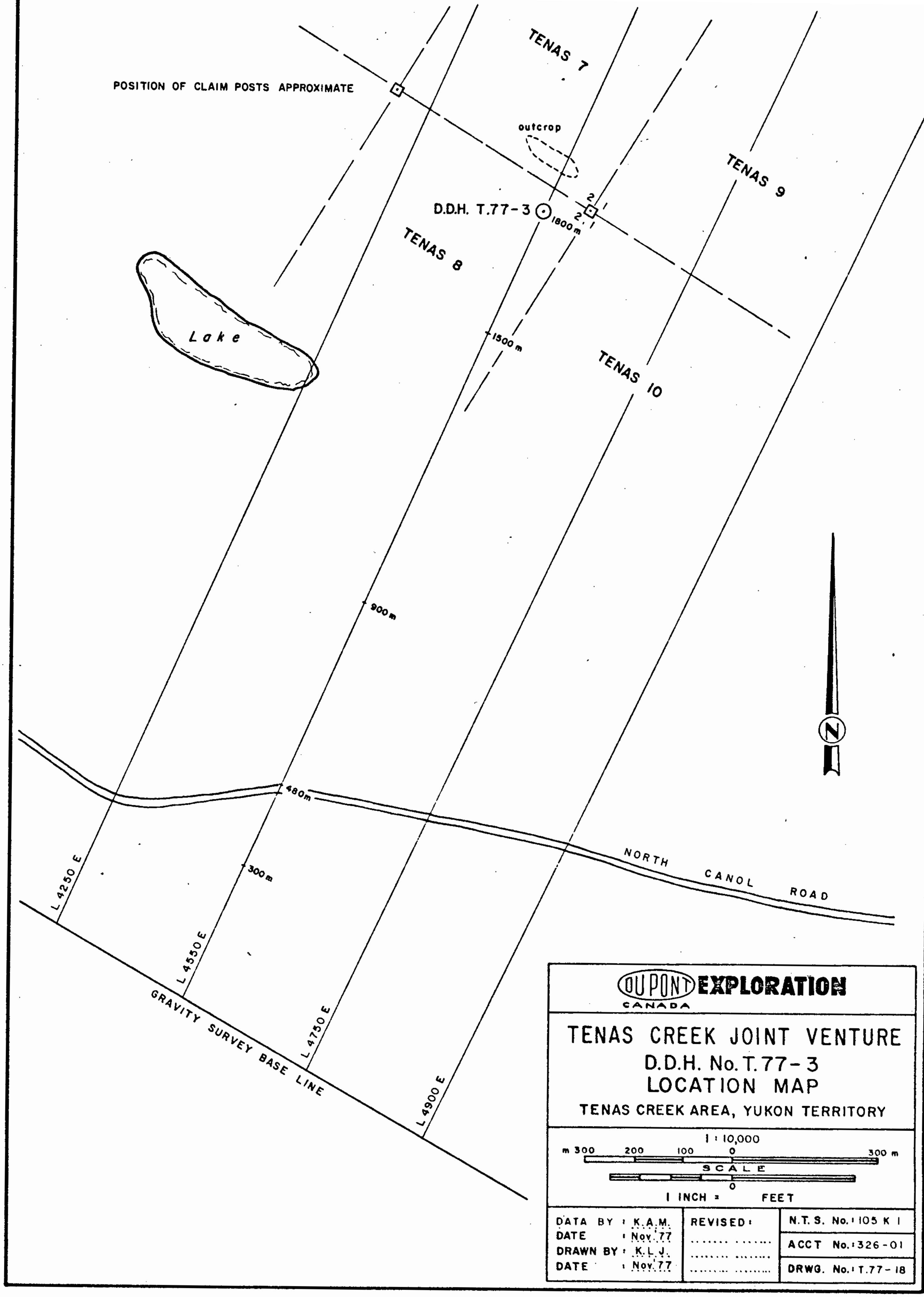
Hole T-77-3 was drilled on line 4550E, 1800N on a gravity anomaly which had been given a second priority rating by geophysicist C.A. Ager. The interpretation indicated a relatively shallow source. The anomaly was explained, by the results of the drilling, as a rock unit contact between granitic rocks and underlying andalusite schist. This hole was fruitful in that it indicated a section of rock units which correlate with the units hosting the Faro deposits.

The drill log for T-77-3 is section 2.9.2

2.9.1 D.D.H. No. T-77-3 Location Map

2.9.2 Drill Log for D.D.H. No. T-77-3

2.9.3 Reaction to K and Ca Staining Media and Etching D.D.H. T-77-3


POSITION OF CLAIM POSTS APPROXIMATE
TENAS 7
outcrop
TENAS 9
D.D.H. T.77-3
1800 m
TENAS 8
Lake
1500 m
TENAS 10
900 m
480m
NORTH CANOL ROAD
300 m
L 4250 E
L 4550 E
L 4750 E
L 4900 E
GRAVITY SURVEY BASE LINE
N
DUPONT EXPLORATION
CANADA
TENAS CREEK JOINT VENTURE
D.D.H. No. T.77-3
LOCATION MAP
TENAS CREEK AREA, YUKON TERRITORY
1 : 10,000
m 300 200 100 0 300 m
SCALE
0
1 INCH = FEET
DATA BY : K.A.M.
DATE : Nov. 77
DRAWN BY : K.L.J.
DATE : Nov. 77
REVISED :
N.T.S. No. : 105 K 1
ACCT No. : 326-01
DRWG. No. : T.77-18

DRILL HOLE RECORD

DU PONT OF CANADA EXPLORATION LIMITED

DRILLED BY: Arctic Diamond Drilling Ltd.
Runners: J. Berry & N. Grimley
Helpers: H. Sask & J. Bayer
DRILL TYPE: BBS-1 Hydraulic
LENGTH: 155.0 metres
CLAIM:
DIP: 90°
LATITUDE: 4550 E
DEPARTURE: 1800 N
ELEVATION:
AZIMUTH:
HOLE STARTED: Aug.24/77
HOLE COMPLETED: Aug.29/77

ACID &/OR TRO-PARI TESTS

DEPTH	DIP	AZIMUTH	DEPTH	DIP	AZIMUTH

SHEET No. 1 OF: 4
HOLE NUMBER: T 77-3
PROPERTY: Tenas J.V.
ACCOUNT No.: 326-01
CORE SIZE: BQ
% CORE RECOVERY:
LOGGED BY: K.A. MacLean

INTERVAL (METRES)				DESCRIPTION	SAMPLE						ASSAYS					
FROM	TO	WIDTH	RCVRY		NUMBER	% SULFIDES	INTERVAL (METRES) FROM	TO	WIDTH	RCVRY						
0.0				Collar, BW casing 0-15.24 m												
0.0	5.18	5.18		Sand												
5.18	5.48	0.38		Boulders												
5.48	8.83	3.65		Boulder, 35 cm of chips, phyllite argillaceous, schistose, with												
				po disseminations.												
8.83	11.58	2.75		Boulders, 45 cm of chips, 10 cm of dark schist, 4 cm orange												
				granite, 5 cm pk grt, 16 cm green metavolcanic.												
11.58	14.63	3.05		Boulders, 36 cm of chips, 3 cm grey-white cg gabbro, 18 cm dark												
				biotite schist, 7 cm altered granite f-mg.												
14.63	19.26	4.63	100%	Granite, biotitic, light grey, foliated 10-15°, small books and												
				flakes, equigranualar homogeneous vague alteration along fine												
				fracts, m-cg, SG @ 15.54 = 2.66, @ 18.29 = 2.67.												
19.26	22.25	2.99		Cave, mostly ½" chips grey green biotite granite and dark schist												
22.25	25.54	3.29		Granite, grey green biotitic as above @ 14.63, fine grained												
				last metre, more prominent light green feldspar, sharp lower												
				contact SG @ 22.86 = 2.68												

DRILL HOLE RECORD

DU PONT OF CANADA EXPLORATION LIMITED

HOLE NUMBER: T 77-3 SHEET NUMBER 2 OF 4

INTERVAL (METRES)				DESCRIPTION	SAMPLE						ASSAYS				
FROM	TO	WIDTH	RCVRY		NUMBER	% SULFIDES	INTERVAL (METRES) FROM	TO	WIDTH	RCVRY					
25.54	26.36	0.82		Transition zone, light greenish grey highly schistose material with white quartz veins to 10 cm, talcy alteration, foliation @ 65°											
26.36	29.17	2.81		Tuff? Light green and brown schistose, 1 cm light green rounded phenos vaguely bedded, soft and talcy foliation surfaces. SG @ 27.43 = 2.84, @ 28.80 = 2.84.											
29.17	29.56	0.39	100%	Chert, vfg greenish tuff, uct distinct @ 48°, SG @ 29.96 = 2.64											
29.56	39.14	9.58		Rhyolite(?) Slightly more coarse grained than previous entry, occ dark po grain and chlor flake, 3% sulphides, vague fol @ 45°, vfg @ lower ct, SG @ 31.39 = 2.64, 33.53 = 2.65, 36.58 = 2.64											
39.14	47.85	8.71		Andalusite schist, purplish colour, foliated @ 60°, with prominent subrounded feldspar phenocrysts, occ light coloured centres in a biotitic matrix rare 1 mm py filled fract along core as @ 46.63, SG @ 39.62 = 2.83, @ 42.37 = 2.80, 45.72 = 2.83.											
47.85	54.86	7.01		Andalusite schist, speckled with dark andalusite, appears to be a finer grained version of above, foliated brownish biotite rich matrix, 52°, SG @ 48.77 = 2.83, 51.81 = 2.91.											
54.86	56.69	1.83		Phyllite, banded, compositional bands with brown biotite alternating with grey fine grained feldspar and chert lenses, contact marked by a few white quartz veins, greasey feel on foliation surfaces, SG @ 55.47 = 2.75.											
56.69	62.03	5.34		Metavolcanic, med green fine grained foliated andesite, occ											

DOX. 77.3

DRILL HOLE RECORD

DU PONT OF CANADA EXPLORATION LIMITED

HOLE NUMBER: T 77-3 SHEET NUMBER 3 OF 4

INTERVAL (METRES)				DESCRIPTION	SAMPLE						ASSAYS				
FROM	TO	WIDTH	RCVRY		NUMBER	% SULFIDES	INTERVAL (METRES) FROM	TO	WIDTH	RCVRY					
				quartz carb bands to 8 cm, distinct transition at upper and lower											
				contacts, SG @ 60.96 = 3.03											
62.03	63.09	1.06		Andalusite-biotite schist, as @ 54.86, speckled, vague composi-											
				tional banding with light brownish sections, fg dark green											
				andalusite.											
63.09	78.94	15.85		Andalusite schist, spotted with more cg andalusite, foliated											
				53° about 5% fine dissem py, SG 62.78 = 2.83, 64.00 = 2.82,											
				67.05 = 2.79, 70.1 = 2.80, 72.85 = 2.81, 75.89 = 2.79											
78.94	87.17	8.23		Metavolcanic, med green foliated andesite, occ chloritic, occ											
				talcy, one 5 mm po band @ 79, 58°, SG @ 79.24 = 2.98, 85.80 =											
				2.7											
87.17	87.78	0.61		Phyllite, banded, biotite-rich beds, occ sml strks po, up to 10%											
				sulp comp bands green, grey and brown.											
87.78	103.62	15.84		Andalusite schist, spotted, foliation generally 52°, occ local											
				variation occ po streaks, SG @ 88.39 = 2.81, 92.05 = 2.83,											
				97.53 = 2.79											
103.62	105.46	1.84	100%	Sheared zone, talcy, angles contorted along core, grey mud, fol											
				contorted @ 337											
105.46	131.67	26.21		Andalusite schist, spotted, grain size of andal increases with											
				depth, 2 x 10 cm bands with ragged po patches @ 109.42											
				and 111.25, core broken and blocky, 1 cm gouge @ 119.49 in											
				15 cm shear, occ light and dark compositional banding, SG @											
				115.82 = 2.82, 118.36 = 2.81, 121.92 = 2.82, 124.96 = 2.80,											
				128.01 = 2.83, 131.06 = 2.80											

DOX. 77.3

DRILL HOLE RECORD

DU PONT OF CANADA EXPLORATION LIMITED

HOLE NUMBER: T 77-3 SHEET NUMBER 4 OF 4

INTERVAL (METRES)				DESCRIPTION	SAMPLE						ASSAYS					
FROM	TO	WIDTH	RCVRY		NUMBER	% SULFIDES	INTERVAL (METRES) FROM	TO	WIDTH	RCVRY						
131.67	135.02	3.35		Andalusite schist, speckled, med brn biotite rich fol @ 60°												
				0.5 x 1.5 mm elongate dark green porphyroblasts, SG @ 134.11 =												
				2.80,												
135.02	137.76	2.74		Phyllite, med grey, strks brn bio, occ comp bands, rare 5 mm												
				green tuff bands @ 65°, 5% po, SG 137.16 = 2.83												
137.76	155.00	17.24		Phyllite, biotitic, occ speckles, pyritic @ 506, 2 mm 40% po @												
				15.33 and 15.11, occ colour and textural banding, SG @ 138.07 =												
				2.80												
155.00				Foot of hole.												
				All casing removed												
				Core stored in boxes 10 m w of hole collar.												

DOX. 77.3

REACTION TO K AND Ca STAINING MEDIA AND ETCHING

DDH T-77-3

Depth (Metres)	Specimen	Ca	K	SG	Comments
15.54	51	++	++	2.66	Specific feldspar grains are calcic, 30%, part of matrix is potassic, 30%.
18.29	60	++	+++	2.67	Similar to above, much of non porphyritic portion is potassic.
22.86	75	++	+++	2.68	Same as above.
27.43	90	+	-	2.84	Calcic portions of tuff bands.
28.80	94.5	+	-	2.84	Weak non specific Ca reaction.
29.26	96	+	+++	2.64	Minor calcium, 50% potassic matrix.
31.39	103	+	++	2.64	Not well stained, minor calcium, potassic matrix.
33.53	110	++	+++	2.65	Strongly potassic and calcic, ratio 3:2.
36.58	120	++	+++	2.64	Strongly potassic, less strong calcic, 3:1.
39.62	130	+	-	2.83	Andalusite schist very weakly calcic.
	139			2.80	
42.37	140	+	-		Weakly calcic.
45.72	150	+	-	2.83	Very weakly calcic.
48.77	160	+	-	2.83	Very weakly calcic.
51.81	170	+	-	2.91	Some bands with calcic minerals in them.
55.47	182	+	-	2.75	Occasional weakly calcic bands.
58.21	191	+	-		10% weakly calcic.
60.96	200	+	-	3.03	10% weakly calcic.
62.78	206	+	-	2.83	10% weakly calcic.
64.00	210	+	-	2.82	5% weakly calcic.
67.05	220	+	-	2.79	5% weakly calcic.
70.10	230	+	-	2.80	5% weakly calcic.

Depth (Metres)	Specimen	Ca	K	SG	Comments
72.85	239	+	-	2.81	5% weakly calcic.
75.89	249	++	-	2.79	10% moderately calcic mineral in some beds.
79.24	260	++	-	2.98	10% fine calcic mineral in foliation.
82.29	270	+	-		5% calcic minerals.
85.80	281.5	+		2.77	Moderately stained calcic minerals in rare beds, 5%.
88.39	290	+		2.81	Weakly stained calcic mineral 5%.
92.05	302	-	-	2.83	
94.48	310	-	-	2.82	
97.53	320	-	-	2.79	
115.82	380	+		2.82	Some thin beds with calcic mineral.
118.86	390	-	-	2.81	
121.92	400A	-	-		
121.93	400	-	-	2.82	
124.96	410	-	-	2.80	
128.01	420	-	-	2.83	
131.06	430	+		2.80	5% calcic mineral in rare beds.
134.11	440	-	-	2.80	Occ deeply etched magnesium carbonate filled fracture.
137.16	450	+		2.83	5% calcic mineral in occ beds.
138.07	453	++		2.80	15% calcic mineral.
140.20	460	-	-	2.81	
143.25	470	-	-	2.81	
146.30	480	-	-	2.81	
	490				No sample.
152.40	500	+		2.79	5% calcic mineral in one bed.
	508	+		2.83	5% calcic mineral in one bed.

3.0 GEOCHEMISTRY

3.1 SAMPLE SPACING AND GRID CONTROL

Approximately 900 soil samples were collected from the claims on the north and west side of the highway. The 1977 geophysical grid was used for control and intermediate lines were run between the 1972-1974 geophysical grid lines on the WOP, MAL and TENAS claims. Stations were in general spaced at 100 m at lines 200 m apart. The base line was cut and chained by Eastern Associates during early 1977, while the geophysical grid was run by crews from C.A. Ager and Associates and consists of flagged lines 400 m apart. Intermediate soil survey lines were put in by Du Pont personnel using compass and topochaix and marked with flagging tape during June and July, 1977.

3.2 SAMPLING TECHNIQUE

All samples were collected with a grub hoe from the "Be" horizon. Sample information was recorded on sample bags and later on sample sheets, and the material was air dried in Vancouver, where the -80 mesh fraction was analyzed for lead and zinc using nitric and perchloric acid digestion followed by atomic absorption analysis. All pulps were retained in Vancouver by Min-En Labs who did the analysis.

3.3 RESULTS

3.3.1 Soil Profile

Soil Type	Definition	Thickness & Type
AL	Leafy undecomposed	Variable to 0.1 m in poplar and birch areas.
AH	Decomposed plant material with soil.	Variable but 5.0 cm common and usually + 1 cm.
Ash (Cx)	Ash layer - exotic	1 to 3 cm throughout true soil areas but not evident on steep hillsides.
Bh	Soil with roots and minor humus usually oxidized in part.	10 cm to 2 cm, most roots of spruce in AH, thicker in burn areas covered with poplar.
Be	Oxidized soil horizon	Nil (gleysols and lacustrine zones) to 50 cm in sandy well drained areas.
C	Residuum, glacial till, older lacustrine deposits moraines, kame terraces.	

3.3.2 Determination of pH

Samples from random lines were used for pH determinations by the use of a Lamotte-Morgan wet pH kit. The primary variability was very low but what little was noted was due more to transported soils near the river than residual or boulder tills on the hillsides. The pH on the hillsides varied from 6.5-8.0 with a very large number of values 6.9-7.2. The soils from near the river tended to be 6.5-7.0 with most values about 6.8-7.0.

3.3.3 Statistics

Both elements show lognormal distribution of the values. Lead has a higher kurtosis (peakedness) than zinc which has its typical broad skew to the higher values. The following table was used to evaluate the distribution of the values on the map:

	Pb	Zn
Mean (geometric)	17.2	99.1
Mean + 0.33 standard deviation (log)	22.7	134.8
Mean + 0.67 standard deviation	30.0	183.3
Mean + 1.00 standard deviation	39.6	349.4
Mean + 1.33 standard deviation	52.2	339.3
Mean + 1.67 standard deviation	69.0	461.5
Mean + 2.00 standard deviation	91.0	627.9

3.4 INTERPRETATION

A detailed, in-depth interpretation has not been made, but there are some clusters of geochemically anomalous sites on the TENAS and WOP claims which correspond to and confirm earlier surveys conducted by previous investigators. In general there appears to be some correlation with gravity features which might lead to proposing drill holes after conducting additional, more detailed geophysical surveys. There is some geological correlation of soil anomalies with the fringes of the andesite dome.

There are also some geochemically anomalous areas in the upper Tenas Creek portion of the MAL claims. No gravity surveys have yet been run over this portion of the geophysical grid.

It should be noted that the interpretation of the geochemical soil survey is on-going, and should not be regarded as complete at this time. Further close study and detailed interpretations are planned for the next stage of the investigations in conjunction with any proposed geophysical surveys which may arise during the planning of future work on the claims.

4.0 GRAVITY SURVEYS

4.1 PREFACE

This section is a reproduction of the report by C.A. Ager which was submitted to Du Pont of Canada Exploration on August 2, 1977. The sections pertaining to a gravity anomaly on the T claims south of the area have been deleted. The raw gravity data section has also been omitted, the results portrayed on the maps make this appendix redundant.

4.2 LOCATION - DATE OF WORK - CREW

Location: Tenas Project Area
BAR, WOP, BELL, TENAS, T claims area
Tenas Creek and Ross River areas, Yukon Territory

NTS 105K - 1

62°03' N latitude, 132°15' W longitude.

Date of Work:
Field work: April 8 - June 9, 1977

Office work: June 16 - August 2, 1977

Crew:

Charles A. Ager, PhD,PEng:	Project geophysicist
Douglas R. MacQuarrie, BSc:	Party chief/geophysicist
Paul Stevenson:	Gravity observer/field assistant
Roger Warren:	Gravity observer
Howard Moskaluk:	Geophysical assistant
Keith Travis:	Field assistant
John Risby:	Field assistant
Kurt Diekman:	Field assistant
Alan Watson:	Gravity observer

4.3 INTRODUCTION

At the request of Du Pont of Canada Exploration Ltd, approximately 101 line miles of reconnaissance gravity work was conducted over the Tenas Project area, Yukon Territory (Fig. 1 and 2). The main intent of the gravity survey was to outline zones of excess mass which could signal the presence of massive Pb-Zn orebodies. The project area is within the well known Anvil Pb-Zn district where several massive sulphides in the range of 20-60 million tons have been discovered to date. The gravity work was concentrated on the BAR, WOP, BELL and T claims as shown in Figure 2.

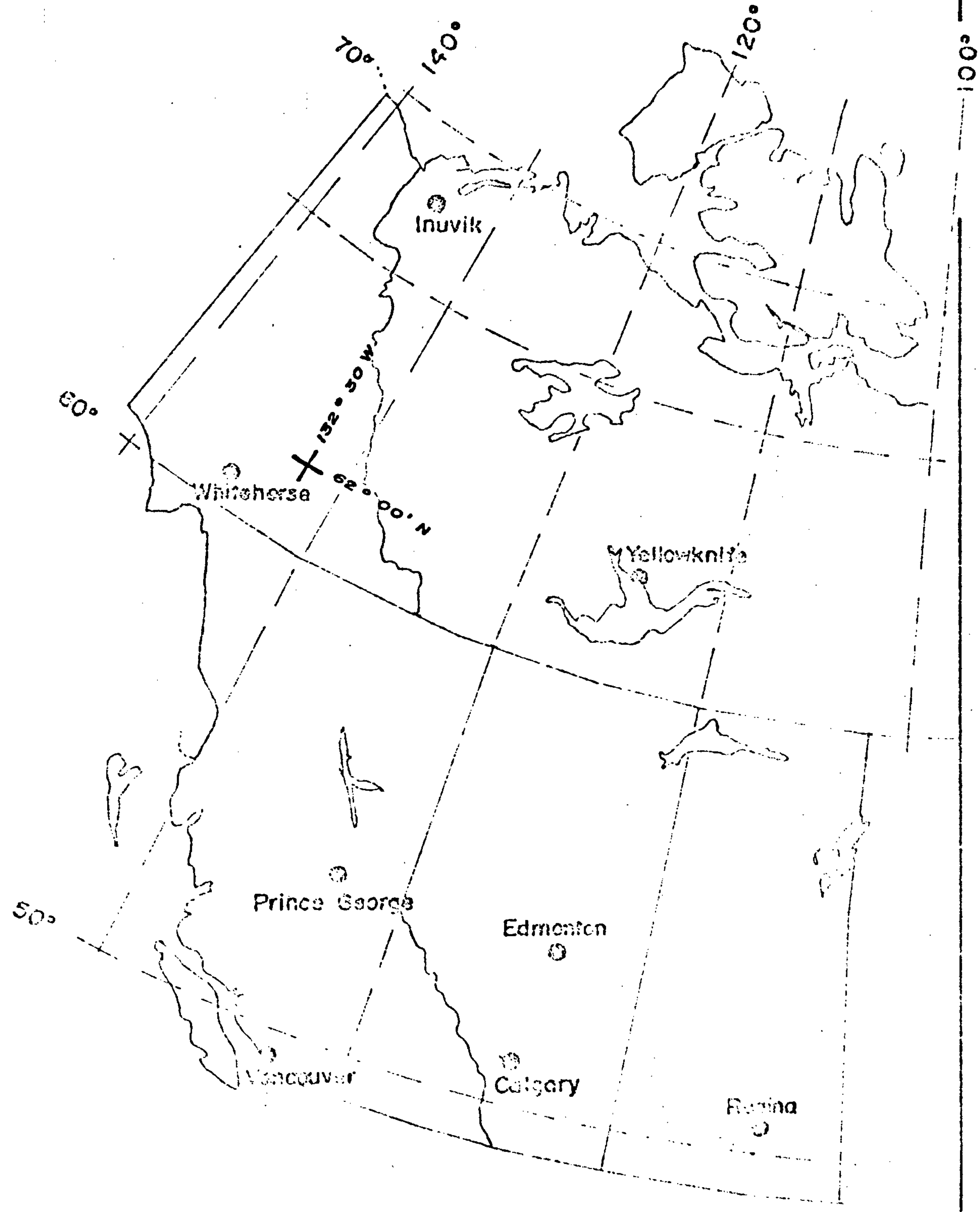


FIGURE 1

0 200 500 mi

0 200 500 km

LOCATION MAP

TENAS PROJECT AREA

DATE JULY, 1977

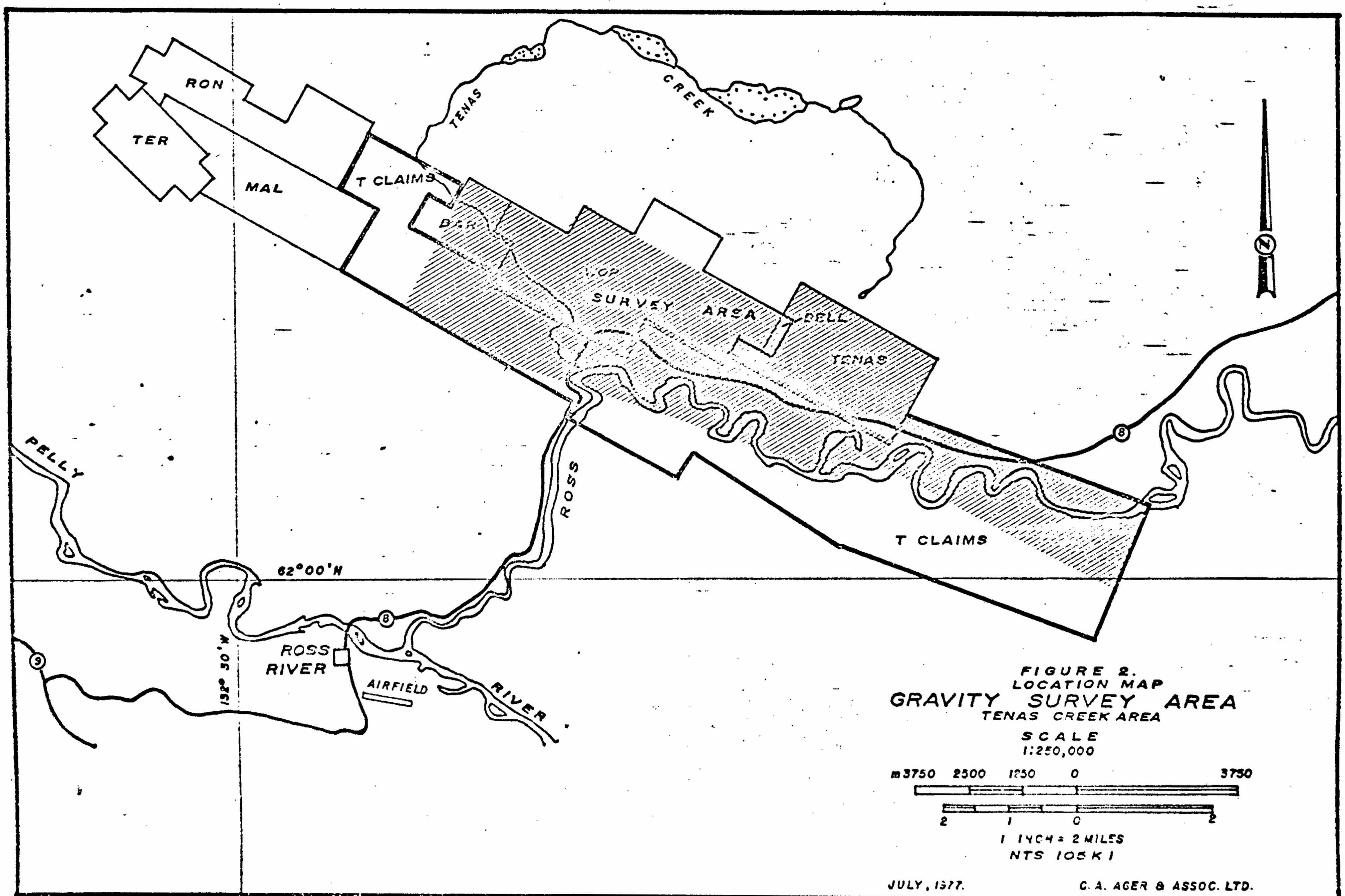


FIGURE 2.
LOCATION MAP
GRAVITY SURVEY AREA
TENAS CREEK AREA

SCALE
1:250,000

m 3750 2500 1250 0 3750

2 1 0 2

1 INCH = 2 MILES
NTS 105 K 1

JULY, 1977. C. A. AGER & ASSOC. LTD.

4.4 INSTRUMENTATION & SURVEY PROCEDURE

Gravity observations were made using two LaCoste and Romberg Model G gravity meters (Serial Nos. G148 and G209) with reading accury of +0.01 mgal. Instrument and diurnal drift were accounted for by tying into known base stations within three hour intervals. All gravity observations were within the dial range 5100-5200 for which the instrument constants are 1.05620 and 1.06067 mgal/division respectively.

Stations were located at 60 metre intervals along flagged chain and compass grid lines established by Ager & Associates Ltd crews. Along the pre-cut and picketed base line, stations are at 50 metre intervals. Line spacing was 300-400 metres as shown on Figures 3-1 and 3-2. Pink fluorescent flagging marks each survey line with lime and pink marking each gravity station.

Station elevations were determined from standard levelling procedures using an electric level developed by Ager & Associates Ltd. Along the base line, elevations were taken to the top of the nail in a peg at each picket position. On cross lines, elevations were taken to the top of flagged pegs at ground level. Station elevations were determined by tying to geodetic bench marks along the North Canol road. Relative station elevations are accurate to ±0.03 metres or better.

The entire gravity survey was tied to a series of 5 gravity base stations that were established on the north side of the North Canol Road and in the Ross River townsite. Each base is marked by a 4"x4" red painted post on which is carved the base station number. The absolute gravity value of each base station was determined by a series of network ties to the National Network Base Station Number 9807-69 at Whitehorse, Yukon Territory. The following table summarizes the base station gravity values with further parameters given in Appendix A.

Station	Location	Observed Gravity
GB 77-1	John Rolls' Trailer Ross River, Y.T.	981,824.18 mgal
GB 77-2	North Canol Road Tenas Grid 8160E+1370N	981,813.84 mgal
GB 77-3	North Canol Road Tenas Grid L10100E+1950N	981,815.77 mgal
GB 77-4	North Canol Road Tenas Grid 1970E-40N	981,829.44 mgal
GB WOP	North Canol and Tenas Creek Road Intersection Tenas Grid 870W+380S	981,828.89 mgal

4.5 DATA REDUCTION

As is well known, the observed gravity field (g_0) contains much information of non interest in exploration geophysics. Simply stated, the problem is to separate the unwanted effects of the earth (g_E) from the observed gravity map. The map of interest, the Complete Bouguer Gravity Map (Δg_{CB}) is defined as follows:

$$\Delta g_{CB} = g_0 - g_E \qquad (1)$$

where

$$g_E = \underbrace{g_L}_{\text{Latitude effect}} + \underbrace{g_{FA}}_{\text{Free Air effect}} + \underbrace{g_{BS}}_{\text{Bouguer Slab effect}} + \underbrace{g_T}_{\text{Terrain effect}} \qquad (2)$$

Using standard procedures, the Complete Bouguer Gravity Maps (Figures 4-1, 4-2) were calculated by Equation 2 above. Terrain effects were calculated to a radius of 600 metres about each station using a computer technique of Ager & Associates Ltd. Gouguer slab and terrain densities were taken as 2.80 g/cc as determined from mean rock density measurements from the survey area. The complete Bouguer gravity values are all relative to the base point GB WOP which was assigned an arbitrary value. A complete listing of the gravity data is given in Appendix A.

4.6 THE GRAVITY MAPS

The gravity survey was designed to test for the presence of massive lead-zinc mineralization within the phyllitic units underlying the area surveyed. Under the concept of search we are interested in detecting massive sulphide bodies with total tonnage in the range 20-60 million tons. This means that their gravity response is expected to be recognizable and probably greater than 1.0 mgal in amplitude. Subtler anomalies less than 1.0 mgal can be interpreted from the data. However, before this can be done with any certainty, further geological, geochemical and geophysical constraints are required. This means that for a 'first pass' interpretation only the obvious and strong gravity anomlies will be identified. As more supportive data becomes available, then, and only then, should the subtler gravity features be investigated in more detail.

The elevation maps for the east and central part of the Tenas Project area are given on Figures 3-1 and 3-2 respectively. The complete Bouguer gravity maps for these same areas are given on Figures 4-1 and 4-2. The current Tenas gravity grid was tied to the old WOP gravity grid. The previous WOP data was combined with the Tenas data, recalculated and replotted using density 2.80 g/cc. The resulting gravity map represents all available gravity data on a common elevation and gravity datum.

4.7 INTERPRETATION OF RESULTS

The complete Bouguer gravity maps (Fig. 4-1, 4-2) represent an excellent overview of the gross geology underlying the survey area. It is important to keep in mind that the area surveyed is some 18 km long by 2-4 km wide. In terms of mining exploration, this represents an extremely large area. With this in mind, the following interpretation is made:

4.7.1 Broad Gravity Highs = Andesitic Units

A broad gravity high feature occupies the main part of the area surveyed. It stretches from the BAR, through the WOP, BELL and TENAS claims. It follows the road as a narrow high and is open to the east on the T claims. The anomaly is extremely large in areal extent - some 1-2 km wide by more than 12 km long. The central plateau of the gravity high most certainly maps the general postion of the andesitic units, and may well indicate a large 'volcanic dome' feature.

Similar gravity high features are partly mapped on the southern part of the BAR claims (south of 1500S on all lines between 4500W and 00EW) and on the southeastern end of the T claims (south of BL+9300E to L12500E+1500N inclusive). These areas are interpreted to indicate the presence of andesitic units as well.

4.7.2 Gravity Gradient Areas = Phyllitic Units

If phyllites have the same density as andesitic rocks then gravity cannot distinguish their difference. However, many of the phyllitic rocks in the belt have densities in the range 2.70-2.80 g/cc. These values are somewhat lower than andesitic rocks which average 2.80-2.90 g/cc. Combine this with the fact that the andesitic units generally overlie less dense phyllitic rocks and it infers that gravity gradient areas will map the general presence of phyllitic rocks. Using this as a guide we see that phyllites should be present in the gravity gradient areas on the northern and southern flanks of the broad gravity high (andesitic rocks) features as discussed above. Intrusive rocks lie on the north of the survey area as indicated by steepening gravity gradients.

4.7.3 Broad Gravity Lows = Unconsolidated Material

The gravity low features which follow the Ross River valley and extend along Tenas Creek clearly indicate the presence of unconsolidated material. Based on a density of 2.0 g/cc for 'overburden' and using a residual gravity of 3.5-4.5 mgal, this material has a thickness in the range 100-150 metres under the Ross River. Under Tenas Creek, narrower channels of 100 metres or more of unconsolidated material are indicated.

4.7.4 Confined Gravity Highs = Potential Massive Sulphide Bodies

As stated previously, massive sulphide bodies will yield recognizable gravity highs if their tonnage is in the range 20-60 million tons. These features will exhibit themselves as either gravity high closures, as contortions in the gravity gradient, or as a combination of both. Inspection of the complete Bouguer gravity maps (Figs. 4-1, 4-2) indicates four gravity high targets of economic interest. Of these anomalies, only one (Pelly Anomaly) is truly outstanding. The residual gravity anomalies associated with each feature are shown on Figures 5-1 and 5-2. Discussion of each anomaly and its association with other geological, geochemical and geophysical data are discussed below.

4.8 THE GRAVITY ANOMALIES

The three gravity high features which have been identified from the complete Bouguer gravity maps as being of potential economic interest are listed below in order of decreasing economic importance.

4.8.1 BAR Anomaly

The gravity high feature centred at about 720S and extending between lines 3400W to 2300W is called the 'BAR Anomaly' (see Figure 5-2). Strong EM conductors on the west grade into very weak conductive zones in the vicinity of the anomaly (Walcott, 1975). The feature is situated in low flat swamp lands where no geological or geochemical data are available. The fact that the gravity high is surrounded by a 'halo' of lows raises some question as to the economic nature of the source. The most obvious interpretation of the anomaly is that it is an 'apparent' anomaly caused by increasing thickness of overburden on all its flanks. However, it does have features which make it a potential drill target as well. The interpreted massive sulphide parameters are as follows:

PARAMETER	MASSIVE SULPHIDE MODEL
Density	4.0 g/cc
Total Tonnage	65.6 million tons
Geometry & Thickness	Flat lying, maximum thickness of 25 metres.
Depth to Centre of Mass	Unknown, but less than 350 metres.
Co-ord of Centre of Mass	L2700W+780S

4.8.2 TENAS Anomaly

The TENAS Anomaly is a weaker feature of amplitude about 0.6 mgals. It is on the north side of a moderate EM conductor (Walcott, 1975) and on the uphill side of geochemical anomalies which are located to the west of the feature. It has an excess mass of 1.43 million tons which corresponds to a potential orebody of 4.8 million tons of density 4.0 g/cc. The anomaly is elongated northwest-southeast over an area 600 metres by 250 metres. It is situated near the southern edge of intrusive rocks to the north. For this reason, it could represent a border phase of the intrusive unit. This feature should be examined in detail by correlation with all other exploration data before comments regarding its economic nature can be clarified. The centre of the anomaly is situated at grid co-ordinates L4550E+1800N on the northern edge of the Tenas claims (Figure 5-1).

4.8.3 ROSS Anomaly

The ROSS Anomaly is marked by a sharp change in the direction of the gravity gradient in the vicinity of BL+4800E. The feature is centred at about L4900E+180N. The ground in this region is very swampy and inaccessible except during winter frozen periods. As a result, insufficient gravity data is presently available to fully define and explain the feature. However, the steep gravity gradient suggests that the anomaly is on the southern flank of an andesite-phyllite and/or andesite-overburden contact. The 'region' of interest is indicated by the circular area on Figure 5-1. More gravity and other data is needed before further comments are in order.

4.9 CONCLUSIONS & RECOMMENDATIONS

The gravity maps with interpretation presented here represents a 'first pass' inspection of the results. The gravity high features which are designated anomalous are the most prominent gravity targets within the area surveyed. When the results of this season's work programme are compiled in final format, then attention should be placed on the 'subtler effects' in regions deemed interesting for other reasons.

The following conclusions and recommendations are made for the three potential massive sulphide targets. They are discussed in order of decreasing economic importance.

4.9.1 BAR Anomaly

The BAR Anomaly is a distinct gravity high feature. However, it is surrounded by unknown thicknesses of unconsolidated material (overburden) and could therefore represent an 'overburden effect'. For this reason, resistivity depth profiling should be done over and around the feature (BL to 1500S on lines 3200W to 1100W inclusive). This work will either explain the anomaly or result in its elevation to a good rill target.

4.9.2 TENAS Anomaly

As stated previously, the TENAS Anomaly is a weak feature. It is in the vicinity of EM conductors and geochemical anomalies. However, it is also near or on the border phase of intrusive rocks to the north. In order for the gravity feature to be important, it must be supported 'in fact' by encouraging results from the current work programme. If it still looks interesting, a tighter and more detailed gravity grid should be established over the feature to re-check its existence and to isolate its areal extent more clearly before drilling.

4.9.3 ROSS Anomaly

The ROSS Anomaly is only partly covered by the recent gravity work. It is situated in swamp lands which are accessible only in winter months. Further geological, geochemical and gravity work are needed before comments regarding its economic nature are in order.

Simply stated, the gravity data presented here gives a good overview of the gross geology of the survey area and also provides definite targets for potential massive sulphide orebodies. It is for these latter reasons that further gravity work is recommended over the target areas as well as the remainder of the Tenas Project calims area to the west.

Charles A. Ager, PhD, PEng
Geophysicist

August 2, 1977

5.0 REFERENCES

Ager, C.A. (1974-1): Gravity Survey - WOP and CHAP Claims Grids, Tenas Creek area, Y.T., November 18, 1974.

Ager, C.A. (1974-2): Gravity Survey - WOP Claims Grid - Addendum: second vertical derivative, December 16, 1974.

Ager, C.A. (1977): Gravity Survey, Tenas Project, August 2, 1977.

Ditson, G.M. et al (1977): Tenas Joint Venture; Report on the Geology of the Project Area, November, 1977.

MacLean, K.A. (1977): Tenas Joint Venture; Logs of drill holes T-77-1, 2, 3, October, 1977.

Sawyer, J.B.P. (1975): A report on the 1975 work programme on the BAR claim group for Boliden Preussag Exploration, Sept 5, 1975.

Sawyer, J.B.P. (1975): Report on the 1975 work programme on the TENAS claim group for Boliden Preussag Exploration, Sept.5, 1975.

Smith, F.M. (1977): Report on Geochemical Soil Survey of the Project Area, October, 1977.

Walcott, P.E. (1975): A geophysical report on a Turam EM survey on the TENAS, BAR and MAL Claims, July, 1976.

LEGEND

5	DISTAL SEDIMENTS - VERY FINE GRAINED, VERY THIN LAMINAR. - RHYOLITE, TUFFS, PEARLY GREY PHYLLITES (TERRESTRIAL) BROWN PHYLLITES (VOLCANIC SOURCE) CALC-SILICATES - GRAPHITIC.
4	PROXIMAL VOLCANO-SEDIMENT - FINE, MEDIUM GRAINED TURBIDITES WITH HIGH VOLCANIC COMPONENT. - TUFFS, EXHALITES, RHYOLITES, GREEN, WHITE ETC. - POSSIBLE HIGH MAGNETITE.
3	ANDESITE - MASSIVE, HETEROGENEOUS. - VARIABLE CHARACTER. - CORE MATRIX, POSSIBLE INTERCALATED FLOWS, TUFFS. - BASIC INCLUSIONS, ASBESTIFORMS, TALCS ETC.
2	JURASSICS - JASPER, CHERT, RHYOLITE, ANDESITE.
1	GRANITICS - QUARTZ MONZONITE ; QUARTZ FELDSPAR PORPHYRY

SYMBOLS

- OUTCROP
- CONTACT OBSERVED
- CONTACT ASSUMED
- FAULT ASSUMED
- 50 ATTITUDE OF FOLIATION
- 45 ATTITUDE OF JOINTING
- CLAIM POST
- T SURVEY GRID - 1977
- TENAS SURVEY GRID - 1974
- WOP SURVEY GRID - 1974
- DIAMOND DRILL HOLE

WEST	CENTRAL	EAST
DRWG No T.77-9	DRWG No T.77-8	DRWG No.T.77-7

SHEET INDEX

inches 0 1 2
0 1 2 3 4 5 centimetres

YUKON GEOLOGICAL SURVEY

This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.

DUPONT EXPLORATION
CANADA

6.1.1

TENAS CREEK JOINT VENTURE

GEOLOGY

BAR, BELL, MAL, T, TENAS & WOP CLAIMS
(PARTS OF)

TENAS CREEK AREA, YUKON TERRITORY

1 : 10 000
m 300 200 100 0 300 600 m
SCALE
0
1 INCH = FEET

MAPPED BY : F.M.S.	REVISED :	N.T.S. No.: 105 K 1
DATE : Jun.-Jul.'77		ACCT No.: 326 - 00
DRAWN BY : K.L.J.		DRWG No.: T.77-9
DATE : Nov. '77		

LEGEND

5	DISTAL SEDIMENTS – VERY FINE GRAINED, VERY THIN LAMINAR. – RHYOLITE, TUFFS, PEARLY GREY PHYLLITES (TERRESTRIAL) BROWN PHYLLITES (VOLCANIC SOURCE) CALC-SILICATES – GRAPHITIC.
4	PROXIMAL VOLCANO-SEDIMENT – FINE, MEDIUM GRAINED TURBIDITES WITH HIGH VOLCANIC COMPONENT. – TUFFS, EXHALITES, RHYOLITES, GREEN, WHITE ETC. – POSSIBLE HIGH MAGNETITE.
3	ANDESITE – MASSIVE, HETEROGENEOUS. – VARIABLE CHARACTER – CORE MATRIX, POSSIBLE INTERCALATED FLOWS, TUFFS. – BASIC INCLUSIONS, ASBESTIFORMS, TALCS ETC.
2	JURASSICS – JASPER, CHERT, RHYOLITE, ANDESITE.
1	GRANITICS – QUARTZ MONZONITE ; QUARTZ FELDSPAR PORPHYRY

SYMBOLS

- OUTCROP
- CONTACT OBSERVED
- CONTACT ASSUMED
- FAULT ASSUMED
- 50 ATTITUDE OF FOLIATION
- 45 ATTITUDE OF JOINTING
- CLAIM POST
- T SURVEY GRID – 1977
- TENAS SURVEY GRID – 1974
- WOP SURVEY GRID – 1974
- DIAMOND DRILL HOLE
- CLAIM BLOCK BOUNDARY (APPROXIMATE)

WEST	CENTRAL	EAST
DRWG No. T.77-9	DRWG No. T.77-8	DRWG No. T.77-7

SHEET INDEX

inches 0 1 2
0 1 2 3 4 5 centimetres

YUKON GEOLOGICAL SURVEY

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DU PONT EXPLORATION
CANADA

6.1.2

TENAS CREEK JOINT VENTURE

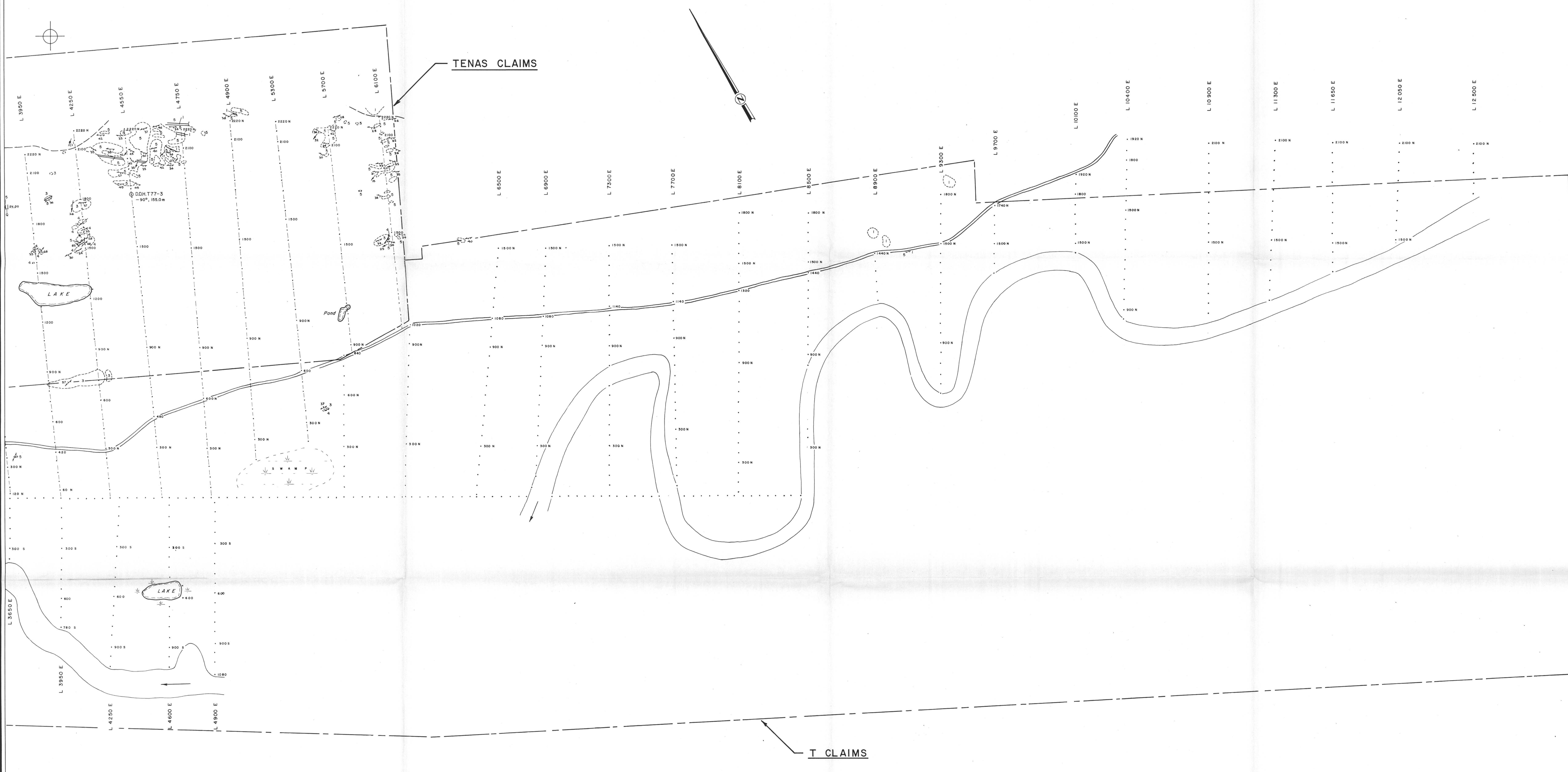
GEOLOGY

BAR, BELL, MAL, T, TENAS & WOP CLAIMS
(PARTS OF)

TENAS CREEK AREA, YUKON TERRITORY

1 : 10,000
m 300 200 100 0 300 600 m
SCALE
0
1 INCH = FEET

MAPPED BY :	F.M.S.	REVISED :	N.T.S. No.: 105 K 1
DATE :	Jun.-Jul.'77		ACCT No.: 326 - 04
DRAWN BY :	K.L.J.		
DATE :	Aug.'77		DRWG No.: T.77-8



LEGEND

5	DISTAL SEDIMENTS - VERY FINE GRAINED, VERY THIN LAMINAR. - RHYOLITE, TUFFS, PEARLY GREY PHYLLITES (TERRESTRIAL) BROWN PHYLLITES (VOLCANIC SOURCE) CALC-SILICATES - GRAPHITIC.
4	PROXIMAL VOLCANO-SEDIMENT - FINE, MEDIUM GRAINED TURBIDITES WITH HIGH VOLCANIC COMPONENT. - TUFFS, EXHALITES, RHYOLITES, GREEN, WHITE ETC. - POSSIBLE HIGH MAGNETITE.
3	ANDESITE - MASSIVE, HETEROGENEOUS. - VARIABLE CHARACTER - CORE MATRIX, POSSIBLE INTERCALATED FLOWS, TUFFS. - BASIC INCLUSIONS, ASBESTIFORMS, TALCS ETC.
2	JURASSICS - JASPER, CHERT, RHYOLITE, ANDESITE.
1	GRANITICS - QUARTZ MONZONITE ; QUARTZ FELDSPAR PORPHYRY

SYMBOLS

- OUTCROP
- CONTACT OBSERVED
- CONTACT ASSUMED
- FAULT ASSUMED
- 50 ATTITUDE OF FOLIATION
- 45 ATTITUDE OF JOINTING
- CLAIM POST
- T SURVEY GRID - 1977
- TENAS SURVEY GRID - 1974
- WOP SURVEY GRID - 1974
- DIAMOND DRILL HOLE
- CLAIM BLOCK BOUNDARY (APPROXIMATE)

WEST	CENTRAL	EAST
DRWG No. T.77-9	DRWG No. T.77-8	DRWG No. T.77-7

SHEET INDEX

inches 0 1 2
0 1 2 3 4 5 centimetres

YUKON GEOLOGICAL SURVEY

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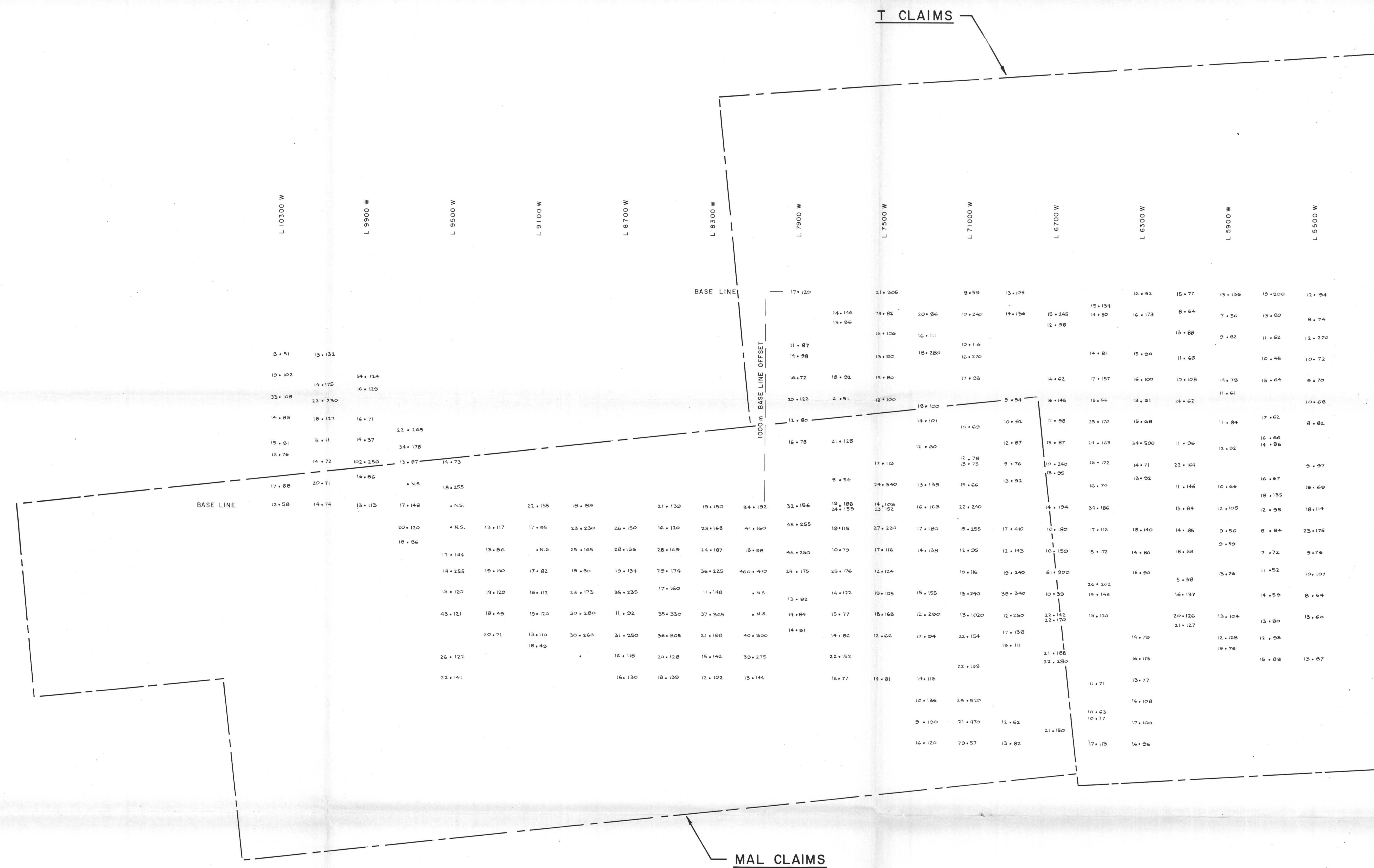
DU PONT EXPLORATION CANADA

6.1.3

TENAS CREEK JOINT VENTURE
GEOLOGY
BAR, BELL, MAL, T, TENAS & WOP CLAIMS (PARTS OF)
TENAS CREEK AREA, YUKON TERRITORY

1 : 10,000
m 300 200 100 0 300 600 m
SCALE
0
1 INCH = FEET

MAPPED BY : F.M.S.	REVISED :	N.T.S. No.: 105 K 1
DATE : Jun.-Jul. '77		ACCT No.: 326 - 04
DRAWN BY : K.L.J.		DRWG No.: T.77-7
DATE : Aug. '77		



LEGEND

• • • • •	T SURVEY GRID – 1977
•—•—•—•—•	TENAS SURVEY GRID – 1974
•—• •—• •	WOP SURVEY GRID – 1974
26 • 132	LEAD IN P.P.M. TO LEFT OF SAMPLE POINT ZINC IN P.P.M. TO RIGHT OF SAMPLE POINT
— —— —	CLAIM BLOCK BOUNDARY (APPROXIMATE)

WEST	CENTRAL	EAST
DRWG No T.77-15	DRWG No T.77-14	DRWG No.T.77-13

SHEET INDEX

inches 0 1 2
0 1 2 3 4 5 centimetres

YUKON GEOLOGICAL SURVEY

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DU PONT EXPLORATION
CANADA

6.2.1

TENAS CREEK JOINT VENTURE

GEOCHEMICAL SOILS

LEAD & ZINC IN P.P.M.

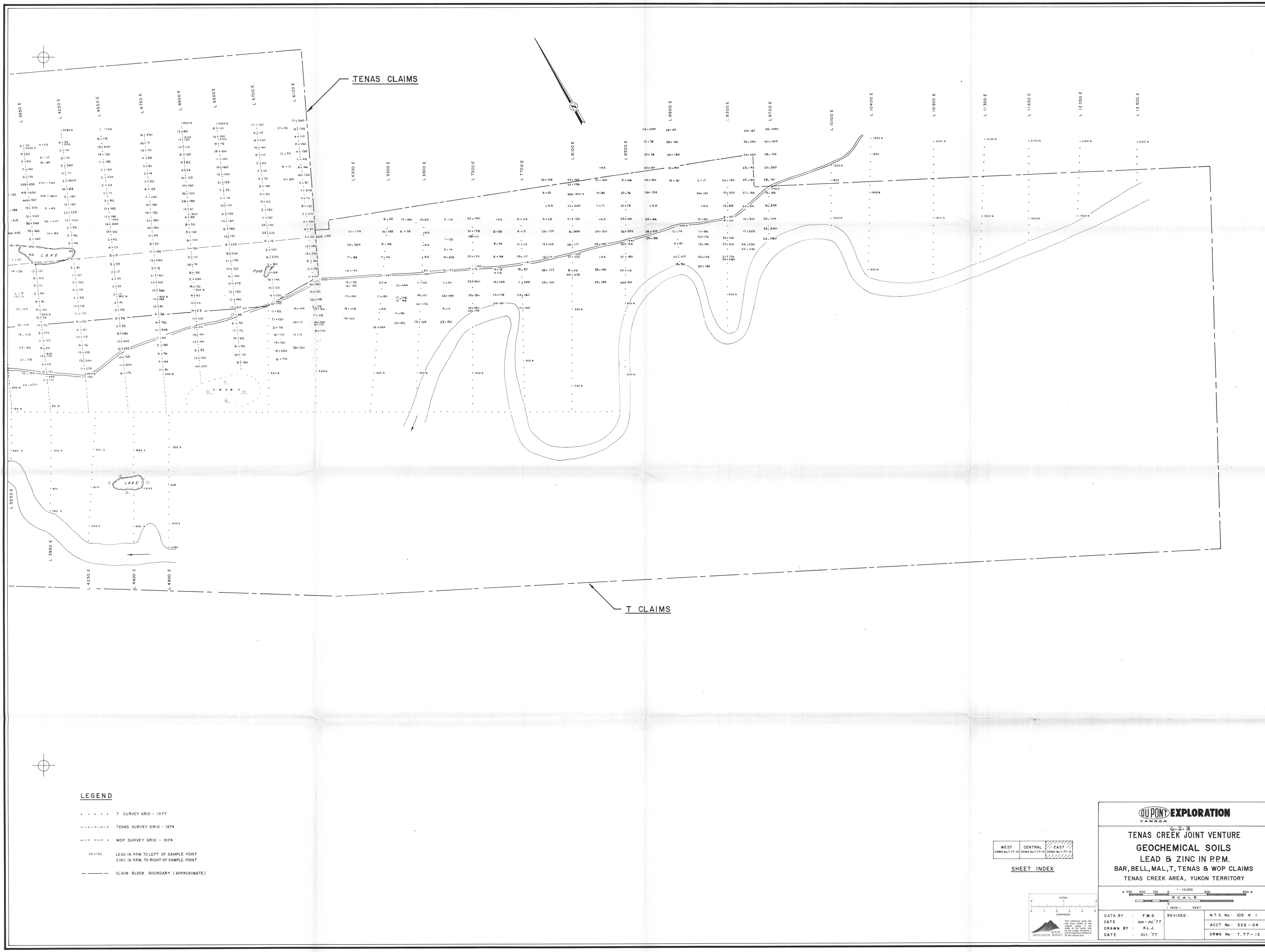
BAR, BELL, MAL, T, TENAS & WOP CLAIMS

TENAS CREEK AREA, YUKON TERRITORY

1 : 10 000
m 300 00 100 0 300 600 m
SCALE
0
1 INCH = FEET

DATA BY : F.M.S. DATE : Jun.-Jul.'77 DRAWN BY : K.L.J. DATE : Oct.'77	REVISED :	N.T.S. No. 105 K 1 ACCT No. 326 - 00 DRWG No. T. 77- 15

TENAS CLAIMS
WOP CLAIMS
BELL CLAIMS
BAR CLAIMS
T CLAIMS
WOP BASE LINE
BASE LINE
CANOL ROAD
CABIN
LAKE
Pond
ROSS RIVER
TO ROSS RIVER
LEGEND
T SURVEY GRID - 1977
TENAS SURVEY GRID - 1974
WOP SURVEY GRID - 1974
26 • 132
LEAD IN P.P.M. TO LEFT OF SAMPLE POINT
ZINC IN P.P.M. TO RIGHT OF SAMPLE POINT
CLAIM BLOCK BOUNDARY (APPROXIMATE)
WEST DRWG No. T.77-15
CENTRAL DRWG No. T.77-14
EAST DRWG No. T.77-13
SHEET INDEX
DU PONT EXPLORATION
CANADA
6.2.3
TENAS CREEK JOINT VENTURE
GEOCHEMICAL SOILS
LEAD & ZINC IN P.P.M.
BAR, BELL, MAL, T, TENAS & WOP CLAIMS
TENAS CREEK AREA, YUKON TERRITORY
1 : 10,000
m 300 200 100 0 300 600 m
SCALE
1 INCH = FEET
DATA BY : F.M.S.
DATE : Jun.-Jul.'77
DRAWN BY : K.L.J.
DATE : Oct.'77
REVISED
N.T.S No. 105 K 1
ACCT No. 326 - 00
DRWG No. T.77-14
inches
centimetres
YUKON GEOLOGICAL SURVEY
This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.



TENAS CLAIMS
T CLAIMS
L 3950 E
L 4250 E
L 4550 E
L 4750 E
L 4900 E
L 5300 E
L 5700 E
L 6100 E
L 6300 E
L 6500 E
L 6900 E
L 7300 E
L 7700 E
L 8100 E
L 8500 E
L 8900 E
L 9300 E
L 9700 E
L 10100 E
L 10400 E
L 10900 E
L 11300 E
L 11650 E
L 12050 E
L 12500 E
L 3650 E
L 4600 E
LAKE
Pond
BASE LINE
LEGEND
T SURVEY GRID - 1977
TENAS SURVEY GRID - 1974
WOP SURVEY GRID - 1974
26 • 132
LEAD IN P.P.M. TO LEFT OF SAMPLE POINT
ZINC IN P.P.M. TO RIGHT OF SAMPLE POINT
CLAIM BLOCK BOUNDARY (APPROXIMATE)
WEST
DRWG No. T. 77-15
CENTRAL
DRWG No. T. 77-14
EAST
DRWG No. T. 77-13
SHEET INDEX
inches
0 1 2
0 1 2 3 4 5
centimetres
YUKON GEOLOGICAL SURVEY
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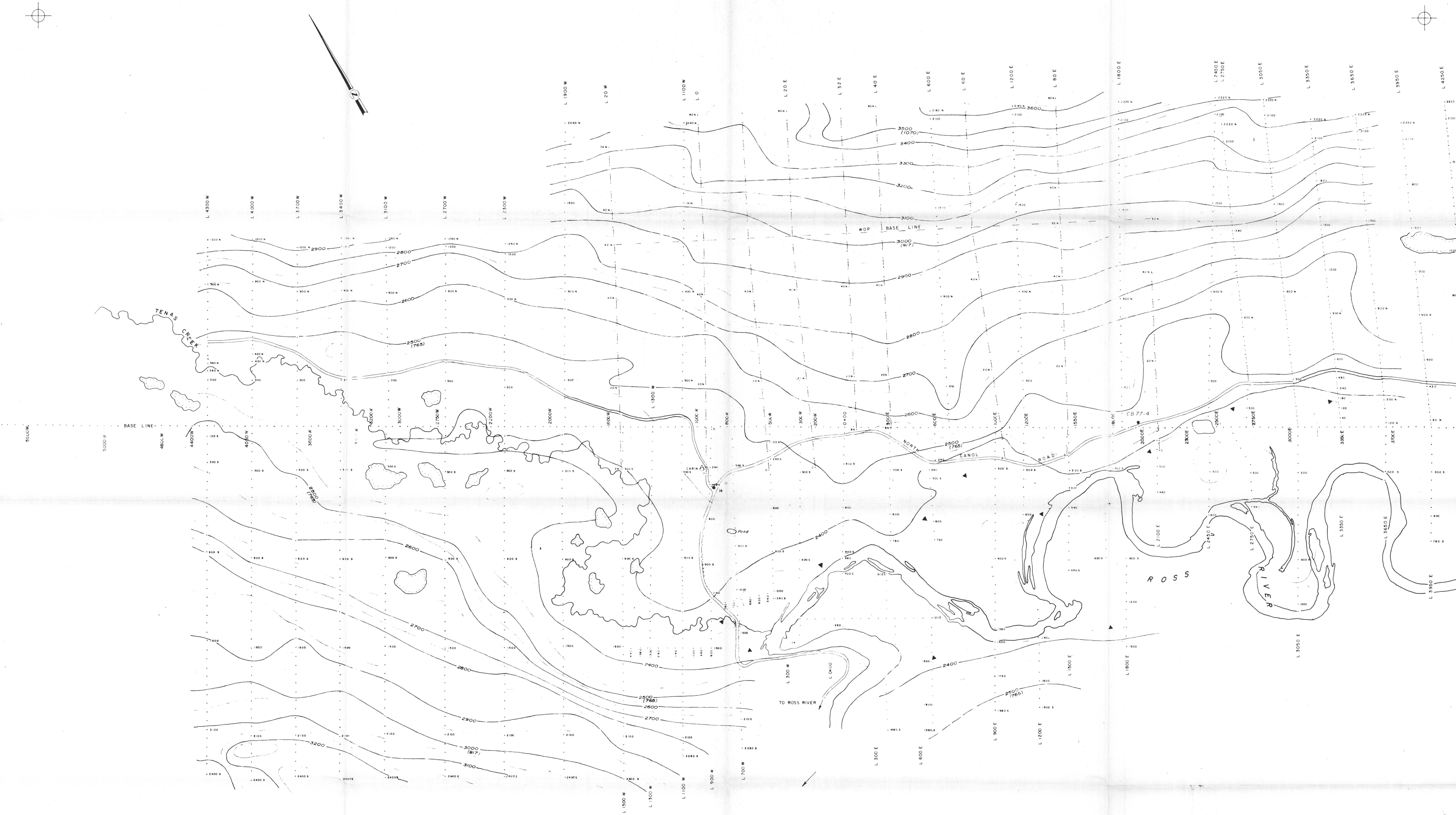
DU PONT EXPLORATION
CANADA
6.2.3
TENAS CREEK JOINT VENTURE
GEOCHEMICAL SOILS
LEAD & ZINC IN P.P.M.
BAR, BELL, MAL, T, TENAS & WOP CLAIMS
TENAS CREEK AREA, YUKON TERRITORY
1 : 10,000
m 300 200 100 0 300 600 m
SCALE
0
1 INCH = FEET
DATA BY : F.M.S.
DATE : Jun.-Jul.'77
DRAWN BY : K.L.J.
DATE : Oct.'77
REVISED :
N.T.S. No.: 105 K 1
ACCT No.: 326 - 04
DRWG No.: T. 77 - 13



LEGEND & NOTES

● GB WOP - GRAVITY BASE STATION

3000S . SURVEY GRID STATION

——3500—— (1070) TOPOGRAPHIC CONTOUR, INTERVAL = 50 FEET
- IN FEET WITH METRIC EQUIVALENT IN BRACKETS
- METRIC EQ. INCLUDES GEODETIC ADJUSTMENT
GEODETIC ADJUSTMENT = 10.12'

WEST	CENTRAL 3 - 2	EAST 3 - 1

SHEET INDEX

inches 0 1 2
0 1 2 3 4 5 centimetres

YUKON GEOLOGICAL SURVEY

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DUPONT EXPLORATION
CANADA

TENAS PROJECT GRAVITY SURVEY

6.3.1

ELEVATION MAP

C. A. AGER AND ASSOCIATES LTD.

1 : 10,000
m 300 200 100 0 300 600 m
SCALE
800 0 400 800
1 INCH = 800 FEET

MAPPED BY : C. A. AGER	REVISED :	N.T.S No.: 105 K. 1
DATE : APRIL JUNE 1977		ACCT No.: TENAS
DRAWN BY : C.H.S.		DRWG No.: 3 - 2
DATE : JULY, 1977		

LEGEND & NOTES

● GB WOP - GRAVITY BASE STATION

3000S . SURVEY GRID STATION

3500 (1070) TOPOGRAPHIC CONTOUR, INTERVAL = 50 FEET
- IN FEET WITH METRIC EQUIVALENT IN BRACKETS
- METRIC EQ. INCLUDES GEODETIC ADJUSTMENT

GEODETIC ADJUSTMENT = 10.12'

WEST	CENTRAL 3-2	EAST 3-1

SHEET INDEX

inches 1 2

centimetres 1 2 3 4 5

YUKON GEOLOGICAL SURVEY

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DU PONT EXPLORATION
CANADA

TENAS PROJECT GRAVITY SURVEY

6.3.2

ELEVATION MAP

C.A. AGER AND ASSOCIATES LTD

1 : 10,000

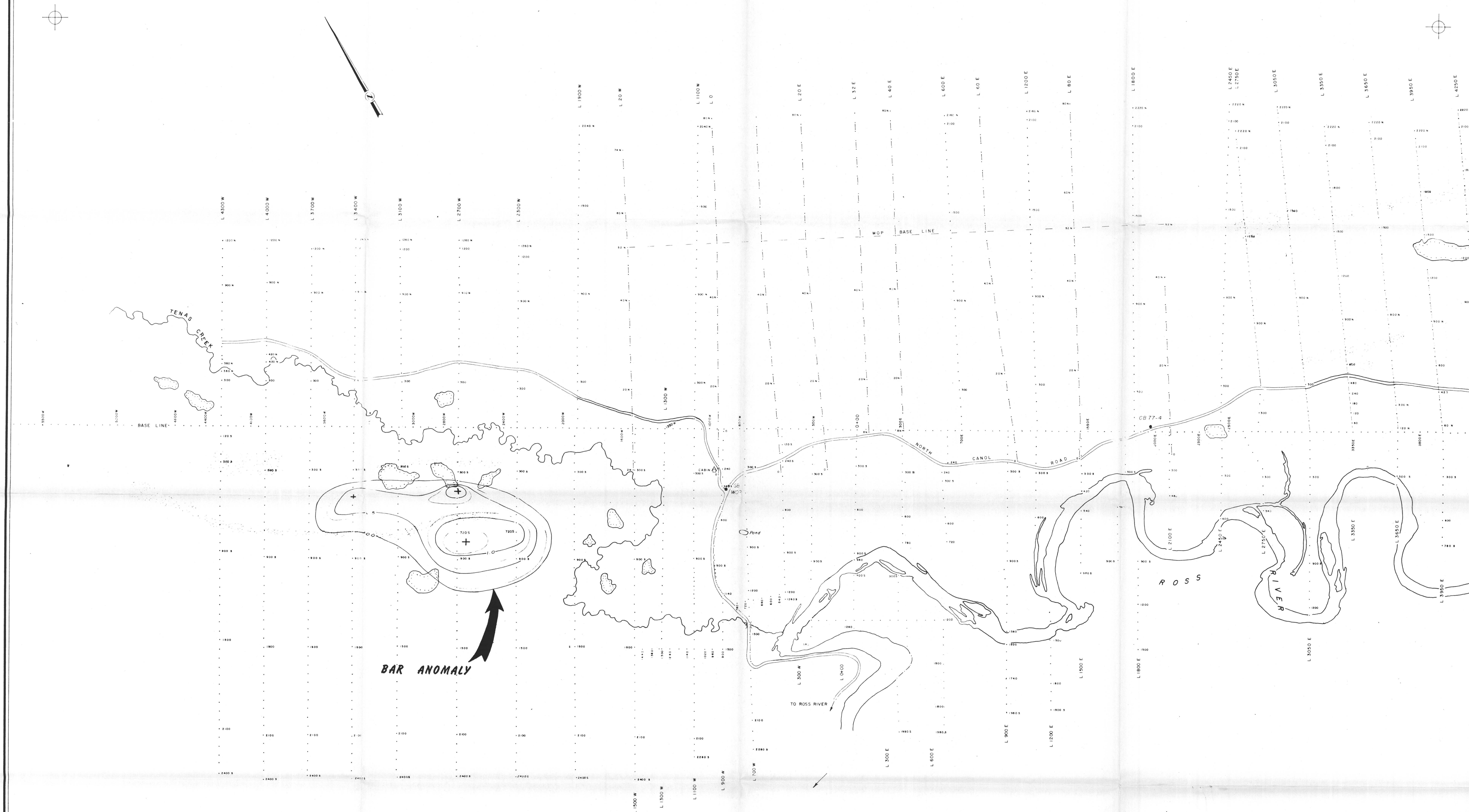
m 300 200 100 0 300 600 m

SCALE

800 0 400 800

1 INCH = 800 FEET

MAPPED BY	C. A. AGER	REVISED	N.T.S. No. 105 K 1.
DATE	APRIL JUNE 1977		ACCT No. TENAS
DRAWN BY	C.H.S.		DRWG No.: 3 - 1
DATE	JULY, 1977		



<u>LEGEND</u>

●	GB WOP	GRAVITY BASE STATION
3000S		SURVEY GRID STATION
—— 0.5 ——		RESIDUAL GRAVITY CONTOUR IN MILLIGALS
		CONDUCTIVE ZONES (AFTER WALCOTT)

WEST	CENTRAL 5-2	EAST 5-1

SHEET INDEX

inches
0 1 2
0 1 2 3 4 5
centimetres

YUKON GEOLOGICAL SURVEY

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DU PONT EXPLORATION
CANADA

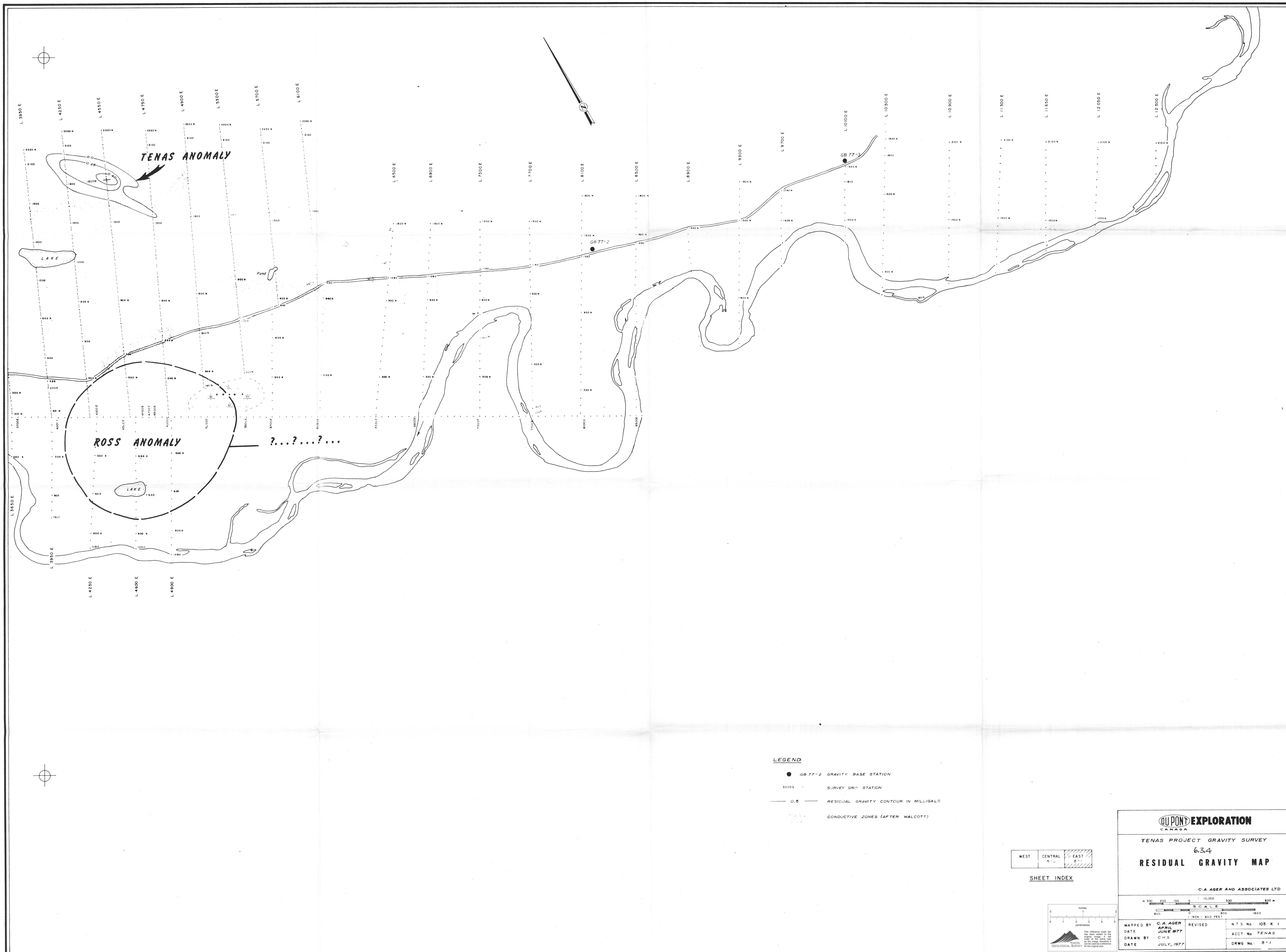
TENAS PROJECT GRAVITY SURVEY
6.3.3

RESIDUAL GRAVITY MAP

C. A. AGER AND ASSOCIATES LTD.

1 : 10,000
m 300 200 100 0 300 600 m
SCALE
800 0 800 1600
1 INCH = 800 FEET

MAPPED BY : C. A. AGER	REVISED :		N.T.S. No. : 105 K 1
DATE : APRIL JUNE 1977			ACCT No. : TENAS
DRAWN BY : C.H.C.			DRWG No. : 5-2
DATE : JULY, 1977			



TENAS ANOMALY
ROSS ANOMALY
?...?...?...
LAKE
Pond
GB 77-2
GB 77-3
L 3950 E
L 4250 E
L 4550 E
L 4750 E
L 4900 E
L 5300 E
L 5700 E
L 6100 E
L 6500 E
L 6900 E
L 7300 E
L 7700 E
L 8100 E
L 8500 E
L 8900 E
L 9300 E
L 9700 E
L 10100 E
L 10500 E
L 10900 E
L 11300 E
L 11650 E
L 12050 E
L 12500 E
L 3650 E
L 4600 E
LEGEND
GB 77-2 GRAVITY BASE STATION
3000S SURVEY GRID STATION
0.5 RESIDUAL GRAVITY CONTOUR IN MILLIGALS
CONDUCTIVE ZONES (AFTER WALCOTT)
WEST
CENTRAL 5-2
EAST 5-1
SHEET INDEX
DUPONT EXPLORATION CANADA
TENAS PROJECT GRAVITY SURVEY
6.3.4
RESIDUAL GRAVITY MAP
C.A. AGER AND ASSOCIATES LTD
1 : 10,000
m 300 200 100 0 300 600 m
SCALE
800 0 800 1600
1 INCH = 800 FEET
MAPPED BY : C. A. AGER
DATE : APRIL JUNE 1977
DRAWN BY : CHS
DATE : JULY, 1977
REVISED
N.T.S No. 105 K 1
ACCT No. TENAS
DRWG No.: 5-1
inches
0 1 2
0 1 2 3 4 5
centimetres
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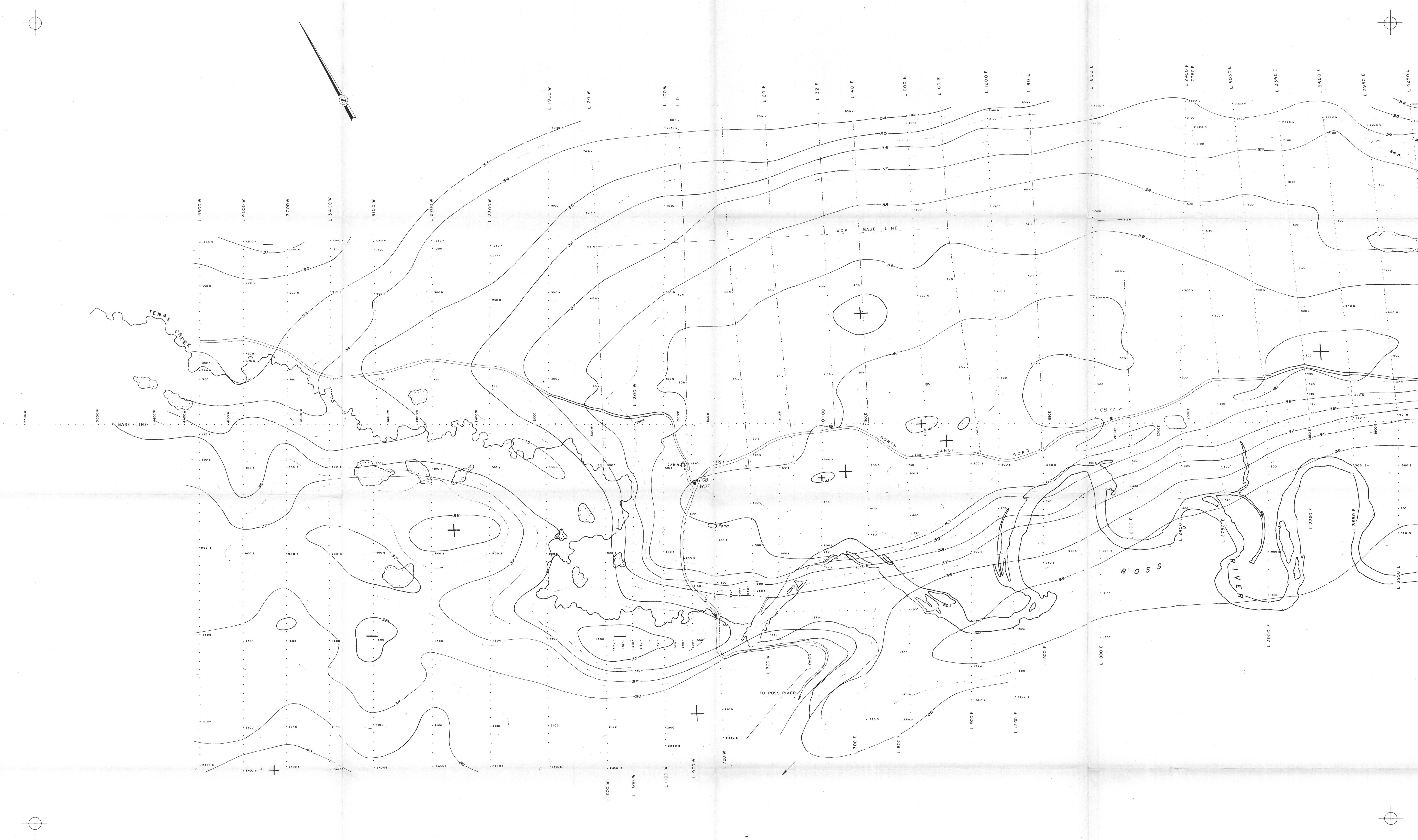
YUKON GEOLOGICAL SURVEY



LEGEND

- ● GB - WOP — GRAVITY BASE STATION
- 3000 S • — SURVEY GRID STATION
- —36— GRAVITY CONTOUR IN MILLIGALS
  - CONTOUR INTERVAL = 0.50 M.GALS

WEST	CENTRAL 4-2	EAST 4-1

SHEET INDEX

inches 0 1 2
0 1 2 3 4 5 centimetres

YUKON GEOLOGICAL SURVEY

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DUPONT EXPLORATION
CANADA

TENAS PROJECT GRAVITY SURVEY
6.3.5

COMPLETE BOUGER GRAVITY

BOUGER DENSITY 2.80 g/cc
ELEVATION FACTOR = 0.19128 mgal/meter
TERRAIN RADIUS = 600 meters

C.A. AGER AND ASSOCIATES LTD.

1 : 10,000
m 300 200 100 0 300 600 m
SCALE
800 0 800 1600
1 INCH = 800 FEET

MAPPED BY : C.A. AGER	REVISED :	N.T.S No. : 105 K 1
DATE : APRIL JUNE 1977		ACCT No. : TENAS
DRAWN BY : C.H.S.		DRWG No. : 4-2
DATE : JULY, 1977		

L 3950 E
L 4250 E
L 4550 E
L 4750 E
L 4900 E
L 5300 E
L 5700 E
L 6100 E
L 6500 E
L 6900 E
L 7300 E
L 7700 E
L 8100 E
L 8500 E
L 8900 E
L 9300 E
L 9700 E
L 10100 E
L 10500 E
L 10900 E
L 11300 E
L 11650 E
L 12050 E
L 12500 E
GB 77-3
GB 77-2
LAKE
Pond
LAKE
L 3650 E
L 3950 E
L 4250 E
L 4600 E
L 4900 E
LEGEND
GB - 77-2 - GRAVITY BASE STATION
3000 S · SURVEY GRID STATION
36 GRAVITY CONTOUR IN MILLIGALS
- CONTOUR INTERVAL = 0.50 M. GALS.
WEST
CENTRAL 4-2
EAST 4-1
SHEET INDEX
DUPONT EXPLORATION
CANADA
TENAS PROJECT GRAVITY SURVEY
6.3.6
COMPLETE BOUGER GRAVITY
BOUGER DENSITY 2.80 g/cc
ELEVATION FACTOR = 0.19128 mgal/meter
TERRAIN RADIUS = 600 meters
C.A. AGER AND ASSOCIATES LTD
1 : 10,000
m 300 200 100 0 300 600 m
SCALE
800 0 800 1600
1 INCH = 800 FEET
MAPPED BY : C. A. AGER
DATE : APRIL JUNE 1977
DRAWN BY : C. H. S
DATE : JULY, 1977
REVISED :
N.T.S No. 105 K 1
ACCT No. TENAS
DRWG No. 4-1
inches
centimetres
This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.