REPORT ON

GEOCHEMICAL SURVEYS

by

P.J.S. BOYLE - B. Sc.

on the

NORTH SYNC PROPERTY

(SYNC # 1 - # 4 Claims, 29 Units)

Situated west of Gataga River

in the Liard Mining Division B.C.

58°23'N 126°27'W
N.T.S. 94L/8W

owned by

TEXASGULF CANADA LIMITED

November, 1977 Calgary, Alberta

TABLE OF CONTENTS

LIST OF FIGURES

*1" = 30 miles

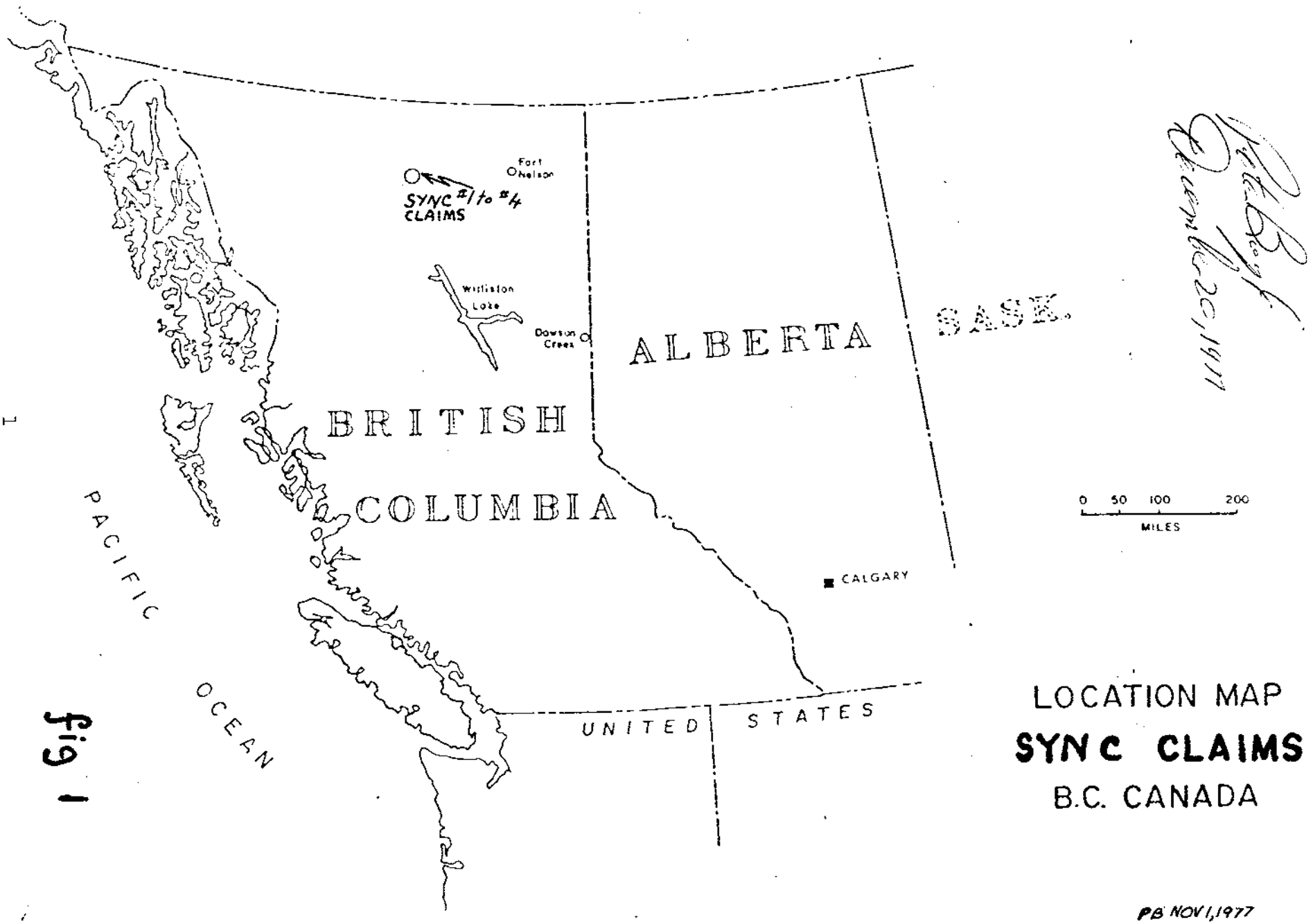


Fig 1

LOCATION MAP

SYNC CLAIMS

B.C. CANADA

PB NOV 1, 1977

INTRODUCTION

The North SYNC Property comprises a total of 29 units in 4 contiguous claims owned by Texasgulf Canada Limited. The property was first staked in 1977.

During the 1977 field season a geochemical programme was undertaken. A grid was layed out, with 200 meters between lines. In all a total of 8.3 line km were completed. Soil samples were collected at 50 meter intervals along the lines. A total of 150 soil samples were collected.

Work was undertaken by personnel from Texasgulf Inc.

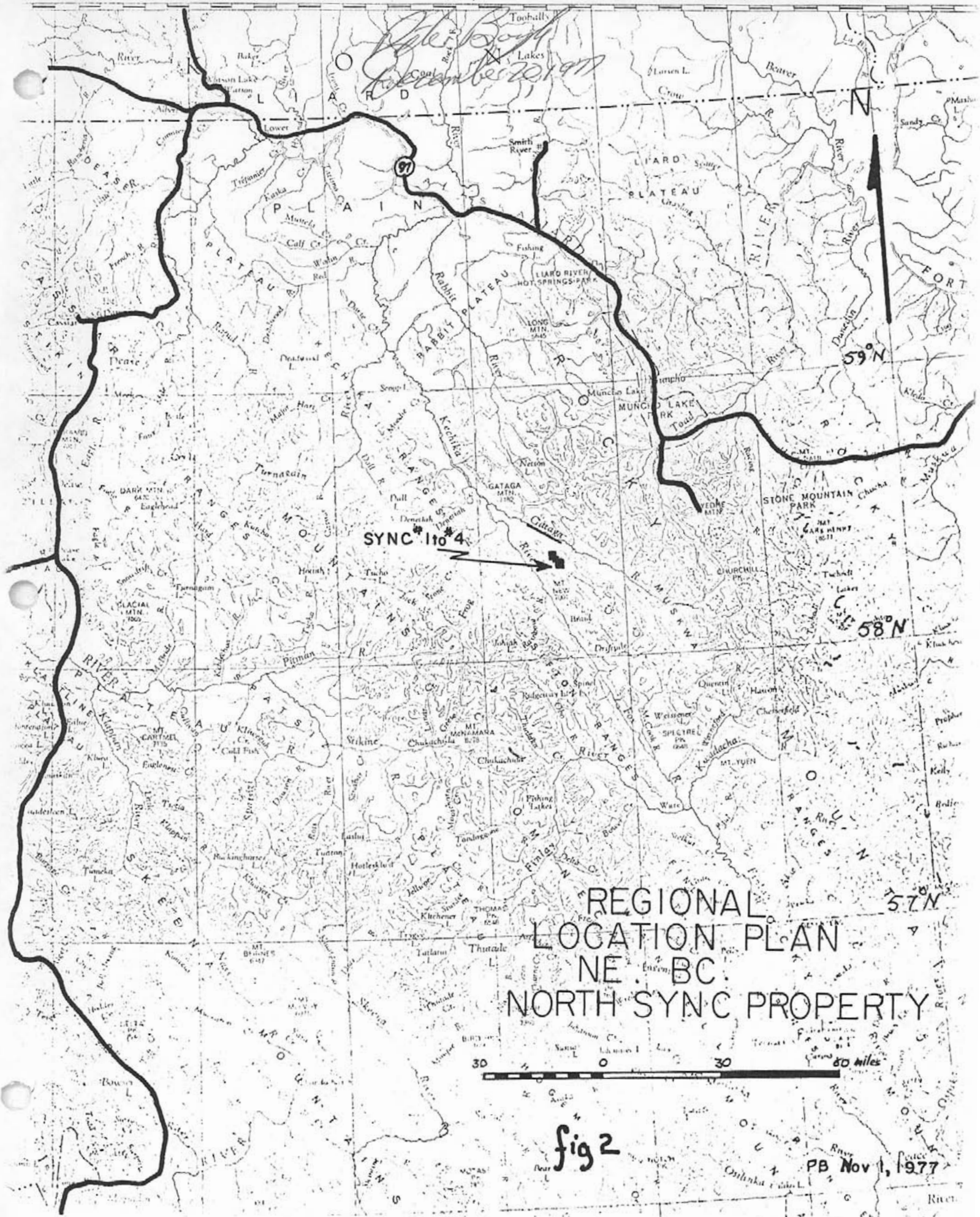
CONCLUSION

Results of the soil sampling program plotted on figures 5,6 and 7 are not encouraging. On the basis of these results no further work should be done on these claims.

LOCATION, ACCESS & TERRAIN

Figure 3 shows the location of the SYNC Claims 6½ km southwest of the mouth of Through CK on the Gataga River @ Lat. $58^0$23'N, Long. $126^0$27W (N.T.S. 94L/8W.)

Access at present is by helicopter from the Texasgulf base camp, at Mayfield Lake 42 km to the


130°W
129°W
128°W
127°W
126°W
125°W
124°W
59°N
58°N
57°N
SYNC 1 to 4
REGIONAL
LOCATION PLAN
NE. BC.
NORTH SYNC PROPERTY
30 0 30 60 Miles
fig 2
PB Nov 1, 1977

southeast. Fixed wing support originates in Watson Lake. Mobilization and demobilization by float plane, was through Muncho Lake at Mile 464 on the Alaska Highway, 95 km north of the base camp.

From the broad Gataga River floor at 2700' elevation the hills rise abruptly to the southeast, to northwest trending limestone ridges over 6500' high. These hills are breached by Through Creek. The property lies between limestone ridges. In the northern portion of the property the creeks drain to the west to Forsberg Creek. To the south, a creek initially drains southward, then it swings east to join up with the north flowing Through Creek. The entire property lies above the tree line.

There is more than 70% outcrop exposure of the limestone. Frost action results in large talus slopes at the foot of small cliffs. Alpine soil over the shale is thin and only locally developed. Outcrop is largely restricted to the incised gullies. Felsenmeer predominates on slopes of less than 26^0. The felsenmeer is water saturated. Solifluction processes are active.

Texasgulf Inc.

fig 3

TEXASGULF CANADA

PROPERTY

CLAIM MAP

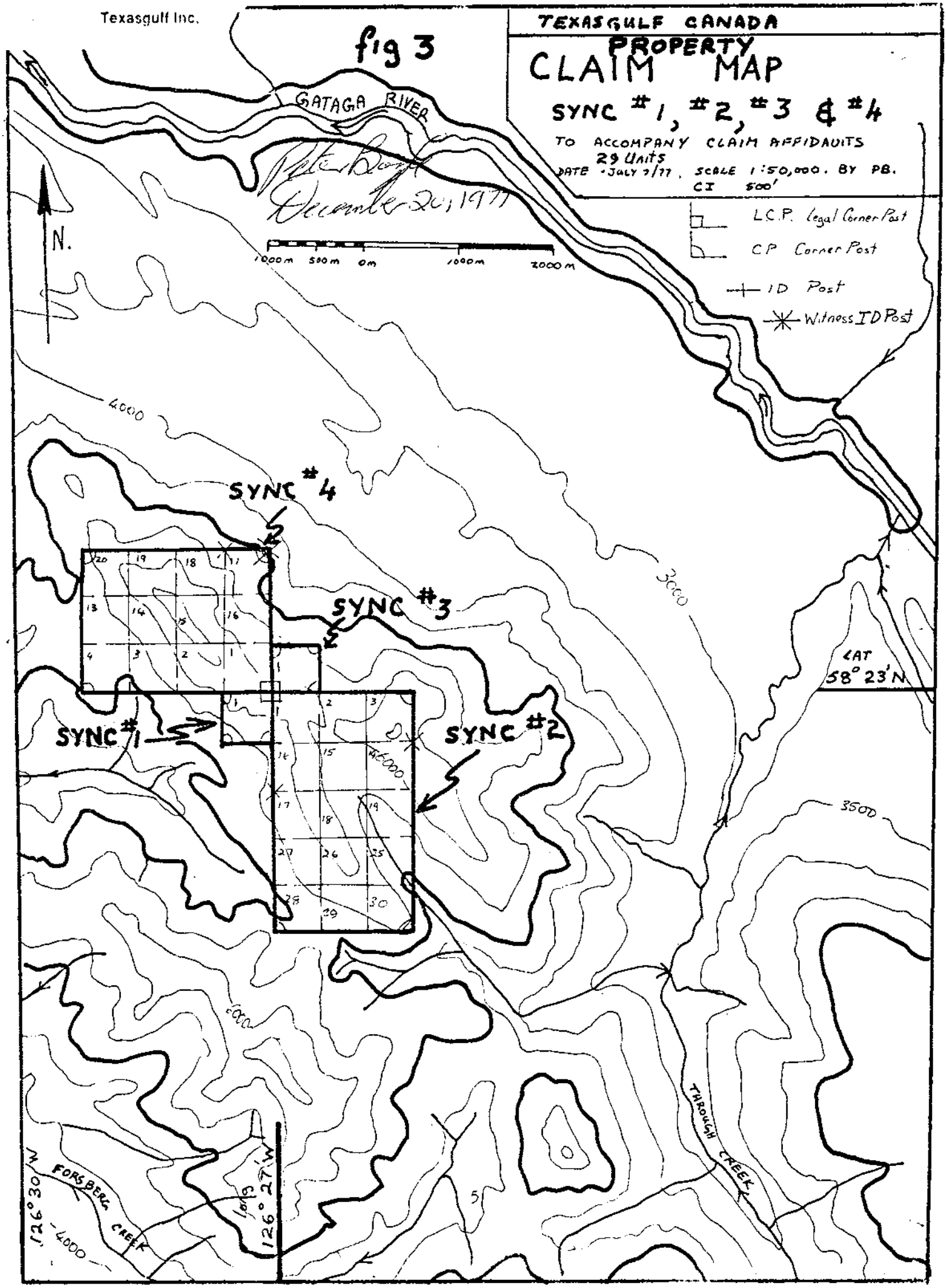
SYNC #1, #2, #3 & #4

TO ACCOMPANY CLAIM AFFIDAVITS

29 Units

DATE - JULY 7/77, SCALE 1:50,000. BY PB.

CI 500'



Texasgulf Inc.

fig 4

TEXASGULF CANADA

PROPERTY

CLAIM GROUPING MAP

SYNC #1, #2, #3 & #4

TO ACCOMPANY CLAIM AFFIDAVITS

29 Units

DATE - JULY 7/77. SCALE 1:50,000. BY PB.

CI 500'

Peter Bengert
December 29, 1977

L.C.P. Legal Corner Post

C.P. Corner Post

I.D. Post

Witness I.D. Post

N.

1000 m 500 m 0m 1000 m 2000 m

GATAGA RIVER

4000

3000

3500

SYNC #4

SYNC #3

SYNC #1

SYNC #2

LAT 58° 23' N

THROUGH CREEK

FORSBERG CREEK

126° 30' W

126° 27' W

SURVEY GRID

In order to provide control for the geological and geochemical surveys, a total of 8.3 line km of grid were layed out, involving a base line, grid lines at 200 meter intervals and tie lines. Sample stations were marked at 50 meter intervals with pickets. All lines were compass controlled, and distances were measured with a metric survey chain. Altimeter readings $\pm$ 5 feet taken at each station using a Thommen altimeter,and the data was compiled to make the base map at a scale of 1:5,000 (Fig. 9). A blow up of the 1:250,000 topography map to this scale was not found to be accurate.

The "Legal Corner Post" for SYNC No. 1, No. 2, No. 3 and No. 4 is located at grid 29 + 30, 4 + 50E. Grid north is set at 140^{O} azimuth.

GEOCHEMISTRY

A total of 150 soil samples analyses were claimed for assessment credit. Pb, Zn and Cu results are shown on the geochemical plans (Fig. 5 to 8 incl.) The samples were collected between July 27 and August 2, 1977. (appendix A). A statement of the qualifications of the personnel who actually conducted the survey is included in Appendix B. "Soil" samples were collected by personnel from Texasgulf Inc.

On flat terrain where the felsenmeer is water saturated, samples were collected from frost boils. Similarly, on nearby slopes where solifluction processes were active, samples were collected from the mass wastage lobes. These samples are largely comprised of small frost heaved fragments of shale and fine mud. Some samples were collected from steep talus slopes where melt water had deposited scree fines. Although all snow had disappeared by late July, the ground was frozen only 1 or 2 cm below the surface in many places.

The alpine soil development on this property is very poor. Soil sampling was restricted to the area underlain by shale.

Soil samples were collected in numbered Kraft paper bags, air dried, and shipped to Bondar-Clegg and Co. Limited in North Vancouver. At this lab,the -80 mesh fraction was analysed for Pb, Zn and Cu., using hot Aqua Regia extraction and Atomic Absorption analytical techniques. Results are quoted as ppm total metal.

The small galena occurrences on this property are found in alpine terrain. As is usual in this environment the galena is coated with a fine black deposit.

Locally, the massive galena fills fractures and replaces bedding in the limestone near the shale contact. Some malachite staining was also noted, associated with the galena.

"Syngenetic" sulphides in sediments frequently seem to produce little or no primary halo which is recognizable by normal methods of detection and interpretation. This is probably true on this property. However, some "epigenetic" remobilization of the sulphides will have occurred in the soils.

Unstable minerals in the secondary environment result in secondary dispersion halos. As a result of weathering by chemical and physical processes unstable and stable minerals are dispersed in the secondary environment.

Chemical processes on this property are retarded by the low temperatures. For each 10^{o} C drop in temperature, the rate of chemical reactions is reported to decrease by a factor of 2 or 3.

Chemical weathering occurs in the environment where water, oxygen and carbon dioxide are abundant and where temperatures and pressures are low. Rainwater can lower the pH of runoff water below a pH of 7, since rainwater in equilibrium with CO_2 from the atmosphere has a pH of 5.7 (containing carbonic acid). However, over much of this property rain falls on limestone.

The attack of rainwater on limestone results in the solution of $CaCO_3$.

$$Ca\ CO_3 + H_2CO_3 \longrightarrow Ca(H\ CO_3)_2$$

(carbonic acid)

Then, the pH of rainwater draining the limestone will have a pH greater than 7. (i.e. the process of hydrolysis involves the ionic species OH and H+ becoming incorporated into the structure of minerals, more specifically there is a reaction between water and the ion of a weak acid or weak base). While acid rain run-off is minor, snow drifts can concentrate CO_2 in the snow to the point where meltwater may aggressively attack rock forming mineral.

Oxidation is the dominant weathering process significant to exploration geochemistry on this property. Oxidation is usually accompanied by hydrolysis and often, by hydration and carbonation.

In this environment, many other sulphide minerals are attacked, permitting the liberation of many major, minor, and trace elements. Acid waters percolating through a sulphide ore deposit may leach Cu, Zn or Pb, in addition to those metals present in pyrite.

Simple sulphides such as sphalerite and galena which do not contain iron may be oxidized directly or may be dissolved by ferrous sulphate or sulphuric acid. Regardless of the process the oxidation of any sulphide mineral leads to the formation of acid sulutions the strength of which depends to a major extent on the extent of hydrolysis of the particular metal, and/or the insolublility of its hydroxide. Solutions resulting from the oxidation of iron sulphides are the most acid.

Sulphuric acid may also react with limestone.

$$CaCO_3 + H_2SO_4 + 2H_2O \rightarrow CaSO_4 + 2H_2O + H_2CO_3$$

Carbonic acid in rainwater may react with lead sulphide.

$$PbS + H_2CO_3 + 2O_2 \rightarrow Pb\ CO_3 + H_2\ SO_4$$

Insoluble cerussite (lead carbonate) is precipitated commonly forming a coating on galena inhibiting further reaction. Where these insoluble compounds are formed, as in the case of lead sulphate, hydrogeochemical dispersion is not likely to be a significant factor, however sulphates of zinc and copper are very soluble in water tending to form significant halos.

The malachite staining noted in the vicinity of some of the galena occurrences indicate that there is some oxidation of a sulphide occuring. Copper sulphate is precipitated by dissolved CO_2 in rainwater, or runoff water from the limestone.

No significant zinc values were obtained from the soil survey suggesting that significant sphalerite does not subcrop on the property.

Lead values were also low. Mechanical dispersion of galena about the minor occurrences would account for the apparent anomalies. Pb and Zn anomalies coincide. Copper values were very low.

High Cu values do not coincide with the statistically anomalous Pb and Zn values.

Pat Boyle
December 20, 1977

APPENDIX A

STATEMENT OF EXPENDITURES

STATEMENT OF EXPENDITURES

GEOCHEMICAL SURVEY - NORTH SYNC

FIELD
SALARIES AND FRINGE BENEFITS - TEXASGULF INC.

P. Boyle-Supervision, Geologist, Blaster, B.Sc. Period July 27-31, 1977	1½day @ $80	$120	
B. Gardiner - Geologist, B.Sc. Period July 26 to Aug. 2, 1977	4 day @ $55	$220	
P. Hubacheck - Geologist, B. Eng. Period July 27 to Aug. 2, 1977	4 day @ $50	$200	
P. Mann - Assistant Period July 31, 1977	1 day @ $40	$ 40	
J. Cosgrove - Assistant Period July 31 to Aug. 2, 1977	2 day @ $40	$ 80	
S. Krystofiak - Assistant Period July 31, 1977	1 day @ $35	$ 35	
R. Bryden - Assistant Period July 26 to Aug. 2, 1977	2 day @ $30	$ 60	
B. Johnson - Cook Period July 26 to Aug. 2, 1977	2 day @ $42	$ 84	
		$839	839.00

CAMP COSTS

17½ man-days @ 25.00/day 437.00

GEOCHEMICAL ANALYSIS

150 samples @ $3.00/sample 450.00

SAMPLE SHIPPING 30.00

HELICOPTER (Quasar 206-B Jet Ranger)
55 hrs @ $300/hour 1,650.00

MOB & DEMOB 450.00

OFFICE
COST OF PREPARING REPORT

P. Boyle Geologist	3 day @ $80	$240	
J. Van Laar Draughtsman	2 day @ $50	$100	
Typing, Stationary, etc.		$75	$ 75
		$415	415.00
		$4271.00	

P. Boyle
December 20, 1977
Peter Boyle

APPENDIX B

STATEMENT OF QUALIFICATIONS

STATEMENT OF QUALIFICATIONS

I, Peter J. S. Boyle, hereby certify that:

1) I am a geologist

2) I am a graduate of the University of Saskatchewan, (Saskatoon) with a Bsc in geology (1972).

3) From 1972 to 1977, I have been engaged in mineral exploration in British Columbia.

4) I have been employed by Texasgulf Inc. since 1974.

5) I personally supervised and participated in the field work and have assessed and interpreted all the data resulting from the work.

6) I have held a B. C. Blasters Certificate since 1975.

P. Boyle
December 20, 1977

STATEMENT OF QUALIFICATIONS

F. GRAHAM Geologist PhD.

F. Graham obtained his BSc at Queens University, Belfast in 1963. In 1967, he completed his MSc at Western University, Ontario. He received his PhD in 1970 from Western University. Since 1974, he has been employed as a geologist by Texasgulf Inc. in lead, zinc exploration in Europe and North America.

P. HUBACHECK Geologist B. Eng.

P. Hubacheck was employed by Texasgulf Inc. as a geologist during the summer of 1977. He obtained his degree from the South Dakota School of Mines in May, 1977.

This is his 5th summer of employment with Texasgulf In., and he is well regarded by his supervisors.

W. GARDINER Geologist BSc

W. Gardiner is employed by Texasgulf Inc. as a geologist during the summer of 1977. He obtained his degree from Memorial University, New Brunswick, 1975.

At present, he is enrolled in his second year of a Master's program at McGill University, Quebec. He is a conscientious and competent field geologist.

Peter Bowyer
December 20, 1977

P.W. MANN Assistant

Mr. Mann is enrolled in his 4th year of Geology at Acadia University, Nova Scotia.

This is his third summer's work with Texasgulf. He is a keen and thoroughly capable field assistant.

J. COSGROVE Assistant

J. Cosgrove is enrolled in his 4th year of Geology at the University of Calgary, Alberta.

This is his second summer in the field. He is a keen and capable field assistant.

S. KRYSTOFIAK Assistant

Mr. Krystofiak is enrolled in his 3rd year of Geology at the University of Alberta. This was his first season of geological related field work.

R. BRYDEN Assistant

R. Bryden completed Grade twelve in Ontario this spring. This was his second summer with Texasgulf in geological related work. He is keen and conscientious.

December 20, 1977

Peter Boyle.

TEXASGULF INC.
REGIONAL EXPLORATION CALGARY

SYNC. No. 1 TO No. 4 CLAIMS

Zn ppm - TOTAL METAL

SOIL SAMPLING

NORTH OF THROUGH CREEK

DATE:	BY:	NTS:	C.I. = 100'
AUG. 4/77	P.B. / P.H.	94 - L - 8	SCALE = 1:5,000

TO ACCOMPANY: REPORT ON GEOLOGICAL AND GEOCHEMICAL SURVEYS, SYNC. No.1 TO No.4 CLAIMS (NORTH SYNC. GROUP)

FIG. 5

GATAGA RIVER — LIARD MINING DIVISION

SUBMITTED BY : P. BOYLE
P. HUBACHECK TEXASGULF, INC.

COMPILER / AUTHOR : Pete Boyle
Peter Hubacheck

DATE : December 20, 1977

100 0 200 400
METERS

LEGEND

LEGAL CORNER POST
CORNER POST
IDENTIFICATION POST
GEOLOGICAL BOUNDARY
MINERALIZED FLOAT •
MINERALIZED OUTCROP x

red > 400 ppm
orange 200 - 400
yellow 0 - 199

7604

MINERAL RESOURCES BRANCH
ASSESSMENT REPORT

NO.

SYNC. No. 4

SYNC. No. 3

SYNC. No. 2

SYNC. No. 1

SHALE LIMESTONE SHALE LIMESTONE SHALE

126° 27' W LONG

58° 23' N LAT.

TYPE OF MATERIAL SAMPLED: ALPINE SOILS, ("B" HORIZON WHERE RECOGNIZABLE)
ANALYTICAL PROCEDURE : -80 MESH, HOT AQUA REGIA, ATOMIC ABSORPTION
ANALYSIS: BY BONDAR CLEGG LABORATORIES, VANCOUVER

TEXASGULF INC.
REGIONAL EXPLORATION CALGARY

SYNC. No. 1 TO No. 4 CLAIMS

Pb ppm - TOTAL METAL

SOIL SAMPLING

NORTH OF THROUGH CREEK

DATE:	BY:	NTS:	C.I. = 100'
AUG. 4/77	P.B. / P.H.	94-L-8	SCALE = 1:5,000

TO ACCOMPANY: REPORT ON GEOLOGICAL AND GEOCHEMICAL SURVEYS, SYNC. No.1 TO No.4 CLAIMS (NORTH SYNC. GROUP)

FIG. 6

GATAGA RIVER — LIARD MINING DIVISION

SUBMITTED BY: P. BOYLE
P. HUBACHECK TEXASGULF, INC.

COMPILER / AUTHOR: Peter Boyle, Peter C. Hubacheck

DATE: December 29, 1977

100 0 200 400
METERS

SYNC. No. 4

SYNC. No. 3

SYNC. No. 2

SYNC. No. 1

SHALE LIMESTONE SHALE LIMESTONE SHALE

126° 27' W LONG

58° 23' N LAT.

5000 5500 6000 6500 4500

38+00N 36+00N 34+00N 32+00N 30+00N 28+00N 26+00N 24+00N 22+00N 20+00N 18+00N 16+00N 14+00N 12+00N 10+00N 8+00N 6+00N

7+00E 6+00E 4+00E 3+00E 2+00E

LEGEND

- LEGAL CORNER POST
- CORNER POST
- IDENTIFICATION POST
- GEOLOGICAL BOUNDARY
- MINERALIZED FLOAT
- MINERALIZED OUTCROP

red > 100 ppm
orange 50
yellow 25 - 49
0 - 24

N

7604

MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
NO. 6865

TYPE OF MATERIAL SAMPLED: ALPINE SOILS, ("B" HORIZON WHERE RECOGNIZABLE)
ANALYTICAL PROCEDURE: -80 MESH, HOT AQUA REGIA, ATOMIC ABSORPTION
ANALYSIS: BY BONDAR CLEGG LABORATORIES, VANCOUVER

TEXASGULF INC.
REGIONAL EXPLORATION CALGARY

SYNC. No. 1 TO No. 4 CLAIMS

Cu ppm - TOTAL METAL

SOIL SAMPLING

NORTH OF THROUGH CREEK

DATE:	BY:	NTS:	C.I. = 100'
AUG. 4/77	P.B. / P.H.	94-L-8	SCALE = 1:5,000

TO ACCOMPANY: REPORT ON GEOLOGICAL AND GEOCHEMICAL SURVEYS, SYNC. No.1 TO No.4 CLAIMS (NORTH SYNC. GROUP)

FIG. 7

GATAGA RIVER — LIARD MINING DIVISION

SUBMITTED BY: P. BOYLE, P. HUBACHECK — TEXASGULF, INC.

COMPILER / AUTHOR: Peter C. Hubacheck

DATE: December 20/1977

100 0 200 400
METERS

LEGEND

- LEGAL CORNER POST
- CORNER POST
- IDENTIFICATION POST
- GEOLOGICAL BOUNDARY
- MINERALIZED FLOAT
- MINERALIZED OUTCROP

red	> 50 ppm
orange	40 - 50
yellow	30 - 39
	0 - 2

7604

MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
NO.

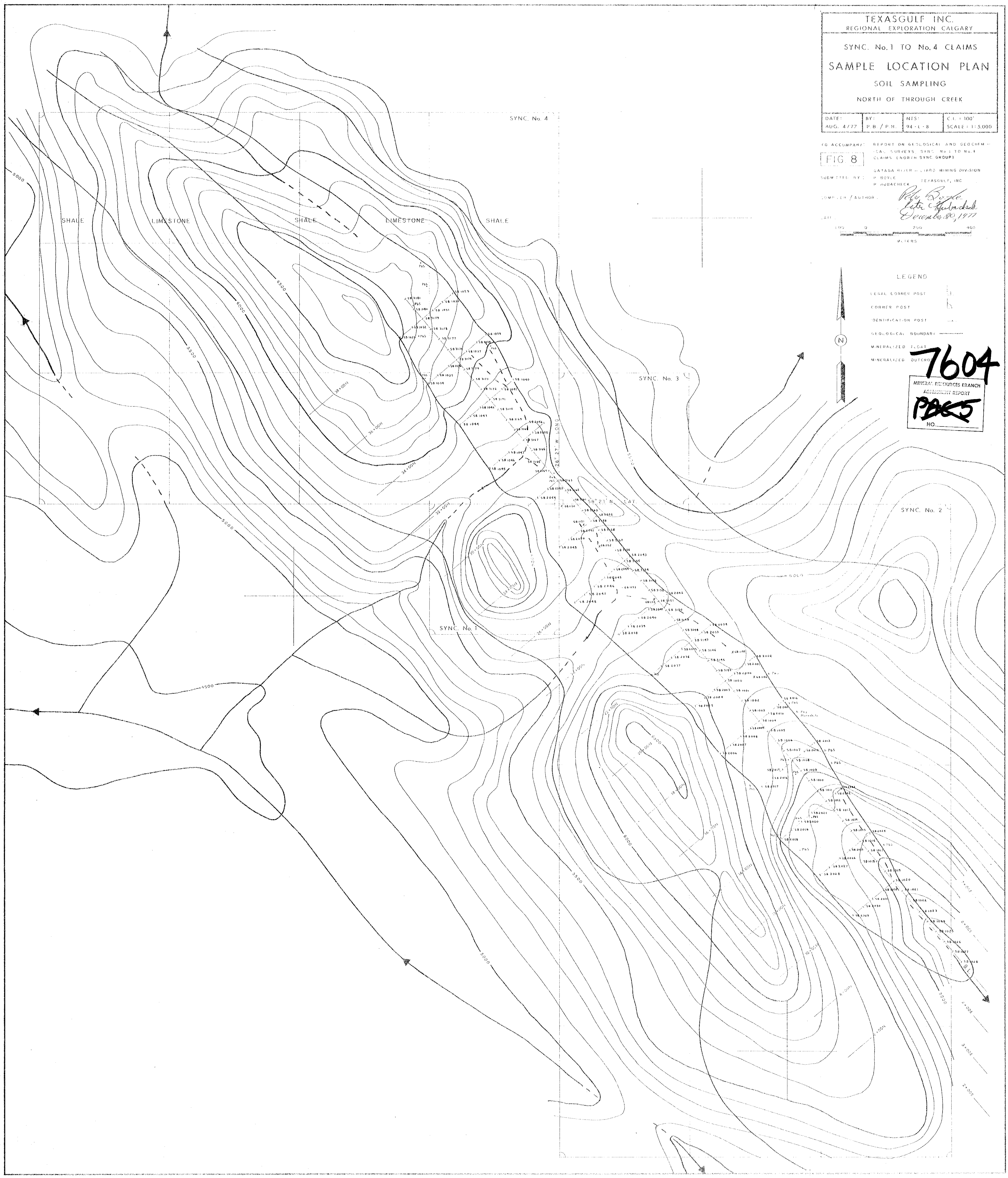
SHALE LIMESTONE SHALE LIMESTONE SHALE

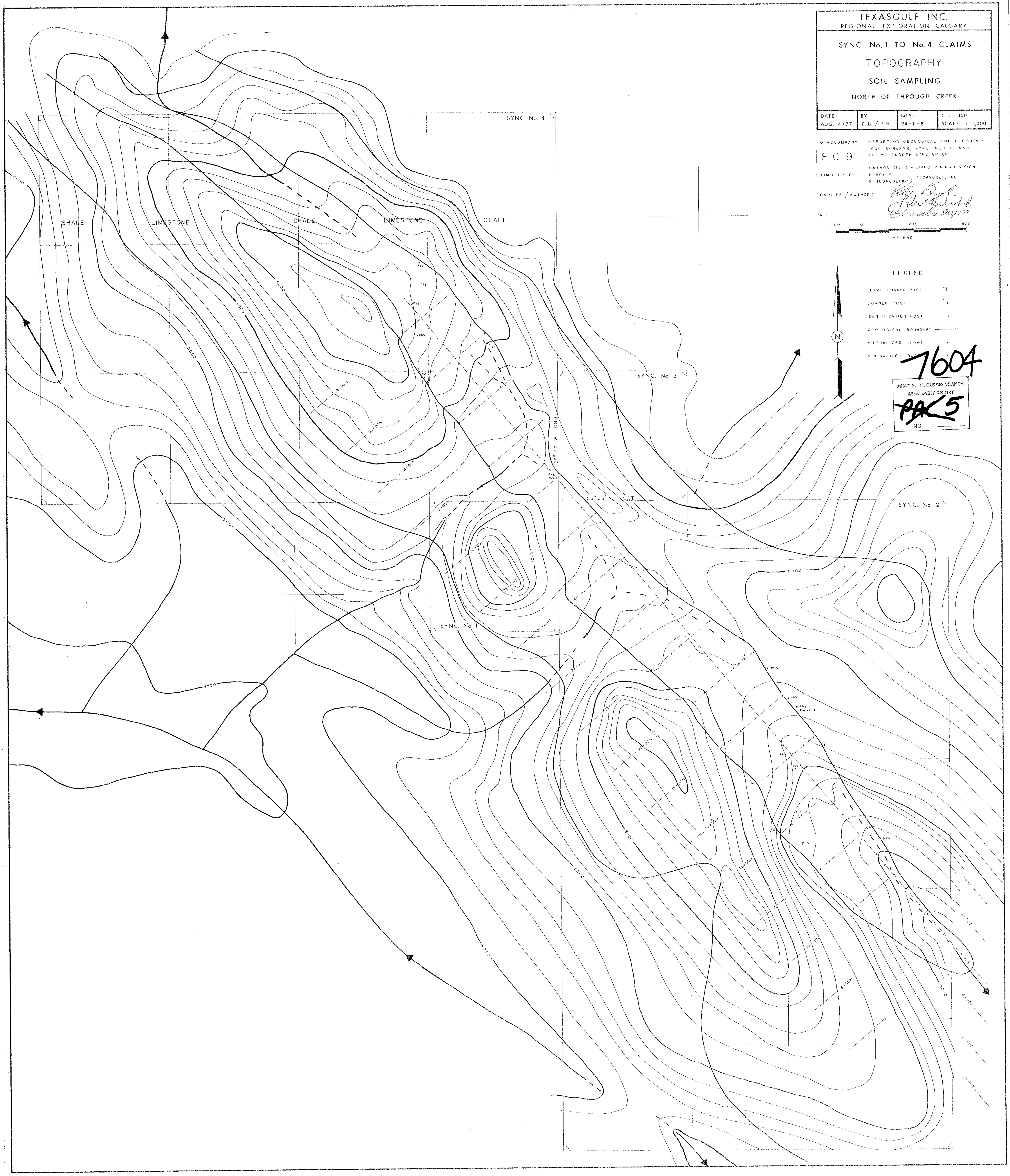
SYNC. No. 4 SYNC. No. 3 SYNC. No. 2 SYNC. No. 1

126° 27' W LONG

58° 23' N LAT.

TYPE OF MATERIAL SAMPLED: ALPINE SOILS, ("B" HORIZON WHERE RECOGNIZABLE)
ANALYTICAL PROCEDURE: -80 MESH, HOT AQUA REGIA, ATOMIC ABSORPTION
ANALYSIS: BY BONDAR CLEGG LABORATORIES, VANCOUVER


TEXASGULF INC.
REGIONAL EXPLORATION CALGARY
SYNC. No. 1 TO No. 4 CLAIMS
SAMPLE LOCATION PLAN
SOIL SAMPLING
NORTH OF THROUGH CREEK
DATE: AUG. 4/77
BY: P.B. / P.H.
NTS: 94-L-8
C.I. = 100'
SCALE = 1:5,000
TO ACCOMPANY: REPORT ON GEOLOGICAL AND GEOCHEMICAL SURVEYS SYNC. No. 1 TO No. 4 CLAIMS (NORTH SYNC GROUP)
FIG. 8
GATAGA RIVER – LIARD MINING DIVISION
SUBMITTED BY: P. BOYLE, P. HUBACHECK, TEXASGULF, INC.
COMPILER / AUTHOR:
DATE:
METERS
LEGEND
LEGAL CORNER POST
CORNER POST
IDENTIFICATION POST
GEOLOGICAL BOUNDARY
MINERALIZED FLOAT
MINERALIZED OUTCROP
7604
MINERAL RESOURCES BRANCH ASSESSMENT REPORT
NO.
SYNC. No. 4
SYNC. No. 3
SYNC. No. 2
SYNC. No. 1
SHALE
LIMESTONE
SHALE
LIMESTONE
SHALE
58° 23' N. LAT.
126° 27' W. LONG
B.L.


TEXASGULF INC.
REGIONAL EXPLORATION CALGARY
SYNC. No.1 TO No.4 CLAIMS
TOPOGRAPHY
SOIL SAMPLING
NORTH OF THROUGH CREEK
DATE: AUG. 4/77
BY: P.B. / P.H.
NTS: 94-L-8
C.I. = 100'
SCALE = 1:5,000
TO ACCOMPANY: REPORT ON GEOLOGICAL AND GEOCHEMICAL SURVEYS, SYNC No.1 TO No.4 CLAIMS (NORTH SYNC GROUP)
FIG. 9
GATAGA RIVER – LIARD MINING DIVISION
SUBMITTED BY: P. BOYLE
P. HUBACHECK
TEXASGULF, INC.
COMPILER / AUTHOR:
DATE:
December 20, 1977
100
0
200
400
METERS
LEGEND
LEGAL CORNER POST
CORNER POST
IDENTIFICATION POST
GEOLOGICAL BOUNDARY
MINERALIZED FLOAT
MINERALIZED OUT
N
7604
MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
PAC 5
NO.
SYNC. No. 4
SYNC. No. 3
SYNC. No. 2
SYNC. No. 1
SHALE
LIMESTONE
SHALE
LIMESTONE
SHALE
5000
5500
6000
6500
4500
126° 27' W. LONG.
58° 23' N. LAT.
38+00N
36+00N
34+00N
32+00N
30+00N
28+00N
26+00N
24+00N
22+00N
20+00N
18+00N
16+00N
14+00N
12+00N
10+00N
8+00N
6+00N
7+00E
6+00E
4+00E
3+00E
2+00E
B.L.
PbS
ZnS
Malachite