3695

GEOLOGICAL & GEOCHEMICAL REPORT

by

J.M. Newell, P.Eng.
P.R. DeLancey, M.Sc.

on surveys completed during June to September 1971

on the

PET MINERAL CLAIMS

situated on the
Dudidontu River, between Camp Island & Ketchum Lakes

in the

ATLIN MINING DIVISION

58°N 131°W, S.W.
(NTS 104-J-5)

and owned by

TEXAS GULF SULPHUR COMPANY

January 1972 Vancouver, B.C.

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

GEOLOGICAL & GEOCHEMICAL REPORT
PET MINERAL CLAIMS

INTRODUCTION

The Pet claim group, comprised of 90 full-sized mineral claims and one fractional claim, was staked by Texas Gulf Sulphur Company during the summer of 1971. The claims cover showings of copper mineralization in brecciated syenite, intrusive into andesitic rocks, with the contact zone largely obscured by a cover of Tertiary volcanic rocks.

This report is based on data obtained from a programme of preliminary geological mapping and geochemical soil sampling, together with drilling, blasting and hand-stripping of mineralized outcrops.

Location, Access & Ownership

The property is located in the Atlin Mining Division, between Camp Island and Ketchum Lakes, on the Dudidontu River, and is centred at approximately latitude 58°24'N, longitude 131°47'W. Access from Dease Lake, some 65 miles to the east, is gained by helicopter or float plane to Ketchum Lake.

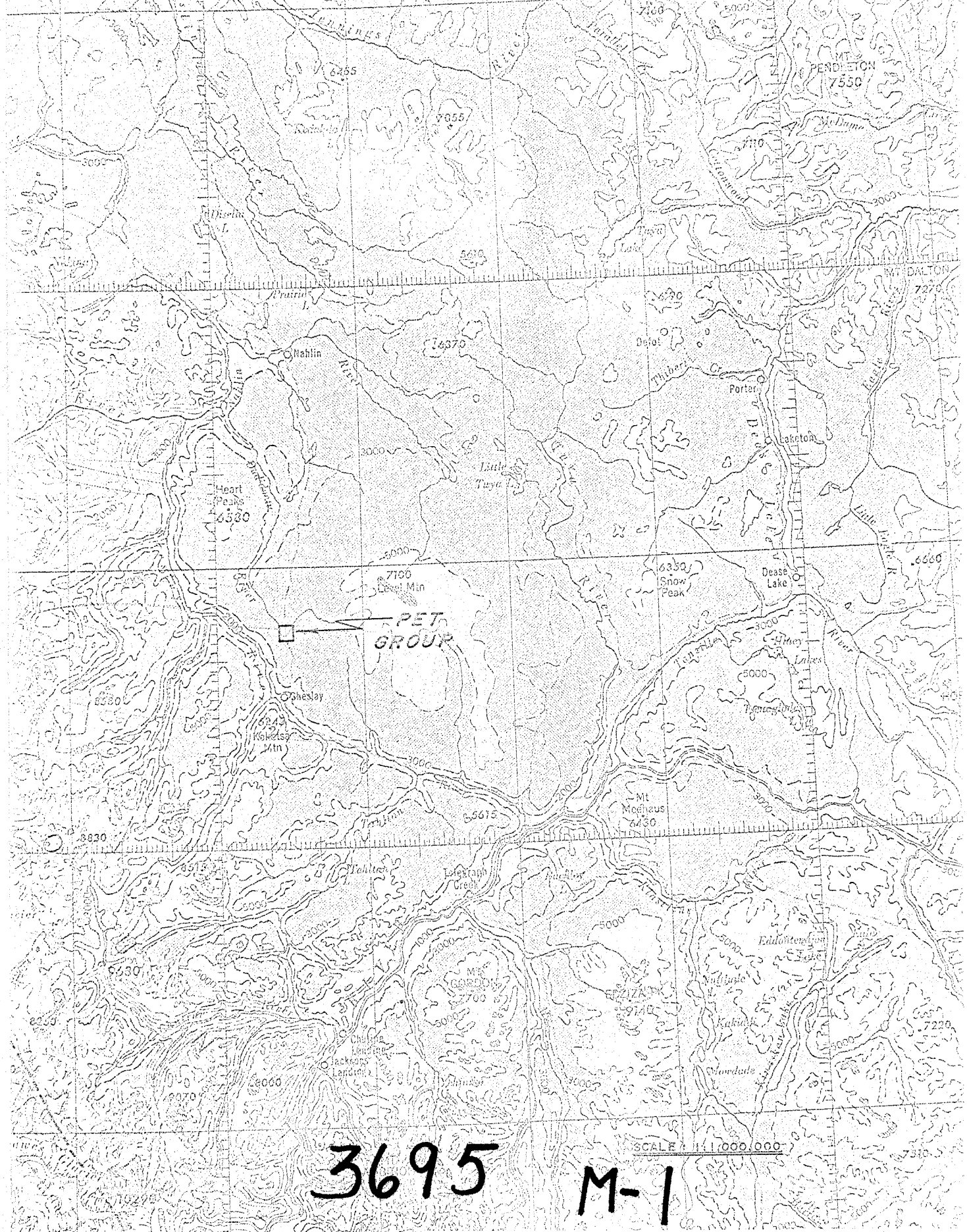
The claims, numbered Pet 1-91, inclusive, are held under location by Texas Gulf Sulphur Company.

Summary of Work Completed

The Pet showings were discovered and staked in the course of a regional reconnaissance programme in the Dease Lake area.

Preliminary work completed subsequent to staking included:-

1. Reconnaissance geological mapping.
2. Establishment of a flagged chain-and-compass grid over the central claims.



3695 M-1

TEXA[illegible] SULPHUR CO.

LOCATION MAP

PET GROUP

FIGURE 1

3. Completion of a soil sampling survey over the gridded area.

4. Blasting, drilling, stripping and sampling of mineralized outcrops.

GEOLOGY

Regional Geology

The geologic setting of the property is illustrated by G.S.C. Map 21-1962 "Dease Lake, British Columbia" (Gabrielse and Souther, 1962).

The syenite, in which mineralization occurs, is part of a large intrusive body, varying in composition from diorite to monzonite, and outcropping over an area of some 4x8 miles, to the north of Ketchum Lake. This stock intrudes andesitic volcanic rocks, believed to be Upper Triassic in age. The contacts are largely obscured by Tertiary volcanic rocks, which are exposed over wide areas around Heart Peaks to the northwest and in the Level Mountain Range to the east.

Property Geology

The intrusive rocks exposed on the property are predominantly syenitic in composition and are partially covered by flat-lying Tertiary basalts. The contact with Triassic volcanic rocks, which are well exposed north of Camp Island Lake, is also hidden by Tertiary cover. The contact between the Tertiary basalts and the intrusion may be a fault of unknown displacement, but this remains to be proven.

The syenite is relatively fresh with little alteration associated with the copper mineralization. Some outcrops, especially those near the contact with overlying Tertiary rocks, may be andesites

that have undergone extensive K-feldspar alteration. Shear zones are often characterized by extensive chloritization and epidotization.

The Triassic volcanic rocks include porphyritic andesites of variable texture and a few small diorite outcrops that appear to be genetically related to the andesites. Fracturing and epidote, chlorite and potash feldspar alteration are common, although only local in nature.

Trenching and blasting in the area around the discovery showing revealed good mineralization in two trenches and indications in others that did not penetrate the zone of weathering. Mineralization is related to a syenite breccia, with a hematite matrix, in a zone trending approximately north-northwest. Chalcopyrite and malachite are found both in the matrix and in the breccia fragments.

GEOCHEMISTRY

Sampling and Analytical Methods

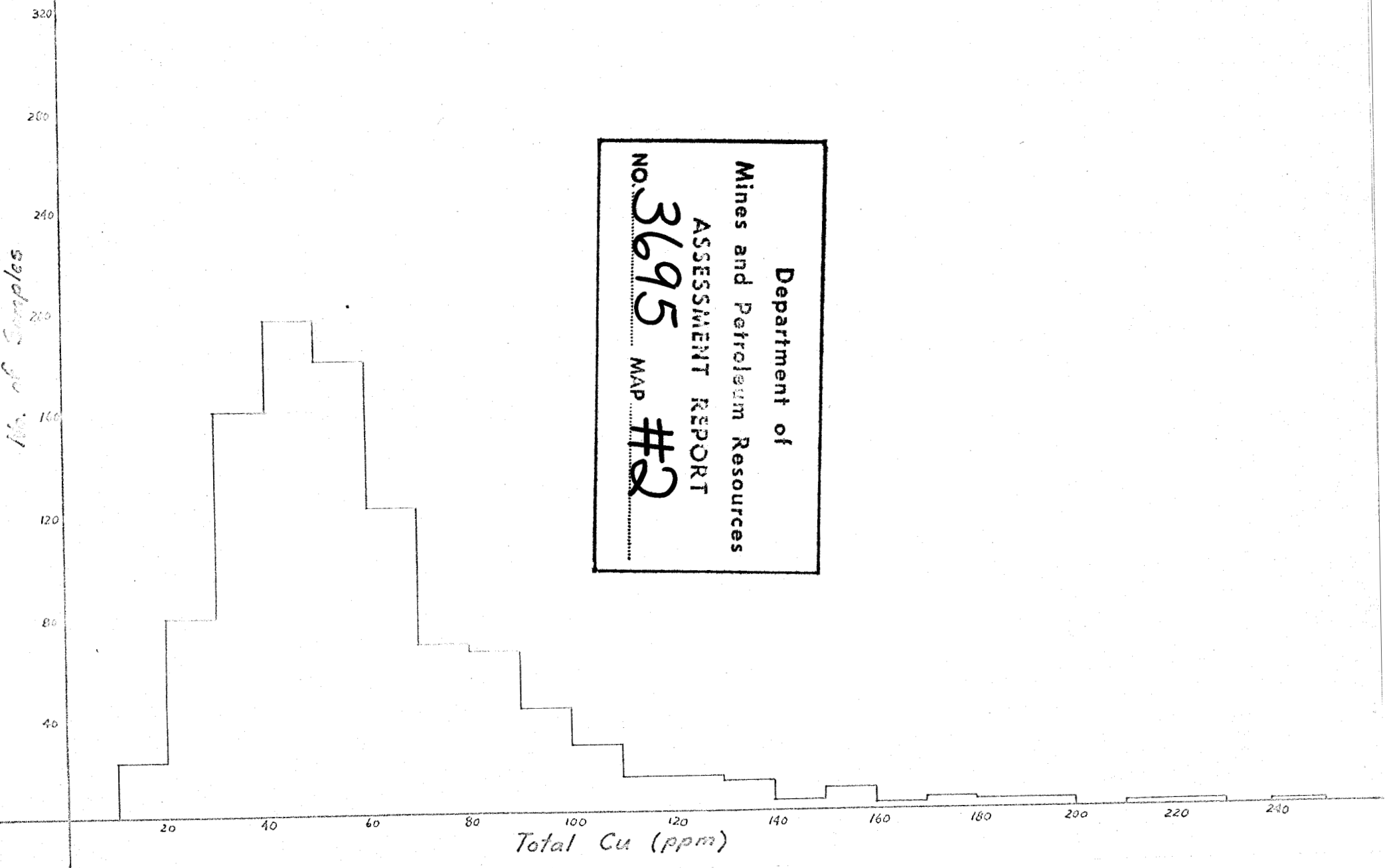
Soil samples were collected, at 100-foot intervals, on flagged lines approximately 500 feet apart. Claim location lines were used as base lines and were also sampled. Samples were taken either by digging shallow pits with a mattock or with a soil auger where greater penetration was required.

Samples were collected in Kraft paper envelopes and shipped to the Bondar-Clegg and Co. Ltd. laboratory in North Vancouver for total copper, molybdenum and zinc analyses.

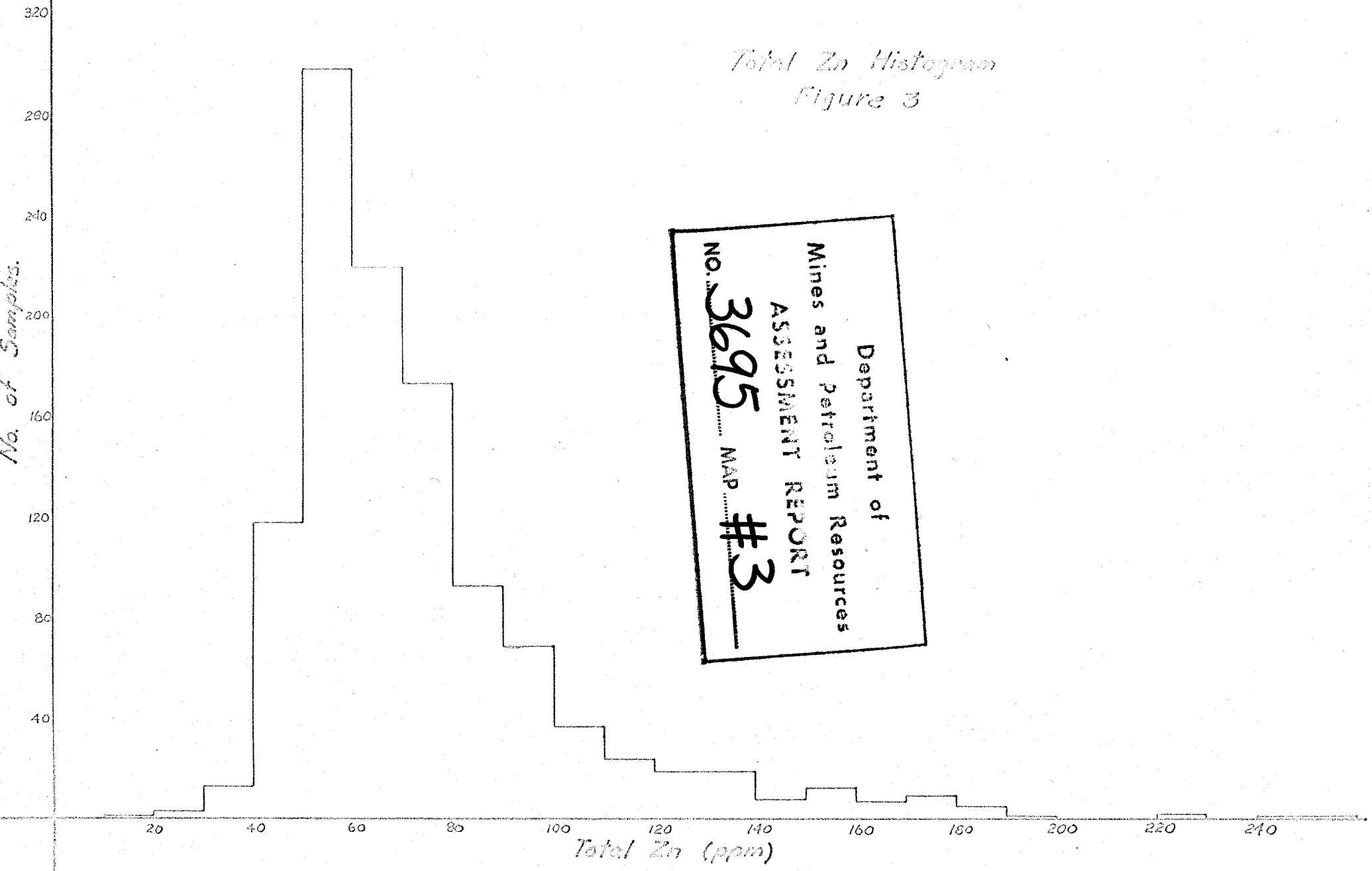
The analytical technique may be summarized as follows:

The samples are first dried and seived to obtain the -80 mesh fraction. Contained metal is extracted from a weighed sample of this fraction, using Le Fort aqua regia. The resulting solutions are bulked to 20% acid concentration and analysed by atomic

Total Cu Histogram
Figure 2



Total Zn Histogram
Figure 3



absorption spectrophotometry, in constant comparison with both synthetic and matrix standards. Results are expressed in parts per million total metal content.

In addition to the soil samples, two 32-element spectrographic analyses were completed on rock chip samples. The samples are ground to -200 mesh and analysed by x-ray fluorescence, in comparison with known standards.

A number of rock chip samples were analysed and/or assayed for copper, molybdenum, zinc, uranium and precious metals. Assays were by standard procedures; rock samples for geochemical analysis are treated in the same way as soil samples, after grinding, except in the case of uranium analysis, which employs the following procedure;

Uranium is extracted from the sample using hot nitric acid. The resultant solution is converted, by fusion, to a fluorescent uranyl fluoride and quantitatively measured by reflectance fluorimetry, in comparison with synthetic and matrix standards.

Discussion of Results

The value distribution curves for copper and zinc (see Figures 2 and 3) show no distinct breaks. The threshold of interest and anomalous sample boundaries have therefore been arbitrarily set at 110 ppm and 140 ppm for copper and at 140 ppm and 180 ppm for zinc with little statistical justification. No values were plotted and no value distribution curve was drawn for molybdenum as assays showed almost no variation in molybdenum content (i.e. varied between 0 and 2 ppm with a very few samples ranging as high as 6 ppm)

The geochemical soil survey shows a number of interesting features.

1. The linearity of north-northwest-trending copper anomalies suggests that soil highs may be related to a number of sub-parallel mineralized zones.
2. Although zinc anomalies are sometimes peripheral to copper highs, there is no obvious relationship between zinc and copper values.
3. Anomalous areas, in general, reflect the proximity of bedrock to surface. Geochemical dispersion in soils is very limited in extent, even where bedrock exposure shows significant copper mineralization. It seems likely that clay lenses have impeded secondary metal dispersion, especially in low-lying swampy areas.

J.M. Newell, P.Eng.

P.R. DeLancey, M.Sc.

Statement of Qualifications

Mr. P.R. DeLancey obtained his B.Sc. degree, in Honours Geology, from the University of Manitoba in 1965. He received his M.Sc. degree in 1970, from the same university. In the interim he was employed by Chile Exploration Company (Anaconda) on the geological staff at Chuquicamata, Chile.

He has been employed by Texas Gulf Sulphur Company's Exploration Division from 1969 to 1971, when he returned to the University of British Columbia for further post-graduate studies.

Mr. D.B. Kilby obtained his B.A.Sc. in Geological Engineering, from the University of British Columbia, in 1971. He has been employed by Texas Gulf Sulphur Company, in various capacities, during the summer field season from 1968 to 1971.

Mr. K.A. Komenac has completed almost all the course requirements for his B.A.Sc. degree in Geological Engineering, at the University of British Columbia. He has been employed by Texas Gulf Sulphur Company, during the summer months, from 1968 to 1971. I regard him as competent in geological mapping and related exploration techniques.

Mr. E. Galata is an experienced prospector.

Mr. B.C. Ratcliffe is a student at the University of British Columbia, who has six summer's field experience in geochemical sampling, five of them employed by Texas Gulf Sulphur Company.

Messrs. C.J. Rockingham, T. Burke, B. Boonstra and D. Morrison are field assistants with experience in mineral exploration varying from one to three field seasons. All are well-trained, competent and conscientious field assistants.

J.M. Newell.

Ot correspondence.

June 26, 1972

DOUBLE REGISTERED

Mr. E.J. Bowles
Chief Gold Commissioner
Department of Mines and
Petroleum Resources
Victoria, B.C.

Ref. File No. 166-Atlin

Dear Sir:

Re: PET Mineral Claims
Geological-Geochemical Report

Thank you for your letter of June 14th requesting additional supporting information for the above report. I apologise for not replying earlier, but have only returned today from an extended out-of-town trip.

The information you require is as follows:-

A number of rock chip samples were taken in the showing area (see box on 1"=1000' Geology Map included with report) for both geochemical analysis and assay. The sample locations are lettered on the map. Analytical results are as follows:-

Location	Values in parts per million		
	Cu	Zn	Mo
A	4650	65	4
A	1300	140	5
D	80	58	2
E	6200	97	5
E	1680	85	2
E	1220	98	2
E	1190	70	4

(continued over page)

Location	Values in parts per million Cu	Zn	Mo
F	1220	75	3
C	710	60	1
B	820	202	3
H	30	50	1
G	710	80	2
I	36	55	1
J	26	45	ND

In addition other rock chip samples were taken from outcrops on the property, all of which are numbered on the geological plan. Analytical results are as follows:-

Outcrop	Values in parts per million Cu	Mo	U
PD-8	24	1	-
PD-9	34,000	2	-
PD-10	47	7	2

Only a very limited number of samples were analysed for uranium. All were collected from the showing area, prior to establishment of the sampling grid. Results are tabulated on the attached Lab Report No. 21-295. Uranium analyses were not requested on later samples.

I trust this information will be all you require and that there will be no further problems regarding acceptance of the assessment report. Naturally in circumstances such as these one is concerned about maintaining our title to these claims. If there should be any further doubt about the report, please do not hesitate to telephone and I will be glad to answer any further queries. Naturally we would prefer to pay cash in lieu, rather than risk losing our title to the

DOMINION OF CANADA:

PROVINCE OF BRITISH COLUMBIA.

TO WIT:

In the Matter of Assessment work carried out on the Pet 1-91 Mineral Claims (Pet North Group, Pet South Group, Pet West Group) situate on the Dudidontu River, northwest of Ketchum Lake, in the Atlin Mining Division.

I, John M. Newell, agent for Texas Gulf Sulphur Company,

of 701-1281 West Georgia Street, Vancouver 5

in the Province of British Columbia, do solemnly declare that during the period June-September 1971, I caused assessment work to be done on the Pet 1-91 Mineral Claims, to the value of $9,144. The expenses were incurred as follows:-

Geological Mapping	P.R. DeLancey, M.Sc.	8 days @ $55	
	K.A. Komenac	3 days @ $35	
	T. Burke	5 days @ $25	
	B. Boonstra	3 days @ $20	
	D.B. Kilby, B.A.Sc.	3 days @ $40	$ 850
Geochemical Sampling	B.C. Ratcliffe	16 days @ $25	
	C.J. Rockingham	16 days @ $20	
	1193 analyses for Cu-Mo-Zn @ $2.70		$3941
Stripping & trenching	D.B. Kilby, B.A.Sc.	6 days @ $40	
	E. Galata	6 days @ $35	
	D. Morrison	6 days @ $25	
	Rock drill rental, powder, etc.	$308	$ 908
Supplies	72 man-days @ $8/day		$ 576
Transportation & Communications			
	5½ hours Bell 206 helicopter @ $260		
	5 hours Beaver @ $90		
	Radio (Marconi CH-25) rental @ $120		$2000
Assays & Rock Chip analyses			
	Assaying	$240	
	Rock chip analyses (geochem.)	$164	$ 404
Supervision & Drafting			
	J.M. Newell, P.Eng.	3 days @ $75	
	P.R. DeLancey	3 days @ $55	
	Drafting	$75	$ 465

And I make this solemn declaration conscientiously believing it to be true, and knowing that it is of the same force and effect as if made under oath and by virtue of the "Canada Evidence Act."

Declared before me at the City of Vancouver, in the Province of British Columbia, this 26 day of May, 1972, A.D.

J. Newell.

L. Jeannotte

A Commissioner for taking Affidavits for British Columbia or A Notary Public in and for the Province of British Columbia.

SUB-MINING RECORDER

ground and it would be greatly appreciated if you would notify me as soon as possible, whether or not my report has now been accepted.

Yours very truly

J.M. Newell
District Geologist

JMN:mcc

c.c. Mining Recorder, Atlin, B.C.

BONDAR-CLEGG & COMPANY LTD.
geologists • geochemists • analysts
1500 PEMBERTON AVENUE, NORTH VANCOUVER, B.C.
PHONE 988-5315

Date Rec'd.- June 28, 1971

GEOCHEMICAL LAB REPORT

No. 21-295

Extraction Cu, Mo, U, Hot Aqua Regia HNO_3

From Texas Gulf Sulphur Co.

Method Atomic Absorption, Fluorimetric

Date July 1 19 71

Fraction Used -80 Mesh

Analyst K. B.

SAMPLE NO.	Cu ppm	Mo ppm	U ppm					REMARKS
E 2736	36	1	0.4					
2737	42	1	2					
2738	33	1	1					
2739	45	1	1					
F 2888	52	1	0.6					
2889	87	1	0.6					
2890	75	1	1					
2891	38	1	1					
2892	57	1	0.6					
2893	52	1	1					
2894	117	2	5					
2895	45	2	0.6					
2896	44	1	0.8					
2897	42	1	0.6					
2898	50	1	1					
2899	67	1	2					
2900	71	1	5					
PD #10	47	7	2					

cc: Mr. Peter Delancey

L E G E N D

3	SYENITE to GRANITE
2	ANDESITES
1	TERTIARY VOLCANIC ROCKS
	OUTCROPS MAPPED ON SCALE 1" = 1000'
	OUTCROPS SCETCHED FROM 1:50,000 SCALE MAP

Newell

TO ACCOMPANY: Geological and Geochemical Report, Pet Mineral Claims, by J.M. Newell and P.R. DeLancey.

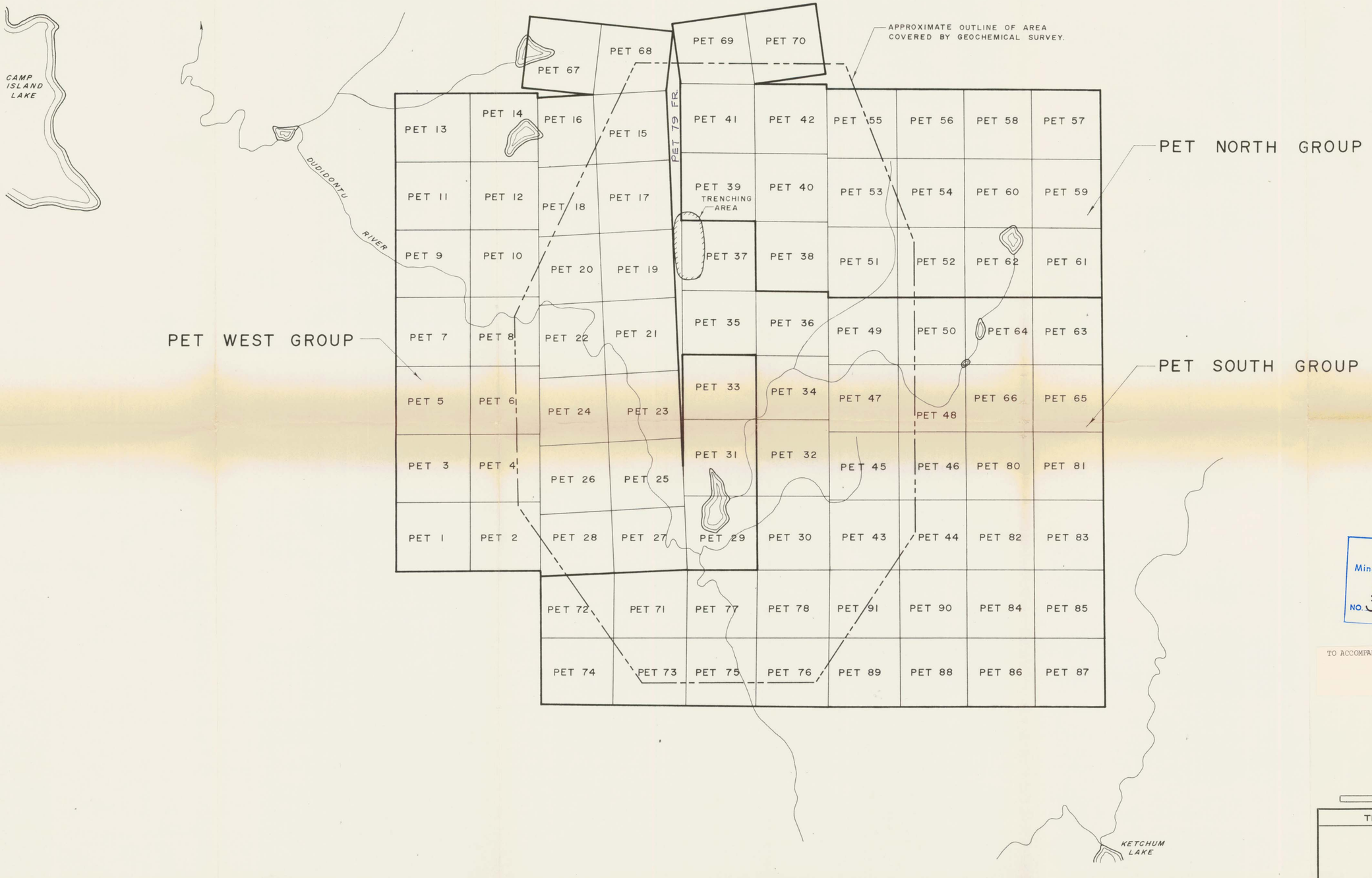
SCALE: ONE INCH = 1000 FEET (approx.)

TEXAS GULF SULPHUR CO.

GEOLOGY

AREA OF PET CLAIM GROUP

WORK BY	DRAWN BY	DATE
P. DELANCEY	P. DELANCEY	AUGUST 31, 1971



TO ACCOMPANY: Geological and Geochemical Report Pet Mineral Claims, by J.M. Newel P.E. DeLancey.

N

SCALE: ONE INCH = 1,000' (approx.)

TEXAS GULF SULPHUR CO.

CLAIM MAP

PET GROUP

ATLIN MINING DIV., B.C.

WORK BY	DRAWN BY	DATE
P.R.D.	L. BELL	JAN., 1972

LEGEND

Zn total ppm

- > 180 ppm
- 180 - 140 ppm

Cu / Zn

N

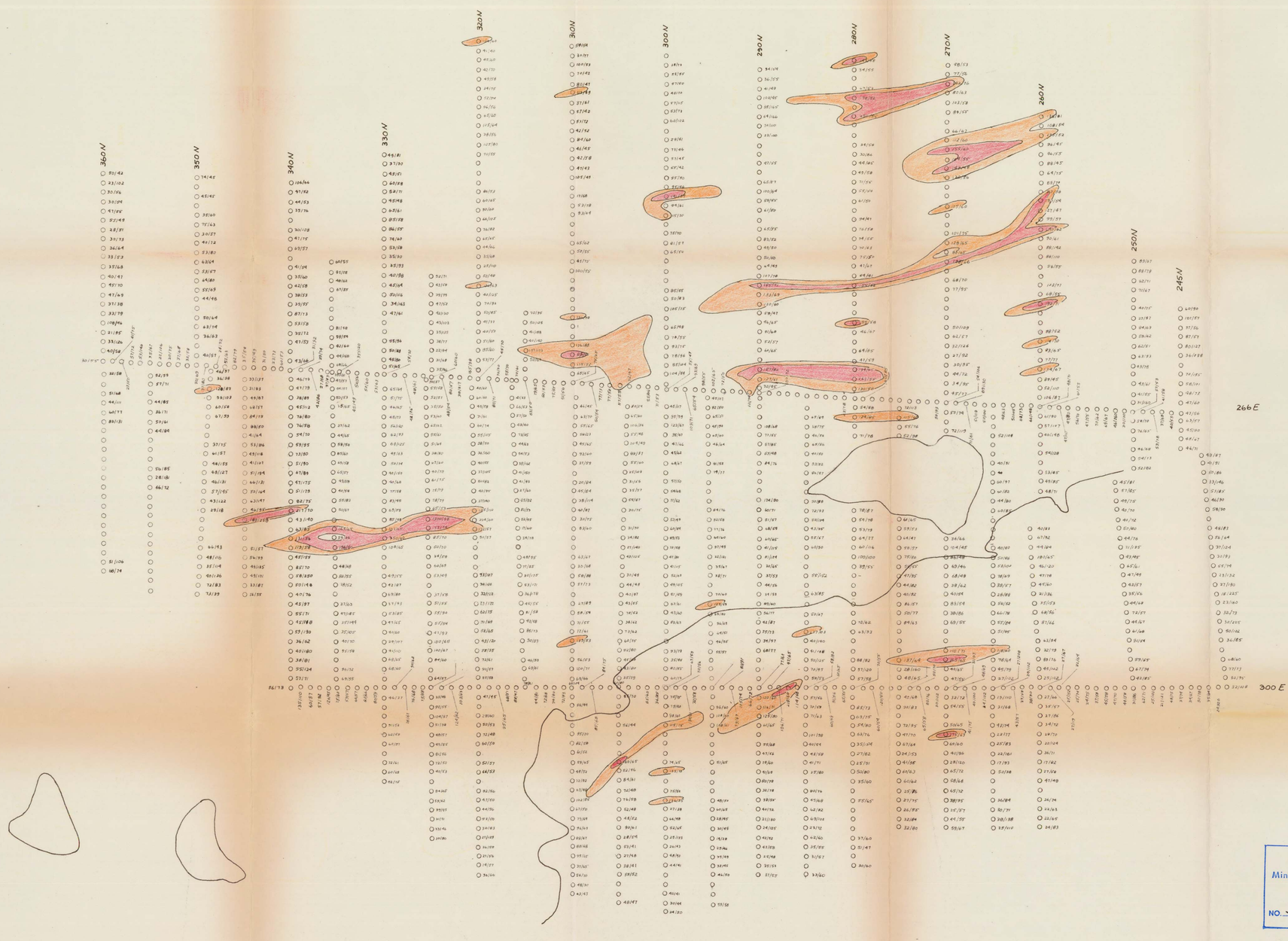
TO ACCOMPANY: Geological and Geochemical Report, Pet Mineral Claims, by J.M. Newell and P.R. DeLancey.

SCALE: ONE INCH = 500 ft

TEXAS GULF SULPHUR CO.

PET GROUP
Soil Geochemistry
ppm total Zn
1193 samples

WORK BY	DRAWN BY	DATE
B. RATCLIFFE	D. KILBY	OCT. 1971



LEGEND

Cu total ppm

> 140 ppm

140 - 110 ppm

Cu / Zn

Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 3695 MAP #6

TO ACCOMPANY: Geological and Geochemical Report, Pet Mineral Claims, by J.M. Newell and P.R. DeLancey.

SCALE: ONE INCH = 500 ft

TEXAS GULF SULPHUR CO.

PET GROUP

Soil Geochemistry

ppm total Cu

1193 samples

WORK BY	DRAWN BY	DATE
B RATCLIFFE	D KILBY	OCT. 1971

Trench H
2 cu yds

- no mineralization seen although there is some rust along fractures
- did not penetrate zone of weathering

Trench G
2 cu yds

- no mineralization seen
- did not penetrate zone of weathering thus sulphides may have been leached

Trench C
8 cu yds

- upper hole showed significant amounts of azurite and malachite around a metallic mineral (possibly chalcocite)
- note presence of syenite breccia with hematite matrix although no chalcopyrite was seen
- rock is extensively weathered (very little fresh rock exposed)

- syenite breccia with a hematite matrix was found in hole 2
- chalcopyrite was found in both the hematite and the syenite fragments
- holes 4&3 show malachite associated with hematite veinlets although primary cpy was seen
- rock is heavily weathered although some fresh rock is exposed

Trench B
6 cu yds

Trench D
6 cu yds

- no mineralization seen
- zone of weathering was not penetrated
- might possibly be some brecciation

Trench A
15 cu yds

- copper mineralization was seen along the entire length of this trench
- hematite occurs in veins and as the matrix of a syenite breccia
- chalcopyrite appears in both the original syenite and in the hematite breccia matrix
- pyrite is not common but it does occur in a number of 1-2' wide qtz. veins
- copper mineralization is almost certainly controlled by large numbers of N.E trending joints of varying attitudes.

Trench E
5 cu yds

- relatively fresh syenite with occasional stringers of specularite along fracture planes
- no chalcopyrite was seen although some flecks of malachite were noted
- fracturing is not as intense as in other trenches

Chip Samples						
Outcrop	Length	Cu %	Zn %	Mo %	Au oz/ton	Ag oz/ton
A	50'	1.53	.05	.002	.005	.04
B ①	12'	.58	.07	.001		
③	12'	.26	.02	.001		
C	30'	.35	.02	.001		
E	18	.07	.02	.001		
Rock Sample						
C		1.56	.02	.001		

To Accompany: Geological and Geochemical Report, Pet Mineral Claims, by J.M. Newell, P.R. DeLancey.

N

SCALE: ONE INCH = 50 FT.

TEXAS GULF SULPHUR CO.

PET GROUP

TRENCHING & BLASTING

WORK BY	DRAWN BY	DATE
D. KILBY	D. KILBY	SEPT. 20, 1971