Box 7

Report on
Preliminary Reconnaissance
CLINTON-ASHCROFT PROJECT, B.C.

92I and 92P

A. J. Schmidt

December 1969

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Texas Gulf Sulphur Company
Vancouver, B.C.

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Report on Preliminary Reconnaissance

CLINTON-ASHCROFT PROJECT, B.C.

ABSTRACT

Summary

An area of approximately 200 square miles (40x5 miles) between Martel and Clinton, in Southern B.C., was investigated by reconnaissance style geological mapping and geochemical silt sampling techniques during May 1969. The area under investigation was shown to contain a mixed assemblage of metasedimentary and meta-volcanic rocks of the Permian Cache Creek Group. This time-stratigraphic unit is known to be favourable for massive sulphide occurrences in the Cordillera of B.C. which is the target being sought.

Recommendations

The author has recommended an airborne magnetometer-E.M. survey of 45 square miles located within the southern half of the project area. Several rhyolite 'necks' are located within this area together with small granitic intrusives, and a large zone of sheared metamorphics. The author also recommends the ground follow-up of any worthy conductors located by the airborne survey by means of 1"=1000' geological mapping and reconnaissance-type ground mag-E.M. surveys.

INTRODUCTION

Purpose of Project

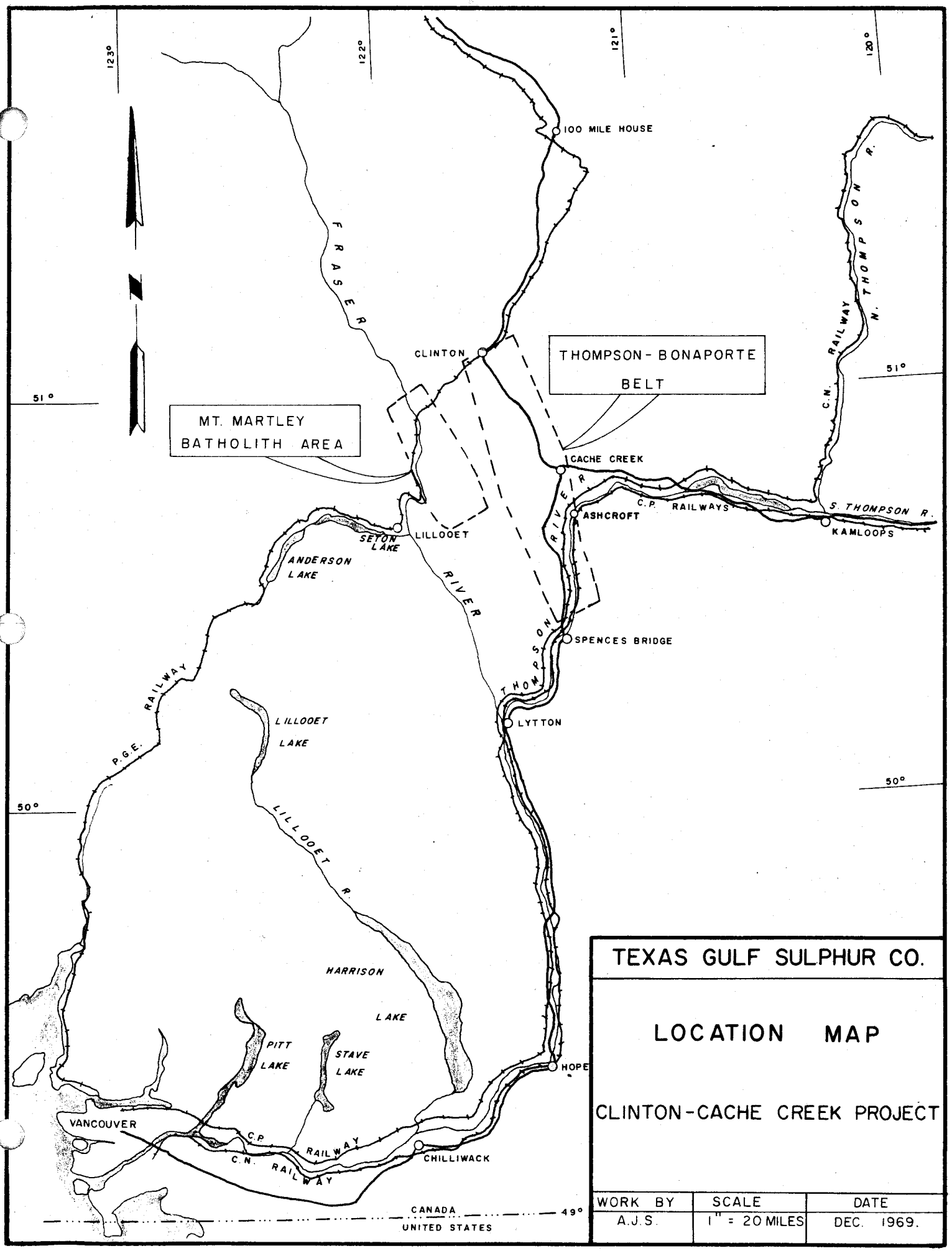
The Clinton-Ashcroft Reconnaissance was conceived as a preliminary investigation of a long, narrow belt of Permian sediments and volcanics within which several areas of sub-economic copper mineralization have been previously located. The target being sought in this area is a massive sulphide orebody, similar to Britannia or Western Mines. These are stratiform massive sulphide orebodies controlled by major regional shear zones but always associated with a rhyo-dacite rock type.

This programme developed two minor off-shoots: one was the search for gold in a younger sandstone-conglomerate sequence overlying the Cache Creek rocks south of Clinton, the other was an investigation of the "porphyry copper" possibilities of the Mt. Martley batholith and related stocks lying adjacent to the Fraser River north of Lillooet.

Field Approach

The field work completed by Texas Gulf Sulphur during 1969 was directed primarily towards outlining the regional geology, plus obtaining a geochemical picture of selected areas. Individual prospect examinations, although not entirely neglected, were considered of secondary importance.

Geological field work was commenced by the writer on May 6th, and was completed on June 7th. Mr. J.Forsythe assisted in the geological mapping during the period May 6-21, while Mr. J.Fraser was similarily engaged during the period May 13-June 7th. Two students, Kilby and Van Tine, were employed during the entire period in the collection of geochemical silt samples.



TEXAS GULF SULPHUR CO.

LOCATION MAP

CLINTON-CACHE CREEK PROJECT

WORK BY	SCALE	DATE
A.J.S.	1" = 20 MILES	DEC. 1969.

Field work was largely confined to vehicle traverses along the numerous logging and ranching roads of the district. Only a few walking traverses were undertaken towards the end of the programme. The company-owned G-2 helicopter was used for four days to assist in the geological and geochemical reconnaissance of the rugged granitic terrain adjacent to the Fraser.

Areas Covered

Reconnaissance geological mapping and geochemical coverage of the Cache Creek group was concentrated in a long narrow belt beginning approximately 3 miles north of Spences Bridge, and extending northwards along the highway to Clinton, a distance of approximately 40 miles, and averaging approximately 5 miles wide.

Geochemical silt sampling and reconnaissance-style prospecting of the Lower Cretaceous Mt. Martley batholith and related stocks was conducted within an area approximately 25 miles long in a north-south direction and up to 8 miles wide east-west. The coverage was rapid and uniformly thin - only about 12 traverses were made, but these were deemed sufficient to evaluate the potential of the area.

Physiography, Climate and Vegetation

The area under investigation lies within the Interior Plateau of southern British Columbia, an area of rolling uplands dissected by deep valleys. The eastern flank of the Coast Range forms the western margin of the area of interest.

Elevations within the area range from 1000 feet along the Thompson River south of Ashcroft to peaks well over 6000 feet which form the height of land between the Fraser and Thompson River systems.

The area lies in the "dry belt" of British Columbia which is sheltered from rain and snow by the Coast Mountains, and has an average precipitation of from 7 to 10 inches in the valleys and somewhat more at higher elevations. The summers are hot and the winters cool. Maximum summer temperatures at Ashcroft and Cache Creek reach to above 100°F, while minimum temperatures have reached -20°F, but normal low temperatures in January are approximately zero.

Valley bottoms and river benches are covered only by a light growth of bunch grass and cactus, thus presenting a bare, desert-like appearance. Many hillsides are free of vegetation, and much rock outcrop is visible. Not until an elevation of 2500 to 3000 feet is reached does timber appear, and as timber-line is at an elevation of about 6500 feet, most of the summits in the area are forested.

Mining History

Although the actual area under consideration has achieved very little in the way of tonnages milled, numerous prospects have been developed during the past 100 years. The Big Slide Mine, one of the earliest lode mines in British Columbia, was discovered in 1872. Over 3000 tons have been milled at this copper-gold deposit, mainly in 1954. Between 1899 and 1905, the important copper deposits of the Highland Valley camp were found a few miles to the southeast. Prior to the development of Bethlehem Copper, the only significant production in the Highland Valley came from the OK Mine which has been idle since 1917. The Maggie Mine, located along the old Cariboo Highway south of Clinton, was discovered sometime prior to 1907, and produced a few tons of high grade copper ore.

Near Bonaparte River, from below Cache Creek to Clinton, numerous bodies of chromite-bearing serpentine occur within the Cache Creek rocks. Some production of chromium has been recorded from the larger of these deposits.

A large deposit of lignitic coal occurs along Upper Hat Creek. It is presently owned by B.C.Hydro and may have some economic significance in the future.

Epsomite deposits near Basque have been worked at intervals since 1919. The salts are probably leached from the adjacent Cache Creek rocks and concentrated in basins during the hot dry spells of the summer months.

GENERAL GEOLOGY

Introductory Remarks

This report is based mainly on the author's field observations gathered during the field mapping programme of May, 1969. However, it must be said that a great deal of information has also been gathered from various reports published by governmental agencies (see Bibliography), particularly on the regional structure and setting of the areas under consideration.

No attempt was made to map the distribution of the Mt. Martley batholith or any of the Cache Creek rocks adjacent to the Fraser River. A very recent publication with detailed maps on a scale of 1"=1 mile is available, and this publication combined with the author's field work was sufficient to curtail serious interest in this particular area.

Regional Setting

The Cache Creek group, of late Paleozoic age, occupies a belt 40 miles long and up to 10 miles wide, extending from Martel Station on the CPR northwesterly, to just south of Clinton. Rocks of this group are chert, argillite, limestone, and altered volcanic rocks, for the most part closely folded and in many places metamorphosed to talc, chlorite and sericite schist. They are considered to be the oldest rocks in the map area.

Triassic rocks outcrop along the Thompson River north and south of the town of Ashcroft. They include both sedimentary and volcanic types, mainly green andesitic flows with interbeds of agglomerate, limestone, and argillite.

A series of fossiliferous strata composed of conglomerate, sandstone and shale that underlies the Thompson River valley near Ashcroft is of Middle and Upper Jurassic age.

Sedimentary rocks of Miocene age form the western boundary of interest of the northern part of the map area. These Coldwater beds consist of greenish grey conglomerate, grit, and sandstone.

Tertiary basaltic lava flows (Kamloops Group) have formed a great plateau along the eastern margin of interest of the northern part of the map area.

The Guichon batholith, firmly dated at 198 ± 8 million years, forms the southeastern boundary of interest. This complexly zoned batholith (granite-diorite) hosts several major 'porphyry' copper-type orebodies. The Mt. Martley batholith and related stocks adjacent to the Fraser River is, on the other hand, much younger, probably early Lower Cretaceous, and economic mineralization has yet to be found associated with it.

Small serpentinized ultrabasic bodies of pre-Jurassic age are to be found along the Bonaparte River Valley.

Lithology of the Cache Creek Group

This group consists of a thick assemblage of cherts, argillites, minor limestones, andesites, dacites, agglomerates and tuffs, and their metamorphic derivatives, exposed along the Thompson River and the Cariboo Highway from Martel north to Clinton. It also includes the massive recrystallized limestones typically exposed in the Marble Canyon and Pavillion Mountains, and known as the Marble Canyon formation. This

limestone, forming a distinct subdivision that may be mapped separately, contains minor intercalations of chert, argillite, and greenstone. Of the remainder of the group, some zones are characterized by a predominance of volcanic materials, and others by a predominance of chert and argillite.

The cherts are typically ribbon cherts, dark green to black, dense, with a conchoidal fracture. The laminae are generally from 1" to 3" thick with thin argillaceous partings. The origin of these cherts is somewhat in doubt: three different hypotheses seem reasonable:

a. The deposition of colloidal silica from siliceous solutions that may be related to vulcanism,

b. the leaching and redeposition of silica from vitric tuff, and,

c. the accumulation of debris from siliceous organisms.

The author feels that the first hypothesis is the most applicable to this area — the presence of abundant volcanic materials such as andesite and dacite flows and agglomerates is evidence of contemporaneous volcanic activity.

The argillites vary from black to grey, are fissile, and often contain carbonaceous material, which in places gives them a lustrous appearance.

Limestones of the group, other than the Marble Canyon formation, occur in beds up to several hundred feet thick as well as in small lenses or pods interbedded with the other rocks. They range in colour from white to grey to black and are fine to medium-grained.

The volcanic suite assigned to the Cache Creek group ranges in composition from acid rhyolites to basic andesites, plus their sedimentary derivatives. The rhyolites are commonly intensely sheared and are often porphyritic, with small quartz "eyes". They make isolated, rusty outcrops which display lustrous foliation planes that may be curved, mullioned, and locally crumpled. The planes are coated with sericite which imparts a greenish colour to the otherwise creamy coloured rock.

The andesites are commonly green to greyish-green, massive rocks, usually affected by some degree of alteration. The dacites are similar, except that they are lighter coloured, slightly more siliceous rocks. All of these volcanic members of the group are commonly pyritized, the rhyolites probably the most. Very little layering on which attitudes can be taken is evident in these rocks.

The Marble Canyon limestone is considered to be a distinct formation of the Cache Creek group, and overlies the sedimentary and volcanic members found along the Thompson-Bonaparte valleys. It is commonly blue-white to cream coloured, and has been recrystallized. The sharp contrast in topography between areas underlain by the Marble Canyon formation and adjacent areas is due mainly to the massive and prominent character of the limestone outcrops.

Structure

Though its aggregate thickness is undoubtedly great, probably 15,000 to 20,000 feet, deformation, metamorphism, abundance of relatively structureless volcanic rocks, and repetition of beds of folding and faulting, have prevented any accurate determination of the overall succession of the Cache Creek group. However, it is generally felt that this group consists of two successions of sedimentary and volcanic rocks separated by the thick series of Marble Canyon limestones.

The strata generally strike northwest (N50°W) and dips are usually steep (60°) to the southwest. McTaggart has suggested that these conditions would indicate an anticlinal structure overturned to the northeast, probably by pressure applied from the southwest during the period of intrusions of the Coast Range batholith.

Shearing and fracturing have affected the whole group in a direction roughly parallel with their strike. This is a product of the regional block faulting. The Thompson and Fraser River valleys occupy

north to northwest trending grabens, quite possibly caused by the intrusions of large batholiths — i.e. the Coast intrusives west of the Fraser, and the Guichon east of the Thompson. The sheared metamorphic rocks just west of Red Hill probably represent a major fault zone which involved porphyry intrusions of small volcanic vents and which subsequently localized the prevalent alteration and mineralization.

The pattern of the lesser faults, although not readily apparent on the ground, showed itself well during a photo-geological study of the district. A complimentary system of cross-faults (N60°E) has affected the areal distribution of the various members, while smaller north-south, and east-west striking faults have resulted in local brecciated and sheared zones.

ECONOMIC GEOLOGY

General Statement

The rocks of the Cache Creek group within the area of interest of this report have not, with only a few exceptions, been noted for their productivity of metallic mineral deposits. In fact, if one were to ignore the chromium produced from several of the small serpentine bodies, the only other recorded production would be the 50 tons of high grade copper ore shipped from the Maggie Mine in 1907.

However, it must be remembered that the "raison d'etre" for the whole programme was a geological concept — not the attraction of known orebodies. Hence, the presence of small amounts of pyrite, chalcopyrite and sphalerite are taken to be encouraging guideposts in our search for ore, and not definite indications of the lack of orebodies.

The Maggie Mine

This old property is situated along the old Cariboo Highway about 2 miles north of the junction of Hat Creek and the Bonaparte River.

The Crown Grants and surrounding claims were purchased by Bethlehem Copper Corp. some years ago and they have done some exploratory drilling on the property.

The showings are located near the edge of a small rhyolite body, close to the interfingering of some argillites and agglomerates. The rhyolites are highly sheared, and vividly coloured by the oxidation of pyrite. Workings on the property followed a shear zone striking north-east and dipping 70° southeast. The zone contained relatively massive lenses of bornite, tetrahedrite, and chalcopyrite, and some lead, zinc and silver values.

Red Hill Prospect

This old prospect is located along the Trans-Canada Highway about 4 miles south of the Ashcroft junction. Here again a small highly sheared rhyolite body has created a vividly coloured gossan due to the oxidation of pyrite. Small showings of nearly massive chalcopyrite and pyrite occur in north-westerly trending shear zones. Noranda drilled several short holes here in 1962 and some values in silver were also noted within the zone.

Discussion of Exploration Possibilities

As stated previously, the target being sought is a stratiform massive sulphide orebody, controlled by major regional structures and/or boundaries between rock types. The area under consideration possesses features similar to the Bathurst massive sulphide camp, i.e. the presence of a mixed assemblage of metasediments and volcanic rocks with zones of quartz-sericite schists. In New Brunswick, many of the sulphide deposits occur along schist-argillite or rhyolite-andesite contacts. This is not dissimilar to the situations seen in the Clinton-Cache Creek project area.

An area some 15 miles long by 3 miles wide has been selected for additional study. It lies within the southern half of the mapped area,

on the west side of the Thompson River, south of Ashcroft. Within this area are numerous rhyolite 'necks', several small granitic intrusives and, of course, the large zone of sheared metamorphic rocks. Equally important, the area is typified by numerous facies changes between the volcanic and sedimentary members of the Cache Creek group (see Fig.No.2).

GEOCHEMISTRY

Thompson-Bonaparte Belt

Approximately 250 geochemical silt samples were collected from selected drainages in this area. This work was hampered somewhat by the fact that it lay in the 'dry belt' of the B.C. Interior and very few flowing streams occur. However, drainage depressions were sampled wherever feasible. These samples were analyzed by Barringer Research Limited for HCl Cu. Their results are appended.

A histogram has been prepared for this suite of samples (see Fig. No.5). A good bimodal curve was produced by this histogram — the lower peak probably representing the areas of Tertiary volcanics and/or sediments. The main peak lies in the 15-25 ppm range. Anomalous values were judged to be those above 41 ppm HCl Cu. In view of the comparatively large number of samples lying above this value (16% of the total) a better cut-off might have been 51 ppm, only 10% of the samples collected have values greater than this.

In any case, a study of the distribution of the anomalous samples indicates no clear-cut anomalies. The area around the Maggie Mine is relatively high, but not unduly so. Most of the gully samples taken from the base of slope west of the highway, north of the Ashcroft turn-off, are at threshold or above, indicating an area of accumulation of trace amounts of copper derived from the stratigraphy.

It must be judged therefore that stream geochemistry as a means of evaluating this area was not satisfactory.

1969 CLINTON-CACHE CREEK RECCE PROJECT
THOMPSON - BONAPARTE BELT

GEOCHEMICAL SILT SAMPLES

HISTOGRAM - HCL Cu.

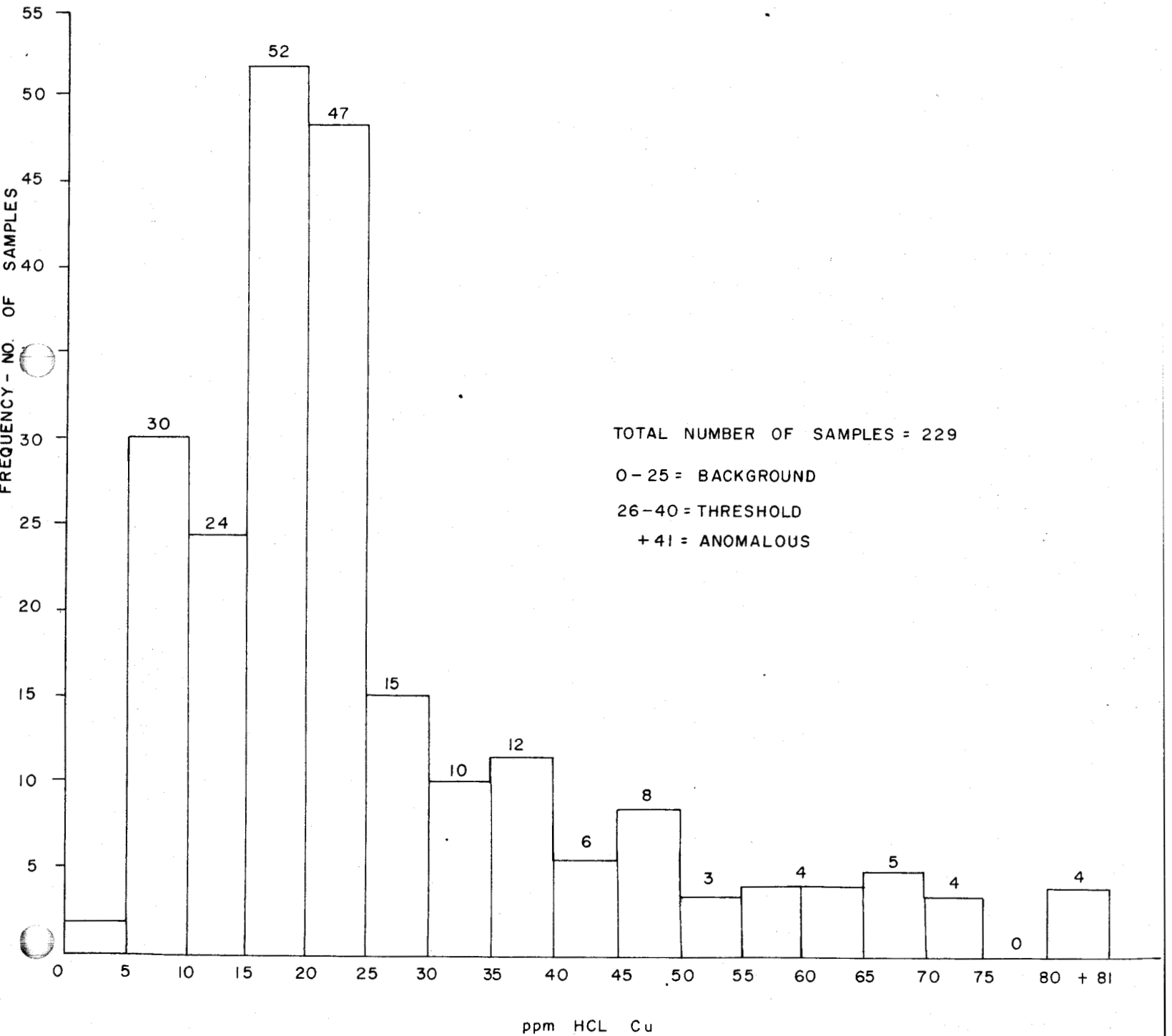


FIG. 5

Mt. Martley Batholith area

Approximately 140 geochemical silt samples were collected from drainages in this area. With the exception of a few gully samples collected from the arid benches adjacent to the Fraser, all of the samples were taken from flowing streams. These samples were also analyzed by Barringer Research Limited for HCl Cu and Total Mo. These results are also appended.

Two histograms were prepared from these data — one for the HCl Cu results, the other for Total Mo. The HCl Cu histogram is slightly skewed, but shows a dramatic cut-off at 25 ppm. Anomalous values are therefore taken to be those over 35 ppm. The Total Mo histogram is a logramithic decay curve showing a background of 4 ppm, and anomalous values above 9 ppm.

Some weak copper anomalies were detected north of the Big Slide Mine. However, these samples were also base of slope gully samples and hence not too much significance can be attached to them. One valid anomaly, in both Cu and Mo, was detected on the lower reaches of Sallus Creek, at the contact between Cache Creek rock with the Mt. Martley batholith. A large gossam over this area is indicative of the pyritized condition of the rocks. The zone has been investigated over the years without any significant mineralization being discovered.

GEOPHYSICS

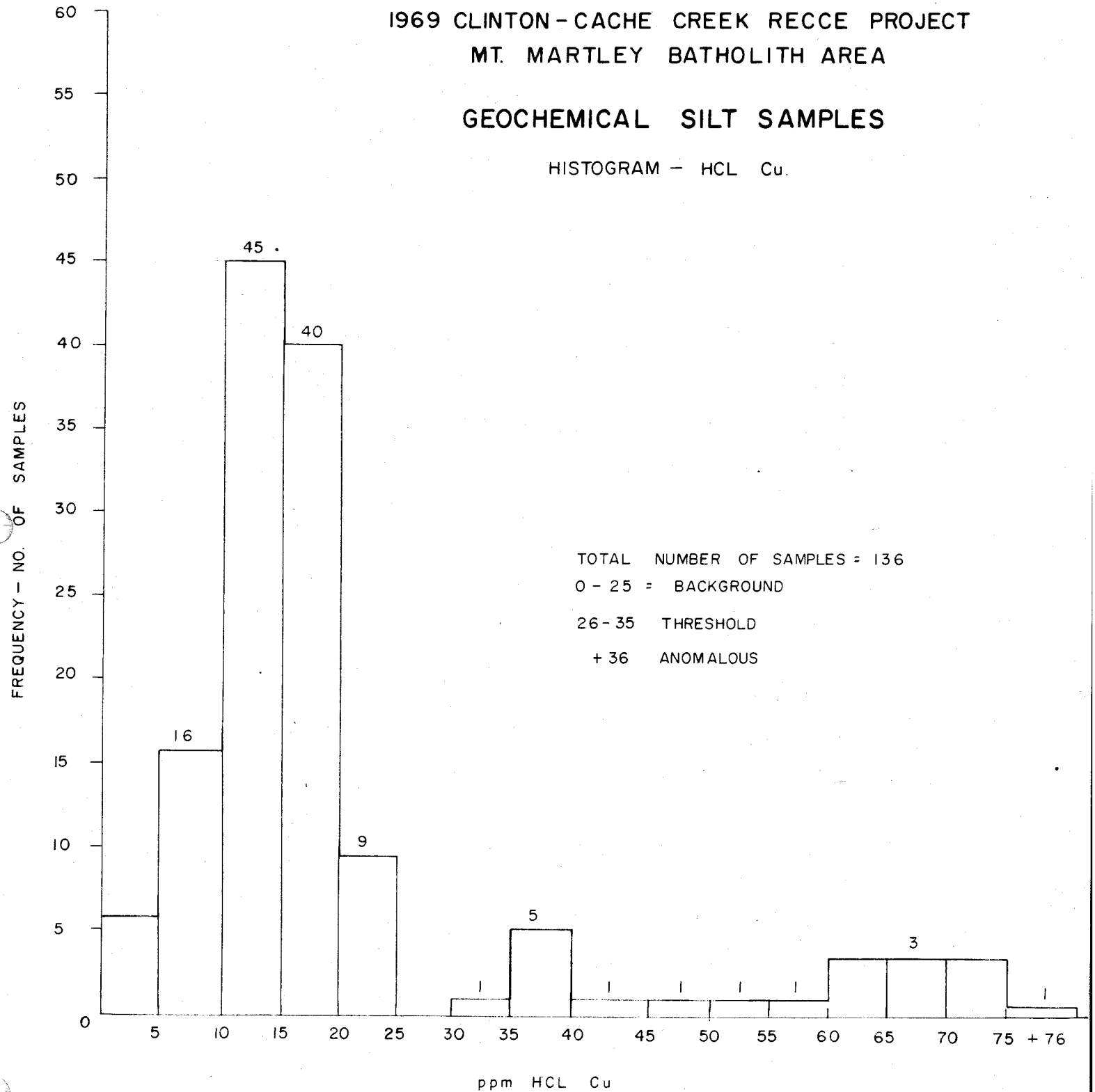
Applicability of Airborne E.M. and Magnetic Surveys

Sulphide bodies, if in sufficiently massive form, form good electrical conductors. This fact has been known for years and has formed the basis for many types of geophysical prospecting methods. As stated previously, the target being sought is a stratiform massive sulphide deposit. If such a deposit exists in the area selected, then obviously

1969 CLINTON - CACHE CREEK RECCE PROJECT
MT. MARTLEY BATHOLITH AREA

GEOCHEMICAL SILT SAMPLES

HISTOGRAM – HCL Cu.



TOTAL NUMBER OF SAMPLES = 136

0 – 25 = BACKGROUND

26 – 35 THRESHOLD

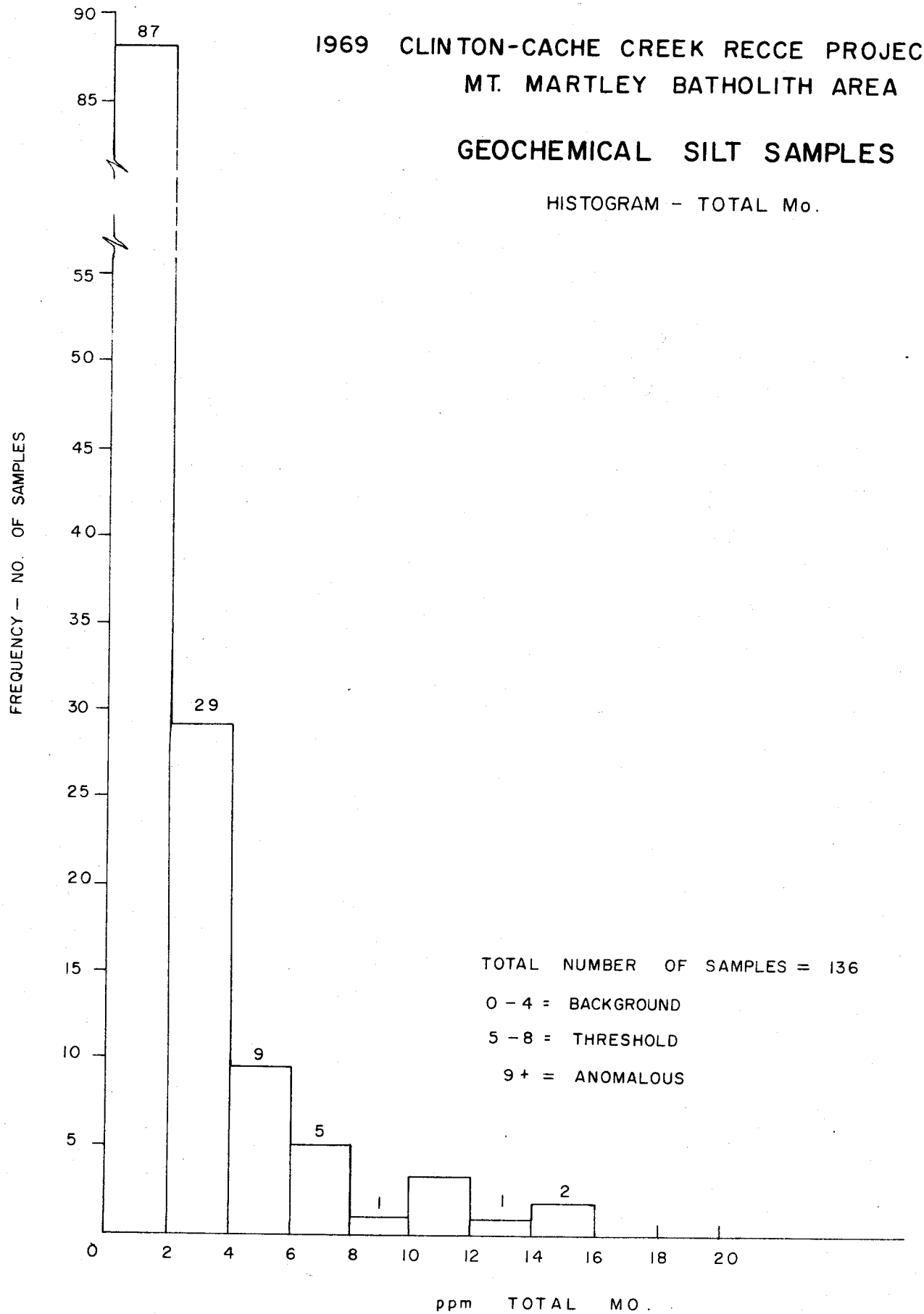
+ 36 ANOMALOUS

FIG. 6

1969 CLINTON-CACHE CREEK RECCE PROJECT
MT. MARTLEY BATHOLITH AREA

GEOCHEMICAL SILT SAMPLES

HISTOGRAM - TOTAL Mo.



TOTAL NUMBER OF SAMPLES = 136

0 - 4 = BACKGROUND

5 - 8 = THRESHOLD

9 + = ANOMALOUS

FIG. 7

the most efficient method to search for it would be an airborne electromagnetic survey. The topography of the area selected is not particularly rugged by B.C. standards and a helicopter-towed 'bird' would not have any undue difficulties.

As there exists a good possibility that such a deposit may have pyrrhotite and/or magnetite associated with it, then an airborne magnetic survey, flown in conjunction with the electromagnetic survey, might well prove useful as a direct method of screening out the spurious anomalies caused by graphitic zones and water-courses.

A. Schmidt

A.J.Schmidt

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Tupper, W.M., et al	Geology, Mineralogy, and Geochemistry of the Captain Sulphide Deposit, N.B. G.S.C. Paper 66-18
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----	B.C.Minister of Mines, Annual Report

APPENDIX A

Gold in the Coldwater Beds

APPENDIX A - Gold in the Coldwater Beds

While researching the project area, two brief reports in the B.C.Minister of Mines Annual Reports were noted (1901 and 1931) concerning the presence of gold in the lower part of the Miocene Coldwater formation. The reports stated that assays of $1.60 and $3.75 per ton had been obtained from sections of the sandstone-conglomerate sequence exposed in a bluff near the mouth of Maiden Creek, about 7 miles south of Clinton.

The economic possibilites of this situation justified a cursory examination of the area. The field approach taken was basically geochemical — the author collected gold pan concentrates at ¼ and ½ mile intervals from the lower reaches of Maiden and Allen Creeks which were subsequently analyzed for their gold content. The author also collected five chip samples representing approximately 100 feet of the geological section exposed just north of the mouth of Allen Creek.

The results were, unfortunately, very disappointing. All the samples, except one, were found to be devoid of gold; one gold pan concentrate sample did run 0.05 oz/ton, which in itself is not too encouraging.

The author must conclude, therefore, that either or both of two possibilities exists,

a. the initial reports in the B.C.Minister of Mines Annual Reports are in error, possibly due to poor assaying technique, or salting of samples, or,

b. the methods used, and the areas covered by myself were insufficient to detect the presence of gold within the sandstone-conglomerate sequence.

APPENDIX B

Geochemical Results

229 Bancbarte Belt for HCl Cu

BARRINGER RESEARCH

Geochemical Laboratory Report

BARRINGER RESEARCH LIMITED
304 CARLINGVIEW DRIVE
REXDALE, ONTARIO, CANADA
PHONE: 416-677-2491
CABLE: BARESEARCH

DATE June 2/69

Texas Gulf Sulphur
701 - 1281 West Georgia St.
Vancouver 1, B. C.

Attention: Dr. R. Loudon

REPORT NUMBER 8-B

y/m Hazelton

SAMPLE NUMBER	HCl Cu ppm		Sample No.	HCl Cu ppm		Sample No.	HCl Cu ppm		Sample No.	HCl Cu ppm
CASS 1	24		CASS 21	32		CASS 41	21		CASS 61	28
2	24		22	24		42	17		62	18
3	18		23	40		43	24		63	21
4	22		24	19		44	19		64	21
5	20		25	130		45	22		65	22
6	19		26	36		46	18		66	6
7	21		27	36		47	17		67	17
8	19		28	22		48	24		68	18
9	18		29	24		49	23		69	18
10	18		30	32		50	14		70	8
11	16		31	19		51	65		71	6
12	23		32	16		52	30		72	11
13	23		33	22		53	41		73	14
14	20		34	24		54	21		74	16
15	50		35	21		55	20		75	19
16	23		36	22		56	14		76	40
17	22		37	23		57	16			
18	19		38	22		58	55			
19	18		39	17		59	20			
20	20		40	18		60	28			

Texas Gulf Sulphur Co.,
701-1281 W. Georgia St.,
Vancouver 5, B.C.

Project # A-558
A. Schmidt

BARRINGER RESEARCH

Geochemical Laboratory Report

BARRINGER RESEARCH LIMITED
304 CARLINGVIEW DRIVE
REXDALE, ONTARIO, CANADA
PHONE: 416-677-2491
CABLE: BARESEARCH

DATE June 9/69.

T.G.S.
Bonaparte Motel,
Cache Creek, B.C.

REPORT NUMBER 17-B

J.M. Hazeldene

SAMPLE NUMBER	HCl Cu ppm		Sample No.	HCl Cu ppm		Sample No.	HCl Cu ppm			
CASS 77	9		CASS 98	42		CASS 118	15			
78	14		99	22		119	15			
79	19		100	35		120	10			
80	23		101	62		121	29			
81	32		102	30		122	33			
82	35		103	58		123	39			
83	47		105	17		124	44			
84	28		106	18		125	62			
85	38		107	22		126	67			
86	20		108	22		127	67			
87	29		109	38		drill core	Tot. 85	Cu ppm		
88	32		110	47		A. Schmidt				
89	67		111	45						
90	30		112	50						
91	71		113	50						
92	36		114	67						
93	24		115	58						
94	24		116	33						
97	25		117	29						

Project # A-558
A. Schmidt

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Geochemical Laboratory Report

BARRINGER RESEARCH LIMITED
304 CARLINGVIEW DRIVE
REXDALE, ONTARIO, CANADA
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CABLE: BARESEARCH

DATE June 9/69.

Texas Gulf Sulphur Co.,
701-1281 West Georgia St.,
Vancouver 5, B.C.

REPORT NUMBER 23-B

SAMPLE NUMBER	HCl Cu ppm		Sample No.	HCl Cu ppm		Tot. Cu ppm		Sample No.	Tot. Cu ppm	
CASS 150	22		CASS 170	21				16E	39	
1	19		1	13				2+ 00N00E	11	
2	32		2	38				02N	42	
3	71		AJS1	15				04N	38	
4	54		2	24				06N	33	
5	58		00+ 00N00E			58		3+ 00N00E	36	
6	75		02N			58		02N	33	
7	38		04N			24		04N	36	
8	21		06n			44		06N	33	
9	20		1+ 00N00E			23		4+ 00N00E	71	
160	16		02N			44		02N	38	
1	23		04N			38		04N	42	
2	47		06N			38		06N	21	
3	19		1+ 02E			44		5+ 00N00E	26	
4	18		04E			38		02N	58	
5	18		06E			62		04N	38	
6	9		08E			44		06N	42	
7	9		10E			54				
8	9		12E			29				
9	8		14E			41				

Project # A-558
A. Schmidt

BARRINGER RESEARCH

Geochemical Laboratory Report

BARRINGER RESEARCH LIMITED
304 CARLINGVIEW DRIVE
REXDALE, ONTARIO, CANADA
PHONE: 416-677-2491
CABLE: BARESEARCH

DATE June 9/69.

Texas Gulf Sulphur Co.,
701-1281 West Georgia St.,
Vancouver 5, B.C.

YM Hazeldine

REPORT NUMBER 25-B

SAMPLE NUMBER	HCl Cu ppm		sample No.	HCl Cu ppm		sample No.	HCl Cu ppm		sample No.	HCl Cu ppm
CASS 175	5	2	CASS 200	47					221	10
6	6		1	6					2	9
7	7		2	7					3	8
8	6		3	6					4	10
9	5		4	7					5	12
180	7		5	11					6	13
1	7		6	17					7	15
2	9		7	67					8	13
3	13		8	62					9	12
4	13		9	105					230	9
190	17		210	90					1	11
1	21		1	39					240	13
2	17		2	38					1	10
3	30		3	32					2	8
4	13		4	54					3	9
5	17		5	19					4	10
6	25		6	23					5	13
may be contamin- 7 ated.	13		7	95					6	11
8	18		8	44					7	19
9	30		220	10					8	20

Geochemical Laboratory Report /

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~~16~~-B continued

Sample No.	Tot. Cu ppm									
CASS 249	30									
250	58									
1	48 ✓									
2	N.S.									

Project # A-558
A. Schmidt

BARRINGER RESEARCH LIMITED
304 CARLINGVIEW DRIVE
REXDALE, ONTARIO, CANADA
PHONE: 416-677-2491
CABLE: BARESEARCH

BARRINGER RESEARCH

Geochemical Laboratory Report

DATE June 10/69.

Texas Gulf Sulphur Co.,
701-1281 West Georgia St.
Vancouver 5, B.C.

Mt. Martley Area
7M Hazeldene

REPORT NUMBER 30-B

SAMPLE NUMBER	HCl Cu ppm	Bis Mo ppm		sample No.	HCl Cu ppm	Bis Mo ppm		sample No.	HCl Cu ppm	Bis Mo ppm
AJS 12	14	2		AJS32	15	2		JRF 8	17	2
13	17	2		3	16	3		9	19	3
14	16	2		4	14	4		10	24	2
15	14	2		5	15	3		11	25	3
16	14	3		6	14	4		12	15	3
17	14	3		7	18	3		13	13	2
18	13	2		8	16	2		14	21	2
19	15	2		9	18	2		15	16	6
20	17	2		40	21	2		16	7	5
1	16	4		1	18	3		17	7	3
2	14	1		2	75	2		18	14	3
3	8	2		3	71	1		19	13	7
4	15	2		4	67	16 *		20	15	4
5	N.S.	N.S.		JRF 1	90	8		1	18	2
6	14	2		2	16	6		2	18	3
7	14	2		3	13	4		CASS 258	14	2
8	11	2		4	43	12 *		9	15	3
9	7	2		5	23	8 *		260	13	2
30	13	2		6	19	3		1	13	2
1	8	2		7	18	3		2	15	2

Geochemical Laboratory Report

30-B continued

Sample No.	HCl Cu ppm	Bis Mo ppm		sample No.	HCl Cu ppm	Bis Mo ppm		sample No.	HCl Cu ppm	Bis Mo ppm
CASS 263	13	2		CASS 296	8	1		CASS 324	62	2
4	7	1		7	7	1		5	38	5
5	6	2		8	14	1		6	67	14
6	15	2		9	19	2		7	67	12
7	14	2		300	19	2		336	16	2
8	5	1		1	15	2		7	18	3
9	6	2		2	16	2		8	16	1
270	3	1		3	15	2		9	16	3
1	4	2		4	17	2		340	16	5
2	4	1		5	14	2		1	16	1
3	3	1		6	16	2		2	11	3
280	13	1		7	15	2		3	12	2
1	17	1		8	18	2		4	15	3
2	13	1		9	15	2		5	15	3
3	16	2		310	16	2		6	17	2
4	13	1		11	22	10		7	20	6
5	7	1		12	20	2		8	20	5
6	7	1		13	18	2		9	71	16
7	8	1		14	17	3		350	62	12
8	11	1		15	24	2		1	62	3
9	5	3		16	37	2		2	58	8
290	7	2		17	22	1		3	50	8
1	8	1		18	54	1		4	40	6
2	7	1		19	40	1		321	39	3
3	66	1		320	22	1				
4	13	1		322	32	6				
5	11	1		3	20	1				

Project # A-558
A.J. Sonmidt

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Geochemical Laboratory Report

BARRINGER RESEARCH LIMITED
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CABLE: BARESEARCH

DATE June 10/69.

Texas Gulf Sulphur Co.,
701-1281 West Georgia St.,
Vancouver 5, B.C.

REPORT NUMBER 34-B

Ym Hazeldene

SAMPLE NUMBER	HCl Cu ppm									
CASS 355	21									
6	21									
7	21									
8	21									
9	19									
360	19									
1	20									
2	26									
3	19									
4	44									
5	6									
6	11									
368	24									
9	29									
370	18									
1	23									
2	26									

LEGEND

INTRUSIVE ROCKS

TRIASSIC — 742 — 1 — BASIC, ULTRA BASIC ROCKS (GABBRO - PERIDOTITE - SERPENTINITE).

LOWER JURASSIC — GUICHON BATHOLITH ROCKS

744 — 2a — QTZ. MONZONITE - GRANITE

743 — 2b — QTZ. DIORITE - GRANODIORITE

743 1/2 — 2c — DIORITE

PERMIAN AND (?) EARLIER

CACHE CREEK GROUP

740 1/2 — 4 — LIMESTONE

734 1/2 — 5 — ARGILLITE, MINOR CHERT

742 1/2 — 6 — CHERT, MINOR ARGILLITE

751 — 7 — ANDESITE, IN PART SEDIMENT

737 — 7 — DACITE, IN PART SEDIMENT

735 1/2 — 8 — RHYOLITE

753 — 9 — QTZ.-SER-SCHIST, RHYOLITE SCHIST, PHYLLITE AND OTHER DYNAMIC METAMORPHICS

738 — 10 — AGGLOMERATE, TUFF ETC.

740 — 11 — MARBLE CANYON FORMATION: LIMESTONE, LIMESTONE BRECCIA, CHERT

UPPER TRIASSIC

NICOLA GROUP

738 1/2 — 12 — ANDESITE, FRAGMENTAL ANDESITE

756 — 13 — ARGILLITE, ARKOSE, GREYWACKE

741 — 14 — LIMESTONE

MIDDLE AND UPPER JURASSIC

745 1/2 — 15 — CONGLOMERATE, SANDSTONE, SHALE, LIMESTONE

MIOCENE

736 1/2 — 16 — COLDWATER GROUP - CONGLOMERATE, SST., ARKOSE, SHALE

739 — 17 — KAMLOOPS GROUP - BASALT, ANDESITE, RHYOLITE

SYMBOLS

GEOLOGICAL BOUNDARY (assumed)

60° BEDDING

45° SHEARING

80° JOINTS

FAULT (assumed)

A-36 OUTCROP, WITH INDENT NUMBER

Scale : ½ mile = 1 inch

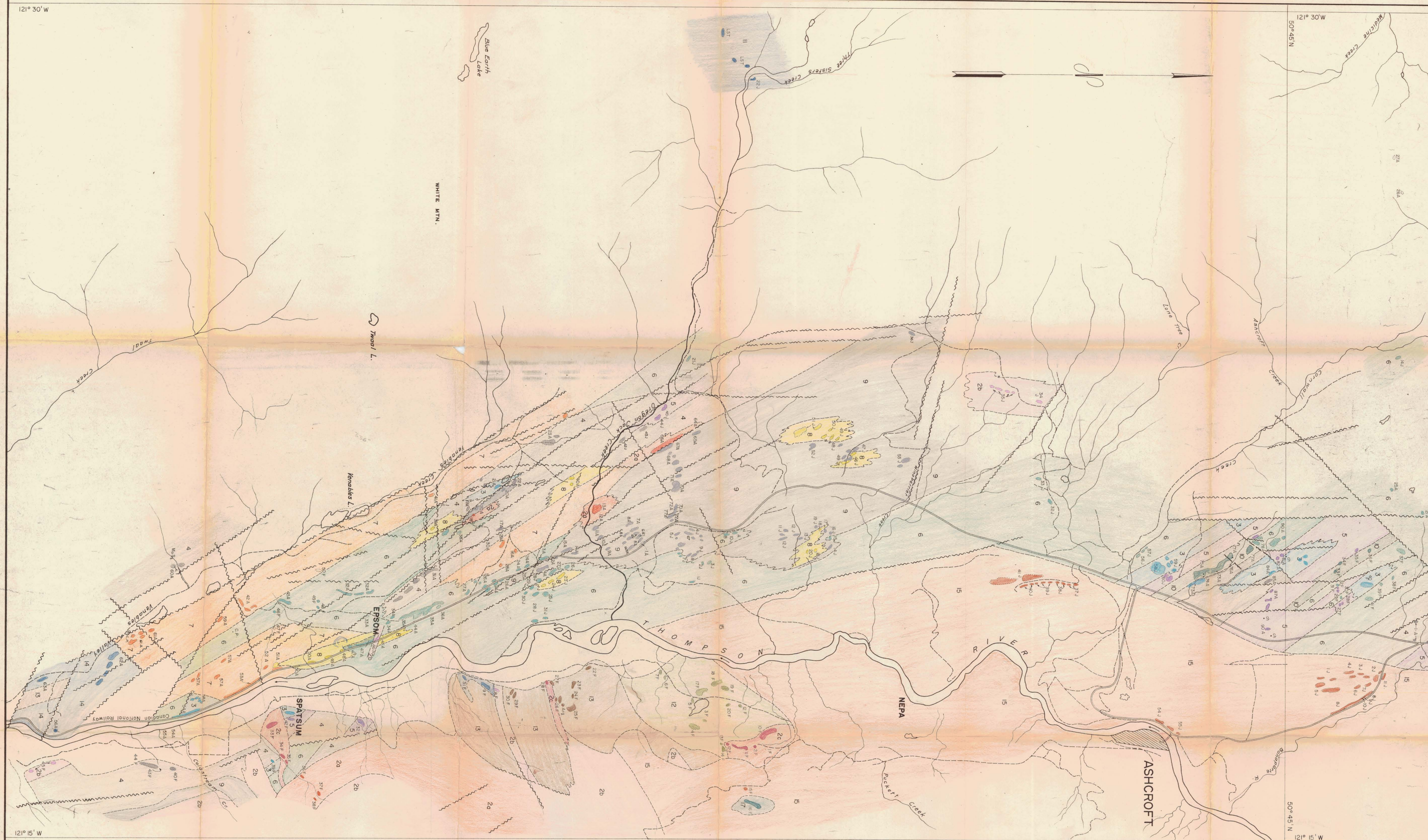
TEXAS GULF SULPHUR COMPANY

CLINTON – CACHE CREEK

GEOLOGY

NORTH HALF

Work by :	Drawn by :	Date :
J. FORSYTHE, J. FRASER & A.J. SCHMIDT	A.J.S. and C.D.	SEPTEMBER 1969



LEGEND

INTRUSIVE ROCKS

TRIASSIC
- 1 — BASIC, ULTRA BASIC ROCKS (GABBRO - PERIDOTITE - SERPENTINITE).

GUICHON BATHOLITH ROCKS

LOWER JURASSIC
- 2a — QTZ. MONZONITE - GRANITE
- 2b — QTZ. DIORITE - GRANODIORITE
- 2c — DIORITE

PERMIAN AND (?) EARLIER

CACHE CREEK GROUP
- 3 — LIMESTONE
- 4 — ARGILLITE, MINOR CHERT
- 5 — CHERT, MINOR ARGILLITE
- 6 — ANDESITE, IN PART SEDIMENT
- 7 — DACITE, IN PART SEDIMENT
- 8 — RHYOLITE
- 9 — QTZ.- SER - SCHIST, RHYOLITE SCHIST, PHYLLITE AND OTHER DYNAMIC METAMORPHICS
- 10 — AGGLOMERATE, TUFF ETC.
- 11 — MARBLE CANYON FORMATION: LIMESTONE, LIMESTONE BRECCIA, CHERT

UPPER TRIASSIC

NICOLA GROUP
- 12 — ANDESITE, FRAGMENTAL ANDESITE
- 13 — ARGILLITE, ARKOSE, GREYWACKE
- 14 — LIMESTONE

MIDDLE AND UPPER JURASSIC
- 15 — CONGLOMERATE, SANDSTONE, SHALE, LIMESTONE

MIOCENE
- 16 — COLDWATER GROUP - CONGLOMERATE, SST., ARKOSE, SHALE

MIOCENE
- 17 — KAMLOOPS GROUP - BASALT, ANDESITE, RHYOLITE

SYMBOLS
- GEOLOGICAL BOUNDARY (ASSUMED)
- 60° BEDDING
- 45° SHEARING
- 30° JOINTS
- FAULT (ASSUMED)
- 36A OUTCROP, WITH IDENT. NUMBER

Scale : 1/2 mile = 1 inch

TEXAS GULF SULPHUR COMPANY

CLINTON - CACHE CREEK

GEOLOGY

SOUTH HALF

Work by :	Drawn by :	Date :
J. FORSYTHE, J. FRASER, A.J. SCHMIDT	A.J.S. and C.D.	SEPTEMBER 1969