4405

GEOLOGICAL & GEOCHEMICAL REPORT

- on the -

S A L L U S   C R E E K   P R O P E R T Y

- for -

CANADIAN JOHNS - MANVILLE CO. LTD.

P. O. Box 1500,
ASBESTOS, P.Q.

COVERING:	Sallus	1 - 10, 15 & 17.
	Ace	7
	Hill	2 Fr.

LOCATED:
(1). 12 miles NE of Lillooet, B. C.
(2). NTS - 92 I/12 E. 13W
(3). 50^{o} 47' N, 121^{o}48' W.

PREPARED BY:

KERR, DAWSON & ASSOCIATES LTD.
#9 - 219 Victoria St.,
KAMLOOPS, B. C.

John R. Kerr, P. Eng.,

May 28th., 1973.

TABLE OF CONTENTS

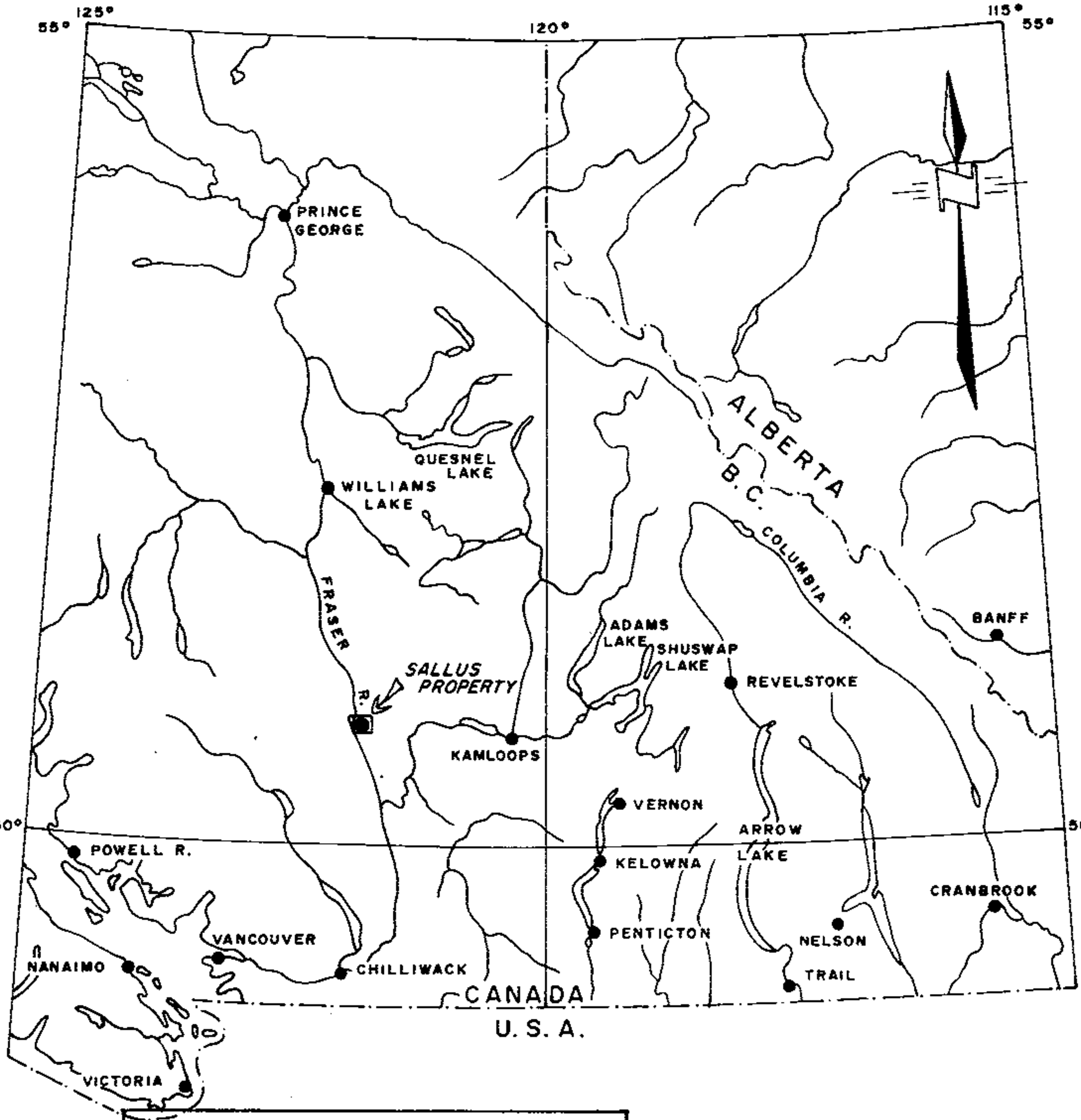
S U M M A R Y & C O N C L U S I O N S

During the period 1969 to the present, approximately 170 claims have been staked in the Sallus Creek area by crews of Canadian Johns Manville Co. Ltd. to cover Cu/Zn/Mo geochemical anomalies in a combined porphyry and contact metamorphic ore environment. Previous work on the claims includes regional soil sampling of the entire claim block, prospecting, regional and detailed mapping, detailed I. P. work and some limited diamond drilling.

Results of the regional sampling programme indicated four Cu or Cu/Mo geochemical anomalies in the vicinity of the forks of Sallus Creek, all associated with a large gossan area of disseminated pyrite and leached pyrite in a small diorite stock. The stock intrudes limestone and argillite of the Cache Creek Group. The 1973 field programme was completed to follow up these anomalies by detailed soil sampling and geological mapping.

A total of 507 "C" Horizon soil and talus fine samples were collected along preselected contours and analyzed for copper only. The results were statistically analyzed, and are presented in various anomalous classifications on the accompanying geochemical map. Results indicate one large anomaly, associated with the gossan zone and diorite stock. Two other smaller anomalies interpreted from the survey are of no consequence.

The size of the main anomaly is 3,500 ft. long by 2,000 ft. wide, with average values 200 - 250 ppm Cu, and ranging up to 480 ppm Cu. This would suggest an average content of copper in surface bedrock of 0.03 - 0.05%. Prospecting and detailed mapping of the zone substantiates the presence of copper in the rock by traces of native copper, malachite, and possibly chalcopyrite in unweathered diorite. Assays of this rock indicate 0.02 - 0.06% Cu.



Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 4405 MAP #1

CANADIAN JOHNS - MANVILLE CO. LTD. KAMLOOPS, B. C.		
LOCATION MAP SALLUS CREEK PROJ.406 LILLOOET MINING DIVISION BRITISH COLUMBIA		
Date: MAY 1973	Scale: 1" = 64 Miles	
Dwn by: WESTERN MAPPING	Dwg no. 406 - 1	

In conclusion, the field programme has indicated a substantially large alteration and copper enriched zone, with low grade copper values being indicated from geochemical analysis of talus and "C" horizon soils, and assays of surface bedrock. The only possibility of economic mineralization being present in the zone would be supergene enriched copper oxides or primary copper sulphides, underlying a totally leached surface capping. Further geochemical analysis on anomalous samples is required to determine the priority of drill testing to investigate the less oxidized and leached rock.

RECOMMENDATIONS

Further work programmes on the anomalous zone delineated by the 1973 and previous programmes, are oriented at testing the hypotheses that copper values are present below a totally leached capping. There are no specific targets available for immediate drilling, and as much of the target area is inaccessible, subsurface investigations will have to be a random sampling process. In order to establish a priority for drilling, the following geochemical analyses of anomalous samples are recommended:

(1). CxCu analysis should indicate the amount of copper present that originated from sulphides by comparison to the total Cu values.

(2). Hg and As analyses, as indicator metals, may assist in determining the strength of the possible underlying sulphide mass.

The most practical method of subsurface investigations would be a series of 10 - 15 percussion drill holes at 200 ft. intervals along the valley floor of Sallus Creek, over the full extent of the anomalous zone. Depth of drilling would be 200 - 300 ft., and would depend on the depth of the oxidized capping. Geochemical analysis of the cuttings of each 10 ft. section would be required to study changes in the content of copper with depth.

INTRODUCTION

This report is a supplement to three previous reports entitled "Geochemical Report on the Sallus Claims" by F. D. Forgeron, – #2376 February, 1970, "Geochemical Report on the Sallus Group of Claims" by – #3095 H. K. Conn and C. P. Lin, April, 1971, and "Geological Report on the Sallus Group of Claims" by K. Schrijver, July, 1971. Normal introductory remarks regarding location, access, topography, etc., are well documented in the earlier reports and are summarized below. The earliest report by Forgeron discusses several geochemical anomalies delineated from regional surveys over the entire Sallus Creek claim block. Four of these anomalies are associated with a large, intense gossan zone, located near the main forks of Sallus Creek. In June of 1971, Lin did some limited follow up of some of these anomalies, and in June of 1972, Schrijver completed some detailed geological investigations. All anomalies and results of previous programmes are discussed in the earlier reports. During the period of April 17th. - May 18th., 1973, a two man field crew sampled in detail all accessible portions of anomalous areas and prepared the accompanying geological map. This report summarizes the 1973 programme.

The Sallus group of claims are located 10 - 12 miles northeast of Lillooet, approximately 1 - 2 miles east of the Fraser River. The main portion of the claims blanket the ridge between Sallus Creek and Gibbs Creek. The portion of claims covered in this survey is the northwest corner of the claim block, at the forks of Sallus Creek. The area of this survey with respect to the claim block is shown in figure 406 - 2. Access into this area is possible via Highway #12, approximately one mile north of Sallus Creek, and thence along a dirt road for approximately one mile. A short traverse by foot up Sallus Creek leads to the center of the survey area.

Topography within most of the surveyed area is extremely precipitous, and traverses could only be completed where physically possible. Therefore, portions of the area remain unsampled and unmapped. Total relief within the area ranges from 1,900 ft. a. s. l. in Sallus Creek to over 4,000 ft. a. s. l. along the ridges. Elevations in other portions of the claims range up to 6,000 ft. a. s. l.

GEOLOGY

The regional geology of the Sallus Creek area is well documented by the G. S. C. Map Sheet 1010A, Geology of the Ashcroft Map Area, by S. Duffel and K. C. McTaggart, and by previous private publications by the staff of Canadian Johns Manville Co. Ltd. A portion of the claim area is documented in the B. C. Dept. of Mines Bulletin No. 44, Geology of the Fraser River Valley between Lillooet and Big Bar Creek, by Hans Peter Frettin, and accompanying map sheet.

The claim area is shown to follow the western contact of the Mt. Martley stock. The Mt. Martley stock can be described generally as a medium - coarse grained massive granodiorite, with local secondary silicification and sericitization near the contacts. Pervasive quartz veins and aplite dikes are also found near the contact. The stock intrudes sedimentary rocks of the Permian Cache Creek group which is subdivided into two main lithologies, limestone and argillite. The argillites have been locally subdivided and are discussed in detail below. Intense thermal alteration of the sediments is evident near the contact of the Mt. Martley stock. The limestone has been in part totally recrystallized, and could be classified as a marble. Intense pyritization of the argillites is present near the stock contacts, evidenced on surface by rust colouration and gossans. The Mt. Martley stock and Cache Creek group are truncated to the south by overlying and later Spences Bridge volcanic rocks.

The survey area was mapped in 1":400' scale detail by R. Willis, junior geologist with Canadian Johns Manville Co. Ltd. Results of the mapping are summarized on Figure 406 - 3. Control for mapping was geochemical sample stations, located by chain and altimeter methods.

Rocks underlying the survey area are mainly argillite and limestone of the Cache Creek sediments. A small plug of rusty, weathered and altered diorite and quartz diorite intrudes the sediments. This stock has a very irregular contact, approximately 3,000 ft. long by 2,000 ft. wide, and is probably genetically related to the Mt. Martley stock, one mile to the east. Pyrite is abundantly disseminated and smeared along fracture faces throughout the diorite. Very fine traces of native copper have been recognized in the highly weathered diorite. Schrijver describes chalcopyrite along fracture faces in unweathered diorite in the creek valley. This was not confirmed by myself or Willis; however, chalcopyrite may be part of sulphide masses, identified as tarnished pyrite.

The Cache Creek sediments have been subdivided into two main lithologies.

I. White and dark grey laminated, coarsely crystalline limestone and marble. The intensity of marble recrystallization is a direct result of thermal alteration from the stocks. Pyrite occasionally occurs in the limestone; however, is not as abundant as in other rocks.

II. Dominantly black fissile argillite, grading from a calcareous, graphitic argillite to a very siliceous argillite, referred to as a quartzite or chert. Fissility within the argillites is variable, and in part the rock has a very schistose texture. The fissility is probably related to folding resulting from the nearby intrusion of granitic stocks.

Late Tertiary diabase dikes up to ten feet wide intrude all rock types. Quartz-carbonate veins, with a high content of pyrite are commonly found in the marble and calcareous argillites.

Recent consolidated conglomerate, containing boulders and cobbles of all other rocks in the area have been mapped along the creek valley.

Economic mineralization is certainly not obvious in surface outcrop. Except for the fine traces of native copper in weathered diorite malachite stain in argillite, and possible chalcopyrite in unweathered diorite, no other economic minerals have been recognized. Assays of these rocks indicate very low content of copper, in the order of 0.02 - 0.06%. The presence of native copper and strong rust colourations are evidence of extreme and deep oxidation. It is very possible that any copper values that were in surface rock have been leached out, and may be found at depth. The most practical drilling method would be a series of percussion drill holes to depths of 200 - 300 ft. along the creek valley.

G E O C H E M I S T R Y

FIELD TECHNIQUES:

During the period of April 17th. - May 16th., 1973, a total of 21 field days were spent collecting 507 talus and "C" horizon soil samples from a large gossan area at the forks of Sallus Creek. All samples were collected along preselected 100 ft. contours, samples collected at 100 ft. intervals along each contour. Samples collected were identified S - to distinquish the project, 20 - to distinquish the contour (2,000 ft. contour), and numbered in sequence of collection along each traverse. Because of the extremely precipitous terraine, some of the area of interest could not be sampled.

Samples collected were either talus fines or "C" horizon soil samples. The talus samples were collected from surface or near surface of talus slopes. The soil samples were all collected from below a thin vegetation layer on steep slopes. The underlying soil was mainly of talus nature, and if soil horizons were present, they were well mixed. Therefore, most soil samples were either "B + C" or "C", and identified as such.

In addition to noting sample locations and proper coding of samples, notes were recorded regarding colour, texture, depth of sample, and general remarks. e. g. terraine, rock types, and noted mineralization. All samples were collected by Mr. J. Binnie, a capable and well experienced field technician.

ANALYTICAL TECHNIQUES:

All samples were packaged and submitted to the laboratories of Bondar - Clegg and Co. Ltd. in Vancouver, B. C. The samples were dried at 40^{o} - 50^{o} C. in infra - red ovens, and sieved to -80 mesh in Tyler screens. An aliquot of the -80 mesh fraction was digested in hot aqua regia to extract the copper, and the metal content of each sample was determined by atomic absorption methods at a detection limit of 1 ppm.

CLASSIFICATION OF DATA:

Although there had been previous geochemical sampling completed in this area, (1969 and 1970), it was difficult to tie-in the older sample location points to the recent survey. The old sample stations on the ground had become lost, or the writing was indistinquishable.

Therefore, it was decided not to include sampling from previous surveys, with the results of the 1973 programme.

A statistical analysis was completed on all results, treating all samples as one population. A cumulative frequency diagram was drawn on probability - log paper, and the best fit straight line was drawn. Deviation of individual plot points was negligible and therefore the two types of soil collected (talus or "C" Horizon) can be treated as one population. This fact would suggest that the vegetation covered soil on steep slopes in this area at Sallus Creek undergoes similar mechanical dispersion of Cu values as does talus slopes.

Another population grouping that was considered for statistical analysis was separate populations over various rock types. Two obvious populations were samples collected over diorite, versus samples collected over the sediments. However, relating the sample location map to the geology map, it is noticed that very few samples were collected over diorite. Any deviation on the cumulative frequency curve is likely caused by the various background content of copper in the two rock types.

The sample data were classified into the following anomaly categories:

Negative	o - b	0 - 89 ppm Cu
Possibly Anomalous	b - (b + s)	90 - 148 ppm Cu
Probably Anomalous	(b + s) - t	149 - 248 ppm Cu
Definitely Anomalous	> t	> 248 ppm Cu

where b - background
s - standard deviation
t - threshold, derived from 2nd. probit of cumulative frequency distribution.

PRESENTATION OF DATA:

Figure 406 - 4 shows the location of all sample points, and individual sample results with the following coding of anomalous categories:

- O - Negative
- ⊗ - Possibly Anomalous
- ◒ - Probably Anomalous
- ● - Definitely Anomalous

Anomalous zones are represented by interpreted contours of the various anomalous limits.

D I S C U S S I O N O F R E S U L T S

The 1973 field programme has adequately covered previously interpreted geochemical anomalies along Sallus Creek. Although the area could not be traversed in its entirety due to precipitous terraine, as thorough a surface programme as possible has been completed, and interpretation of results supplies sufficient information to make a worthwhile decision about this area of the property.

All of the samples are talus fines and/or "C" horizon soils, and for the purpose of statistical analysis have been classified as one population of sample type. Talus is a result of primarily mechanical dispersion of rock and metal values in rock, and values obtained from copper geochemical analysis should approximate the actual content of copper in surface bedrock. Therefore, in addition to considering the statistical interpretation of anomalies, emphasis must be placed on considering the absolute geochemical value of copper in each sample.

Three and possibly four anomalous targets were delineated from the geochemical survey. The two most western zones are small, and maximum values are 270 and 292 ppm Cu. On an absolute scale this reflects a possible content of 0.03% Cu in surface bedrock. These two anomalies are considered of no further interest.

The prime target of interest is the large anomaly associated with the heavily oxidized gossan area. An anomalous area to the southeast of this may be a fourth anomaly; however, insufficient sample locations make delineation of the anomaly in this direction not very accurate. Therefore, this fourth anomaly may in fact, be part of the large anomaly. Values of the samples from this anomaly range up to 480 ppm Cu, with average value being 200 - 250. This would indicate an actual content of 0.02 - 0.05% Cu in surface bedrock. Surface samples of leached diorite with pyrite and traces of native copper indicate 200 ppm Cu. This is comparable to talus fines sample results.

The overall dimensions of the gossan zone and interpreted geochemical anomaly are 3,500 ft. long by 2,000 ft. wide, certainly sufficient for a large tonnage porphyry deposit. The surface content of copper is not of economic interest, and no one area within the anomaly has been found to date that indicates any appreciable improvement of surface copper content. However, there is much evidence to indicate surface leaching of sulphides, which would suggest the possibility that copper bearing sulphides and/or a zone of supergene copper enrichment may exist below a totally leached surface capping.

Respectfully Submitted By:

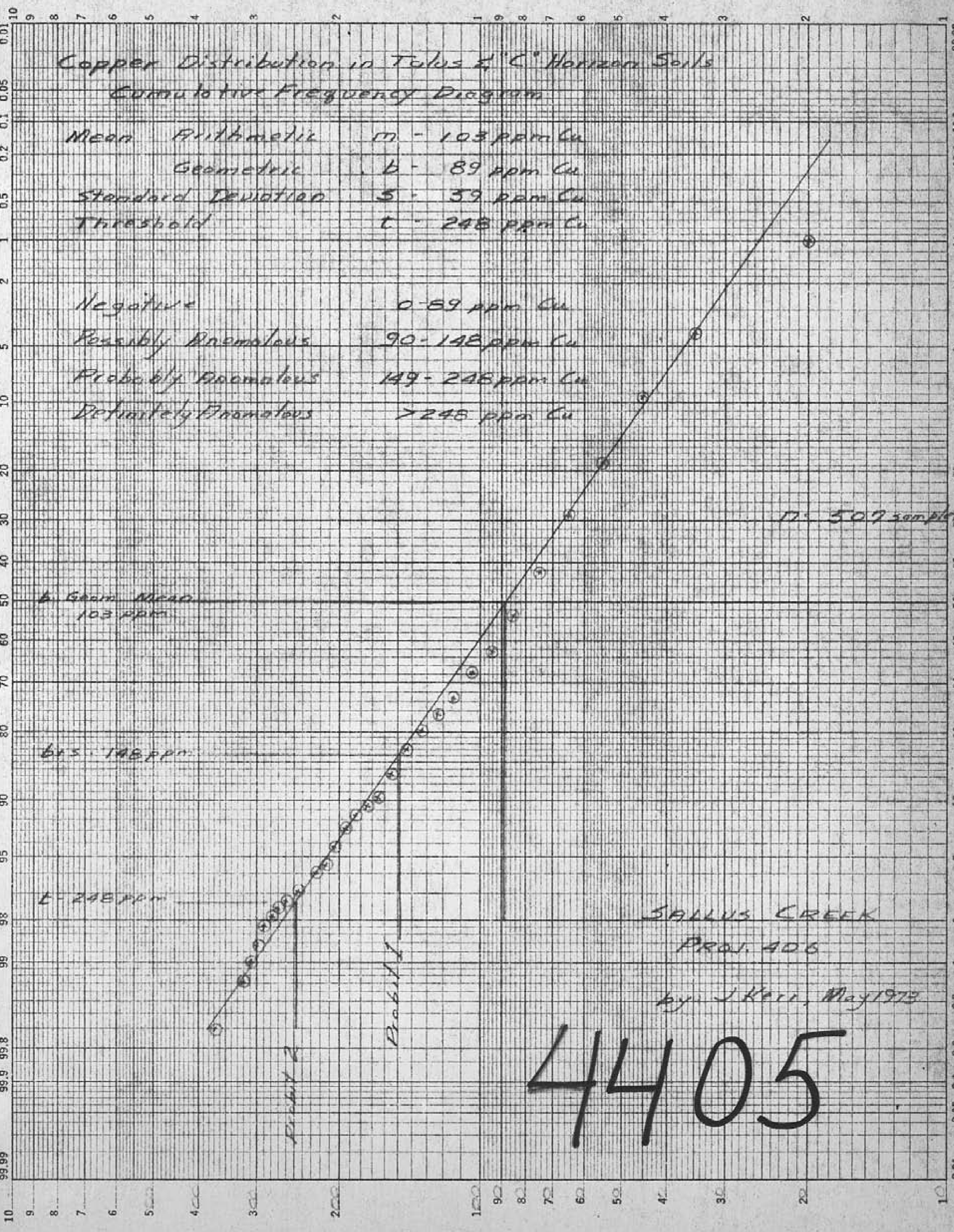
John R. Kerr

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
JOHN R. KERR

John R. Kerr, P. Eng.,
May 28th., 1973.

A P P E N D I X   A

CUMULATIVE FREQUENCY DIAGRAM


Copper Distribution in Talus & "C" Horizon Soils
Cumulative Frequency Diagram
Mean Arithmetic m - 103 ppm Cu
Geometric b - 89 ppm Cu
Standard Deviation s - 59 ppm Cu
Threshold t - 248 ppm Cu
Negative 0-89 ppm Cu
Possibly Anomalous 90-148 ppm Cu
Probably Anomalous 149-248 ppm Cu
Definitely Anomalous >248 ppm Cu
n - 507 samples
b Geom Mean 103 ppm
b+s - 148 ppm
t - 248 ppm
Probably 1
Probably 2
SALLUS CREEK
PROJ. 406
by: J Kerr, May 1973
4405
Cu ppm

A P P E N D I X   B

COST STATEMENT

STATEMENT OF COSTS

(1). FIELD PERSONNEL - April 17th. - May 16th., 1973.

J. Binnie - Sr. Field Assistant			
21 days at $40.00 per day	$	840.00	
R. Willis - Jr. Geologist			
17 days at $30.00 per day		510.00	
B. Dykeman - Assistant			
4 days at $25.00 per day		100.00	
J. Kerr - P. Eng. and Project Supervisor			
2 days at $100.00 per day		200.00	$ 1,650.00

(2). TRANSPORTATION

Rental 4 x 4 3/4 Ton Truck - 1 month at $375.00 per month	375.00

(3). ROOM AND BOARD

42 man days at $13.00 per man/day	546.00

(4). ANALYTICAL COSTS

490 soil samples analyzed geochemically for copper only and preparation @ $1.20 each	588.00

(5). INTERPRETATION AND REPORT PREPARATION

J. Kerr, P. Eng..	400.00	
Drafting	70.00	
Secretarial	20.00	
Photocopying and Reproduction	18.00	508.00
TOTAL HEREIN		$3,667.00

Certified Correct:

John R. Kerr

John R. Kerr, P. Eng.

PROFESSIONAL PROVINCE OF JOHN R. KERR BRITISH COLUMBIA ENGINEER

A P P E N D I X   C

WRITER'S CERTIFICATE

JOHN R. KERR, P.ENG.
GEOLOGICAL ENGINEER

9 – 219 VICTORIA STREET
KAMLOOPS, B.C.

PHONE (604) 374-6427

WRITER'S CERTIFICATE

I, JOHN R. KERR, OF KAMLOOPS, B. C. HEREBY CERTIFY THAT:

(1). I am a member of the Association of Professional Engineers in the Province of British Columbia, and a Fellow of the Geological Association of Canada.

(2). I am employed by Kerr, Dawson & Associates Ltd.,with my office at #9 - 219 Victoria Street, Kamloops, B. C.

(3). I have practiced as a geologist for 9 years since graduation from the University of British Columbia in 1964 with a B. A. Sc. in Geological Engineering.

(4). I have no direct interest or holdings of securities of Canadian Johns - Manville Co. Ltd., or in the Sallus claims described in this report.

(5). The work described in this report was completed from April 17th. - May 18th., 1973, and was supervised directly by myself.

(6). The costs, as shown in Appendix B of this report, are to the best of my knowledge, correct.

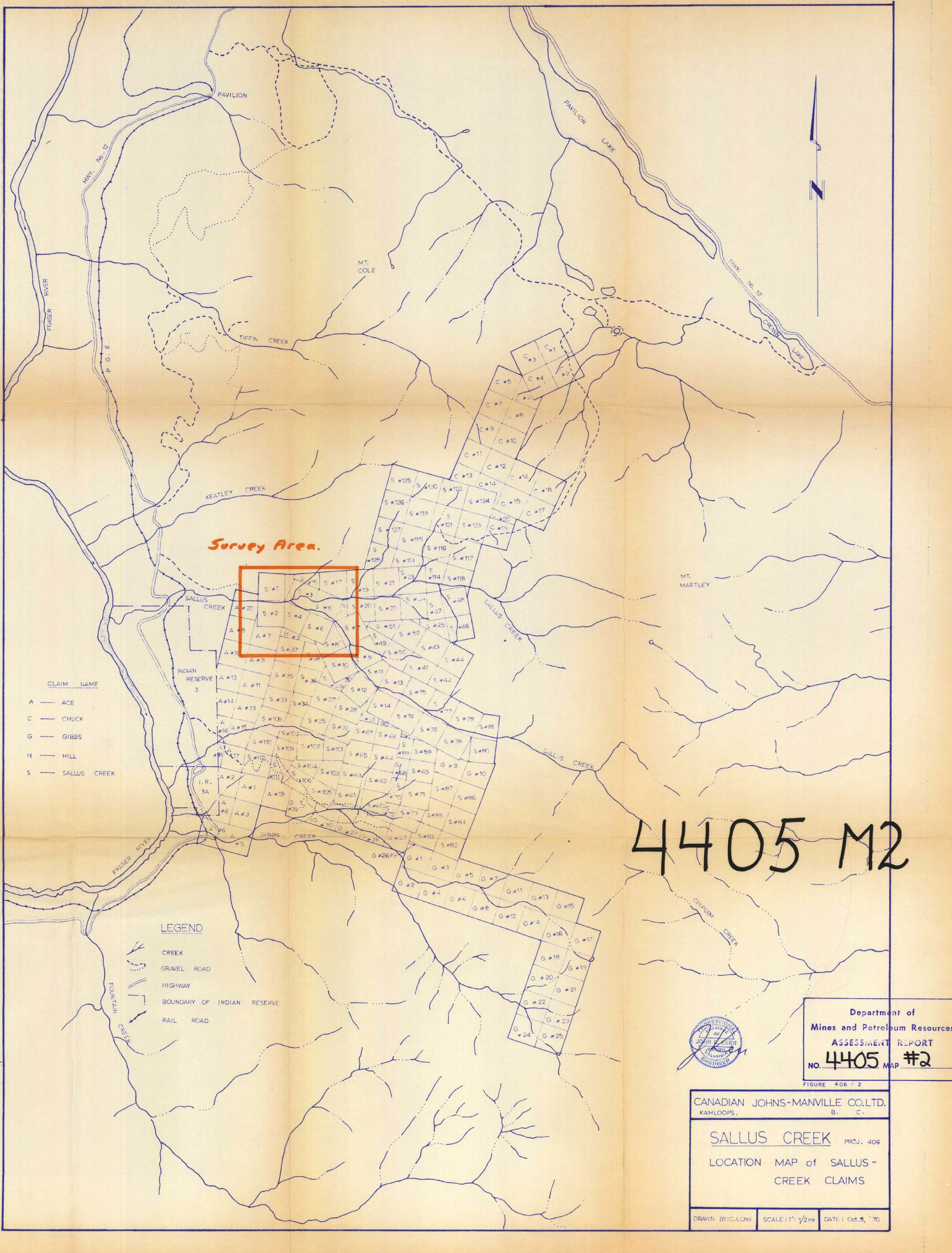
(7). This report is based on published and unpublished data, my own personal knowledge of the area, and the field data collected during the field programme.

John R. Kerr

John R. Kerr, P. Eng.

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
JOHN R. KERR

May 28th., 1973,
KAMLOOPS, B. C.



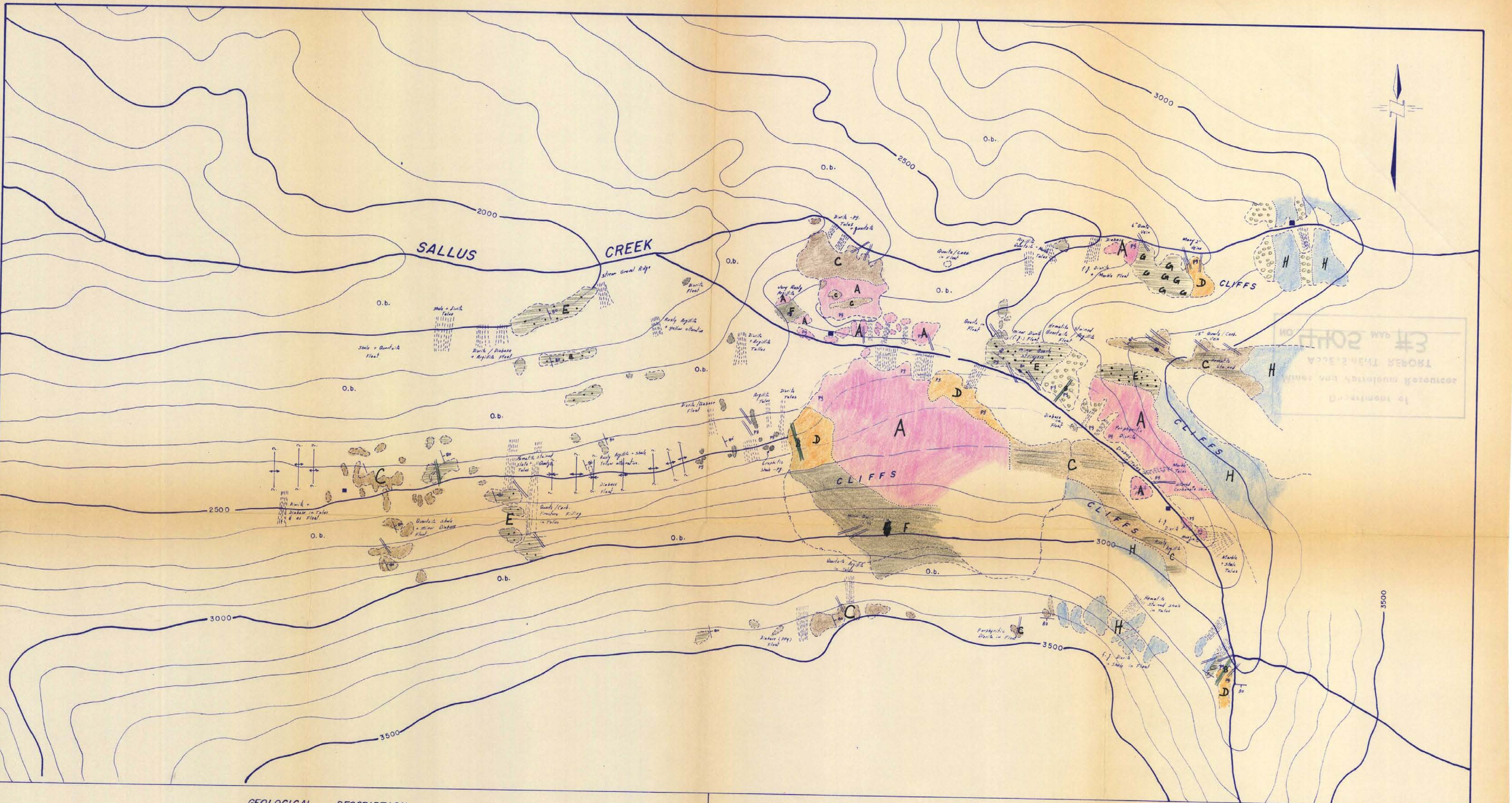
SALLUS
1 to 24
~~24~~ ~~14, 15, 17, 19~~
~~8~~ ~~20 to 24~~,
32 60 to 91,
10 119 to ~~124~~ 128
66
51

Sallus Creek
6 25 to 30,
18 33 to 38, 41 to 52,
15 104 to 118
39

10 GIBBS 1 to 30
26 to 29 ~~[illegible]~~

HILL 1 Fr., 2 Fr.

CHUCK 1 to 16,
19, 20



GEOLOGICAL DESCRIPTION

Rocks occuring in both forks of Sallus Creek consist of all rocks indicated by map units as well as quartz monzonite of the Mount Hartley Stock. Pyrite occurs in most of the rock types, however seems to increase closer to the diorite intrusive exposure. Exposure of these intrusive probably occurs above 3500 ft. on the ridge south of Sallus Creek (as well as where shown on the map), since diorite porphyry and diabasic rock were found in float at 3400 ft. contour. No alteration minerals of copper were found but a yellow mineral found on cleavage planes of shale may be indicative of possible sulphide leaching. No alteration was found adjacent to the quartz - Carbonate veins, however minor pyrite was found to exist as disseminated particles within the veins. Pyrite was found to be concentrated along cleavage planes in several variations of argillite and shale of outcrops located in the North Sallus fork. The conglomerate contains rounded and angular fragments (1" - 6" in diameter) of argillite, shale, graphitic shale, quartzite and f.g. diorite. The rock unit denoted as shale may be called a phyllite or schist in some areas, however these occur only locally and thus have been included as shale. Leaching is taking place at the present in the south fork - limestone is being leached and carbonates deposited around fragments of recent stream sediments.

ROCK CLASSIFICATION

A	DIORITE - Fine Grained & Porphyritic
B	DIABASE DIKE INTRUSIONS
C	QUARTZITE
D	CALCAREOUS ARGILLITE
E	SHALE Siliceous & Schistose in part
G	GRAPHITIC SHALE
F	ARGILLITE
H	MARBLE -White & Black Laminated
	CONGLOMERATE - *RECENT ?*

C to H: CACHE CREEK GROUP

LEGEND

- STRIKE & DIP of BEDDING
- ATTITUDE of QUARTZ / CARBONATE VEINS
- TALUS SLOPE
- OUTCROP BOUNDARY ; EXISTENCE UNCERTAIN
- CONTACT within MAP UNITS
- Py PYRITE OCCURENCE
- O.b. OVERBURDEN
- CLAIM POST
- QUARTZ / CARBONATE VEINS

4405 M3

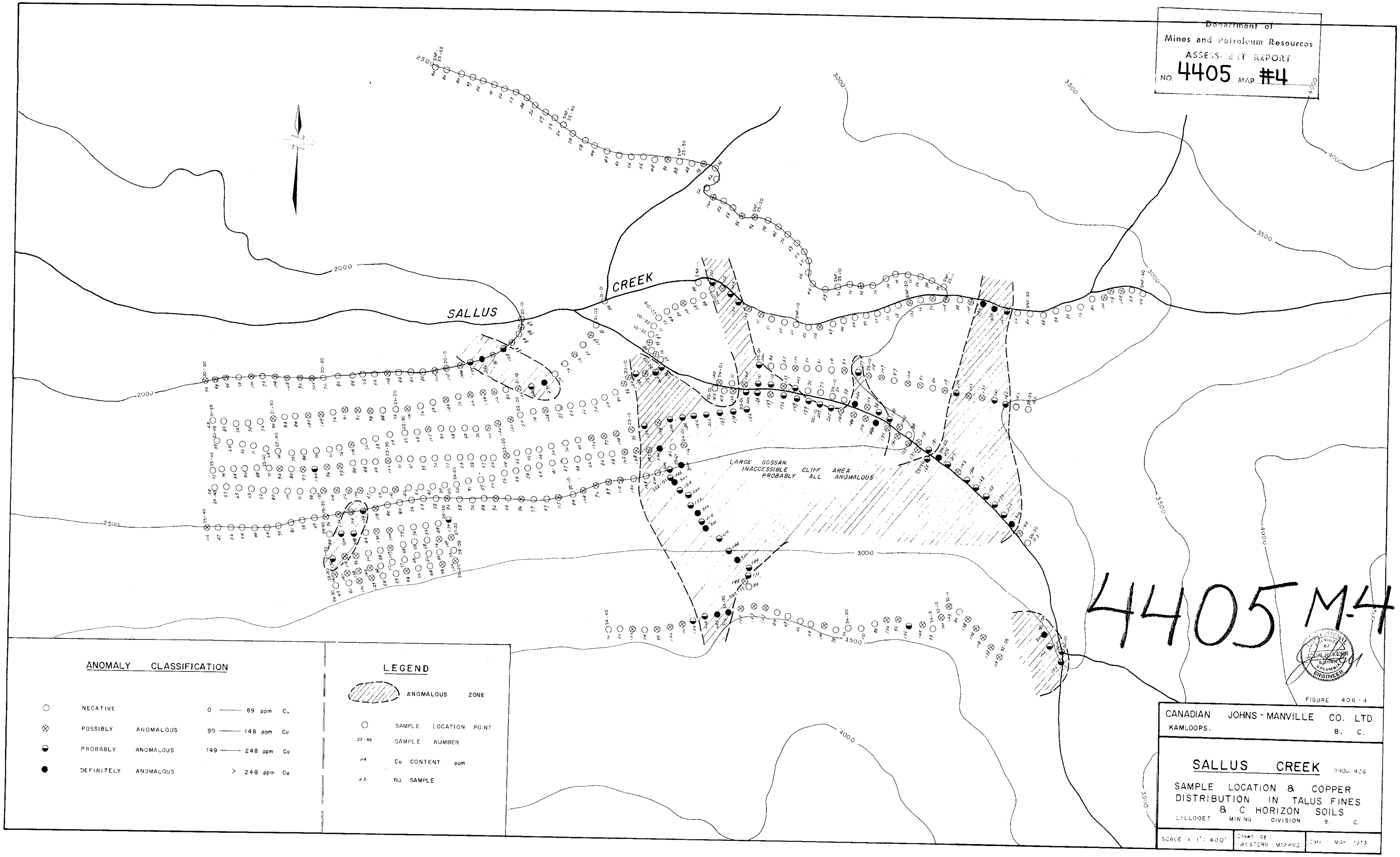
FIGURE 406 - 3

CANADIAN JOHNS-MANVILLE CO. LTD.
KAMLOOPS. B. C.

SALLUS CREEK PROJ. 406
(SALLUS FORKS GOSSAN AREA)

GENERAL GEOLOGY & TOPOGRAPHY

SCALE : 1" : 400'	Drawn by : WESTERN MAPPING	Date : MAY 1973



Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 4405 MAP #4
4405 M-4
SALLUS
CREEK
LARGE GOSSAN
INACCESSIBLE CLIFF AREA
PROBABLY ALL ANOMALOUS
2000
2500
3000
3500
4000
ANOMALY CLASSIFICATION
NEGATIVE 0 — 89 ppm Cu
POSSIBLY ANOMALOUS 90 — 148 ppm Cu
PROBABLY ANOMALOUS 149 — 248 ppm Cu
DEFINITELY ANOMALOUS > 248 ppm Cu
LEGEND
ANOMALOUS ZONE
SAMPLE LOCATION POINT
23-45 SAMPLE NUMBER
84 Cu CONTENT ppm
N.S. NO SAMPLE
FIGURE 406-4
CANADIAN JOHNS-MANVILLE CO. LTD.
KAMLOOPS, B. C.
SALLUS CREEK PROJ. 406
SAMPLE LOCATION & COPPER
DISTRIBUTION IN TALUS FINES
& C HORIZON SOILS
LILLOOET MINING DIVISION B. C.
SCALE 1" : 400'
Drawn by: WESTERN MAPPING
DATE: MAY 1973