

774

COMINCO LTD.

TRAIL, B.C.

GEOCHEMICAL SURVEY REPORT ON THE  
PINCHI NO. 1 CLAIM GROUP, PINCHI LAKE AREA  
OMINECA, M.D.

(SE QUADRANT 54°, 124°)

The Pinchi No. 1 claim group is located 5 miles northeast of Fort St. James, B.C. The following is a list of claims comprising the Pinchi No. 1 claim group and indicates the amount of assessment credit requested on each claim:

<u>Claim</u>	<u>Record No.</u>	<u>Requested Assessment Credits</u>	<u>Total</u>
<u>Pinchi No. 1 Group:</u>			
Wilmar 1-6	31679-31684	1 year each claim	6
Mar 1-20	30356-30375	1 year " "	20
			<u>26 years</u>

Work was carried out on the above claims during the period from August 29 - September 17, 1965.

REPORT BY  
D.W. HEDDLE  
PROFESSIONAL ENGINEER

DWH:ss  
May 25, 1966

GEOCHEMICAL SURVEY REPORT ON THE  
PINCHI NO. 1 CLAIM GROUP, PINCHI LAKE AREA  
OMINECA, M.D.

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1965 GEOCHEMICAL SURVEY EXPENDITURES  
PINCHI NO. 1 CLAIM GROUP (MAR AND WILMAR CLAIMS)  
PINCHI LAKE AREA, OMINECA M.D.

SALARIES

1 Exploration Geologist (L.M. Azzaria) soil analysis and supervision for 20 days (August 29 - September 17) at \$45/day	\$ 900
2 Field Assistants (E.W. Batchelor and G. E. Paulus) for 18 days (August 29 - September 14) at \$30/man-day	1,020
1 Senior Exploration Geologist (D.W. Heddle, P. Eng.) supervisory trip for 3 days @ \$60/day \$ 180 Report preparation 2 days @ 60/day <u>120</u>	300

EQUIPMENT

Rental of Lemaire mercury detector for 19 days at \$10/day	190
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TRANSPORTATION

Truck rental 18 days @ \$400/month	<u>240</u>
TOTAL:	\$ <u>2,650</u>

D. W. Heddle  
D. W. Heddle  
Professional Engineer

Endorsed by:

G. Hamson  
G. Hamson  
Branch Accountant

This is Exhibit "A" to the Statutory Declaration of D.W. Heddle, declared before me the 26<sup>th</sup> day of May A.D. 1966.

[Signature]  
A Commissioner for taking Affidavits for the Province of British Columbia.

CANADA ) STATUTORY DECLARATION RELATING TO EX-  
PROVINCE OF BRITISH COLUMBIA ) PENDITURES ON A GEOCHEMICAL SURVEY OF  
TO WIT: ) CERTAIN MINERAL CLAIMS THE PROPERTY OF  
COMINCO LTD.

I, DUNCAN W. HEDDLE, Professional Engineer, of the  
City of Trail, in the Province of British Columbia, DO SOLEMNLY DECLARE:

1. That I am the person who prepared a geochemical report as the result of surveys carried out of certain mineral claims, the property of Cominco Ltd., situated in Omineca Mining Division.
2. That copies of the said report are being filed with the Mining Recorder in Smithers.
3. That attached hereto and marked with the letter "A", upon which I have signed my name at the time of declaring hereof, is a statement of expenditures incurred in connection with the geochemical survey of the said claims showing in addition the dates during which those making the said survey performed their work.

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  
Municipality of Tadanac, in  
the Province of British  
Columbia, this 26<sup>th</sup> day of  
A.D. 1966.

D. W. Heddle

  
A Commissioner for taking Affidavits for British Columbia

GEOCHEMICAL SURVEY REPORT ON THE  
PINCHI NO. 1 CLAIM GROUP, PINCHI LAKE AREA  
OMINECA M.D.  
(54° 124° SE)

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SUMMARY

A total of \$2,650 was expended on the geochemical survey of the Pinchi No. 1 Claim Group. It is requested that \$2,600 of this amount be applied as assessment credit on claims of the Pinchi No. 1 Group. An Application for Certificate of Work has been filed with the Mining Recorder at Smithers, B.C.

The following is a list of the claims in the Pinchi No. 1 Claim Group and shows the amount of assessment work to be credited to each claim:

<u>Claims</u>	<u>Record No.</u>	<u>Requested Assessment Credit</u>	<u>Total</u>
<u>Pinchi No. 1 Group:</u>			
Wilmar 1-6	31679-31684	1 year each claim	6 years
Mar 1-20	30356-30375	1 year " "	20 "
			<u>26 years</u>

INTRODUCTIONGeneral

From July to September 1965 geochemical (mercury detector) surveys were carried out in the general Pinchi Lake area. Emphasis was placed on the coverage of mineral claims overlying the Pinchi fault zone. Part of the survey included the Pinchi No. 1 Group from which samples were collected and analyzed for mercury content.

The immediate area along the Pinchi fault zone is known to be favorable for the occurrence of mercury mineralization. At least 15 cinnabar deposits have been found along the Pinchi fault and of these, two have been economically mined. A mantle of overburden which covers extensive areas of the Pinchi fault zone is a big detriment to prospecting for additional deposits. Therefore, in order to assess the area in terms of its mercury potential, methods other than conventional prospecting must be employed. This geochemical survey was made on the basis that the mercury content of soils would indicate areas in which to localize more intensive geochemical or geophysical coverage or even targets which would warrant drilling or trenching.

Our work with the Lemaire mercury detector was, to some extent, experimental. Little or no information was available with respect to the best soil horizon or depth to sample. We had no idea of what contamination might have resulted from the former reduction plant operation at the Pinchi Lake Mine or how widespread such contamination might be. The Lemaire detector in its present form does not distinguish between metallic mercury in the soil (halo effect) or possible cinnabar particles in the soil which may have been transported over considerable distances. We are currently conducting laboratory studies in an attempt to clarify some of the unknown factors which might aid in interpreting survey results. These studies will include experiments pertaining to the mode of occurrence of metallic mercury in soils and the nature of soil fractions which might provide the best and consistent conditions for concentration. Post-doctorate research work along the general lines described above is now being done under Cominco sponsorship by Dr. L.M. Azzaria at McGill University.

The survey was done during the period from August 29, 1965 to September 17, 1965 under the supervision of D. W. Heddle (U.B.C. 1949) Cominco Senior Exploration Geologist and registered B.C. Professional Engineer. Field supervision and analyses were carried out by Dr. L.M. Azzaria (Ph.D. Geological Sciences, Toronto). Dr. Azzaria did post-doctorate work at the University of California, Berkley, under H.E. Hawkes, one of the foremost authorities in the development of mercury detector work. E.W. Batchelor and G.E. Paulus, third year Geology students assisted Azzaria in the field work.

#### Location and Access

Claim of the Pinchi No. 1 Group are located 5 miles NW of the village of Fort St. James. The claims straddle the Fort St. James - Pinchi Lake highway. The southeast end of the claim group adjoins the Indian Reserve which is accessible by a secondary road leading from the Fort St. James - Pinchi Lake highway.

#### GENERAL GEOLOGY

The claim group lies along the position of the Pinchi fault zone extending southeasterly from the south shore of Pinchi Lake. The claims are entirely drift covered and the exact position of the fault zone can only be inferred.

In general, the northeastern margin of the Pinchi fault zone represents the contact between closely folded stratified Permian rocks on the southwest and Mesozoic formations and Jura-Cretaceous Omineca granitic intrusions on the northeast. It seems probable that the fault zone marks the site of major thrust-faulting from the southwest and that Permian rocks have moved up with respect to the Mesozoic formations. Intense faulting occurs in the Permian rocks within the fault zone. There, the more important faults trend north and northwest and dip steeply west and southwest.

The orebodies at the Pinchi Mine and numerous smaller mercury deposits occur along the Pinchi fault zone in sheared and brecciated Permian limestones or in carbonatized serpentine.

The Pinchi No. 1 claim group lies along the general inferred position of the Pinchi fault zone. As the claim area is entirely covered by overburden the geology on the claims must be left open to interpretation. To the northeast on the footwall side of the Pinchi fault it is inferred that the claims are underlain by volcanics of the Takla Group. To the southeast, on the hangingwall side of the fault, it is inferred that Permian limestones of the Cache Creek group underlie the mantle of overburden.

#### EQUIPMENT AND PRINCIPLE OF OPERATION

The high volatility of mercury and the association of small amounts of mercury with many sulphide deposits has suggested that extensive mercury halos may exist around sulphide deposits. The halo developed from mercury deposits should be particularly amenable to detection by soil analyses. Our Lemaire mercury detector technique, with a sensitivity (5 parts per billion), well below the average abundance of mercury in rocks and soils, can be used to detect the small amounts of mercury that may indicate hidden ore deposits.

The Lemaire detector works on a basically simple principle. The mercury contained in the sample is vaporized in a closed chamber by a heat source which may consist of a torch or small furnace. The mercury vapor is drawn into a light chamber which houses an ultra-violet light. The reading obtained from a microammeter is a measurement of the amount of light absorbed by the mercury vapor which is proportional to the amount of mercury in the sample.

A modification was made to the standard Lemaire detector by L.M. Azzaria, J.M. Bryan, A.R. Allen and R. Wilson of the Cominco Technical Research Center and the Instrument Shop at Trail, B.C. Commercially available detectors are sensitive to several specific substances as well as to smoke and dust in general. The Cominco modification consisted essentially of the addition of a gold wire filter in the vapor circuit by means of which the mercury was

trapped on the gold and contaminating vapors were expelled.

The operation of the modified Lemaire detector essentially consists of two steps. In the first step the sample is heated by a small electric furnace at 800° - 900° C and the mercury is vaporized and collected on the gold filter, while interfering vapors are exhausted. In the second step the gold is heated by a second electric furnace to re-vaporize the mercury which is then pulled into the ultra-violet light chamber.

#### PROCEDURE IN SAMPLING AND ANALYSIS

Location of samples was controlled by chain and compass survey. On the Pinchi No. 1 group samples were generally taken at 500' intervals along the claim location line and at 1,000' intervals along lines 1,000' on either side of the location line. More detailed sampling was done along several sections of the location line.

The soil development varies considerably from one locality to another within the general Pinchi Lake area. The A and B soil horizons are usually confined to within a foot of the surface and are followed by unmodified glacial material. The initial samples were taken below the A1 horizon generally at a depth of 6" to 12" below the surface. In some cases deeper resampling was done to check high readings indicated in the initial survey.

Analyses were done in a field laboratory in Fort St. James. Samples were allowed to dry at room temperature as drying at higher temperatures would cause the loss of some mercury. The dry samples were sieved to - 100 mesh size. A one gram sample of the -100 mesh fraction was then processed in the modified Lemaire mercury detector as described in the preceding section of this report. The detector reading was then referred to a standard curve to obtain the mercury content of the sample expressed in parts per billion (ppb).

In this survey all samples yielding 70 ppb or less were considered to be normal for the area or within the background range. Samples yielding more than 70 ppb mercury are considered to be anomalous.

Readings expressed in parts per billion are plotted on a 1" = 1/4 mile plan and have been contoured where applicable. In contouring the mercury content of the soils only the results from the initial sampling (at a depth of one foot or less) were considered. In areas where information is sparse, contouring is open to various interpretations.

#### RESULTS

Results of the geochemical survey on the Pinchi No. 1 claim group are shown on Plate PL 10. The initial survey indicated several anomalous areas on the Pinchi No. 1 claim group. It should be noted here that contouring represents only the values from the initial sampling (at a depth of one foot or less). As indicated on Plate PL 10 swampy conditions prevail in the vicinity of the claim area. A number of samples taken, particularly in the central part of the claim group, were made up entirely of organic matter and those ran gave very erratic results. Our analysis procedure in 1965 was not adequate to satisfactorily run such samples.

Towards the end of the field season a number of the stronger anomalies indicated on the Pinchi No. 1 Group were resampled at a greater depth (1'-2 1/2'). Most of the analyses from the resampled locations were done in Trail at the end of the season. Results of the deeper sampling indicate values generally below the background range of 70 ppb. Although the apparent conflicting results between the shallow and the deeper sampling tend to discredit the validity of the original anomalies, one cannot overlook the possibility that they might have some significance.

Perhaps the high values obtained in the shallower sampling results from surface contamination by "fallout" from the former reduction plant operation at the Pinchi Mine although it is not clear why contaminating material would not be more uniformly distributed. If our results can be attributed to contamination from the plant,

perhaps the erratic pattern may have resulted from the selective absorption of contaminating vapors in the atmosphere by certain types of vegetation. Another consideration might be that anomalies are caused by erratically distributed particles of cinnabar in the soil fraction rather than by metallic mercury dispersed as a halo. Current research by Cominco is aimed at making a distinction between mercury contained in soils as the native element and that possibly driven off from cinnabar during the analysis process.

On the other hand the apparent conflicting results between the shallow and deeper sampling may be brought about by some poorly understood mechanism which concentrates mercury from an underlying deposit only in the upper soil horizon, leaving the deeper soils somewhat deficient in mercury. If such a mechanism does exist, the anomalies indicated in our shallower sampling are meaningful and warrant further detailed investigation.

More detailed work is necessary to arrive at possible answers to problems in this type of survey. It is recommended that the anomalous areas be covered by more detailed sampling (possibly on a 100-foot grid). Samples should be collected from both the A soil horizon and from depths of one to two and one-half feet. If either type of sampling gives a systematic pattern of anomalies, stripping or drilling would be warranted as an ultimate test.

ATTACHMENTS:

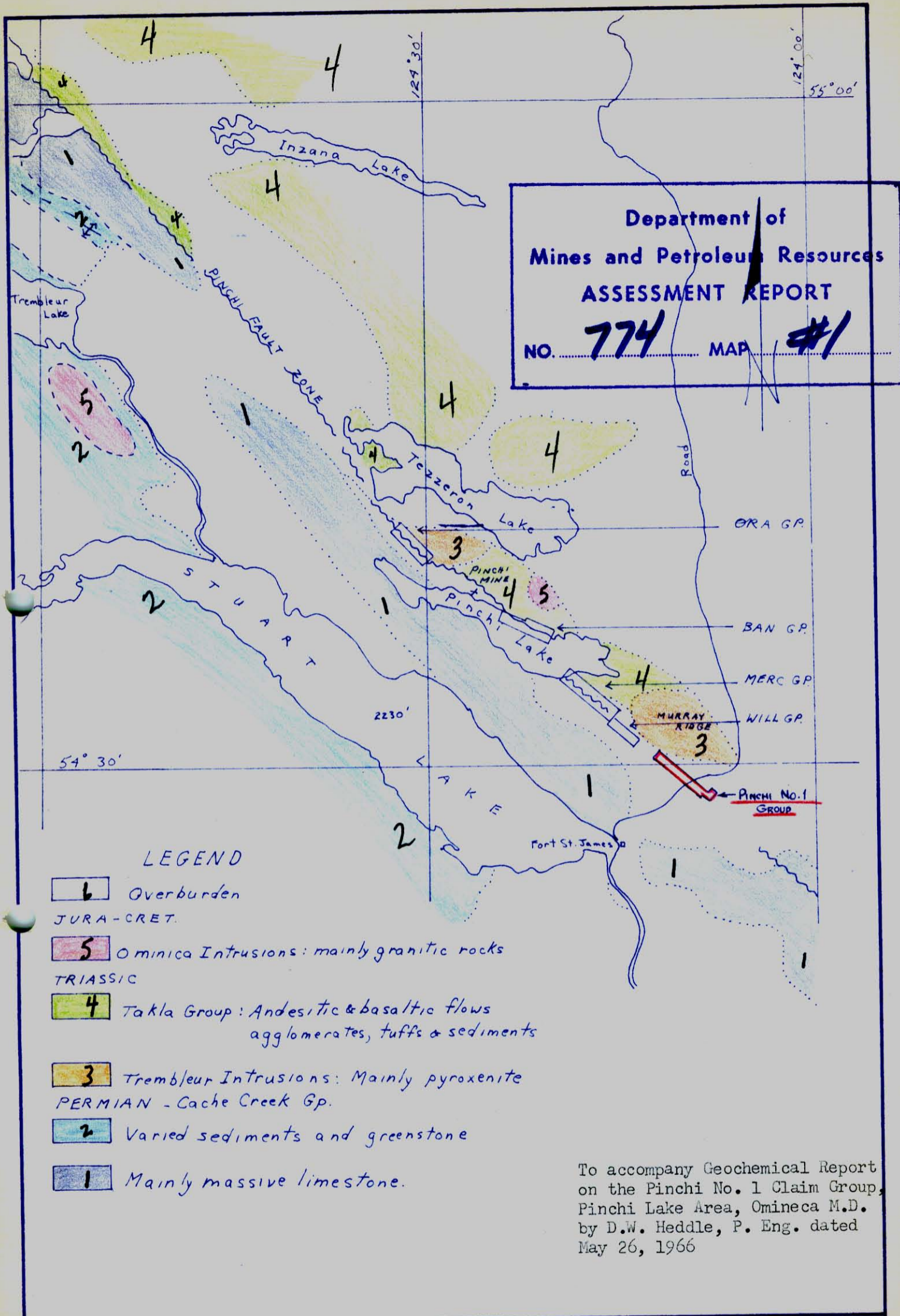
- (1) Plan - Pinchi Lake Area - General Geology and Claim Location, Scale 1" = 6 mi. Plate PL-14.
- (2) Plan - Geochemical Survey - Pinchi No. 1 Claim Group, Scale 1" =  $\frac{1}{4}$  mi, Plate PL-10.
- (3) Statement of Expenditures.
- (4) Statutory Declaration relating to Expenditures.

Report by: D. W. Heddle  
D.W. Heddle  
Professional Engineer

DWH:ss  
Trail Expl'n Office, Western District  
May 26, 1966

Distribution: Mining Recorder (Smithers) (2)  
Western Expl'n, Trail (2)





**Department of  
Mines and Petroleum Resources**  
**ASSESSMENT REPORT**  
 NO. **774** MAP **#1**

**LEGEND**

- 6 Overburden
- JURA-CRET.
- 5 Omineca Intrusions: mainly granitic rocks
- TRIASSIC
- 4 Takla Group: Andesitic & basaltic flows  
agglomerates, tuffs & sediments
- 3 Trembleur Intrusions: Mainly pyroxenite
- PERMIAN - Cache Creek Gp.
- 2 Varied sediments and greenstone
- 1 Mainly massive limestone.

To accompany Geochemical Report  
on the Pinchi No. 1 Claim Group,  
Pinchi Lake Area, Omineca M.D.  
by D.W. Heddle, P. Eng. dated  
May 26, 1966

**The Consolidated Mining and Smelting Company of Canada Limited**

DRAWN BY:		TRACED BY:	
REVISED BY	DATE	REVISED BY	DATE

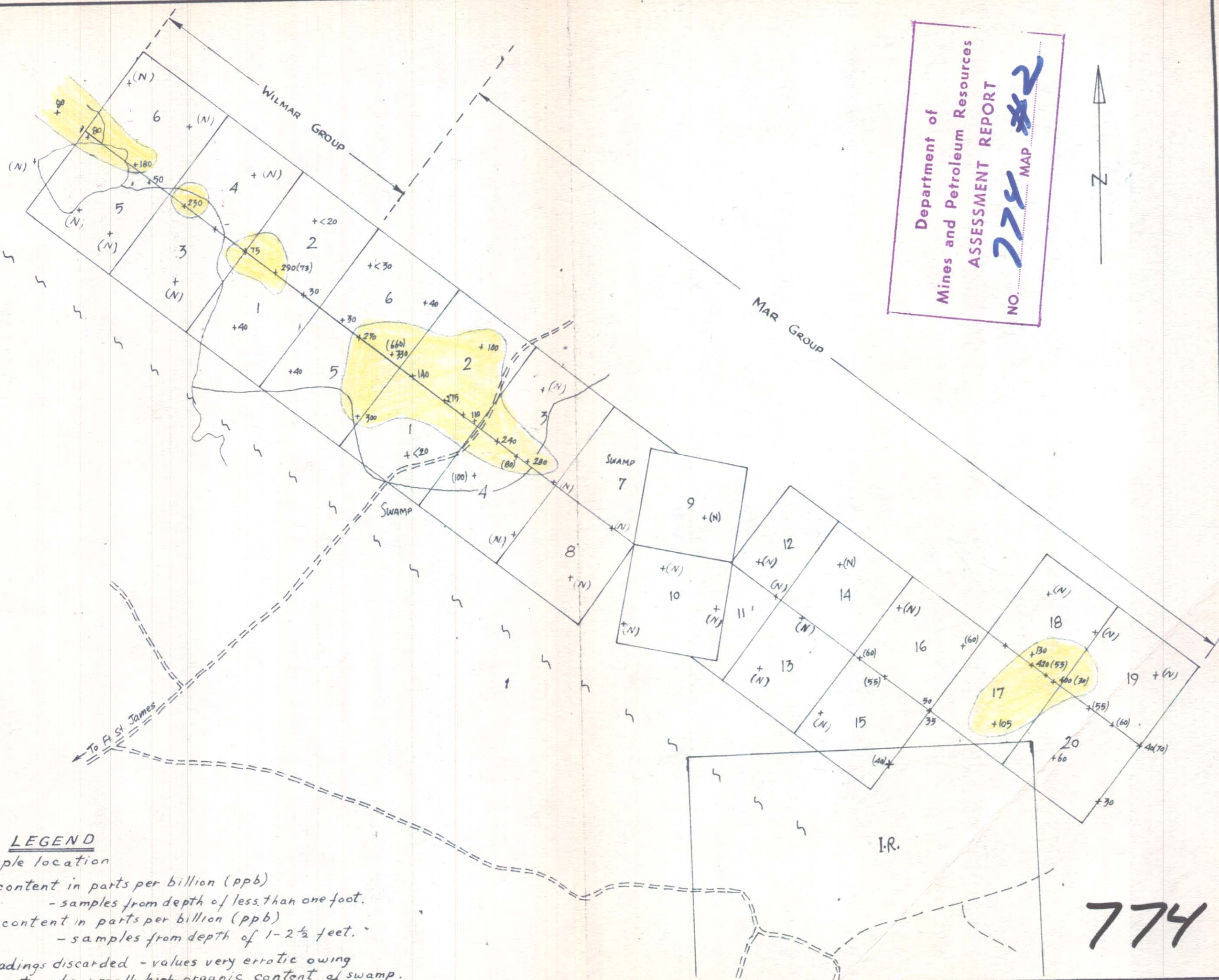
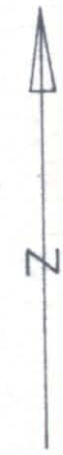
PLAN - PINCHI LAKE AREA - GENERAL GEOLOGY  
AND CLAIM LOCATION

SCALE: 1" = 6 mi      DATE: May, 1966      PLATE: PL. 14

*4 copies*



Department of  
Mines and Petroleum Resources  
ASSESSMENT REPORT  
NO. 774 MAP #2



**LEGEND**

- + = sample location
- 300 = Hg content in parts per billion (ppb)  
- samples from depth of less than one foot.
- (40) = Hg content in parts per billion (ppb)  
- samples from depth of 1-2 1/2 feet.
- (N) = Readings discarded - values very erratic owing to abnormally high organic content of swamp.

Plus 70 contour (shallow samples).

Inferred projection Pinchi Fault.

To accompany Geochemical Report on the Pinchi No 1 Claim Group, Pinchi Lake Area, Ominica M.D, dated May 26, 1966 by D.W. Heddle, P. Eng.

D. W. Heddle

**The Consolidated Mining and Smelting Company of Canada Limited**

DRAWN BY: G.E.P.		TRACED BY: A. ATAL	
REVISED BY	DATE	REVISED BY	DATE

GEOCHEMICAL SURVEY - PINCHI No 1  
CLAIM GROUP

Ominica M.D.

SCALE: 1" = 1/4 Mile    DATE: Sept., 1965    PLATE: P.L 10