

COMINCO LTD.
GEOCHEMICAL REPORT ON THE TOAD CLAIM
GROUP, PINCHI LAKE AREA
N.W. QUADRANT 54° 124' NW.

TOAD BY
D.W. HEDDLE, P. ENG.
WORK DONE: SEPT. 3-11, 1966.
C/W 62299/34 13971/2

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GEOCHEMICAL SURVEY REPORT ON THE
TOAD CLAIM GROUP, PINCHI LAKE AREA
OMINECA M.D.

(NW QUADRANT 54° 124°)

The Toad claim group is located on the west side of Tezzeron Lake about 22 miles northwest of Fort St. James, B.C. The following is a list of claims comprising the Toad claim group and indicates the amount of assessment credit request on each claim:

<u>Claim</u>	<u>Record No.</u>	<u>Record Date</u>	<u>Requested Assessment Credits</u>
Toad 1-13	44291-303	Aug. 27/66	1 year each claim
Toad 14-15	44231-32	Sept. 26/66	—
		Total:	<u>13 years</u>

Work was carried out on the above claims during the period September 3 to September 11, 1966.

REPORT BY

D.W. HEDDLE

PROFESSIONAL ENGINEER

DWH:gmc
July 7, 1967

GEOCHEMICAL SURVEY REPORT ON THE
TOAD CLAIM GROUP, PINCHI LAKE AREA
OMINECA M.D.

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GEOCHEMICAL SURVEY REPORT ON THE
TOAD CLAIM GROUP, PINCHI LAKE AREA
OMINECA M.D.
(54° 124' NW)

SUMMARY

A total of \$1,390 was expended on the geochemical survey of the Toad claim group. It is requested that \$1,300 of this amount be applied as assessment credit on certain claims of the group. An Application for Certificate of Work is being filed with the Mining Recorder at Smithers, B.C.

The following is a list of claims in the Toad Claim Group and shows the amount of assessment work requested for credit to each claim:

<u>Claim</u>	<u>Record No.</u>	<u>Requested Assessment Credit</u>	<u>Total</u>
Toad 1-13	44291-303	1 year each claim	13 years
Toad 14-15	44231-32	-	-
			<u>13</u> years

INTRODUCTIONGeneral

In 1965 and 1966 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 in 1966 included the Toad 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 has been, so 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 has been done under Cominco sponsorship by Dr. L.M. Azzaria at McGill University.

The survey was done during the period from September 3-11, 1966 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.H. 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. A.S. Atal (M.Sc. Geology) and F.R. Hassard, a Student Assistant, assisted Azzaria in the field work.

Location and Access

Claims of the Toad Group are located on the west side of Tezzeron Lake about 22 miles NW of the village of Fort St. James. A logging road leading from the Fort St. James-Manson Creek highway provides access to the southern group.

GENERAL GEOLOGY

The claim group lies along the general position of the Pinchi fault northwesterly zone extending from the north shore of Pinchi Lake. The claims are heavily 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 Toad claim group lies along the southwest side of the inferred position of the Pinchi fault zone. As the claim area is almost 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. The initial sampling was carried out along claim location lines or cross lines from the location lines on in some cases along old logging roads. More detailed fill-in sampling was done where this seemed warranted from the results of the initial coverage.

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 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 areas where information is sparse, contouring is open to various interpretations.

RESULTS

Results of the geochemical survey on the Toad claim group are shown on plate PL 67-1. The initial sampling indicated two anomalous areas on the claim group and these were generally substantiated by more detail fill-in coverage. The two anomalous east-west trending zones are indicated by the 100 ppb contour on the accompanying map.

The significance of the indicated anomalous zones is not fully understood. Similar anomalies in other areas have been attributed to the probable presence of cinnabar particles in the soil rather than to metallic mercury dispersed as a halo. Current research by Cominco is aimed at making a distinction between anomalies derived from mercury contained as the native element in soils and anomalies derived from the mercury driven off from cinnabar particles during the analysis process.

Further investigation will be carried out in this area.

ATTACHMENTS:

- (1) Plan - Pinchi Lake Area - General Geology and Claim Location, Scale 1" = 6 mi. Plate PL-14.
- (2) Plan - Geochemical Survey - Toad Claim Group, Scale 1" = 1/4 mi. Plate PL 67-1.
- (3) Statement of Expenditures.
- (4) Statutory Declaration relating to Expenditures.

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

DWH:gmc
Trail Expl'n Office, Western District
July 7, 1967
Distribution: Mining Recorder (Smithers) (2) ✓
Western Exploration (1)

1966 GEOCHEMICAL SURVEY EXPENDITURES
TOAD CLAIM GROUP, PINCHI LAKE AREA
OMINECA M.D.

SALARIES

1 Exploration Geologist (L.M. Azzaria) soil analysis and supervision 9 days (Sept. 3-11, 1966) at \$50/day	\$ 450
2 Field Assistants (A.S. Atal and F.R. Hassard) for 8 days (Sept. 3-10, 1966) at \$40 and \$30/man-day	530
1 Senior Exploration Geologist (D.W. Heddle, P. Eng.) supervisory capacity for 2 days @\$60/day - \$120 Report preparation 1 day @\$60/day - \$ 60	180

EQUIPMENT

Rental of Lemaire Mercury Detector and auxiliary equipment for 8 days at \$15/day	\$ 120
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TRANSPORTATION

Truck rental 8 days @\$100/month	\$ 110
TOTAL:	<u>\$ 1,390</u>

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

Endorsed by:

G. Hamson
G. Hamson
Accountant, Tadanac Operations

This is Exhibit "A" to the Statutory Declaration of D.W. Heddle, declared before me the 17 day of Sept, 1967.

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


CANADA)
PROVINCE OF BRITISH COLUMBIA) STATUTORY DECLARATION RELATING TO
EXPENDITURES ON A GEOCHEMICAL SURVEY
OF CERTAIN MINERAL CLAIMS THE PRO-
PERTY OF COMINGO LTD.
TO WIT:)

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

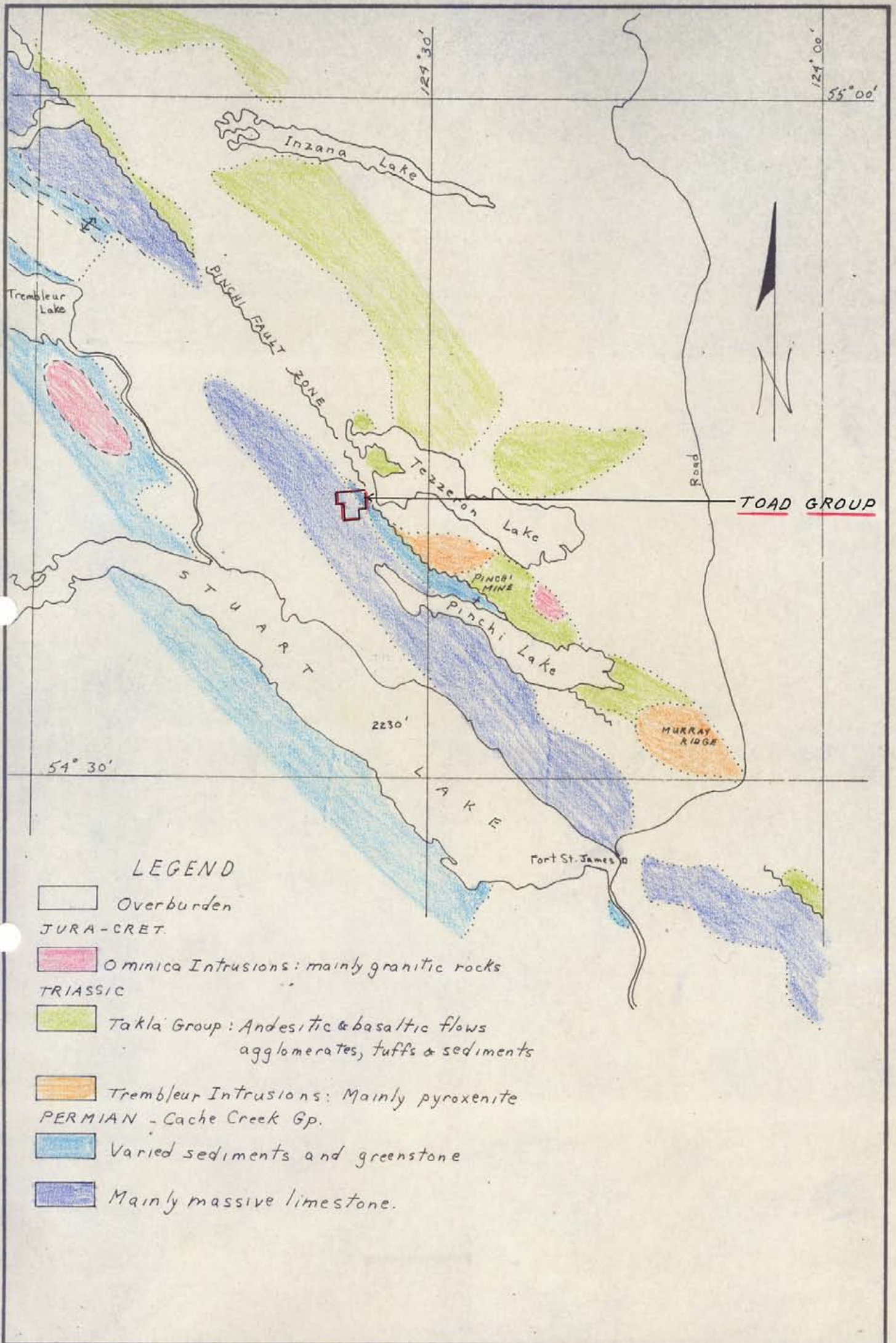
1. That I am the person who prepared a geochemical report
as the result of surveys carried out of certain mineral claims,
the property of Comingo Ltd., situated in Omineca Mining Division.
2. That copies of the said report are being filed with
the Mining Recorder in Smithers.
3. That attached hereto 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 17th day of)
July, A.D. 1967.)


A Commissioner for taking Affidavits for British Columbia.


D. W. Heddle




The Consolidated Mining and Smelting Company of Canada Limited

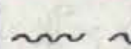
DRAWN BY:		TRACED BY: <i>D.W.H.</i>		PLAN - PINCHI LAKE AREA - GENERAL GEOLOGY AND CLAIM LOCATION - TO ACCOMPANY GEOCHEMICAL REPORT BY D.W. HEDDLE, P. ENG. ON THE TOAD CLAIM GROUP, PINCHI LAKE AREA, OMINECA M.D. DATED JULY 7, 1967.
REVISED BY:	DATE	REVISED BY:	DATE	
SCALE: 1" = 6 mi		DATE: July 1967		PLATE: P.L. -14

LEGEND

+ = Sample location

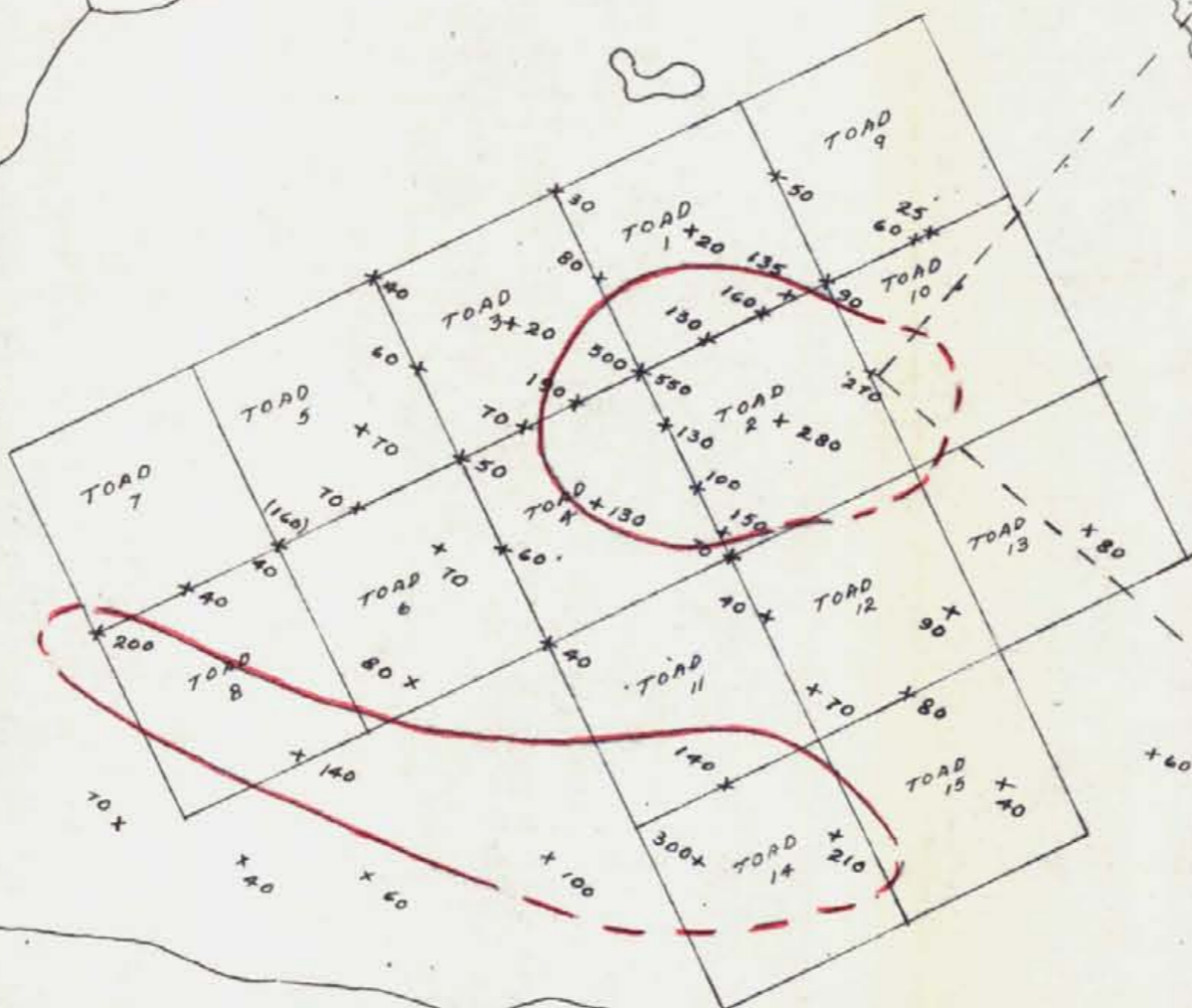
150 = Hg content in parts per billion (ppb)
(samples from depth of less than one foot.)

 Plus 100 ppb. contour

 Inferred projection of Pinchi Fault.

TEZZERON

LAKE



To accompany Geochemical Report on the Toad Claim Group, Pinchi Lake Area, Omineca M.D., dated July 7, 1967 by D.W. Heddle, P. Eng.

D. W. Heddle.

Drawn by: D.W.H.		Traced by:	
Revised by	Date	Revised by	Date

**GEOCHEMICAL SURVEY
TOAD CLAIM GROUP**

Scale: 1" = 1/4 mile Date: July, 1967 Plate: PL-67-1

