4529

PHOTOGEOLOGICAL STUDY
REDFERN LAKE AREA

PREPARED FOR

RIO TINTO CANADIAN EXPLORATION LTD.

- BY -

W.J. HENNESSEY CONSULTING LTD.

JUNE 8, 1973

CLAIMS	AND	CLAIM NUMBERS:	OWNER:
FOO	1-25 incl.	63337-63361 incl.	Vestor Explorations Ltd.,
EGG	1-22 incl.	63362-63383 incl.	1502 - 11111 - 87th Avenue,
CHILLY	1-36 incl.	63384-63419 incl.	Edmonton, Alberta.
VISTA	1-4 incl.	63420-63423 incl.	T6G 0X9.
DAMN	1-20 incl.	64249-64268 incl.	

LOCATION:

N.T.S. 94-G-5W
240 Miles N.N.W. of Prince George,
4 Miles N.E. of Redfern Lake.
Laird Mining Division
Lat. 57°23'N, Long. 123°50'W

DATES:

May 16, 1973 - June 8, 1973

PHOTOGEOLOGICAL STUDY
REDFERN LAKE AREA,
BRITISH COLUMBIA.

MAPS
#1 Index map
#2 Photogeological Study
#3 Claim map
#4 Overlay

Prepared For

RIO TINTO CANADIAN EXPLORATION LTD.

by

W. J. HENNESSEY CONSULTING LTD.

July 6, 1973.

PHOTOGEOLOGICAL STUDY
REDFERN LAKE AREA, B.C.

INTRODUCTION.

This study was undertaken at the request of Mr. R. A. Benkis, of Rio Tinto Canadian Exploration Ltd., Toronto. During the summer of 1972, a number of claims were staked by Vestor Explorations Ltd., of Edmonton, on a plateau situtated immediately northeast of Redfern Lake, British Columbia. A geochemical survey of the ground disclosed the presence of anomalously high concentrations of lead and zinc in the soil of the plateau, plus a few fragments of float which assayed approximately 14% combined sulphides. Subsequently, Rio Tinto acquired an interest in the Vestor claims, and on May 16, 1973, Mr. Benkis, Dr. M. Mehrtens and the writer visited the property. During this brief examination, the areas of the anomalies were traversed in several places, but no relationship to the bedrock could be established. A number of soil and rock samples were collected by Dr. Mehrtens, for further analyses.

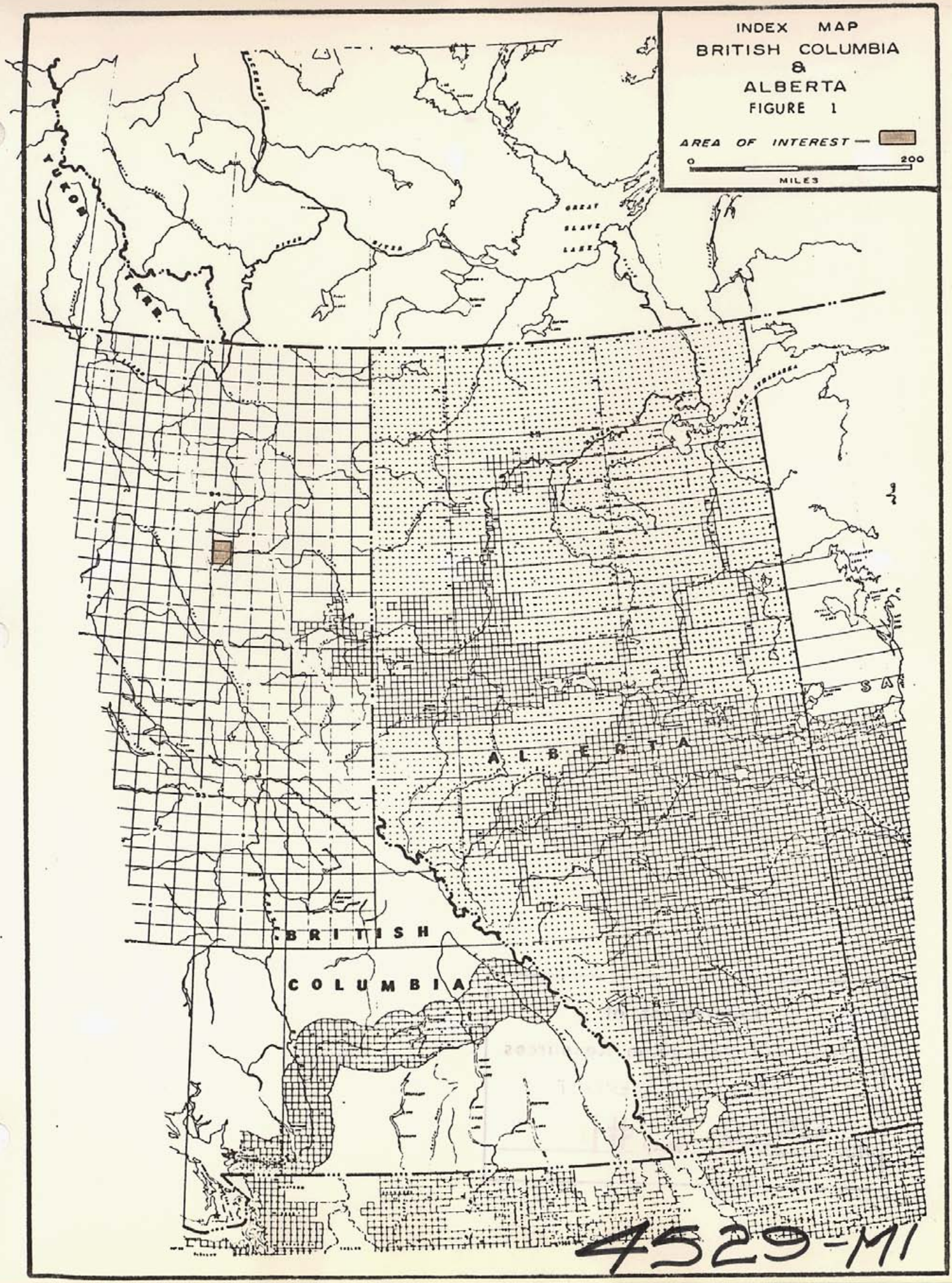
The purposes of the present study are 1) to establish the regional geological setting of the anomalous area, and 2) to attempt to relate the Pb-Zn anomaly to the bedrock.

The writer wishes at this point to acknowledge the advice and assistance of Dr. G. C. Taylor, of the Institute of Sedimentary and Petroleum Geology in Calgary, especially with regard to the identification of the various rock units. Dr. Taylor has completed mapping of the region, his work is currently in the process of publication.

GENERAL GEOLOGY.

Redfern Lake is situated near the head of Besa River in the Muskwa Ranges of north-eastern British Columbia. (NTS 94 G/5W) The rocks exposed at the surface within the study area range in age from Ordovician to Mississippian. The lead-zinc anomaly occurs upon carbonates of Devonian age, ascribed to the Dunedin formation. The Dunedin is underlain by the Stone formation, and overlain by the Besa River shales. In the general area, the Dunedin yields laterally to the Besa River, so that a short distance to the north of the study area, the Dunedin carbonates are absent, and the equivalent shales of the Besa River directly overlie the Stone formation. Thus, a shale-carbonate interface exists in the near vicinity, and could generate an environment favourable to the deposition of lead and zinc sulphides within the carbonates. The facies interface has not been identified on, or adjacent to, the plateau itself. Although the Besa River shales crop out immediately to the east, their contact with the carbonates appears to be a fault at Petrie Creek. At Besa River, the shales overlie the carbonates, but the contact is near-vertical. A summary of the formations exposed in the study area, is given in the accompanying table of formations.

The structure of the plateau is simple. Nearly flat-lying, gently warped limestones and dolomites of the Dunedin formation form an undulating surface with an elevation of about 6000 feet above sea level. At its eastern edge, the rocks are disrupted by a drag fold which passes northward into a fault.


INDEX MAP
BRITISH COLUMBIA
&
ALBERTA
FIGURE 1
AREA OF INTEREST
0
200
MILES
YUKON
TERR.
GREAT
SLAVE
LAKE
ALBERTA
BRITISH
COLUMBIA

4529-M1

Another fault is present along the western edge of the plateau, and places Ordovician and younger beds upon the Dunedin formation. This fault appears to diminish in magnitude northward, as opposed to the one along the eastern edge, which increases to the north. The two faults probably have the same root zone.

On Petrie Creek, at the north end of the plateau, the strata are folded into an anticline-syncline pair, which is probably an expression of drag-folding. These folds diminish in amplitude to the south of Petrie Creek, and are not at all evident on the plateau. On the north bank of Besa River, however, the Stone and Dunedin formations are folded into a broad, possibly faulted anticline, the east flank of which disappears beneath closely folded, crenulated, Besa River shales. It is entirely possible that the shales contain the southward extension of the fault which occurs along the eastern edge of the plateau. Because of the extensive distortion of the shale, it is exceedingly difficult to project the trace of the fault any farther to the south.

GEOLOGY OF THE PLATEAU.

The surface of the plateau is composed entirely of Dunedin limestones and dolomites. The formation has a thickness of about 1000 feet, but erosion has cut down to variable depths into the rocks. Quite a considerable amount of bedrock is exposed, although most of the surface is covered by drift, which seems to be derived by weathering of the underlying strata. Only a few

glacial erratics were observed; these consist of iron-stained quartzite boulders. Vestor's report indicates the presence of several small shale lenses within the limestone, but these were not seen during this examination. Several patches of barite and calci-barite were observed, however. These seem to occur as pods and/or breccia-fillings within the limestone. In addition, two veins of barite were observed on a previous visit. Both occur on the rim of the draw at the southwest corner of the plateau. The most westerly of these veins is said to contain crystals of galena.

A fairly extensive joint system is visible on the aerial photographs. The more prominent of these are indicated on the enclosed map, and have a trend which is more or less concordant with the regional strike. They are probably related directly to the underlying thrust fault. None of these joints appear to be specifically related to the geochemical anomalies. At the north-eastern corner of the plateau, near Petrie Creek, the reader will observe a north-trending line marked "CB". This indicates a series of alternating dark and light colored bands, which do not appear to be either bedding or vegetational staining. If they are of a structural or stratigraphic nature, they have a near-vertical dip. At the present, their nature is not evident, but they may have some significance in that an anomaly occurs at the same place.

Except along the eastern edge of the plateau, the photo-observed dips are very low, mostly ten degrees or less. The dips measured by the Vestor people have been copied verbatim, and include a number of attitudes which are in excess of thirty

degrees. These steeper dips must be of a very local nature; possibly some were measured on large frost-heaved slabs. This is not an attempt to deny their reality, crenulations may certainly be present, but are not evident on the photos. The strike of the beds varies widely. This, combined with the generally low dips, indicates only very gentle warping of the strata.

In the valley of Besa River, just west of the anticlinal axis, there is a fairly prominent topographic ridge, trending almost N-S. The north end of this ridge terminates at a small gully on the edge of the plateau. The gully is flanked by strata which dip westward at about twenty degrees, and which appear to be duplicated. On this evidence, a speculative fault has been indicated on the map, and its northward extension underlies a topographically low area of the plateau. The inferred displacement on this fault may be as much as 500 feet. Its possible existence is of interest because it occurs near the eastern end of the south-westerly group of strong anomalies. The eastern group of anomalies appears to be related to the same beds, on the downthrown side of the fault. It is important therefore, to establish whether or not this inferred fault does exist; the evidence from the photographs is not conclusive.

Stratigraphically, the anomalies are most closely associated with beds which occur at or near the top of the Dunedin formation. At their north-eastern ends, the two main anomalies lap over onto the Besa River shales. This is assumed to be due to soil creep or solution. The anomalous trend is

northeast-southwest, oblique to the regional strike, and crosses areas of bedrock as well as soil. No mineralization can be seen in the limestone, even where bedrock is exposed within a geochemical high. This fact, although somewhat disturbing, should not be the subject of undue concern at present. The writer has seen several carbonate samples, from various other localities, which assay as high as 16% ZnS, yet the mineralization is totally invisible, even under 20x magnification. The crystals are so fine that they disappear within the rock matrix. There is a strong suspicion that such may be the condition at Redfern.

At the contact between the Stone and Dunedin formations, a residual soil or regolith is frequently developed. It commonly has a red or brown color, and may be as much as 150 feet in thickness. Sulphide mineralization has been observed in the regolith at several localities. At Redfern, it has not been viewed in outcrop, but on Petrie Creek, red staining on the Stone formation may be due to seepage from the regolithic horizon, which is concealed by talus.

CONCLUSION.

The Redfern plateau is formed on strata of the Devonian Dunedin formation, which appear to be only mildly deformed. Bedrock dips are generally low, except along the eastern margin, where near-vertical dips are common. A major thrust fault emplaces Silurian, Ordovician and lowest Devonian rocks upon the Dunedin at the western margin of the plateau. True reef is developed only sporadically, as small mounds, within the plateau itself, and the

Dunedin carbonates probably belong to the near-reef shelf facies. Only faint porosity can be seen in the rocks which were samples.

The mineral anomaly seems to be most closely associated with strata which occur near the top of the Dunedin formation. The "stretched-out" appearance of the anomaly could be due to duplication of the mineralized beds by a subsidiary fault, which has not been positively identified.

It is suggested that the high sulphide values in the soil samples may be due to the presence of sub-microscopic particles of metallic sulphides enclosed within the dolomite rocks. Values as high as 16% of ZnS are known to occur elsewhere in similar lithologies, and the mineralization is totally invisible. Furthermore, the regolith at the base of the Dunedin is known in several other locales to contain sulphides, notably at Robb Lake. There is no evident causative relationship between any structural features and the anomalies.

RECOMMENDATIONS.

It is recommended that bedrock samples be collected within the anomalous area, and analysed for sulphides. A choice locality would seem to be at the south-western end of the trend, where high values terminate abruptly at the wall of a steep gully. An attempt should be made to sample the regolith at its outcrop; probably the best place to try to find it would be in the long draw at the south-western corner of the plateau.

Should coring be undertaken, some form of analysis should be performed on the entire core, because of the

distinct possibility of invisible mineralization.

The writer has no idea of how satisfactory an I.P. survey would be in the sort of deposit that this is assumed to be. Should it turn out to be inconclusive, perhaps a gravity survey should be considered.

W. J. Hennessey, P. Geol.

M.B. Mehrtens, B.Sc., Ph.D., P.Eng.

THE ASSOCIATION OF PROFESSIONAL ENGINEERS OF ALBERTA
PERMIT NUMBER P 0822
W. J. HENNESSEY CONSULTING LTD.

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
M. B. MEHRTENS

Expiry Date: July 14, 1974

Reference:

Devonian Stratigraphy of Northeastern British Columbia; G.S.C. Bulletin 186, G. C. Taylor and W. S. MacKenzie.

CERTIFICATION

This is to certify that:

1. I, William J. L. Hennessey, am a geologist, residing at 4124 - 26th Street N.W., in Calgary, Alberta.

2. I have received a B.A. (Geology) degree from St. Francis Xavier University, Antigonish, Nova Scotia, in May, 1952.

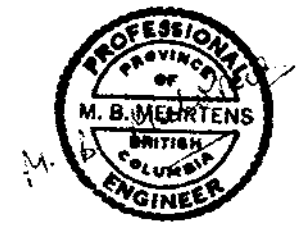
3. I am a Professional Geologist, registered within the Engineering and Related Professions Act, in the Province of Alberta.

4. I have been practising my profession in the petroleum and mining industry since 1952, as an employee up to and including the position of Senior Geologist until 1966, and as a Consultant Geologist since that time.

5. I have no interest in, nor do I expect to receive any interest, either actual or implicit, in the properties described herein, or in any securities pertaining thereto.

6. This report is based upon: personal examination and knowledge of the property, published and unpublished maps and reports of the Geological Survey of Canada, personal examination and study of the aerial photographs of the region, and a report by Vestor Explorations Ltd.

DATED at Calgary, in the Province of Alberta, this 10th day of July, 1973.



Expiry date: July 14, 1974

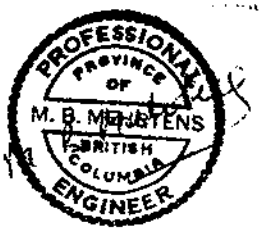
W. J. Hennessey, P. Geol.
Permit No. P-652, Alberta

CERTIFICATION

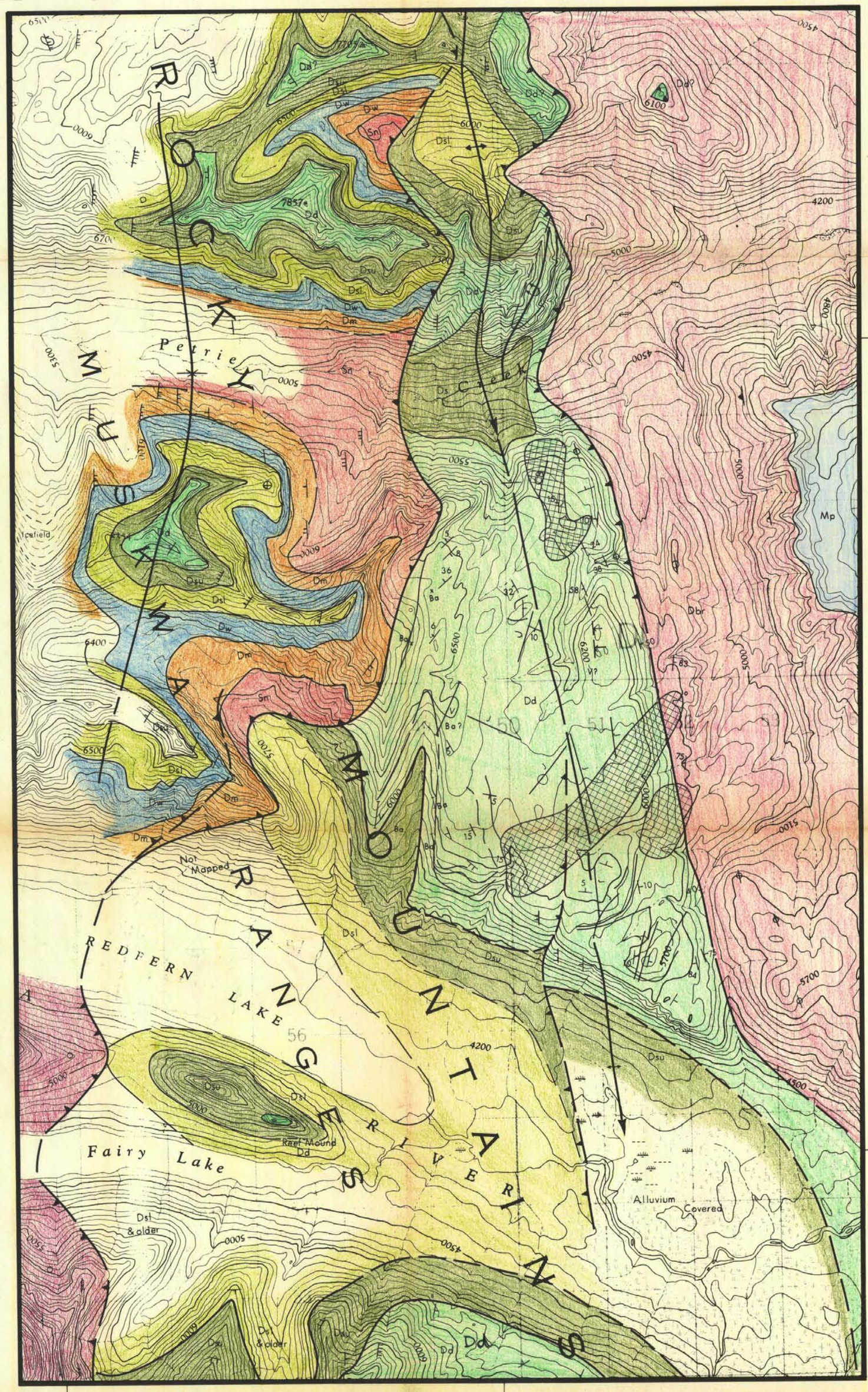
This is to certify that I, M.B. Mehrtens, did accompany W.J. Hennessey and R.A. Benkis to the Redfern Lake area of British Columbia described in this report and did at that time carry out a geological examination of the property.

M. B. Mehrtens

M.B. Mehrtens, B.Sc., Ph.D., P.Eng.



Expiry Date: July 14, 1974



LEGEND

MISSISSIPPIAN

Mp	PROPHET	Limestone, chert, shale

DEVONIAN

Dbr	BESA RIVER	Black shale
Dd	DUNEDIN	Grey fine-grained dolomite and limestone; amphipora-bearing.
Dsu	UPPER STONE	Light grey, massive dolomite
Dsl	LOWER STONE	Dark grey, silty dolomite, sandy at base.
Dw	WOKK PASH	Sandstone, dolomite sandstone, argillaceous dolomite.
Dm	MUNCHO-McCONNELL	Dolomite, sandy dolomite, varicolored shale.

SILURIAN

Sn	NONDA	Dolomite, silty dolomite

ORDOVICIAN (& OLDER?)

O	Lithology not determined, appears to be sandstone and shale.

STRIKE & DIP OF BEDDING

- ⊕ Nearly flat
- Group 1, 5°-10°
- 2, 10°-20°
- 3, 20°-45°
- 4, 45°-60°
- 5, 60°-80°
- Near Vertical
- Overturned

FAULTS

- Thrust Fault, Defined
- Thrust Fault, Inferred
- Normal Fault
- Tear or Strike Slip Fault
- Type not determined
- Joints & Fractures
- Distinct Alignment (May indicate faulting fracturing or joining)

SYMBOLS

FOLD AXES

- Anticline, with culmination and plunge
- Syncline with depression and plunge
- inferred fold Axes
- Overturned Anticline
- Overturned Syncline

BEDDING

- Formation contact
- Defined, inferred
- Edge of Prominent Bed
- —K— Key Bed
- —M— Persistent Marker Bed
- Dike
- V Vein

MISCELLANEOUS

- CB Color banding
- ×Ba Barite Occurrene
- Geochemical Anomaly

TABLE OF FORMATIONS

MISSISSIPPIAN	PROPHET	Limestone, shale, chert.
	BESA RIVER	Black shale, chert (3000'?)
DEVONIAN	DUNEDIN	Dolomite, limestone, shale reefoidal in part (800-1000')
		Regolith, sandstone, shale, limestone, red-bed.
	STONE upper / lower	Dolomite, dolomite breccia, Calcite (±1000')
	WOKK PASH	Sandstone, dolomite ss, shaly dolomite (100-150')
	MUNCHO-McCONNELL	Fine grained dolomite, sandy toward base, with thin shale partings (275')
SILURIAN	NONDA	Dolomite, silty dolomite - Thickness not determined.

PHOTOGEOLOGICAL STUDY
REDFERN LAKE AREA
NORTHEASTERN BRITISH COLUMBIA

PREPARED FOR
RIO TINTO CANADIAN EXPLORATION LTD.
BY
W. J. HENNESSEY CONSULTING LTD.

DATE: MAY 29/73 SCALE: 2" = 1 MILE (approx.)

4529-M2

RIO TINTO CANADIAN EXPLORATION LIMITED

VESTOR OPTION — B. C.

REDFERN LAKE AREA

CLAIM MAP

July - 1973 | R.A.B. / e.k. | DWG. C - 3421

N. T. S.
94 - G - 5

Department of
Mines and Petr[illegible]
ASSESSMENT REPORT
NO. 4529 MAP #3

SCALE
0 5,000 ft.

Petrie Creek

REDFERN LAKE

Fairy Lake

MOUNT DOPP

NORANDA

CHILLY

DAMN

FOO

DU

4529-M3