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15 Oct 84
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TURNER ENERGY

Call from Jim Simpson, Co. geologist., in memo from co. president.

Promotional Tone. Three "excited geologists named. (Possible "elephant," etc)

4 mile road in, just completed.

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Turner has just completed 1½ year claims dispute with Regional Resources. Seems to be resolved now.

Quartzite Breccia

Yellow-green, strongly silicified (well healed), vuggy at surface. Trenching revealed sulphides to 20%, and Ag sulphosalts (12.5 oz/t over 40'). Associated Conductor (Pulse EM) is 6000' long (within SUE claims) with principal target at depth of 250'

Breccia now opened to 100' width. Assays pending. Simpson not certain that breccia is related to Fault rather than Cassiar Bath, but thinks former. EM reported extremely strong.

D.

104016

820231 TURNER ENERGY 15 Oct 84

Call from Jim Simpson, Co. geologist, in response to memo from co. president.

Promotional Tone. Three "excited geologists" named. (Possible "elephant," etc)

4 mile road in, just completed.

$\$\frac{1}{4}$m. public financing going into oct '84 drill program.

Geol. + Geoph. reports in progress. He will forward a copy to us.

Brinco has looked at it recently. Turner looking ahead to ~~major~~ participation on part of some major.

Turner has just completed $1\frac{1}{2}$ year claims dispute with Regional Resources. Seems to be resolved now.

<u>Quartzite Breccia</u>

Yellow-green, strongly silicified (well healed), vuggy at surface. Trenching revealed sulphides to 20%, and Ag sulphosalts (12.5oz/t over 40'). Associated Conductor (Pulse EM) is 6000' long (within SUE claims) with principal target at depth of 250'

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D.

BUTLER MOUNTAIN MINERALS CORP. (BMM-V) JANTAR RESOURCES CORPORATION (JAN.A-V)

MORE MIDWAY CLAIMS ACQUIRED - Butler Mountain Minerals Corp. has concluded a joint venture agreement covering Jantar Resources Corporation's precious-base metals prospect adjoining to the south the Butler YP claims in the Midway area 65 miles west of Watson Lake, Yukon. (See map overleaf page two). Butler can earn a 51% interest in the prospect by spending $250,000 in 1985 and 1986 and by issuing 25,000 common shares in two stages.

A recently concluded preliminary geological and geochemical investigation of the 1,400 acre property suggests a silver-lead-zinc mineralized structure extends onto the Jantar holdings from an adjoining property controlled by Butler.

JANTAR'S OIL INTEREST REVIEWED - J.S.Johal, president of Jantar Resources has reported the company holds a 2% working interest in 10,741 acres in Sabine county, Texas, where there are seven wells. Of these one is dry, one is awaiting test, two tested 13,000,000 and 2,075,000 absolute open flow per day, three are on production and produced an average of 156 barrels of oil per day and 1,549,000 cu.ft. of gas per day, during August. The three producing wells started production in July. Revenue from these wells is expected to exceed $5,000 U.S., per month to Jantar. An additional five wells are expected to be drilled before the end of 1984 and to add to the company revenue.

TURNER ENERGY LTD. (TUN-V)

SURFACE SAMPLES AND GEOPHYSICAL SURVEYS LOCATE EXPLORATION TARGETS - Turner Energy Ltd. geologist R. Darney has reported recent work on the Sue 1 and Sue 2 property in the Midway area, 65 miles west of Watson Lake, Yukon, has included bulldozer trenching which uncovered significant silver-lead mineralization within an area of quartzite breccia. The zone, due to overburden cover, is yet to be defined. Early sampling has shown silver values in both grab and chip samples ranging from 0.22 oz/ton silver to 18.37 oz/ton silver. Two discontinuous chip samples taken across widths of 40 feet returned values of 4.27 oz/ton silver and 12.52 oz/ton silver.

The zone has been resampled to confirm results. In an attempt to penetrate overburden adjacent to the main zone, bulldozer trenching discovered float assaying 18.57 oz/ton silver, 22.90% lead.

The breccia zone lies adjacent to an intense pulse EM conductor revealed in the recent rurvey by Glen White Geophysical Consulting & Services Ltd. The good correlation between the known mineralization, the EM conductor and widespread float makes the Sue claims a high priority target, Mr. White said. The time domain electromagnetometry survey has detected a very strong conductor some 2 km. (approx. 6500 ft.) in length. This conductor is associated with the argentiferous galena breccia zone described in the Du Pont geochemical report. The principal conductor is at a depth of 50 - 75 m (150 - 225 ft.). This conductor is extremely interesting in that it follows a Landsat linear which trends northward to the Acorn and Butler properties where a major conductor and mineral zone has been discovered, he said. (See location map overleaf page two).

RULE RESOURCES LTD. (RUL-V) MARTEL OIL & GAS LTD. (MRL-V)

JOINT VENTURE PROPOSED FOR OPTIONED CLAIMS IN NEVADA - Martel Oil & Gas Ltd. holds an option to buy 13 mining claims near Virginia City, Nevada, subject to regulatory approval. Rule Resources Ltd. has been offered the right to participate in these claims to the extent of a 50% undivided working interest.

From preliminary sampling and mapping, geologist Stephen Gower of Gower, Thompson & Associates has inferred a zone of structural preparation at the intersection of the east dipping Comet structure and the west dipping Oest structure, some 450 feet below the surface.

Reporting this, John B. Lepinski, a director of both Rule and Martel, says the major mineralized structure is the Comet breccia zone, which Martel plans to evaluate by drilling over a length of 1,400 feet, a width of 150 feet and a depth of 350 feet. It is this structure which, up to 1927, produced approximately 48,000 ounces of gold from high grade ore, which averaged 4.0 ounces of gold per ton. The grade control was based primarily on visible gold content. Management consider the Oest mine has significant potential to host a viable gold deposit amendable to open pit mining methods. The companies have invited other third parties to make joint venture proposals.

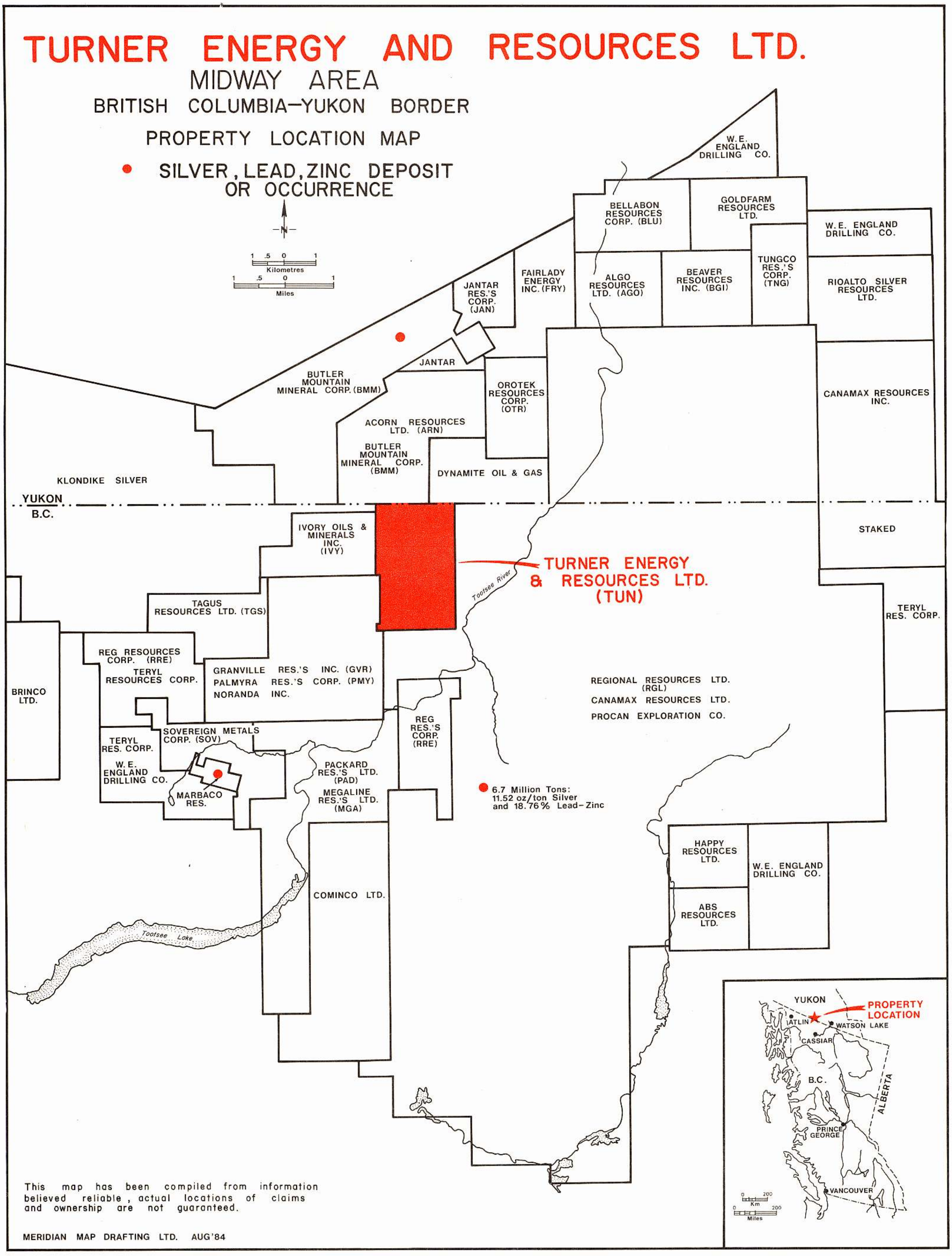
FOR THE RECORD

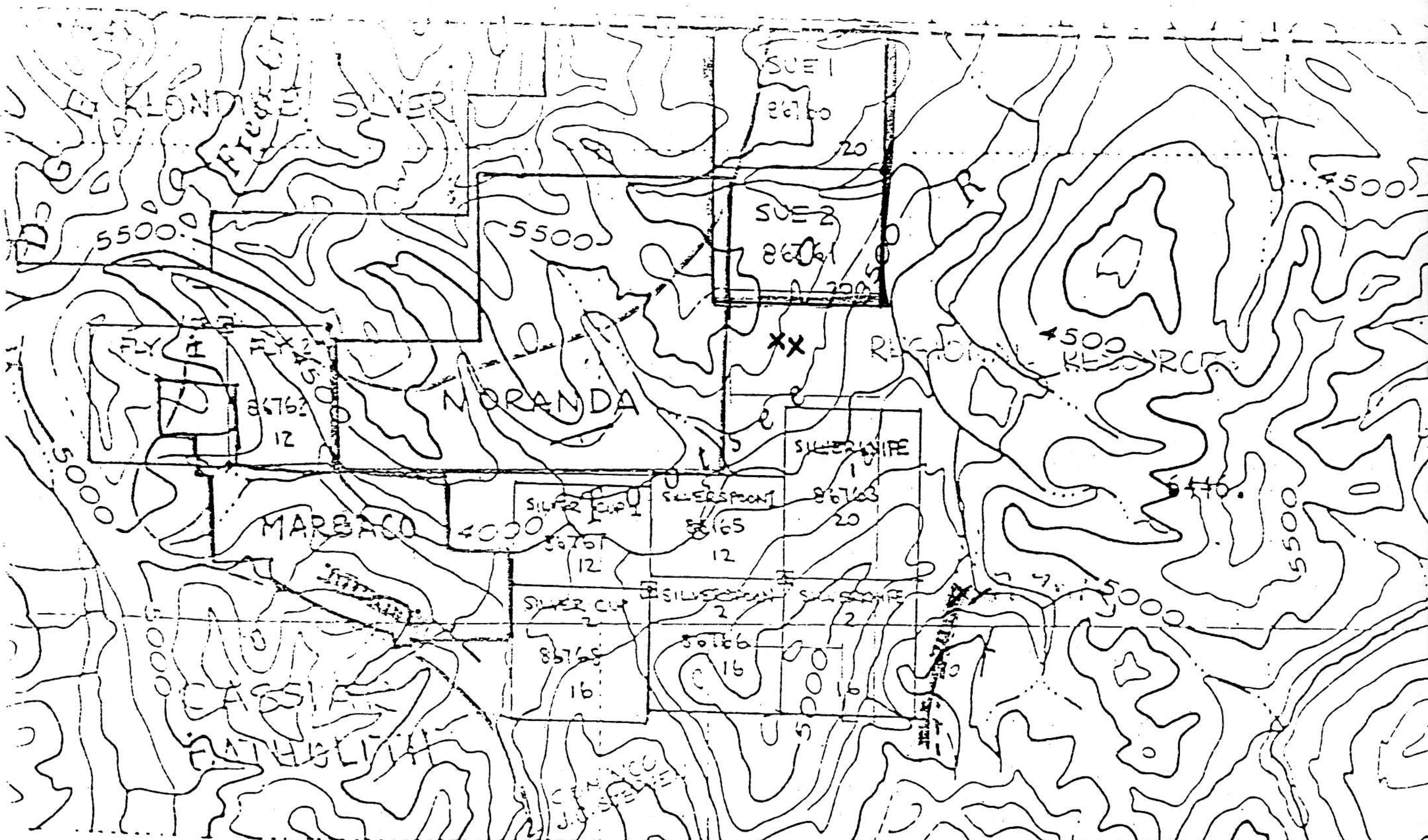
FORUM RESOURCES LTD. (FOM-V) had a working capital deficit of $158,991 at 30Jun84. Donald Clozza, president, reports that the recently completed drill program on the Daley property in Idaho, returned extremely poor assay results. Management consider the Boise Front in Idaho to be an ideal area for exploration of precious metal properties and are negotiating on prospects in two established mining districts near Boise, Idaho. Forum have agreed to sell their Dominion Creek property in the Yukon Territory, subject to shareholder approval, and thereby provide interim funding for new project inspection.

GLF TECHNOLOGIES (1979) LTD. (GLF-V) have issued 553,105 shares to settle debts totalling $115,151.

LOST LAKE RESOURCES LTD. common shares were listed 27Sep84 on the Development Section of Vancouver Stock Exchange, symbol LSO. Of 10,000,000 shares with no par value authorized, 1,675,001 are outstanding including 750,000 in escrow. Transfer agent is Canada Permanent Trust Co. Sponsoring member is Haywood Securities Inc.

MEGALINE RESOURCES LTD. MGA-V) (MEGLF-Nasdaq) has reported the B.C. Ministry of Tourism did not award the right for the establishment of a central accommodation reservation system for the Province of British Columbia and for Expo '86 to Citycore Development Corporation. As a result, Megaline's agreement with Citycore has been terminated.


TURNER ENERGY AND RESOURCES LTD.
MIDWAY AREA
BRITISH COLUMBIA—YUKON BORDER
PROPERTY LOCATION MAP
SILVER, LEAD, ZINC DEPOSIT OR OCCURRENCE
Kilometres
Miles
W.E. ENGLAND DRILLING CO.
BELLABON RESOURCES CORP. (BLU)
GOLDFARM RESOURCES LTD.
W.E. ENGLAND DRILLING CO.
JANTAR RES.'S CORP. (JAN)
FAIRLADY ENERGY INC. (FRY)
ALGO RESOURCES LTD. (AGO)
BEAVER RESOURCES INC. (BGI)
TUNGCO RES.'S CORP. (TNG)
RIOALTO SILVER RESOURCES LTD.
JANTAR
BUTLER MOUNTAIN MINERAL CORP. (BMM)
OROTEK RESOURCES CORP. (OTR)
CANAMAX RESOURCES INC.
ACORN RESOURCES LTD. (ARN)
BUTLER MOUNTAIN MINERAL CORP. (BMM)
DYNAMITE OIL & GAS
KLONDIKE SILVER
YUKON
B.C.
IVORY OILS & MINERALS INC. (IVY)
STAKED
TURNER ENERGY & RESOURCES LTD. (TUN)
Tootsee River
TAGUS RESOURCES LTD. (TGS)
TERYL RES. CORP.
REG RESOURCES CORP. (RRE)
TERYL RESOURCES CORP.
GRANVILLE RES.'S INC. (GVR)
PALMYRA RES.'S CORP. (PMY)
NORANDA INC.
BRINCO LTD.
REGIONAL RESOURCES LTD. (RGL)
CANAMAX RESOURCES LTD.
PROCAN EXPLORATION CO.
REG RES.'S CORP. (RRE)
TERYL RES. CORP.
SOVEREIGN METALS CORP. (SOV)
W.E. ENGLAND DRILLING CO.
MARBACO RES.
PACKARD RES.'S LTD. (PAD)
MEGALINE RES.'S LTD. (MGA)
6.7 Million Tons: 11.52 oz/ton Silver and 18.76% Lead-Zinc
HAPPY RESOURCES LTD.
W.E. ENGLAND DRILLING CO.
ABS RESOURCES LTD.
COMINCO LTD.
Tootsee Lake
YUKON
PROPERTY LOCATION
ATLIN
WATSON LAKE
CASSIAR
B.C.
ALBERTA
PRINCE GEORGE
VANCOUVER
Km
Miles
This map has been compiled from information believed reliable, actual locations of claims and ownership are not guaranteed.
MERIDIAN MAP DRAFTING LTD. AUG'84



SCALE 1:50,000

TOTAL 144 UNIT

TURNER ENERGY & RESOURCES LTD.
8930 OAK STREET
VANCOUVER, B.C.
V6P 4B7

FOR IMMEDIATE RELEASE SEPTEMBER 27, 1984

The Company has received partial results from Mikado Resources Ltd. with regard to its joint venture work programme on the Sue 1 and Sue 2 property in the Midway area.

Mr. R. Darney, geologist, has reported the following: "A recent bulldozer trenching program on the Turner Energy Sue claims has uncovered significant silver-lead mineralization within an area of quartzite breccia. The zone, due to overburden cover, is yet to be defined. However, early sampling by Pamicon Developments Limited has shown silver values in both grab and chip samples ranging from .22 oz/Ton Silver to 18.37 oz/Ton Silver. Two discontinuous chip samples taken across widths of 40 feet returned values of 4.27 oz/Ton Silver and 12.52 oz/Ton Silver.

Since extremely low sulphide content in the above samples prohibits any visual estimate of grades, the zone has been resampled in order to confirm the present results.

In an attempt to penetrate overburden adjacent to the main zone, bulldozer trenching discovered float assaying 18.57 oz/Ton Silver, 22.90 oz/Ton lead.

The breccia zone lies adjacent to an intense pulse EM conductor revealed in a recent survey by Glen White Geophysical Consulting & Services Ltd. The good correlation between the known mineralization, the EM conductor and widespread float makes the Sue claims a high priority target for your company."

According to Glen White, "the time domain electromagnetometer survey has detected a very strong conductor some 2 km. (approx. 6500') in length. This conductor is associated with the argentiferous galena breccia zone described in the Du Pont geochemical report. The principal conductor is at a depth of 50 - 75 m (150 - 225'). This conductor is extremely interesting in that it follows a Landsat linear which trends northward to the Acorn and Butler properties where a major conductor and mineral zone has been discovered."

Trading Symbol: TUN

FOR ADDITIONAL INFORMATION:
J.M. Timmis, President

ON BEHALF OF THE BOARD

Jane Timmis

J.M. Timmis,
President

Jane Timmis, President of Turner Energy & Resources Ltd. has prepared this news release of behalf of the Board of Directors of the Company and takes full responsibility for its content. The Vancouver Stock Exchange has neither approved nor disapproved the content of this release.

TURNER ENERGY & RESOURCES LTD.

8930 OAK STREET,
VANCOUVER, B.C.
V6P 4B7
Tel.: (604) 266-5114

TRADING SYMBOL: TUN - V

FOR IMMEDIATE RELEASE

October 1, 1984.

Turner Energy & Resources Ltd. has concluded an agreement with Mikado Resources Ltd. to provide further exploration funds for Turner's Sue 1 and Sue 2 property located in the midway area of the Liard Mining Division, B. C. on the B.C./Yukon border.

During the past 30 days Mikado has spent in excess of $30,000 on the property and has committed to spend an additional $20,000 by October 30, 1984. Mikado will earn a 14% working interest in the property for completing such expenditures.

Pursuant to the terms of the new agreement between Turner and Mikado, Mikado has committed to spend $250,000 on the property in 1985 to earn an additional 25% working interest. Failing such expenditure Mikado will lose its entire interest in the property and the agreement shall terminate.

Furthermore, Mikado may provide an additional $750,000 which a minimum of $375,000 to be spent by December 31, 1986. Mikado will earn an additional 21% working interest in the event that such expenditure is made with provision for pro-rating if a lesser amount is spent.

FOR ADDITIONAL INFORMATION:
J.M. Timmis, President

ON BEHALF OF THE BOARD

J H Simpson

J.H. Simpson
Director

J.H. Simpson, Director of Turner Energy & Resources Ltd. has prepared this news release of behalf of the Board of Directors of the Company and takes full responsibility for its content. The Vancouver Stock Exchange has neither approved nor disapproved the content of this release.

Glen E. White GEOPHYSICAL CONSULTING & SERVICES LTD
9251 BECKWITH ROAD, RICHMOND, BRITISH COLUMBIA V6X 1V7 (604) 273-1636

August 15, 1984

Ms. J. Timmis,
Turner Energy & Resources Ltd.,
8930 Oak St.,
Vancouver, B.C.
V6P 4B7

INTRODUCTION

Glen E. White Geophysical Consulting & Services Ltd. has completed work for Cordilleran Engineering on the Midway property during the years 1981,82 and 83 and on the Butler Mountain YP project in the same area in 1983. The 1983 work for Butler Mountain Minerals Corp. resulted in a dramatic new mineral discovery at a depth of some 600 feet.

The Midway, Butler and Midas properties appear to be on a large landsat linear which would also appear to pass through the Turner Energy Resources property. The argentiferous galena and breccia located by Dupont from their description would appear to be similar to the Butler Minerals breccia. On this basis I would recommend geochemical soil sampling and deep penetrating pulse electromagnetometer surveying. My proposal is to cover the complete 40 units on a reconnaissance geochemical-pulse electromagnetometer basis such that a specific diamond drill target can be recommended upon completion of the program. The area of coverage would be 1.5 Km wide leaving ½ Km off of the western boundary due to the Cassiar batholith. This involves some 45 Km of line cutting on lines spaced 200 m apart and 837 soil samples at 50 m spacings.

Glen E. White GEOPHYSICAL CONSULTING & SERVICES LTD.
9251 BECKWITH ROAD, RICHMOND, BRITISH COLUMBIA V6X 1V7 (604) 273-1636

THE SURVEY

Glen E. White Geophysical Consulting & Services Ltd. will complete the survey including interpretation, drafting, computer processing, geochemical analysis etc. for an all inclusive fee of $31,100 as follows:

TIME: Approximately 20-25 day work

Geochemical soil sample, line cutting, mob and demob	$7,200
Geochemical Analysis Ag, Pb, Zn,	4,000
Pulse Electromagnetometer Survey	14,000
Airfare, Airfreight	2,900
Computer processing & drafting	1,000
Interpretation and reports	2,000
	$31,100

PAYMENT SCHEDULE

Should this proposal meet with your approval please sign and return one copy for our files with a mobilization deposit of $15,000 with a further $10,000 to be paid upon completion of the field program and the remainder upon receipt of maps and reports.

Yours truly,

Glen E.White, P.Eng.

Accepted on behalf of
Turner Energy & Resources Ltd.

____

Date: ________________________

TURNER ENERGY & RESOURCES LTD.
8930 OAK STREET
VANCOUVER, B.C.
V6P 4B7

<u>FOR IMMEDIATE RELEASE</u>

Turner Energy & Resources Ltd. is pleased to announce that Phase II exploration work on its Sue 1 and Sue 2 claims in the Midway District has commenced.

Phase 1, completed in 1983, involved a satellite survey, aerial photographs, and field examination. Phase II is to consist primarily of soil sampling and deep penetrating reconnaissance pulse electromagnetometer surveying. The program is to be conducted by Glen E. White Geophysical Consulting Ltd., whose 1983 work for Butler Mountain Minerals nearby YP project resulted in a dramatic new mineral discovery at a depth of some 600 feet. The Phase II programme is designed to establish drill targets.

The accompanying map shows the location of Turner's Sue I and Sue 2 claims, bordering the Regional Resources property where reserves now stand at 6.7 million tons, grading 11.52 oz/ton silver and 18.76% combined lead/zinc.

Butler Mountain Minerals YP property is situated to the northwest. Butler Mountain has recently entered into a deal with Acorn Resources (directly to the north of Turner) to operate their property.

Discovery areas are marked with the letter "X".

According to Glen White & Co., the "Midway, Butler and Midas properties appear to be on a large landsat linear which would also appear to pass through the Turner Energy & Resources property." The argentiferous galena and breccia located by DuPont on Turner's ground appears to be similar to the breccias associated with both the Regional and Butler discoveries.

By all indications, the upcoming programme should prove to be a very exciting one for Turner, with the prospect of boundless opportunities upon completion.

Jane Timmis,
President.

REPORT ON GEOLOGICAL EVALUATION
OF
MINERAL PROPERTY AT TOOTSEE LAKE

Claim Blocks: SUE 1 (2655) and SUE 2 (2656)

LOCATED IN: LIARD MINING DIVISION
104 O/16W
Latitude 59°59', Longitude 130°22'

OWNER: Turner Energy & Resources Ltd.

OPERATOR: Turner Energy & Resources Ltd.

CONSULTANT: Pegasus Earth Sensing Corporation

AUTHOR: T. Reimchen and E. Bakker

SUBMISSION DATE: February 10, 1984

Vancouver, B.C.
Canada

February, 1984
Project 110-04

PEGASUS
earth sensing
corporation

4381 GALLANT AVENUE
NORTH VANCOUVER, BRITISH COLUMBIA
CANADA V7G 1L1
TELEPHONE: (604) 929 - 2377
TELEX: 04-352543

February 10, 1984
File 110-04

Ministry of Energy, Mines and Petroleum Resources
Mining Recorder
Province of British Columbia,
Victoria, B.C.

Attention: Mr. Talis Kalnins

Dear Sir:

Please find enclosed two copies of the assessment report on the SUE 1 and SUE 2 Claims in the Liard Mining Division for Turner Energy & Resources Ltd. Also find enclosed a cheque for $600.00.

If there are any questions concerning this report, or if additional information is required, please contact us.

Respectfully submitted,
PEGASUS EARTH SENSING CORPORATION

Reimchen

T.H.F. Reimchen, P.Geol.

Encl.

/ar

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LIST OF FIGURES

1.0 INTRODUCTION

1.1 Property Location

The SUE property is located 17 km southeast of Rancheria, Yukon Territory (Figure 1). It is accessible by a gravel road which turns south off the Alaska Highway 14 km east of Rancheria, and a side road which turns west off the gravel road 17 km from the Highway. The property is located 5 km down this road.

The claims are situated near the northeastern boundary of the Stikine Ranges of the Cassiar Mountains. They straddle a tributary of Tootsee River and the ridges on either side of this tributary. Elevations range from 1150 to 1675 m above sea level.

1.2 Property Definition

1.2.1 History

The SUE 1 and SUE 2 claims were staked and recorded by Mr. T. Cameron-Scott of Vancouver, B.C. All interest was transferred to Reg. Resources Corp. on February 14, 1983 and to Turner Energy and Resources, Ltd. on March 29, 1983.

In the past the same area was covered by the JCS 1 and JCS 2 claims owned and operated by DuPont of Canada Exploration Limited.

The property is currently owned and operated by Turner Energy & Resources Ltd. of Vancouver.

1.2.2 Economic Assessment

The property is situated in an area containing several deposits of base metals such as Midway, Silver Tip and Amy. Although few of those have been proven to be of economic size, the area warrants further investigation.

Anomalous tungsten values were found in 1976 in the creek which bisects the SUE property. Subsequent work by DuPont defined an anomalous tungsten zone approximately 60 m wide which followed a limestone-quartzite contact over 450 m in length. This zone appeared to lie in the contact metamorphic aureole of the Cassiar Batholith. Skarns in this aureole contain scheelite and molybdenite. Quartzites contain galena and silver.

1.3 Summary of Work

From April 22 to September 9, 1983, a structural-geological study was carried out on the Tootsee Lake area by Pegasus Earth Sensing Corporation. The purpose of this study was to assess the SUE property by correlating its own structural geological characteristics with those of the surrounding areas and in particular with those of areas with known mineral deposits.

The study consisted of two parts:

(1) A study of aerial photographs of scale 1:56,000. Because no detailed topographical map has yet been published this study incorporated topographical observations. Results are presented on a 1:20,250 map (Figure 2).

(2) A study of Landsat satellite images. Results are presented on an overlay of a 1:100,000 Landsat image (Figure 3).

Both studies covered the SUE property and surrounding area.

A field investigation to evaluate the geological setting and to aid in the evaluation of the aerial photos was carried out on three days between August 16 and September 6, 1983 by Peter Christopher & Associates Inc. Several traverses through the SUE property were made in this period.

All results were integrated with each other and with previous work. Final conclusions and recommendations were then established.

1.4 List of Claims

From April 22 to September 9, 1983, work was performed on the following claims:

Claim Name	Units	Record No.	Photogeology & Topographical Study	Landsat Image Study	Field Investigation
SUE 1	20	2655	Performed	Performed	1 Day
SUE 2	20	2656	Performed	Performed	½ Day

2.0 DETAILED TECHNICAL DATA AND INTERPRETATION

2.1 Introduction

Rocks in the Tootsee Lake area can be broadly divided into two groups:
(1) Paleozoic folded sediments and volcanics; and
(2) Cretacious monzonite-granodiorite intrusive rocks (Cassiar Batholith).
The first group comprises calcareous phyllite and phillitic limestone of the Kechika Group; shales, siltstones, dolomites, sandy dolomites and dolomitic sandstones; and fetid dolomite, limestone and greenstone of the Sylvester Group. The Cassiar Batholith has a contact metamorphic aureole with skarns and hornfelses.

Mineralization occurs in two environments:
(1) in the contact aureole of the Cassiar Batholith (silver-lead-zinc at Amy, and tungsten at scattered localities); and
(2) near the fault contact of the McDame Group and Sylvester Group (silver-lead-zinc at Midway and Silvertip).

2.2 Photogeological and Topographical Interpretation (Figure 2)

2.2.1 Bedrock Geology

From west to east four clearly different rock types can be discerned:
(1) highly resistant non-deformed intrusive rocks (correlate with Cassiar Batholith);
(2) mixed, in general schistose, dark sediments (correlate with Ketchika Group);
(3) light to grey colored rocks, subdivided into a westerly more massive and resistant part and an easterly more eroded and better foliated part (correlate with sandydolomite-dolomitic sandstone, and laminated dolomite respectively); and
(4) thick light coloured unit of carbonate rocks (correlate with McDame Group.

All sedimentary rocks dip moderately east and overlie the Cassiar Batholith with a fault contact. This contact truncates successive units. The westerly (lower) units wedge out to the north.

2.2.2 Faults

In contrast to Landsat interpretation, faults indentified in photogeological interpretation are small, but are often part of much larger fault systems.

Three types of faults can be discerned:
(1) Trending SW-S to NE-E; A major fault of this type is found near the contact of the Cassiar Batholith. Other faults with this orientation parallel the batholith contact and are probably all parallel to the bedding or foliation.
(2) Trending NW-SE. Some of the faults with this orientation clearly show dextral movements. A major fault runs parallel to the creek southwest of the SUE property. Other valleys such as those south and southeast of the SUE property might parallel this trend as well.
(3) Trending E-W. Faults with this orientation are scarce. However, some of the east-west valleys such as the one in the SUE property might parallel this trend.

2.2.3 Recent Geology and Topography

Tootsee River meanders in a wide valley and cuts into glacial and fluvioglacial deposits. The valley limits closely follow the 4,000 ft (1220 m) contour. Terraces are widespread throughout the valley. An extensive remnant of a high level terrace exists along the southeast side of the valley south of the SUE property. This terrace locally exhibits well developed kettle topography. Smaller remnants of this terrace occur at the eastern edge of the SUE property.

Major tributaries occupy hanging valleys which are filled with glacial and fluvial deposits.

Bedrock exposures occur locally in the valleys. They are mainly confined to elevations above the tree line with sparse vegetation. Areas underlain by sediments normally have smooth and rounded erosion forms. However, ridges exist where layers of contrasting resistance outcrop and at fault escarpments.

Intrusive rocks of the Cassiar Batholith are eroded in a different manner. Cirques, aretes (ridges) and horns (peaks) are common.

2.3 Landsat Satellite Image Interpretation

2.3.1 Introduction

Landsat satellites occupy near polar orbits. Each successive orbit shifts westwards resulting in a total coverage of the earth every 18 days for each satellite.

A multispectral scanner (MSS) on board the satellite produces a continuous image strip built up from successive scan lines extended perpendicular to the forward direction of the satellite's orbital motion. Reflected electromagnetic radiation from the ground is transferred by an oscillating mirror to a recording system after passing through filters which select four different wavelength intervals (bands), numbered 4 to 7. Band 6 in the infrared part of the spectrum is the best band for showing geological structures.

Data obtained by the MSS is transmitted in digital form to receiving stations on earth. Digital videotapes can be converted into computer compatible tapes and analyzed through a variety of computer-based programs. Alternatively, the digital data can be reconverted at ground-processing facilities into sets of black and white photo images. Color images are made from a combination of individual black and white images by projecting each given band through a particular filter.

For every feature of the earth's surface, a combination of MSS bands can be found which show that feature or a variation of it to its best.

2.3.2. Procedure

For the study of the Tootsee Lake area a computer tape containing the information from this general area was processed by Pegasus Earth Sensing Corporation on computers at MacDonald Dettwiler & Associates in Vancouver.

The part of the computer tape representing the Tootsee Lake area was viewed on a video screen. Information from the different bands was adjusted together with adjustments in contrast until a colour scene was obtained which showed geologic structures to their best advantage. Structural information from the video scene was transferred to a topographic map and to a print of Band 6 of the same area. This print was complemented with additional interpretation.

2.3.3 Landsat Image Structure

In contrast to aerial photographs, Landsat images show structures extending over large areas. Small structures, although often visible, cannot be assessed for their geological importance. Differences in rock type are obscure in Band 6 images.

Results of the Landsat image processing and interpretation show many linear elements (Figure 3). Most of these lineaments represent fractures or faults. They occur mainly in a 4 to 7 km wide SW to NE trending belt which parallels the contact of the Cassiar Batholith NE of Tootsee Lake, but cuts through the batholith N and W of Tootsee Lake. The major part of the SUE property falls within this belt.

Large scale NW-SE and N-S faults are common, although none cut through the SUE property. Other directions are scarce.

The set of SW-NE and NW-SE faults appear to rotate, when starting in the southwest and going northeast, initially clockwise and later counter-clockwise. These faults probably form a conjugate set which is clearly younger than the intrusion of the Cassiar Batholith.

The N-S trending faults in the study area seem to be younger than faults trending in other directions.

Some large circular features appear to be present W and N of the SUE claims. Others, less well defined, might be present to the southeast. They are probably related to the intrusion mechanism of the Cassiar Batholith.

2.4 Field Investigation

Mr. Peter A. Christopher, PhD and P.Eng., exploration manager of Peter Christopher & Associates Ltd. of Vancouver, spent August 16 and September 2 and 6, 1983 examining the SUE claims.

August 16 and September 2 traverses were made along the B.C.-Yukon border. Minor argillite or shale float were observed.

The September 6 examination was conducted with helicopter support along the valley area at the east side of the property and the main ridge in the southwest part. Rocks examined on the ridge consisted mainly of fetid dolomite and limestone of the McDame Group. No mineralization was observed. Trenches were reported to contain argillaceous breccia containing lead, zinc and silver mineralization. The valley area along the eastern boundary contained extensive overburden and is probably fault controlled. Float was observed. It is of glacial origin and of little value in assessing the property.

2.5 Conclusions

Geologic processing and interpretation of Landsat imagery showed that the SUE 1 and SUE 2 claims are situated in a belt paralleling the border of the Cassiar Batholith. The belt is characterized by SW-NE trending lineaments and can be termed a "fault belt". Several mineral deposits are known to exist within this belt.

Other linear trends also cut the SUE claims. The photogeology study revealed the presence of smaller linear structures which have been partly identified as faults.

The faults are probably of different age. Two directions, SW-NE and NW-SE, probably form a conjugate set.

Part of the SUE claim area is underlain by rocks from the contact aureole of the Cassiar Batholith. Sedimentary units overlying the batholith are truncated by the contact. Consequently, there is a large variation of rock types in the aureole.

Several mineralizations are known from the contact-aureole.

The following facts on the SUE claims have been established:

(1) they are within a belt with known mineralization;
(2) known faults and possible faults cross the claims;
(3) they are underlain by contact aureole with known mineralizations;
(4) varying rock types exist in aureole implying a possible larger variation in minerals;
(5) scheelite and molybdenite occurrences are known.

We conclude that the SUE claims have a good potential for containing economic mineral deposits.

2.6 Recommendations

We recommend that the next phase of work on the SUE claims consists of a 2-week field program to include:

(1) detailed mapping;

(2) sampling program;

(3) simple geophysics (e.g. VLF).

Results of this program would be integrated with previous work.

Based on the results of this proposed program further field work such as geophysics, trenching and drilling would be planned.

Yours very truly,
PEGASUS EARTH SENSING CORPORATION

Ebo Bakker,
Senior Geologist

T.H.F.Reimchen, P.Geol.,
President

3.0 ITEMIZED COST STATEMENT April 22 - September 9, 1983

Topographical and Photogeological Interpretation	
Ted Reimchen @ $65.00/hr 0.5 hrs	$ 32.50
Cecil Urlich @ $55.00/hr 3.5 hr	192.50
Ebo Bakker @ $45.00/hr 26.5 hr	1,192.50
Satellite Image Interpretation	
Ted Reimchen @ $65.00/hr 7 hrs	455.00
Ebo Bakker @ $45.00/hr 51 hrs	2,295.00
	$ 4,167.50
Satellite Image Processing	
Professional Fees	
Dave Hawes @ $55.00/hr 9.5 hrs	$ 522.50
Computer Tape	217.00
Computer Time for Data Analysis	
@ $90/hr 1.5 hrs	135.00
@ $60/hr 0.7 hrs	42.00
Satellite Image Reproduction	112.52
	$ 1,029.02
Field Investigation (Dr. P.A. Christopher, P.Eng.)	
Aug. 16, Sept 2 and 6: 3 half-days @ $350.00/day	$ 525.00
Vehicle support @ $100/day	150.00
Room and board @ $50/day	75.00
Helicopter split charter	150.00
Mobilization split	250.00
	$1,150.00
Additional Expenses	
Typing @ $20/hr 0.5 hrs	$ 10.00
Photocopying @ 25¢/pg 168 pgs	42.00
Maps @ $3.00/each plus tax	20.16
Communication	17.46
Vehicles @ 20¢/km 1-7.25 km	29.45
	$ 119.07
TOTAL COST	**$ 6,465.59**

C E R T I F I C A T E

I, Ted H.F. Reimchen, of 5571 Cove Cliff Road, North Vancouver, B.C., Canada, do hereby certify that:

I am a graduate of the University of Alberta, graduated with a B.Sc. Degree in Geology and Zoology in 1964, and with a M.Sc. Degree in Geology in 1966.

I have been registered as a professional geologist since 1971 by the Association of Professional Engineers, Geologists, and Geophysicists of Alberta.

I am a member of Canadian Institute of Mining and Metallurgy, Society of Quaternary Geologists, American Society of Photogrammetry, Canadian Remote Sensing Association, and Canada/United States Radar Satellite Study Team.

I have practised as a consulting geologist since 1968, and am the President of Pegasus Earth Sensing Corporation since (formerly Reimchen Surficial Geology Ltd.)

I have no interest in the SUE 1 and SUE 2 claims.

I do not express any guarantee or warranty. The report is based on facts resulting from personal investigations and from investigations completed and reported by staff of Pegasus Earth Sensing Corporation.

Dated at the District of North Vancouver in the Province of British Columbia, this 10th day of February, 1984.

Respectfully submitted,

Ted H.F. Reimchen, P.Geol.

C E R T I F I C A T E

I, Ebo Bakker, of 3738 Mount Seymour Parkway, North Vancouver, B.C., Canada, do hereby certify that:

I am a graduate of the Leiden University, Netherlands, graduated with a B.Sc. Honors Degree in Geology with Mathematics, Physics and Chemistry in 1973, and with a M.Sc. Degree in Geology in 1979.

I am a member of the Royal Dutch Geology and Mining Society, the Geological Society of Sweden, a fellow of the Geological Association of Canada and a Member-in-Training of The Association of Professional Engineers, Geologists and Geophysicists of Alberta.

I have been a practicing geologist since 1976 and have been an employee of Pegasus Earth Sensing Corporation since 1981.

I have no interest in the claims SUE 1 and SUE 2.

Dated at the District of North Vancouver in the Province of British Columbia this 10th day of February, 1984.

Respectfully submitted,

Ebo Bakker, M.Sc.

MINERAL EXPLORATION UTILIZING REMOTE SENSING DATA

Pegasus Earth Sensing Corporation (PESC) offers a wide range of remote sensing services for exploration geology which can facilitate every stage of a mineral exploration project.

Mineral exploration projects typically encompass the following four phases:

1. Regional geologic reconnaissance
2. Detailed site geologic field mapping
3. Geophysical exploration
4. Drilling and testing

Because each succeeding phase is more expensive than the preceding one, it is important that each limits the scope to be covered in the next. Remote Sensing is a proven multistage tool that can be used to meet this objective. Proper employment of remote sensing data and interpretive techniques can substantially reduce the time and costs involved for each stage of mineral exploration. Small-scale imaging platforms such as satellite and manned spacecraft systems are primarily useful in the regional reconnaissance phase. Aerial photography is useful in the second phase. Large-scale aerial photographs and airborne geophysical surveys provide supplemental data in the third and fourth phases.

Current state-of-the-art indicates that a combination of satellite data and airborne geophysical surveys provide a very promising reconnaissance tool for some types of mineral deposits and geologic features which have subtle signatures. Visual and geophysical analyses are most valuable for exploration of areas where mineralization is known or suspected in zones of faulting or fracturing. Numerous other exploration techniques can also be used. Band ratioing has been successfully used on several exploration projects including location of gossans in vegetated areas.

PESC uses one of the most powerful sets of multispectral image processing computer programs available. Developed by MacDonald Dettwiler & Associates Ltd. (MDA) of Vancouver, CANADA, this system can be manipulated for a variety of applications. Multispectral computer analysis techniques afford a complimentary method of exploration where mineralization may show surface indications and be associated with alteration or geobotanical indicators. The spectral data of known mineral deposits and their surrounding rock units are processed by specific computer programs to map areas of similar spectra, which are usually clues to unrecognized mineralized zones. Similarity is defined by an economic and surficial geologist and a computer scientist through an interactive process. Satellite imagery is employed in the form of digital data which are numerical values of equal-intensity recorded in four bands.

Statistical computer programs are employed to investigate the spectral uniformity of known mineral occurrences and their surrounding rock units. Computations are performed on the spectral responses of these areas to produce a "spectral signature", which is a unique code of reflectance and adsorptance as recorded by the satellite's sensor.

Supervised and unsupervised training metheds are utilized to search for other areas that may show a similar "spectral signature". In the supervised mode, a computer routine is initiated to define the spectral signatures of points where mineral deposits are known to occur. The computer is trained to search the LANDSAT saene, one picture element at a time, and to display points having the same signature. Overlays are developed that portray zones having spectral responses similar to areas of known mineralization, thereby providing targets for further exploration surveys. The unsupervised mode groups together land areas that have similar spectral responses, and can be used to map rock and soil units having spectral nonuniformity.

Following the application of remote sensing techniques, a field investigation supported by an aerial photographic analysis, is conducted for several sites of known mineralization. The geologic evidence thereby acquired supplements information contained in the literature and further validates the spectnal signature.

PESC's computer processing techniques result in a computer printout wherein each printed character represents an area of 0.46 hectares. The printouts are examined for areas having the same spectral signature as areas of known deposits. When found, these are designated as prime exploration targets (PET). At this stage, geophysical, seismic, and geochemical data is digitized and superimposed in an effort to define metallogenic provinces and depositional basins.

The more complicated the technique, the higher the cost. Such techniques must therefore be used judiciously and by experienced personnel. Regardless of either the sensor or the stage of exploration, the image interpreter is always looking for clues to structural or stratigraphic features that may serve to localize mineral occurrences, or to pose geologic hazards. Specifically, the interpreter is looking for evidence of faults, fractures, arched or domed strata, basins, oxidized or hydrothermally altered areas, and linears, which are unexplained alignments of drainage, topography, vegetation, and lithologic units.

PESC personnel have worldwide experience and expertise in the design and management of complex remote sensing exploration programs and in the analysis of the data obtained.

Ted Reimchen
Reimchen Surficial Geology Ltd

Remote sensing data and their interpretation as tools in mineral resource exploration

Remote sensing techniques have a wide range of practical applications which include assessments in the fields of minerals, forestry, water, and other resources.

One field that is being extended is exploration geology, and this article outlines how every stage of a mineral exploration project can be facilitated by remote sensing services. These services have been developed by Reimchen Surficial Geology Limited (RSG), using specialized computer processing for interpretation of LANDSAT scenes.

A mineral exploration project may typically involve: regional geologic reconnaissance; detailed site geologic field mapping; supervision of geophysical exploration; and drilling operations.

Since each succeeding phase is more expensive than the preceding one, it is important that each limit the area to be covered in the next one. Proper use of remote sensing data and their interpretation can substantially reduce the time and costs for each stage of exploration.

Small scale imaging platforms (satellite and/or manned spacecraft systems) are primarily useful in the regional reconnaissance phase, while aerial photography is useful in the second phase. Large-scale aerial photographs and airborne geophysical surveys provide supplemental data in the third and fourth stages.

RSG uses one of the most powerful sets of multispectral image processing computer programs available. Developed by MDA, of Vancouver, BC, the system can be manipulated for a variety of applications.

The remote sensing services which are most frequently applied are described below.

1. Analysis of LANDSAT Facsimile Images for Mineral Exploration

The imagery employed in this type of study is acquired by NASA's Earth Resources Technology Satellite (LANDSAT I & II). Such imagery provides a uniquely synoptic view of the earth's surface that has most application in the early stages of resource inventory and exploration, especially in remote areas where ground access is difficult.

This type of study usually involves an initial literature review to assist in the geologic interpretation of the satellite imagery. The principal effort of the analysis is directed toward the detection of evidence of geologic structure. From inferences based on this evidence, overlays are prepared (at scales of 1:500,000 or 1:250,000 keyed to individual satellite frames or mosaics) showing faults, fractures, synclines, anticlines, domes and bedding, strike and dip directions.

This structural data, in conjunction with what is known about mineral locations and modes of occurrence within the area of interest (from the literature) is synthesized into a second overlay to indicate what are interpreted to be prime exploration targets.

2. Analysis of LANDSAT Imagery and Geophysical Data

This type of investigation is identical to the above analysis insofar as the literature review and LANDSAT data are concerned. In addition, however, structural enalyses are also made employing aeromagnetic and gravimetric data. Isoline maps from these geophysical surveys are interpreted to produce maps showing magnetic and gravimetric lineaments. Both sets of lineaments are interpreted as defining structural boundaries.

These geophysical maps, along with the LANDSAT structural map, are synthesized so as to portray the coincidence of the structural evidence derived from the three data sources (namely, visual interpretation of fault/fracture patterns from LANDSAT observations and the two interpretations from the geophysical data). The relationship of structural coincidence with the location of known mineral deposits is then determined.

If a high degree of correlation is found between known mineral occurrences and the remote sensing analyses, the inference is made that the structures defined by the three data sources are favourable environments and potential locations for yet undiscovered mineral emplacement. These areas are subsequently annotated on a final overlay to a base map or LANDSAT image, as prime exploration targets.

3. Multispectral Computer Analysis of LANDSAT Imagery

The visual/geophysical analysis, as described above, is most valuable for exploration of areas in which mineralization is known or suspected of occurring in zones of faulting or fracturing. For conditions in which mineralization may be associated with alteration or geobotanical indicators, and may show surface indications (eg, halos), the multi-spectral computer analysis technique affords a complementary method of exploration.

In this type of analysis, the spectral data of known mineral deposits and their surrounding rock units are processed by computer routines to map areas of similar spectra which may be clues to unrecognized mineralized zones. The LANDSAT imegery in the form of digital data (numerical values which equal intensity values recorded in four bands) is employed in the multispectral processing techniques.

Statistical computer programs are employed to investigate spectral uniformity (as observed in four spectral bands of the LANDSAT scanner system) of known mineral occurrences and their surrounding rock units. Computations are performed on the spectral responses of the areas of known mineralization to produce a "spectral signature", which is a unique code of reflectance values as recorded by the satellite's sensor.

Two methods are utilized to search for other areas that may show a similar "spectral signature". These methods are:

1. the supervised training method; and
2. the unsupervised training method.

In the supervised training method, a computer routine is initiated whereby spectral signatures of points of known mineral deposits are defined, and the computer is instructed (trained) to search the LANDSAT scene, one picture element at a time, and to print out points having the same signature. In this way, overlays are developed that portray zones having spectral responses similar to areas of known mineralization, thereby providing targets for further exploration surveys.

The unsupervised training method groups parcels of land that have spectral responses "similar" to one another, the criteria for "similarity" being defined in an iterative process by an economic geologist and computer scientist. This method is employed to map rock and soil units having spectral non-uniformity.

A field investigation supported by aerial photographic analysis is then conducted for several sites of known mineralization. The geologic evidence thereby acquired supplements information contained in the literature to further determine the validity of the spectral signatures.

The results obtained by RSG's computer processing technique results in a computer printout map at a scale of 1:24,000 wherein each printed character represents 0.46 hectare (1 acre). The printouts are examined for areas having the same spectral signature as areas of known deposits, which, when found, are designated as prime exploration targets.

INTERPRETATION EXPERIENCE

Digital Landsat imagery lends itself well to interpretation of vegetation. Plants which absorb trace metals usually have a flowering stage. Investigation of the spectral values (usually in the ultra-violet part of the spectrum) of these plants and plant assemblages is most economical as scenes from a variety of years and times can be examined.

Plant variety complexes overlying metalliferous ore bodies can be clustered by computer techniques. Usually weak associations or correlations result. However, when combined digitally with results of geochemical techniques, interpretations are more significant.

A satellite prospecting technique is excellent for a first look at an area. The satellite digital data offers a distinct advantage — it is recording data in two non-visible bands. Electronic based techniques allow us to observe those data and interpret them. If seismic, geochemical, and geophysical data are digitized and interleaved with enhanced "massaged" satellite data, the resultant images are still geological maps that must be interpreted. Rarely have we pinpointed minerals. The techniques that we are building are still in their initial stages. Because of spectral changes no two scenes of the same area are exactly alike. Interpretation is always dependent on experience.

Illustrations: Descriptions follow of the accompanying illustrations, together with information about some of the techniques used.

COVER PHOTO

South end of Dead Sea, approximately 1:120,000 scale, produced by computer enhancement. Red colours denote active, flowering vegetation, grey to black areas are soils that are fallow. The variety of blue colours on the Dead Sea are a reflection of the differing densities created by evaporation of soluble salts. Dykes have been constructed across this portion. Evaporation of water pumped into the various cells concentrates the halides.

The light blue colour in the southwest corner has been delineated by interpretation of specially created computer programs to emphasize differences in soil moisture. Shallow brackish water wells are being developed in this area.

The abrupt vegetation linearity south of the Dead Sea denotes a fault. Displaced stream channels in this area attest to recent tectonic activity. Groundwater appears to migrate towards the Dead Sea (−400 metres below sea level). At the fault, water migrates to the surface which results in vegetation growth.

On the east side of the photo, limestone (buff colour) overlies sandstone (brown) bajadas.

GYPSUM TARGETS (Fig 1)

Geological and computer assisted interpretation for gypsum in the Southern Canadian Rockies revealed the presence of surficial soils and rock rich in gypsum. A multispectral program utilizing the Image 100 computer system in Ottawa was performed in an area covering 20,000 km^2. Using packaged software programs and geological interpretation more than 30 prime exploration targets were delineated. Subsequent field exploration revealed seven targets containing scattered outcrops of gypsum. It soon became evident that gypsum deposits in this area were strata bound, mainly occurring in rocks of Middle Devonian age. Because of the incompetent nature of gypsum, most deposits were structurally controlled occurring in folds or struetural traps in zones of dilation.

A second computer program of studies was instigated at the facilities of MDA, in Vancouver. At this time, geological software "game plans" were prepared by RSG. These computer programs ratioed and stretched selective spectral wavelengths. Follow-up work showed that gypsiferous glacial soils were present in certain areas, especially along faults. Conventional geological investigation and a drilling program has revealed the presence of a large tonnage ore body. Glacial cover ranges from 0.5 metres to over 20 metres. The Landsat infrared enhancement, 1:100,000 scale is in the general area of discovery. Anomalous areas with gypsiferous rich soils cannot be displayed as they were depicted by a variety of colour screens.

An auriferous metallogenic area in the Cordillera of Eastern Central Peru (Fig 2) was defined on the basis of numerous small scale Spanish and Pre-Columbian workings. Geological fieldwork in this area revealed the existence of gold-bearing meta-sedimentary rocks. Some of these rocks appear to be associated with Tertiary igneous rocks. Computer enhancement of this area by contrast stretching of certain elements revealed the fact that all known "workings" were associated with intersecting linears. Based on this observation, an electronic filtering was used to remove atmospheric haze as well as the high infrared reflectance normally associated with forested areas.

A program to separate linears as small as five pixels in length (400 metres) was instigated. The computer scenes underwent geometric and radiometric corrections so that the small scale linears could be transferred to maps with some degree of accuracy. Subsequent field investigation revealed spotty skarn-type deposits covered by dense vegetation along a linear belt several kilometres long. Unfortunately concentrations did not appear to be concentrated enough to warrant fuller field investigation.

Landsat scene 1:250,000 shows general physiography. Note "recent" volcano with radial drainage channel in the southeastern part of this area. The mineralized zone extends northwest to southeast through the area.

A program was begun in Saudi Arabia to separate felsic from mafic igneous rock in an attempt to define copper bearing areas. This area (Fig 3) with its dissected circular features is considered by local authorities to be one of the numerous locations of King Solomon's mines. All igneous rocks in this arid environment have a weathering patina of iron minerals. Using iron absorption bands, computer images were stretched and ratioed. The resulting product clearly displays a difference in colour densities.

Field checking revealed a variety of complex basic igneous rocks seemingly intruded by silicic stocks of varying ages. The area was then enhanced and stretched for a digital 5 pixel linear classification. Aeromagnetic and gravity data were digitized and superimposed. Anomalous magnetic areas coincided with nests of intersecting fractures.

Fieldchecking has revealed vein type copper prospects. More detailed investigation is now occurring in the area as well as detailed mapping. In this Landsat scene, two semi-circular structures can be seen introducing a darker coloured country rock. So far, no "old workings" have been re-discovered.

A project to locate underwater bars was instigated off the Orinco River in the Gulf of Paria. In this area (Fig 4) placer bearing gravels have yielded diamonds mainly suitable for industrial purposes. Computer enhancement of the area by ratioing bands 4 and 5 and superimposing the resultant onto another scene from a different time period (called temporal comparison) revealed areas of semi-permanent underwater bar formation.

Aerial flights utilizing water penetration films and filters plotted the distribution and course of these bars. Dredging and diving has revealed a variety of industrial grade stones in this area. The Landsat scene 1:400,000 scale shows part of the Gulf of Paria with the island of Trinidad to the north. Offshore bars can be observed as well as current swirl.

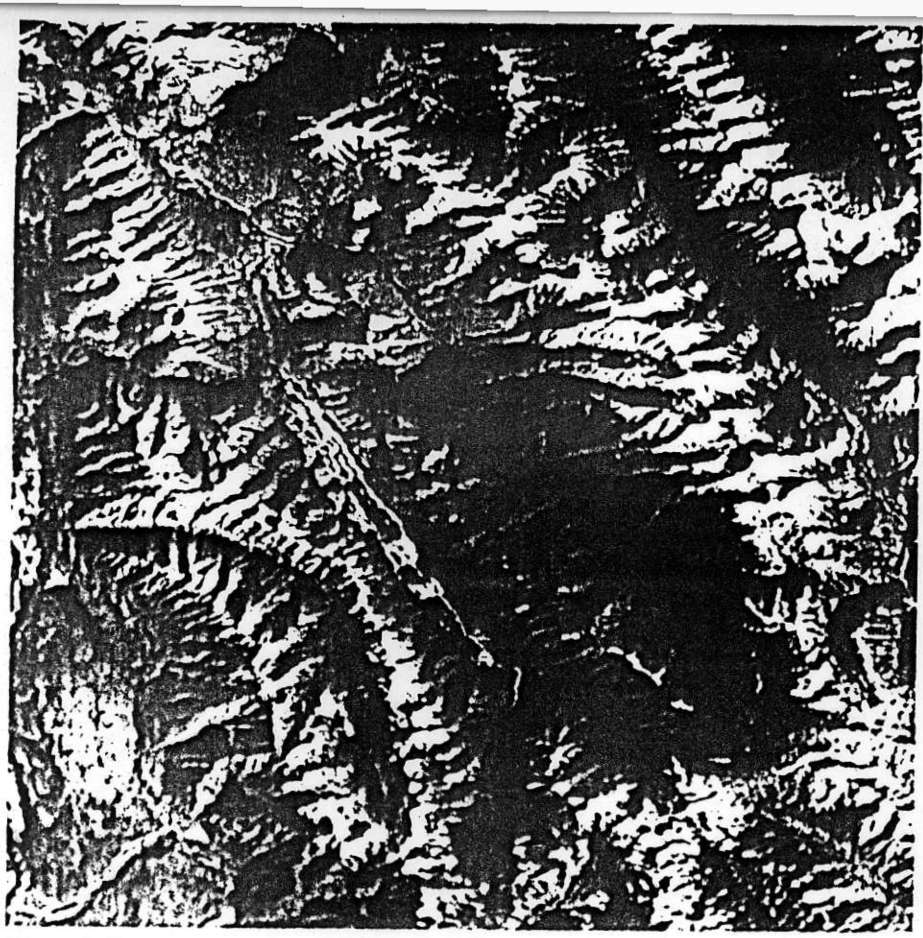
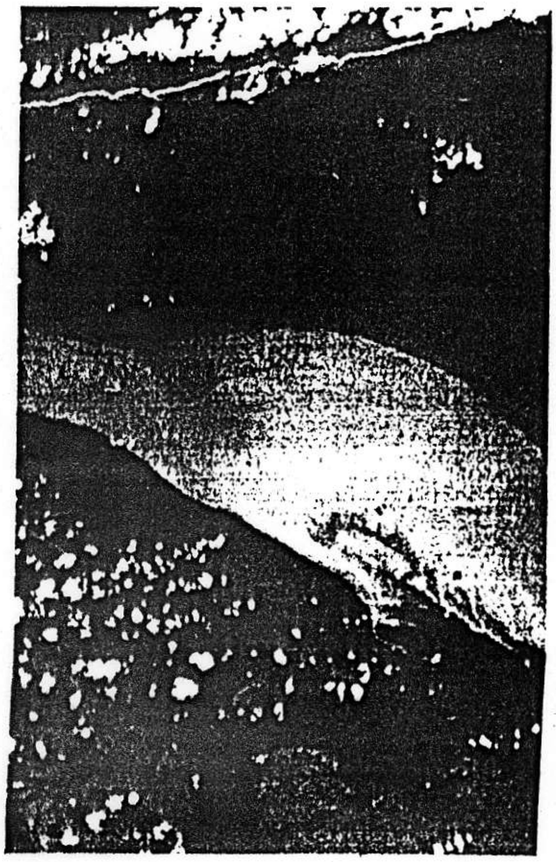


Figure 1. Gypsum targets

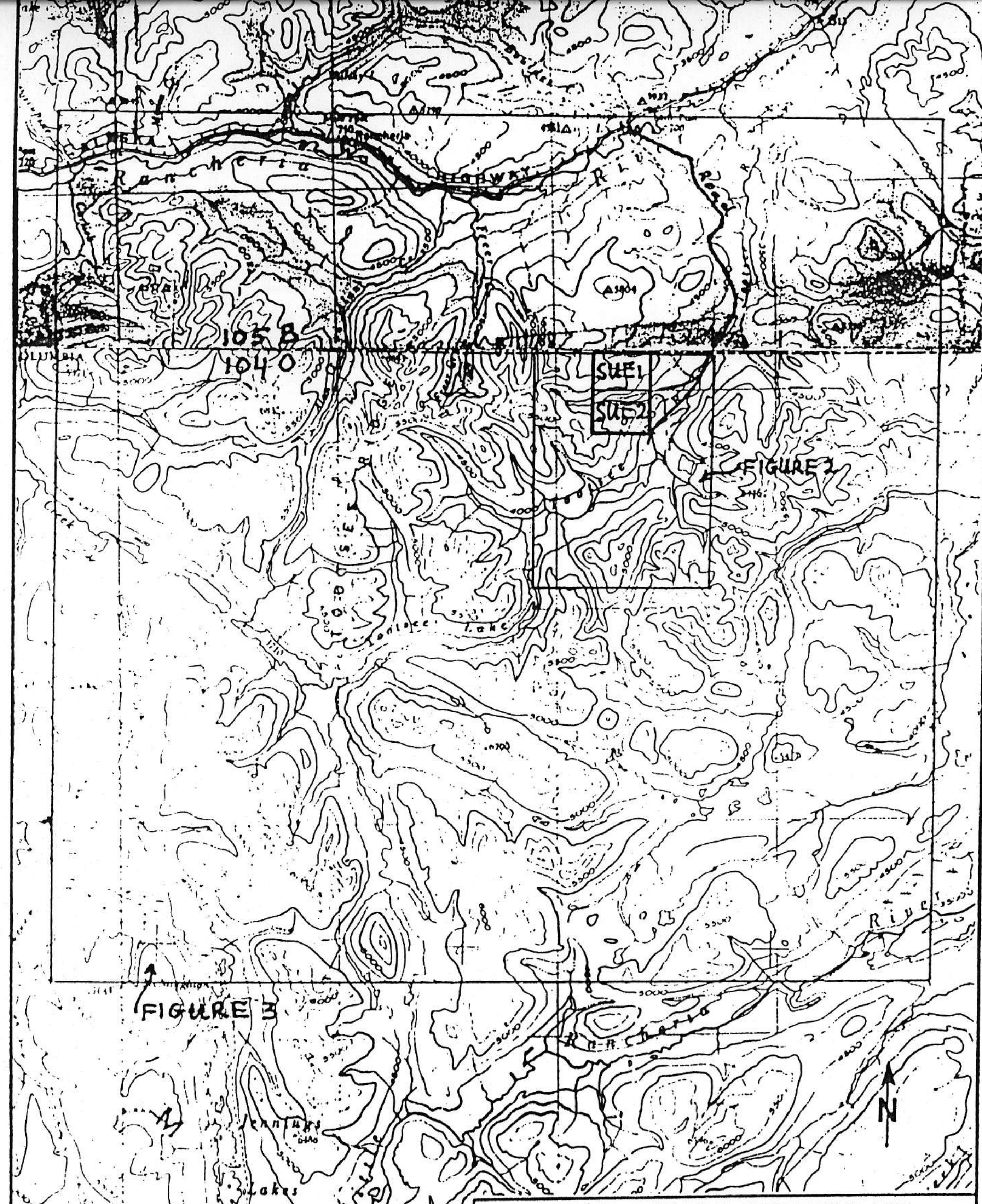
Figure 2. Auriferous area in Peru

Figure 3. Copper in Saudi Arabia

Figure 4. Underwater bars, Orinoco River



Reprinted from WESTERN MINER February 1981



0 500 1000
metres

TURNER ENERGY & RESOURCES LTD.

AREA LOCATION MAP
(ON MAPS NTS 104O AND 105B)

TO ACCOMPANY REPORT BY		
PEGASUS EARTH SENSING CORPORATION	SCALE 1:250,000	DATE AUG. 1983
	FILE 110-04	FIGURE 1
	DRAWN JAS	CHKD EB

PEGASUS
earth sensing
corporation

4381 GALLANT AVENUE
NORTH VANCOUVER, BRITISH COLUMBIA
CANADA V7G 1L1
TELEPHONE: (604) 929 - 2377
TELEX: 04-352543

April 16th, 1984
File 110-04

Turner Energy & Resources Ltd.
8930 Oak Street
Vancouver, B.C.
V6P 4B7

Dear Ms Timmis:

Re: Proposal for Development of Mineral Property at
Tootsee Lake, British Columbia
Claim Blocks: SUE 1(2655) and SUE 2(2656)

This letter outlines our cost estimates for geologic work necessary to develop hard rock mineral prospects owned by Turner Energy & ResourcesLtd. near Tootsee Lake, B.C. The exploration program outlined consists of three phases: Phase I - Geological mapping and geological sampling; Phase II - Geophysical survey and trenching of favourable areas defined by Phase I; Phase III - diamond drilling of promising areas defined by Phases I and II.

If you have any questions or comments, please feel free to contact us.

Yours very truly,

PEGASUS EARTH SENSING CORPORATION

T.H.F. Reimchen, P.Geol.

Pat Whiting,
Geologist

Attachments: Cost Estimate
Project Schedule

cc: Mr. Brian Edgar

Cost Estimate

Phase I

Satellite Survey (completed in 1983)	$ 7,362.25
Field Preparation 2 days @ $280	560.00
Air Fare 1 person @ $500	500.00
Mapping 5 days @ $315	1,575.00
Geochemical Sampling 5 days @ $100	500.00
Helicopter 5 hours @ $500	2,500.00
Sample Processing, Assays	500.00
Accommodation, Food 10 man/days @ $60	600.00
Report Expenses	2,000.00
Contingencies 10% on $16,097.25	1,610.00
	$ 17,707.25

Phase II

Field Preparation 1 day @ $400	$ 400.00
3 days @ $280	840.00
Air Fare 2 people @ $500	1,000.00
Line Cutting 70 hrs @ $13	910.00
Geophysical Survey 7 days @ $315	2,205.00
7 days @ $120	840.00
Geophysical Equipment	400.00
Trenching by explosives 4 sample sites	
explosives	1,000.00
equipment	1,300.00
crew 100 hrs @ $50	5,000.00
Mapping 7 days @ $450	3,150.00
Helicopter 10 hrs @ $500	5,000.00
Accommodation, Food 35 man/days @ $60	2,100.00
Report Expenses	5,000.00
Sample Processing, assays	700.00
Contingencies 10% on $29,845	2,980.00
	$ 32,825.00

Phase III

Air Fare, 1 person @ $500	500.00
Field Preparation 2 days @ $400	800.00
3 days @ $280	840.00
Drilling 800 ft @ $35	28,000.00
Geologic Mapping & Supervision 5 days @ $450	2,250.00
Food, Accommodation 15 man/days @ $60	900.00
Helicopter 12 hrs @ $500	6,000.00
Report Expenses	5,000.00
Contingencies 10% on $44,290	4,430.00
	$ 48,720.00

Project Schedule

Tasks		PHASE I												PHASE II																	PHASE III													
Ebo Bakker:	Field Preparation													X																X	X												
	Travelling																X								X								X						X				
	Mapping																	X	X																								
	Drill/trench. supervision																			X	X	X	X	X										X	X	X	X	X					
	Report writing																									X	X													X	X	X	X
Pat Whiting:	Field preparation	X	X											X	X	X														X	X	X											
	Travelling			X						X							X								X																		
	Geochem/Geophysics																	X	X	X	X	X	X	X																			
	Mapping				X	X	X	X	X																																		
	Report writing										X	X	X													X	X	X	X	X												X	X
Others:	Line Cutting																	X	X	X	X																						
	Geochem/Geophys.				X	X	X	X	X									X	X	X	X	X	X	X																			
	Trenching																			X	X	X	X	X																			
	Drilling																																	X	X	X	X	X					

DU PONT OF CANADA EXPLORATION LIMITED

GEOLOGICAL & GEOCHEMICAL REPORT

JCS 1 AND 2 CLAIMS (Sue 1+2)

LIARD MINING DIVISION

BRITISH COLUMBIA

104-O-16W

59°58'N 130°24'W

L. K. Eccles
Geologist, B.Sc.

February 1980

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LOCATION AND ACCESS

The JCS property is located in British Columbia, approximately 85 km west-southwest of Watson Lake, Yukon Territory on a tributary of the Tootsie River.

A road leading from the Alaska Highway follows along the west side of the Tootsie River and a cat track leading off that road eventually ends up in the centre of the property. The cat track is, for the most part, impassable at present due to washouts and rock slides. The JCS claims are approximately 35 km by road from the Alaska Highway.

Access can also be gained by helicopters which are available for charter from Watson Lake or Swift River.

PHYSIOGRAPHY AND VEGETATION

The claims are bisected by a deeply incised tributary of the Tootsie River and lie at elevations which range between 1200 m and 1700 m above sea level.

Vegetation varies between alpine mosses, grasses and low shrubs at the higher elevations and Black Spruce and Balsam on the valley floor. Over 50% of the claims lie above timberline.

PROPERTY DEFINITION

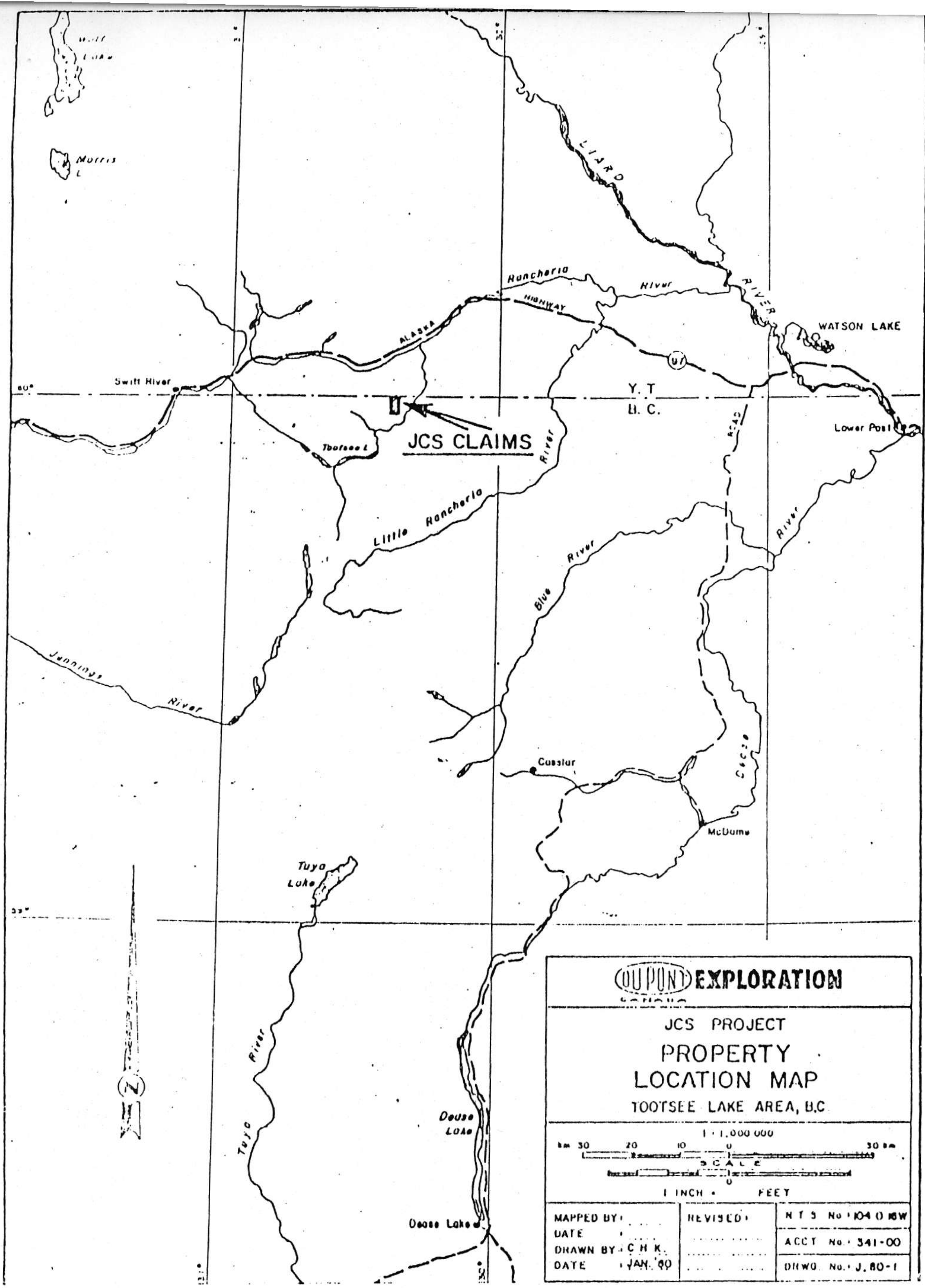
History

In the field season of 1976, J.C. Stephen Explorations found anomalous tungsten values in the silt sediment fraction of the creek which bisects the property.

With the information provided by J.C. Stephen on the anomalies and after the area was revisited and resampled by F.M. Smith and J.C. Stephen in June 1979, Du Pont of Canada Exploration Limited agreed to stake the JCS 1 and JCS 2 claims.

Soil samples were collected over most of the property to define anomalous tungsten zones then detailed soil sampling and mapping was done over the most interesting area.

It is not known whether the ground had been staked in past years.


Morris L
LIARD RIVER
Rancheria River
ALASKA HIGHWAY
WATSON LAKE
97
60°
Swift River
Y.T.
B.C.
JCS CLAIMS
Tootsee L
Lower Post
ROAD
River
Little Rancheria
Blue River
Jennings River
Cassiar
McDame
Tuya Lake
59°
Tuya River
Dease Lake
Dease Lake
N
DUPONT EXPLORATION
JCS PROJECT
PROPERTY
LOCATION MAP
TOOTSEE LAKE AREA, B.C.
1 : 1,000,000
km 30 20 10 0 30 km
SCALE
1 INCH = FEET
MAPPED BY:
DATE
DRAWN BY: C.H.K.
DATE JAN. 80
REVISED:
N.T.S. No. 104 O 16W
ACCT. No. 341-00
DRWG. No. J.80-1

List of Claims

Claim Name	Record No.	Units	Date of Record
JCS 1	870	20	1979 06 11
JCS 2	871	20	1979 06 11

Owner and Operator

The property is currently owned and operated by Du Pont of Canada Exploration Limited.

Economic Assessment of the Property

An anomalous tungsten zone approximately 60 m wide and over 450 m long follows a contact between limestone and quartzite and lies within the contact metamorphic aureole of the Cassiar Intrusive. High-grade scheelite skarn bands, outcropping within this zone have attitudes conformable to the steeply dipping, metasedimentary rocks.

Molybdenite occurs in some of the skarn bands and anomalous molybdenum geochemical values occur in the quartzite close to the intrusive. On an adjacent property (Toot claims), high grade zones of molybdenite occuring along the same contact zone, were drilled by Noranda Exploration Company Limited in 1979.

A breccia zone within the quartzite, known to have dimensions of at least 10 m x 25 m, contains blebs of galena. A grab sample from the zone assayed about 10 oz/ton silver. Possible extentions of this zone have been obscured by overburden.

GEOCHEMICAL SURVEY

Sample Collection and Preparation

Samplers, using claim lines, hip chains and compasses for control, initially undertook to sample the JCS property on a regional scale, using a grid system with 300 m x 300 m sample spacings. It was hoped that this procedure would help define the source of the scheelite which caused anomalous values found in the original stream sediment samples. A total area of about 10.8 sq km was covered by this grid.

Once the regional soil sampling was completed , a detailed grid using a 10 m x 25 m sample spacing and covering 0.19 square kilometres was undertaken over the scheelite bearing skarn zones. In all cases sample stations were flagged and labelled.

A total of 600 soil samples were collected and sent to Min-En Laboratories in North Vancouver to be analyzed for tungsten and molybdenum. Results of the geochemical sampling programme are shown on the maps in the back pockets of this report.

Soil samples were collected from depths of about 20 to 30 cm below surface using a mattock with an 8 cm x 13 cm (3" x 5") blade to dig through the LH and Ao horizon to the B or C detritus or rock grit.

All samples were collected in pre-numbered, wet-strength soil sample envelopes with special information tags stapled to them. At each station, the specific information about that particular sample was recorded on the tag which was then removed before oven drying the samples.

After oven drying, the samples were each ground to approximately -120 mesh, using a 20.5 cm diameter, disc pulverizer. Samples were split using a special aluminum sample splitter so that two representative "pulps" from each sample were obtained. One pulp from each sample was sent to Min-En Laboratories in North Vancouver for analyses. The other has been stored by Du Pont.

Procedures for Geochemical Analysis and Assaying

The oven dried, pulverized and split pulps were analyzed in the following manner by Min-En Laboratories:

a. Molybdenum geochem samples were analyzed by atomic absorption after a six hour digestion of a 1.0 gram sample, using an 85:15 $HClO_4$ - HNO_3 acid mixture.

b. Tungsten geochemical analysis was done by fusion and acid digestion of a 1.0 gram sample followed by colorimetric analysis.

c. Assays of lead and silver were done using the standard wet chemical acid digestion analytical procedure.

Interpretation

a. Tungsten

Anomalous tungsten values were considered to be 47 ppm or higher and so a single contour representing that value was used to define anomalous zones on the tungsten geochemical map (back pocket, Dwg. J-80-4). Values range from 2 ppm up to 1050 ppm.

A north-south trending bleb of high tungsten values predominates on this property within and beyond the confines of the detailed grid. It is approximately 60 metres wide at its widest part; however, it has not been followed beyond the edges of the detailed grid and the zone appears to extend beyond the southern-most line.

The long narrow shape of the anomalous tungsten zone which closely follows the skarned contact of the limestone with the quartzite, possibly also reflects the downslope movement of scheelite particles.

b. Molybdenum

Molybdenum values are generally in the 1 to 8 ppm range except in the extreme northwest portion of the grid where the argillite/quartzite contact exists in a shallow embayment of the granitic rocks. Here values range up to 43 ppm Mo which possibly reflects the close contact effects of the intrusive. However, no visible molybdenite was seen in this area.

Anomalous values for the detailed geochemical grid were considered to be 8 ppm Mo and over. A few values, up to 60 ppm Mo, occur within the quartzite unit at random locations with no explanation for their presence other than the close proximity of the quartzite to the granite. No anomalous molybdenum values exist over the limestone rocks; however, this is to be expected considering the mobile nature of molybdenum in an alkaline environment.

One small molybdenum anomaly occurs over a skarn which was seen to contain visible molybdenite.

c. Lead and Silver

Only one rock sample was analyzed for lead and silver and it was anomalous in both elements(Pb=13,500 ppm, Ag=365 ppm). The rock, containing visible galena was sampled from a breccia zone within the quartzite.

GEOLOGICAL FIELD WORK

Detailed geological mapping was undertaken on the JCS claims at the same time and covering the same area as the detailed geochemical survey. The scale of mapping was at 1:2 000 and it covered an area of 0.19 sq km.

Regional prospecting was carried out over about 5 sq km in hopes of finding more skarn zones.

A total of two rock samples were taken from the scheelite and the scheelite/molybdenite mineralized skarn areas and one galena-bearing sample was collected from the quartzite breccia zone. All these samples were sent to Min-En Laboratories in North Vancouver for geochemical analysis - the first two samples were analyzed for W and Mo and the last sample was analyzed for W, Mo, Pb, Ag and Au.

A total of two rock samples from the skarn zones were collected and sent to Vancouver Petrographics in Fort Langley for thin section identification of fluorescent minerals. See appendix A for thin section descriptions.

Lithology and Structure

The JCS property is located on the contact of the Cassiar batholith and Lower Paleozoic sediments of the Atan - Good Hope Groups according to Map 18-1968 by Gabrielse. A thick unit of limestone from the McDame - Sandpile groups also exists on the property further to the south.

The rocks of the intrusion are predominantly medium- to coarse-grained, biotite quartz monzonite. They are commonly massive and homogeneous and weather to a rusty, brown-buff colour. The intrusive rocks, the only ones observed on the property, occupy the northern portion of the JCS 1 claim and the contact with the sediments cuts across the claim in an approximate northeast/ southwest direction.

According to Gabrielse (GSC Paper 68-55) the "sedimentary strata of the Good Hope - Atan Groups occur within the contact-metamorphic aureole of the Cassiar batholith ...".

Contact metamorphic effects can be observed in the hornfelsed argillites, quartzites and skarn which occur in the area of detailed mapping.

A thin band of dark brown to black argillite can be seen to lie in direct contact with the intrusive rocks bounded by a band of white quartzite, at least 50 metres wide, to the east. The true thickness of the argillite bed like that of the quartzite on the claims cannot be estimated as it has been mostly engulfed by the intrusive rocks. The only outcrop of argillite occurs in a small embayment of the intrusive complex near L50N/180W on the detailed grid (see Geology Map J-80-2 in the back pocket).
The argillite grades into grey/white banded quartzite moving to the east away from the granite/sedimentary contact. More commonly, the quartzite is white and massive. One small area within the quartzite has breccia-pipe characterisitics. Black weathering (as opposed to the typical grey to white weathering of

the white massive quartzite) and brecciated rocks with frothy textures stained to a greenish-yellow is characteristic of the quartzite breccia zone. The outcropping of this peculiar phase within the quartzite measures about 10 metres x 30 metres. Disseminated blebs of galena are often visible in the rock.

Within the area of the detail mapping, near the contact with the limestone but still within the quartzite layer several narrow skarn bands were observed, which are up to 1 metre thick. The skarned quartzite has visible scheelite and molybdenite. A rock sample taken from this skarn had geochemical values of 305 ppm molybdenum and 550 ppm tungsten.

According to the mapping done by Gabrielse (GSC map 18-1968), both the limestones from the Atan-Good Hope Group and the McDame-Sandpile Groups exist within the limits of the property. A contact between the two units was not observed; however, the most easterly outcrops of limestone within the area of detailed mapping weather in higher relief than those closer to the quartzite contact and the relief change is quite sudden, perhaps indicating a different unit.

Close to the contact with the quartzite the coarsely crystalline limestone commonly contains long radiating crystals of wollastonite. Several narrow bands of scheelite bearing skarn exist close to the contact. The skarns commonly have one or a combination of the following minerals: white quartz, wollastonite, chlorite, talc, scheelite and molybdenite. Often the skarn has a breccia texture with dark green to black rock fragments surrounded by a light, grey-green crystal mush. Outcropping skarn bands are mostly obscured by limestone float.

The limestone is banded in places and commonly weathers to a typical white or blue grey colour.

Reliable attitudes of all sediments within the area generally dip moderately or steeply to the east or south-east.

Mineralization

Interest in the area originated from anomalous tungsten values in stream sediments. Since that time, although tungsten still remains to be the most interesting economic mineral on the property, some molybdenite has been discovered as well as some galena with associated silver values.

Fine to coarse crystals of scheelite (up to 3 mm) occur disseminated in all the narrow skarn bands. Molybdenite occurs as paint on the fracture surfaces within a skarn band in the quartzite.

The width and number of skarn bands is not known as overburden covers much of the anomalous zone.

In the quartzite breccia zone, galena (and interesting silver values) occurs as disseminated blebs. The outcrop is small and no extensions of the zone have been found.

CONCLUSIONS AND RECOMMENDATIONS

The regional geochemical survey helped to pin-point the source of the scheelite found in J.C. Stephen's original anomalous stream sediment sample. Detailed mapping and soil sampling defined the character, shape and approximate extent of the scheelite and molybdenite bearing skarn zone.

An extension of the detailed geochemical grid, in both the north and south directions, is required to trace the total extent of the anomalous scheelite-bearing zone. A trenching programme and drilling, contingent on the results of the trenching, is required to explore the actual dimensions of the skarn zone and to determine the grade and persistence of the tungsten and molybdenum mineralization at depth.

Soil samples taken from around the breccia zone carrying galena with high silver values should be reanalyzed for silver. A trench over the showing is required to determine the grade and extent of the silver mineralization.

COST STATEMENT - 1979

JCS Claims

Geochemical Surveys and Mapping

1. Wages

Name	Per Diem Rate	Specific Dates	No. Days	Total
Caira, N.	41.18	Aug. 13,14,19,20	4	$ 164.72
Carlson D.	42.21	June 3, Aug. 13,14	3	126.63
Dionne, C.	41.18	June 3	1	41.18
Eccles, L.	67.75	Aug. 14,19-22,29	6	406.50
Jones M.	41.18	June 3	1	41.18
Raven, W.	38.08	Aug. 19-21	3	114.24
Shaw, I.	42.21	Aug. 13, 14	2	84.42
Whiticar, D.	41.18	June 3	1	41.18
				$1 020.05

2. Food and Accommodation

Name	Specific Dates	No. Days	Total
Caira, N.	Aug. 13,14,19,20	4	$ 113.75
Carlson, D.	June 3, Aug. 13,14	3	84.50
Dionne, C.	June 3	1	28.50
Eccles, L.	Aug. 14,19-22,29	6	170.65
Jones, M.	June 3	1	28.50
Raven, W.	Aug. 19-21	3	64.60
Shaw, I.	Aug. 13,14	2	56.70
Whiticar, D.	June 3	1	28.50
			$ 575.70

3. Transportation

Date	Company	Invoice No.	Amount
June 3	Terr Air	5662	$ 438.00
Aug. 13	Terr Air	5071	346.25
Aug. 14	"	5073	474.75
Aug. 19	"	5089	292.00
Aug. 20	"	5480	401.50
Aug. 21	"	5986	492.75

3. Transportation (cont.)

Date	Company	Invoice No.	Amount
Aug. 22	Terr Air	5993	$ 803.00
Aug. 29	"	6000	492.75
			$3 741.00

4. Geochemical Assay Costs

551 soil samples analyzed for Mo, W @ $5.25 per sample.

Date Invoice	Invoice No.	Amount
1979 11 01	5782	$2 895.90

5. Petrographic Work

Two Rock Samples: Thin section identification.

Date Invoice	Invoice No.	Amount
1979 07 13	1658	$66.50

Distribution

JCS 1 claim group: 288 samples
JCS 2 claim group: 263 samples

Distribution of Work to Claims

N.B. Costs pro-rated on basis of samples collected.

	Claim Group		
	JCS 1	JCS 2	Total
1. Wages	$ 532.46	$ 487.59	$1 020.05
2. Accommodation & Meals	300.51	275.19	575.70
3. Transportation	1 952.80	1 788.20	3 741.00
4. Geochemical Assays	1 512.00	1 383.90	2 895.90
5. Petrographic Work	34.76	31.74	66,50
	$4 332.53	$3 966.62	$8 299.15

L. Eccles
LOUISE ECCLES
(GEOLOGIST)

QUALIFICATIONS

I, Louise K. Eccles, do hereby certify that:

1. I am a geologist residing at 782 W. 22 Avenue, Vancouver, British Columbia and am employed by Du Pont of Canada Exploration Limited.

2. I am a graduate of the University of British Columbia with a B.Sc. (Honors) degree in geology.

3. I have practised my profession in geology continuously for the past three years in British Columbia, Ontario, Yukon and Northwest Territories.

4. Between 1979 August 18 and 24, I directed a field programme on the JCS 1 and JCS 2 claims on behalf of Du Pont of Canada Exploration Limited.

L. Eccles

L. K. Eccles
1980 February 20

ATTESTATION

I, F. Marshall Smith, do hereby certify that:

1. I am a geologist residing at 6580 Mayflower Drive, Richmond, British Columbia and am employed by Du Pont of Canada Exploration Limited.

2. I am a graduate of the University of Toronto with a B.Sc. (Honors) degree in geology.

3. I am a registered Professional Engineer in the province of British Columbia.

4. I have practised my profession in geology continuously in Canada for the past 12 years.

5. I have supervised the work and training of Louise K. Eccles (author of the attached report) for the last five consecutive field seasons and can attest to the described work as being carried out in the described manner and to Louise K. Eccles being a competent and responsible geologist.

F. Marshall Smith

F. Marshall Smith
1980 February 20

APPENDIX "A"

Thin Section Identification of
Fluorescent Minerals in 2 Rock Samples

JCS

Vancouver Petrographics Ltd.

JAMES VINNELL, Manager
JOHN G. PAYNE, Ph. D. Geologist

P.O. BOX 39
8887 NASH STREET
FORT LANGLEY, B.C.
V0X 1J0

PHONE (604) 888-1323

Invoice 1658

Report for: Marshall Smith,
DuPont Canada Exploration,
c/o General Delivery,
SWIFT RIVER, Yukon Y0A 1A0

Samples: 2 and 3, Identify the Fluorescent Minerals

Sample 2

The mineral is fluorescent under short-wave-length ultraviolet but not long-wave-length. A thin section was made. The mineral is scheelite; properties are as follows:

equant, anhedral to rectangular grains up to 3 mm across; most occur in one cluster, but smaller grains are scattered in the sample.
very high relief (greater than garnet)
low birefringence (maximum color in crossed nicols is 1st order yellow, suggests birefringence 0.012 to 0.015)
interference figure gives uniaxial positive sign
hardness in hand sample about 5 to 6
mineral cut by coarse fractures, possibly a weakly developed cleavage.
color in plane light is very pale straw, the mineral may be very weakly pleochroic.

Optical properties of scheelite: R.I. 1.918, 1.934; birefringence 0.016, uniaxial positive, distinct cleavage (octahedral),
color: white, yellow, brown, or grey
habit: octahedra or tabular

Sample 3

A very soft, gummy mineral forms scattered grains, mainly on fracture surfaces. It gives a bright bluish-white fluorescence in both short and long ultraviolet light. A small amount was all that could be scraped off; this was mounted in a powder camera and an X-ray photo was made. No thin section was made because of the very soft nature of the mineral(s).

The X-ray pattern shows that calcite is present, a fact confirmed by adding HCl to the sample. Another mineral may be present as well; a few lines were not identified as calcite, but were not sufficient to characterize another mineral. Results of this study are summarized on the following page.

The X-ray pattern is not good, because I did not grind the sample for fear of losing some in the process; thus, many lines are represented by a series of dots produced by individual mineral grains.

Results of Analysis of x-ray data on sample 3

d-spacing	intensity	calcite
8.84	weak	--
3.37	moderate	--
3.02	strong	yes
2.71	moderate	--
2.56	weak	--
2.51	weak	--
2.28	moderate	yes
2.11	moderate	yes
2.03	weak	--
1.925	weak	yes
1.873	weak	yes
1.636	weak	--
1.517	weak	--

some of the lines described as weak are extrapolated from only a few spots, and may not be important. The only important lines not produced by calcite are those with d-spacings of 3.37 and 2.71.

John Payne

John Payne,
June, 1979