

823301

## APPENDIX 1

Summary of Salamet Mines Diamond Drill Hole Data

APPENDIX I cont'd

<u>Hole No.</u>	<u>Claim</u>	<u>Footage</u>	<u>Remarks</u>
V 6	Pluto	346	did intersect skarn

APPENDIX 1

SUMMARY OF SALAMET MINES DIAMOND DRILL HOLE DATA  
(From a Report by Hicks & Cormie, 1957)

A. Holes Collared on Greenwood Property

<u>Hole No.</u>	<u>Claim</u>	<u>Footage</u>	<u>Remarks</u>
S 71	Jim McRae 2 FR	328	intersected white to tan arkose and sandstone
S 73	Jim McRae 2 FR	265	intersected white to tan arkose and sandstone
S 75	Jim McRae 2 FR	551	intersected white to tan arkose, intersected sharpstone of Brooklyn Form. (probably at bottom?)
S 78	Buckhorn	518	intersected diorite
S 79	Jim McRae 2 FR	112	did not reach bedrock
S 80	Buckhorn	511	166'-1751 assayed 1.03 Cu, 0.07 Au, intersected andesite and diorite
S 81	Jim McRae 2 FR	164	intersected sharpstone of Brooklyn Form.
S 82	Jim McRae 2 FR	464	intersected Brooklyn rocks, not limestone
S 83	Syd H. Johnson	100	did not reach bedrock

B. Holes not Collared on Greenwood Property but Applicable to Local Geology

<u>Hole No.</u>	<u>Claim</u>	<u>Footage</u>	<u>Remarks</u>
A 33-A	Peacock	72	did not reach bedrock
A 33	Pluto	134	intersected cherty andesite
DW 4	Pluto		drilled by Granby, did not get significant intersection
DW 5	Greyhound	?	drilled by Granby, did not get significant intersection
V 5	Pluto	130	intersected white to tan arkose and sandstone

#144

- REPORT PREPARED FOR -

BULKLEY SILVER RESOURCES INC. A SUBSIDIARY OF  
NEW FRONTIER PETROLEUM CORPORATION  
1230-800 WEST PENDER STREET,  
VANCOUVER, B.C.  
V6C 2V6

- REPORT ON -

THE TAM O'SHANTER PROPERTY  
GREENWOOD MINING DIVISION  
BRITISH COLUMBIA, CANADA

NTS 82E 2E; LAT 49° 06'N, LONG 118° 43'W

- DATED -

MARCH 13, 1984  
VANCOUVER, BRITISH COLUMBIA

- PREPARED BY -

H.H. SHEAR, P. ENG.

## TABLE OF CONTENTS

SUMMARY	Page 1
CONCLUSIONS & RECOMMENDATIONS	Page 2
INTRODUCTION	Page 3
LOCATION, ACCESS, TOPOGRAPHY, CLIMATE AND LOCAL RESOURCES	Page 4
PROPERTY DESCRIPTION	Page 4
CLAIMS & LOCATIONS MAP (FIGURE 1)	Page 5
HISTORY	Page 6 - 7
DISCLOSURE OF WRITER'S INTEREST	Page 9
GEOLOGY	Page 9 - 10
EARLY TERTIARY STRATIFIED ROCKS (FIGURE 2)	Page 11
CROSS SECTION A-A' PRIME THROUGH BENGAL SHAFT (FIGURE 4)	Page 13
DISCUSSION OF EXPLORATION WARRANTED	Page 15
ESTIMATED COSTS OF PROGRAM	Page 18
REFERENCES	Page 19
CERTIFICATE OF QUALIFICATIONS	Page 20
LETTER OF CONSENT	
ENCLOSURES-FIGURE 3 PLAN CENTERED AROUND BENGAL SHAFT ZONE SHOWING GEOLOGY	

### SUMMARY

The Tam O'Shanter property, located near Greenwood, B.C., has received a great deal of exploration attention in years past in the search for disseminated porphyry copper type deposits. A diamond drill hole and some surface trenching done in 1979 has disclosed the presence of a large, intensely hydrothermally altered zone which appears to be mostly capped by about 300' of overlying Tertiary rocks. The alteration zone displays many of the characteristics of an epithermal gold-silver system and it is associated with and adjacent to a major, regional Tertiary fault. A program of geophysics and deep diamond drilling costing \$125,000.00 has been recommended to search for gold-silver deposits at depth within this epithermal system.

### CONCLUSIONS AND RECOMMENDATIONS

The Tam O'Shanter property is situated in the historic old Greenwood mining district which has had prolific past production.

The property has received a great deal of exploration attention from the 1890's to the present in a search for disseminated porphyry copper type deposits.

Current attention is focused on the Bengal shaft zone, which except for a shallow shaft and a few pits, has received no definitive work until 1979. This area lies adjacent to and is associated with a major regional structure, the Toroda Creek fault.

In 1979, Oneida Resources Inc. drilled a hole, DDH 79-2, which intersected 555', from 296' - 851', of intensely hydrothermally altered rocks adjacent to the Bengal shaft.

The zone has been subjected to intense silicification and pyritization with some K-feldspar alteration and argillization. It displays many of the characteristics which are typical of the uppermost portion of epithermal gold-silver hydrothermal systems.

While no anomalous values occur on the surface at the Bengal shaft zone, it is not necessary for values to occur at or near surface for the situation to fit the epithermal gold-silver hydrothermal system model.

Some high grade silver values do occur nearby lending encouragement that the system will contain significant deposits of gold and silver.

This very intensely hydrothermally altered zone definitely warrants further attention. The writer recommends the \$125,000.00 program of line cutting, I.P. surveying, PEM surveying, and diamond drilling of 3,000 feet as defined under the heading, Discussion of Exploration Warranted, in this report. The program is designed to search for gold-silver deposits at depth in this epithermal system.

Respectfully submitted,

H.H. Shear, P. Eng.

## Introduction

The Tam O'Shanter property is owned by Bulkley Silver Resources Inc. a subsidiary of New Frontier Petroleum Corp. of 1230-800 W. Pender Street, Vancouver, B.C. The property was formerly in the name of Oneida Resources Ltd. which was amalgamated into New Frontier. The property is centered 4 kilometers west of the old mining town of Greenwood, British Columbia, Canada.

The area covered by this group of claims has received extensive exploration attention from the 1890's to the present. Early exploration was prompted by the success of the large medium grade, skarn hosted copper-gold deposits at Phoenix 10 kilometers to the east, and at the Mother Lode Mine 2 kilometers to the North. With the advent of very large, very low grade producers in British Columbia, such as the Brenda Mine in the early 1960's, exploration in the Tam O'Shanter area became focused on a small stock of Nelson diorite which carries slight amounts of copper values throughout an area of some 3,000-3,500' by approximately 5,000'.

Since 1978, the management of Bulkley Silver and its predecessors have been investigating a large highly silicious pyritized zone located immediately west of the above mentioned stock. This area, known as the Bengal shaft zone, appears to display several of the characteristics of typical epithermal gold-silver bearing systems which are being increasingly exploited in the western cordillera in Nevada and elsewhere in the United States. There are minor and sporadic gold-silver values occurring within this epithermal system on the Tam O'Shanter property.

The writer has completed this report at the request of Mr. G.O.M. Stewart, President, of Bulkley Silver Resources Inc. The writer has been intimately associated with the property and area since December, 1962. This involvement is detailed under the section on Disclosure of Writer's Interest in this report. Work completed in the area by San Jacinto Exploration Ltd. from 1966-1969, and by Mascot Mines and Petroleum Ltd. from 1973-1974 was completed under the writers direction. The writer has inspected all work completed on this property from 1965 to the present time, because of various interests held in the property in the past. However, he currently holds no interest in the subject property or the companies involved in this property. Numerous files of data and various old and recent reports, listed under references, were studied at Bulkley Silver's field office in Greenwood, B.C. in preparing this report. The property was visited most recently on October 3 and 4, 1983, when the latest work, some backhoe trenching, was completed.

This report describes the Tam O'Shanter property, briefly covering work prior to 1978 and concentrating on information and theories on the current target areas. An exploration program totalling of \$125,000.00 is recommended for the Bengal shaft zone.



### Location, Access, Topography, Climate and Local Resources

The Tam O'Shanter property lies 1.5 to 6 kilometers west of Greenwood, British Columbia. Greenwood is situated 10 kilometers north of the Washington State - B.C. border and approximately 500 kilometers (300 miles) east of Vancouver, B.C. The property is centered at latitude 49° 06'N and longitude 118° 43'W, and is found on NTS sheet 82E/2E. It lies in the Deadwood Camp area of the Greenwood Mining Division.

Access is from Greenwood, which is located on B.C. Hwy. #3, via the Deadwood Flat and Mother Lode Creek road. This is a good gravel road usually passible by two wheel drive vehicles except during spring breakup, and it crosses a very small segment of the extreme northeast part of the claim block. Approximately 4 kilometers beyond Deadwood Flat, a good modern logging road turns south and passes into the center of the property. Numerous old logging and mining roads traverse most of the property making access to many areas fairly easy by four wheel drive vehicles.

The topography of the property is fairly moderate with a few fairly short steep slopes. Elevations range from approximately 850 M (2800') on the northeast corner of the claim block at Deadwood Flat to 1460 M (4800') at the height of land at the south central part of the property.

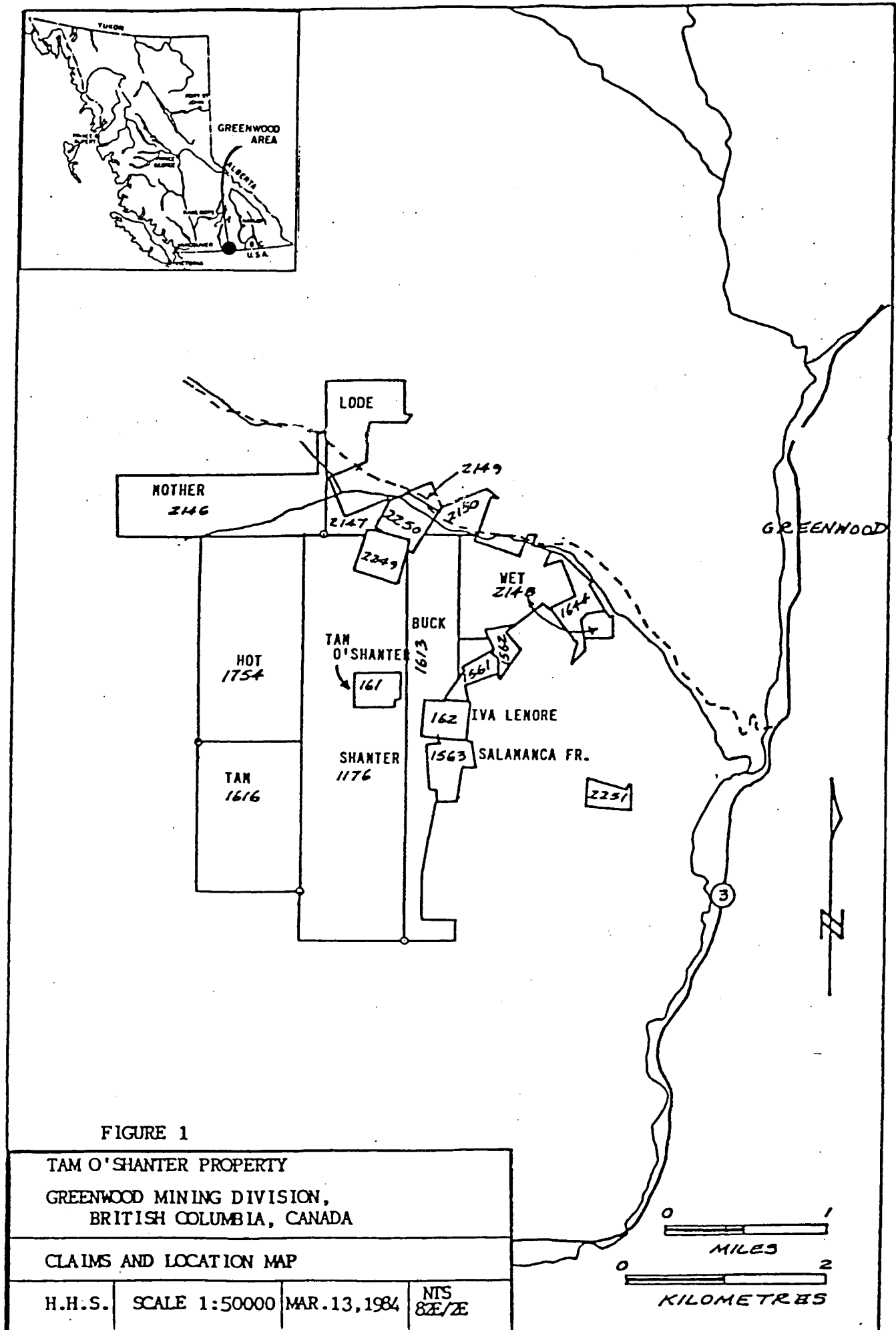
The climate of the area is moderate. Deadwood Flats is under cultivation as hay meadows and cattle range throughout the property areas. Temperature extremes can rarely touch - 35°C or +35°C but usually don't exceed -30°C or +30°C. The snow pack at high levels rarely exceeds 1.5 meters but usually reaches about 0.8 meters.

All required goods and services for food and lodging are available in Greenwood. Many additional goods and services are available especially at Grand Forks 50 kilometers by road to the east.

There are no unusual obstacles that exist toward exploration, or future developments. In fact the property is very favorably located with this regard.

### Property Description

The Tam O'Shanter property consists of 68 contiguous units totalling approximately 3400 acres (1400 hectares) composed of the following: 9 reverted crown grants totalling 8 units and 8 claims, 7 mineral claims totalling 58 units, and 2 fractional mineral claims totalling 2 units. In addition, Bulkley Silver Resources Inc. owns two additional separate units: the Contact claim which is a 2 post located claim lying 500 meters north east of the Montrose Fr., and the Eureka claim which is a reverted crown grant mineral claim lying 1,500 meters east of the Salamanca Fr. The claims are shown on Figure 1 along with their location in B.C.



The list of contiguous claims are:

Reverted Crown Grant Mineral Claims:

<u>Claim Name</u>	<u>Record No.</u>	<u>Lot No.</u>	<u>Expiry Date</u>
Tam O'Shanter	161(11)	2405	Nov. 20, 1988
Iva Lenore	162(11)	1262	Nov. 20, 1987
Viceroy Fr.	1561(6)	1722	June 11, 1992
Arlington Fr. and No. 9 Fr.	1562(6)	1110 882s	June 11, 1992
Salamanca Fr.	1563(6)	2902	June 11, 1992
Montrose Fr.	1644(7)	2654	July 9, 1992
Gold Bug No. 2	2249(6)	1718	June 5, 1993
Little Buffalo Fr.	2250(6)	1717	June 5, 1992

Located Claims and Fractions:

<u>Claim Name</u>	<u>Record No.</u>	<u>No. Units</u>	<u>Expiry Date</u>
Shanter	1176(7)	16	July 7, 1989
Buck	1613(6)	8	June 28, 1992
Tam	1616(6)	6	June 28, 1991
Hot	1754(8)	8	Aug. 29, 1993
Mother	2146(4)	8	Apr. 29, 1990
Lode	2147(4)	6	Apr. 29, 1993
Wet	2148(4)	6	Apr. 29, 1988
Buck Fr.	2149(4)	1	Apr. 29, 1992
Horn Fr.	2150(4)	1	Apr. 29, 1992

The two separate claims are:

<u>Claim Name</u>	<u>Record No.</u>	<u>Lot No.</u>	<u>No. Units</u>	<u>Expiry Date</u>
Eureka Fr.	2251	3259	1	June 5, 1986
Contact	2399		1	Sept. 2, 1987

No work recommendations for these two claims are included in this report.

HISTORY

Greenwood is the center of a prolific mining camp with serious prospecting starting in the late 1880's, commencement of small high grade production from several properties in the early 1890's and major production of copper-gold ores beginning at the turn of the century with the arrival of two railroads and the construction of three smelters in the district. This activity led to intensive prospecting all over the Greenwood district and past work was especially concentrated on any area where widespread mineralization occurred.

A body of Nelson quartz diorite occurs on the Tam O'Shanter property which is weakly but pervasively mineralized with chalcopyrite and pyrite along scattered fractures. This body trends off the property to the east and disappears under the west edge of Deadwood Flat to the east. From the 1890's this zone has received much attention and numerous prospect pits have been dug literally throughout this intrusive. In a few areas of more intense alteration and mineralization, shallow shafts and short adits have been driven. All of the eastern portion of the property lying east of the overlying tertiary rocks was solidly crown granted by the early 1900's.

The most extensive workings on this large, very low grade copper zone occur on the Buckhorn claim, not part of the subject property, which lies between Bulkley Silver's Arlington Fr. - No. 9 Fr. Claim and the Montrose Fr. Claim. On the Buckhorn a 200' shaft was sunk with levels driven at 100' and 200' depths. Two car loads of ore were reported to have been shipped. This work was completed from 1899-1901.

During 1921-22, several hundred feet of underground development was carried out on the Tam O'Shanter claim on a small high grade silver vein which also carried significant credits in gold and copper. According to the report of the Minister of Mines - 1923, three tons grading 0.40 oz/ton gold and 66.0 oz/ton silver was shipped from these workings. The writer inspected these workings in 1965 and suspects from the size of the old stopes that additional unreported production occurred. The Tam O'Shanter workings occur near the western edge of the mineralized diorite and are on strike, to the northeast, of Bulkley Silver's current zone of interest at the Bengal shaft area.

No work is reported on the property in the old records from the mid 1920's to the mid 1950's.

In 1952 Attwood Copper did some exploration centered around the Greyhound claim on the east side of Deadwood Flat. This claim produced briefly during 1970 from an open pit but the zone was known from the early 1900's. From 1955-1957 Salmo Prince Mines Ltd. and Meta Uranium Ltd. conducted work programs, using Salamet Mines Ltd. as their operating company, around the Greyhound claim, Deadwood Flats and the Buckhorn claim. These programs from 1952-1957 were primarily done to search for the typical skarn hosted ores which accounted for the main production tonnage from the Greenwood district.

From 1964 through 1974, a number of companies in succession concentrated their attention on the wide spread, low grade copper mineralization in the small stock of Nelson diorite lying from the middle of the Tam O'Shanter property to Deadwood Flat, and including the Buckhorn, Moreen Fr. and XLCR crown grants adjoining the subject property on its east side. Since no economic zones were disclosed by this work, a detailed description of the very large quantity of exploration work done is unwarranted. Work completed during these years would amount to close to \$1,000,000.00 in 1984 dollars. This work consisted of extensive line cutting, geochemical surveying, magnetometer surveying, I.P. and resistivity surveying and geological mapping. It is estimated that some 17 kilometers (10 miles) of road building and some 6,000 meters (20,000') of bulldozer trenching was completed from 1964-1968. From 1964 through 1974, 43 diamond drill holes totalling roughly 12,500 feet and 63 percussion drill holes totalling roughly 10,000 feet were completed. The results of this work were that a medium sized zone of .3% copper was found on

the Buckhorn claim associated with the old workings. A zone 1,000 feet long and 200-400 feet wide with intercepts ranging from .15 - .3% copper was found on the Iva Lenore claim. Several other zones were exposed which appeared interesting but drill results were poor (in the range of 0.1% copper).

The companies that were active on the Tam O'Shanter property and adjoining Buckhorn group from 1964-1974 are:

Silver Dome Mines Ltd.	1964
Crown Silver Development Co. Ltd.	1965
Utah Mining and Construction Co. Ltd	1966-67
San Jacinto Explorations Ltd.	1965-69
Siniloops Syndicate (Nippon)	1969
Perry, Knox, and Kaufmann (Sun Oil)	1971
Mapletree Exploration Corp. (Cyprus)	1973
Mascot Mines and Petroleum Ltd. (Giant Mascot)	1973-74

In 1975, Mr. George O.M. Stewart became interested and involved in the property. From 1975-1978 he made detailed studies of alteration and fracture patterns along with geological mapping as an aid to designing an additional exploration program. As a result of this study, an area of intense silicification was disclosed adjacent to the Bengal shaft. The zone also contained abundant limonite. At the end of this period the property was transferred to Oneida Resources Ltd.

In 1979, Oneida Resources Ltd. completed 8.2 km of grid centered around the Bengal shaft zone and drilled 3 diamond drill holes totalling 658 M (2,160') to test the zone. In May, 1980, a 200' long backhoe trench was completed across a portion of the Bengal shaft zone. At the same time the backhoe was used to clean out several old workings elsewhere on the property.

In May 1981, Mr. G.H. Rayner, P. Eng., completed a detailed geological study centered around the Bengal shaft area covering an area of approximately 1500 x 2000 meters. This work is described in a report dated May 24, 1982.

In January 1982, Oneida was amalgamated with three other companies which become New Frontier Petroleum Corporation and it became the owner of the Tam O'Shanter property.

In October 1983, some 200 lineal feet of trenching was completed with a large backhoe near the Bengal shaft to accumulate more geologic information. At the same time approximately 100 feet of trenching was completed about 1,500 meters to the north where copper staining was uncovered on a new logging road.

On December 16, 1983, New Frontier transferred the title of the Tam O'Shanter property to it's subsidiary, Bulkley Silver Resources, Inc.

### Disclosure of Writer's Interest

The writer has had a direct or indirect interest in large portions of the current Tam O'Shanter property since December, 1962, when he first staked claims in the area. He was one of three vendors in the property to Silver Dome Mines Ltd. in 1963 and acquired shares in Silver Dome for the property. When the property was allowed by Silver Dome to lapse in 1970 the writer again became a direct owner, with partners, when it was restaked. The writer was the president and one of the principal shareholders of San Jacinto Explorations Ltd. from 1965-1971 which held the Buckhorn, Moreen Fr. and XLCR crown grants and some of the area currently held by Bulkley. The writer and a partner were the optionors of the property while work was completed by several companies from 1971 through 1974. In 1975, Mr. George Stewart was invited into the situation and consequently the writer was one of the vendors to Oneida for which he received stock in Oneida. Most of this share position was sold back to the principals of Oneida in September, 1981. The writer received 1,000 shares in New Frontier Petroleum Corp. as a result of the amalgamation of Oneida in 1982. At that time, the writer obtained an additional 540 shares in New Frontier due to holdings in Kelly Petroleum which was also amalgamated into the new company. By May 1983, all of these 1,540 shares were disposed of and the writer currently has no interests in the property, Bulkley Silver Resources Inc. or New Frontier Petroleum Corporation.

The writer is President and one of the principal shareholders of Dentonia Resources Ltd. which owns the controlling interest in the Jewel Mine currently being explored and developed 9 kilometers to the northeast of the subject property. Mr. G.O.M. Stewart is also a director and principal shareholder of Dentonia Resources Ltd. The writer is President and principal shareholder of Skylark Resources Ltd, which owns the controlling interest in the Skylark prospect 3.5 kilometers east of the subject property.

### Geology

Regional: The geology of the Greenwood area is complex, which has caused differences of opinion in the past by various authorities who have studied the geology of the district. No comprehensive published work has been completed to date. Work in the last few years by personnel employed by exploration companies and B.C. Dept. Mines personnel, all of whom share and discuss their findings with each other, continues to add and improve on the knowledge of the geology of the Greenwood area. The following discussion is intended as a brief, simplified overview of the general geology of the district. The description of the Grand Forks Group and Brooklyn Formation is mainly derived from verbal communications with Dr. Neil Church, Geologist with the B.C. Department of Mines.

The oldest rocks in the district belong to the Grand Forks Group which is correlated with the Shuswap (Monashee) Metamorphic Complex. Its age is not accurately known but these rocks are considered to have been deposited during Paleozoic time. An 'educated guess' would date them as Permo-Carboniferous in age. The group has been classified as paragneiss consisting of quartzites, chlorite schist, gneiss, migmatites and pegmatites. Some local bands of marble occur. Church and others have identified these rock types within the Greenwood mining area, lying further west than previously mapped by past work. Within these areas from bottom to top the group consists of quartzite (chert),

chlorite schist and quartz sweat (argillaceous rocks) with bands of marble, and amphibolite (andestic volcanics). The Grand Forks Group is considered to be the basement rocks in the Greenwood area.

Lying unconformably on the Grand Forks Group is an unnamed formation of black argillite with some local bands of limestone which has been dated as Permian in age. A pronounced unconformably exists at the top of this formation.

The next youngest rocks belong to the Brooklyn Formation which is considered Upper Triassic in age. The basal unit is andesite to basaltic volcanics. Above this is a unit of chlorite andesite volcanic breccia (low metamorphism). Above the breccia is a complex assemblage with sharpstone conglomerate on the bottom, limestone on top and argillite more or less between but complexly interfingered with both the conglomerate and limestone. Much of the ore produced to date from the Greenwood district has occurred associated with the transition zones of argillite to limestone and argillite to conglomerate. The uppermost rock type of the Brooklyn is a unit of andesite.

All the above rocks have been intruded by igneous bodies of small stock to batholith proportion related to the Nelson Intrusions of Cretaceous age. Rock types vary from granite to diorite and quartz diorite. Some serpentinized ultrabasic bodies occur in the district and may be older than the Nelson Intrusions.

All of the above rocks are overlain unconformably by the Kettle River Formation which is Eocene in age. The Kettle River Formation is mainly a sedimentary sequence of feldspathic and lithic volcanic sandstones with subordinate conglomerate, volcanic breccias and dacite. Overlying the Kettle River Formation are Eocene to Oligocene rocks belonging to the Marron Formation. These rocks are mainly flows of dacite, latite, and andesite with minor tuff. Related dykes, sills, plugs, and stocks cut all pre-Marron rocks. These intrusives include Coryell syenite, diorite, quartz monzonite, gabbro and their fine grained equivalents.

Tertiary block faulting has been imposed across the district and in some places is responsible for preserving thick sections of the Kettle River and Marron Formations in graben blocks.

The Tam O'Shanter property straddles a north-south fault contact which forms the boundary between the Tertiary formations to the west and older rocks to the east. (Refer to Figure 2). This fault is part of the Toroda Creek fault system which forms the east boundary of the Toroda Creek graben. The graben, and contained suite of Tertiary rocks, continues south into Washington State for about 50 kilometers from the subject property. This east fault boundary swings northwesterly a short distance north of the property and can be traced in that direction for about 12 kilometers.

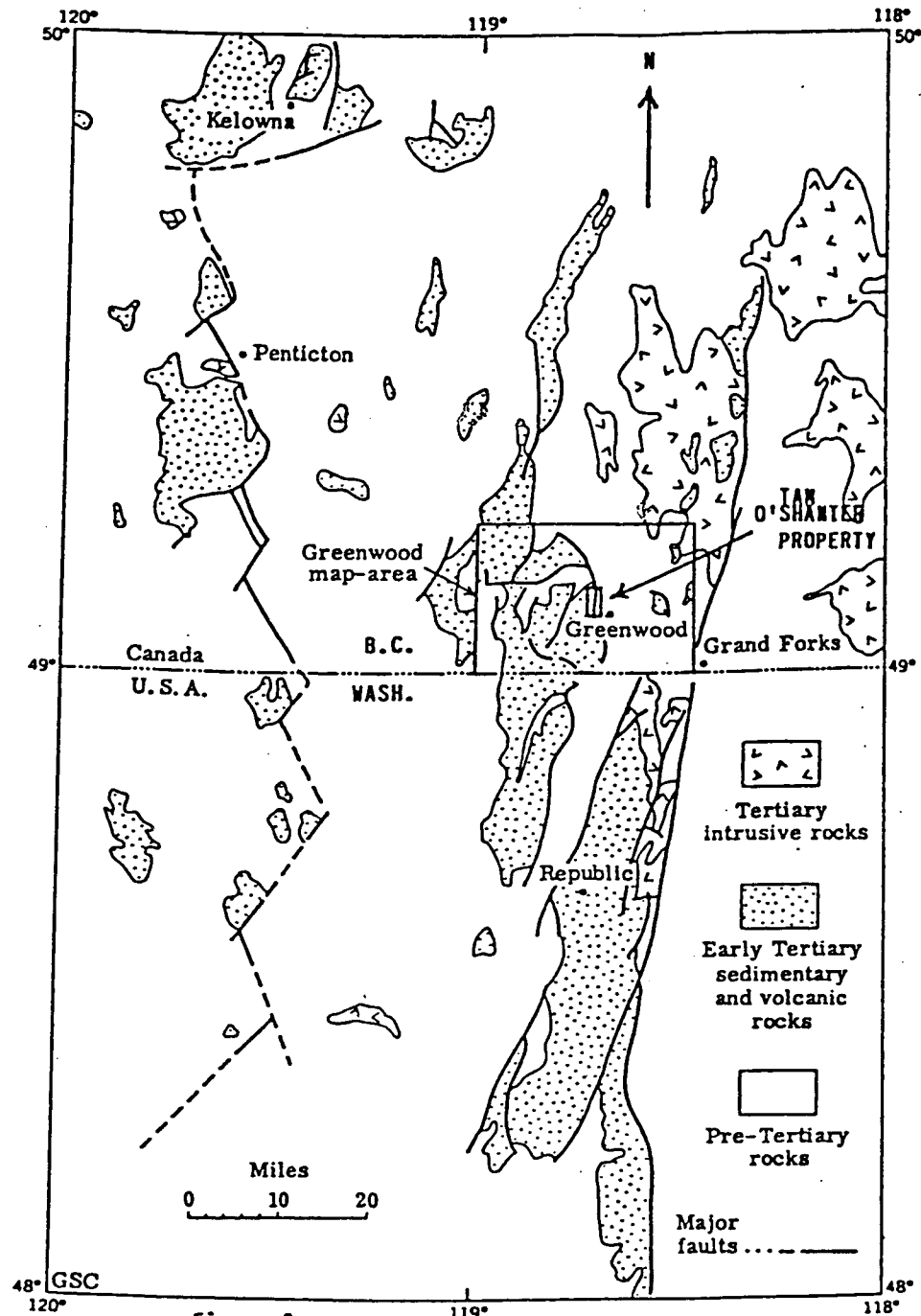


Figure 2

Distribution of early Tertiary rocks in parts of south-central British Columbia and northern Washington.  
From: Early Tertiary Stratified Rocks,  
Greenwood Map Area; G.S.C. paper 67-42  
by J.W.H. Monger.



Local: The Tam O'Shanter property is underlain by four main formations. The oldest rocks are an assemblage of silicified rock, chert and cherty tuffs, and andesite tuffs. These rocks have been intruded by a stock of diorite and quartz diorite related to the Nelson Intrusions. The western part of the property is underlain by units of the Marron volcanic sequence and a small crescent shaped body of Kettle River Formation sediments occurs between the Marron and older rocks. Refer to Figure 3 enclosed at the back of this report. Most of this geologic map was prepared from work by G.H. Rayner in 1981. Certain areas not covered by Rayner were added by the writer based on his work done in 1973-74.

The oldest rocks on the Tam O'Shanter property as mapped by Rayner are silicified rock, chert and cherty tuffs, and andesite tuffs. In the past, these rocks have been considered part of the Knob Hill Formation. The writer has been told that this term is now out of date and that many of the older rocks in the district are, in fact, less metamorphosed units of the Grand Forks Group (Dr. Neil Church - verbal communication). There is no known exposure on the property of the more readily identifiable units of the Brooklyn formation such as the sharpstone conglomerate, argillite, or the Brooklyn limestone. There are a few small skarny zones on the property with massive magnetite in two spots which may suggest that some very small remnants of the Brooklyn Formation are present. Some of the andesite occurring on the property could belong to the basal andesite unit of the Brooklyn. The highly silicious rock and chert units would have to be classified as Grand Forks Group rocks as described under the General Geology section of this report. These rocks underlie the northeast and southeast portions of the property.

The body of Nelson diorite and quartz diorite underlies an area of 3000-3500 feet wide (north-south) and trends off the property under Deadwood Flat to the east, approximately 6500 feet from its western contact with the Kettle River Formation. This intrusive is characterized by pervasive low grade propylitization and chalcopyrite mineralization, and was the focus of most of the work and drilling completed on the property in the past. Drilling by Mascot Mines and Petroleum Ltd. in 1974 on the northwest and north edge of the Grand Forks rocks as shown on Figure 3 disclosed that the diorite shallowly underlies the older rocks there.

The Kettle River Formation had only one natural outcrop, prior to exploration work, at the Bengal shaft area near its western contact. The best exposure is in a 1964 bulldozer cut which opened up its eastern border where it is in fault contact with mineralized Nelson diorite. Oneida's drill holes 79-1 to 3 and Mascot's holes G-16 and 17 cut Kettle River rocks. Surface exposures consist of basal conglomerate and tuffaceous sandstone (arkose) while the drill holes cut dacite in addition to tuffaceous sediments. The Kettle River Formation is in fault contact on its west border with Marron rocks.

The Marron Formation, as mapped by Rayner, consists of a volcanic pile from bottom to top of basalt and basaltic andesite, massive trachyandesite porphyry, fine platy tuff, platy trachyandesite porphyry, and scoriaceous andesite porphyry. This formation underlies all of the western third of the Tam O'Shanter Group. It covers a broad area to the north, west, and south of the property and its eastern boundary has marked the limit of past exploration interest.

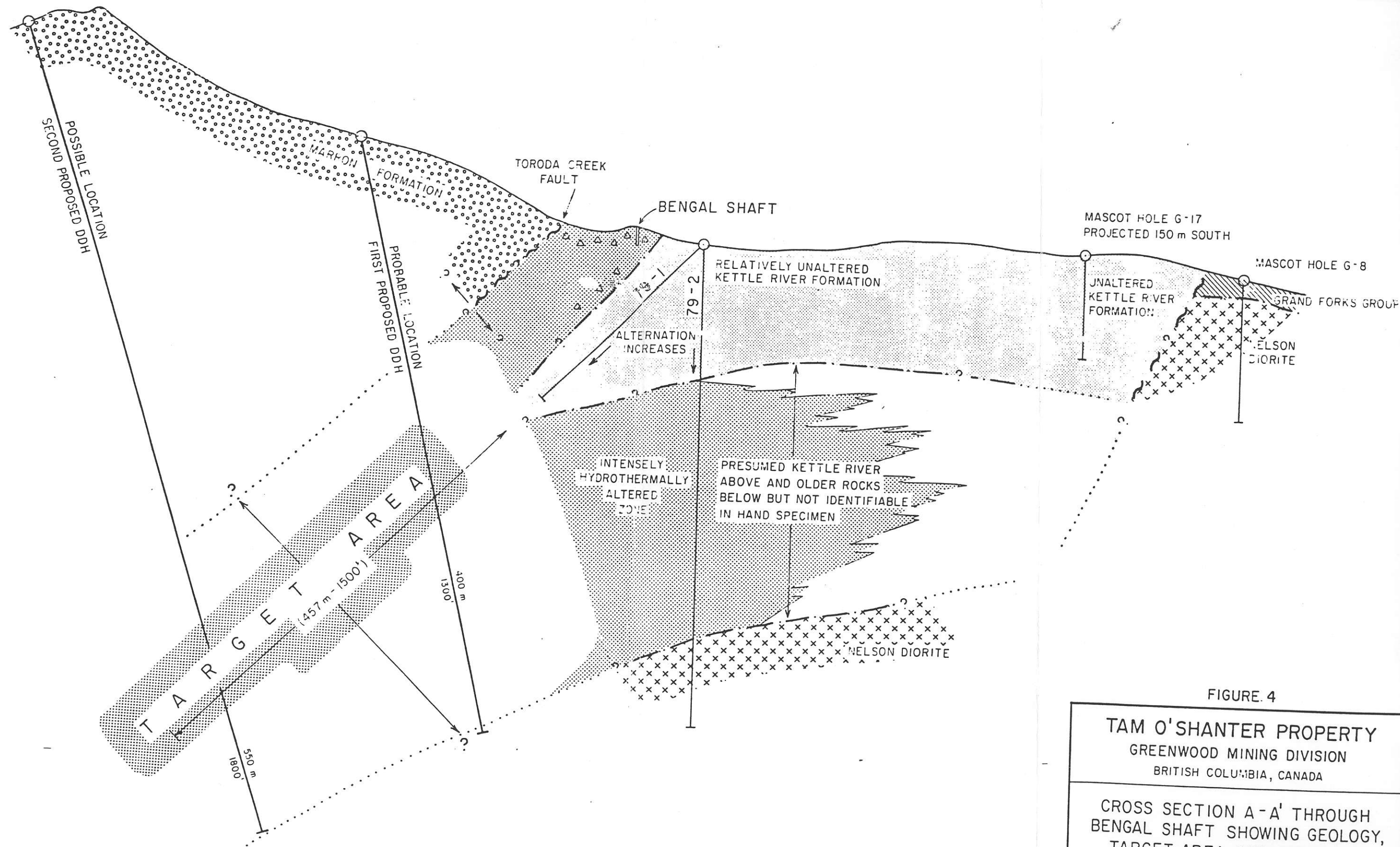


FIGURE 4

**TAM O'SHANTER PROPERTY**  
 GREENWOOD MINING DIVISION  
 BRITISH COLUMBIA, CANADA

CROSS SECTION A-A' THROUGH  
 BENGAL SHAFT SHOWING GEOLOGY,  
 TARGET AREA AND PROPOSED  
 DIAMOND DRILLING

m 0 50 100 150 m

BY: HHS, JC	SCALE: 1:2500	DATE: MAR. 13, 1984	NTS 82 E/2 E
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Structure: The Toroda Creek Fault, where it forms the contact between the Kettle River and Marron Formations, is the structural feature of current interest on the property. The area underlain by Kettle River rocks has very few outcrops, so that current knowledge on this area is quite limited. Available data suggests that the area from the Bengal shaft to the south for some 400 meters is the focus of intense structural movement and cross faulting.

Alteration and Mineralization: The writer will not elaborate further on the large area of low grade copper mineralization on the eastern central portion of the Tam O'Shanter property, since this is not the area of current interest, and no work is proposed to be done there. This area has been briefly described under History in this report. Certain possibilities still remain there but should be the subject of a future report when better copper prices make such a target attractive.

The current area of interest is the Bengal shaft zone which is associated with the Toroda Creek fault. The zone is exposed in two outcrops, one containing the Bengal shaft and the other 400 meters to the south. In 1979, Oneida Resources Ltd. completed three diamond drill holes, two located about 40 meters east of the shaft and the third located about 150 meters to the south. Refer to Figure 4 which is an east-west cross-section through the Bengal Shaft and DDH's 79-1 and 2.

On the surface at the Bengal shaft the zone consists of intensely brecciated, silicified and pyritized Kettle River rocks. Some clay minerals are also present. The Bengal shaft has been sunk on a breccia zone in which the matrix is almost 100% quartz. Minor molybdenum values occur here and some yellow molybdenite stain is present. There are no other values occurring in any of the surface exposures. The zone abuts against the Toroda Creek fault 50 meters to the west of the shaft and grades to rather weak alteration at the collars of DDH 79-1 and 2. The exposure 400 meters to the south was opened by old pits and recent trenching. A 60 meter wide section of intensely argillized Kettle River rocks is exposed. Adjacent to this and on the west side of this alteration zone Oneida's trenching has exposed a 3 meter section of solid quartz. No additional work has yet been done in this area.

Oneida's DDH 79-1 was drilled west a -45 degrees to test below the Bengal shaft. The hole intersected progressively more altered Kettle River tuffs and sediments, but did not intersect the breccia or intense alteration exposed on surface. Silification, pyritization and kaolinization increased with depth to the end of the hole at 481 feet. The hole was abandoned due to squeezing which appeared to be caused by weakening of the rock due to alteration to clay minerals.

DDH 79-2 was drilled vertically from the DDH 79-1 site to a depth of 1040 feet. The upper 296 feet was similar to 79-1. From 296' to 323' a zone of brecciated tuff, shale, altered and silicified rock and dacite porphyry occurred. From 323' to 651' a unit of dacite porphyry was intersected. This unit was intensely altered, with the strength of alteration decreasing somewhat with depth. Alteration consisted of silicification and pyritization which was very intense in places (10-15% py). K-feldspar development and

argillization occurred in places. From 651' to 851', hole 79-2 cut a succession of highly altered, silicified and pyritized unidentified rock, presumably not Kettle River Formation. One section from 707' - 722.5' cut massive, white, high silica rock similar to the very high silica rock occurring on the surface.

The section of core from 296' to 851' represents a zone that has undergone intense hydrothermal alteration. The character of alteration is typical of that in the uppermost portion of models of epithermal gold-silver hydrothermal systems as described by Berger and Eimon, and others in relatively recent papers and publications.

At 851', 79-2 passed into quartz diorite which is likely the same body as outcrops some 500 meters to the ENE. Alteration of the quartz diorite decreased to the bottom of the hole at 1040'.

Values of interest in 79-2 are as follows:

<u>Intercept (ft)</u>	<u>Width (ft)</u>	<u>Au (PPB-oz/ton)</u>	<u>Ag (PPM-oz/ton)</u>	<u>Cu %</u>
330-340	10	500-0.015		
560-610	50			0.29%
930-950	20	200-.006	64.0-1.88	

The silver values occurring in section 930-950 were concentrated in a two foot section of lead-zinc mineralization at 940. It would be more accurate to represent the zone at 940' as 2' of 18 to 19 oz/ton silver.

DDH 79-3 was drilled 639 feet due east at -45 degrees. The hole cut relatively unaltered Kettle river rocks from 15'-121.5' at which point it passed into highly silicious rocks of the Grand Forks Group from 121.5'-149.5'. From 149.5' to the end, 79-3 cut the typical cherty - andesite assemblage of these older rocks as mapped on surface. The only mineralization of interest was a 2 foot section from 189.5' -191.5' which assayed 0.021 oz/ton gold, 0.52 oz/ton silver, and 1.49% copper.

In considering the value of DDH's 79-1 to 3, it appears that 79-1 did not reach its objective and 79-3 was drilled in the wrong direction. Hole 79-2 intersected a very intensely hydrothermally altered zone which warrants further attention.

#### Discussion of Exploration Warranted

Most of the known epithermal gold-silver systems usually have some trace or indicator elements present at surface. These could typically include such elements as arsenic, antimony, mercury, flourine and thallium, as well as gold and silver. However, there are cases where mineral zones and ore deposits have been discovered below alteration zones which carry no values at surface. A case in point is the Las Torres Mine near Guanajuato, Mexico, which the writer visited in March, 1972. There, Lacana Mines diamond drilled a hole below an alteration zone with no surface values which appeared to be an

extension of the famous silver deposits at Guanajuato. They hit the top of ore grade material at a depth of 1500 feet.

The apparent Tertiary host rocks at the Tam O'Shanter are unusual in British Columbia. However, numerous Tertiary hosted epithermal systems occur throughout the Western Cordillera of the United States. At Republic, Washington, approximate 50 kilometers south of the property, the Knob Hill gold mine has one of the longest continuous production histories of any gold mine in the United States. It is hosted by Tertiary rocks which are probably related to the Tertiary rocks in the Greenwood area. (See Figure 2)

The hydrothermally altered zone exposed at the Bengal shaft area and intersected in DDH 79-2 appears to have the characteristics of the uppermost portion of an epithermal system and warrants further exploration. The silver values cut in 79-2 and the high grade silver vein occurring at the Tam O'Shanter workings, which are on strike with the Bengal shaft zone, lend encouragement that the system may contain significant deposits of gold and silver. The zone is only seen for 400 meters but the lateral dimensions are totally unknown. Further, the Kettle River Formation may have acted as a trap or cap to the system since the grade of alteration jumps dramatically 300 feet below surface.

Hole 79-2 has shown that a substantial amount of pyrite is present in the zone. This will make I.P. surveying a useful tool in getting as much information as possible about the configuration of the system before more drilling is done. Data presently available suggest a moderate dip to the west. Past IP surveys did not extend over the Bengal shaft zone.

There may be enough pyrite present in some of the zones to respond to EM surveying. A try with PEM surveying, which has good depth potential, is also warranted as it would be more definitive in establishing a dip to the zone.

Enough I.P. surveying should be completed to try to delineate the length of the Bengal shaft zone. At least 3200 feet of strike length should be covered. Lines should be cut every 400' but all lines may not have to be covered. Initially, I.P. surveying could be done on 800' step outs to delineate the zone and fill-in as warranted could then be completed. East-West cross lines should be cut at least 3000' each way from the zone to allow for wide spaced I.P. readings so as to obtain information as deep as possible.

This should be followed by diamond drilling. At this time, it is assumed that the next drill sites will lie due west of the Bengal areas since it now appears that the zone dips that way. Some drilling and blasting may be required for drill site preparation and drill access trails because of the steep areas of numerous Marron Rock outcrops in that direction. Funds for two diamond drill holes totalling at least 3000' should be reserved.

In summary, the following program is recommended:

A grid of lines should be cut for I.P. surveying with a north-south baseline 3,200 feet long and lines every 400 feet cut 3,000 feet both east and west (total: 57,200'=10.8 miles)

An I.P. survey initially on lines 800' apart (24,000'=4.6 miles) followed by intermediate detail lines as warranted. Reserve for 2 lines or 9,600'=1.8 miles. (total: 33,600'=6.4 miles).

Test a PEM instrument over the DDH 79-2 area and if the response proves useful reserve for 4 more 2,000' lines across the zone (10,000'=1.9 miles)

Following the I.P. survey, an initial diamond drill hole should be spotted to the west across the Toroda Creek fault from the Bengal shaft and DDH's 79-1 and 79-2. It is necessary to be certain of the western dip of the zone before proceeding with a deep hole test. Once that dip is determined, the location of a second hole to test the zone to a depth of at least 1,500' can be established.