831234

PACIFIC CASSIAR LIMITED

SUMMARY REPORT
on the
GLACIER CREEK MINERAL CLAIMS

Latitude 58°58' North
Longitude 129°55' West
Claim Sheet 103-P-13 West
and 104-A-4 West

STEWART AREA
Skeena Mining Division
British Columbia
Canada

Calgary, Alberta
November 20, 1990

J. A. Kelly, P. Geol.
Consulting Geologist

Table of Contents

Table of Contents

Continued...

Summary and Recommendations

Pacific Cassiar Limited of Calgary Alberta owns four groups of claims totalling 45 crown granted claims and fractions covering some 1630 acres. The claims are located in the Glacier-Albany Creeks area on the east side of Bear River Valley 4 miles northeast of Stewart, British Columbia. Stewart, served by all-weather highway home Terrace is located at the north end of Portland Canal 110 miles north of Prince Rupert, B.C.

The Stewart Area has been an active mining and exploration camp since the first lode silver and gold discoveries in 1902. Most of the discoveries and early attempts at development in the Bear River valley occurred during the period 1908-1916. The only production of note from the Glacier Creek area was from the Dunwell mine. Between 1926 and 1941 the mine produced 9800 ozs of gold and 329,000 ozs. of silver from 50,000 tons of ore.

The Glacier Creek area is a topographically rugged terrain accessible from Stewart via pack trails.

The claims areas are underlain for the most part by north-trending west dipping volcanics and argillaceous sediments of the Jurassic-Age Hazelton Supergroup intruded southwest of the claim group by a quartz monzonite pluton of Tertiary age.

A major north-trending structure, the Portland Canal fissure zone, a complex fault/shear system up to 1500 feet wide, strikes through the claim areas and appears to control the location and orientation of mineralization.

The claims cover a number of mineralized, brecciated fissure vein and vein systems which for the most part are controlled by north-trending west-dipping fault and/or shear zone elements of the Portland Canal fissure zone. Veins are composed of quartz or quartz-calcite carrying variable amounts of pyrite, sphalerite, galena, chalcopyrite, freibergite and minor native silver. All of the sulphides carry gold but the distribution of values is erratic. None of the ores in the Stewart camp required roasting to extract gold or silver.

At least 14 prospects and occurrences are known, most of

which were found previous to 1920. Twelve of these have been explored by underground workings varying in size from short adits and cross-cuts to the 3600 foot long Portland Canal Tunnel. A number of these workings were re-opened and re-assessed in 1955, 1981 and 1988. This work included chip and channel sampling and some limited drilling. Assay results confirmed that though zones carry economic gold values, distribution is erratic and a consistent economic grade could not likely be maintained. However, no bulk or panel sampling has been done which would confirm this supposition.

Exploration and evaluation work done to date in the claims has focused on assessing the commercial potential of prospects and occurrences found prior to 1920. Despite the known favorability of the area, no exploration porgrams employing up-dated methods have ever been carried out to explore for new deposits. In view of the untested exploration potential of the claims a preliminary program of underground panel sampling together with prospecting, sampling and geological reconnaissance is proposed. Contingent on the results of this work, an integrated program of geological mapping, geophysical and geochemical surveys will be designed and implemented to develop new targets for exploration drilling.

Cost estimate for the preliminary prospecting and sampling is $30,000.

1.0 Introduction

At the request of Pacific Cassiar Limited the writer was retained to prepare a summary report on the Company's mining claims located 4 miles northeast of Stewart, B.C.

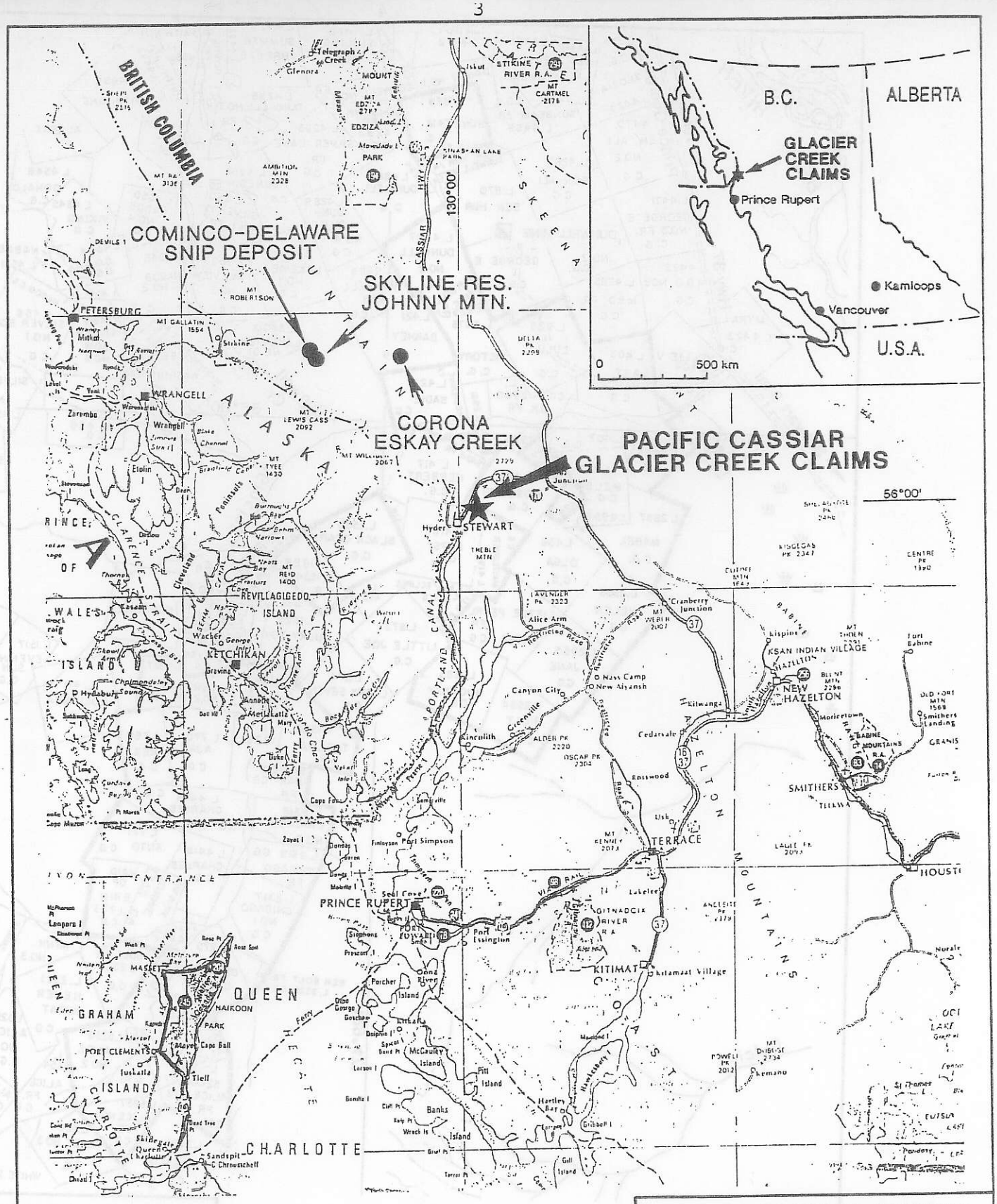
The writer has not visited the properties and the following report is essentially a synthesis of pertinent information contained in previous company reports together with relevant data available from government publication and maps. Notwithstanding the assumed reliability and accuracy of this information, conclusions and recommendations contained herein must be considered as preliminary at this time.

2.0 Property, Ownership and Status

The Glacier Creek gold properties comprise 45 crown granted mineral claims and fractions totalling some 1625 acres. The claims are located in four separate groups as outlined in Table 1, below. A property map is presented in Figure 2.

Table 1 - Pacific Cassiar Limited, Glacier Creek Claims
Stewart Area, B.C.

Group	Claim	Record Number	Claim	Record No.
1	Sunbeam	L.869		
2	Billy	L.2954	Lucky Boy	L.402
	Dunwell 2	L.4287	Lulu	
	Dunwell Fr.	L.4290	Lulu	L.926
	Helen	L.2956	Mabel	L.2937
	Jane	L.2955	Melba	L.437
	Jennie	L.2958	O.K. Fr.	L.296
	Kootenay	L.1385	Sadie	L.420
	Last Chance	L.403	Olga	L.436
	Little Pearl	L.1384	Victory	L.4476
			Wolverine Fr	L.2961
3	Black Bear	L.1553	Tiger	L.1554
4	Ajax	L.770	Chicago Fr	L.2319
	Alice 1	L.5252	Go Between Fr	L.2959
	Alice 2	L.5253	Jumbo	L.774
	Alice 1 Fr	L.5251	Maid of Erin	L.773
	Alice 2 Fr	L.5260	Minnie	L.772
	Auto	L.771	Mosquito	L.428
	Ben Bolt	L.775	Rex	L.769
	Ben Bolt Fr	L.2325	Silver Bar 1	L.1826
	Charles	L.4418	Silver Bar2Fr	L.6827
	Charles 3 Fr	L.4419	Silver Bar Fr	L.1828
	Chicago 1	L.2317	Thelma	L.1552
	Chicago 2	L.2318	Virginia Fr	L.4420
	Chicago Fr	L.2319		



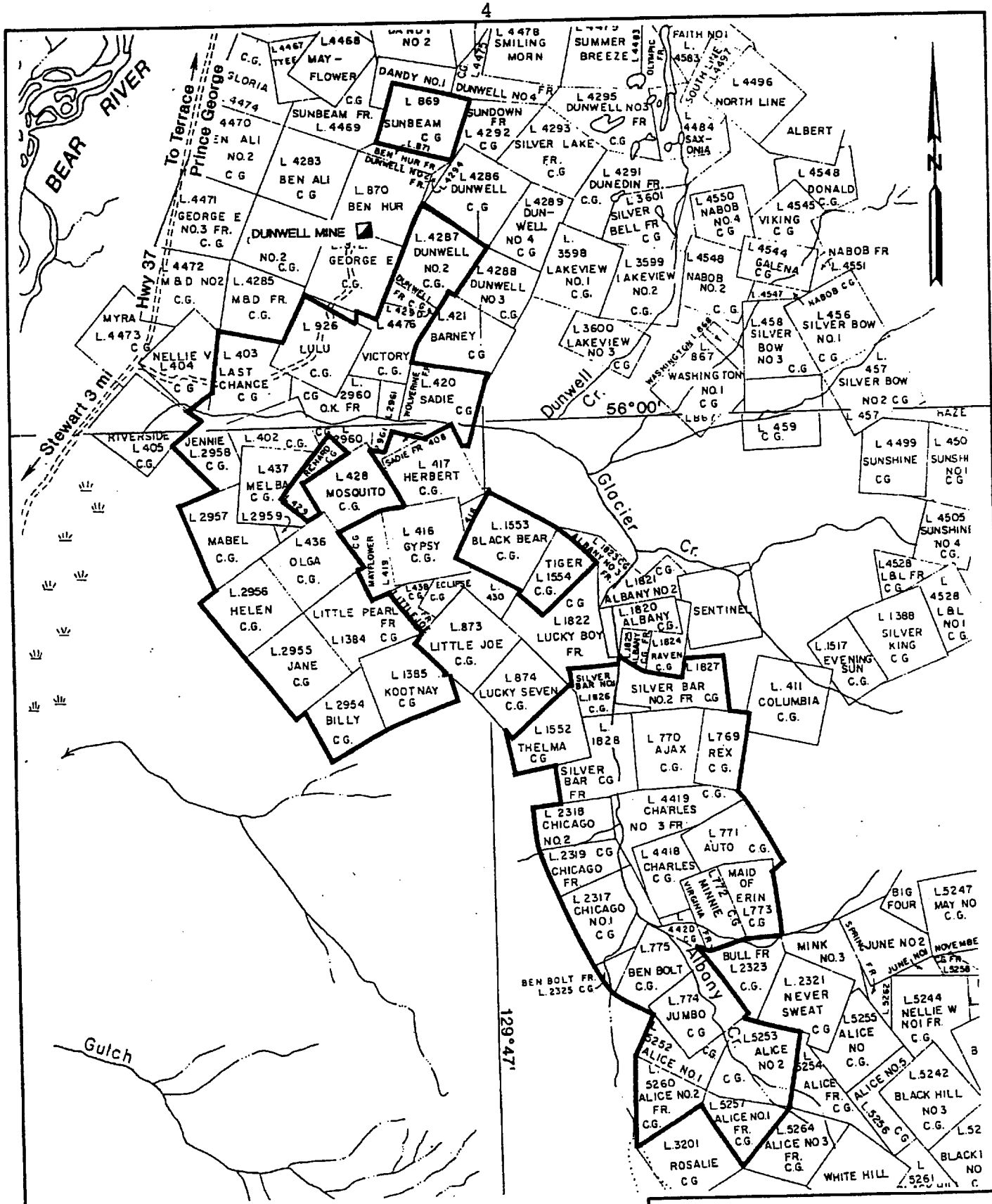
PACIFIC CASSIAR LIMITED

GLACIER CREEK CLAIMS
STEWART AREA, B.C.

LOCATION MAP

J.A. Kelly, P.Eng.
November, 1990

FIG. 1



PACIFIC CASSIAR LIMITED

GLACIER CREEK CLAIMS
STEWART AREA, B.C.

PROPERTY MAP

J.A. Kelly, P.Eng.
November, 1990

FIG. 2

The claims are owned 100% by Pacific Cassiar Limited, Suite 2420, 645 - 7 Avenue SW, Calgary, Alberta, T2P 4G8. Title to the claims and fractions are free of any liens or encumbrances.

The Glacier Creek area is not within any areas presently subject to native land claims negotiation, park or recreational development or abnormally excessive environmental regulations.

Crown granted mineral claims and fraction titles are held in fee simple and are subject to an annual tax payment.

3.0 Location, Access and Services

The four claim groups are located in the Skeena Mining Division 4 miles north of Stewart, B.C. on the east side of Bear River at elevations of 1000 to 3500 ft. Geographical co-ordinates are: latitude 55°58' N and longitude 129°55' (Fig. 2). The claims are shown in B.C. Dept. of Mines and Petroleum Resources Claim Sheets 103-P-13 West and 104-A-4 West.

The properties are accessible by road from Stewart to the Dunwell Mine then via old wagon roads or trails to the various old workings (Figure 3). The condition of these routes is not known at this time.

Stewart, located about 110 miles north of Prince Rupert, is served by an all-weather highway, Highway 37, from Terrace, by sea from Prince Rupert and Vancouver and by local charter air services. Services and supplies in Stewart are limited and could only support short term exploration programs.

4.0 History of Exploration

The Stewart area has been an active mining camp since the turn of the century when adventurers travelled to the north end of the Portland Canal in search of placer gold. In 1902 John Stewart and partners located lode silver at American Creek sparking a prospecting and staking rush into the area. Between 1904-1915 most of the exploration and development activity was concentrated in the Bear River area east and north of Stewart.

This is when many of the origianl discoveries in the Pacific Cassiar claims were made. However, after 1918, attention moved to the Salmon River area 10 miles northwest of Stewart where discovery of high grade silver gold ore on the Premier property in 1918 led to the development of one of the richest mines (Silbak Premier) in B.C. history.

Between 1910 and 1967 the Stewart camp produced a total of 1.895 MM ozs Au, 44.044 MM oz Ag, 4.483 MM lbs. Cu 69.02 MM lbs Pb and 24.7 MM lbs Zn. The only production from the Glacier Creek area was from the Dunwell Mine which produced 9800 ozs. of gold from 50,000 tons of ore during the period 1926 to 1941.

Base metal exploration underwent a resurgence in the area in the early 1970's, but interest declined later in the decade as base metal prices fell.

Rising gold prices and new discoveries by Reg Davis and Skyline Resources on an old Cominco prospect on Johnny Mountain 65 miles northwest of Stewart (Figure 1), sparked new interest in the Stewart-Iskut district in 1982-83. In 1986-87, the Delaware Resources-Cominco joint venture delineated a commercial gold deposit, the Snip deposit, on claims adjacent to the Skyline property to the north (Figure 1).

In 1987 Calpine Resources acquired the old McKay gold-base metal prospect at Eskay Creek, 50 miles north-northwest of Stewart (Figure 1). Drilling programs carried out over the next two years resulted in the discovery and delineation of the now famous '21 Zone' gold deposit. The SNIP, Johnny Mountain and Eskay discoveries sparked yet another staking rush to the Stewart-Iskut-Eskay Creek area and the so-called "Golden Triangle' (Figure 1) is currently the most active exploration area in Canada.

Apart from property examinations and re-sampling carried out from time to time, no long term, integrated exploration and development programs have been pursued on the Pacific Cassiar properties since the early days (1904-1916).

In 1955 Pacific Cassiar (then Cassiar Consolidated Mines) rehabilitated underground workings and conducted detailed

sampling programs in the Jennie, Lucky Boy, Melba, Mosquito, OK Fraction and Ben Bolt claims. In view of prevailing metal prices at that time further work was suspended.

In 1980 Silver Princess Resources carried out limited underground sampling and drilling programs in the OK and Mosquito claims.

Brief summaries of previous work in the various claims together with the results reported are included with the prospect and occurrence descriptions in Section 6.0 further on in this report.

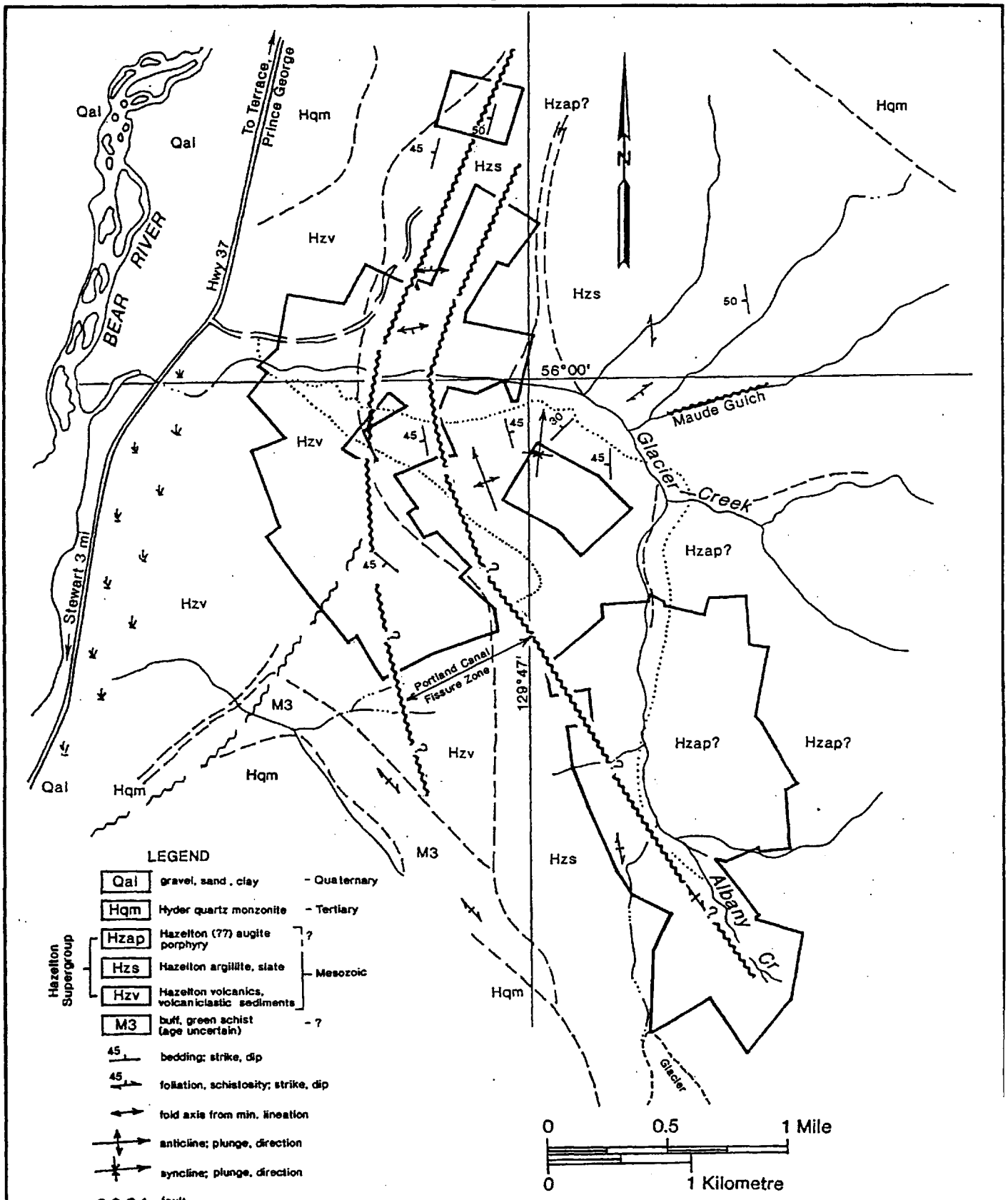
5.0 Geology

5.1 Topography and Physiography

The Stewart area lies within the Boundary Ranges of the northern Coast Mountains, a region of rugged mountainous topography at an early stage of maturity. Topographic relief is abrupt and considerable with mountain peaks rising some 3500-6000 feet above river valleys and fiords.

Stewart lies at the north end of Portland Canal, a 25 mile long trench-like fiord separating the southern extremity of the Alaska panhandle from British Columbia. This topographic feature continues north of Stewart as a linear valley drained by Bear River.

The Company's claims are located on the east side of Bear River valley where moderate to steeply rising wooded slopes have been deeply and sharply incised by Glacier Creek, Albany Creek and their various tributaries. Topographic relief in the stream valleys crossing the claim areas varies from 500 to 2500 ft. (Figure 3). Elevation variations, however, are considerable; from 750 ft. MSL in the Jennie claim to over 4000 ft. in the Alice No. 2 claim at the head of Albany Creek (Figures 2 and 3). Several of the north/south-trending tribulaires such as Dumwell Creek follow fault linears (Figure 3).



LEGEND

Qal	gravel, sand, clay	– Quaternary
Hqm	Hyder quartz monzonite	– Tertiary
Hzap	Hazelton (?) augite porphyry	?
Hzs	Hazelton argillite, slate	– Mesozoic
Hzv	Hazelton volcanics, volcaniclastic sediments	
M3	buff, green schist (age uncertain)	– ?

Hazelton Supergroup

- 45 bedding; strike, dip
- 45 foliation, schistosity; strike, dip
- fold axis from min. lineation
- anticline; plunge, direction
- syncline; plunge, direction
- fault
- Portland Canal Fissure Zone
- trail
- gravel road
- all-weather highway

(Geodata Sources: Grove 1971, Alldrick 1989)

PACIFIC CASSIAR LIMITED

GLACIER CREEK CLAIMS
STEWART AREA, B.C.

GEOLOGICAL MAP

J.A. Kelly, P.Eng.
November, 1990

FIG. 3

5.2 Stratigraphy

In the Stewart area, moderately folded Mesozoic-age volcanics and sediments which form the western margin of the Bowser Basin are intruded by a series of Tertiary plutons and related stocks of the Coast Crystalline Belt.

The east side of Bear River is underlain by sequences of Triassic to Middle Jurassic-age volcanic flows, pyroclastics and epiclastics which in turn grade into Middle-Upper Jurassic argillites and mudstones (Table 2). According to Alldrick (1989), the volcanics and sediments (formerly described as "Hazelton" and "Bowser" assemblages, respectively, in older publications) resulted from a continuous process of vulcanism and sedimentation in the western Bowser Basin. For the purpose of this report the whole volcanic-sedimentary series is referred to as 'Hazelton Supergroup' in Table 2.

Hazelton rocks are intruded by irregular plutons, stocks and dykes varying in composition from quartz monzonite, augite diorite (augite 'porphyry') and granodiorite. Table 2, modified from Alldrick (op. cit.), illustrates stratigraphic relationships in the Stewart area.

Published geological maps (Grove, op. cit.) and property reports indicate that, except for the western part of the Group 2 claims, the Pacific Cassiar claims are underlain by argillite, slates, mudstones and related pelitic sediments of the upper Hazelton Supergroup (Figure 3). Dykes and sills of augite porphyry are reported to cut the sediments in many of the prospects.

An augite porphyry is shown on Groves' 1971 geological map as underlying the area east of Albany Creek (Figure 3). However, Alldrick (op. cit.) suggests augite porphyry 'intrusives' in the Stewart area are actually volcanic flows. Thus, the nature and extent of this 'intrusive' is questionable.

Table 2 - Table of Formations, Stewart Area, B.C.
(modified from Alldrick, 1989)

GEOLOGICAL AGE	VOLCANIC and SEDIMENTARY ROCKS	INTRUSIVE ROCKS
		Coast Plutonic Complex
Tertiary		Hyder quartz monzonite, Boundary granodiorite, Portland Canal dyke swarm
	Hazelton Supergroup	
Middle & Upper Jurassic	Argillite, siltstone, slate, sandstone, limestone	
Middle Jurassic (transition sequence)	black grits, sandstone, argillite, pumice	
Lower Jurassic	carbonaceous and pyritic felsic tuff, pumice, epiclastic conglomerate siltstone and felsic tuffs, 'Premier porphyry' andesite flows, augite porphyry flows, andesite flows	Mesozoic Intrusives 'Premier porphyry' intrusive, augite porphyry intrusives, Texas Creek granodiorite
Late Triassic ?	andesite tuffs and siltstone	

5.3 Structure

For the most part, sediments and volcanics underlying the claims area trend northerly and dip 35°-50° west. Locally these sequences have been further deformed by what appear to be a series of interference folds (cross fold systems) trending N/NW and E-W, respectively (Figure 3). The N/NW folds are qenerally broad, open anticlines and synclines plunging to the north. The east-west folds are similar but plunge directions are uncertain. Confused, large amplitude isoclinal folds are reported (Grove, 1971) in the siltstone, and argillite beds in the Glacier Creek-Maude Gulch area (Figure 3) and may be related to structural deformation associated with the Portland Canal fissure zone.

NW-trending and N-trending fault systems have affected rocks underlying the claim areas. The NW-trending series are very local and displacements are limited.

Of the north-trending fault systems crossing the claim areas, the most prominent is the Portland Canal fissure zone (Figure 3), a major northerly trending complex fault/shear zone which can be traced over a strike length of at least 10 miles. At its south end, Groves' map (op. cit.) shows the fault to be a simple steeply- dipping strike-slip fault striking northeast. Where it passes from volcanics into sediments south of Glacier Creek (Figure 3), the dip decreases to about 45° west and the structure suddenly becomes a north trending complex fault/shear system nearly 1500 feet wide. However, Skerl (1955) indicates the eastern side of the fissure zone trends through the Ben Bolt claim and controls the Ben Bolt vein system. Thus, in Figure 3, the Portland Canal Fissure Zone is tentatively inferred to trend southeast through the Ben Bolt claims.

The fissure zone continues northward across Dunwell Creek where it decreases in complexity and width and appears to die out some 5 miles north of the Dunwell mine. The possible economic importance of this structure is discussed further on in this report.

Cleavage related to folding, faulting or intrusion is well

developed in the thinly layered argillites and siltstone in the Glacier Creek area. Here, cleavage planes are generally steep and cross-cut the axial planes of major and minor folds.

With the exception of narrow zones proximial to the contacts of intrusions, foliation and/or schistosity are not commonly developed in the sediments.

5.4 Metamorphism

Local metamorphic effects are reported in sediments proximal to intrusives. Generally, however, sedimentary sequences in the Glacier Creek area are only slightly metamorphosed. Alldrick (1984) indicates the regional metamorphic grade is lower to sub-greenschist facies.

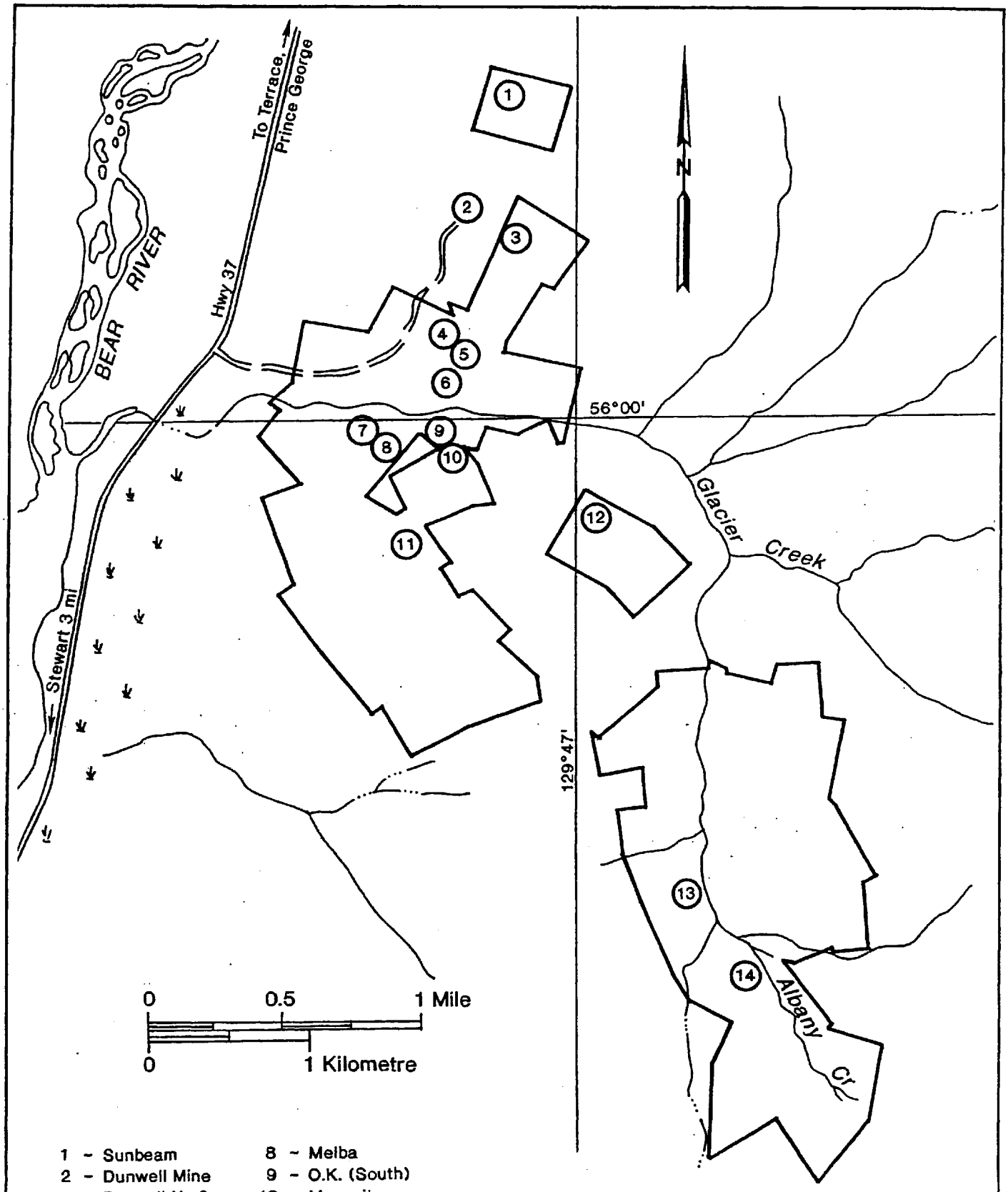
5.5 Mineralization and Alteration

Gold and silver with pyrite, pyrrhotite and various combinations of base metal sulfides and sulfosalts occurs throughout the Stewart district. Alldrick (1984) has categorized the mineral deposits of the camp as follows:

1) Stratabound (volcanogenic) sulfide deposits
   a) Disseminated sulfide deposits (eg. Big Missouri)
   b) Massive Sulfide deposits (eg. Silbak Premier)
2) Shear zone - hosted massive sulfide vein deposits (eg. Scottie Gold, Porter-Idaho etc.)
3) Quartz/breccia fissure vein (epithermal) deposits (eg. Dunwell, Chicago, Ben Bolt etc.)

All of the known propsects and occurrences in the Pacific Cassiar claims are of the Category (3), quartz/breccia fissure vein variety. A generalized description of vein/breccia fissure deposits (modified from Alldrick (op.cit) follows:

> "The veins consist primarily of quartz but carry angular wallrock fragments plus scattered coarse crystals and fine-grained blebs and pods of sulphide minerals. Wallrock fragments within the veins are commonly silicified, but vein walls are sharp with little or no silicification of the wallrock. Drusy vugs are common. Sul-



PACIFIC CASSIAR LIMITED

GLACIER CREEK CLAIMS
STEWART AREA, B.C.

MINERALIZED VEIN ZONES

J.A. Kelly, P.Eng.
November, 1990

FIG. 4

phide minerals occur as euhedral crystals and as crystal aggregates of pyrite, sphalerite, galena, chalcopyrite, chalcocite, and freibergite; there is minor associated native silver. The sulphides are typically concentrated near the centre of the quartz vein and sulphide crystals may be up to 3 centimetres across.
The veins cut volcanic, sedimentary, and intrusive rocks, thus they represent a very late-stage mineralizing event."

Gold occurs with all the common sulfide minerals but distribution of gold values tends to be erratic and the veins were usually mined for silver. Although there is no specific data with respect to mineral zonation in the Glacier Creek area, Groves (1971) suggests that in the Stewart area Ag:Au ratios decrease with depth. The Au:Ag ratio at the Dunwell mine averages 30:1 (Groves, op. cit.). At the Ben Bolt property, some 1000 to 1500 ft. higher in elevation, Ag:Au ratios vary from 30:1 to over 200:1.

None of the ores in the Stewart camp required roasting to extract gold or silver.

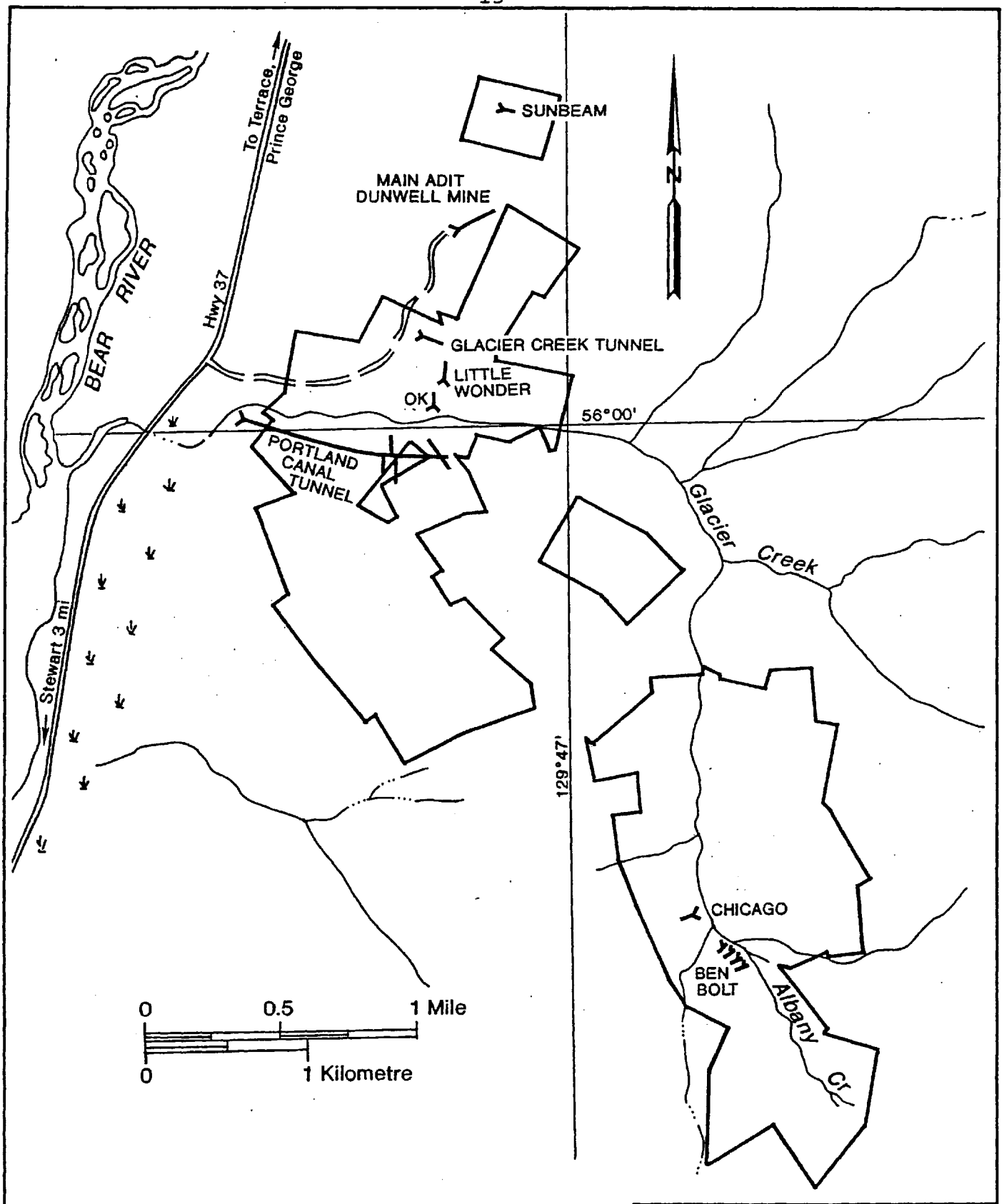
Fissure veins are classed as epigentic-mesothermal. Alteration of the country rock is limited to narrow zones of silica-carbonate bleaching along the brecciated vein contact.

More detailed descriptions of the various prospects and occurrences are presented Section 6.0, following.

6.0 Prospects and Occurrences

6.1 Sunbeam (L.896)

This claim covers the Sunbeam vein, a mineralized quartz fissure vein outcropping at an elevation of 1780 ft. on the north side of Dunwell Creek in the north central area of the claim (Figure 6). Here, the vein is some 6.0 ft. wide, strikes N to NIO°E and dips some 50-60° west. Mineralization compises pyrite, galena, and sphalerite with lesser tetrahedrite, argentite, and native silver. The vein structure cuts argillite and greywacke sediments but appears to follow a grey dyke (diorite porphyry).

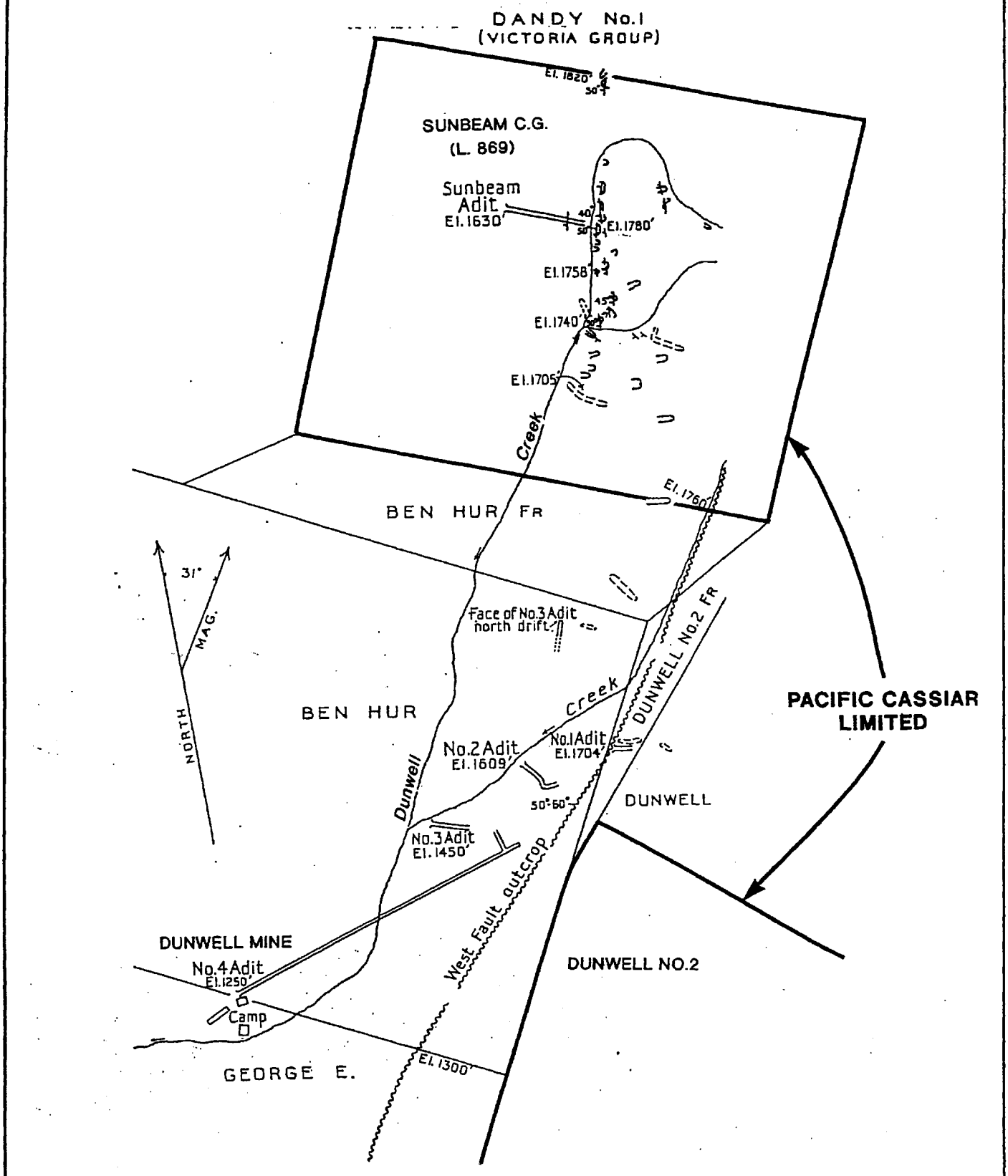


PACIFIC CASSIAR LIMITED

GLACIER CREEK CLAIMS
STEWART AREA, B.C.
LOCATION MAP
ADITS & TUNNELS

J.A. Kelly, P.Eng.
November, 1990

FIG. 5



PACIFIC CASSIAR LIMITED

GLACIER CREEK CLAIMS
STEWART AREA, B.C.

DUNWELL & SUNBEAM WORKINGS

J.A. Kelly, P.Eng.
November, 1990

FIG. 6

The zone was traced some 450 ft. along stike by a series of pits and open cuts.

Approximately 100 tons of hand sorted ore was shipped by leasers in 1932-33 (Minister of Mines, B.C., Annual Report, 1937, P.B8).

A 500 ft. cross-cut was driven S 85°E to explore the down dip portion of the vein at an elevation of 1680 ft. (Figures 5 and 6). At 300 ft. from the portal a sparsely mineralized sheared vein about 4.0 ft. wide was intersected. Whether or not this was the Sunbeam vein was never established.

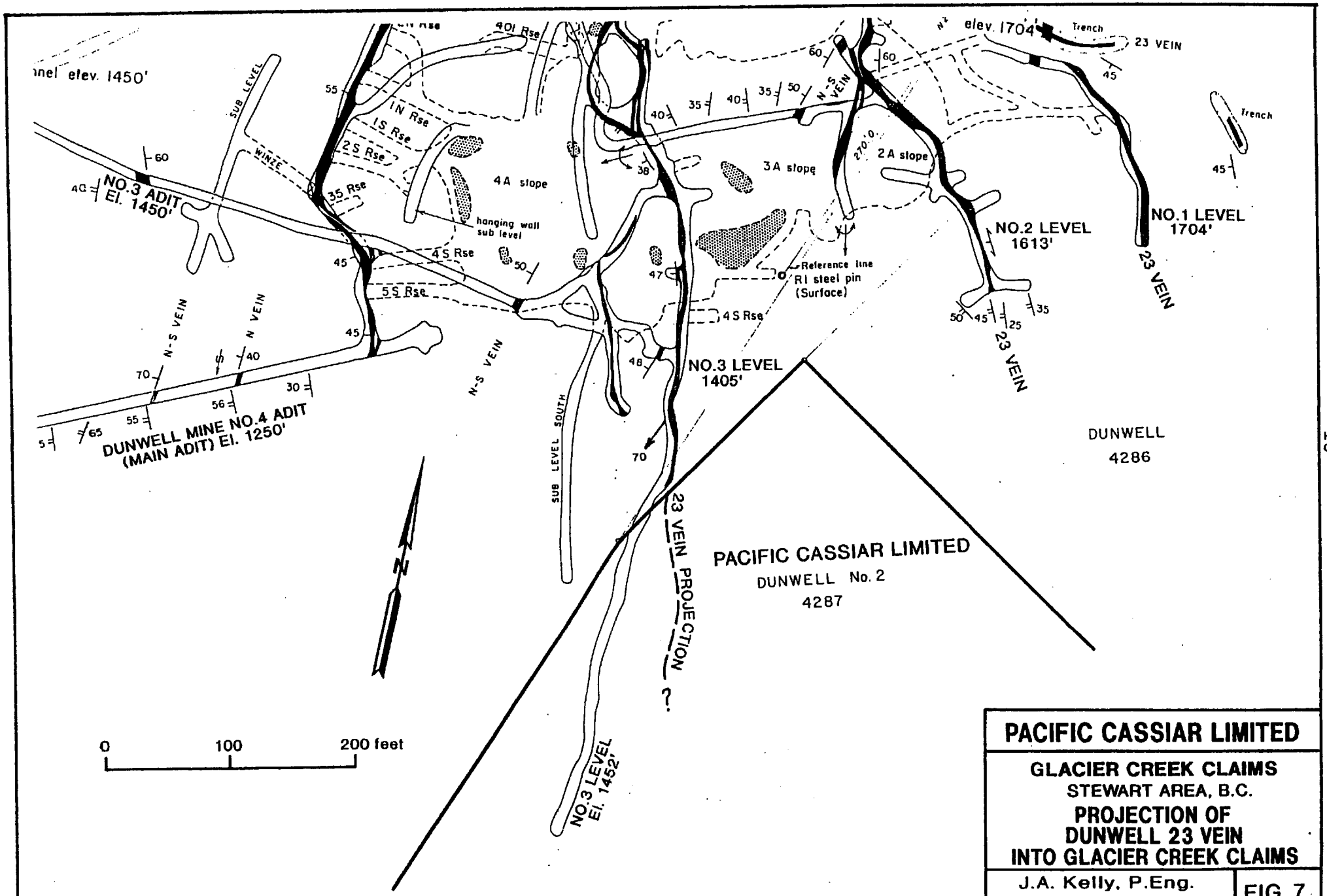
The Sunbeam vein zone probably lies within the western margin of the Portland Canal Fissure Zone and is likely a northerly extension of the vein system exploited in the Dunwell Mine. (Figure 6)

6.2 Dunwell 2 (L4287) and Dunwell Fraction (L4290)

Between the period 1926-41 the Dunwell mine produced some 50,000 tons of ore containing a total of 9,816 ozs gold, 329,000 ozs silver , 27,000 lbs of copper and nearly 2,500,000 lbs of zinc. Most of the production was from the '23' or 'Dunwell' vein, a simple quartz-calcite brecciated fissure vein with an undulating strike and dip of N30° W - 20°E and 30°-50° west, respectively. The vein is associated with a grey augite porphyry dyke which in turn appears to be controlled by a north trending fault zone within the Portland Canal fissure zone (Figures 3, 6, 7 and 8).

Gold bearing sulfides in the vein occur as pods and layers forming discreet ore leneses raking 70° to the south (Figure 7). The vein structure is hosted by complexly folded argillites, siltstones and greywackes of the Hazelton Supergroup. Although the north-striking dyke appears to be spatially related to mineralization, a genetic relationship is conjectural.

According to mine records the '23' vein was followed on the No. 1 Level (1450 ft. elevation) to the Dunwell 2 boundary (Figure 7). Here, the vein either stops (?) or the drift was



PACIFIC CASSIAR LIMITED

GLACIER CREEK CLAIMS
STEWART AREA, B.C.

PROJECTION OF DUNWELL 23 VEIN INTO GLACIER CREEK CLAIMS

J.A. Kelly, P.Eng.
November, 1990

FIG. 7

driven off line into the hanging wall for whatever purpose(?).

Drilling by Silver Princess Resources (Harris, 1988) reported that gold values (up to 0.402 over 2.2 ft.) occur in the vein at the 1150 elevation.

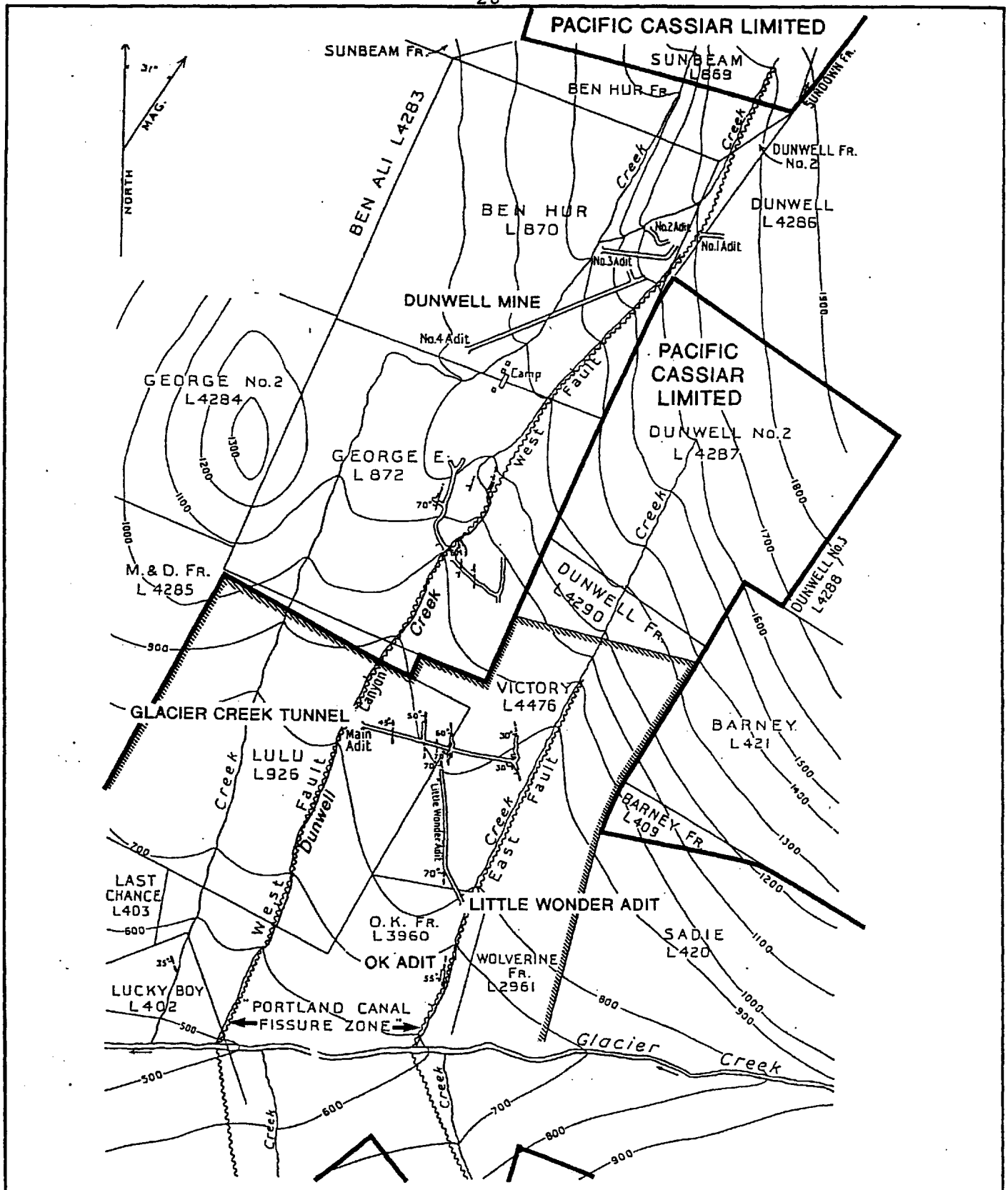
It is possible that the '23' vein zone continues accross the Dunwell 2 and Dunwell Fraction and is continuous with one of the zones in the Victory claim (Figure 8).

6.3 Victory (L.4476), Lulu (L.926) and N½ of O.K. Fraction (L.2960)

At least five north-trending west-dipping brecciated fissure vein zones occur in the Portland Canal Fissure Zone where it trends across the Lulu-Victory claim areas. These zones were explored and sampled from short cross-cuts from the 795 ft. long Glacier Creek adit. This tunnel was driven S80° E on the 830 ft. elevation from the Lulu claim (Figure 8) by the Glacier Creek Mining Company during the period 1910 to 1925. For the most part mineralization was found to consist of pyrite sparsely distributed in quartz-carbonate stringer veins and/or brecciated quartz-argillite zones. The vein zones are from 2.0 to 6.0 ft. wide and only low gold values were reported (Mines Minister, B.C., Annual Report, 1937, p. B15)

The central vein zone encountered 200 feet west of the portal in the Glacier Creek adit was explored along strike at an elevation of 780 feet by the Little Wonder adit collared in the northwest corner of the O.K. Fraction (Figure 8). This 760 ft. long adit exposed several short, narrow, gold-bearing shoots and the best of these was reported to average 0.28 oz Au, 4.6 oz Ag, 6.0% Pb, 8% Za over a 10 inch and 30.0 ft. length (Mines Minister, B.C., Annual Report, 1937, P. B16). A composite sample from a small stope above the adit assayed 1.8 oz Au the and 4.0 oz Ag (op. cit., 1937).

In 1979 and 1980 the Glacier Creek adit was re-opened, sampled and seven holes were drilled by Silver Princess Resources to explore for west dipping vein zones in the Portland Canal



LEGEND

Vein

Fault

Dip

Scale 300 0 300 600 Feet

PACIFIC CASSIAR LIMITED

GLACIER CREEK CLAIMS
STEWART AREA, B.C.

GLACIER CREEK AND LITTLE WONDER ADITS
LULU, VICTORY, O.K. FR. CLAIMS

J.A. Kelly, P.Eng.
November, 1990

FIG. 8

Fissure Zone below the adit level. Of the seven holes drilled only one encountered economic gold values over a mineable width (eg Hole 9, 14.6 to 21.1 ft.; 0.338 oz Au over 6.5 ft; Harris, 1981).

About 400 ft. south of the Little Wonder portal, a brecciated vein zone (presumably the same zone exposed in the Little Wonder tunnel) was explored by the OK adit collared at an elevation of 670 ft. (Figure 8). Although silver, lead and zinc were reported from the original vein outcrop (eg 12.0 oz Ag, 16% Pb, 6% Zn over 4.0 ft.) the 300 ft. adit did not encounter significant mineralization (Minister of Mines, B.C., Annual Report, 1937, p. B14). No significant values were reported from subsequent re-sampling by Silver Princess Resources in 1980 (Harris, op. cit.)

6.4 Portland Canal Tunnel

In 1913-14, Portland Canal Terminals Ltd. drove a 3620 ft. adit, the Portland Canal Tunnel, eastward from a portal located above the Dunwell mill at an elevation of 250 ft. (Figures 3, 4 and 9). The purpose of the adit was to cross-cut and explore mineralized zones in the Portland Canal fissure zone including veins found on surface in the Jennie, Melba, Lucky Boy, Mosquito, Richard and OK Fraction claims. These various zones were subsequently opened and sampled along drifts excavated off the adit. No further exploration work was carried out after 1914. A brief description of the tunnel follows.

From the portal to 2350 ft. the bearing is S 71°30'E; from 2350 ft. to 3160 ft. the bearing is S 83°E, from 3160 ft. to the E face the bearing is S 89°E (Figure 8).

The adit crosses andesite, volcanic breccia and more andesite in the first 1440' then a 70 ft. section of tuffs and sediments. The remainder of the tunnel crosses argillites and sediments with a general 45° W dip. Presumably the section from 1440 ft. to 1510 ft. is the transition zone from volcanics to sediments. At least 18 'andesitic' dykes varying from 1 to 25

ft. in thickness were encountered (Skerl, 1955). Quartz with calcite and sulfides become more common toward the east. A major fault zone (Lucky Boy Zone?) was crossed between 2270 and 2410 ft. from the portal.

In 1954 and 1955 Pacific Cassiar Ltd. rehabilitated the adit and conducted a mapping and sampling program to re-assess the various vein zones. The following data is abstracted from reports by Rutherford (1955) and Skerl (1955). A generalized geological plan based on Skerl's 1955 report is presented in Figure 9.

6.4.1 Jennie (L.2958)

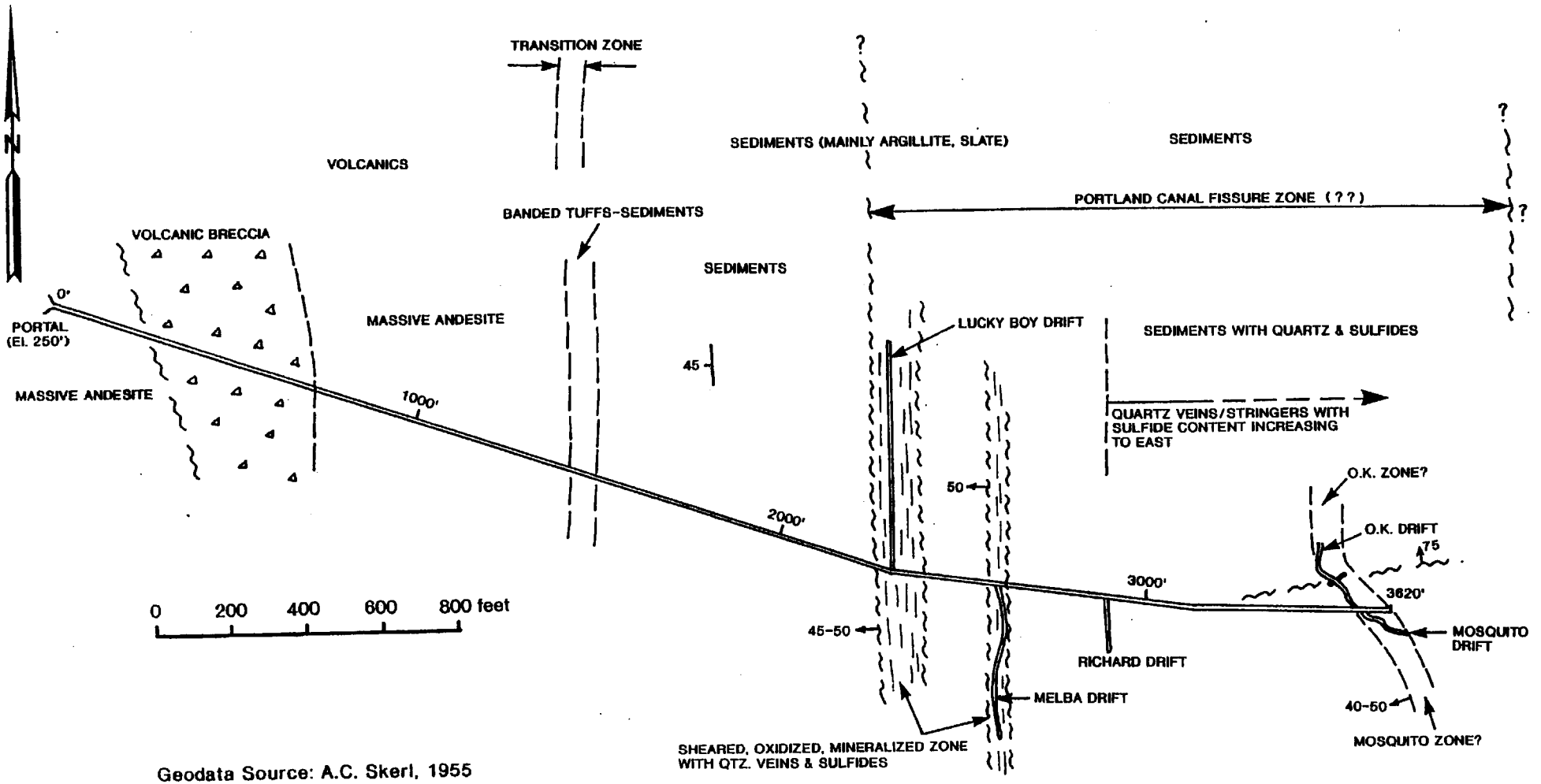
No minerlaization was reported from the adit section through the Jennie claim and no samples were taken in the 1955 program.

6.4.2 Lucky Boy (L.402)

2340 ft. from the portal, a pyritic vein zone occurring in a major fault zone was explored from a 600 ft. long drift driven north (Figure 9). Only 200 ft. of the adit was opened for sampling in 1955 (Rutherford, op. cit) but no samples were taken (presumably because the mineralization was judged to be poorly developed).

6.4.3 Melba (L.2959)

At 2638 ft. from the portal the Melba Drift was driven South for 405 ft. following a pyritized quartz vein (Figure 9). No samples were taken in 1955. The vein is one of a series occurring in a complex fault zone located between 2585 ft. and 2640 ft. from the portal. This fault zone was not sampled in the 1955 program.



Geodata Source: A.C. Skerl, 1955

PACIFIC CASSIAR LIMITED

GLACIER CREEK CLAIMS
STEWART AREA, B.C.
GENERALIZED GEOLOGICAL PLAN
PORTLAND CANAL TUNNEL
JENNIE, MELBA, LUCKY BOY, O.K., MOSQUITO CLAIMS

J.A. Kelly, P.Eng.
November, 1990

FIG. 9

6.4.4 Mosquito (L.248) and OK Fraction, S½(L.2950)

Between 3550 to 3600 ft. from the portal, Skerl (1955) reports groups of veins and stingers from 1 inch to 2.0 ft. wide carrying pyrite, galena, sphalerite and chalcopyrite (Figure 9). The most promising of these was opened up 120 ft. to the south in the Mosquito drift and 155 ft to the north in the OK drift (Figures 9 and 10). The vein zone dips from 65° to 80° W cross-cutting the enclosing sediments. Part of the zone in the OK drift is in an altered dyke.

Back sampling in the adit and the two drifts returned uneconomic metal values. In the OK drift (Figure 9), a central 60 ft. seotion averaged 0.07 oz. Au, 1.05 oz Ag, 1.64% Pb and 2.09% Zn over a 2.4 ft. average width. In the Mosquito drift, 50 feet of vein averaged 0.01 oz Au and 0.15 oz. Ag. Averages for Pb and Zn were not calculated.

Sampling of the last 51 ft. of the adit (Figure 9) indicated the presence of erratic high grade gold values and Skerl (op. cit.) reported the following gold values:

South wall: 0.35 oz Au over 52.0 ft.

North wall: 0.015 oz Au over 53.4 ft.

Average: 0.118 oz Au plus negligible Ag, Pb, Zn and Cu.

Skerl's calculations, however, included several statistically high Au values (0.54 oz and 1.82 oz) found only in the south wall of the drift. Because these values are so high compared to the average gold values found elsewhere in the zone, it is the writer's opinion that they should have been cut or re-assayed. In view of this, Skerl's calculation is not regarded as a realistic assessment of the gold tenor of the zone sampled.

In 1980 the adit was re-opened, sampled and mapped by Silver Princess Resources (Harris, 1900). As in the 1955 work, erratic high gold and silver values (up to 0.87 oz Au, 8.33 oz Ag) were reported from sampling of the OK and Mosquito drifts. Subsequent drilling by Silver Princess Resources of the up and down dip projections of the mineralized section was unable to define any zones containing consistent gold values of economic significance.

6.5 Black Bear (L.1553)

Hanson (1935) reports a quartz vein 10 ft. wide mineralized with pyrite, galena and sphalerite occurs in the Black Bear claim at an elevation of 1500 ft. (Figure 4). No assay data is given.

6.6 Olga (L 436)

In 1925 Phoenix Silver Mines reported finding a 4.0 foot wide vein in the central claim area (Figure 4). Sampling records show total metal values of $18.25 per ton in gold silver lead and zinc. Another 4 foot wide vein was found at the south end of the claim but no assay values were reported. (Minister of Mines, B.C., Annual Report, 1925, p. A84). It was postulated that the veins found in the Olga claim might be strike extensions of vein zones encountered in the Portland Canal tunnel in the Lucky Boy and Melba claims.

6.7 Ben Bolt (L.775) and Jumbo (L.774)

The Ben Bolt and Jumbo claims cover a mineralized quartz fissure vein outcropping on the west side of Albany Creek at an elevation of 2500 feet (Figure 4). The vein zone strikes N to N 15° W, dips 25-30° west and is reported to be at least 200 ft. thick (Skerl, 1955).

Between 1910 and 1912 the vein was explored on 5 levels and a total of 1600 ft. of adits cross-cuts (plus a winze) were completed. According to Skerl (op. cit.) only the lower 30 ft. of the zone was actually exposed by development work. Apart from some prospecting work carried out in 1922 no other work was done on the property until 1955 when Pacific Cassiar (formerly Cassiar Consolidated Mines) carried out a detailed sampling program of the underground workings.

Mineralization comprises (in order of abundance) pyrite, sphalerite, galena, chalcopyrite and freibergite (silver-rich lead sulfosalt) in layers parallel to the dip of the vein or in

scattered dissemations.

Vein material consists of quartz with lesser calcite, cross-cutting brecciated silicified argillite along the eastern margin of the Portland Canal fissure zone. Xenoliths, ragged lenses and seams of argillite and graphite occur in the vein and the footwall argillite has been intruded by an augite prophyry dyke parallel to the dip of the vein. Portions of this intrusive are weakly mineralized proximal to the vein. The genetic relationship of the intrusive and mineralization is conjectural.

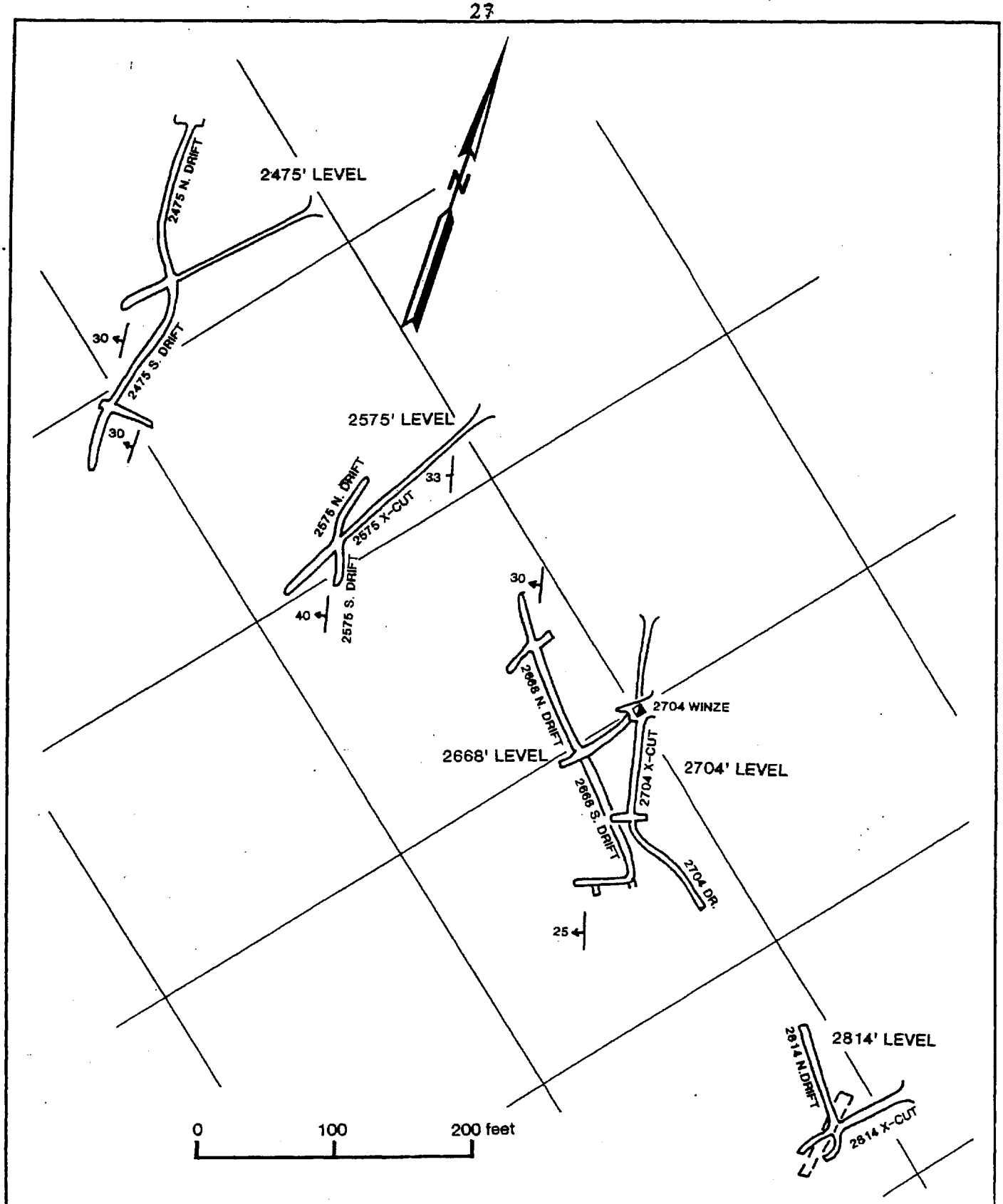
Results of channel sampling of the entire width of the mineralization exposed in the five levels (Skerl, op. cit.) are summarized in Table 3 below (see also Figure 10). Assay results are averages of all samples from each level. A total of 215 samples were taken.

Table 3 Summary of 1955 Sampling Results, Ben Bolt Zone (from Skerl, 1955

Location	Length (Ft.)	Width (Ft.)	Au(oz)	Ag(oz)	Pb%	Zn%
2475-N.Drift	100.0	30.0	0.02	0.62	0.36	1.48
2575-X-Cut	70.0	7.0	0.01	0.57	0.05	0.52
2668-N. Drift	110.0	40.0	0.02	4.24	2.35	2.65
2668-S. Drift	100.0	25.0	0.012	1.03	0.34	0.13
2704-X-Cut	10.0	6.0	0.07	2.65	2.00	1.25
2704-- Drift	20.0	4.0	0.008	1.12	0.23	1.53
2814-X-Cut	40.0	12.0	0.004	4.68	0.40	0.03

6.8 Chicago (L.2317)

The Ben Bolt vein extends north into this claim. Rutherford (1954) reports the vein was explored by a 90 ft. long adit (Figures 4 and 5) but only pyrite was found in the quartz and no samples were taken.



SUMMARY OF SAMPLING RESULTS (Skerl, 1955)

WORKING	LGTH (ft)	WIDTH (ft)	oz. Au	oz. Ag	% Pb	% Zn
2475 N. DR.	100	30	0.02	0.62	0.36	1.48
2575 X-CUT	70	7	0.01	0.57	0.05	0.52
2668 N. DR.	110	40	0.02	4.24	2.35	2.65
2668 S. DR.	100	25	0.012	1.03	0.34	0.13
2704 X-CUT	10	6	0.07	2.65	2.00	1.25
2704 DR.	20	4	0.008	1.12	0.23	1.53
2814 X-CUT	40	12	0.004	4.68	0.40	0.03

PACIFIC CASSIAR LIMITED

GLACIER CREEK CLAIMS
STEWART AREA, B.C.

PLAN OF BEN BOLT WORKINGS
BEN BOLT CLAIM

J.A. Kelly, P.Eng.
November, 1990

FIG.10

6.9 Alice (L.5252)

A 1930 prospecting program found a showing (on strike with the Ben Bolt Zone?) consisting of sphalerite, pyrite and galena (Figure 4). No location or assays were reported. A second mineralized vein located "east of the Portland Canal fissure zone" was traced 500 feet along strike (north-south?) but, again, no assays were reported. (Minister of Mines, B.C., Annual Report, 1930).

7.0 Conclusions

1. Based on sampling results from previous work, none of the known vein zones appears to have an immediate potential for commercial ore development. Although vein structures are generally persistent along strike and down-dip, distribution of gold and silver values is quite erratic. Whereas a sizeable tonnage could conceivably be developed in zones such as the O.K. or Mosquito, maintaining an economic grade would not likely be possible given the sampling results obtained to date.

   On the other hand, in deposits such as this where distribution of metal values is eratic or random, chip sampling or drill hole assays can often be misleading because of 'nugget effect'. In these situations bulk sampling is usually the only realistic method to assess precious metal content with any reasonable degree of certainty.

2. Extensive sections of oxidized shear zone material (Portland Canal fissure zone) are exposed in the Portland Canal tunnel but only sulfide-bearing quartz veins were sampled in previous programs. Whether or not portions of the oxidized zone might contain a significant tonnage of low grade gold mineralization amenable to bulk mining and heap leach extraction has never been determined.

3. Most if not all previous work in the claims has been directed toward proving up or re-assessing the commercial potential of known vein zones discovered in the early years. No systematic exploration programs directed toward discovering new veins or mineralized shear zones have ever been carried out. Except, perhaps, for the Sunbeam and Black Bear claims, there is ample 'room' in the other Glacier Creek claim blocks for new discoveries.

8.0 Recommendations

8.1 Data Compilation

1. A compilation map at a scale of 1:5000 should be prepared for the claims area in order to provide a working base map. The compilation should include topographic contours, available geological data, surface workings, portal locations and access routes. An overlay of government aeromagnetic data would be helpful.

2. A claim ownership map for all claims in the area should be prepared. It is always an advantage to know who one would have to deal with should acquisition of adjoining claims become necessary.

8.2 Underground Work

1. Bulk or panel sampling of the O.K., Mosquito and Ben Bolt zones should be carried out to further assess their commercial potential. Previous assay results from chip and channel sampling and/or drill core were not encouraging but, in the writer's opinion, these data may not have been conclusive given the eratic nature of gold mineralization.

   Although taking four or five hundred pound bulk samples would be preferable, the set-up costs for blasting, mucking and removal would be prohibitive. Panel sampling, therefore, is recommended for the following zones:

   (i) Mosquito/O.K. Zones - the last 50 ft. of the Portland Canal tunnel (from the Mosquito-OK drifts to the east face); 10 ft. long panels on both walls.

   (ii) Ben bolt zone - 2668 Level, 2668 North Drift
   2704 Level, 2704 Cross Cut

2. Zones of sheared, oxidized and/or silicified sediments/volcanics exposed in the Portland Canal tunnel (eg. between 2270 and 2410 ft. east of the portal) should be sampled to determine if there is a potential for low grade leachable gold.

8.3 Surface Work

1. Surface prospecting of the claim areas for new mineralized zones is recommended prior to embarking on any major exploration. In the writer's experience a qualified, experienced prospector/geologist can usually turn up a lot of new showings in old camps.

   In addition, previously reported occurrences on which no follow-up work was done should be opened up and sampled. This would include the upper section of the Ben Bolt vein and the mineralized occurences in the Alice, Black Bear and Olga claims.

   This program should also include panning of creeks and streams, reconnaissance-scale soil geochemical sampling and VLF-EM traverses. The graphitic nature of the vein contacts suggests they should be reasonably good conductors. Contingent on the results if this work, recommendations (2) and (3), following, should be considered.

2. Geological mapping, with the emphasis on delineating the location and limits the Portland Canal fissure zone, is recommended to provide an adequate geological base for ancillary programs of geophysical and geochemical work.

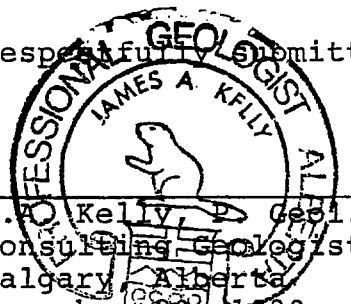
3. Geophysical and geochemical surveys would likely be quite useful in locating and/or tracing mineralized zones in overburden covered areas. However, prior to embarking on

should be done. Geophysical methods recommended are magnetometer, self-potential, VLF-EM and, possibly, induced potential. Soil geochemical sampling analyses should include Au, Ag, Cu and Zn.

9.0 Cost Estimate

The following estimates are "ball park" figures only as the writer has no cost experience in the Stewart area.

1.	Data Compilation	$2,500
2.	Detailed Prospecting/Ungerground Sampling	
	Geologist/prospector 30 days @ $250/day	7,500
	Helper 30 days @ $100/day	3,000
	Vehicle rental 30 days @ $ 75/day	2,250
	Accommodation Food, Fuel 60 days @ $200/day	1,200
	Travel expenses	500
	Equipment, instrument rentals	1,500
	Assays and analyses, 500 samples @ $20	1,000
	Report and Map Preparation	3,000
	Consulting Services 10 days @ $300/day	3,000
	Contingencies	1,729
	Subtotal	27,269
	Administrative costs @ 10%	2,731
	TOTAL	$30,000



Respectfully submitted

J.A. Kelly, P. Geol.
Consulting Geologist
Calgary, Alberta
November 20, 1990

CERTIFICATE OF QUALIFICATIONS

I, James A. Kelly, of the City of Calgary in the Province of Alberta, do hereby certify that:

1. I am a Consulting Geologist with offices at Suite 310, 441 - 5th Avenue SW, Calgary, Alberta.

2. I received a B.Sc. in Geology from the University of Alberta in 1959, and an M.Sc. in Geology from the University of Montana in 1964.

3. I have been practising my profession continuously since 1961.

4. I am registered as a Professional Geologist with the Association of Professional Engineers, Geologists and Geophysicists of Alberta; and as a Professional Engineer with the Association of Professional Engineers of Ontario.

5. I am the author of the report entitled "Preliminary Report on the Glacier Creek Mineral Claims, Skeena Mining Division, British Columbia" dated October 20, 1990. The report is a compilation of pertinent data obtained from company files and government publications; I have not personally examined the property. Recommendations contained herein are based on conclusions drawn from these data.

DATED this 20th day of November, 1990.

J. A. Kelly, M.Sc., P. Geol.
Consulting Geologist

References

Government Reports

Alldrick, D.J. (1987): Geologic Setting of the Precious Metal Deposits in the Stewart Area (104 B/1), B.C. Ministry of Energy Mines and Pet. Res., Paper 1984-1, pp. 149-167.

_____, (1989): Stratigraphy and Petrology of the Stewart Mining Camp (104 B/1), B.C. Ministry of Energy Mines and Pet. Res., Paper 1989-1, pp. 316-340.

Grove, E.W. (1971): Geology and Mineral Deposits of the Stewart Area, British Coumbia, B.C. Ministry of Energy Mines and Pet. Res., Bull. 58, 219 pp.

Hanson G. (1929): Bear River and Stewart Map-areas, Cassiar District, British Columbia, Geol. Surv., Canada, Mem. 159, 84 pp.

_____ (1935): Portland Canal Area, British Coumbia, Geol. Surv., Canada, Mem. 175.

McConnell, R.C. (1913): Portions of Portland Canal and Skeena Mining Divisions, Skeena District, B.C., Geol. Surv., Canada, Mem. 32.

Mines Minister of B.C., Annual Report for 1908 (p.155), 1911 (p.K74), 1915 (p.K73), 1920 (p.N58), 1922 (p.N72), 1928 (p.A84, A90), 1927 (p.C88), 1928 (p.C100), 1930 (p.A106), 1935 (p.B28), 1937 (pp.B7-16), 1954 (p.A82), 1955 (p.17), 1965 (p. 51)

References

Company Reports

i) Pacific Cassiar Limited

Davidson, L.S. (1950): Report on Big Four, Dunwell and Ben Bolt Mines, Portland Canal.

Rutherford, C. (1954): Preliminary Report on Portal Mining Co. Ltd., Cassiar District, Stewart, B.C.

_____(1954): Report on the Ben Bolt Mine for Cassiar Consolidated Mines Limited.

_____(1955): Progress Report to Jan. 1, 1955 for Cassiar Consolidated Mines Limited.

Skerl, A.C. (1955): Summary Report on the Geology of the Portland Canal Tunnel of Cassiar Consolidated Mines Limited, Stewart, B.C.

_____(1955): Report on the Ben Bolt Mine, Stewart, B.C.

_____(1963): The Geology of the Dunwell Mine, Stewart, B.C.

ii) Silver Princess Resources Ltd.

Harris, C.R. (1981): Summary of 1980 Glacier Creek Exploration.

_____(1981): Progress Report to Shareholders.

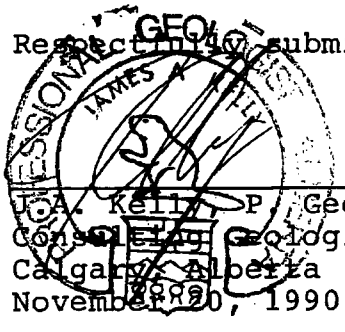
_____(1988): Silver Princess Resources Ltd. Dunwell Mine Project - 1988.

should be done. Geophysical methods recommended are magnetometer, self-potential, VLF-EM and, possibly, induced potential. Soil geochemical sampling analyses should include Au, Ag, Cu and Zn.

9.0 Cost Estimate

The following estimates are "ball park" figures only as the writer has no cost experience in the Stewart area.

1.	Data Compilation	$2,500
2.	Detailed Prospecting/Ungerground Sampling	
	Geologist/prospector 30 days @ $250/day	7,500
	Helper 30 days @ $100/day	3,000
	Vehicle rental 30 days @ $ 75/day	2,250
	Accommodation Food, Fuel 60 days @ $200/day	1,200
	Travel expenses	500
	Equipment, instrument rentals	1,500
	Assays and analyses, 500 samples @ $20	1,000
	Report and Map Preparation	3,000
	Consulting Services 10 days @ $300/day	3,000
	Contingencies	1,729
	Subtotal	27,269
	Administrative costs @ 10%	2,731
	TOTAL	$30,000



Respectfully submitted

J.A. Kelly, P. Geol.
Consulting Geologist
Calgary, Alberta
November 20, 1990

CERTIFICATE OF QUALIFICATIONS

I, James A. Kelly, of the City of Calgary in the Province of Alberta, do hereby certify that:

1. I am a Consulting Geologist with offices at Suite 310, 441 - 5th Avenue SW, Calgary, Alberta.

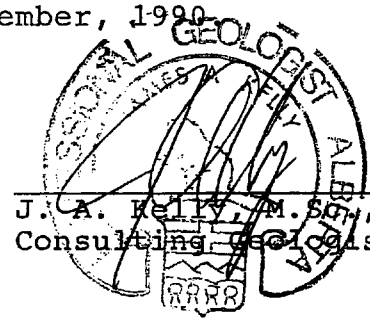
2. I received a B.Sc. in Geology from the University of Alberta in 1959, and an M.Sc. in Geology from the University of Montana in 1964.

3. I have been practising my profession continuously since 1961.

4. I am registered as a Professional Geologist with the Association of Professional Engineers, Geologists and Geophysicists of Alberta; and as a Professional Engineer with the Association of Professional Engineers of Ontario.

5. I am the author of the report entitled "Preliminary Report on the Glacier Creek Mineral Claims, Skeena Mining Division, British Columbia" dated October 20, 1990. The report is a compilation of pertinent data obtained from company files and government publications; I have not personally examined the property. Recommendations contained herein are based on conclusions drawn from these data.

DATED this 20th day of November, 1990.



J. A. Kelly, M.Sc., P. Geol.
Consulting Geologist