ARIS SUMMARY SHEET

District Geologist, Prince George | Off Confidential: 92.08.13

ASSESSMENT REPORT 21594 | MINING DIVISION: Cariboo

PROPERTY:	QFP			
LOCATION:	LAT	52 58 00	LONG	123 51 00
	UTM	10 5868683	442910	
	NTS	093B13W		
CLAIM(S):	QFP			
OPERATOR(S):	Nebocat, J.			
AUTHOR(S):	Nebocat, J.			
REPORT YEAR:	1991, 26 Pages			
COMMODITIES SEARCHED FOR:	Gold			
KEYWORDS:	Jurassic,Hazelton Group,Shales,Siltstones,Tuffs Chert pebble conglomerates,Orthoquartzites,Eocene Quartz-eye rhyolite porphyry,Bleaching Limonite-hematite-pyrite veins,Quartz-carbonate veins,Pyrolusite			

WORK DONE: Geological,Geochemical,Physical

GEOL	100.0 ha	
LINE	2.7 km	
PETR	5 sample(s)	
ROCK	6 sample(s)	;ME
SILT	4 sample(s)	;ME
SOIL	14 sample(s)	;ME

GEOLOGICAL, GEOCHEMICAL AND PETROGRAPHIC REPORT

QFP AND QFP 2 MINERAL CLAIMS

CARIBOO MINING DIVISION

NTS: 93B/13W

Latitude: 52° 58' north

Longitude: 123° 51' west

Owner: John Nebocat

Operator: John Nebocat

June 12, 1991

TABLE OF CONTENTS

INTRODUCTION

The QFP claims are located in the Fraser Plateau of central British Columbia.

Access to the property is via the Nazko road to Marmot Lake, from there to the Baezaeko River via the Michelle Creek and Coglistiko River logging roads, a distance of about 120 km west from Quesnel.

The terrain is typified by rolling forested hills and plateaux which are extensively covered by glacial drift. Annual rainfall is slight to moderate, and drainages are commonly intermittent and swampy. Lodgepole pine is the dominant tree type with lesser amounts of Douglas fir occurring on dry slopes and spruce growing along creeks and swamps. Underbrush is scant and consists primarily of alder and various species of willow.

The QFP claim was staked on August 17, 1989 and the QFP2 claim was staked on November 2, 1990. All work on the property was performed by the author.

A total of 6 rock, 4 silt and 14 soil samples were collected. The baseline was extended 0.55 km and an additional 2.15 km of crosslines were established. All lines were located using a powersaw and were marked with pickets chained for slope corrections. Pickets were placed every 25 m. Approximately 6 hectares of the grid area was geologically mapped and prospected. All the work described in this report was performed on the QFP and QFP 2 claims.

A petrographic study and report was prepared on 5 rock specimens collected from various parts of the property.

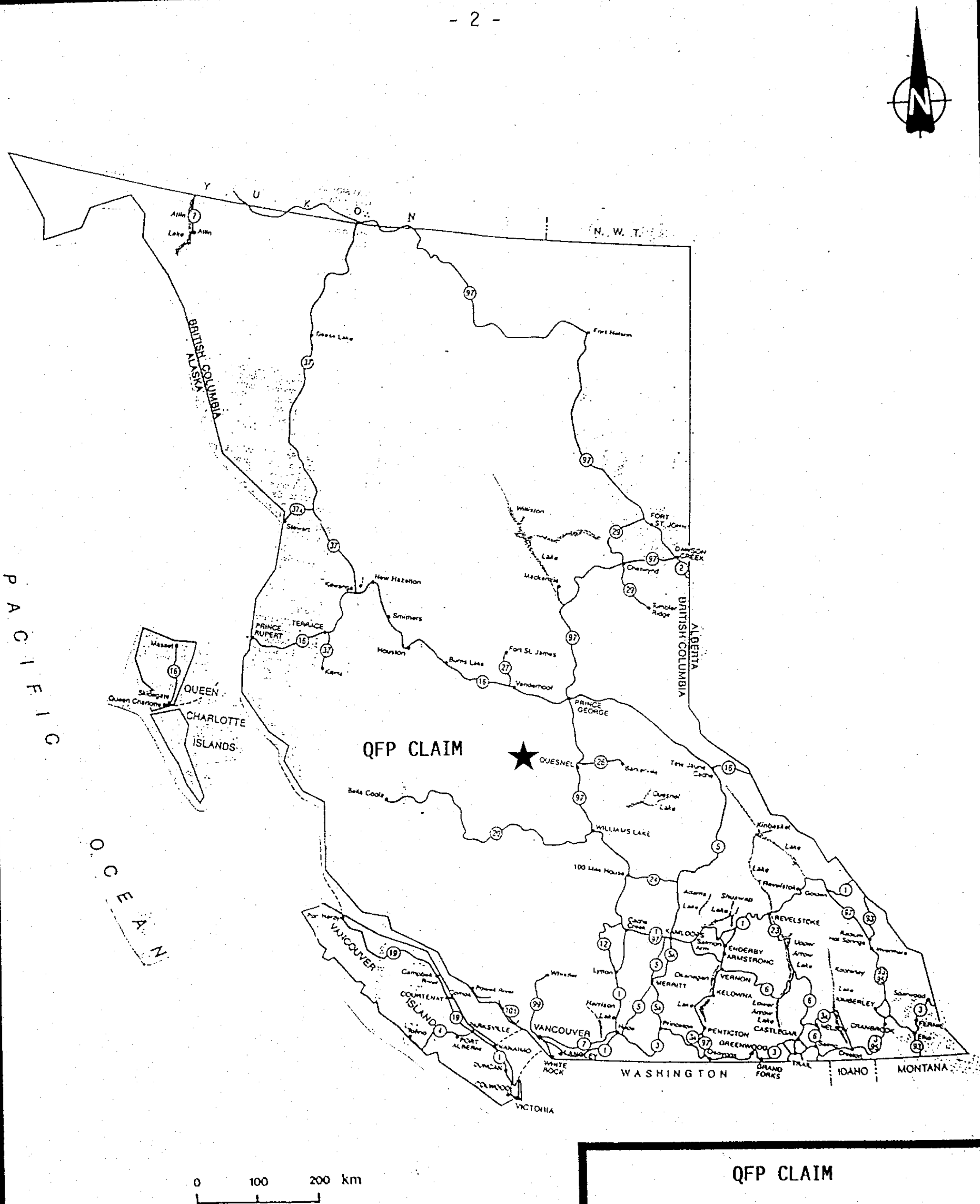
A Tertiary (Eocene) quartz-limonite (after pyrite)-pyrolusite bearing quartz eye rhyolite porphyry, underlying the central portion of the claim, has intruded, altered and mineralized sedimentary rock believed to be part of the "basement" Stikinia Terrane, presumably the Hazelton Group.
There is a potential for a bulk tonnage, low grade precious metal deposit to occur on the QFP property.

DISCUSSION

Regional Geology

The QFP claims are situated in the Intermontane Belt of central British Columbia and are underlain by a basement of island arc volcanics and sediments belonging to the middle Jurassic Hazelton Group, which constitutes most of the Stikine Terrane.

Late Cretaceous to early Tertiary graben structures are in-filled with terrestrial lacustrine and fluvial deposits. All of the above are

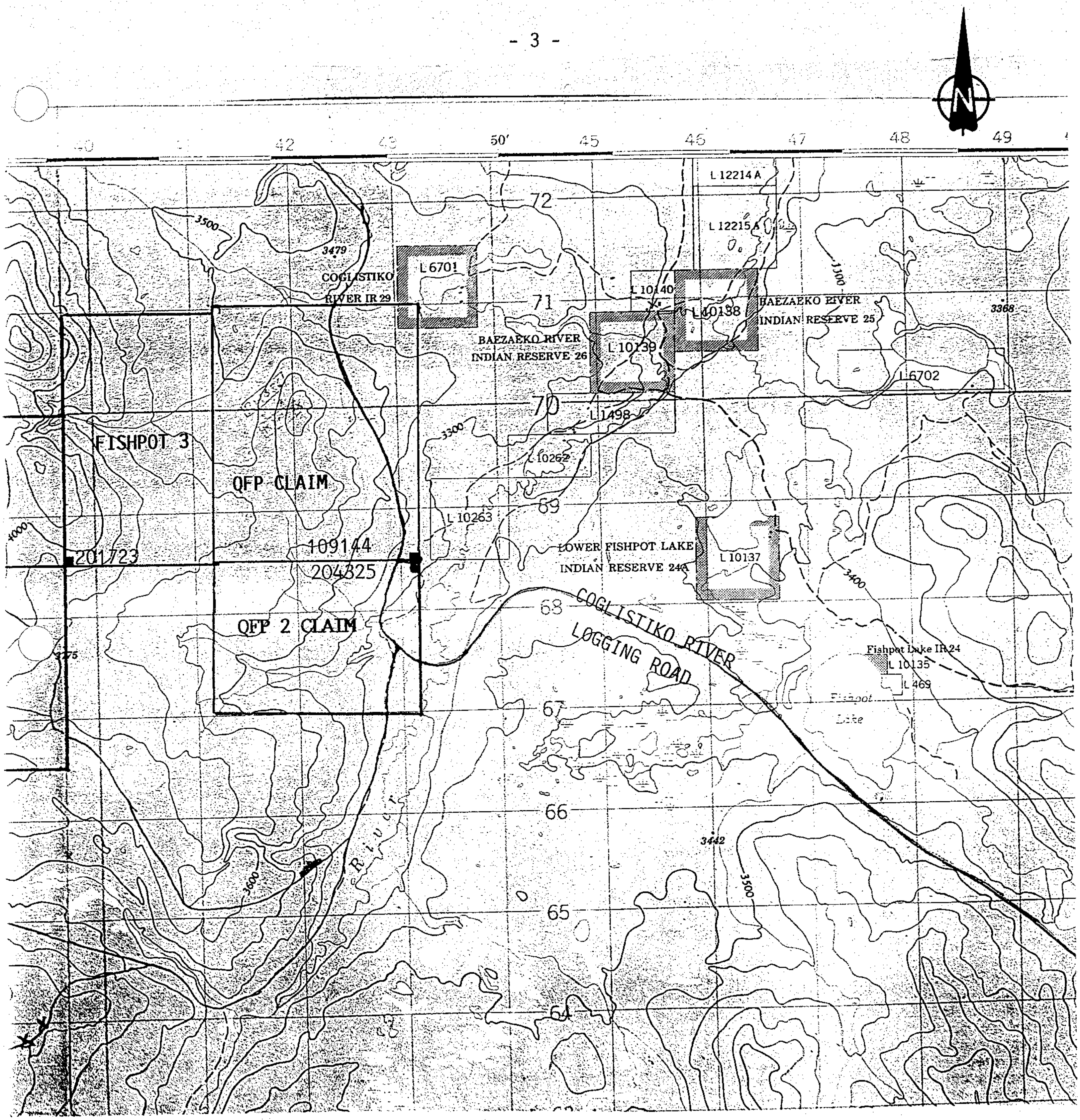


QFP CLAIM

INDEX MAP

Cariboo Mining Division

93B/13W Jun. 12, 1991 Figure 1



QFP CLAIM LOCATION

CARIBOO MINING DIVISION

0 1.0 2.0 3.0 km

scale - 1:50,000

93B/13W Jun.12 , 1991 Figure 2

overlain by subaerial volcanics ranging from Eocene (Ootsa Lake Group) to Recent (unnamed) in age.

Property Geology

Less than 1% of the property appears to be underlain by outcrop; the balance is covered by a thick mantle of glacial till.

A quartz eye rhyolite porphyry underlies the central portion of the grid between L8800 E and L9200 E, mostly north of the baseline and over a distance of at least 300 m.

The unit is traversed by numerous quartz veins ranging in thickness from a few mm to several cm. The veins are for the most part milky white and contain no visible sulphides or other minerals. Some pyrolusite occurs along these and other fractures and seems to precede the quartz veins. No stockwork types of veins were seen within the porphyry. The veins are ubiquitous but generally spaced metres apart. A dominant and subordinate set of veins was observed in the large outcrop occurring on L8800E: they trend 075/63 NW and 045/85 NW, respectively.

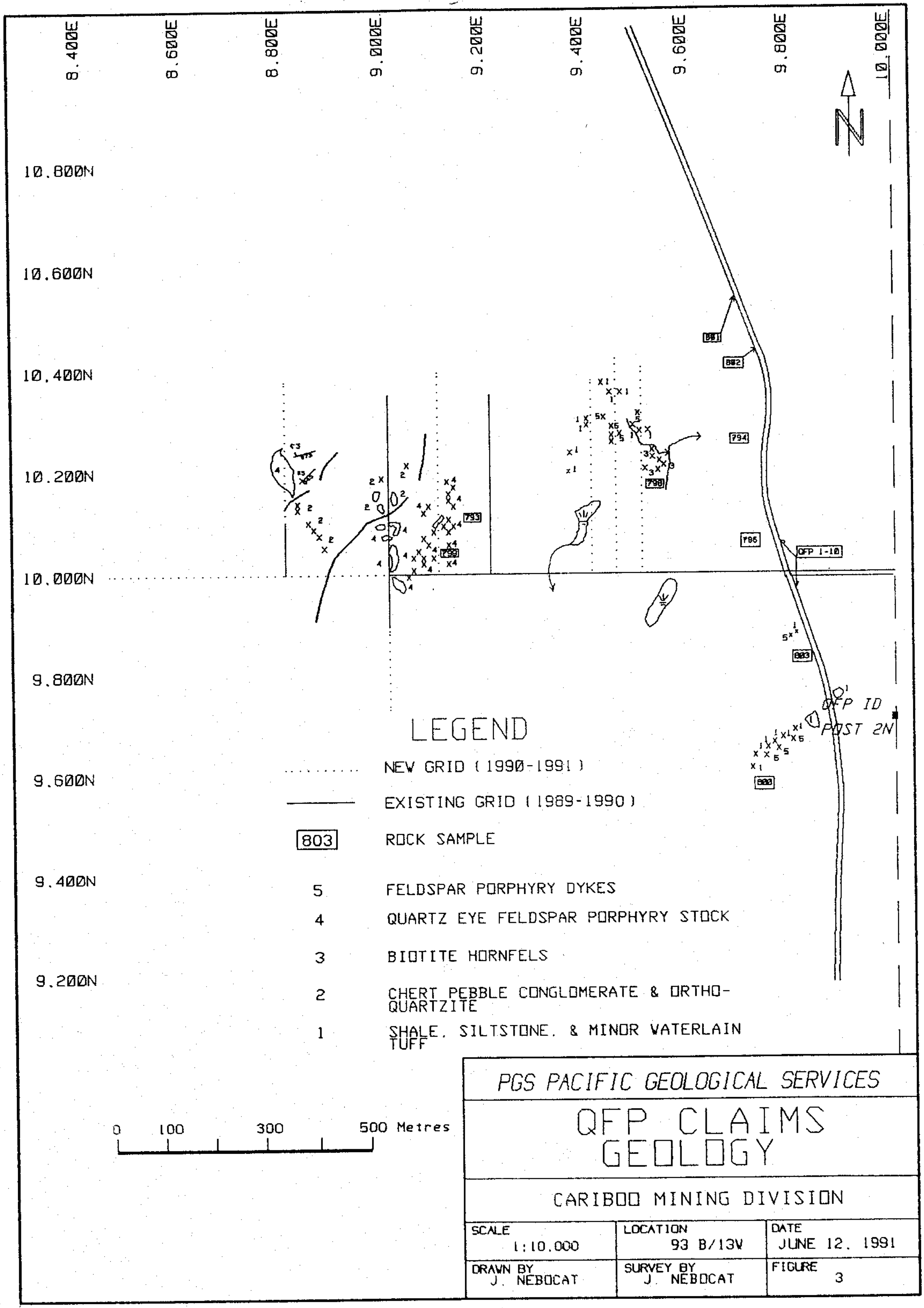
Quartz "eyes" are abundant and are usually less than 5mm across. They are generally clear to slightly greyish in colour.

Finely disseminated limonite and hematite (<0.5%) is found throughout the porphyry and is believed to be derived from pyrite. The grains are generally 1mm to 2 mm in size.

A chert pebble conglomerate unit, with interbeds of orthoquartzite and qreywacke/grit, occurs as a roof pendant over the rhyolite porphyry and forms the summit of a knoll located at the centre of the QFP claim. The chert clasts are mainly white, grey and black in colour, and the grit units are generally grey to black.

Buff to creamy white and grey epithermal quartz veins, plus minor calcite and limonite, are seen locally within the conglomerate. One minor speck of tetrahedrite? was observed in float last year, and a rock sample (#793) assayed in excess of 3 g/t gold. Minor epithermal style quartz is found as float within the porphyry west of the summit near L9100E.

Sub-crop and a considerable amount of float of shale, siltstone and tuff was found between L9400E and L9500E from 10,200N to 10,400N. This material is identical to that found along the road 300 m south of the baseline. The unit is thinly bedded and extremely friable, some carbonate occurs along fractures. Most of the material north of the baseline appears to be glacially transported, but since the glacial trend observed here is clearly from SW to NE, the outcrop along the road is not the source but probably some location several hundred metres west of it buried under till.



8.400E
8.600E
8.800E
9.000E
9.200E
9.400E
9.600E
9.800E
10.000E
N
10.800N
10.600N
10.400N
10.200N
10.000N
9.800N
9.600N
9.400N
9.200N
801
802
794
798
793
799
795
QFP 1-10
803
800
QFP ID
POST 2N
LEGEND
NEW GRID (1990-1991)
EXISTING GRID (1989-1990)
803 ROCK SAMPLE
5 FELDSPAR PORPHYRY DYKES
4 QUARTZ EYE FELDSPAR PORPHYRY STOCK
3 BIOTITE HORNFELS
2 CHERT PEBBLE CONGLOMERATE & ORTHO-QUARTZITE
1 SHALE, SILTSTONE, & MINOR WATERLAIN TUFF
0 100 300 500 Metres
PGS PACIFIC GEOLOGICAL SERVICES
QFP CLAIMS
GEOLOGY
CARIBOO MINING DIVISION
SCALE 1:10,000
LOCATION 93 B/13W
DATE JUNE 12, 1991
DRAWN BY J. NEBOCAT
SURVEY BY J. NEBOCAT
FIGURE 3

Just east of L9500E and between 10,200N and 10,250N are several subcrops or glacially transported pieces of hornfels. Minor disseminated pyrite and pyrrhotite is present. This rock is clearly derived from the thin bedded sediments described above.

Several subcrops of a buff weathering feldspar porphyry dyke unit occur in rootfalls interspersed with the shale and is centered about L9450E X 10,300N. This is the same porphyry dyke found cross-cutting the shale along the road south of the baseline. No hornfels was found adjacent to the dykes at either location.

A petrographic report found in Appendix III at the back of this report gives a more detailed description of some of the lithologies described above.

Geochemistry

Fourteen soil, four silt and six rock samples were collected on the grid and in various locations on the claims.

The samples were analyzed by IPL International Plasma Laboratories Ltd. of Vancouver, B.C. All samples were analyzed for 30 elements using ICP instrumentation; gold was analyzed by atomic absorption for soil and silt samples and by fire assay preconcentration and atomic absorption finish for rock samples. A complete description of techniques is provided in Appendix II.

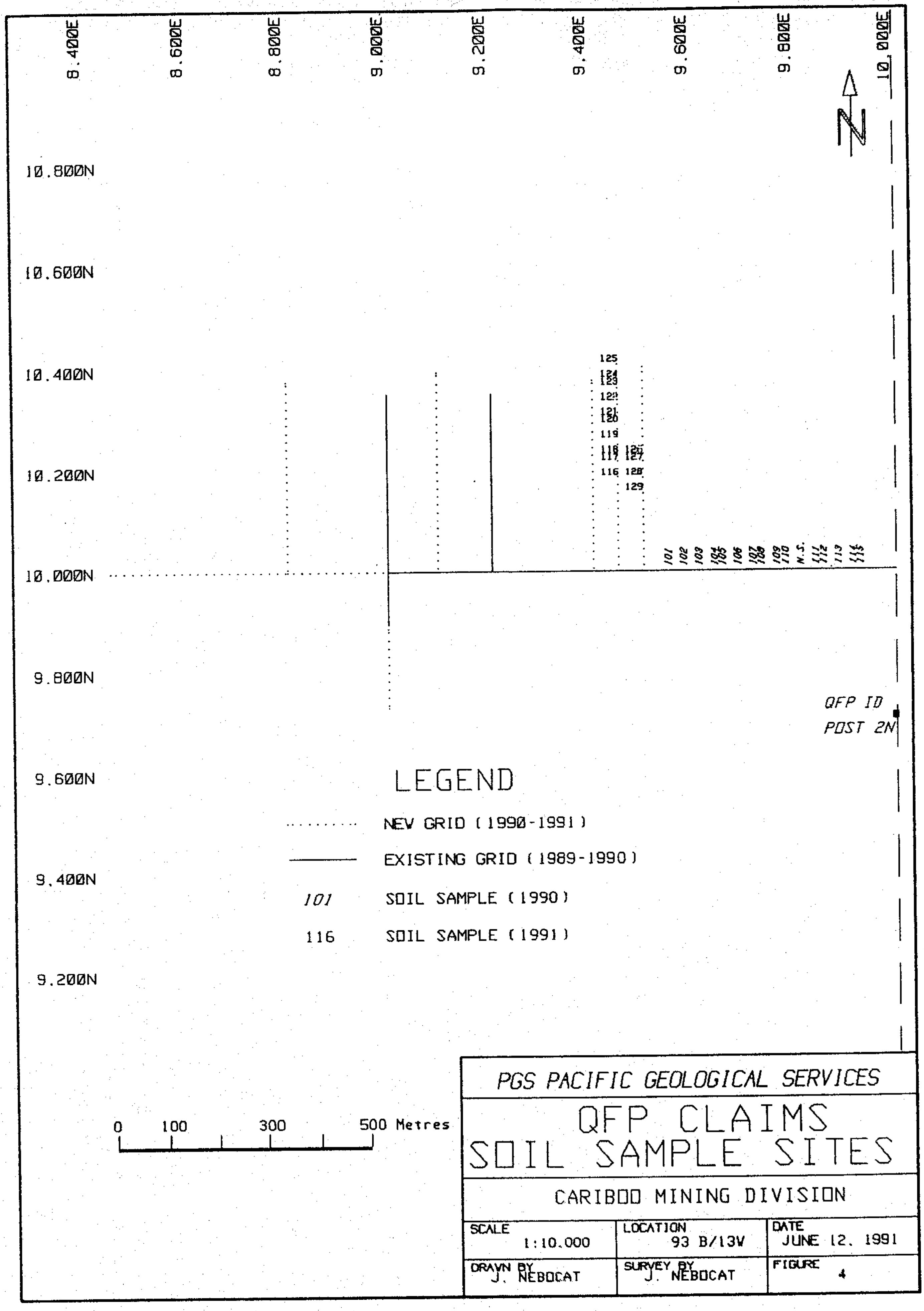
Field Procedures

Soil samples were collected at 25 m intervals along two lines spaced 50 m apart. The average sample depth was about 30 cm. The soil was collected using a shovel and stainless steel trowel and placed into gusseted kraft paper envelopes.

Silt samples were collected using a trowel and similarly placed into paper envelopes. Rock samples were collected using a geological hammer to break the samples before placing them into plastic bags.

Interpretation

The soil samples were collected on lines 9450E and 9500E (see figure 4). The object was to explore for the source of the highly altered and geochemically anomalous float boulders found along the roadcut. These highly altered boulders were glacially transported from a source to the southwest, but soil geochemistry seems to be an ineffective tool as the overburden appears to be too thick over the apparent source area(s).


8.400E
8.600E
8.800E
9.000E
9.200E
9.400E
9.600E
9.800E
10.000E
N
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10.600N
10.400N
10.200N
10.000N
9.800N
9.600N
9.400N
9.200N
125
124
123
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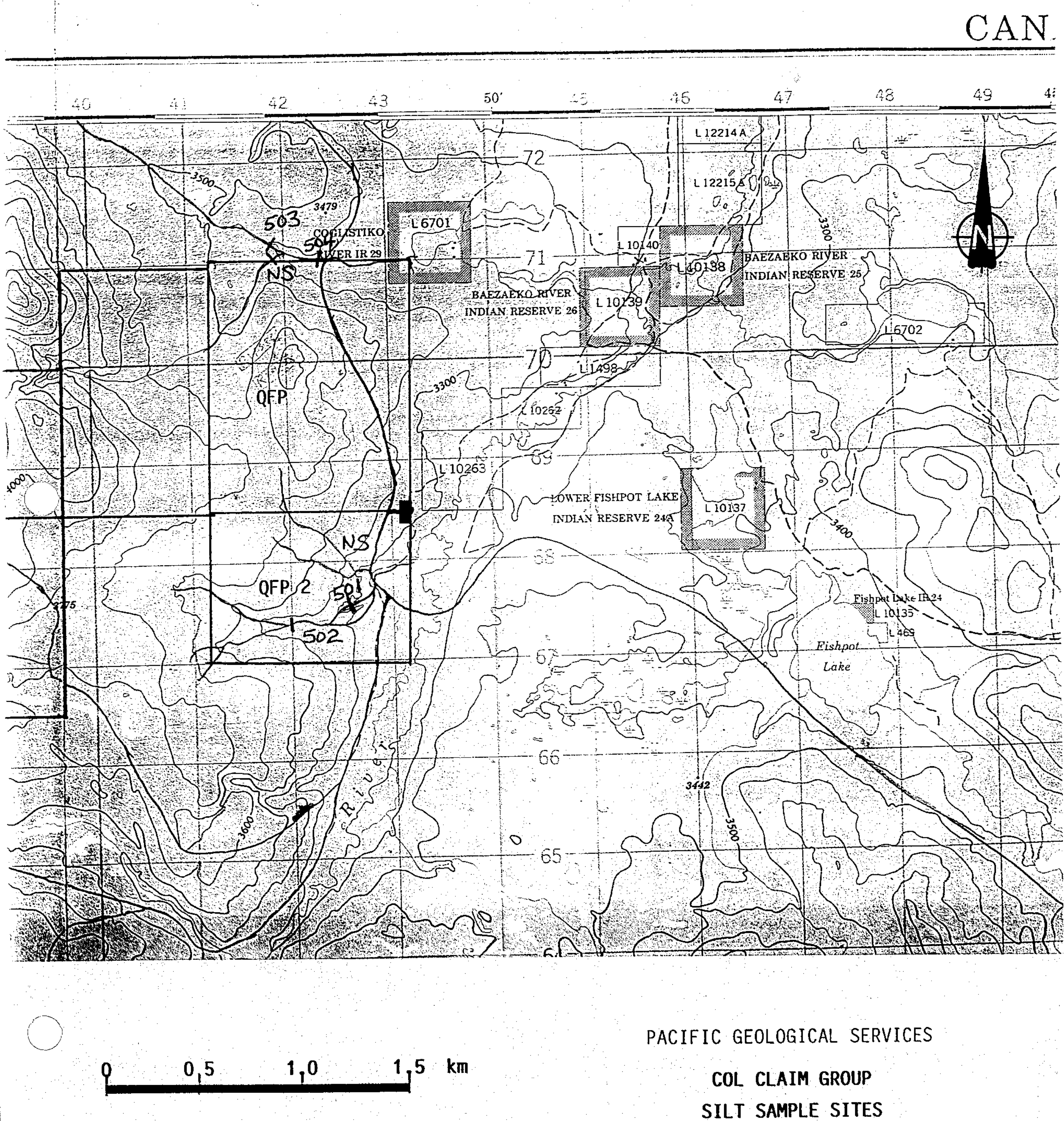
127
128
129
101
102
103
110
N.S.
113
QFP ID
POST 2N
LEGEND
NEW GRID (1990-1991)
EXISTING GRID (1989-1990)
101 SOIL SAMPLE (1990)
116 SOIL SAMPLE (1991)
0 100 300 500 Metres
PGS PACIFIC GEOLOGICAL SERVICES
QFP CLAIMS
SOIL SAMPLE SITES
CARIBOO MINING DIVISION
SCALE 1:10,000
LOCATION 93 B/13W
DATE JUNE 12, 1991
DRAWN BY J. NEBOCAT
SURVEY BY J. NEBOCAT
FIGURE 4



PACIFIC GEOLOGICAL SERVICES

COL CLAIM GROUP
SILT SAMPLE SITES

93B/13W Jun. 12, 1991 Figure 5

Silt samples were collected where possible. Drainages are scarce or absent, and most are seasonal at best. No significant values were obtained; highly anomalous manganese occurs in sample 501, but this sample contained considerable organic material.

The rock samples were generally low in all metals. Sample 801 yielded 105 ppb Au and 806 ppm As and sample 802 ran 122 ppm As. All rocks showed a slight enhancement in Sb levels.

The location of the rock samples is shown on Figure 3--GEOLOGY, and a description of the samples is provided in Appendix I.

CONCLUSIONS

1. Additional mapping has increased the extent of the rhyolite porphyry to the west and has indicated that more sediments underly the grid between the road and the edge of the rhyolite.

2. Soil sampling fails to be a useful method of prospecting to trace the source of the altered and mineralized boulders found in the till along the logging road.

RECOMMENDATIONS

1. A picket survey line should be run along the logging road with stations every 25 m, or less, to establish control for mapping and sampling the mineralized float and to establish the extent of glacial smearing, based on the known lithologies that outcrop up-ice from the road.

2. Pending the success of the sampling/mapping program along the road, the picket line could be soil sampled since the roadway cuts at least 1 metre into the overburden.

3. An induced polarization survey should be run over the baseline to test for the source of the intensely kaolinized and presumably sulphide-bearing (at depth) float seen in the roadcut.

John Nebocat, P.Eng.

Vancouver, B.C.
June 12, 1991

PROFESSIONAL
PROVINCE OF
J. NEBOCAT
BRITISH COLUMBIA
ENGINEER

STATEMENT OF COSTS

Labour:	John Nebocat - Oct. 31, Nov. 1, Nov. 3, 1990; May 8-15, June 10-12, 1991 14 days @ $200.00/day	$ 2800.00
	Sherryl Nebocat - Oct. 31, Nov. 1, 3, 1990; May 8-15, 1991 11 days @ $80.00/day	$ 880.00
Analyses:	24 Au/ICP analyses @ $12.00/sample; 6 rock prep. @ $3.25/sample and 18 soil prep. @ $1.00/sample, plus 7% GST	$ 348.29
Petrographic:	thin section preparation	$ 50.00
	report	$ 300.00
Food & Supplies:		$ 150.00
Fuel & Oil:		$ 100.00
TOTAL		**$ 4628.29**

STATEMENT OF QUALIFICATIONS

I, John Nebocat, residing at #13 - 230 West 14th. Street, North Vancouver, British Columbia, declare that:

1. I am a geologist and have been employed in mineral exploration and earth science studies with industry and government since 1973.

2. I obtained a diploma in Mining Technology from the British Columbia Institute of Technology in 1974. In 1984 I graduated from the Montana College of Mineral Science & Technology with a Bachelor's Degree in Geological Engineering (Honours).

3. I am a registered Professional Engineer with the Association of Professional Engineers of British Columbia.

4. I carried out the work described within this report

PROFESSIONAL
PROVINCE OF
J. NEBOCAT
BRITISH COLUMBIA
ENGINEER

John Nebocat, B.Sc., P. Eng.

APPENDIX I

Rock, Soil and Silt Sample Results and
Descriptions of Rock Samples

Report: 9100175 R Pacific Geological Services Project: None Given   Section 1 of 2

Sample Name	Width	Type	Au ppb	Au ppb	Ag ppm	Cu ppm	Pb ppm	Zn ppm	As ppm	Sb ppm	Hg ppm	Mo ppm	Tl ppm	Bi ppm	Cd ppm	Co ppm	Ni ppm	W ppm
00116		Soil	--	5	0.1	40	7	112	14	6	<3	3	<10	<2	0.3	20	112	<5
00117		Soil	--	<5	0.2	15	10	228	7	<5	<3	3	<10	<2	1.2	21	77	<5
00118		Soil	--	<5	0.2	29	7	170	17	6	<3	3	<10	<2	0.8	17	104	<5
00119		Soil	--	<5	0.2	33	23	246	26	7	<3	3	<10	<2	1.5	18	152	<5
00120		Soil	--	<5	0.1	33	14	164	19	5	<3	2	<10	<2	0.6	18	117	<5
00121		Soil	--	<5	0.2	30	7	120	16	<5	<3	2	<10	<2	0.4	19	86	<5
00122		Soil	--	<5	0.1	38	9	123	18	8	<3	3	<10	<2	0.3	20	169	<5
00123		Soil	--	<5	0.2	27	6	141	13	6	<3	3	<10	<2	0.3	19	179	<5
00124		Soil	--	<5	0.2	17	6	137	13	6	<3	2	<10	<2	0.3	19	152	<5
00125		Soil	--	<5	0.1	20	8	128	10	<5	<3	2	<10	<2	0.2	16	81	<5
00126		Soil	--	<5	0.1	25	3	144	12	<5	<3	3	<10	<2	0.3	19	81	<5
00127		Soil	--	<5	0.2	18	3	223	12	<5	<3	3	<10	<2	0.5	20	78	<5
00128		Soil	--	<5	0.2	26	5	131	12	6	<3	1	<10	<2	0.6	19	70	<5
00129		Soil	--	<5	0.1	22	6	132	10	5	<3	2	<10	<2	0.5	16	62	<5
00501		Silt	--	<5	0.2	37	3	93	<5	6	<3	2	<10	<2	1.0	17	54	<5
00502		Silt	--	<5	0.2	43	4	104	12	<5	<3	2	<10	<2	0.8	17	107	<5
00503		Silt	--	<5	0.1	19	4	86	7	<5	<3	1	<10	<2	0.4	17	51	<5
00504		Silt	--	<5	0.1	28	4	89	6	<5	<3	1	<10	<2	0.4	18	58	<5
R 00798	grab	Rock	<5	--	0.2	70	11	583	16	21	<3	10	<10	5	1.4	31	64	<5
R 00799	grab	Rock	5	--	0.1	3	11	30	22	<5	<3	3	<10	<2	0.2	1	6	<5
R 00800	grab	Rock	<5	--	0.3	21	27	71	<5	8	<3	5	<10	<2	0.7	5	24	<5
R 100801	grab	Rock	105	--	0.5	101	10	235	806	12	<3	4	<10	<2	1.0	13	156	<5
R 100802	grab	Rock	<5	--	0.4	47	<2	384	122	20	<3	5	<10	<2	4.6	15	303	<5
R 100803	grab	Rock	10	--	0.1	53	<2	310	51	19	3	7	<10	<2	1.4	13	217	<5
Minimum Detection			5	5	0.1	1	2	1	5	5	3	1	10	2	0.1	1	1	5
Maximum Detection			10000	10000	100.0	20000	20000	20000	10000	1000	10000	1000	1000	10000	10000.0	10000	10000	1000
Method			FA/AAS	GeoSp	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP

DESCRIPTION OF ROCK SAMPLES

00798 weathered and limonitic quartz stringers in float around area containing abundant hornfels float.

00799 quartz feldspar porphyry float with quartz veins and disseminated limonite and hematite

00800 limonitic quartz veins cross-cutting shale

00801 carbonate veined chert pebble conglomerate and sandstone with minor disseminated pyrite

00802 hematite and limonite altered shales

00803 same as #00802

-- = Not Analysed unr = Not Requested ins = Insufficient Sample

iPL
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Report: 9100175 R   Pacific Geological Services   Project: None Given   Page 1 of 1   Section 2 of 2

Sample Name	Ba ppm	Cr ppm	V ppm	Mn ppm	La ppm	Sr ppm	Zr ppm	Sc ppm	Ti %	Al %	Ca %	Fe %	Mg %	K %	Na %	P %
00116	161	81	91	458	7	26	10	4	0.20	2.45	0.28	3.91	1.33	0.08	0.03	0.10
00117	228	55	68	1964	8	26	2	3	0.15	2.20	0.27	3.17	0.68	0.09	0.02	0.20
00118	138	73	81	259	6	33	5	3	0.16	1.99	0.34	3.52	1.03	0.09	0.03	0.07
00119	128	111	88	335	7	17	3	4	0.13	1.89	0.16	3.54	1.37	0.06	0.02	0.04
00120	112	84	81	459	6	26	4	4	0.15	1.71	0.29	3.43	1.02	0.06	0.02	0.08
00121	119	73	91	501	7	29	5	4	0.19	1.60	0.35	3.71	0.85	0.07	0.03	0.08
00122	118	127	91	542	8	23	4	6	0.13	1.94	0.25	3.77	1.68	0.08	0.03	0.05
00123	180	103	79	442	7	29	2	4	0.12	2.02	0.28	3.36	1.28	0.07	0.02	0.12
00124	168	123	83	635	7	28	2	4	0.10	2.17	0.30	3.37	1.62	0.07	0.02	0.12
00125	135	65	73	345	5	23	4	3	0.16	1.72	0.28	3.19	0.77	0.06	0.03	0.10
00126	164	53	77	664	6	32	4	3	0.19	2.47	0.31	3.59	0.71	0.07	0.03	0.15
00127	186	47	72	814	5	47	5	2	0.20	2.65	0.43	3.37	0.57	0.08	0.02	0.13
00128	103	54	91	316	6	29	5	3	0.22	1.88	0.27	3.79	0.65	0.08	0.03	0.06
00129	91	45	69	341	6	24	3	3	0.18	1.79	0.25	3.29	0.55	0.06	0.03	0.12
00501	450	27	48	>10000	7	132	2	2	0.04	1.01	2.16	3.75	0.55	0.07	0.03	0.17
00502	158	49	61	1052	9	62	4	5	0.09	1.86	1.07	3.45	0.80	0.07	0.03	0.07
00503	89	52	58	675	11	46	8	5	0.21	1.68	0.66	3.13	0.70	0.05	0.04	0.08
00504	117	55	59	977	14	60	8	6	0.19	2.05	0.88	3.48	0.71	0.06	0.04	0.09
R 00798	162	136	20	1971	7	10	2	4	0.01	0.45	0.07	3.08	0.06	0.18	0.02	0.04
R 00799	61	101	3	141	8	5	4	<1	<0.01	0.32	0.04	0.55	0.03	0.19	0.02	0.01
R 00800	191	71	9	2814	4	929	2	2	<0.01	0.24	9.19	2.61	5.72	0.09	0.02	0.04
R 100801	101	62	21	553	6	483	1	6	<0.01	0.40	2.65	3.08	1.70	0.26	0.02	0.04
R 100802	607	62	35	58	5	9	1	7	<0.01	0.57	0.03	>5.00	0.05	0.18	0.02	0.13
R 100803	128	56	24	120	8	20	1	3	<0.01	0.63	0.04	>5.00	0.04	0.15	0.02	0.08
Minimum Detection	2	1	2	1	2	1	1	1	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Maximum Detection	10000	10000	10000	10000	10000	10000	10000	10000	1.00	5.00	10.00	5.00	10.00	10.00	5.00	5.00
Method	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP

-- = Not Analysed   unr = Not Requested   ins = Insufficient Sample

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APPENDIX II

Descriptions of Analytical Procedures

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Method of Gold analysis by Fire Assay / AAS

(a) 20.0 to 30.0 grams of sample is mixed with a combination of fluxes in a fusion pot. The sample is then fused at high temperature to form a lead "button".

(b) The precious metals are extracted by cupellation. Any Silver is dissolved by nitric acid and decanted. The gold bead is then dissolved in boiling concentrated aqua regia solution heated by a hot water bath.

(c) The gold in solution is determined with an Atomic Absorption Spectrometer. The gold value, in parts per billion, is calculated by comparision with a set of known gold standards.

QUALITY CONTROL

Every fusion of 24 pots contains 22 samples, one internal standard or blank, and a random reweigh of one of the samples. Samples with anomalous gold values greater than 500 ppb are automatically checked by Fire Assay/AA methods. Samples with gold values greater than 10000 ppb are automatically checked by Fire Assay/Gravimetric methods.

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Method of ICP Multi-element Analyses

(a) 0.50 grams of sample is digested with diluted aqua regia solution by heating in a hot water bath for 90 minutes, then cooled, bulked up to a fixed volume with demineralized water, and thoroughly mixed.

(b) The specific elements are determined using an Inductively Coupled Argon Plasma spectrophotometer. All elements are corrected for inter-element interference. All data are subsequently stored onto computer diskette.

* Aqua regia leaching is partial for Al, Ba, Ca, Cr, Fe, K, Mg, Mn, Na, P, Sn, Sr and W.

QUALITY CONTROL

The machine is calibrated using six known standards and a blank. Another blank, which was digested with the samples, and a standard are tested before any samples to confirm the calibration. A maximum of 20 samples are analysed, and then a standard, also digested with the samples, is run. A known standard with characteristics best matching the samples is chosen and tested. Another 20 samples are analysed, with the last one being a random reweigh of one of the samples. The standard used at the beginning is rerun. This procedure is repeated for all of the samples.

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Method of Silver & Gold Analyses by Fire Assay

(a) 1/4 to 1 assay tonne of the pulp sample is mixed with a combination of fluxes in a fusion pot and fused at a high temperature to form a lead "button".

(b) The precious metals are extracted by cupellation and weighed as a dore bead. The silver is then dissolved with diluted nitric acid and decanted.

(c) The resulting gold bead is annealed and weighed using a Sartorius micro-balance. The weight lost from the original bead is used to calculate the silver content. Both the silver and the gold are reported in Ounces per short tonne (OPT).

QUALITY CONTROL

- Every fusion of 24 pots contains 22 samples, one internal standard or blank, and a random reweigh of one of the samples.
- Anomalous gold values greater than 0.2 OPT and silver values greater than 1.0 OPT are automatically checked.
- Any indication of other precious metals is noted on the final report.

APPENDIX III

Petrographic Report on Five Thin Sections
From the QFP Property, B.C.

PETROGRAPHIC REPORT ON FIVE THIN SECTIONS FROM THE QFP PROPERTY, B.C.

Report for: John Nebocat, Geologist, P. Eng.
PGS Pacific Geological Services
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V7M 1P3.

Invoice attached

May 30, 1991

Samples submitted: QFP2, A, B, 793, 799.

QFP2: PYRITE (-LIMONITE) VEINED, SERICITE ALTERED SHALE

Described in the field as a brecciated shale?, veined with limonite, assaying 100-150 ppb Au. Traces of remnant pyrite can be seen in the centers of the limonite veins, suggesting that all the limonite is after pyrite. Light coloured bleached haloes around some of the fractures could be due to supergene oxidation processes. The rock does not react to cold dilute HCl and is not magnetic. In thin section, the mineralogy is roughly as follows:

Limonite (goethite and hematite?)	35%
Quartz (?partly secondary)	30%
Sericite (illite and/or muscovite)	30%
Pyrite	3%
?Carbon	2%

The rock is extremely fine grained (average about 10-20 microns). Only in the light-coloured (bleached) areas can any mineralogy be seen: the rock appears to be made up mainly of quartz and sericite, with disseminated limonite grains. Quartz forms anhedral detrital-looking grains rarely up to 100 microns (0.1 mm) in diameter, but generally only 5-10 microns in the matrix of the rock. In places, sutured aggregates of anhedral 10-20 micron quartz grains appear to be secondary. It is not clear whether the fine grains in the matrix are primary or secondary, or more likely both.

Sericite may be mainly illite (potassium clay), as subhedral flakes of about 5-10 microns diameter, but occasionally flakes of ?muscovite up to 30 microns are present. There is only rare feldspar (?orthoclase: low refractive index) visible, as subhedral grains up to 50 microns in diameter. Much feldspar, if originally present, has presumably been sericitized.

Dark (unbleached) areas of the slide are virtually opaque in transmitted light, making identifications difficult. However, it is possible that they are similar to the bleached areas, with a minor amount of very finely divided ?carbon, and major amounts of limonite. Limonite in the veins ranges from amorphous and yellow-brown to red-brown and finely crystalline (10-15 micron diameter). It appears to be mainly goethite.

The character of the rock is consistent with it having been a fine-grained clastic such as a mudstone or shale before pyritic veining and sericite- ?quartz alteration.

A: LIMONITIC, SILICIFIED ?TUFF OR TUFFACEOUS SHALE, CUT BY TWO DISTINCT GENERATIONS OF QUARTZ VEINS

Described in field notes as silicified shale?, veined with limonite and cross-cutting quartz stringers. Hand specimen is a black, very fine-grained rock with a lamination enhanced by red-brown limonitic bands (some also on cross-cutting angles). Rare reaction in small spots to cold dilute HCl; not magnetic. No sulfides visible; fair degree of porosity. In thin section, the minerals are:

Quartz (largely secondary)	55%
Limonite (goethite mainly)	25%
Sericite (illite and muscovite)	15%
?Relict feldspar	3%
Amorphous ?carbon	2%
Carbonate (calcite)	<1%

The rock is made up of alternating bands of semi-opaque (limonite-rich) and relatively clear (siliceous) material. The grain size is very fine, averaging about 10-20 microns in both layers. However, there are traces of a relict texture that might be described as spherulitic for want of a better term. Rounded colloform shapes of silica, with darker cores enriched in extremely finely divided (micron or less size) ?carbon, are up to 0.1 mm in diameter. In certain layers they may make up to 70% of the rock, and appear almost bed- or vein-like. In other (fine-grained) layers, a vaguely ?fragmental texture is visible; taken together, they suggest the rock could have been tuffaceous, but field relations would be needed to confirm such a speculation.

Sericite is present throughout as fine subhedral flakes of ?muscovite up to 0.05 mm in diameter, as well as very fine flakes that may more properly be termed illite. They stand out in a tightly interlocking mosaic of highly anhedral quartz grains, much of which looks to be secondary (at least recrystallized, if not metasomatically added). There may be minor feldspar present; staining would be required to verify this.

Quartz veins of at least two distinct types are common: one is composed of fibrous oriented perpendicular to the vein walls (grains are up to 0.2 mm long), and the other contains both subhedral quartz grains similar to the spherulites (i.e. full of inclusions of ?carbon at their cores) and a really distinctive, water-clear quartz with minutely detailed, intricate growth zoning. The first type are mainly perpendicular to the lamination in the rock, and are highly strained (undulose extinction). They are irregular, lensoidal, and appear to be early (are cut by the seconda type, which is often bedding-parallel, thicker, and more continuous). Both types appear to cut through limonite areas. The later quartz type would be an excellent candidate for epithermal veining. A good deal of porosity is developed along these veins, and much of the limonite in them has cubic shapes, indicating the presence of former pyrite that has been pseudomorphed during weathering.

B: PLAGIOCLASE-MINOR QUARTZ PORPHYRY OF ?BIOTITE DACITE COMPOSITION, STRONGLY ALTERED TO SERICITE-QUARTZ-LIMONITE

Described in field notes as "QFP dykes", weathered and sericitized, occurring in rootfalls. In hand specimen, it is a light buff-brown igneous rock characterized by large glomeratic plagioclase phenocrysts up to 0.5 cm in diameter and scattered darker mafic relics; no quartz eyes are visible, in contrast to 799. It is a more intermediate-looking rock than 799. There are only rare traces of reaction to cold dilute HCl, and it is not magnetic. In thin section, the modal mineralogy is as follows:

Sericite (muscovite)	35%
Plagioclase (relict albite)	30%
Quartz (groundmass; partly secondary)	20%
(primary phenocrysts)	5%
Limonite (goethitic)	10%

Former plagioclase phenocrysts are up to 5 mm long, euhedral, and heavily replaced by secondary minerals including albite, sericite, and minor secondary quartz. The relict feldspar is quite clear, and only rarely shows twinning; it is not likely to be primary, and is probably a secondary alkali feldspar near albite in composition. Optical continuity over entire phenocrysts suggests thorough replacement. Sericite is fine muscovite, forming subhedral flakes up to 0.5 mm diameter. Quartz is anhedral and up to 0.2 mm diameter, with a tendency towards a graphic texture.

Quartz phenocrysts are visible in the section; they are euhedral, clear, only lightly strained and up to 1 mm across.

Former mafic sites are entirely pseudomorphed by coarse muscovite as subhedral flakes up to 1 mm across and minor opaque oxides; from their appearance, they probably were originally biotite books.

The groundmass is composed of fine-grained (average 0.05 mm or less) sericite, quartz, feldspar and limonite. Limonitic replacement is quite heavy throughout this rock, probably representing the weathering of both Fe-bearing mafics and possibly minor pyrite.

This was originally a high-level porphyry of about dacite in composition (hard to tell if any K-spar was present) that has been strongly phyllic altered to sericite, quartz, and possibly some pyrite. There are rare thin (0.25 mm) quartz and quartz-limonite veins.

793: BRECCIA OF ?SHALE, CONGLOMERATE AND FELDSPAR PORPHYRY CLASTS IN COARSE COCKADE AND CHALCEDONIC QUARTZ MATRIX

Described as "crystalline and chalcedonic quartz enveloping shale and chert pebble conglomerate clasts". Assayed 3 g/t (0.111 oz/ton) Au. Black shale and buff-coloured ?chert pebbles and ellipsoid clasts are up to 2 cm long. There is minor hematite staining, but the bulk of the rock is made up of white ?vein quartz. There is no reaction to cold dilute HCl or to a magnet. In thin section, the modal mineralogy is dominated by secondary quartz:

Quartz (mainly secondary)	75%
Sericite (?illite)	15%
Hematite	5%
Relict feldspar (albitic plagioclase?)	5%

The major portion of the slide consists of coarse, euhedral to subhedral quartz, often with a bladed or cockscomb habit (technically only where it forms veins up to 1 cm thick). In many places the texture is properly termed cockade, as the bladed quartz has formed around fragments (growing perpendicular to the fragment boundaries). Some grains are up to 2.5 mm long, and have a feathery, plumose internal structure. Most grains are only slightly strained; fluid inclusions are rare and very small (few microns). There are commonly voids at the centers of irregular veins, and around these some of the quartz has chalcedonic character (very fine-grained, tightly interlocked anhedral 25 micron diameter). This latter quartz is closely associated with the bulk of the limonite, which is mainly subhedral red hematite up to 25 microns across. It is not possible to say whether this limonite represents the oxidation of former sulphides.

Included clasts of rock are mainly ?shale and ?conglomerate, composed of variably fragmental microcrystalline quartz and lesser amounts of sericite. Much of this quartz (10-20 microns diameter) also has a secondary appearance. The sericite is mainly very fine grained (10 microns) and may be largely illite; rarely, coarser subhedral flakey masses contain grains to 50 microns diameter.

One 7 mm long clast has clear remnants of former plagioclase pheneocrysts as ghosted outlines up to 1.5 mm long; this may represent a former feldspar porphyry. The phenocrysts were plagioclase, and are now replaced by albite, sericite and minor secondary quartz, as is the groundmass. Quartz or mafic phenocrysts are not evident.

The locus of the gold in this sample can only be speculated to be with the hematitic limonite, but in any case the texture and abundance of quartz suggest a highly prospective epithermal environment.

799: QUARTZ PORPHYRY (?RHYOLITE) VEINED BY COCKSCOMB QUARTZ

This sample cones from the QFP stock lying to the west of the mineralized float (QFP2), and is described as "veined with quartz, disseminated pyrite throughout"; assays are awaited. In hand specimen, it is a cream-coloured, fine grained acid rock characterized by fine grey quartz but no plagioclase or mafic phenocrysts and thin limonite fractures; it looks distinctly different than the QFP dykes (sample B). Grey to white quartz veining with abundant vugs looks very similar to that in 793. There is no reaction to cold dilute HCl or a magnet; black fracture coatings are probably Mn-oxides. In thin section, mineralogy is:

Quartz	(secondary, vein)	25%
	(primary phenocrysts)	10%
	(groundmass)	10%
Feldspar	(alkali?, mainly groundmass)	30%
	(relict albitic plagioclase?)	10%
Sericite	(illite and muscovite)	10%
Limonite	(goethitic)	5%

The host rock is composed of euhedral quartz phenocrysts up to 2 mm in diameter set in a distinctive rather coarse groundmass with a suggestion of relict former ?spherulitic texture. The phenocrysts show strong resorption by the matrix and "coronas: up to 0.25 mm thick surround them. They are strongly fractured and moderately strained. Most of the groundmass consists of rounded relict grains of ?alkali feldspar of 0.1 mm diameter, with a little fine subhedral interstitial sericite (?illite) and lesser anhedral ?quartz. There are also a few scattered relict plagioclase phenocrysts that were up to 1 mm long; they are now partly replaced to completely pseudomorphed by fine sericite (?muscovite) as subhedral scaly flakes up to 30 um.

Veins are composed of the same coarse, bladed, feathery euhedral to subhedral quartz as in 793. The grains grow perpendicular to the vein walls, giving them a cockscomb texture. Minor amounts of the same fine anhedral chalcedonic quartz are found at the centers of the veins, as a last stage before the final vugs. Traces of brown, amorphous goethitic limonite are found in these vugs. No opaque that could be described as pyrite was seen.

Neither the groundmass character, type or abundance of phenocrysts are similar to those of the QFP dykes (sample B); also, 799 appears to be more felsic (possibly rhyolitic in composition, although staining for K-feldspar would be necessary to substantiate this). It also appears to be more high-level than B, although the two could be related to the same magma. The veining is clearly the same as in the mineralized sample that assayed 3 g/t Au, suggesting both rock types have been exposed to this mineralizing episode.

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