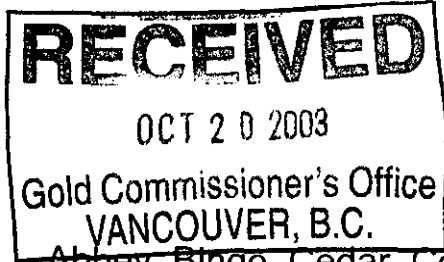


**Geological, Geochemical and Geophysical**

**Assessment Report**



on the

***Pearson PGE Property***

Abbey, Bingo, Cedar, Coho, Coho #4 - #6, Coho 2 - 3, Dan 1 - 11, EFR, EFR 1 - 6, Galleon 53, Galleon 57, Galleon 70 - 71, Galleon 80, Jack, Jack 2, Jan 7, Jan 8, Jan 8, Jay Jay, Nabay 1 - 11, Obin, Outhouse, Pacmist 2 - 4, Princess, Princess 2, Ralph 1 - 2, Ran, Ran 1 - 16, Roccod, Timber, Ultra 1 - 6, Whistle 1 - 2, Woody claims

and

***Karen Property***

Karen 1 - 5 claims

**Port Renfrew Area  
Victoria Mining Division**

Latitude and Longitude: *Pearson PGE* 48° 35' - 48° 41' N; 124° 13' - 124° 31' W  
*Karen* 48° 26' - 48° 28' N; 124° 04' - 124° 08' W

Map Sheets: *Pearson PGE* 092C.059, 068, 069 92C09, 10E  
*Karen* 092C.050 92C08E

Claim Owners: Emerald Fields Resource Corp. and Gary Pearson

Operator: Emerald Fields Resource Corp.

Consultants: Sean D. McKinley, P. Geo. and Discovery Consultants

Authors: Sean D. McKinley, P. Geo. and William R. Gilmour, P. Geo.

Date: October 10, 2003

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## **Introduction**

In May 2003, Emerald Fields Resource Corp. undertook an exploration program on their mineral claims, the *Pearson PGE* and *Karen* properties, near Port Renfrew, B.C. The primary target of this exploration was Ni-Cu-PGE mineralization hosted by intrusive rocks.

Emerald Fields approved the initial work program and budget, specifically by Mr. Alasdair Mowat, President, and Mr. Perry Heatherington, Chief Operating Officer. Subsequently, Emerald Fields approved minor program and budget changes. This report was prepared at the request of Emerald Fields to meet assessment work requirements. Reconnaissance geological mapping of logging roads on the *Pearson PGE* property was conducted at a scale of 1:10,000 and was accompanied by rock sampling for major and trace element geochemistry and petrographic analysis. This mapping and rock sampling was conducted by consultant geologists Sean McKinley, P.Geo. and Chris Sebert, P.Eng.

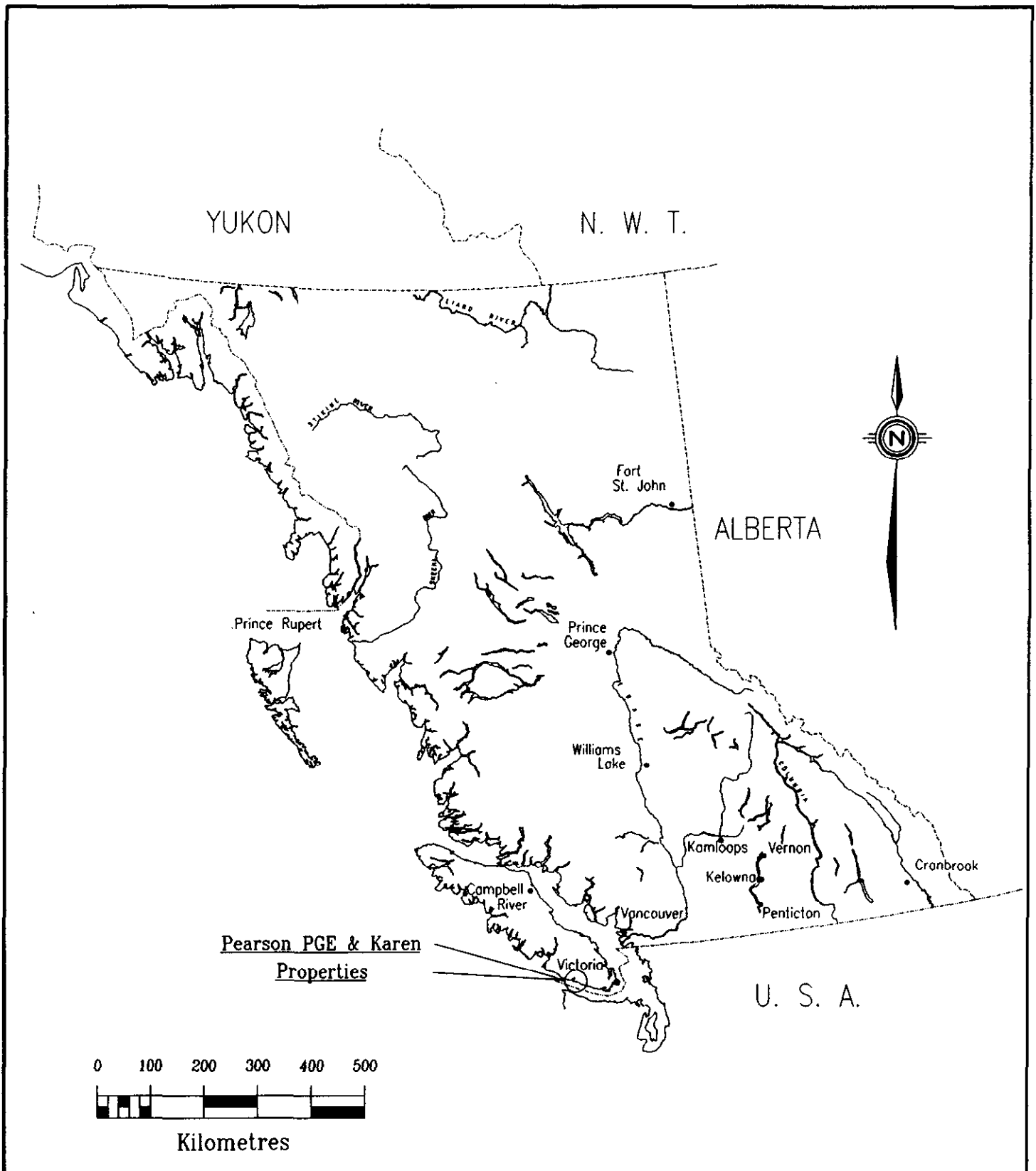
Discovery Consultants conducted a stream sediment sampling program that covered most of the major drainages on the *Pearson PGE* and *Karen* properties with the aim of identifying prospective targets for mineralization.

In addition, an orientation VLF-EM and magnetometer survey was conducted in the vicinity of a massive sulphide showing in the Renfrew Creek area. This assessment report also includes the results of April 2003 exploration by prospectors working directly for Emerald Fields (Appendix F), and not under the supervision of Messrs. McKinley or Sebert.

## **Location, Access and Physiography**

The community of Port Renfrew is located on the southwest coast of Vancouver Island approximately 100 km WNW from the city of Victoria (Figures 1 and 2). The *Pearson PGE* property is located near Port Renfrew, north of the San Juan River in the vicinity of Gordon River, Fairy Creek and Renfrew Creek. The roughly rectangular claim block is approximately 22 km east to west by approximately 10 km north to south. The *Karen* property is southeast of Port Renfrew, and a few kilometres west of the Jordan River.

The area comprises some quite rugged and steep topography, heavy west coast rain forest vegetation, second-growth forests and logging clear-cuts. Despite the remote and rugged location, the area is relatively easily accessed via paved Highway 14 from Victoria and Sooke or from the northeast from Lake Cowichan by gravel logging road. The claims themselves can be reasonably accessed via a network of active and partially deactivated logging roads that also provide some excellent geological exposures.



**DISCOVERY** Consultants

Emerald Fields Resource Corp.

Pearson PGE & Karen Properties

LOCATION MAP

## Claims

The *Pearson PGE* property comprises 87 contiguous four-post and two-post claims, totalling 620 claim units. The *Karen* property comprises 5 contiguous four-post and two-post claims totalling 65 claim units. All the claims are in the Victoria Mining Division.

The following tables summarize the pertinent claim information. The claims registered in the name of Emerald Fields are 100% owned by the company. The claims registered to Gary Pearson are subject to an option agreement between himself and Emerald Fields. The expiry date, as shown, is subject to the approval of this assessment report.

### Pearson PGE Property

<u>Claim Name</u>	<u>Tenure No.</u>	<u>Units</u>	<u>Expiry Date</u>	<u>Registered Owner</u>
Abbey	379141	1	2005.06.27	Pearson, Gary Michael
Bingo	374411	1	2005.06.27	Pearson, Gary Michael
Cedar	377112	1	2005.06.27	Pearson, Gary Michael
Coho	390304	1	2004.06.27	Pearson, Gary Michael
Coho #4	390462	1	2004.06.27	Pearson, Gary Michael
Coho #5	390463	1	2004.06.27	Pearson, Gary Michael
Coho #6	390464	1	2004.06.27	Pearson, Gary Michael
Coho 2	390305	1	2004.06.27	Pearson, Gary Michael
Coho 3	390306	1	2004.06.27	Pearson, Gary Michael
Dan 1	374714	1	2005.06.27	Pearson, Gary Michael
Dan 2	374410	1	2004.06.27	Pearson, Gary Michael
Dan 3	378448	1	2004.06.27	Pearson, Gary Michael
Dan 4	375070	1	2005.06.27	Pearson, Gary Michael
Dan 5	375324	1	2004.06.27	Pearson, Gary Michael
Dan 6	375325	1	2005.06.27	Pearson, Gary Michael
Dan 7	376819	1	2005.06.27	Pearson, Gary Michael
Dan 8	377111	1	2005.06.27	Pearson, Gary Michael
Dan 9	378824	1	2005.06.27	Pearson, Gary Michael
Dan 10	378825	1	2005.06.27	Pearson, Gary Michael
Dan 11	378826	1	2004.06.27	Pearson, Gary Michael
EFR	394701	1	2005.06.27	Emerald Fields Resource Corp.
EFR 1	395053	20	2004.06.27	Emerald Fields Resource Corp.
EFR 2	395054	20	2004.06.27	Emerald Fields Resource Corp.
EFR 3	395055	20	2004.06.27	Emerald Fields Resource Corp.
EFR 4	395056	16	2004.06.27	Emerald Fields Resource Corp.
EFR 5	395119	7	2004.06.27	Emerald Fields Resource Corp.

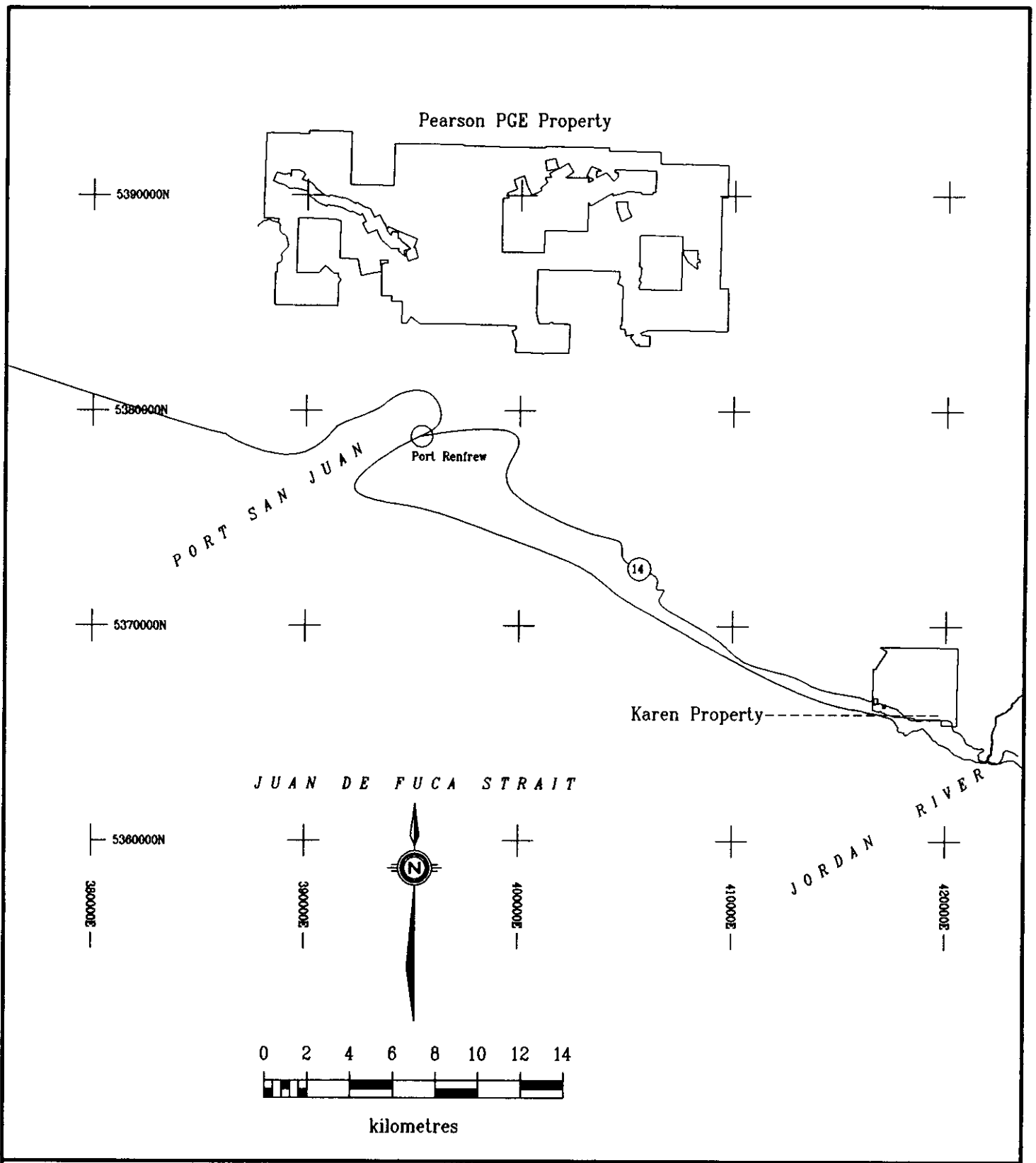


<u>Claim Name</u>	<u>Tenure No.</u>	<u>Units</u>	<u>Expiry Date</u>	<u>Registered Owner</u>
EFR 6	395120	14	2004.06.27	Emerald Fields Resource Corp.
Galleon 53	370610	1	2005.06.27	Pearson, Gary Michael
Galleon 57	373716	1	2005.06.27	Pearson, Gary Michael
Galleon 70	373375	1	2004.06.27	Pearson, Gary Michael
Galleon 71	373376	1	2004.06.27	Pearson, Gary Michael
Galleon 80	374247	1	2005.06.27	Pearson, Gary Michael
Ghost	379144	1	2005.06.27	Pearson, Gary Michael
Jack	378447	1	2004.06.27	Pearson, Gary Michael
Jack 2	378451	1	2004.06.27	Pearson, Gary Michael
Jan 7	377113	1	2005.06.27	Pearson, Gary Michael
Jan 8	378446	1	2004.06.27	Pearson, Gary Michael
Jan 8	378450	1	2004.06.27	Pearson, Gary Michael
Jay Jay	381143	1	2005.06.27	Pearson, Gary Michael
Nabay 1	394833	10	2004.06.27	Emerald Fields Resource Corp.
Nabay 2	394880	18	2004.06.27	Emerald Fields Resource Corp.
Nabay 3	394893	3	2005.06.27	Emerald Fields Resource Corp.
Nabay 4	394896	16	2004.06.27	Emerald Fields Resource Corp.
Nabay 5	394894	5	2004.06.27	Emerald Fields Resource Corp.
Nabay 6	394895	20	2004.06.27	Emerald Fields Resource Corp.
Nabay 7	394897	20	2004.06.27	Emerald Fields Resource Corp.
Nabay 8	394898	20	2004.06.27	Emerald Fields Resource Corp.
Nabay 9	394991	20	2004.06.27	Emerald Fields Resource Corp.
Nabay 10	394992	15	2004.06.27	Emerald Fields Resource Corp.
Nabay 11	394969	8	2005.06.27	Emerald Fields Resource Corp.
Obin	374409	1	2005.06.27	Pearson, Gary Michael
Outhouse	379146	1	2005.06.27	Pearson, Gary Michael
Pacmist 2	378449	1	2004.06.27	Pearson, Gary Michael
Pacmist 3	379145	1	2005.06.27	Pearson, Gary Michael
Pacmist 4	379142	1	2005.06.27	Pearson, Gary Michael
Princess	379328	1	2004.06.27	Pearson, Gary Michael
Princess 2	379889	1	2005.06.27	Pearson, Gary Michael
Ralph 1	374615	1	2005.06.27	Pearson, Gary Michael
Ralph 2	374614	1	2005.06.27	Pearson, Gary Michael
Ran	394702	1	2005.06.27	Emerald Fields Resource Corp.
Ran 1	394703	16	2005.06.27	Emerald Fields Resource Corp.
Ran 2	394704	16	2004.06.27	Emerald Fields Resource Corp.
Ran 3	394705	20	2004.06.27	Emerald Fields Resource Corp.
Ran 4	394706	16	2004.06.27	Emerald Fields Resource Corp.
Ran 5	394834	16	2004.06.27	Emerald Fields Resource Corp.
Ran 6	394835	16	2004.06.27	Emerald Fields Resource Corp.
Ran 7	394881	8	2004.06.27	Emerald Fields Resource Corp.

<u>Claim Name</u>	<u>Tenure No.</u>	<u>Units</u>	<u>Expiry Date</u>	<u>Registered Owner</u>
Ran 8	394890	16	2004.06.27	Emerald Fields Resource Corp.
Ran 9	395047	15	2005.06.27	Emerald Fields Resource Corp.
Ran 10	395048	20	2005.06.27	Emerald Fields Resource Corp.
Ran 11	395049	20	2005.06.27	Emerald Fields Resource Corp.
Ran 12	395050	18	2005.06.27	Emerald Fields Resource Corp.
Ran 13	395051	10	2005.06.27	Emerald Fields Resource Corp.
Ran 14	395052	4	2005.06.27	Emerald Fields Resource Corp.
Ran 15	395161	5	2005.06.27	Emerald Fields Resource Corp.
Ran 16	395162	10	2004.06.27	Emerald Fields Resource Corp.
Roccod	379890	1	2005.06.27	Pearson, Gary Michael
Timber	381142	1	2005.06.27	Pearson, Gary Michael
Ultra 1	394967	12	2005.06.27	Emerald Fields Resource Corp.
Ultra 2	394968	20	2005.06.27	Emerald Fields Resource Corp.
Ultra 3	394989	12	2005.06.27	Emerald Fields Resource Corp.
Ultra 4	394990	20	2005.06.27	Emerald Fields Resource Corp.
Ultra 5	395057	18	2004.06.27	Emerald Fields Resource Corp.
Ultra 6	395058	12	2004.06.27	Emerald Fields Resource Corp.
Whistle 1	385855	1	2005.06.27	Pearson, Gary Michael
Whistle 2	386342	1	2005.06.27	Pearson, Gary Michael
Woody	379143	1	2005.06.27	Pearson, Gary Michael

Karen Property

Karen 1	395160	1	2004.07.04	Pearson, Gary Michael
Karen 2	395194	20	2004.07.04	Emerald Fields Resource Corp.
Karen 3	395203	20	2004.07.04	Emerald Fields Resource Corp.
Karen 4	395204	12	2004.07.04	Emerald Fields Resource Corp.
Karen 5	395205	12	2004.07.04	Emerald Fields Resource Corp.



	Consultants	Emerald Fields Resource Corp.
Pearson PGE & Karen Properties		LOCATION MAP
Date: Sept. 24/2003	Project: 726	Scale: as shown
N.T.S.: 092C	Mining Div: Victoria	Figure: 2

## **Regional Geology**

The geology of southwestern Vancouver Island is composed of three distinctly different terranes:

- 1) Paleozoic and Mesozoic metamorphic, volcanic, sedimentary and intrusive rocks of the Wrangellia Terrane,
- 2) Mesozoic volcano-sedimentary rocks of the Pacific Rim Terrane including the mostly sedimentary Leech River Complex, and
- 3) Tertiary rocks of the Crescent Terrane, including the ophiolitic Metchosin Igneous Complex and the sedimentary Carmanah Group (Yorath and Nasmith, 1995).

The older rocks of Wrangellia were thrust against the younger Leech River rocks along the San Juan Fault that runs roughly east west from Port Renfrew to Cobble Hill. The Leech River Complex (Pacific Rim Terrane) was thrust onto the younger Crescent Terrane rocks along the Leech River Fault. This obduction was accompanied by a magmatic event between 40 and 50 Ma ago.

The geology of the *Pearson PGE* property, situated immediately north of the San Juan Fault, has been mapped in the past as predominantly a mixture of rocks from the West Coast Complex and the younger Island Plutonic Complex. Previous studies of the regional geology include Clapp (1912) and Muller (1977 and 1982). The predominant rock types are dioritic to gabbroic intrusions with ultramafic phases within the West Coast Complex and granodioritic intrusions of the early to middle Jurassic Island Intrusive Suite. Easterly and southeasterly trending bodies of recrystallized limestone are common throughout the area. These limestone bodies and associated skarn zones are engulfed as pendants within the West Coast Complex intrusive rocks. They have been interpreted as remnants of the Triassic Quatsino Formation limestones. Lesser lithologies include Triassic volcanics of the Karmutsen Formation (not recognized in this study) and Triassic sedimentary rocks of the Vancouver Group. More extensive areas of Triassic Karmutsen basalts and Jurassic Bonanza volcanics are found north of the *Pearson PGE* property.

To the south of the *Pearson PGE* property, and separated from the rocks described above by the San Juan Fault, are Jurassic to Cretaceous metasediments of the Leech River Complex. Further south again, and to the east (*Karen* property) are the Metchosin ophiolite, Sooke gabbro and Carmanah sedimentary rocks.

## **Mineralization**

### ***Pearson PGE* property**

In the past 30 to 40 years, this area has received considerable exploration attention by companies (including Noranda, 1960s) searching for skarn-type Fe and/or Cu deposits. Skarn deposits are a logical exploration target here given the presence of both limestones and intrusive rocks. Indeed numerous skarn zones have been identified including a number of bodies of massive sulphide (pyrrhotite, chalcopyrite +/- magnetite, pyrite). The most significant of these occurrences are perhaps the Reko deposits (MINFILE nos. 092C090, -091, -110 and -146). Other occurrences of

what are reported as iron/magnetite skarns from within the property include the following: Bugaboo (MINFILE 092C022), David (092C023), Elijah (092C024), Sirdar (092C025), Baden Powell (092C027) and Rose/Thorn (092C030). Little or no reporting of Ni and/or PGE exploration exists for this area.

Disseminated to net-texture pyrrhotite with lesser pyrite and chalcopyrite is quite common in the ultramafic rocks on the claim block. However, exposures of semi-massive to massive sulphides were observed on the Fairy Main and Granite Creek Main logging roads. The latter was the more impressive of the two, comprising a several metre-wide outcrop of massive pyrrhotite with blebs of chalcopyrite; the true extent of this mineralization was not exposed. This mineralization was documented by Reako Explorations Ltd. during their exploration in the 1970s and is described in more detail below. Reako interpreted the sulphides to be skarns.

During the 1980s, prospector Matti Tavela discovered several pieces of mineralized float in the area east of Fairy Creek, several kilometres to the southwest of the massive pyrrhotite occurrences. Two of these samples graded 0.5% Ni, 0.6% Cu, 0.07-0.1% Co and >200ppb Pd. A third sample graded 0.66% Ni, 0.25% Cu, 0.07% Co, 75ppb Pt and 520ppb Pd. Follow-up prospecting by Gary Pearson confirmed the presence of the mineralized float. Pearson has extensively sampled this belt of ultramafic rocks and has returned many assays in excess of several hundred ppb Pt+Pd.

#### Karen Property

The only recorded MINFILE occurrence on the *Karen* property is the Wolf showing (MINFILE 092C 094). At the Wolf showing disseminated pyrite and pyrrhotite with lesser chalcopyrite, bornite and magnetite are hosted by sheared and altered volcanic rocks of the Metchosin Igneous Complex which are cut by gabbroic intrusions thought to be comagmatic with the volcanic rocks.

The past producing Sunro Mine (MINFILE 092C 073) is located 3 km to the east of the *Karen* claims. Mineralization there comprises veinlets and irregular masses of chalcopyrite, pyrite and pyrrhotite with traces of molybdenite, cubanite and pentlandite. The sulphides are hosted by sheared and hornblende-altered Metchosin basalts and are spatially associated with Sooke gabbro intrusions that are possibly comagmatic with the volcanic rocks. This deposit produced 1.3 million tonnes of ore between 1962 and 1978 and recovered 13.75 million kilograms of copper and over 203,000 grams of gold.

Three to four kilometres northwest of the *Karen* property are the Ren/Mead (MINFILE 092C 137) and John 1 (MINFILE 092C 138) showings. These show similar styles of mineralization and geological associations to those described above. A grab sample from the John showing graded 0.4% Cu and 0.34 g/t Au.

#### Regional Stream Geochemistry

The B.C. Ministry of Energy and Mines conducts regional reconnaissance-scale stream sediment and water geochemical surveys (RGS). The samples are analysed for numerous elements including Au, Ag, Cu, Pb, Zn and Ni (Note: PGEs are not

reported in the datasets). This data is available on the Ministry website. Approximately 20 of these samples have been taken from within the properties with numerous more existing in the surrounding areas. Of particular note to this project are the numerous RGS samples that are anomalous in Ni (>90<sup>th</sup> percentile) within and close to the claim block. One anomalous sample (RGS ID 92C891386), located just outside of the Emerald Field claims, contained 157 ppm Ni and 426 ppm Cr (It is not clear at this time if these numbers are reflecting the inherent higher amounts of Ni and Cr in the mafic/ultramafic rocks of the area or correspond to mineralization). Although many of the RGS samples within the claim block did not yield particularly high Ni values, a large number of streams remained unsampled, as well as the upstream portions of the sampled streams (usually only one sample was taken from one stream). As such, it was decided that a thorough first pass sampling of all or most of the drainages in the claim block would be beneficial to the advancement of knowledge of this property.

### **Stream Sediment Geochemistry**

As the properties had not received much PGE exploration in the past, a survey was designed to help evaluate the PGE potential. The survey collected the high-energy portion of the streambed, the most favourable setting for PGE deposition. Sieved Silts samples, comprising 2 – 3 kg of –20 mesh field sieved sediments were sieved in a laboratory, producing a –80 mesh sample. Heavy Mineral samples, comprising about 10 kg of –20 mesh sediments were process in another laboratory to give heavy mineral concentrates. The survey details and results are described and discussed below.

### **Geophysical Surveys**

In the valley of Renfrew Creek, along the Granite Main logging road, semi-massive to massive sulphides occur. An orientation magnetometer and VLF\_EM survey, totalling about 2000 metres of line, was carried out in the area. The survey details and results are described and discussed below.

### **Recent Exploration**

#### **Pan Island Resource Corp. (1980s)**

Pan Island Resource Corporation carried out several years of exploration in the area between Fairy Creek and Harris Creek in the early to mid-1980s (ARIS Reports 12184, 14686, 14968). Pan Island conducted an airborne magnetic and VLF-EM survey, a stream and soil geochemical sampling program as well as additional heavy mineral panning and prospecting. The geophysical survey outlined several "areas of interest" based on inferred intersecting faults, and delineated numerous narrow, elongate east-west trending VLF-EM conductors ranging from around 500 metres to greater than 1000 metres in length in the Fairy Creek and southern Renfrew Creek areas. The geochemical survey outlined several Cu, Ni and Co anomalies. The best geochemical anomalies included Ni values in silt samples from the west side of the Fairy Creek drainage ranging from 146-660 ppm. These anomalies are coincident

with an ENE-trending VLF-EM conductor. Two rock chip samples from about a 3 - 4 metre wide ultramafic dike (actual lithology not confirmed from assessment report) from Fairy Creek yielded values of 700 and 680 ppm Ni and 78 and 83 ppm Co respectively. Visible mineralization was not reported for these samples. An additional rock chip sample from Harris Creek yielded values of 2010 ppm Cu, 860 ppm Ni and 100 ppm Co (no geological description given). Pan Island's 1986 report (ARIS 14968) described the geology in the central part of their Lizard claims along Harris Creek as "ultramafic serpentinite and altered intrusives" which have been sheared and contain local pods of pyrrhotite, pyrite and chalcopyrite. They described the rocks on the Renfrew claims as a mixture of intermediate to mafic intrusives and gneisses with 30-90% mafic minerals; the rocks west of Renfrew Creek were reported to be less mafic. Pan Island also stated that the geophysical anomalies could be explained by magnetite-bearing serpentinites.

#### Matti Tavela (1980s)

As discussed above, Matti Tavela conducted geological mapping, soil sampling and float boulder sampling on his Ebb claims in the Fairy Creek area in the early 1980s. Tavela documented geology dominated by gabbroic/ultramafic rocks containing Cu-Ni-Co mineralization. The mineralization, it should be noted, is restricted to glacial float boulders; a bedrock source was not confirmed. Six float boulders from east of Fay (Fairy) Creek averaged 0.41% Cu, 0.40% Ni and 0.065% Co. Mineralization occurs as disseminations and intergranular networks of pyrrhotite and chalcopyrite with lesser violarite, pyrite and pentlandite.

#### Gary Pearson (late 1990s-2002)

In the past two years, prospector Gary Pearson (pers. comm.) encountered many occurrences of what he identified as ultramafic rocks. This would not normally be very unusual as they might, at a first pass, be identified as migmatized mafic/ultramafic volcanics forming part of the West Coast Complex. However, following a visit to the area, Dr. Dante Canil, an igneous petrologist from the University of Victoria, identified these rocks as cumulative peridotites having 25-35% fresh olivine surrounded by 60-70% oikocrystic orthopyroxene. A total of 12 specimens from the area were confirmed to be cumulate peridotite. Pearson has since identified over 30 of what he has called peridotite bodies in the area. Additional samples have been analysed by Vancouver Petrographics and some of these have been confirmed to be ultramafic in composition. The author has visited some of these localities and has confirmed the presence of ultramafic rocks for several of them. However, some of the "peridotite" bodies identified by Pearson are mafic rocks such as hornblendite and fine-grained gabbro.

## **Property Geology (Figures 4a - d)**

The geology of this area has not been mapped extensively in detail. Therefore, it was decided that a series of 1:10,000 scale transects would be mapped across the property utilizing the extensive logging road network as a first pass. The goal of this geological work was to: 1) determine the nature and distribution of the major lithologies on the claim block, 2) determine the prevalence and mode of occurrence of the ultramafic rocks, and 3) characterize the trace element geochemistry of these lithologies to help explain the results of the stream geochemical survey. Many of the major logging mainline roads, including Granite Main, Braden Main and Gordon Main, and numerous side roads were mapped over a two week period. Numerous hand samples were collected in the field; of these, a subset of 17 representative samples from the Renfrew Creek area and one sample from Bugaboo Creek were submitted to Vancouver Petrographics for thin section preparation and petrographic analysis. The complete petrographic reports of Bruce Northcote, Ph.D., P.Geol. are included in Appendix A. The principal units encountered are described below.

### **Limestone (recrystallized) – Map Unit 1**

Two main easterly to southeasterly trending bodies of recrystallized limestone or marble were mapped in the northern and eastern parts of the Renfrew Creek drainage in the eastern part of the claim block. Numerous east-southeast trending limestone bodies were mapped in the Bugaboo Creek-Gordon Mainline area on the western part of the property. Many other small isolated occurrences of limestone and skarn exist throughout the property. The limestone or marble is generally coarse grained and white to grayish in colour and appears to be quite pure. Narrow quartz-rich sandy beds are present locally. These rocks have a distinctive bleached white and grey appearance that makes them quite easy to discern from the surrounding intrusive rocks. Fossils were not observed although any that were originally present were likely destroyed by the recrystallization that accompanied metamorphism. Skarn zones comprising irregular lobes of calc-silicate (diopside-garnet-actinolite) metasomatism and massive magnetite lenses are common within this unit especially in the Bugaboo Creek area. Muller (1982) interprets these limestone/marble bodies to represent remnants of metamorphosed Quatsino limestone.

### **Dioritic Intrusions**

Diorite and quartz diorite intrusions are the most common rock units in the map area. In the field these rocks were subdivided macroscopically on the basis of their mafic mineral  $\pm$  quartz contents and were given the names mafic, intermediate, felsic diorite or quartz diorite. Mafic diorites (map unit 2a) generally contain >50% mafic minerals (hornblende > biotite  $\pm$  pyroxene) and felsic diorites contain <10% mafic minerals. Quartz diorites generally have >10% quartz content. Petrographic analyses allowed a refining of the nomenclature for the intrusive rocks. Mafic diorites were further subdivided into gabbro, hornblendite, diabase and monzodiorite.



Typical dioritic intrusive rocks contain 40-60% anhedral to subhedral plagioclase crystals up to 2mm in size. Quartz contents are most commonly 5-7% or less. Mafic mineral contents are quite variable, but generally comprise 10-25% hornblende and <10% biotite; more mafic diorites contain up to 45% hornblende and up to 15% biotite. Two samples (GR03-035 and GR03-036) contain up to 15% K-feldspar and are classified as monzodiorite.

A subset of the felsic diorites termed leucogranite was also identified petrographically (samples GR03-005 and GR-030). These samples from the lower elevations in the Renfrew Creek valley are very light in colour having <5% mafic minerals. These rocks contain 40-55% K-feldspar, 30-35% quartz and 15-25% plagioclase with grains generally less than 2mm in size. The only primary mafic mineral identified was biotite.

The dioritic intrusions are generally quite massive and featureless. Locally, however, such as the near southern portion of GR 3000 logging road, a distinctive gneissic banding is present in the rocks. This banding is defined by mafic-rich bands approaching hornblende in composition and lighter coloured plagioclase-quartz rich bands up to several tens of centimeters wide. The amphibole in the mafic bands is often very coarse, sometimes taking on a pegmatitic appearance. Carson (1973) and Muller (1982) also note gneissic banding in plutonic rocks on southern Vancouver Island. Muller has suggested that this is a metamorphic texture. Observations in the field by the author are consistent with this interpretation. No conclusive evidence of primary igneous layering was observed in the field.

Mafic dioritic to diabasic xenoliths (e.g. sample GR03-011B) supported by a more felsic dioritic intrusive rock are common locally throughout the property and are quite prevalent in the upper parts of the Granite 6000 logging road system. The mafic xenoliths are generally sub-metre size, are angular and vary from tightly packed and jigsaw-fit to "suspended" in the lighter diorite. Invariably the mafic rocks are intruded by the more felsic diorite, but both phases could be part of the same plutonic phase.

#### **Ultramafic Intrusions – Map Unit 2d**

Ultramafic rocks are found throughout the property, but do not appear to be very common. They comprise variably serpentinized peridotites that were likely altered from lherzolites and dunites (i.e. olivine-pyroxene-rich intrusive rocks). These rocks are dark green to black in colour and often appear quite fine grained, possibly due to destruction of original textures due to serpentinization. Olivine is often difficult to identify in the field. Sample GR03-008, for example, contains <20% olivine crystals <0.5mm in size, but may have originally contained approximately 75% with crystals possibly up to 3mm in size. Pyroxene (orthopyroxene>clinopyroxene) is the other common mafic phase and can be altered to amphibole.

The ultramafic rocks are not well exposed. They tend to occur in small, deeply weathered outcrops. They are often flanked by the more typical dioritic rocks and as such they likely are limited in size to several tens of metres in width. Their contact relationships with the other intrusive phases are not clear. However, the outcrop hosting sample GR03-008, a serpentinized peridotite, appears to grade into the

gabbroic and dioritic rocks that host sample GR03-007. It appears that the ultramafic rocks may have been emplaced as sills or plugs within the dioritic rocks. The strongly weathered and decomposed nature of these rocks may hinder their discovery, and as such they may be more common than it first appears.

### **Granodioritic Intrusions**

For the purposes of this study, this granodioritic subdivision had been reserved for felsic intrusive rocks thought to be part of the Jurassic Island Intrusions. This unit is relatively rare in the study area. Perhaps the best example is exposed along Braden Main logging road (sample BR03-010). This rock consists of coarse, felsic quartz diorite to granodiorite containing 15-20% quartz and less than 10% mafic minerals (mostly hornblende). Crystals reached up to 4mm in size and are generally coarser than those seen elsewhere on the property. The exposure on Braden Main corresponds with the Island Intrusion (Jg) unit on the map of Muller (1982). It is possible, but not clear at this time, that the leucogranites exposed in the Renfrew Creek valley (see above) are part of this younger, more felsic intrusive phase.

### **Metasedimentary rocks**

Metasedimentary rocks are exposed along the southernmost portions of the claim block, but were not examined extensively in this program. These rocks include strongly deformed chert, mudstone and chlorite schist (metavolcanic?). They are well exposed along Fairy Main logging road and its side roads. Muller (1982) included these rocks as part of the Pacific Rim Complex, but they may be part of the Leech River Formation. They are separated from the plutonic rocks of the West Coast Complex to the north by the north-dipping San Juan Fault.

### **Rock Geochemistry**

A set of 18 rock samples that were representative of the major units that were encountered in the field, and that were also visually unmineralized, were submitted for major and trace element geochemical analysis at ALS Chemex Labs in Vancouver, B.C. With the exception of one sample (BU03-029), all samples were taken from the Renfrew Creek area; sample BU03-029 was taken from the Bugaboo Creek area in the west. The same lithologies were observed throughout the study area though. These are the same samples submitted for petrographic analysis and discussed above in the section on property geology. This geochemical data is included in Appendices B and C. Analytical techniques used by ALS Chemex Labs are included in Appendix E; these 18 samples were analysed using packages ME-MS61 (major and trace elements) and PGM-ICP24 (Pt, Pd, Au). The data was intended to provide information on the geochemical composition of 'normal' unmineralized rocks in the study area and to complement the stream sediment geochemical data in an effort to provide a preliminary estimation of what geochemical contribution these 'normal' rocks would make to the composition of the sediments. This helps to determine what values amongst the stream sediment data are background or anomalous.

Few obvious correlations between rock type and geochemical characteristics were observed. Rocks that were mapped as 'most mafic' or ultramafic generally had Mg contents of greater than 5% (e.g. samples BU03-029 – hornblendite, GR03-013A – hornblendite, GR03-007 – altered gabbro, GR03-008 – serpentinized peridotite) and combined Fe+Mg contents of over 10%. The more felsic rocks, i.e. diorites, quartz diorites and monzodiorites, which are volumetrically more common in the study area generally contain less than 4% Mg. In addition, and perhaps most significantly, the more mafic and ultramafic rocks have relatively high contents of Ni, Cr and Co, elements, which were reported as 'anomalous' by previous workers. For these mafic samples, Ni values ranged from 106 to 826 ppm, Cr values ranged from 102 to 1005 ppm and Co values ranged from 38 to 107.5 ppm. In contrast, the more 'felsic' rocks generally contained less than 100 ppm Ni, less than 100 ppm Cr and less than 40 ppm Co, but more commonly <50 ppm Ni and <70 ppm Cr. As such, it is clear that one must be careful in the identification of Ni, Cr and Co 'anomalies'; a particular area that had a predominance of more mafic to ultramafic composition rocks would yield results, both in bedrock and stream sediment geochemistry, that appear anomalously high in these elements since the prevailing rocks in that area were naturally richer in these elements compared with more felsic diorites. Values of several hundreds of ppm Ni or Cr are clearly not necessarily anomalous in an area dominated by ultramafic rocks. Precious and base metals showed no particular correlation with rock type; precious metal contents for these rocks were generally at or close to lower detection limits.

## **Mineralization**

Two principal styles of mineralization are present on the property: 1) skarn-related massive magnetite  $\pm$  sulphide, and 2) massive sulphide (pyrrhotite-pyrite-chalcopyrite) mineralization of unknown origin. These styles of mineralization were identified in numerous outcrops in the field and have been confirmed by a combination of petrographic analyses and trace element geochemistry. A total of 30 samples of various types of mineralization were analysed at ALS Chemex labs in Vancouver, B.C. using analytical packages ME-ICP61 (major and trace elements), PGM-ICP27 or PGM-ICP24 (Pt, Pd, Au) and Cu-AA62 (high grade Cu samples). This data is included in Appendix D. The technical specifications of the Chemex analytical packages are included in Appendix E.

### **Skarn-related massive magnetite deposits**

Magnetite-rich skarn zones are the most common style of mineralization in this area. Many of these zones were discovered in the course of the geological mapping throughout the entire claim block, but are particularly prevalent and form the largest mineralized zones in the Bugaboo Creek area on the west end of the property and in the headwaters of Renfrew Creek in the eastern part of the property (Reko prospects). The skarn zones tend to have the same general characteristics in all occurrences. The magnetite forms massive or semi-massive pods or veins. Many of the magnetite zones are less than a metre wide, but the largest occurrences in the Bugaboo and Renfrew Creek areas reach up to several 10s of metres in width (see

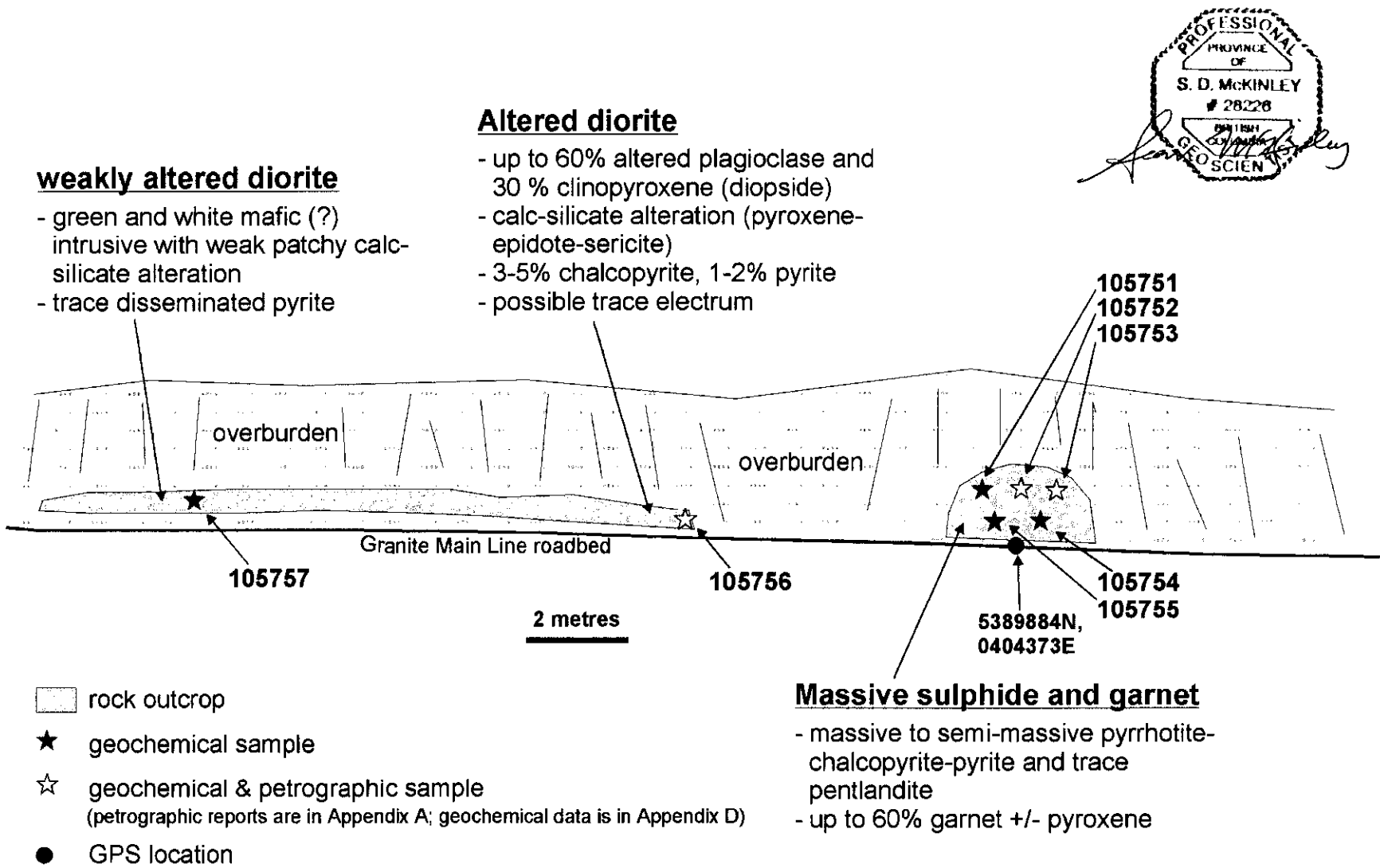
MINFILE descriptions; 092C022 – Bugaboo; 092C023 – David; 092C025 – Sirdar; 092C027 – Baden Powell; 092C090 – Reko 3; 092C091 – Reko 10; 092C110 - Reko 38; 092C146 – Reko North). These skarn zones can be crudely further subdivided into sulphide-rich and sulphide-poor zones. The most common sulphides are pyrite, pyrrhotite and chalcopyrite that occur as blebs, disseminations and veinlets within the magnetite bodies. The magnetite-rich bodies are often contained within recrystallized limestone or at the contact between limestone and dioritic intrusive rocks. Veins or irregular zones of skarn-related garnet and calc-silicate (diopside) are commonly associated with this style of mineralization. Sample GR03-028 is an example of a sulphide-bearing skarn zone from Granite Main Road. It was analysed petrographically (see Appendix A) and geochemically (see Appendix D). This sample was described as massive garnet (up to 90%) and small amounts of carbonate, chlorite, clinopyroxene, feldspar and epidote with 5-7% chalcopyrite, 3-5% pyrite and 3-5% magnetite occurring mostly as veins and fracture fillings.

Geochemical analyses for numerous skarn mineralized samples are included in Appendix D. The skarn zones contain little or no precious metals (Au-Ag-Pt-Pd). With the exception of copper, they also contain low concentrations of base metals (Zn values reach up to 387ppm; Pb values are mostly below 10 ppm). Copper values are variable in the magnetite zones and reach up to 0.36% Cu. The higher Cu contents are not restricted only to the sulphide-rich skarn zones although the three sulphide-rich skarn samples have elevated Cu contents of 285-3570 ppm Cu. Nickel values are low in all skarn samples; the maximum value is 121 ppm Ni, but generally they are below 75 ppm. Similarly, these samples are also low in chromium with most values being less than 30 ppm Cr.

#### **Massive/semi-massive sulphide deposits**

One significant occurrence of semi-massive to massive sulphides was encountered in the project area (Figure 5). This occurrence is located on the east side of Granite Main logging road at coordinates 0404373E, 5389884N. The showing comprises two outcrops: 1) the southern exposure consists of a vertical face 3 metres long and 1.5 metres high composed of massive and semi-massive pyrrhotite and pyrite with patches and stringers of chalcopyrite, and 2) the northern exposure, located 5 metres north of the massive sulphides, consists of a 12 metre long, low relief, linear outcrop of altered intrusive rock with disseminated and stringer sulphides.

Petrographic analysis of two samples from the massive sulphide outcrop (105752 and 105753) revealed substantial amounts of garnet (40-60%) that were not completely recognized in the field. These samples contain up to 40% pyrrhotite, 7-15% chalcopyrite, 1-3% pyrite and trace amounts of marcasite, pentlandite and possible sphalerite. Geochemical analyses of these samples and 3 others (105751 to 105755) are included in Appendix D and are summarized in the table below:



**Figure 5: Simplified sketch of massive sulphide showing (facing east), Granite Main Line**

<b>Selected assay data for sulphidic samples, Granite Main showing</b>										
<b>Sample No.</b>	<b>Au ppm</b>	<b>Ag ppm</b>	<b>Pt ppm</b>	<b>Pd ppm</b>	<b>Ni ppm</b>	<b>Cr ppm</b>	<b>Co ppm</b>	<b>Cu ppm/%</b>	<b>Pb ppm</b>	<b>Zn ppm</b>
<b>105751</b>	0.53	11.8	<0.03	0.03	854	6	2020	7.45%	8	146
<b>105752</b>	0.08	1.7	<0.03	0.03	359	20	430	9850	5	37
<b>105753</b>	0.12	4.7	<0.03	<0.03	259	22	439	2.6%	<2	65
<b>105754</b>	0.13	3.2	<0.03	0.03	235	22	482	1.66%	8	58
<b>105755</b>	0.12	3.3	<0.03	0.08	642	21	1535	1.2%	6	44
<b>105756</b>	0.05	<0.5	<0.03	<0.03	53	97	46	1425	4	78
<b>105757</b>	<0.03	<0.5	<0.03	<0.03	153	168	41	94	<2	43

Samples 105756 and 105757 are from the outcrop just to the north of the massive sulphide occurrence and contain only disseminated chalcopyrite and pyrite. A petrographic analysis for 105756 described it as a calc-silicate altered diorite. This sample contained up to 60% plagioclase and 30-35% diopside. Sericite was present up to 7% as an alteration product of plagioclase. Epidote was present associated with sulphides in veinlets. Up to 5% pyrite and chalcopyrite (the assay value of 1425ppm Cu suggests only a small amount of chalcopyrite is present). The petrographic work also revealed the possible presence of trace electrum as minute bright yellow grains within pyrite.

None of the sulphide-rich samples contain appreciable amounts of precious metals; Au and Ag contents are generally below 0.15 and 5 ppm respectively and Pt and Pd values are generally below or only slightly above detection limits of 0.03ppm. Ni and Co contents seem to be elevated in the massive sulphide samples; contents range from 235 to 854ppm and Co contents range from 430 to 2020ppm in the five high grade samples (105751-105755). Zn and Pb values for all of the sulphidic samples are quite low.

## Stream Sediment Geochemistry

### Design of the Survey

Sampling for this survey was conducted at sites characterized by active stream channels containing a range of coarse, immature sediments, dominated by gravels, cobbles and boulders. Sampling of high energy sites contrasts with the standard stream sediment sampling procedure where silt and/or clay are collected from accumulation sites associated with more quiet-water sedimentation.

Nickel - copper - PGE deposits are targeted by this survey, with platinum, palladium, nickel, copper, cobalt and chromium as the primary pathfinder elements. Sampling the high-energy environment is especially important in PGE exploration (Fletcher, 1988). After discussion among Sean McKinley, Emerald Fields and Discovery Consultants, it was decided to employ three sampling methods to sample the high-energy environment:

1. Sieved Silt Survey: Large amounts of high-energy sediment are sieved to obtain a coarse sand and silt sample (minus 20 mesh) of about 2 – 3 kg.
2. Moss Mat Survey: In creek beds where the sediments were scarce, the live moss covering rocks below high water level were collected. Moss mats can be an effective method of trapping heavy sediments (Lett and Jackaman, 2001), especially during high water levels. In discussing the surveys below, the moss mat samples have been included within the Sieved Silt survey.
3. Heavy Mineral Survey: Large amounts of high-energy sediment are sieved to obtain a coarse sand and silt sample (minus 20 mesh).

Although this was a preliminary survey to identify anomalous areas for further exploration, to speed up the exploration process, the emphasis shifted from a standard first-pass heavy mineral survey to a significant component of Sieved Silt sampling of order 1 and order 2 creeks. Many of these low order creeks are less than 1 km<sup>2</sup>, although drainages up to about 3 km<sup>2</sup> were sampled by this method. Also, most small drainages contain small amount of -20 mesh sediment, making the collection of large Heavy Mineral samples too costly, due to lengthy sample time required.

Heavy Mineral sampling generally is more suited to larger order creeks where more fine-grained sediments are present. One of the advantages of Heavy Mineral method is that the contrast between anomalous and non-anomalous tends to be significantly higher.

For efficiency reasons, most of the sample sites were accessed from trucks along logging roads. The Sieved Silt samples on Fairy Creek were accessed by foot traverse.

Local stream drainages are developed in bedrock and in areas of incised colluvium, glacial till and glaciofluvial outwash deposits. In this survey, gravel bars within active stream channels were sampled at the appropriate location (Fletcher, 1990) – at the

bar head. Fletcher (Fletcher and Wolcott, 1989) has demonstrated that gold is mainly transported during freshets when bar sediments are eroded and later re-deposited. Sampling of a freshet bar requires a vertical profile be sampled. Erratic winnowing of, and re-deposition of, light sediments at the surface of the bars also necessitates sampling at depth.

The high-energy environment provides the best setting for obtaining the needed consistent quantities of physically transported precious metals, sulphides and other heavy mineral materials. The same high-energy sediments contain precipitates of hydromorphically-transported precious metals, iron oxide and partly weathered sulphides.

### **Collection Methods**

The stream sediments were generally notably angular in the survey area. The samples were collected by carefully shovelling the sediments into a -20 mesh stainless steel sieve (diameter 36 cm, depth 17 cm) that rests in a large aluminum pan containing water. Some liquid detergent was added to the wash water to prevent flotation of small metallic mineral grains. Using handles on the sieve, a rotary-type motion like a washing machine was used to sieve the sediments. In this manner 2 – 3 kg of sediment was collected for Sieved Silt samples and about 10 kg for Heavy Mineral samples. The sieves and pans were carefully cleaned between samples to prevent contamination. About 40 % of the Sieved Silt samples contain some component of moss mats.

### **Methods of Sample Preparation and Analysis**

In total, 97 Sieved Silt and/or moss mat samples were collected and sent to Acme Analytical Laboratories, in Vancouver, BC, for sample preparation and analysis. After drying and sieving to -80 mesh, a splitter was used to create a 30g sub-sample, for aqua regia digestion and ICP-MS analysis.

In total, 38 Heavy Mineral samples were sent to C.F. Mineral Research Ltd., in Kelowna, BC, for the preparation of heavy mineral concentrates. The samples were wet sieved, then subjected to a 2.96 specific gravity (intermediate) heavy liquid separation, followed by a 3.27 specific gravity (heavy) separation. The heavy fraction was then separated by magnetic susceptibility into magnetic, paramagnetic and nonmagnetic fractions. Due to the low weights of the -150 mesh fractions, the samples were coarsened to -80 mesh.

The -80HN (heavy, nonmagnetic) fraction averaged 3.8g per sample – analysis was on either 1g or 0.5g samples. Fletcher (1988) has shown that for some deposits platinum values can be higher in the magnetic fraction than in the non-magnetic, but with both fractions still being anomalous. Therefore, the entire HP, heavy paramagnetic, and some of the HM, heavy magnetic, fractions were analysed.



## Analytical Results

The results for the Sieved Silt and Heavy Mineral and Sieved Silt samples are in Appendices G and H, respectively. The sample locations are plotted on 1:20,000 maps, Figures 7a and 7b, for the *Pearson PGE* and the *Karen* properties, respectively. Platinum, palladium and gold values are displayed on Figures 8a and 8b for the *Pearson PGE* and the *Karen* properties, respectively. The copper, nickel, cobalt and chromium values are on Figures 9a and 9b, respectively.

The Heavy Mineral gold values are also reported as micrograms of gold; the weight of gold in a particular fraction, standardized to a 10 kg, -20 mesh field sample. The non-magnetic fraction is the most suitable for interpreting results. The background value for gold is < 1 microgram. Microgram values of greater than 4 combined with a corresponding concentration value of > 500 ppb are definitely anomalous.

Due to the relatively small number of samples collected, a rigorous statistical analysis is not valid. Background, threshold and anomalous classifications for selected elements were determined from histograms.

The following are background, threshold and anomalous values for selected elements for Sieved Silt and Heavy Mineral (-80HN) samples:

### Platinum and Palladium

Almost all of the platinum and palladium values were either below detection limits or only a few ppb above detection limits. In interpreting geochemical results it is statistically difficult to assign threshold values to such just-above-detection samples. However, one Heavy Mineral sample on the east side of the *Karen* property returned 12 ppb palladium in both the HN and HM fractions, giving some credence to a threshold classification. The presence of 13 ppb Pd and 8 ppb Pt in a Heavy Mineral sample at the mouth of Braden could also be classified as a PGE threshold sample. There is only one anomalous PGE value, 46 ppb Pd in Sieved Silt.

### Copper

Sieved Silts: background < 60 ppm  
threshold 60 – 80  
anomalous > 80

Heavy Minerals: background < 150 ppm  
threshold 150 – 200  
anomalous > 200

### Gold

Sieved Silts: background < 6 ppb  
threshold 6 – 10  
anomalous > 10

Heavy Minerals: background < 2 micrograms  
threshold 2 – 5  
anomalous > 5

### Nickel

Sieved Silts: background < 60 ppm  
threshold 60 – 100  
anomalous > 100

### Chromium

Sieved Silts: background < 70 ppm  
threshold 70 – 100  
anomalous > 100

### Cobalt

Sieved Silts: background < 30 ppm  
threshold 30 – 40  
anomalous > 40

There is a strong correlation among nickel, chromium and cobalt values in Sieved Silts. The correlation coefficient ( $r$ ) for Ni : Cr is 0.96, and for Ni: Co is 0.76.

Some Sieved Silt and Heavy Mineral samples contain mercury values significantly above the background of about < 200 ppb Hg. The source of the mercury is not known.

## Quality Control

### Duplicate Field Samples

Being a small survey, only one duplicate field sample was collected during the Heavy Mineral sampling. The analytical results show excellent agreement between the samples (H35, H36), except notably for gold values. One sample contained anomalous gold, while the other returned background values. Silver and mercury values were also significantly different. The samples were small, only 1.5 and 1.4 g of -80 HN sediment. The size of the analytical sample was 1.0 g. and although the samples were carefully split, using a microsplitter, to produce the 1.0 g, it is possible that non-heterogeneous sub-samples were produced. Also, one sample may have had significantly more gold. This discrepancy, while fairly common in silt samples, is quiet rare in heavy mineral sampling.

In the Sieved Silt survey, a silt sample and a moss mat sample were collected at one site (S095, S096). The variation in analytical results is not statistically significant.

Any difference between the original and duplicate samples will measure precision in sample collection, sample preparation and sample analysis. However, generally the sampling procedure will account for most of the differences between samples.

### Field Blank Samples

Samples containing low levels of precious and base metals were prepared from stream sediments. Pre-testing indicates that minor anomalous gold values can occur in these blanks. Also, being natural sediments, variations are more likely to be greater than with laboratory blank pulps.

The purpose of these blanks, which are submitted 'blind' to the laboratory, is to monitor possible contamination during the sample preparation (sieving, splitting). There is no evidence of contamination problems during the processing.

### Laboratory Duplicate Samples

Every 20 samples, the laboratory analyses another split of -80 mesh sediment. It is expected that erratic gold results will occur in the analysis of 30g sub-samples.

The three laboratory duplicate Sieved Silt samples show excellent correlation, except in gold. This variation is due to the inhomogeneous distribution of gold in the sample, not to analytical error.

### Laboratory Blank Samples

Blank pulp samples are inserted by the laboratory to determine any analytical problems. These samples do not go through the sample preparation process, so any errors are usually analytical. The results demonstrate that there is no problem with the analytical results.

### Laboratory Standards

In contrast to duplicate and blank standards, the purpose of analytical standards is to determine accuracy, as opposed to precision (repeatability) of results. In geochemical stream sediment surveys accuracy of results is generally not the issue it is in ore grade determination. The results do not show any significant variations that indicate an accuracy problem.

## **Geophysical Surveys**

Magnetometer and VLF-EM reading were taken at 10-metre intervals with a GEM Systems GSM – 19v5.0 magnetometer. The location of the three lines of the survey is shown on Figure 7a. The resultant data are shown in a table in Appendix K, along with line profiles of the data.

The orientation survey results show both VLF and anomalies, although follow-up exploration would be required to determine the source of the anomalies.

## Discussion

### Geology

The geology of the study area is dominated by massive dioritic to gabbroic intrusions with lesser granodioritic and ultramafic phases. Except in the cases where intrusive breccias were observed, contact and intrusive relationships were not observed in this study. In addition, there was little evidence of layering within the intrusions themselves; the intrusions appear to be emplaced as stocks and possibly as sills. As such, the possibility of finding Ni-PGE mineralization hosted by a layered mafic intrusion in this area seems to be quite low. At the same time, however, the lack of a layered mafic intrusion does not preclude the possibility of the presence of Ni-PGE mineralization.

In British Columbia such mineralization is most commonly associated with: 1) Alaskan-type, zoned mafic-ultramafic intrusive complexes (e.g. Tulameen Complex), 2) with gabbroid intrusions (e.g. Giant Mascot Mine) and 3) with flood basalts provinces such as the Karmutsen Formation (e.g. Tofino Nickel) (Lefebure, 2000). The identification of felsic, mafic and ultramafic intrusive phases suggests the possibility of at least a zoned intrusive complex in the study area. However, there are several pieces of evidence that suggest these rocks may be quite different from a typical Alaskan-type complex, namely the prevalence and size of the ultramafic phases and the overall age of the intrusions. Nixon et al. (1997) describe numerous Alaskan-type ultramafic-mafic complexes in British Columbia. In general these complexes are found within volcanic arc terranes of the Intermontane Belt and are considered to be coeval with the early Mesozoic arc volcanic rocks of the Quesnel and Stikine terranes (Nixon et al., 1997). The intrusive rocks in this project area are considered to be Paleozoic age. In addition well known layered intrusions (as opposed to zoned intrusions such as the Alaskan type) that host PGE deposits such as the Bushveld Complex and the Stillwater Complex are much older being 2050 Ma and 2700 Ma respectively (Hulbert et al., 1988). These types of large Precambrian to Archean age intrusive complexes have not been reported in the Cordillera of British Columbia. The ultramafic rocks within the project area appear not to exceed a thickness of at most 100-200 metres. By comparison, the ultramafic rocks of the Alaskan-type complexes are mappable over thicknesses of several 1000s of metres; Archean intrusive complexes such as the Bushveld and the Stillwater Complexes are even larger still with thicknesses in excess of 7000 metres. These intrusive complexes also commonly display primary igneous textures such as cumulate layering that seem to be lacking in the project area. Cumulate textures apparently have been documented petrographically within some of the ultramafic rocks here (G. Pearson, pers. comm.), but they appear to be relatively rare; any layering observed in the field could be attributed to metamorphic processes. Although conjectural, it is possible that the intrusive rocks exposed in the project area represent the upper parts of a large intrusion with earlier crystallizing ultramafic phases existing at greater depths and thus not being widely exposed. The ultramafic rocks could in fact be large rafts of previously crystallized cumulate rocks that were engulfed by later

pulses of more felsic magmas. Where intrusive breccias were observed, most commonly more mafic composition diorites were intruded by more felsic composition rocks. By comparison, the upper parts of the Bushveld Complex are gabbroic to dioritic in composition.

Although the identification of ultramafic rocks in the project area is significant, it is by no means unusual within intrusive suites on western Vancouver Island. Carson (1973) writes that all compositions of plutonic rocks from peridotite to granite occur in the western third of Vancouver Island. Carson documents medium grained, dark green to black peridotite exposed over several hundred feet within a gneiss complex on Meares Island near Tofino northwest of the project area and suggests that they may be part of the same intrusion as the gneiss and equivalent to the basic sills of the Sicker Group. Carson also quotes that Muller suggested that the peridotite bodies were equivalent to the Karmutsen Formation and were therefore Triassic in age; Carson documented a 75 foot-wide peridotite dike intruding the Bedwell Batholith of west-central Vancouver Island which would give it a post-Jurassic age. Carson (1973) describes Tertiary intrusions (such as those near Sooke south of the project area) as mainly unaltered to moderately altered gabbro, quartz diorite and dacite porphyry with lesser granodiorite and quartz monzonite and no gneisses, whereas the older Jurassic intrusions are mainly granodiorite to quartz diorite with common gneissic structures and moderate to strong alteration. These descriptions seem also to describe all of the rocks in the study area. This might suggest that there are intrusive rocks of completely different ages within this area with the more granodioritic and more altered rocks being possibly Jurassic and older (i.e. West Coast Complex and Island Intrusions) whereas the fresher gabbroic to dioritic, and possibly the ultramafic, rocks are younger and related to Tertiary intrusive activity. Although this is entirely speculative at this time and would require significant further work to prove, it would be significant for Ni-PGE exploration in the area because J. Houle identified enrichments of Ni and Co at the Sunro deposit south of the project area (MINFILE Report 092C 073). It should also be noted that Rusmore (1982), in a study that included the southernmost portion of the study area, placed the amphibolitic rocks within the West Coast Complex, but placed dioritic to gabbroic rocks with the younger Island Intrusions. Rusmore also documents two phases of deformation accompanied by metamorphism and intrusive activity that ended as recently as about 39-41 Ma. This suggests the possibility of multiple intrusive ages within the study area and the possibility of some much younger intrusions than previously identified. Such an observation is important in that it may open the opportunity, assuming that these younger intrusions exist, for discovery of Cu-Au mineralization similar in style to that at the Sunro Mine associated with Eocene intrusions.

Although it is speculative, the geology of this region might be considered prospective for Ni-Cu sulphide mineralization based on the genetic model for the Aguablanca deposit in Spain. Tornos et al. (2001) describe Aguablanca as a magmatic Ni-Cu sulphide deposit hosted by diorites and gabbros intruded during a subduction/collision event. Part of this new model includes the late emplacement of intrusive breccias containing fragments of consolidated layered cumulate rocks. The Aguablanca model has recently been proposed for the Giant Mascot Ni-Cu mine

near Hope, southwestern B.C. (Metcalf et al., 2003). Interestingly, Nixon (2003) has inferred from research into the compositions of spinels from ores at the Giant Mascot Mine that that deposit may have formed within an eastern extension of Wrangellia Terrane as opposed to the younger intrusive rocks with which it has normally been genetically linked. The Aguablanca model may have implications for exploration in the areas discussed in this report; the geological units hosting that deposit appear to have similarities to some of the rocks on the *Pearson PGE* property while the Sooke gabbro on the *Karen*, associated with an obducted ophiolite complex, may be of similar tectonic affinity to Aguablanca. The linking of the Giant Mascot deposit to Wrangellia may prove to have interesting implications for exploration within the rocks of the West Coast Complex which are also generally included as part of Wrangellia.

### Discussion of Cu/Pd ratios

Various authors including Barnes and Meier (1999) and Keays and Lightfoot (2002) have discussed the use of ratios of metals such as Cu and Ni to the noble metals (e.g. Pt, Pd) in exploration for platinum group elements (PGEs). Since PGEs are strongly fractionated into sulphide minerals, as soon as even a small amount of sulphides start to fractionate from a magma, the remaining residual melt will be strongly depleted in PGEs, that is, the fractionating sulphide phase(s) efficiently extract available PGEs from the melt. Pt and Pd are more strongly fractionated into sulphides than Cu and Ni and therefore will appear to be more strongly depleted than these elements. As such, Barnes and Meier (1999) state that if, for example, the Cu/Pd ratio of a magma or intrusive rock is greater than the Cu/Pd ratio for the mantle (i.e. the assumed original source of the parent magma) then the magma has already segregated sulphides or platinum group minerals and thus fractionated the PGEs such that any remaining magmas are depleted in Pd, or other PGEs, thus yielding a high Cu/Pd ratio compared to the mantle. Barnes and Meier (1999) state that Cu/Pd or Cu/Pt ratios greater than mantle ratios sulphide segregation has already occurred and that, therefore, there is a possibility of a PGE-rich ore deposit at a stratigraphically lower position i.e. earlier segregated PGE-rich sulphides depleted the melt of PGEs such that later phases of the magma were relatively depleted on those metals. Thus, low values of Pt and Pd in a rock can actually have positive implications in PGE exploration. Barnes and Meier (1999) use mantle Cu/Pd ratios ranging from 1000 to 10,000. Thus, a ratio greater than 10,000 suggests depletion of Pd relative to Cu has occurred and that sulphides may have segregated at depth. It should be noted that the Cu/Pd ratios for rocks above the PGE-rich Merensky Reef of the Bushveld Complex are much higher than those below the Reef (Keays and Lightfoot, 2002). The same is true for basalts and intrusive rocks above the Noril'sk deposits in Siberia (Barnes and Meier, 1999).

Of the 18 representative geochemical samples taken and discussed in the rock geochemistry section above, 10 had Pd values above detection and thus were usable in a Cu/Pd ratio calculation. Cu/Pd ratios for these samples ranged from 3900 to 63300. Interestingly, the three samples with ratios of less than 10,000 (i.e. the mantle ratio discussed above) are mafic to ultramafic rocks (hornblendites and peridotite), rock types that are often more closely associated with Ni-PGE deposits, whereas the 'depleted' ratios of greater than 10,000 are associated with the typical

dioritic rocks. As such, one might characterize the rocks in this area as depleted in Pd relative to Cu and relative to the mantle. Given the very small number of samples in this dataset, however, such conclusions at this stage are largely speculative and would need considerably more sampling to be considered reliable. In addition, it should be noted that although 'depleted' Cu/Pd ratios generally are indicative of the fractionation and segregation of PGE and Ni-Cu minerals at a lower stratigraphic level, they do not necessarily imply that these minerals have been concentrated in a particular economically viable layer or 'reef' (Note: reef-type Ni-PGE deposits are not a known ore deposit type in British Columbia). The mechanisms of magma emplacement may cause the Ni-Cu-PGE-bearing minerals to remain disseminated within the rocks. Barnes and Meier (1999) suggest that tectonic settings where the crust is thin, such as a rift environment, or where major crust-penetrating faults are present, are the most favourable settings for PGE ore deposits. Such settings allow for significant amounts of magma to be emplaced rapidly at higher crustal levels prior to the segregation of sulphides. While the Cu/Pd ratios from the dataset in this study should be used with caution, they may provide a very useful tool for future Ni-Cu-PGE exploration in the area.

### **Mineralization**

By far the most common style of mineralization in this area is skarn magnetite deposits related to the interaction of the intrusions with the older limestones. Most of the mineral occurrences in the area can be attributed to skarns. The copper-rich massive sulphide occurrence described along Granite Main logging road is slightly enigmatic. Upon first examination of this occurrence, the sulphides by virtue of their mineralogy and textures could easily be considered magmatic in origin and therefore very important in the exploration of Ni-PGEs. However, there are several pieces of evidence that the sulphides are skarn-related. The local geology is highly permissive for skarn mineralization; limestone is common to the north, south and east of the sulphide outcrop and altered diorite is present in the immediate vicinity of the outcrop. The well documented Reko skarn iron-ore deposits are in all within several hundred metres of this occurrence; a magnetite-chalcopyrite-bearing massive garnet occurrence (sample GR03-028) which is most likely skarn-related exists 125 metres north of this along the Granite Main road. The presence of up to 60% garnet and the calc-silicate alteration on the adjacent dioritic rocks are also indicative of skarn mineralization.

No Ni-PGE mineralization was discovered in the field. However, as discussed above, if such mineralization exists within these rocks, it will likely be at depth and therefore will not be exposed unless the host rocks are steeply folded or faulted whereby they are brought to the current erosion level. The general lack of internal structure within the largely massive dioritic intrusions did not allow for an assessment of the degree of deformation within the intrusive rocks.

### **Stream Sediment Geochemistry**

The presence of anomalous gold values in the Heavy Mineral samples demonstrates that sample collection and preparation recovered heavy minerals. This, combined

with the absence of any anomalous platinum or palladium, strongly indicates that PGE significant occurrences are not likely to occur in the Heavy Mineral sampled basins. However, sampling of some very large basins sampled by a single Heavy Mineral sample will not always detect local mineralization in an order 1 creek. Such an order 1 creek draining eastward into Fairy Creek produced the only PGE stream sediment anomaly – 46 ppb palladium.

Threshold or anomalous copper values in Sieved Silt or Heavy Minerals samples occur in 12 catchments in the northeast corner of the *Pearson PGE* property. The Granite Main copper showing is within this area, as well as 4 MINFILE copper +/- magnetite showings. In this copper area, 4 catchments have threshold or anomalous values in gold.

In the Fairy Creek area, there are six catchments with threshold or anomalous copper values. Two threshold-copper northwesterly draining tributaries of Braden Creek adjoin the Fairy Creek area to the northwest.

A southeast draining tributary to the Gordon River is strongly anomalous in gold - Heavy Mineral sample H031. A Sieved Silt site (S070) about 2 km to the southeast shows anomalous gold (in lab duplicate analysis). These catchments are adjoining at their headwaters.

By the southern boundary of the property along the Harris Creek logging road, one Heavy Mineral sample returned anomalous gold, although this was not confirmed by a duplicate field sample.

Reid Creek, a tributary to Braden Creek, has above background gold values. However, most of the catchment is not covered by *Pearson PGE* claims.

On the *Karen*, gold anomalies are common with anomalies in 7 catchments. Copper is also anomalous, with 4 catchments. As well one creek contains above background Pt and Pd values.

On the *Pearson PGE*, there is a concentration of above-threshold nickel values in tributaries to Renfrew Creek. The northern portion of this area overlaps part of the above-mentioned copper +/- gold area.

Anomalous mercury values occur in the Heavy Mineral and Sieved Silt surveys.

### **Geophysical Surveys**

Magnetometer surveys may be a method to trace known sulphide zones and to delineate targets in geochemically anomalous areas where outcrop is scarce.



## Conclusions

- Preliminary but cost effective geological mapping along logging roads has not discovered any evidence for significant layered intrusions that could host nickel-copper-PGE mineralization.
- Most of the semi-massive to massive sulphides seem to be genetically related to skarn development.
- Copper is the main metal of economic significance in these skarn showings.
- The known skarn zones in the area have not demonstrated significant size potential to date.
- The stream sediment survey demonstrates that the PGE mineralization is not widely present or is of high tenor. Except for one small tributary of Fairy Creek on the *Pearson PGE*, no other PGE anomalies were noted.
- The stream sediments on the *Karen* are significantly anomalous in gold and copper.
- One catchment on the *Karen* has a threshold value in palladium and platinum.
- The source of the gold on the *Karen* may be from the Tertiary Carmanah Group conglomerates, although further upstream gabbros and ophiolites may be the source of the gold, copper +/- PGEs; anomalous Cu and Au values in this area may be indicative of mineralization of a similar style to the Sunro Mine (B.C. MINFILE 092C 073), a past producing Cu-Au deposit hosted by a Eocene volcanic rocks and located 3 km to the east of the *Karen* property.
- The high correlation among nickel, chromium and cobalt, and the relatively low values can be indicative of the geochemistry of widely distributed mafic rock units, not significant mineralization; the relatively high Ni, Cr and Co contents inherent to the mafic and ultramafic intrusions in the area are likely sufficient to yield the values considered anomalous in previous geochemical surveys.
- Recent developments in the genetic models for the Giant Mascot deposit of southwestern B.C. and the Aguablanca deposit of Spain may have similarities and applications to the geology and future exploration in the study area.

## Recommendations

- The foremost recommendation is that Emerald Fields reviews the data and conclusions of this report, and with other data that it may have, evaluate its exploration strategy on the large (685 claim units) project.
- Without negating serendipity, there should be a clear understanding of the types of mineral deposits that could reasonably occur and their economic potential.
- On the *Pearson PGE*, one drainage catchment is worthy of follow-up exploration for PGEs and three for gold.
- In the northeast corner of the *Pearson PGE*, the area of copper +/- gold enrichment may be worthy of follow up exploration.
- In the Fairy Creek area of the *Pearson PGE*, the area of copper +/- gold +/- PGE enrichment may be worthy of follow up exploration; the Cu-Ni sulphides discovered by Tavela near Fairy Creek remain unexplained and further prospecting for a bedrock source for Tavela's mineralized float boulders is recommended.
- On the *Karen*, the source of the gold and copper in the stream sediments should be determined – firstly, by follow-up sampling upstream, then by prospecting, mapping and geochemistry in anomalous catchments.
- On the *Karen*, the above-background PGE site is a lower priority for further exploration.
- Any exploration on showings of copper sulphides with possible PGEs and/or gold, such as the Granite Main showing, should utilize follow-up stream sediments surveys, soil surveys and geophysics.
- The Granite Main massive sulphide showing should be trenched and then mapped and sampled in detail to give a better understanding of the size, genesis and geological relationships of this interesting occurrence.
- Skarn-hosted copper sulphide mineralization should be considered a viable exploration target on the *Pearson PGE* property, especially in the Granite Main area.
- Any future exploration efforts for intrusion-hosted Ni-Cu-PGE deposits should consider using geochronology to help determine the relative ages and relationships of the different intrusive rock types in the area.
- A more detailed rock geochemical sampling program would provide a useful complement to any geochronological work and could provide useful information as to the “fertility” of these intrusive rocks for Ni-PGE mineralization at depth.
- As a part of any future rock sampling and petrographic analysis, it is recommended that attention be given to the identification and determination of

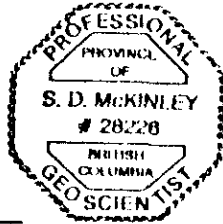
the composition of spinels as a potential pathfinder for Ni-Cu-PGE deposits as outlined by Nixon (2003).

- Trenching across some of the ultramafic rock occurrences would yield more information on their size and contact relationships with the more common diorite intrusions.

Respectfully submitted,

*Sean McKinley*

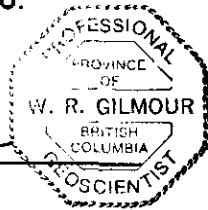
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Sean D. McKinley, P. Geo.

*W. R. Gilmour*

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William R. Gilmour, P. Geo.

October 10, 2003

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**Statement of Qualifications**

I, Sean D. McKinley do hereby certify that:

I am a Consulting Geologist residing at 804-220 Townsite Road, Nanaimo, B.C., V9S 5S8.

I am a graduate of Queen's University, Kingston, Ontario where I received a Bachelor of Science degree in 1992, and the University of British Columbia, Vancouver, B.C. where I received a Master of Science degree in 1996. I have practiced my profession continuously since graduation.

I am a Professional Geoscientist in good standing with the Association of Professional Engineers and Geoscientists of British Columbia.

This report is based on my knowledge of the regional geology in the area and on my geological mapping of the *Pearson PGE* property.

I have no interests in Emerald Fields Resource Corp. nor in the property reported on herein.

I consent to the use of this report for submission for assessment requirement for the *Pearson PGE* property.

Dated on October 10, 2003, in Nanaimo, British Columbia.



Sean D. McKinley, M.Sc., P.Geo.





## Statement of Qualifications

I, William R. Gilmour, of 13511 Sumac Lane, Coldstream, BC, V1B 1A1, do hereby certify that:

I am a consulting geologist in mineral exploration associated with Discovery Consultants of Vernon, BC.


I am a graduate of the University of British Columbia, with a Bachelor of Science degree in geology.

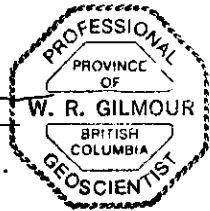
I have been practising my profession continuously since graduation in 1970.

I am a Professional Geoscientist in good standing with the Association of Professional Engineers and Geoscientists of British Columbia.

This report is based on a major involvement in the planning of the stream sediment survey, a thorough review of the fieldwork carried out by Discovery Consultants personnel, and an interpretation of the geochemical results.

I consent to the use of this report for submission for assessment requirement for the *Pearson PGE* and *Karen* properties.

  
\_\_\_\_\_  
William R. Gilmour, P. Geo.



October 10, 2003

Pearson PGE Property

1. Professional Services

W.R. Gilmour (P.Geo.)			
Planning, Supervision	1.75 days @\$500/day	\$875.00	
Data Compilation & Report Writing	5 days @\$500/day	2,500.00	
S. D. McKinley (P.Geo.)			
Project Planning	2 days @\$500/day	1,000.00	
Geological Mapping (May 6 - 25)	16 days @\$500/day	8,000.00	
Data Compilation & Report Writing	7 days @\$500/day	3,500.00	
C. Sebert (P.Eng.)			
Geological Mapping (May 9 - 20)	12.0 days @\$500/day	6,000.00	
A. P. Pryslak (P.Geo.)			
Geological Mapping & Prospecting (Apr. 15 - 22)	8.0 days @\$450/day	3,600.00	
		-----	\$25,475.00

2. Field Personnel

Prospecting (Apr 15 - 29)			
P. Heatherington (Prospector)			
	10.0 days @\$350/day	\$3,500.00	
Stephen Stares			
	10.0 days @\$270.25/day	2,702.50	
Michael Stares			
	10.0 days @\$270.25/day	2,702.50	
Cliff Hickman			
	10.0 days @\$270.25/day	2,702.50	
Jeff Stares			
	10.0 days @\$270.25/day	2,702.50	
		-----	14,310.00
Stream Sediment Sampling (May 6-12, 14-17, 19-22, 24)			
plus mob/demob			
	Rick Mitchell 16 days @\$358.46/day	\$5,735.36	
	Dave Strain 16 days @\$358.46/day	5,735.36	
stat.	Rick Mitchell 1 day @ 224.04	224.04	
holiday	Dave Strain 1 day @ 224.04	224.04	
		-----	11,918.80
Geophysics Survey (May 23)			
	Rick Mitchell 1 day @\$358.46/day	358.46	
	Dave Strain 1 day @\$358.46/day	358.46	
		-----	716.92
		-----	26,945.72
3. Office Personnel			
	Drafting	3,143.92	
	Field Prep/Demob	372.40	
	Data Compilation	324.00	
	Data Compilation - Zone 14	2,044.40	
	Secretarial	51.80	
		-----	5,936.52

4. Expenses

Analysis

<u>ACME Lab</u>		
59 silt samples @\$27.00/sample	1,593.00	
40 mossmat samples @\$29.00/sample	1,160.00	
31 Heavy Mineral samples @\$25.00/sample	620.00	
5 blank samples @ \$27.00/sample	135.00	
<u>ALS Chemex Lab</u>		
30 Rock samples @\$29.50/sample	885.00	
18 Rock samples @\$37.00/sample	666.00	
<u>X-RAL</u> - submitted by EFR		
Rock samples	5,004.83	
<u>CF Mineral Research</u>		
31 HM sample preparation @\$171.75/sample	5,324.25	
Preparation of -80HM, HP fractions	139.50	
<u>Vancouver Petrographic</u>		
thin-section work	4,246.91	
Shipping	179.68	
	-----	19,954.17
Communications		418.33
Communications - EFR		398.86
Field Supplies		246.30
Field Supplies - EFR		953.02
Equipment Rentals		962.70
Office General		182.20
Lodging & Meals		1,486.30
Lodging & Meals - EFR		3,960.27
Maps & Publications, Map prints		1,282.69
Transportation - 4x4 trucks		
17 days @ \$ 40/day (May 6 - May 24)	\$680.00	
2,208km @ \$ 0.40/km	883.20	
fuel	539.78	
highway & ferry tolls	185.82	
truck (Apr - Jun) - EFR	3,673.48	
fuel - EFR	522.19	
Transportation - car		
250 km @ 0.40/km	100.00	
	-----	6,584.47
Travel - Air - EFR		4,552.98
Emerald Fields Resource Corp. Administrative Costs		7,000.00
Discovery Consultant Management Fees (10% of disbursements)		1,800.00
		-----

**Total Assessment Work: \$108,139.53**

**Karen Property**

1. Professional Services			
W.R. Gilmour (P.Geo)			
Planning & Supervision	0.25 days @\$500/day	\$125.00	
Data Compilation and Report Writing	1.0 day @\$500/day	500.00	
S.D. McKinley (P.Geo.)			
Data Compilation and Report Writing	1 day @ \$500/day	500.00	
		-----	\$1,125.00
2. Field Personnel			
Stream Sediment Sampling (May 13, 18 & 24)			
Rick Mitchell	2.0 days @\$358.46/day	716.92	
Dave Strain	2.0 days @\$358.46/day	716.92	
		-----	1,433.84
3. Office Personnel			
Drafting		400.00	
Field Prep/demob		50.00	
Data Compilation		50.00	
Secretarial		25.00	
		-----	525.00
4. Expenses			
Analysis			
<u>ACME Lab</u>			
3 silt samples @\$27.00/sample		77.25	
7 Heavy Mineral samples @\$25.00/sample		140.00	
<u>CF Mineral Research</u>			
7 HM sample preparation @\$171.75/sample		1,202.25	
Preparation for -80HM, HP, HN fractions			
Shipping		19.46	
		-----	1,438.96
Communications		50.00	
Field Supplies		27.36	
Equipment Rentals		109.19	
Office General		50.00	
Lodging & Meals		60.84	
Maps & Publications, Map prints		200.00	
Transportation			
a) Truck			
4x4 2 days @\$40/day		\$80.00	
189km @40¢/km		75.60	
fuel		16.13	
highway & ferry tolls		11.93	
		-----	\$183.66
Emerald Field Resource Cort. Administrative Costs		1,000.00	
Discovery Consultants Management Fees (10% of disbursements)		200.00	
		-----	3,320.01
		-----	
<b>Total Assement Work:</b>			<b><u>\$6,403.85</u></b>