# GEOLOGICAL AND GEOCHEMICAL REPORT

on the

## EPI 3, 10 and 11 MINERAL CLAIMS

Twin Lakes Area
Osoyoos Mining Division

82E-4, 5
(49°14'30" N. Lat.,119°46' W. Long.)

for

GRANT F. CROOKER
Box 404
Keremeos, B.C.
VOX 1NO
(OWNER AND OPERATOR)

by

GRANT F. CROOKER, B.Sc., F.G.A.C.
CONSULTING GEOLOGIST



December, 1991

TABLE OF CONTENTS


| | Page |
|---|---|
| SUMMARY AND RECOMMENDATIONS | 1 |
| 1.0 INTRODUCTION | 3 |
| 1.1 General | 3 |
| 1.2 Location and Access | 3 |
| 1.3 Physiography | 4 |
| 1.4 Property and Claim Status | 4 |
| 1.5 Area and Property History | 5 |
| 2.0 EXPLORATION PROCEDURE | 9 |
| 3.0 GEOLOGY AND MINERALIZATION | 10 |
| 3.1 Regional Geology | 10 |
| 3.2 Claim Geology | 14 |
| 3.3 Mineralization and Alteration | 16 |
| 4.0 GEOCHEMISTRY | 17 |
| 4.1 Silt Geochemistry | 17 |
| 5.0 CONCLUSIONS AND RECOMMENDATIONS | 18 |
| 6.0 REFERENCES | 19 |
| 7.0 CERTIFICATE OF QUALIFICATION | 21 |

APPENDICES

Appendix I - Certificates of Analysis
Appendix II - Rock Sample Descriptions
Appendix III - Cost Statement

## ILLUSTRATIONS


| FIGURE | | PAGE |
|---|---|---|
| 1. | Location Map | follows page 2 |
| 2. | Claim Map | follows page 4 |
| 3. | Regional Geology | follows page 13 |
| 4. | Geology, EPI 3, 10 and 11 Claims | pocket |


## TABLES


| TABLE | | PAGE |
|---|---|---|
| I | Rock Geochemical Results | 16 |
| II | Silt Geochemical Results | 17 |

## SUMMARY AND RECOMMENDATIONS

The EPI claims are located approximately 25 kilometers southwest of Penticton B.C. in southern British Columbia. The claims are bounded by Olalla on the west, Twin Lakes on the north, Park Rill on the east and Keremeos and Cawston on the south. The property consists of 15 claims covering 201 units in the Osoyoos Mining Division.

Mining has been carried out in this region of the province since the late 1800's. The important gold camps include Hedley, Fairview, Orofino Mountain and Olalla.

The EPI claims are underlain by Tertiary volcanic and sedimentary rocks of the Penticton Tertiary Outlier which are favourable rocks for epithermal gold and silver mineralization. At least three gold occurrences are found within these Tertiary rocks, the Vault, Dusty Mac and Venner Meadows properties.

The Dusty Mac property produced 58,700 tons of ore yielding 19,484 ounces of gold and 339,282 ounces of silver from 1969 through 1976. Mineralization was related to a silicified lens of White Lake Formation cut by many faults. The mineralization appears to have been controlled by these faults.

The Vault property is a relatively recent discovery (1982) and consists of two types of epithermal gold mineralization occurring within Tertiary rocks. The first is a large quartz stockwork zone with abundant chalcedony and pyrite and prominent east-west fractures. Gold values in this zone are on the average about 0.07 ounces per ton. A second type of mineralization is a distinct east-west, quartz-calcite-adularia vein. Considerable exploration on the vein has indicated reserves of 150,000 tonnes grading 0.49 ounces gold per ton. A northeast trending fault crossing the property is thought to be a major control of mineralization.

During 1989 and 1990 geological mapping and prospecting were carried out over a number of areas of the EPI claims. Three grids were also established over major structural trends and geological mapping, prospecting and magnetometer and VLF-EM surveying carried out over the grids. A limited amount of IP was also carried out over Grid A.

The 1989 and 1990 programs on the EPI claims yielded a number of favourable results for the presence of epithermal gold mineralization. These include:

a) A number of north trending magnetic lows, some with coincidental VLF-EM conductors, which have the potential to be feeder zones for epithermal gold mineralization.

b) A weak chargeability anomaly on Grid A near a clay altered outcrop of dacite may represent sulphide mineralization within a sulphide system.

c) The discovery of a number of weakly to strongly clay altered zones and areas with chalcedony float. The most significant of these zones occurs on Grid B where sampling gave weakly anomalous mercury (130 ppb) and arsenic (77ppm) values. The clay alteration may be indicating favourable structures with epithermal mineralization at depth.

The 1991 program consisted of carrying out geological mapping and prospecting over the EPI 3, 10 and 11 claims. These claims had received little attention in the previous work programs.

The most favourable indications for epithermal gold mineralization discovered during the 1991 program occur along the Daly Creek Fault. A number of areas show strong to moderate clay alteration along with rusty fracturing. Five rock samples were collected along the zone, and although none gave anomalous gold values, several did give weakly anomalous arsenic (103 ppm), antimony (3 ppm), molybdenum (28 ppm) and barium (1284 ppm) values.

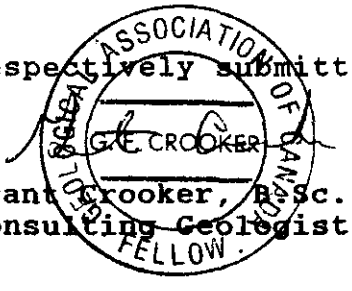
Several drainage samples were also collected along the Daly Creek Fault. These did not give anomalous gold values, but several gave weakly anomalous arsenic (33 ppm), copper (67 ppm) and barium (654 ppm) values. Swamp and lake sediment sampling carried out by Petro Canada along the Daly Fault in the late 1970's, 200 to 1000 meters north of the area covered by this program also gave weakly anomalous geochemical responses for copper and molybdenum. This fault zone is thus weakly geochemically responsive over a length of 4000 meters.

Recommendations are to continue work on the property. This should include the following:

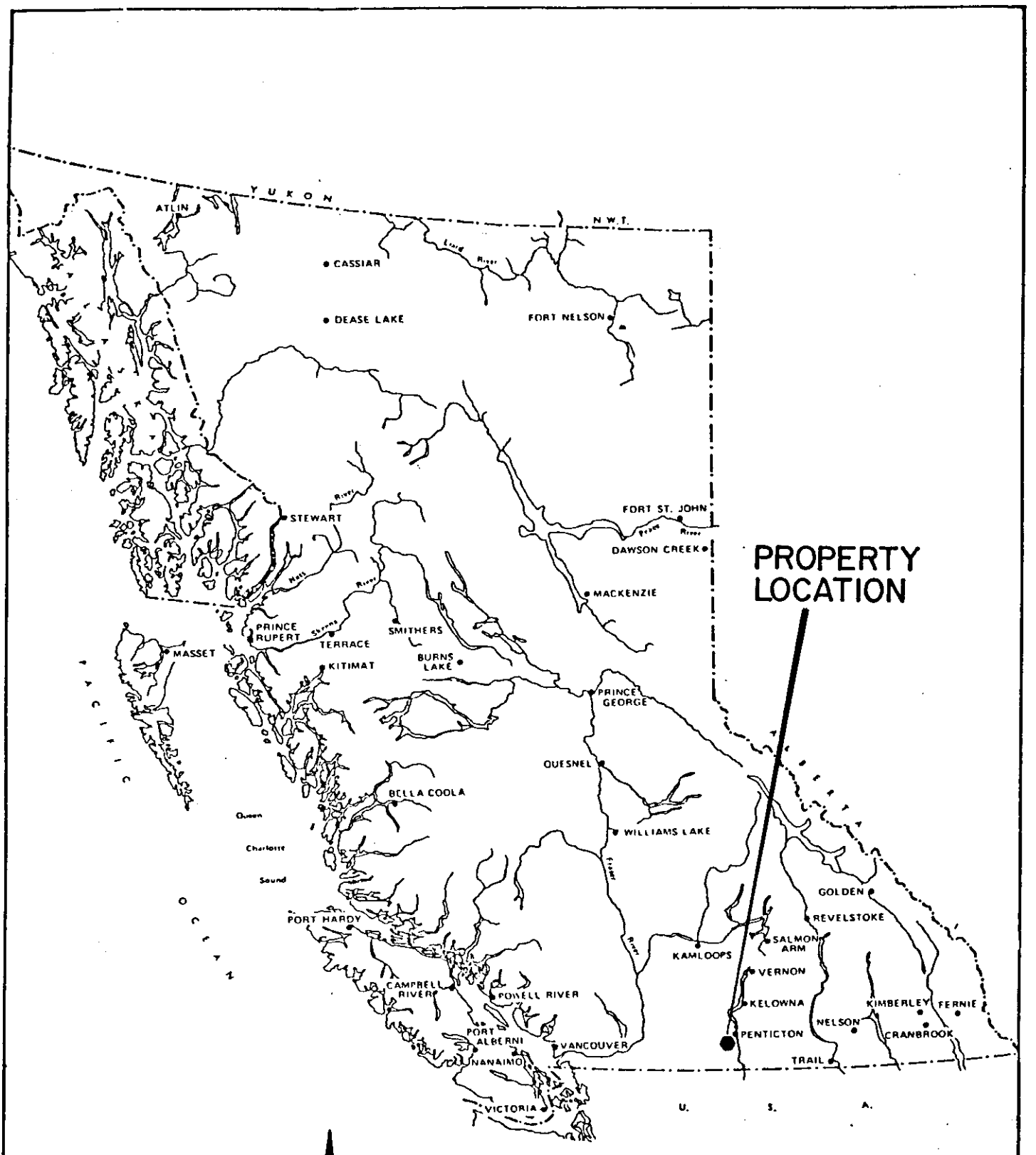
1) The Daly Creek Fault Zone and other major structural trends should be drainage sampled in a systematic manner to locate gold or trace element geochemical anomalies.

2) Prospecting should be carried out along the major structural trends.

Respectively submitted,




Grant Crooker, B.Sc.,F.G.A.C.
Consulting Geologist




| GRANT F. CROOKER | |
|---|---|
| EPI CLAIMS | |
| LOCATION MAP | |
| N.T.S. 82E-4,5 | OSOYOOS M.D., B.C. |
| 0 200 400KM. | |
| DRAWN BY: G.C. | SCALE : AS SHOWN |
| DATE : DEC. 1991 | FIGURE Nº. G1 |

CHONG

# 1.0 INTRODUCTION

## 1.1 GENERAL

Work was carried out on the EPI 3, 10 and 11 claims in the spring and fall of 1991 by Grant Crooker, Geologist. The work program consisted of geological mapping, prospecting and rock and drainage sampling.

## 1.2 LOCATION AND ACCESS

The property (Figure G-1) is located approximately 25 kilometers southwest of Penticton in southern British Columbia. It is bounded by Olalla (Figure G-2) on the west, Twin Lakes on the north, Park Rill on the east and Keremeos and Cawston on the south. The claims lie between 49°12'30" and 49°18' north latitude and 119°42'20" and 119°48'15" west longitude (NTS 82E-4, 5).

Access to the property is available through a variety of routes. The Taylor Lake logging road provides the best access, turning off Highway 3A at the Twin Lakes junction and proceeding south. This is an all weather two wheel drive road which gives access to the eastern and southern portions of the property.

The Horn Creek logging road turns off from the Twin Lakes road and gives access to the northern and western portions of the property. This is a two wheel drive road but it does have some rough sections.

An old four wheel drive logging road leads to Armstrong Creek and the Columns Provincial Park, and provides access to the southwestern portion of the property. This road turns east off Highway 3A between Keremeos and Olalla.

A number of old logging roads and a road along the power line link up with all of the above roads, although most are usable only by four wheel drive vehicles.

## 1.3 PHYSIOGRAPHY

The property is located within the Thompson Plateau section of the Interior Plateau. Elevation varies from 580 to 1580 meters above sea level and topography varies from flat to steep. Many of the higher elevations of the property are relatively flat but extremely high cliffs occur where the property drops into Keremeos, Manuel and Horn Creeks.

Outcrop is relatively abundant on the ridges but becomes sparse on the lower slopes and structural trends.

A number of creeks flow through the property, including Horn, Manuel and Armstrong creeks. These creeks all have cut steep and narrow canyons. Water can be found in all of these creeks in localized sections all year round. Abundant springs provide the source for these creeks. Many swamps at the higher elevations of the property also contain water throughout the year.

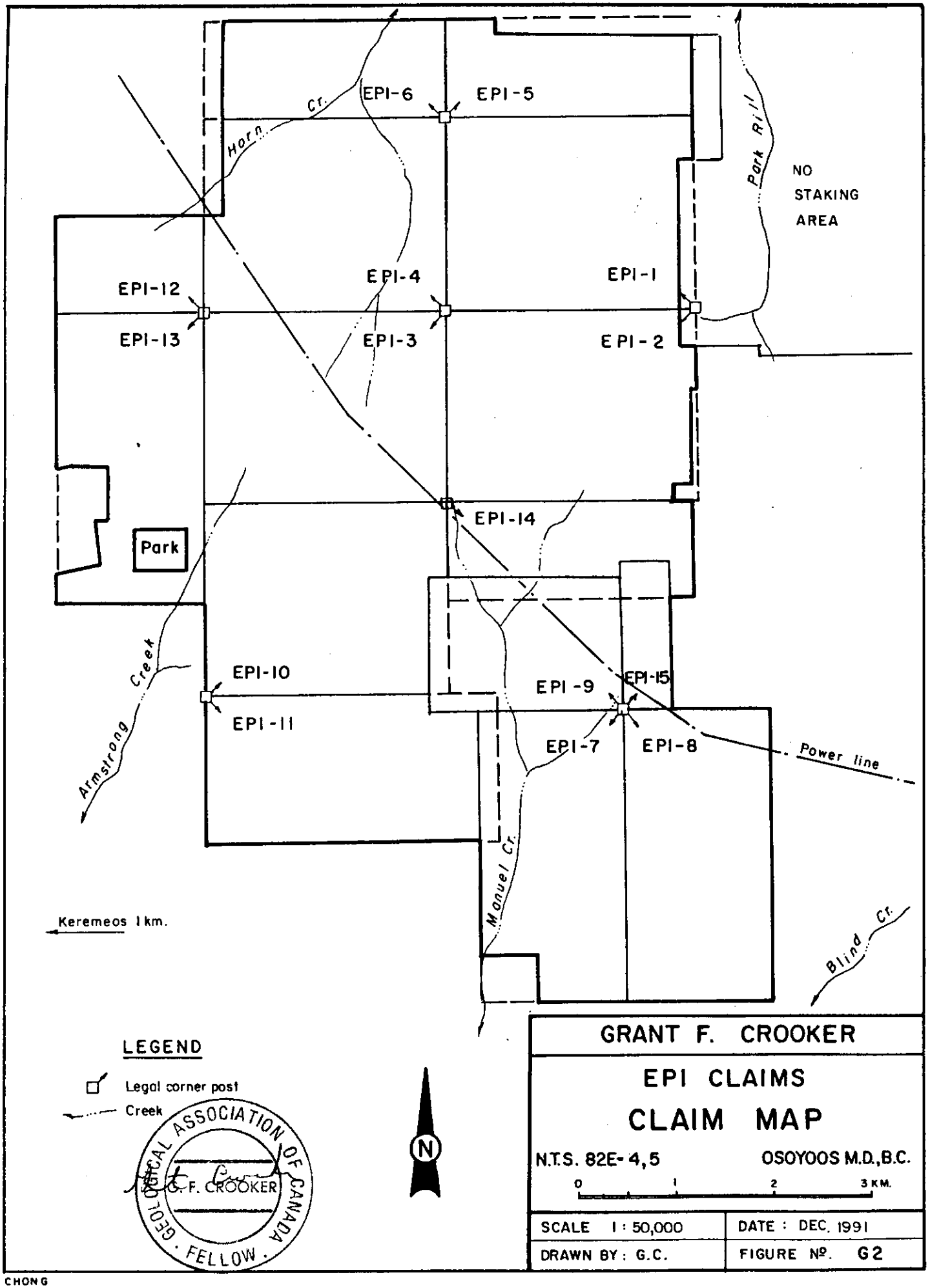
Vegetation varies from open range land toa forest cover of pine and fir trees. Large areas of the property have been logged from the 1950's to the present. A B.C. Hydro transmission line passes through the center of the property.

## 1.4 PROPERTY AND CLAIM STATUS

The EPI 1-15 claims (Figure G-2) are owned by Grant Crooker of Keremeos, B.C. and consists of 15 claims covering 201 units in the Osoyoos Mining Division.

| Claim | Units | Mining Division | Record No. | Record Date | Expiry Date |
|---|---|---|---|---|---|
| EPI-1 | 20 | Osoyoos | 3127(3) | 17/03/89 | 17/03/94 |
| EPI-2 | 20 | Osoyoos | 3128(3) | 18/03/89 | 18/03/93 |
| EPI-3 | 20 | Osoyoos | 3129(3) | 21/03/89 | 21/03/94* |
| EPI-4 | 20 | Osoyoos | 3130(3) | 23/03/89 | 23/03/93 |
| EPI-5 | 5 red | Osoyoos | 3131(3) | 22/03/89 | 22/03/94 |
| EPI-6 | 10 | Osoyoos | 3132(3) | 22/03/89 | 22/03/94 |
| EPI-7 | 18 | Osoyoos | 3133(3) | 26/03/89 | 26/03/93 |
| EPI-8 | 18 | Osoyoos | 3134(3) | 26/03/89 | 26/03/92 |
| EPI-9 | 12 | Osoyoos | 3135(3) | 26/03/89 | 26/03/92 |
| EPI-10 | 12 red | Osoyoos | 3136(3) | 29/03/89 | 29/03/94* |
| EPI-11 | 9 red | Osoyoos | 3137(3) | 30/03/89 | 30/03/93* |
| EPI-12 | 6 | Osoyoos | 3138(4) | 01/04/89 | 01/04/93 |
| EPI-13 | 18 | Osoyoos | 3139(4) | 01/04/89 | 01/04/93 |
| EPI-14 | 10 | Osoyoos | 3177(7) | 04/07/89 | 04/07/93 |
| EPI-15 | 3 | Osoyoos | 3176(7) | 04/07/89 | 04/07/94 |

*Upon acceptance of this report.


EPI-6
EPI-5
Horn Cr.
Park Ri//
NO STAKING AREA
EPI-12
EPI-4
EPI-1
EPI-13
EPI-3
EPI-2
EPI-14
Park
EPI-10
EPI-9
EPI-15
EPI-11
EPI-7
EPI-8
Armstrong Creek
Power line
Manuel Cr.
Keremeos 1km.
Blind Cr.
LEGEND
Legal corner post
Creek
GEOLOGICAL ASSOCIATION OF CANADA
G. F. CROOKER
FELLOW
N
GRANT F. CROOKER
EPI CLAIMS
CLAIM MAP
N.T.S. 82E-4,5
OSOYOOS M.D., B.C.
0 1 2 3 KM.
SCALE 1:50,000
DATE : DEC. 1991
DRAWN BY : G.C.
FIGURE Nº. G2

CHONG

## 1.5 AREA AND PROPERTY HISTORY

The EPI claims are located in the South Similkameen-South Okanagan, an area which has a very rich history of mining. Placer mining began in the area in the 1860's, with hard rock mining beginning soon after. A number of gold camps are located around the claim group, including Hedley, Olalla, Orofino Mountain and Fairview. Many other gold properties, including the Dusty Mac, Venner Meadows (Au-Rain) and Vault are also located near the EPI claims.

The Hedley Camp has the most significant production in the area, with 3,981,553 tons of ore producing 1,730,643 ounces of gold and 190,091 ounces of silver between 1904 and 1955. The Nickel Plate Mine was reopened in 1987 by Corona Corporation with open pit reserves of 7,200,000 tons grading 0.15 ounces gold per ton. The gold in the Hedley Camp is related to skarn mineralization.

The Fairview Camp has the second highest record of production in the area with 536,000 tons of ore producing 17,040 ounces of gold and 169,497 ounces of silver between 1898 and 1949. Recent exploration by Oliver Gold Corp has given 762,000 ton of proven, probable and possible ore grading 0.110 ounces gold per ton and 1.2 ounces silver per ton. Production from the area has been from quartz veins.

A limited amount of ore has also been produced from the Orofino Mountain Camp. Approximately 21,800 tons of ore yielded 8,846 ounces of gold and 2,393 ounces of silver. Brightwork Resources Inc. currently has the Grandoro and King properties under option and carried out a 2500 foot diamond drilling program on the Grandoro property during June of 1990. This program was successful, with the best result a 5.58 foot section returning 1.040 ounces per ton gold. Gold and silver mineralization at this camp is also related to quartz veins.

A number of precious metal occurrences are found within the Olalla Camp, although only a limited amount of ore has been produced. Gold and silver mineralization is related to skarns (Bullion, Juniper-Bell) and quartz veins and breccias with carbonate alteration (Sunrise, Something Good, Cliff claims). Goldcliff Resource Corp. is currently exploring the Sunrise, Something Good and Cliff claims.

At least three gold and silver occurrences are found within the same Tertiary volcanic and sedimentary rocks that underlie the EPI claims. These are the Dusty Mac, Vault and Venner Meadows properties and all are related to epithermal gold mineralization.

The Dusty Mac property produced 58,700 tons of ore yielding 19,484 ounces of gold and 339,282 ounces of silver between 1969 and 1976. The deposit consisted of a lens like zone of silicified Eocene White Lake Formation volcanic rocks and sedimentary debris

containing minor disseminated pyrite and native silver. Some quartz veins on the property also carry minor bornite and chalcopyrite. The zone has been cut by an important system of reverse faults. The system generally trends southeasterly, with interwoven easterly and southerly striking segments and splays. Quartz veins and gossans are present in or adjacent to most of the main faults.

The Venner Meadows property was apparently discovered in a logging road cut in 1973 and was known at that time as the Au-Rain claims. Work programs, including soil sampling, magnetometer and VLF-EM surveys, and trenching were carried out by a number of companies through 1978, when the claims were allowed to lapse. Erratic gold and silver mineralization occurs within a northeasterly trending shear zone with associated silicified patches and bands, and calcite veins.

The area was restaked in 1979 and additional work programs carried out. Subsequent diamond drilling intersected significant gold mineralization. The mineralization is associated with faulting and brecciation within a propylitically altered andesite. Quartz and carbonate veining is found throughout the andesite, as narrow 1 mm lacey veining and larger veins up to 20 cms in width. The veins are generally broken and cut by numerous small scale offsets, and pyrite is common along fractures, within quartz veins, as fine disseminations, and as partial matrix in breccia zones. Common accesory minerals are purple flourite and amethyst. Electrum has been identified and is generally associated with and surrounded by pyrite and silica.

The Vault property contains the most significant gold mineralization within the Penticton Tertiary Outlier. It is a relatively recent discovery, having been staked by M. Morrison in March 1982 to cover a gossanous area of silicified breccias that contained anomalous values in gold. Riocanex optioned the property in May 1982, and carried out percussion drilling in late 1982 and diamond drilling in April of 1983. A number of intersections contained anomalous gold and silver values, but the grades were not considered high enough by Riocanex and the property was dropped.

In late 1983 Dome Exploration (Canada) ltd. optioned the property and in early 1984 an induced polarization survey was carried out over the discovery zone with follow-up diamond drilling. Dome concluded that the precious metals and associated arsenic, mercury and antimony values are related to a zone of multi-stage silicification, pyritization, and brecciation accompanied by argillic alteration along and above a major southerly dipping fault zone which separates the Marron Formation from the overlying Marama Formation. They also concluded the mineralization was sub-economic and terminated the option.

Seven Mile High Resources Inc. optioned the property in November of 1984. Geological mapping, geochemical soil sampling and geophysical surveying were carried out over various areas of the property. This work resulted in the discovery of a new, large, gossanous, silicified and clay altered zone named the MH Zone. A number of percussion holes were drilled to test the new discovery but no economic mineralization was encountered.

In May of 1986, Canadian Nickel Company Limited entered into an option agreement with Seven Mile High to earn a 60% interest in the property and act as operator. Subsequent to this option agreement, approximately $ 3,500,000 has been spent on exploration including 37,000 meters of diamond drilling. The drilling has located epithermal gold mineralization in two east-west trending zones: the Main Zone and North Vein.

The Main Zone contains numerous gold-bearing veins in a quartz stockwork which is 600 meters long, 40 to 125 meters wide and 5 to 30 meters thick. The top of the mineralization is 170 meters below the surface at the west end and 500 meters below surface at the east end. Although several ore-grade intersections have been identified within the veins, the overall grade of the stockwork is less than 0.07 ounces gold per ton. The mineralization appears to be controlled by a northeast trending fault and east-west trending fractures. A first phase of ascending fluids selectively silicified the matrix of pyroclastics, followed by repeated fracturing of the now brittle pyroclastics and emplacement of gold-silver bearing quartz veins and veinlets.

The North Vein is a discrete narrow quartz-calcite-adularia vein located 300 meters north of the Main Zone. Diamond drilling to date has indicated a mineral resource of 150,000 tonnes grading 0.49 ounces gold per ton. The average true width for the intersections included in the tonnage calculation is 0.57 meters. The North Vein has been tested over a strike length of 1,050 meters and a vertical depth varying from 100 to 200 meters.

At the present time no work is being carried out on the property. The Vault deposit is significant in that it is a new discovery and it is basically a blind deposit, with no significant gold values on surface.

There is little documentation of exploration on the area covered by the EPI claims. Pacific Petroleum (Petro Canada) carried out regional geological and geochemical surveys on the property for uranium in 1976. Several uranium, copper, molybdenum and fluorine anomalies were located by the survey. Detailed grid follow-up and diamond drilling were carried out in 1977 and 1978 but no radioactive deposits were found. In 1978 the claims were placed in the uranium moratorium, and when the claims came open in 1989 they were staked by Grant Crooker.

Work programs were carried out on the EPI claims during 1989 and 1990. This consisted of geological mapping and prospecting over various areas of the property and establishing three grids (A, B and C). Geological mapping, prospecting and magnetometer surveying were carried out over all three grids. A VLF-EM survey was also carried out over grid C, and Interpretex Resources carried out orientation induced polarization and Omni plus surveys over part of Grid B.

The programs yielded a number of favourable results for the presence of epithermal gold mineralization. The magnetometer surveys indicated a number of north trending magnetic lows, some with coincidental VLF-EM conductors, which represent structural trends. These structural trends could represent feeder zones for epithermal gold mineralization. The induced polarization survey delineated a weak chargeability anomaly near an outcrop of clay altered dacite. This chargeability anomaly may represent sulphide mineralization within an epithermal system.

Prospecting and geological mapping resulted in the discovery of a number of weakly to strongly clay altered zones and areas with chalcedony float. The most significant of these zones was found on Grid B where sampling of chalcedony float gave weakly anomalous mercury (130 ppb) and arsenic (77 ppm) values. The clay alteration may be indicating favourable structures with epithermal gold mineralization at depth.

## 2.0 EXPLORATION PROCEDURE

The 1991 program consisted of carrying out geological mapping and prospecting over the EPI 3, 10 and 11 claims which had not previously been examined. The numerous roads on the property were used for control and most of the work program was carried out along them.

**GEOCHEMICAL SURVEY PARAMETERS**

-survey total - 7 rock samples
-rock samples analyzed by 31 element ICP and for Au
-survey total - 8 silt samples
-silt samples analyzed by 31 element ICP and for Au

The silt samples were sieved to minus 20 mesh in the field. Collection of silt samples is difficult due to lack of relief and high organic content in the drainages.

All samples were sent to Mineral-Environments Laboratories, 705 West Fifteenth Street, North Vancouver, B.C., V7M 1T2, for geochemical analysis. Laboratory technique for silt samples consists of preparing samples by drying at 95° C, and sieving to minus 80 mesh. Rock samples are prepared by drying at 95° C and grinding to minus 150 mesh.

A 31 element ICP analysis and gold analysis were carried out on all samples. The gold analysis consists of aqua-regia digestion, atomic adsorption finish. Sensivity for gold is to five ppb.

The geochemical data was plotted on figure G-4.

# 3.0 GEOLOGY AND MINERALIZATION

## 3.1 REGIONAL GEOLOGY

The EPI claims are located along the eastern margin of the Intermontane Belt of southern British Columbia. Most of the claims (Figure G-3) are underlain by Early Tertiary volcanic and minor sedimentary rocks of the Penticton Tertiary Outlier. The Penticton Tertiary Outlier, as well as other bedded Tertiary Deposits in southwestern British Columbia and northern Washington are erosional remnants of what was probably once a continuous belt composed of mainly volcanic rocks extending from central Washington to central British Columbia.

The Tertiary rocks rest on a pre-Tertiary basement varying from Triassic or older metasedimentary and metavolcanic rocks of the Shoemaker and Old Tom Formations to Cretaceous and Jurassic granites, granodiorites and syenites.

A brief description of the Tertiary rocks is given below as described by Church (1973, 1979).

The basal Springbrook Formation is the oldest formation and rests unconformably on pre-Tertiary basement rocks. The formation is mainly exposed along the western extremity of the area and is believed to range in thickness from 200 to 700 feet. The basal beds are a conglomerate containing large angular boulders, grading upwards into a conglomerate composed of smaller, more rounded material, to an uppermost strata consisting of tuffaceous sandstones and siltstones. At present a Middle Eocene age has been tentatively assigned to the formation, based on K-Ar dates obtained from similiar rocks in southern British Columbia.

The Springbrook Formation has been tentatively correlated with the following Tertiary sedimentary rocks: Kettle River, Curry Creek, Coldwater, Allenby and O'Brien Formations. The beds generally dip 10 to 15 degrees east.

The Marron Formation overlies with slight angular unconformity the Springbrook Formation and has been divided into the Yellow Lake, Kitley Lake, Kearns Creek, Nimpit Lake and Park Rill Members.

The Yellow Lake Member forms the lower most unit of the formation and varies from about 500 to 1,800 feet in thickness. The rocks can be broadly classified as anorthoclase-augite porphyry with many rocks containing rhomb-shaped phenocrysts of anorthoclase. In many places the rocks are amygdaloidal and contain calcite and natrolite, some thomsonite and rarely brewsterite.

The Kitley Lake Member conformably overlies the Yellow Lake Member and has a relatively uniform thickness of 1,000 feet. It forms the lower part of the Marron Formation. The rocks form conspicuous, thick, tan trachyte flows with discrete tabular crystals, polygonal clusters and clots of feldspar phenocrysts measuring 3 to 6 millimeters in diameter.

Conformably overlying the Kitley Lake Member in the middle part of the Marron Formation is the Kearns Creek Member. This unit attains a maximun thickness of about 400 feet and consists of dark brown, vesicular, basaltic lava and flow breccia. The rocks typically have abundant pyroxene phenocrysts and scattered laths of plagioclase. Most vesicules are filled with chlorite, chalcedony and some calcite.

The Nimpit Lake Member overlies the Kearns Creek Member conformably in the upper middle part of the Marron Formation. It varies between 200 and 1,000 feet in thickness. The rocks are chemically similiar to the Kitley Lake trachyte and trachyandesite lavas but differ in texture and stratigraphic position. The trachyte flows are typically yellowish or cream coloured where fresh and contain scattered small phenocrysts of pyroxene, and radiating plagioclase glomerophenocrysts. Pyroclastic deposits are generally thin, discontinuous and composed of agglomerate and tuff.

The Park Rill Member forms the uppermost unit of the Marron Formation and conformably overlies the Nimpit Lake Member. The unit varies in thickness from 200 to 1,500 feet and is mainly dark brown, non-vesiculiar andesite lavas. The rocks are typically merocrystalline, containing equal parts glass and crystal measuring about one millimeter in diameter.

The dip of the Marron beds rarely exceeds 30 degrees except in areas of severe fault disturbance. The beds are cut by numerous faults, many of which are of the gravity type show large vertical displacement. The Marron Formation appears to correlative with the Midway, Princeton and Kamloops Groups.

The Marama Formation is a unit characteristically composed of rhyolitic and rhyodacitic rocks that unconformably overlie the Marron Formation and underlie the White Lake Formation. The rocks are up to 1,000 feet in thickness but in several areas the formation appears to be absent from the stratigraphic succession.

The lower most beds of the Marama Formation consist of conglomerate, minor sandstone, and shale with seams of pyroclastic rocks intercalated throughout. These beds appear to be overlain by rhyodacite volcanic breccia and massive lava. The upper part and major portion of the formation is composed of thick rhyodacite lavas. These rocks are shades of grey, light brown and cream, and are brittle, non-vesiculiar and tend to cleave into thin plates perpendiculiar to the bedding surface.

The Marama beds show great variation in attitude and have been cut by many north trending normal faults, some of which have downthrows of several hundred feet. The Marama Formation may be comparable to the Sanpoil volcanics in northeastern Washington state.

The White Lake Formation overlies the Marron and Marama Formations with angular unconformity and is in turn overlain by younger sedimentary rocks and breccias. The formation consists of a thick succession of lake and stream sediments and volcanic rocks that is about 3,500 feet thick at its thickest section.

The White Lake beds are divisable into three members. The lower and middle members contain interdigitated sedimentary and volcanic deposits while the upper member consists mainly of volcanic rocks with some intercalated sedimentary rocks.

The stratigraphy of the sedimentary rocks consists of a lower succession of thick beds of fine grained sediments overlain by equally thick beds of coarse grained sediments. The mudstones range in colour from light to dark grey and are thinly bedded, but because of their non-resistant nature are poorly exposed. The sandstones are commonly massive but locally thinly bedded or flaggy. These rocks contain a high percentage of volcanic fragments and may be best described as a volcanic wacke. Carbonaceous shales with thin seams of coal are reported throughout the sequence.

The sedimentary rocks are intercalated with many lenses and layers of pyroclastic rock with the tuffaceous layers generally non-fissile and light coloured. Wood, stems and leaf fossils are abundant in these rocks, especially in mudstones. Needle-bearing branches identified as Metasequoia sp. are common, along with some fern like Comptonia sp. and broad leaf foliage.

The volcanic rocks have a thickness of about 3,000 feet and can be divided into three members. The lowest member is about 1,500 feet thick and consists of thin feldspar porphyry lava flows and abundant lahar and pyroclastic rocks containing some fragments of Marama dacite. The middle member, about 1,200 feet thick consists of a few feldspar porphyry lava flows and much lahar agglomerate. The upper member is about 300 feet thick and consists mainly of brown augite porphyry lava and breccia containing small quartz xenoliths and a few blocks of granite.

The White Lake beds are folded and cut by many faults. Near White Lake the beds are folded into the broad "White Lake Syncline", plunging about 25 degrees east. White Lake beds are generally more steeply inclined than older Tertiary rocks in adjacent areas.

These beds are probably of Eocene but may be of Oligocene age and bear marked structural and lithilogical similarity to the lower unit of the Klondike Mountain Formation north of Republic in Washington State.

The Skaha Formation contains the youngest Tertiary beds in the area. It is slightly younger than the White Lake Formation and overlies the White Lake with minor unconformity. The Skaha Formation consists of two members, a lower one composed mainly of slide breccia and some volcanic rock, and an upper one composed of coarse boulder block conglomerate (fanglomerate).

The lower member consists of three facies, basal breccia, augite porphyry and granite breccia. The basal breccia facies are composed mainly of fragments of the Shoemaker, Old Tom and Vaseaux Formations in a chaotic mixture of coarse and finely broken rocks, massive blocks of chert and greenstone, and some conglomerate. The augite porphyry lava (tephrite) is massive, dense, dark brown and contains large euhedral augite crystals embedded in a fine grained matrix. It makes up only a small portion of the formation. The granite breccia facies consists of slide debris, mainly slabs and blocks of granite and some aplite, and a few beds of granite boulder conglomerate and arkose.

The upper member of the Skaha Formation consists of coarse clastic sedimentary rock of mixed provenance. The unit is a thick bedded mixed boulder and block conglomerate containing fragments up to six feet in diameter, but commonly less than one foot. The fragments are composed of older Tertiary and pre-Tertiary rocks.

The rocks of the Penticton Tertiary Outlier have been intersected by many important gravity faults. Folds are important only within the White Lake and Okanagan Falls synclines. The main structural features are as follows:

1) The area underlain by Tertiary rocks is mostly bounded by gravity faults.
2) The Tertiary pile is thickest and structurally lowest near the Okanagan Valley.
3) Beds commonly dip in an easterly direction, westerly dipping beds are few.

VAULT PROPERTY

EPI CLAIMS

OKANAGAN FALLS

OBSERVATORY

PARK HILL

WHITE LAKE

TWIN LAKES

TROUT LAKE

YELLOW LAKE

COLUMNS PARK

MEYERS FLAT

OLALLA

KEREMEOS

SIMILKAMEEN RIVER

JULY 1979

PRELIMINARY MAP 35

# GEOLOGY OF THE PENTICTON TERTIARY OUTLIER

BY B. N. CHURCH

**SKAHA FORMATION**

- 10q — MOSTLY CHERT AND GREENSTONE SLIDE BRECCIA AND SOME TEPHRITE LAVA OVERLAIN BY POLYMICTIC CONGLOMERATE
- 10b — CHANNEL DEPOSIT OF GRANITE BOULDER CONGLOMERATE AND BRECCIA AND ARKOSIC SANDSTONES

**WHITE LAKE FORMATION**

- 9 — MOSTLY VOLCANIC BRECCIAS INCLUDING PYROCLASTIC ROCKS AND LAHARS, MINOR TRACHYTIC AND ANDESITIC LAVAS
- 8 — VOLCANIC CONGLOMERATE, SANDSTONES, AND SHALES

**MARAMA FORMATION**

- 7a — MASSIVE APHANITIC DACITE LAVA AND SOME BRECCIA FORMING MOSTLY REMNANTS OF VOLCANIC DOMES
- 7b — VOLCANIC CONGLOMERATE WITH CLASTS FROM THE MARRON FORMATION
- RHYOLITE PYROCLASTIC ROCKS AND SOME LAVA

**MARRON FORMATION**

- 6 — PARK HILL MEMBER: MEROCRYSTALLINE ANDESITIC LAVA AND MINOR BRECCIA
- 5 — NIMPIT LAKE MEMBER: TAN TRACHYTE AND TRACHYANDESITE LAVA AND MINOR BRECCIA
- 4 — KEARNS CREEK MEMBER: OFTEN HIGHLY VESICULAR PYROXENE-RICH BASALTIC ANDESITE LAVA
- 3 — KITLEY LAKE MEMBER: MOSTLY TRACHYANDESITE LAVA WITH CONSPICUOUS GLOMEROPHENOCRYSTIC CLOTS OF FELDSPAR

**MARRON FORMATION**

- SHATFORD CREEK MEMBER: LOCAL DEPOSIT OF BROWN ANDESITE LAVA AND BRECCIA WITH SOME QUARTZ-FILLED AMYGDALES
- YELLOW LAKE MEMBER. MOSTLY PYROXENE-RICH MAFIC PHONOLITE LAVA WITH LOCAL WELL-DEVELOPED PHENOCRYSTS OF RHOMB-ANORTHOCLASE AND SOME PRIMARY ANALCITE, ABUNDANT ZEOLITE FILLINGS IN CRACKS AND AMYGDALES
- 2a — PURPLE AND GREY VOLCANIC WACKE FROM EROSION OF 1a AND PINK RADIOACTIVE FELDSPATHIC TRACHYTIC ASH FLOW, SANDSTONE, AND CONGLOMERATE
- CLARK CREEK PORPHYRY: A SILL-LIKE BODY RELATED TO 1a WITH COARSE FELDSPAR PHENOCRYSTS

**SPRINGBROOK FORMATION**

- Og — POLYMICTIC CONGLOMERATE AND BRECCIA WITH CLASTS DERIVED MAINLY FROM PRE-TERTIARY BEDDED ROCKS

**KETTLE RIVER FORMATION**

- Ob — MAINLY GRANITE BOULDER CONGLOMERATES, ARKOSE, VOLCANIC WACKE, AND RHYOLITE BRECCIA
- SHINGLE CREEK PORPHYRY: A COARSE SANIDINE QUARTZ PORPHYRY INTRUSION FEEDER TO THE RHYOLITE VOLCANICS OF 8b

**PRE-TERTIARY BASEMENT ROCKS:**

- MAINLY GRANITIC INTRUSIONS
- MAINLY CHERTS, GREENSTONES, SCHISTOSE ROCKS, AND MINOR INTRUSIONS

**SYMBOLS**

- DRIFT COVERED AREA
- GEOLOGICAL BOUNDARY (APPROXIMATE)
- BEDDING: HORIZONTAL, INCLINED
- FAULT: APPROXIMATE, ASSUMED
- TOPOGRAPHICAL CONTOUR INTERVAL, 500 FEET
- STRUCTURE SECTION A — D
- STREAM
- MAIN ROAD
- CHEMICAL ANALYSIS STATION
- ROCK SPECIMEN LOCALITY
- DYKE
- DIAMOND DRILL HOLE
- LAKE

● GOLD OCCURRENCE

N

GEOLOGICAL ASSOCIATION OF CANADA
G.F. CROOKER
FELLOW

GRANT F. CROOKER

EPI CLAIMS

## REGIONAL GEOLOGY

N.T.S. 82E- 4,5 OSOYOOS M.D., B.C.

0 2 4 KM.

| | |
|---|---|
| SCALE AS SHOWN | DATE : DEC. 1991 |
| DRAWN BY : G.C. | FIGURE Nº. G3 |

CHONG

## 3.2 CLAIM GEOLOGY

The 1991 program consisted of carrying out geological mapping at a scale of 1:5,000 on the EPI 3, 10 and 11 claims (Figure G-4). The terminology used by Church and in the two previous reports by the author was kept for the claim geology to keep continuity of information. A brief description of the rock units is given below.

The oldest rocks are pre-Tertiary basement units occurring along the southern boundary of the EPI 11 claim. These rocks consist mainly of black chert and grey quartzite although minor greenstone is also present. Some of the outcrops are highly contorted. The rocks have been labelled unit Z-a and are part of the Apex Mountain Group.

The basal Springbrook Formation (Unit O) is the oldest Tertiary unit and rests unconformably on the pre-Tertiary basement along the southern boundary of the EPI 11 claim. This formation is very recessive and outcrops are scarce.

The Springbrook Formation has been divided into units O-a and O-b. The lowest section, unit O-b, is a polymicitc conglomerate with well rounded clasts, mainly of chert, ranging up to one meter in diameter. This unit is well exposed along a road several hundred meters south of the EPI 11 south claim boundary. Overlying the conglomerate is unit O-b which consists of tuffaceous sandstone and siltstone. Unit O-b outcrops very poorly and is only found at a few locations, mainly along road cuts.

Rocks of the Marron Formation underlie the remainder of the EPI 3, 10 and 11 claim area and consist of the Yellow lake, Kitley Lake and Kearns Creek members.

The Yellow Lake Member, unit 1, is the lowest member of the Marron Formation and overlies the Springbrook Formation with slight unconformity. It has been divided into unit 1-a, generally a light green, anorthoclase-augite porphyry with abundant rhomb shaped phenocrysts of anorthoclase, and unit 1-b, an amygdaloidal variant of unit 1-a. The amygdules in unit 1-b are mainly filled with quartz, calcite and zeolites. Tiny flecks of biotite are scattered throughout the matrix of both units.

The Yellow Lake Member occurs within the central and southern portions of the EPI 11 claim. Almost all of the outcrops mapped on the EPI 11 claim contained abundant quartz and calcite filled amygdules.

The Kitley Lake Member, unit 3, overlies the Yellow Lake Member and underlies most of the EPI 3, 10 and 11 claims. Unit 3-a is a cream to tan coloured trachyte and trachyandesite with abundant discrete tabular crystals and clots of feldspar phenocrysts 3 to

6 millimeters in diameter. Plagioclase is the most abundant feldspar and biotite flecks are often imbedded in the fine crystalline matrix.

Rocks of the Kearns Creek Member, unit 4, overlie the Kitley Lake Member. The Kearns Creek Member has been divided into units 4-a, 4-b and 4-c.

Unit 4-c is the lowest and consists of a narrow band of grey tuffaceous sandstone and mudstone overlying the Kitley Lake Member. Units 4-a and 4-b make up almost all of the Kearns Creek Member. Unit 4-b is a dark brown to black, massive basaltic andesitic lava, typically with abundant pyroxene phenocrysts and scattered laths of plagioclase. Unit 4-a is similiar to 4-b, except it has abundant vesicules often filled with chlorite, chalcedony and calcite.

Kearns Creek rocks outcrop at only three small areas on the EPI 3, 10 and 11 claims. The first is in the south-west portion of the EPI 3 claim, the second along the Daly Creek Fault and the third along the common boundary of the EPI 10 and 11 claims. All three exposures consist of small down dropped areas of highly vesiculiar unit 4-a.

Two major north trending faults (Figure G-4) cut across the claims. The Manuel Creek and Daly Creek faults appear to have almost identical strike directions.

The Manuel Creek Fault strikes a few degrees west of north and follows or closely parallels Manuel Creek along the estern edge of the EPI 10 and 11 claims. The southern section of the fault separates the Tertiary rocks from pre-Tertiary basement to the west and puts Springbrook Formation in fault contact with Marron Formation. The northern section of the fault puts various volcanic units of the Marron Formation in fault contact.

The Daly Creek Fault also strikes a few degrees west of north along the western section of the EPI 3, 10 and 11 claims. The southern section of the fault follows Daly Creek, while to the north it follows several less pronounced drainages. The fault is exposed in a road cut for 15 meters before disappearing under cover to the east and west at the northern portion of the EPI 10 claim. It strikes approximately 170° and dips moderately east. The zone consists of crushed, bleached material with fragments up to one meter in diameter.

## 3.3 MINERALIZATION AND ALTERATION

Prospecting was carried out over the EPI 3, 10 and 11 claims and 7 rock samples were taken (Table I). None of the samples gave anomalous gold values, but several samples did give weakly anomalous arsenic, barium, molybdenum and antimony geochemical responses.

Sample 91E-5 is a sample of moderately clay altered Kitley Lake Formation collected in the northeast corner of the EPI 10 claim. It contained rusty fractures and boxworks with yellow and orange iron oxides. Arsenic (48 ppm) and antimony (3 ppm) are weakly anomalous.

Five rock samples were collected within or adjacent to the Daly Creek Fault Zone. This is a major north trending structure cutting across the western section of the EPI 3, 10 and 11 claims. It strikes a few degrees west of north and dips moderately to the east. Roads cut across the fault zone at a number of locations and moderate to strong clay alteration with rusty fractures were noted at these locations. The clay alteration occurs in all three rock types (Springbrook Formation, Kitley Lake and Yellow Lake Members, Marron Formation) cut by the fault.

The rock samples (92E-1, 2, 3, 6 and 7) did not give anomalous gold values, however they did give some weak geochemical responses in trace elements. The most interesting response was from 91E-1 which gave 103 ppm arsenic and 28 ppm molybdenum. Sample 91E-3 was weakly anomalous in arsenic (48 ppm) while 91E-6 and 7 were weakly anomalous in barium (1148 and 1284 ppm).

| Sample No. | Au ppb | Ag ppm | As ppm | Ba ppm | Mo ppm | Sb ppm | Cu ppm |
|---|---|---|---|---|---|---|---|
| 91-1 | 5 | 1.0 | 103 | 238 | 28 | 1 | 76 |
| 91-2 | 5 | 0.7 | 21 | 176 | 3 | 1 | 61 |
| 91-3 | 5 | 1.3 | 32 | 765 | 6 | 1 | 16 |
| 91-4 | 5 | 1.7 | 15 | 49 | 3 | 1 | 6 |
| 91-5 | 5 | 1.7 | 48 | 548 | 9 | 3 | 9 |
| 91-6 | 5 | 1.2 | 12 | 1148 | 3 | 1 | 10 |
| 91-7 | 5 | 1.4 | 11 | 1284 | 1 | 1 | 14 |

Table I - Rock Geochemical Results, EPI Claims

# 4.0 GEOCHEMISTRY

## 4.1 SILT GEOCHEMISTRY

Eight drainage samples (Table II) were collected from the property in the course of prospecting. None of the samples gave anomalous gold values but several samples did give weakly anomalous trace element and/or base metal responses.

The two samples giving the best geochemical responses were 91E-S1 (33 ppm As and 57 ppm Cu) and 91E-S2 (10 ppm As and 654 ppm Ba). Both samples were taken from drainages along the Daly Creek Fault, 91E-S1 from Daly Creek at the south end and 91E-S8 from a small active drainage at the north end.

Lake and swamp sediment sampling by Petro Canada during the late 1970's, 200 to 1000 meters further north along the Daly Creek Fault also gave anomalous molybdenum and copper values.

One other sample, 91E-S6 gave a weak geochemical response for copper (70 ppm) and zinc (180 ppm). This sample was taken in the southeast corner of the EPI 11 claim in an area underlain by basement rocks.

| Sample No. | Au ppb | Ag ppm | As ppm | Ba ppm | Mo ppm | Sb ppm | Cu ppm |
|---|---|---|---|---|---|---|---|
| 91-1S | 5 | 1.2 | 33 | 120 | 1 | 1 | 57 |
| 91-2S | 5 | 1.2 | 6 | 161 | 1 | 1 | 22 |
| 91-3S | 5 | 1.3 | 5 | 195 | 2 | 1 | 47 |
| 91-4S | 5 | 1.3 | 3 | 207 | 2 | 1 | 26 |
| 91-5S | 5 | 1.3 | 1 | 212 | 1 | 1 | 29 |
| 91-6S | 5 | .7 | 1 | 220 | 1 | 1 | 70 |
| 91-7S | 5 | 1.4 | 1 | 245 | 1 | 1 | 18 |
| 91-8S | 5 | 1.1 | 10 | 654 | 1 | 1 | 13 |

**Table II - Silt Geochemical Results, EPI Claims**

## 5.0 CONCLUSIONS AND RECOMMENDATIONS

The EPI claims are located within volcanic and sedimentary rocks of the Penticton Tertiary Outlier, a favourable geological environment for epithermal gold and silver mineralization. Three gold occurrences are found within the Tertiary rocks of the area, the Vault, Dusty Mac and Venner Meadows properties. All three are related to strong structural features.

The 1991 program covered by this reported consisted of geological mapping and prospecting on the EPI 3, 10 and 11 claims, which had not previously been examined. Seven rock samples and eight drainage samples were also collected.

The most favourable indications for epithermal gold mineralization occur along the Daly Creek Fault. A number of areas show strong to moderate clay alteration along with rusty fracturing. Five rock samples were collected along the zone, and although none gave anomalous gold values, several did give weakly anomalous arsenic, antimony, molybdenum and barium values.

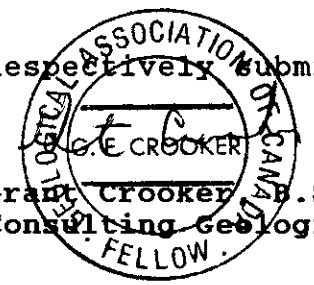
Several drainage samples were also collected along the Daly Creek Fault. These did not give anomalous gold values, although several gave weakly anomalous arsenic, copper and barium values. Swamp and lake sediment sampling carried out by Petro Canada along the Daly Fault in the late 1970's, 200 to 1000 meters north of the area covered by this program also gave weakly anomalous geochemical responses for copper and molybdenum. This fault zone is thus weakly geochemically responsive over a length of 4000 meters.

Recommendations are to continue work on the property.

1) The Daly Creek Fault Zone and other major structural trends should be drainage sampled in a systematic manner to locate gold or trace element geochemical anomalies.

2) Prospecting should be carried out along the major structural trends.

Respectively submitted,




**Grant Crooker B.Sc., F.G.A.C.,**
**Consulting Geologist**

## 6.0 REFERENCES

Bostock, H.S., (1927): Geological Survey of Canada, Map 628A, Olalla.

Bostock, H.S., (1928): Geological Survey of Canada, Map 627A, Okanagan Falls.

Bostock, H.S., (1930): Geological Survey of Canada, Map 341A, Keremeos.

Cairnes, C.E., (1936): Geological Survey of Canada, Map 538A, Kettle River (West Half).

Cann, R.M., (1984): Gold Option Okanagan Falls B.C., Geology, Geochemistry, Magnetic and VLF Surveys and Drilling - 1984 for Rio Algom Exploration Inc.

Church, B.N., (1973): Geology of the White Lake Basin, B.C., Department of Mines and Petroleum Resources, Bulletin 61.

Church, B.N., (1979): Geology of the Penticton Tertiary Outlier, B.C. Ministry of Energy, Mines and Petroleum Resources, Preliminary Map 35.

Crooker, G.F., (1990): Geological and Geophysical Report on the EPI 1-13 Claims, Twin Lakes Area, Osoyoos Mining Division.

Crooker, G.F., (1990): Geological and Geophysical Report on the EPI 1-15 Claims, Twin Lakes Area, Osoyoos Mining Division.

Daughtry, K.L., (1984): Geochemical Assessment Report on the Gold Property (Gold, Golden 1 and Golden 2 Claims), Venner Meadows, Osoyoos Mining Division, B.C., for the E & D Joint Venture.

Little, H.W. (1961): Geology Kettle River (West Half), B.C., Geological Survey of Canada Map 15-1961.

GEM (1975), p E21, Rain, Ministry of Energy, Mines and Petroleum Resources.

Groenweg, W., and Hunter, E.N., (1987): Geological and Diamond Drilling Report on the Vault 1-5 Claims, Osoyoos Mining Division for the Canadian Nickel Company Limited. Assessment Report #15,595.

Groenweg, W., (1988): Diamond Drilling Report on the Vault 1 Claim, Osoyoos Mining Division for the Canadian Nickel Company Limited. Assessment Report #17,293.

Johnson, D., (1983): Summary Report, OK Gold Project, Osoyoos M.D., B.C., for Lacana Mining Corporation.

Jones, H.M., (1985): A Report on the Vault Group of Mineral Claims, Okanagan Falls Area, Osoyoos Mining Division, B.C., for Seven Mile High Resources Inc..

McClintock, J., (1982): Geology, Geochemistry and Drilling on the Vault Option, Osoyoos Mining District B.C. for Riocanex Inc.. Assessment Report #10,968.

Meyers, R.E. and Taylor, W.A., (1989): Lode Gold-Silver Occurrences of the Okanagan Region, south-central British Columbia, B.C. Ministry of Energy, Mines and Petroleum Resources Open File 1989-5.

Oddy, R.W., (1984): Diamond Drill Program on the Vault 1-5 Mineral Claims, Okanagan Falls, British Columbia, Osoyoos Mining Division for Dome Exploration (Canada) Limited. Assessment Report #12,487.

Racicot, F. and Salazar, G. (1980): Okanagan Uranium Program, White Lake Basin, Astro 35, 36 and 48-56 Claims, 1979 Field Season Report for Petro-Canada Exploration Inc.. Assessment Report #7,751.

Rowe, R.B., (1977): Report on the Geology and Geochemistry of the Allie, Micki, Cat, Mouse, Ian and Astro 1-46 Claims Osoyoos Mining Division for Pacific Petroleums Ltd.. Assessment Report #6,532.

Salazar, G., (1978): 1978 Program Astro Uranium Property, Osoyoos Mining Division for Pacific Petroleums Ltd.. Assessment Report #7,095.

Saleken, L.W., (1989): An Initial Report on the EPI Group of Mineral Claims, "An Epithermal Gold Prospect", Twin Lakes Area, South Okanagan Gold Belt for Grant F. Crooker.

Schroeter, T.G. and Panteleyev, A., (1986): Gold in British Columbia, B.C. Ministry of Energy, Mines and Petroleum Resources, Preliminary Map No. 64.

Seven Mile High Resources Inc.: Various News Releases 1984 through 1989.

Templeman-Kluit, D.J., (1989): Geological Map with Mineral Occurrences, Fossil Localities, Radiometric Ages and Gravity Field for Penticton Map Area (NTS 82E), Southern British Columbia, Geological Survey of Canada Open File No. 1969.

Wells, R.C., (1983): Report on the OK Falls Project, British Columbia for Lacana Mining Corporation.

## 7.0 CERTIFICATE OF QUALIFICATIONS

I, Grant F. Crooker, of Upper Bench Road, Keremeos, in the Province of British Columbia, hereby certify as follows:

1. That I graduated from the University of British Columbia in 1972 with a Bachelor of Science Degree in Geology.

2. That I have prospected and actively pursued geology prior to my graduation and have practised my profession since 1972.

3. That I am a member of the Canadian Institute of Mining and Metallurgy.

4. That I am a Fellow of the Geological Association of Canada.

5. That I am the owner of the EPI 1-15 mineral claims.

Dated this 9th day of Jan, 1992, at Keremeos, in the Province of British Columbia.

GEOLOGICAL ASSOCIATION OF CANADA
G F CROOKER
FELLOW

Grant Crooker, B.Sc., F.G.A.C.,
Consulting Geologist

# Appendix I

## CERTIFICATES OF ANALYSIS

COMP: GRANT CROOKER
PROJ: EPI CLAIMS E013
ATTN: GRANT CROOKER

# MIN-EN LABS — ICP REPORT

705 WEST 15TH ST., NORTH VANCOUVER, B.C. V7M 1T2
(604)980-5814 OR (604)988-4524

FILE NO: 1V-1577-LJ1
DATE: 91/11/25
* SILT * (ACT:F31)

| SAMPLE NUMBER | AG PPM | AL PPM | AS PPM | B PPM | BA PPM | BE PPM | BI PPM | CA PPM | CD PPM | CO PPM | CU PPM | FE PPM | K PPM | LI PPM | MG PPM | MN PPM | MO PPM | NA PPM | NI PPM | P PPM | PB PPM | SB PPM | SR PPM | TH PPM | TI PPM | V PPM | ZN PPM | GA PPM | SN PPM | W PPM | CR PPM | AU-WET PPB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 91E-S1 | 1.2 | 15100 | 33 | 13 | 120 | 1.5 | 8 | 11480 | .1 | 10 | 57 | 22990 | 1680 | 15 | 4660 | 725 | 1 | 930 | 13 | 780 | 26 | 1 | 130 | 1 | 1318 | 51.7 | 59 | 2 | 2 | 3 | 30 | 5 |
| 91E-S2 | 1.2 | 11320 | 6 | 9 | 161 | 1.2 | 9 | 10270 | .1 | 10 | 22 | 26910 | 1670 | 11 | 4940 | 795 | 1 | 1270 | 14 | 1750 | 25 | 1 | 191 | 2 | 1624 | 72.4 | 55 | 2 | 2 | 4 | 55 | 5 |
| 91E-S3 | 1.3 | 14340 | 5 | 7 | 195 | 3.3 | 8 | 11160 | .1 | 9 | 47 | 24390 | 1760 | 18 | 4780 | 1331 | 2 | 560 | 5 | 1620 | 29 | 1 | 122 | 1 | 1278 | 46.7 | 97 | 2 | 1 | 2 | 14 | 5 |
| 91E-S4 | 1.3 | 22330 | 3 | 5 | 207 | 2.4 | 9 | 10490 | .1 | 8 | 26 | 26340 | 1400 | 27 | 5700 | 672 | 2 | 700 | 3 | 1530 | 27 | 1 | 398 | 4 | 1333 | 57.1 | 67 | 3 | 2 | 2 | 16 | 5 |
| 91E-S5 | 1.3 | 22030 | 1 | 6 | 212 | 1.9 | 10 | 10310 | .1 | 10 | 29 | 27410 | 2170 | 17 | 5280 | 687 | 1 | 1150 | 5 | 1970 | 29 | 1 | 273 | 3 | 1597 | 59.5 | 72 | 3 | 1 | 2 | 19 | 5 |
| 91E-S6 | .7 | 21150 | 1 | 10 | 220 | 1.6 | 7 | 16930 | .1 | 13 | 70 | 30220 | 3110 | 20 | 4690 | 1544 | 1 | 670 | 18 | 3630 | 31 | 1 | 232 | 1 | 1045 | 47.5 | 180 | 1 | 1 | 2 | 25 | 5 |
| 91E-S7 | 1.4 | 13160 | 1 | 3 | 245 | 1.0 | 16 | 11530 | .1 | 14 | 18 | 39700 | 1300 | 14 | 5960 | 395 | 1 | 860 | 10 | 3000 | 19 | 1 | 212 | 1 | 3037 | 135.1 | 81 | 2 | 2 | 10 | 177 | 5 |
| 91E-S8 | 1.1 | 15500 | 10 | 4 | 654 | 1.1 | 7 | 12720 | .1 | 7 | 13 | 21290 | 1800 | 13 | 3980 | 886 | 1 | 740 | 2 | 1100 | 32 | 1 | 426 | 2 | 1153 | 40.7 | 61 | 2 | 1 | 2 | 14 | 5 |
| ~~E00305470015~~ | ~~.3~~ | ~~7560~~ | ~~1~~ | ~~3~~ | ~~46~~ | ~~.8~~ | ~~6~~ | ~~5490~~ | ~~.1~~ | ~~9~~ | ~~13~~ | ~~40280~~ | ~~390~~ | ~~10~~ | ~~3280~~ | ~~479~~ | ~~1~~ | ~~140~~ | ~~1~~ | ~~420~~ | ~~16~~ | ~~1~~ | ~~15~~ | ~~1~~ | ~~1220~~ | ~~137.6~~ | ~~68~~ | ~~1~~ | ~~1~~ | ~~3~~ | ~~25~~ | ~~5~~ |

COMP: GRANT CROOKER
PROJ: EPI CLAIMS E013
ATTN: GRANT CROOKER

# MIN-EN LABS — ICP REPORT

705 WEST 15TH ST., NORTH VANCOUVER, B.C. V7M 1T2
(604)980-5814 OR (604)988-4524

FILE NO: 1V-1577-RJ1
DATE: 91/11/25
* ROCK * (ACT:F31)

| SAMPLE NUMBER | AG PPM | AL PPM | AS PPM | B PPM | BA PPM | BE PPM | BI PPM | CA PPM | CD PPM | CO PPM | CU PPM | FE PPM | K PPM | LI PPM | MG PPM | MN PPM | MO PPM | NA PPM | NI PPM | P PPM | PB PPM | SB PPM | SR PPM | TH PPM | TI PPM | V PPM | ZN PPM | GA PPM | SN PPM | W PPM | CR PPM | AU-WET PPB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M-1 | 1.5 | 22310 | 7 | 18 | 24 | .8 | 13 | 18680 | .1 | 17 | 135 | 33650 | 1340 | 18 | 12010 | 528 | 4 | 1570 | 37 | 1290 | 34 | 1 | 19 | 1 | 2396 | 145.2 | 129 | 3 | 2 | 8 | 114 | 5 |
| 91E-1 | 1.0 | 14090 | 103 | 8 | 238 | 1.6 | 9 | 8760 | .1 | 16 | 76 | 33810 | 2780 | 8 | 3210 | 321 | 28 | 380 | 3 | 2310 | 49 | 1 | 266 | 4 | 1692 | 132.9 | 67 | 5 | 1 | 3 | 36 | 5 |
| 91E-2 | .7 | 12270 | 21 | 6 | 176 | .7 | 7 | 5360 | .1 | 7 | 61 | 19700 | 5920 | 11 | 5620 | 362 | 3 | 660 | 10 | 400 | 23 | 1 | 108 | 1 | 1022 | 51.7 | 65 | 3 | 1 | 6 | 118 | 5 |
| 91E-3 | 1.3 | 20160 | 32 | 5 | 765 | .9 | 12 | 11670 | .1 | 11 | 16 | 24440 | 7490 | 3 | 4690 | 324 | 6 | 1110 | 9 | 1250 | 21 | 1 | 802 | 1 | 1969 | 68.0 | 54 | 2 | 1 | 5 | 99 | 5 |
| 91E-4 | 1.7 | 2000 | 15 | 3 | 49 | .1 | 4 | 158530 | .1 | 3 | 6 | 7930 | 780 | 1 | 2070 | 2816 | 3 | 440 | 7 | 120 | 26 | 1 | 394 | 1 | 34 | 8.3 | 7 | 5 | 1 | 6 | 119 | 5 |
| 91E-5 | 1.7 | 13230 | 48 | 3 | 548 | .6 | 7 | 9660 | .1 | 4 | 9 | 19460 | 3750 | 5 | 3160 | 145 | 9 | 900 | 1 | 1450 | 21 | 3 | 846 | 5 | 914 | 21.7 | 20 | 3 | 1 | 2 | 32 | 5 |
| 91E-6 | 1.2 | 19400 | 12 | 3 | 1148 | .8 | 7 | 10260 | .1 | 6 | 10 | 15160 | 4490 | 8 | 4200 | 151 | 3 | 340 | 1 | 1270 | 85 | 1 | 779 | 4 | 935 | 28.2 | 37 | 3 | 1 | 2 | 28 | 5 |
| 91E-7 | 1.4 | 17610 | 11 | 4 | 1284 | 1.2 | 9 | 8710 | .1 | 9 | 14 | 24860 | 3260 | 14 | 5150 | 722 | 1 | 580 | 1 | 1650 | 23 | 1 | 705 | 6 | 1238 | 49.4 | 43 | 4 | 1 | 3 | 33 | 5 |

# Appendix II

## ROCK SAMPLE DESCRIPTIONS

## ROCK SAMPLE DESCRIPTIONS

| Sample NO. | Type | Description |
|---|---|---|
| 91E-1 | float | -strongly clay altered Yellow Lake, iron staining |
| 91E-2 | float | -fine grained sandstone, 1-3 cm chalcedony veinlets parallel to bedding, rusty, Mn stain |
| 91E-3 | float | -weakly clay altered sandstone, pervasive rustiness |
| 91E-4 | float | -white calcite with chlorite on fractures, minor iron oxides |
| 91E-5 | float | -moderately clay altered Kitley Lake, rusty fractures, boxworks with yellow, orange iron oxides |
| 91E-6 | grab | -moderately clay altered, bleached Kitley Lake very rusty fractures |
| 91E-7 | grab | -strongly clay altered Kitley Lake, rusty groundmass and fractures |

# Appendix III

## COST STATEMENT

## COST STATEMENT

| | | |
|---|---|---|
| **SALARIES** | | |
| - Grant Crooker, Geologist<br>April 30, May 2-4, 30, Oct. 2, 3,<br>10, Dec. 14-17, 19-½, 1991<br>12.5 days @ $ 375.00/day | $ | 4,687.5 |
| **MEALS AND ACCOMODATION** | | |
| - Grant Crooker - 8 days @ $ 60.00/day | | 480.00 |
| **TRANSPORTATION** | | |
| - Vehicle Rental (Ford 3/4 ton 4x4)<br>April 30, May 2-4, 30, Oct. 2, 3, 10, 1991<br>8 days @ $ 60.00/day | | 480.00 |
| - Gasoline | | 76.99 |
| **FREIGHT** | | 9.26 |
| **SUPPLIES**<br>- Hipchain thread, flagging, geochem bags, etc. | | 98.50 |
| **GEOCHEMICAL ANALYSIS** | | |
| -7 rocks, 31 element ICP, Au,<br>@ $ 14.50/sample | | 101.50 |
| -8 silt samples, 31 element ICP, Au<br>@ $ 12.00/sample | | 96.00 |
| **DRAUGHTING** | | 171.20 |
| **PREPARATION OF REPORT** | | |
| - Secretarial, reproduction, telephone,<br>office overhead etc. | | 400.00 |
| **Total** | **$** | **6,600.95** |

EPI-3

EPI-10

EPI-11

4S, 4W

4S, 0W

91-7 rusty

91-8S

91-6 rusty

91-7S

91-5S

91-2S

91-1

91-3

91-2

91-3S

91-4S

91-4

91-6S

91-1S

rusty

rusty

ARMSTRONG CREEK

DALY CREEK

FAULT

Power line

MANUEL CREEK

MANUEL CREEK FAULT

37°

1500

1400

1300

1200

1100

3a

4a

1b

0a

0a?

Z

0

I

## LEGEND

MARRON FORMATION
- NIMPIT LAKE MEMBER
  - 5 Trachyte, trachyandesite, minor tuff & breccia
- KEARNS CREEK MEMBER
  - 4a Vesicular basaltic andesite lava
  - 4b Massive " " "
  - 4c Tuffaceous sandstone & siltstone
- KITLEY LAKE MEMBER
  - 3a Tan trachyte & trachy andesite
  - 3b Agglomerate with trachyte & trachyandesite clasts
- YELLOW LAKE MEMBER
  - 1a Anorthoclase-augite porphyry
  - 1b " " " with abundant amygdules

SPRINGBROOK FORMATION
- 0a Tuffaceous sandstone, minor siltstone
- 0b Polymictic conglomerate

PRETERTIARY BASEMENT
- Za Chert, argillite, quartzite
- Zb Greenstone

Outcrop
Geological contact – defined, approx., assumed
Fault — " " "
Bedding
Fracturing
91-7 Bedrock sample location & No.
91-4 Float " " " "
91-1S Silt " " " "
Grid station
Clay alteration
Spring
Creek
Road
Legal corner post
Swamp
py Pyrite

GEOLOGICAL BRANCH
ASSESSMENT REPORT

22,214

GEOLOGICAL ASSOCIATION OF CANADA
G. F. CROOKER
FELLOW

GRANT F. CROOKER

EPI CLAIMS

# GEOLOGY
## EPI-3, 10, 11 CLAIMS

N.T.S. 82E-4,5 OSOYOOS M.D., B.C.

0 100 200 400 METRES

| | |
|---|---|
| SCALE 1:5000 | DATE: DEC. 1991 |
| DRAWN BY: G.C. | FIGURE No. G4 |

CHONG