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SUMMARY REPORT OF

1981 REGIONAL EXPLORATION PROGRAMME

NORTHERN GOLD

M-504

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for

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Vancouver, B. C.

by

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I. ABSTRACT

A regional exploration programme for bulk tonnage gold was carried out on the Tulsequah (104-K) Map Area (Figure 1) during the period of May 25 to August 14, 1981. A total of 14 field personnel including one permanent Chevron employee operated from a centrally-located base field camp established at Trapper Lake.

Exploration criteria for bulk tonnage gold deposits was applied to four contrastin geologic environments within the Map Area. Anomalous geochemical values were obtained locally from rock, soil, and silt from each of the four environments and the more significant anomalies were protected by claims. To date over 600 units in 16 separate claim groups have been staked. Additional staking is planned

Geochemical data support initial exploration criteria and suggest the following controls on Au mineralization in the region.

1. major structures and their associated high-level hydrothermal alteration.
2. cross-structures which trend at a high angle off major structures.
3. high level intrusions, in part localized by major structures.
4. intense alteration of host rocks of which two types are significant:
   (1) quartz-carbonate alteration
   (2) silicification or "silica-soaking"

The most potential lithologies in the regiona are those which comprise the Permian-age Cache Creek group in the region south of Tatsamenie Lake, where these rocks are affected by large structures, intense alteration and a varied suite of attending intrusions.

In 1982, geologic criteria developed during the present exploration should be applied in further regional exploration and detailed examination of claim groups should be carried out to bring at least some of the properties to the drilling stage.

II. INTRODUCTION

(A) GENERAL PURPOSE AND AIM

The Tulsequah map sheet was initially selected by literature research for reconnaissance exploration for bulk-tonnage, low-grade gold deposits (Dick, 1980) since a variety of known geological criteria for this ore-deposit type occur there. Some of the more important of these criteria, which could be abstracted from published data were:

1. large-scale structures, including thrust faults and steep-angle normal faults.
2. interbedded non-calcareous and calcareous strata
3. shallow-crystallizing felsic intrusions (post-structure)
4. silicification and pyritization of host, calcareous lithologies
5. associated Sb, As, Ba and C. minerals
6. highly-fractured host rocks
7. known mineralization

All of these features were shown to occur over much of the map area.

Subsequently, in August 1980 the region was visited for a one-week period. Results of this exploration (Dick 1981) were promising and

a regional programme was proposed. During February 1981, two claim groups were staked as a result of the August, 1980 work in light of competition in the region (TUT and SAM claim groups). In late May, 1981 regional exploration, consisting of soil, stream, and rock-chip sampling, combined with geologic mapping was undertaken. The initial aim of the first phase of exploration in the region was to define which suites, or packages of lithologies and which structural elements in the region were most potential for hosting disseminated gold, and to narrow down a large region by priority-ranking larger target areas. Secondly, the target regions were to be sampled by standard geochemical methods and geologically-mapped on a regional scale.

(B) EXPLORATION CRITERIA

(a) General

Exploration criteria for low-grade, bulk-tonnage gold deposits are varied and confused, in large part due to the variety of geological environments within which this ore-deposit type can occur. There is no one single environment which can be categorized as hosting bulk-tonnage gold. As well, new discoveries are continually being made in which low-grade gold is being found in "new" environments. In this exploration, four distinct "types" of gold mineralization provided criteria:

1. "Carlin"-type, in which sub-microscopic gold is disseminated in a porous, calcareous host
2. "Vein-stockwork" type, wherein fine gold occupies networks of veins, fractures, or is disseminated in altered strata

which overlie hypabyssal, silica-rich intrusions. Mineralization of this type (so-called "porphyry"-type) can also occur as a distal facies of mineralization surrounding also base-metal porphyry occurrences or can occur within the intrusions, especially where the latter are syenitic in composition.

3. Vein-type mineralization where wider, structurally-controlled quartz veins cut quartz-carbonate-altered mafic, ultramafic, or other lithologies.
4. Massive sulphide deposits.

(b) Structure

Gold deposits show an affinity for large-scale structures, especially where the latter are cut by secondary structures. Deep-seated structural features channel hydrothermal fluids to a near-surface environment where boiling and resultant deposition of gold can occur. Secondly, major structures act as zones of weakness along which intrusive bodies and apophyses can intrude to a shallow level. The Tulsequah Map Area is transected by numerous major structural features.

(c) Alteration

Two main types of alteration are commonly associated with gold deposition: (a) carbonate alteration and; (b) silicification. Major structures in the Tulsequah Map Area are marked locally by both types of alteration, and significant alteration is generally confined to these structural zones.

(d) Mineralogy

In addition to minerals which comprise silica (quartz) and quartz-carbonate (ankerite, quartz, siderite, calcite, fucsite

mariposite) alteration types, a number of other minerals are diagnostic of Au mineralization. The more common of these are: tourmaline, scheelite, arsenopyrite, pyrite and stibnite. These "tracer" minerals, with the exception of scheelite, are abundantly distributed in the Tulsequah Map Area.

(C) AREA EXPLORED IN 1981

Figure 2 shows the general area within which exploration was carried out in 1981. Approximately square miles were covered.

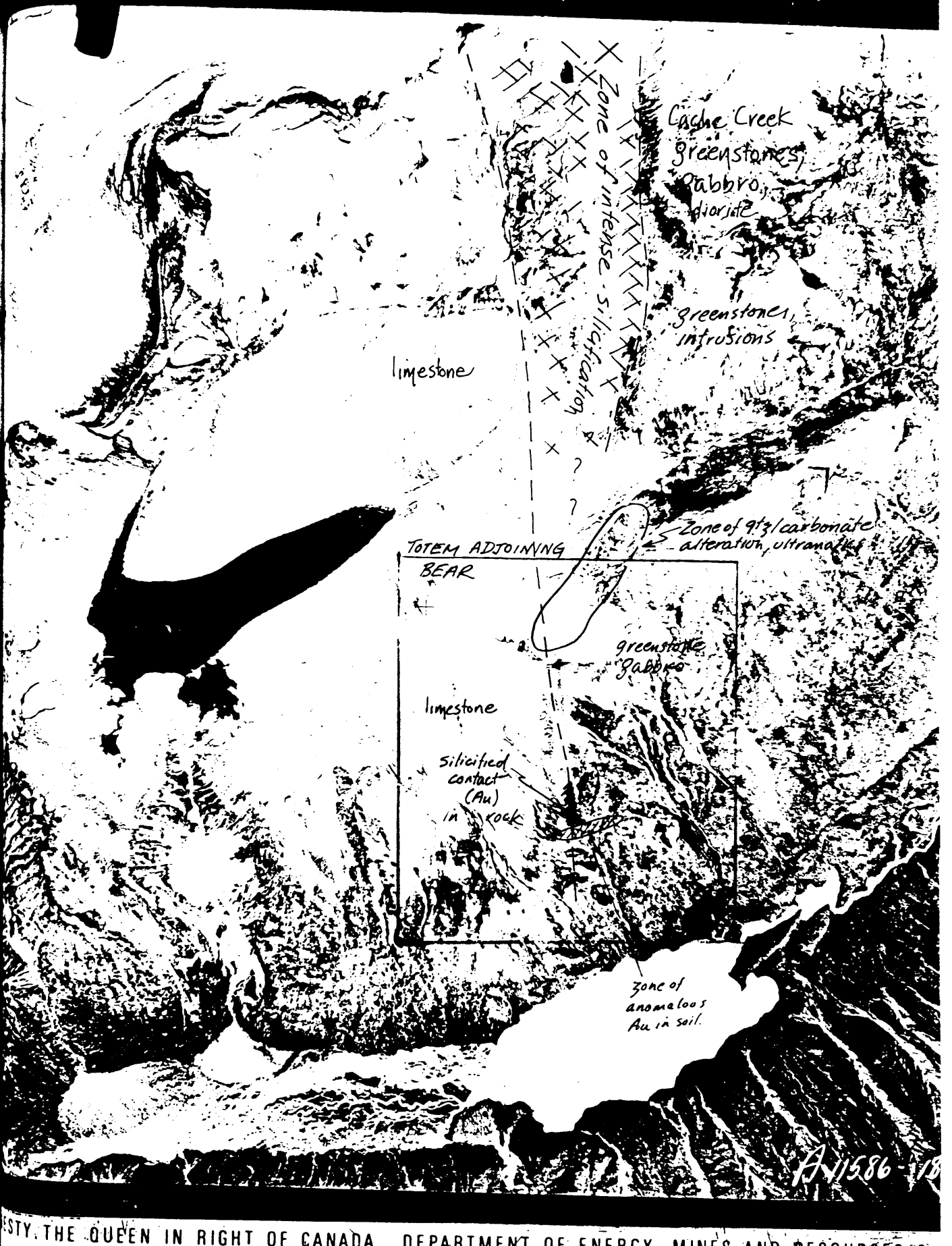
(D) PHYSIOGRAPHY AND CLIMATE

Topography in the Tulsequah Map Area varies from extremely steep to moderately steep. Steep-walled gorges and valleys contain rapid, poorly graded streams while major rivers occupy broad, glacial-scoured valleys. North of Tatsamenie Lake the valleys are heavily forested and contain an abundance of dense underbrush and devil's club, while to the south, more sparsely forested valleys are incised in vegetation-free plateaus. The southwestern half of Tulsequah Map Area is extensively ice-covered. Major ice-fields and glaciers persist above the 5000 foot contour but valley-glaciers have receded substantially in recent years, exposing much previously-covered bedrock.

Topography is more subdued but still steep and rugged in the more-heavily forested northeast part of the map area. In this region glacial ice is absent and vegetation reflects a substantial decrease in annual rainfall amounts. Extensive burn areas in the vicinity of the Inklin River make traversing difficult.

To the south of the Sam claims, and adjoining them, are the Totem (20 units) and the Bear (20 units) claim groups. The Bear claims were staked to protect a regional soil anomaly of 775 ppb Au. After staking, detailed geochemical traverses revealed a zone within which numerous samples ranged between 100 and 500 ppb Au, while two samples contained 1600 and 9200 ppb Au respectively. Concurrent geological follow-up revealed a vertical contact of an assemblage of gabbro and greenstone with a vertically-dipping limestone. In the vicinity of the contact the limestone is heavily silicified over a width of approximately 15 to 20? feet. Six rock chip samples from within the zone returned geochemical concentrations of: 3750; 6300; 1325; >10,000; >10,000; and 7400 ppb Au. In addition four of these samples contain between 10 and 20 ppm Ag.

In visual appearance, these mineralized rocks are very similar to those at the Tardis and Petro claim groups (see Area II). The carbonates (limestones, orange to white-weathering, karsted away from the silicified contact) are extremely heavily fractured. Fractures are infilled, and the rock further shattered by, myriadal networks of chalcedony-filled microfractures which locally coalesce to produce a massive chalcedony rock. Although no sulphides were noted, chalcedonic parts locally are discoloured to a steely-grey hue and a yellow oxidation coats some fractures, suggestive of


Zone of intense silicification
Cache Creek
greenstones,
gabbro,
diorite
greenstone
intrusions
limestone
?
?
Zone of qtz/carbonate
alteration, ultramafics
TOTEM ADJOINING
BEAR
greenstone
gabbro
limestone
Silicified
contact
(Au)
in
rock
zone of
anomalous
Au in soil.

the presence of very fine grained arsenopyrite. A white-weathering, soft, powdery clay mineral (sericite) accompanies the chalcedony in some samples and in others, extremely fine-grained tourmaline occurs in the micro-veinlets.

The original carbonate protolith contains angular fragments of chert, up to 0.5 m in diameter, and these are still apparent in the silicified equivalent, preserving the brecciated texture of the rock.

The Totem claims (20 units) adjoin the Bear claims to the north and join the Bear claims to the Sam claims. The Totem claims were staked to cover the northern extension, or continuation, of the silicified contact zone on the Bear claims. The silicifcation on the Totem claims occurs at the same contact between vertically-dipping limestone and Cache Creek group but the silicified zone is wider (between 100 and 300 meters-wide) and more intense with widespread, wholesale replacement of the marble by fine grained white quartz. The general geology of the Bear and Totem claim groups is shown, in highly simplified form, on Figure 7.

As with the Bear, very little work has been done on the Totem claim group. From two soil traverses run across the silicified zone, three samples contain between 105 and 115 ppb Au while one isolated sample contains 1950 ppb Au. The only anomalous rock value

returned to date is from a malachite-, azurite-stained outcrop of silicified carbonate which contains 60 ppm Ag, >1000 ppm As, and 525 ppb Au. These data, although preliminary would suggest that, as is the case with the Bear showing to the south, any gold mineralization which might occur could be restricted to narrow zones which could be easily missed in regional sampling, or anything but closely-spaced geochemical follow-up.

The Pole (20 units), Misty #1 (20 units) and Misty #2 (20 units) adjoin the Sam #1 and #2 groups to the east and north respectively and cover anomalies in silt, soil and rock along the northern extension of the N-S-striking zone of anomalies. On the Misty claims, several soil samples were collected which contain Au in the 100 to 300 ppb range while two samples of pyritic Cache Creek group greenstones, one float and the other outcrop, contain 1000 and 2050 ppb Au respectively. The latter sample is from a heavily quartz veined outcrop. Between the north boundary of the Misty claims and Tatsamenie Lake, ultramafic bodies occur at the contact of a major intrusive batholith and Cache Creek carbonates and greenstones and likely represent a northern continuation of the same favorable structure staked to the south. Along the south shore of Tatsamenie Lake, where this structure would project, two soil samples contain 160 ppb Au and further north, near the contact of Cache