PRELIMINARY GEOLOGICAL REPORT ON THE MAR CLAIM GROUP

Name | Grant No. | Expiry Date
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MAR 1 to 24 | YA14896-YA14919 | March 30, 1978
MAR 25 to 30 | YA17104-YA17104 | Oct. 5, 1978

MAYO MINING DISTRICT, YUKON TERRITORY

64°02' N 135°43' W

on behalf of

QUEENSTAKE RESOURCES LTD.

by G. GUTRATH, P. Eng.

March, 1978

166 - D - 4

090364
This report has been examined by the Geological Exploration Unit and is recommended to the Commissioner to be considered as representing the amount of $3700.

J.A. Moore
Resident Geologist or
Resident Mining Engineer

Considered as representation work under Section 53 (4) Yukon Quartz Mining Act.

B.R. Baxter
Supervising Mining Recorder

Commissioner of Yukon Territory
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In Report
- Location Map
- General Geology and Location Map 1 inch = 4 miles
- Distribution of lode and placer deposits
  Keno Hill - Galena Hill - Dublin Gulch Area 1 inch = 4 miles
- Dublin Gulch - Ray Gulch General Geology and Distribution of placer gold and tungsten 1 inch = ½ mile

In Pocket
- Preliminary Geology - Mar Claim Group 1 inch - 400 feet
INTRODUCTION

The Mar claim group was staked by the writer in March, 1977 and the property was subsequently acquired by Queenstake Resources Ltd.,

Between July 15 and September 12, 1977 Queenstake Resources carried out a placer gold-tungsten exploration programme under the overall supervision of the writer. The programme was carried from a base camp on Dublin Gulch that is located 2 miles to the west of the Mar Property.

Between September 18 and September 23, 1977, a preliminary geological mapping programme was carried out by the writer from a camp located in Ray Gulch at the 3300 foot elevation. The camp and crew were brought in from the main Dublin Gulch camp by taking a bulldozer up the Lynx Creek valley to Ray Gulch. Tungsten mineralized skarn zones were discovered by tracing scheelite bearing float up Ray Gulch at night using an ultraviolet lamp.

Between September 25th and 27th the skarn zone located on the east side of Ray Gulch at the 4300 foot elevation was chain and compass surveyed. Traverses were made to the north and northwest of the skarn zone in order to locate the schist-intrusive contact. Access to north side of the Mar Group was by 4-wheel drive truck from the Dublin Gulch camp.
The Mar Claim group of 30 contiguous claims is located in the central Yukon 25 air miles northwest of Mayo. There is road access to the property via Dublin Gulch.

In 1904, tungsten mineralization was first found in the Dublin Gulch area related to quartz veins and pegmatites in and peripheral to a large granodiorite stock. In 1942 high grade scheelite mineralization was found in skarn float in Ray Gulch but the source of the mineralization was not located. The G.S.C. mapped the area in 1943 and located a number of skarn-limestone zones. One of these zones is reported to be 75 feet thick and samples taken from the zone assayed 0.27% and 0.50% \( WO_3 \). Since that time only sporadic exploration has been carried out in the Ray Gulch area that is now covered by the Mar Claim group. The claims were staked in March, 1977 and in September, 1977 a preliminary geological mapping and silt sampling programme was completed. At the end of the programme, an additional 6 claims were staked adjoining the east side of the claim group.

The Mar property, is underlain by Yukon Group metasediments that are in contact on the west side of the claim group with a granodiorite stock. The metasediments trend in a northerly direction and dip at 15° to 25° to the west towards the granodiorite stock. The actual contact is completely covered by shallow overburden.

The 1977 exploration programme located a scheelite mineralized diopside-amphibolite-epidote-carbonate skarn zone on the east side of Ray Gulch. The zone is 25 to 40 feet thick and can be traced for 500 feet along strike and down dip for approximately 1,000 feet. The zone has been
surveyed with an ultra-violet lamp and was found to be uniformly mineralized with scheelite. Four samples taken from various outcrop locations in the skarn zone area assayed 0.12%, 0.41% and 0.15% WO₃.

CONCLUSION

The contact between the tungsten bearing granodiorite intrusive stock and the limestone beds of unit 2 is an ideal geological environment for the development of scheelite mineralized skarn zones. This favourable contact zone extends for a distance of 5,000 feet on the Mar property. There are also other intrusive stocks and dikes in the claim area that may host peripheral scheelite bearing skarn zones. All the gulchs cutting the Mar property have placer scheelite in the stream gravels indicating widespread scheelite mineralization in the claim area.

The skarn zone located during the 1977 programme is 2,000 feet to the east of the projected granodiorite contact. It can be assumed that the intensity of alteration and possibly the scheelite content will increase as the altered limestone beds approach the intrusive contact. The initial sampling indicates that this skarn zone is low grade when compared with the Canada Tungsten property and the MacTung property that are also located in the Yukon but this is offset by the potential of this zone which can be initially mined by low cost open pit methods.

It is concluded that the Mar Claim group warrants continued exploration to outline drill targets.
RECOMMENDATIONS

The following exploration programme is recommended:

Phase I

a) Geological mapping

The outcrop geology on the Mar Claim area should be mapped on a scale of 1 inch = 200 feet. Special attention should be given to determining the extent and stratigraphic position of the limestone beds in relation to the intrusive contact.

Map the skarn zone on the east side of Ray Gulch on a scale of 1 inch = 40 feet and sample.

b) Geochemical sampling

Silt sample all the streams and dry gulches in the Mar claim area.

Collect rock chip samples from the limestone beds, ultraviolet lamp the samples and then analyse for $\text{WO}_3$.

c) Geophysical Survey

Magnetic Survey

Survey a grid with a southwest-northeast baseline starting at the intrusive contact on the north side of the Mar Group and extending southwest to the west side of the claims. Crossline should extend into the intrusive for at least 1,000 feet to the northwest and to the southeast the lines should extend to the edge of Ray Gulch (4,400' elevation). This area is largely covered by thin overburden and a magnetometer survey should be able to define the intrusive-meta-sediment contact.
Two lines could extend across Ray Gulch in order to cover the exposed skarn zone on the east side of Ray Gulch.

Phase II

It is estimated that 5 to 6 holes will be required for a total of 3,000 feet of diamond drilling.
ESTIMATED COSTS

Phase I

a) Geological and Geochemical sampling
   Overall supervision, geological mapping, geochemical sampling
   1 geologist and assistant.
   1 month (July 15 - August 15th)
   30 man days @ $200/day
   $ 6,000

b) Grid and magnetometer Survey.
   Baseline 10,000 feet long with cross-lines every 400 feet. The crosslines would average 3500 feet.
   Total of 20 line miles at an overall cost of $200/mile
   4,000

c) Analysis
   Geochemical analysis $1,000
   Assaying 500
   1,500

d) Transportation
   Airfares $1,000
   Truck 4x4 600
   1,600

e) Living Cost
   120 man days @ $10.00/day
   1,200

f) Miscellaneous field supplies, map preparation, aerial photographs, etc.
   1,000

g) Data compilation, drafting and reports
   2,000

   Overhead and contingencies @ 20%
   3,460

Phase II
   3,000 feet of diamond drilling
   at an estimated overall cost of $30/foot
   $ 90,000

   $ 110,760
GEOGRAPHY

Location

The Mar Group is located 25 air miles northwest of the community of Mayo in the central Yukon. The claims cover the upper portion of Ray Gulch that flows south from the Potatoe Hills into Lynx Creek.

Access

Dublin Gulch is 54 miles by road from Mayo. The first 30 miles to the McQuesten Bridge is a good all weather gravel road. The 24 miles of road along Haggart Creek to Dublin Gulch can be driven with a 2 wheel drive truck except in the early spring and late fall when a 4 wheel drive truck is required. From upper Dublin Gulch there is a 4 wheel drive tote road in poor to fair condition that goes 6 miles to the Potatoe Hills and passes through the north side of the Mar Claims.

A bulldozer-tote road was constructed from the south end of the Mar Group to the campite a distance of approximately one quarter mile. A trail has been cleared and blazed from the camp up Ray Gulch to the Potatoe Hills.

Topography

The claims cover the Potatoe Hills - Ray Gulch area on the north side of Lynx Creek valley between the elevation of 2900 feet (asl.) and 4900 feet. The Potatoe Hills, at the head of Ray Gulch, are two small rounded hills that are the highest points (5043 ft.) in the Haggart-Lynx creek drainage.
Ray Gulch is a short gully, 2.25 miles long that flows south into the Lynx Creek valley. The northerly two thirds of the gulch, from an elevation of 3300 feet to 4500 feet is in a steep walled gully with numerous large outcrops. The maximum relief is 1,000 feet on the west side of gulch. The east side is a much gentler slope with less outcrops. Both the east and west side of the Mar Group are cut by gulchs that sub-parallel Ray Gulch.

Climate

The climate is typical of the central Yukon with mean annual temperatures of approximately -3.3°C and the average minimum temperatures of -10°C, and the average maximum of 2.8°C. Temperatures as low as 27°C and as high as +32°C have been recorded in the area.

The average precipitation is estimated at 15 inches.

The rainfall commonly occurs in May and June with almost daily thunder-showers during the rest of the summer. Snowfall starts in October and in upper Ray Gulch there may be accumulation of up to 5 feet. By the end of May the lower slopes of Lynx Creek are free of snow but snow patches in protected areas at the higher elevations remain through July.

Vegetation

The Lynx Creek valley is heavily timbered with mixed fir and spruce to an elevation of 3,500 feet. In Ray Gulch, above the 3,500 foot elevations the trees begin to thin out, become smaller and are predominately balsam and spruce.
The steep west slope of the gulch has large open areas covered with grass and buck brush while the east slope is more uniformly timbered. Above the 4,000 foot elevation there are only scattered clumps of balsam with large open areas of buck brush.

**Water**

There is ample water for drilling in the lower part of Ray Gulch, below the 3,000 foot elevation. There would be adequate water in upper Ray Gulch between the 4,000 and 4,700 foot elevation for drilling from May to mid-August and possibly into September depending on the previous winter snow-pack and summer rainfall. Water for drilling could also be obtained from upper Baum Boy gulch for drilling in the Mar Group area.

There is ample water in Lynx Gulch for any future mill requirements.

**CLAIMS**

The Mar Group consists of 24 claims staked in March, 1977 and an additional 6 contiguous claims staked in October, 1978.

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<tr>
<th>NAME</th>
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The tags have been placed on the Mar 1 to 24 claims.
HISTORY

Scheelite was discovered in 1904 in the placer deposits in Dublin Gulch. In 1908 Cochfield located scheelite and wolframite in quartz veins and pegmatites at the head of Dublin Gulch. During this period two quartz vein were found cutting the meta-sediments at the head of Ray Gulch.

In 1942 Harvey Ray, a prospector, found high grade scheelite bearing float in Ray Gulch. The source of the float was not located but other scheelite skarn zone were found on the west side and at the head of Ray Gulch.

In 1943 the area was mapped by the G.S.C. and a number of skarn zones were located. The G.S.C. found that all three gulches cutting the Mar Group had scheelite in the gravels.

In 1963 and 1964 Mayo Silver Mines Ltd. explored gold bearing quartz veins on the east side of the headwaters of Ray Gulch but no exploration was done for tungsten (A. Archer). Mayo Silver traced arsenopyrite-quartz float to a narrow vein conformable with bedding, which assayed 2.02 oz/T. gold and 3.65 on ton silver across 2.5 feet (Archer Cathro and Associates Ltd. - Occ No. 27).

The Ray Gulch and Dublin Gulch area was staked by C. Provencher in 1968 and optioned to Great Plains Development in 1968, Tam Mining in 1969 and Connaught Mines Ltd. from 1969 to 1971. Connaught had the property subleased to Canex-Placer in 1970 and 1971 Canex did an extensive soil sampling programme that extended from Patirium Pup to the Potatoe Hills and covered the entire south side of Dublin Gulch.
During 1971 Canex drilled 2000 feet and cut 20 bulldozer trenches in the Dublin Gulch-Bonn Boy Pup area to test gold and tungsten geochemical anomalies. This programme did not extend into Ray Gulch (personal communication D. Howard, Canex) but was concentrated on exploring for a possible large low-grade scheelite-quartz stockwork in or peripheral to the granodiorite intrusive in the Dublin Gulch area.

In 1968 R.J. Cathro sampled a 50 foot bed in the Ray Gulch area that assayed less than 0.10% WO₃.

There has been no recorded work done in the area since 1968.
GEOLOGY

General

The Dublin-Ray Gulch area is underlain by Yukon Group meta-sediment of Precambrian age that have been divided into three units. The oldest is a quartzite, phyllite and quartz-mica schist unit that occurs to the east of Ray Gulch. The second unit underlies the Potatoe Hills and Ray Gulch area and is composed of quartzite, phyllite, graphitic schist limestone, quartz-mica schist and skarn. The balance of the area to the west of Ray Gulch and the Dublin Gulch area is underlain by the third and youngest unit that is composed of quartzite-phyllite, graphitic schist and quartz-mica schist.

The meta-sediments of the Yukon Group have been intruded by granodiorite and related intrusive rocks of Cretaceous age. The largest intrusive stock outcrops to the west of the Potatoe Hills. It extends to the southwest for 3 miles and it averages approximately 1 mile in width. There are numerous small outlier stocks and dikes surrounding the main intrusive.

The regional trend of the bedding between Ray Gulch and Haggart Creek is north to north westerly with dips of 15° to 35° to the west.

A major fault-fissure vein system has been traced by regional geochemical silt sampling and by numerous outcrop exposures of quartz-arsenopyrite-scorodite gold veins. The fissure-vein zone trends in an easterly direction from the Peso Rex-Secret Creek property across the Haggart Creek valley, along the south side of Dublin Gulch and into the upper Lynx Creek drainage for a distance of approximately 20 miles.
The placer gold in Dublin Gulch and Haggart Creek is primarily derived from gold bearing quartz-arsenopyrite veins that occur in the fault fissure zone that sub-parallels the north contact of the granodiorite stock.

The placer scheelite and wolframite in Dublin Gulch is derived from quartz veins, pegmatites and skarn zones. The majority of the vein and pegmatite occurrences are within or peripheral to the granodiorite intrusive on the south side of Dublin Gulch. The skarn zones are concentrated in the Ray Gulch area that is covered by the Mar Claim Group.

**Property**

The majority of the Mar Claim Group is underlain by the middle unit (2) of the Yukon Group. This unit, where observed in Ray Gulch, is composed of quartz-mica schist, phyllite, limestone and minor graphite schist and quartzite. The general trend of the bedding is northerly and the dip varies from 10° to 25° to the west.

Massive limestone beds in excess of 75 feet thick can be traced along the west side of Ray Gulch in extensive steep outcrops. Thinner limestone beds were observed on both sides of this thick section. On the east side of Ray Gulch there was very little limestone found in outcrop until a flat bench is reached on the claim line between the Mar #1 Post, 17 and 18 and #2 post, 17 & 18. This flat bench appears to exhibit poorly formed karst features and may be entirely underlain by limestone.
Approximately 400 feet to the north of the No. 1 Post of the Mar 17 and 18 at the 4450 foot elevation there is a massive outcrop as diopside-amphibolite-epidote-carbonate skarn. On the southeast side of the outcrop crystalline limestone lenses are noted but going to the northwest the original limestone bed has been completely altered to skarn. The skarn zone is overlain by a light brown phyllite. The skarn zone can be traced along a cliff face for 500 feet and over a width of up to 40 feet and it has an average width between 25 to 30 feet. The skarn band and the overlying schist strike north 10° to 20° east and dip at 15° to 20° to the northwest. The skarn band can be traced down dip to the southwest almost to the bottom of the gulch a distance of 1,000 feet and over an elevation interval of 400 feet.

Mineralization

The skarn zone was traversed at night with an ultraviolet lamp. This included a traverse around the bottom of the cliff face and across the talus slope. It was found that the skarn zone is uniformly mineralized with fine grained scheelite and where there is coarser and more complete skarn alternations there is an increase in scheelite grain size and content. Four representative samples were collected from various outcrops in the skarn area. The samples assayed 0.12%, 0.24%, 0.41% and 0.15% WO₃.

There is little or no sulphide mineralization and only minor magnetite in the skarn zone.
The following description of a skarn zone and mineralization is from Tungsten Deposits of Canada, Ec. Geol. Series No. 17, 1959.

"In 1942, however, Harvey Ray prospected for lode scheelite deposits east of Dublin Gulch and found some large blocks of float containing scheelite on the west side of Ray Gulch at an elevation of 3,400 feet where the slope curves into Lynx Creek Valley. The float consisted of crystals of scheelite up to half an inch long in pale green, coarsely crystalline tremolite with some calcite and quartz. Fragments of it after being crushed, weighed, and panned, yielded 2.7 to 3.3 per cent scheelite. The source of this rock was not discovered but above it for more than 2 miles along the west side of the gulch and around the head, Ray found skarn material containing disseminated scheelite. In general appearance the skarn material resembles a medium-grained diorite - it is mainly composed of crystals of dark green silicates with calcite filling the interstices. In 1943 mapping by the Geological Survey showed that the skarn is in a zone of limy beds about 75 feet thick in schist and quartzite of the Yukon group. Around Ray Gulch the limy beds are exposed in cliffs reaching elevations close to 4,000 feet. They are cut by granitic dykes and lie on the crest and northerly side of the anticline referred to earlier (see page 22). As the anticline plunges southwesterly, the beds strike in northerly directions and dip westerly towards the granodiorite stock whose contact lies from 300 feet to half a mile northwest, back from the top of the cliffs. This is a most favourable structure and general situation for the skarn type of scheelite deposit. Despite the widespread presence of disseminated scheelite, no spot as rich as the float referred to above was found. The samples taken by the Geological Survey from the accessible parts of the cliffs assayed 0.27 to 0.50 per cent WO₃."
The writer did not locate the float or source of the float during the preliminary mapping programme carried out in September, 1977. The skarn zone located by the writer on the east side of Ray Gulch at the 4300 foot elevation does not match the description given by the G.S.C., so it would appear that there is still a large skarn zone to be located in the Ray Gulch area.

Respectfully submitted,

Gordon [Signature]
Engineer, P. Eng.