

ARCHER, CATHRO
AND ASSOCIATES LTD.
CONSULTING GEOLOGICAL ENGINEERS

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BENTALL CENTRE, VANCOUVER, B.C. 688-2568

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SUMMARY REPORT

POTATO HILLS TUNGSTEN
MAYO AREA, YUKON TERRITORY

for

CONNAUGHT MINES LTD.

R.J. Cathro

March 9, 1970

SUMMARY

The Potato Hills intrusive stock in central Yukon is a unique mineral occurrence with a significant tungsten potential. The intrusive is important because tungsten occurs in a quartz vein stockwork within the stock. Gold arsenic and silver-lead-antimony mineralization occurs in quartz veins outside the margins of the intrusion. The overall low grade of the tungsten, its nature of occurrence, the very large tonnage potential and the amenability to large scale surface mining methods make it directly comparable to porphyry-type copper and/or molybdenum deposits. At daily milling rates in excess of 20,000 tons, mining operations are now feasible on mineralization having a recoverable value of \$4.00 per ton. A direct mining and concentrating cost of \$1.50 per ton appears possible from the type of mineralization at Potato Hills if sufficient tonnage can be found.

The grade of the area sampled is 0.042% WO_3 , and this represents only 5% of the bedrock surface of the stock. A commercial operation should be possible if only 15% of the surface area averages 0.15% WO_3 or better. This would amount to 100 million tons to a depth of only 250 feet.

A surface sampling program, consisting of geochemical sampling, bulldozer trenching and shallow drilling is recommended at an estimated cost of \$50,000.

LOCATION AND ACCESS

The Dublin Gulch area is situated at 64°02'N and 135°45'W, in N.T.S. claim sheet 106-D-4. It is accessible by a 55 mile road from Mayo, which in turn is 240 road miles north of Whitehorse. A rough trail passable by 4-wheel-drive vehicles extends two miles from the placer workings in Dublin Gulch across the property to the summit of Potato Hill.

PROPERTY

The property consists of 116 contiguous, unpatented mineral claims which form a single rectangular block and cover the entire surface area of the intrusion. They are owned 60% by Conrad Provencher and 40% by John H. Boyce. One crown granted claim, Olive (lot 11, group 1054), which was staked on a gold showing in 1910, is still in good standing and is situated within the boundaries of the Pan and Arpa claims. It is owned by the heirs of the original prospectors. All claims are in good standing until June, 1970 or later.

HISTORY AND PREVIOUS WORK

The earliest recorded prospecting in the Mayo area was by placer miners in the 1880's. Placer operations have been carried out on Haggart Creek and Dublin Gulch almost continuously since 1898 and are still underway. Scheelite was identified by the G.S.C. in 1904 as a major constituent of the "grey sand" associated with the gold placer concentrates. Tungsten concentrates have been collected as a by-product from time to time since World War One.

Lode prospecting in the area can be divided into three stages: (1) for arsenopyrite-gold-quartz veins prior to World War One, (2) for scheelite veins during both World Wars, and (3) for silver and gold veins by United Keno Hill Mines Ltd. in 1960, and by Mayo Silver Mines Ltd. between 1962 and 1965, when the Rex property of Peso Silver Mines Ltd. to the west was under active development.

The first investigation of the large tonnage, low-grade tungsten potential was done in late 1968 when Great Plains Development Co. of Canada Ltd. sampled a small part of the stock with bulldozer trenches under the writer's supervision. Nothing significant has been done since.

GEOLOGYA. Regional

Potato Hills and other nearby mountains are remnants of an older rolling upland which has an elevation of about 4,500 feet. The summit of Potato Hills reaches just over 5,000 feet with valley floors at about the 2,500 foot elevation. The Mayo area was near the margin of continental glaciation during the Pleistocene period. Glaciation consisted mainly of scouring and widening of main valleys with deposition of thick covers of till in the bottoms and lower flanks of the valleys. Local alpine glaciers were present on the higher peaks.

The Potato Hills stood above the upper limit of the ice sheet and probably shielded Dublin Gulch and Haggart Creek from an ice advance from the northeast, preserving the placer deposits. Some evidence of a limited, older glaciation is present as a thin layer of weathered glacial till covering the stream gravels. Lynx Creek valley contains truncated spurs which indicate it contained valley glaciers to about the 4,000 foot elevation. The Potato Hills upland and Dublin Gulch basin are extensively mantled by a layer of residual soil and decomposed bedrock up to ten feet deep.

The bedrock of the area consists of schist and quartzite of Precambrian and/or Cambrian age. This unit regionally contains maroon and green shale and conglomerate but in this area it is both extensively deformed and metamorphosed and consists of chlorite, sericite and graphite schist.

These older rocks are intruded by the Potato Stock, a small irregular body, probably Cretaceous in age, which is elongated in a northeast direction. The stock, which generally follows the upper headwaters of Dublin Gulch on its south and east sides, is 3.5 miles long and from one quarter to one mile wide. In composition, it ranges from granodiorite to quartz monzonite. Texture is uneven with large potash feldspar crystals commonly giving a porphyritic appearance. Grain size ranges from fine to coarse and locally the stock is foliated. Biotite is the mafic mineral. Magnetite is almost completely absent and the intrusive has no magnetic expression.

B. Economic

All the mineralization in the Potato Hills area occurs in quartz veins and a pronounced zoning is present. The vein system is most strongly developed within the stock where scheelite is virtually the only important mineral present in the quartz gangue. Near the margins of the stock, particularly along the northwest side, gold and arsenopyrite

are locally common. Lead, zinc and antimony minerals are common at greater distances from the stock. Tin has been reported from one vein but copper and molybdenum appear to be absent.

Tungsten mineralization appears to be confined to two bedrock environments: (1) associated with a quartz-filled fracture system or stockwork within the stock, and (2) disseminated in skarn zones which have developed in limy horizons on the southeast side of the stock, near Ray Gulch. Minor amounts of wolframite have been found in placer operations but their source is not definitely known.

The quartz stockwork is a complex network of narrow, ramifying fractures ranging in width from a fraction of an inch to six inches. At least three sets of fractures seem to be present and in places the veinlets are spaced every three to six inches. A weak but pervasive hydrothermal alteration is present. In the weathered areas, the intrusive rock has decomposed to produce a granitic sand containing fragments of quartz veins and scheelite. The sand rests "in situ" or slowly creeps downhill through solifluction and further decomposes to a residual, organic soil. Small scattered areas of unaltered, frost-fractured outcrop and talus occur and these are also shot through with scheelite

bearing quartz veins. Calcite and muscovite are the only other minerals in the veins, which have been called pegmatites in the past.

Scheelite occurs as discrete grains both in the veinlets and in the adjacent wallrock. Fairly coarse crystals up to 1/4 inch long are present although the average size of the grains is much finer. The scheelite is not associated with any other metallic or heavy minerals and could be easily separated from the host rock by crushing and gravity methods.

Prospecting during World War One located three scheelite bearing veins in bedrock near the heads of Bawn Boy and Dublin Gulches. These assayed from 1.8% to 10.1% WO_3 across widths of 2 to 8 inches while the wallrocks up to 2.5 feet on either side assayed from trace to 1.2% WO_3 . A vein which cut the quartzite near the head of Ray Gulch assayed similarly. One "pegmatite" near the head of Dublin Gulch assayed 6.3% WO_3 .

No further lode prospecting was done until 1942 when tremolite skarn float assaying 2.7% to 3.3% WO_3 was found in Ray Gulch. This skarn was not found in place although outcrops of diopside skarn were sampled by the G.S.C. and assayed from 0.27% to 0.50% WO_3 . This area was briefly

examined by the writer and samples of ten foot widths from a skarn horizon fifty feet wide assayed from trace to 0.12% WO_3 . It is possible that the skarn contains more scheelite in areas where it is cut by quartz veins or granitic dikes.

During the summer of 1968, Conrad Provencher located one of the old trenches near the head of Dublin Gulch and dug seven shallow prospect pits in an area 200 feet long. Only two of the trenches reached bedrock but all encountered decomposed granitic rock containing fragments of quartz vein with scheelite. Using a D7 bulldozer in October, 1968, Great Plains Development Co. of Canada Ltd. dug 18 trenches near Provencher's handpits in an area about 1000 feet square. The average grade of 56 samples taken by the writer and Provencher was 0.042% WO_3 , equal to about \$1.80 per ton at a price of \$43.00 per unit.

CONCLUSIONS AND RECOMMENDATIONS

A reasonable target appears to be 100 million tons grading 0.15% WO_3 (a gross value of \$6.00/ton at the recent price of \$43.00/stu). This tonnage would support at 10,000 ton/day mill for 30 years and represent a volume

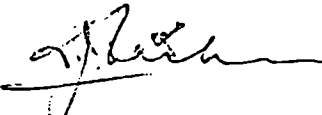
of rock about 2000 feet square and 250 feet deep. The bedrock area of the Potato Hills stock is about six times this size, of which only 5% has been sampled. The grade of the portion sampled is about one-third of the target grade of 0.15% and there is a reasonable possibility that better grade areas exist.

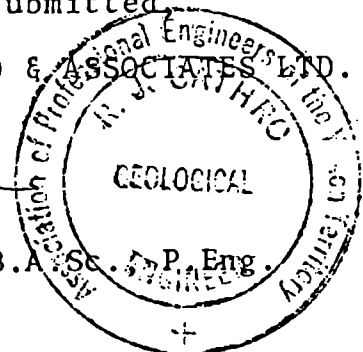
The property should be grid soil sampled to locate the best area of mineralization which should then be sampled by bulldozer trenching and shallow drilling. Estimated costs of this first stage of development are:

(1) <u>Soil sampling (including picketing of a control grid) - 400 foot sample spacing - approx. 1200 samples</u>	\$15,000.00
(2) <u>Bulldozer trenching - 200 hours using a D8 with ripper attachment, at \$45.00/hour including fuel</u>	9,000.00
(3) <u>Shallow Drilling - ten 100 foot holes 1000 feet at \$20.00/foot</u>	20,000.00
(4) <u>Engineering supervision and reports</u>	6,000.00
	\$50,000.00

Respectfully submitted,

ARCHER, CATHRO & ASSOCIATES LTD.


R.J. Cathro, B.A.Sc., P. Eng.



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March 9, 1970

CERTIFICATE

I, ROBERT J. CATHRO, with business address in Whitehorse, Yukon Territory and residential address in West Vancouver, B.C., do hereby declare that:

1. I am a consulting geological engineer.
2. I am a graduate of the University of British Columbia, 1959, in geological engineering.
3. I am a registered professional engineer in Yukon and British Columbia.
4. From 1959 to 1965, I was employed by mining and exploration companies in Yukon and N.W.T. I entered private practice in late 1965 and have specialized in the geology of Yukon since then.
5. I maintain business offices in Whitehorse and Vancouver.
6. I have visited the property referred to in this report and examined the available geological data.
7. I have no interest, nor do I expect to receive any interest, direct or indirect, in any properties or companies referred to in this report.

Respectfully submitted,



R. J. Cathro, B.A.

