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TUNGSTEN INVESTIGATION

DARK Claims

Scheelite Dome

Mayo Area, Yukon

G. Elvins

Box 2840, Whitehorse

R.J. Cathro, P.Eng.

July 15, 1969

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INTRODUCTION

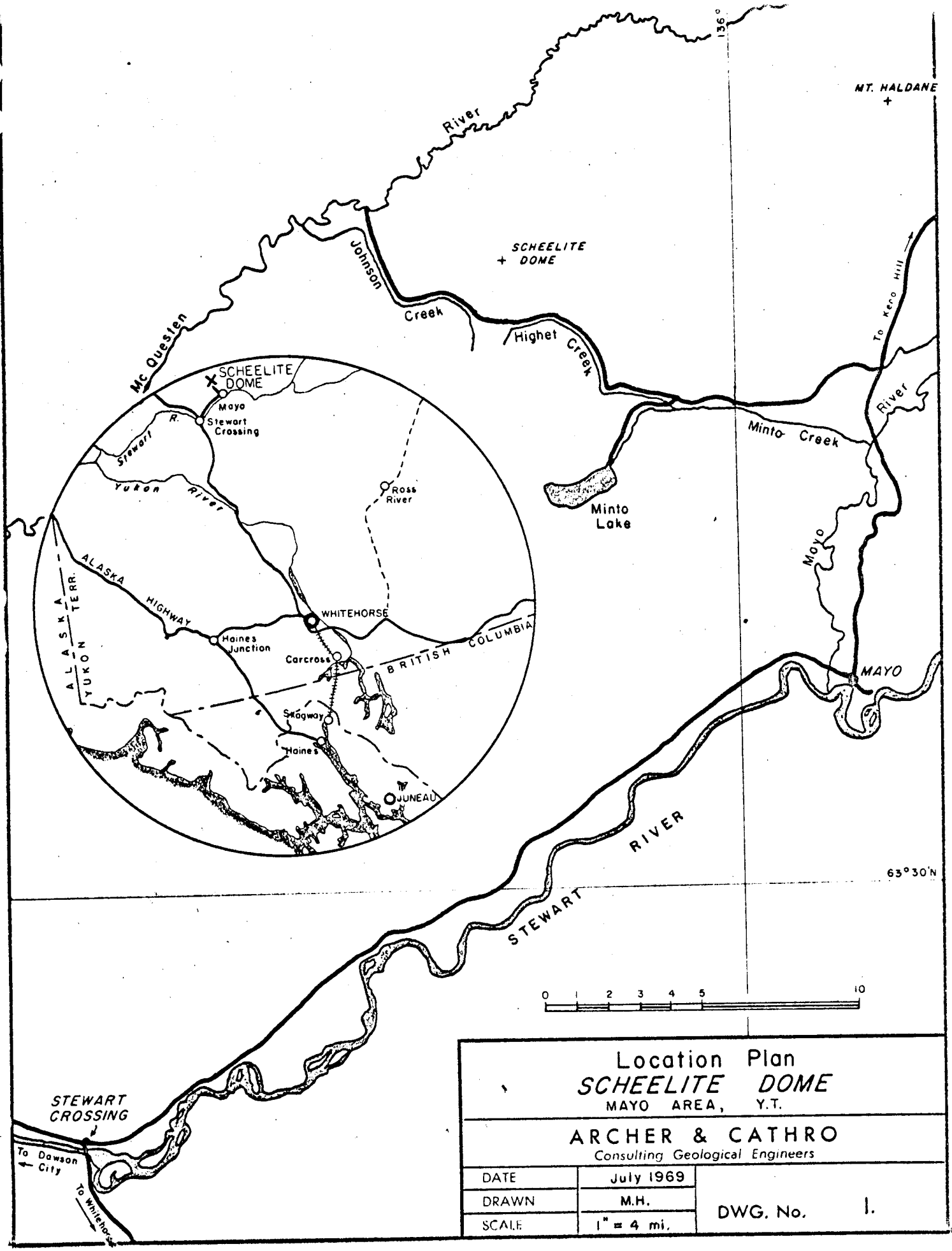
C.A. Main and A. Brownlee made a preliminary investigation of the Scheelite Dome area from June 26 to 29, 1969, inclusive, under the writer's supervision. The intrusive stock is of interest as a possible porphyry-type tungsten deposit and the purpose of the examination was twofold:

(a) to study the occurrence of the scheelite in the intrusive stock and,

(b) to conduct a test geochemical soil survey to determine if the technique was an effective way to locating concentrations in overburden covered areas.

PROPERTY, LOCATION AND ACCESS

The property is situated at 63°46'N, 136°15'W in NTS claim sheet 115-P-16, about 18 airmiles northwest of Mayo, Y.T. (See Figure 1). Mayo is 253 road miles north of Whitehorse, capital of Yukon, by all-weather gravel highway. The south edge of the claims, along the Highet Creek - Sabbath Creek valley, is accessible by a 15 mile summer truck road which leaves the highway to Keno Hill at a point about 10 miles north of Mayo.



Location Plan
SCHEELITE DOME
MAYO AREA, Y.T.

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DATE	July 1969
DRAWN	M.H.
SCALE	1" = 4 mi.

DWG. No. 1.

The Scheelite Dome intrusion is largely covered by the Dark claim group, comprising 48 contiguous, unpatented mineral claims. The location of the claims as plotted on the government claim sheet is shown in Figure 2. The claims are registered in Mayo as follows:

Claim Name	Grant No.	Owner	Expiry Date
Dark 1 - 8	Y26897-Y28904	G. Elvins	Feb 10, 1970
9 - 32	Y31626-Y31649	"	Jan 31, 1970
33 - 40	Y31618-Y31625	"	Jan 31, 1970
41 - 48	Y31650-Y31657	"	Jan 31, 1970

Approximately 20 other claims are in good standing on the southeast side of the intrusive stock, owned mostly by J. Hawthorne of Mayo. These were staked to cover the antimony veins and do not appear to cover a significant part of the stock.

HISTORY

Placer gold was first discovered in 1894 on Johnson Creek, although it was not mined until 1958 due to difficult ground conditions. Total production by Barduson Placers Ltd. between 1958 and 1967 was approximately 7500 ounces. Highet Creek has been one of the most productive placer creeks in the Yukon outside the Klondike with con-

tinuous production since discovery in 1903. Total production to the end of 1968 is estimated at about 51,200 ounces.

Lode prospecting has been conducted sporadically over the years and has been directed primarily towards quartz veins containing arsenopyrite and stibnite. The most recent vein exploration was in 1965 on the Maw claims. The tungsten mineral, scheelite was first reported in the Highet Creek placer by Keele and the main investigation of its source was by the Geological Survey of Canada during the two World Wars when the metal was in short supply. Cockfield recognized in 1918 that the intrusive rocks of the Scheelite Dome Stock were the probable source of the scheelite and the first careful examination was by Bostock in 1942 and 1943. This resulted in the discovery of a skarn occurrence in bedrock on the north side of the stock and the recognition that most of the scheelite probably occurred is disseminated grains in the numerous quartz veins and pegmatite dikes which cut the stock. The skarn showing has been investigated periodically, most recently by Skyline Exploration Ltd. in 1968. The low-grade deposit contained in the vein stockwork has only become of economic interest in recent years with the development of modern bulk-mining methods. The changing economics have been discussed in more detail in a recent paper by the writer.

The following published references provide useful background information on the Scheelite Dome area:

1905 - Keele, Joseph; The Duncan Creek Mining District, Sum.Rept. 1904
1916 - Cairnes, D.D., Mayo Area, G.S.C. Sum.Rept. 1915, pp 10-49
1919 - Cockfield, W.E., Mayo Area, Yukon, G.S.C. Sum.Rept. 1918, Part B, pp 1-15
1939 - Bostock, H.S., Mining Industry of Yukon, 1938, G.S.C. Memoir 220, pp 8, 14
1941 - Bostock, H.S., Mining Industry of Yukon, 1939 & 1940, G.S.C. Memoir 234, pp 27-33
1959 - Bostock, H.S., in Little, H.W., Tungsten Deposits of Canada, G.S.C. Econ-Geol Series No. 17, pp 20-21, 30-33
1964 - Bostock, H.S., McQuesten, G.S.C. Map 1143A
1965 - Green, L.H., The Mineral Industry of Yukon Territory, 1964, G.S.C. Paper 65-19, pp 73-78
1966 - Green, L.H., The Mineral Industry of Yukon Territory, 1965, G.S.C. Paper 66-31, pp 20-21
1969 - Cathro, R.J. - Tungsten in Yukon, Western Miner, April 1969, pp 23-40

GENERAL GEOLOGY

The Scheelite Dome Stock is partially unroofed along the crest and upper south slope of Scheelite Dome. The main bedrock area is slightly over two miles long and up to one mile wide, although other small areas of intrusive rock are situated within an overall area some 3.5 mile long. These isolated bedrock areas are all presumably connected at depth in one intrusive stock.

The intrusion has been variously described in earlier

publications as granodiorite and biotite granite. It seems likely that slight variations in composition occur within the stock, probably a function of quartz content. The relationship between composition, quartz veining and scheelite content has never been investigated. The country rock consists of metasediments belonging to the Yukon Group. These vary in composition from sericite or chlorite schist to impure quartzite with occasional narrow bands of limestone or limy schists.

Bedrock is extensively mantled by talus and a thin overburden cover and outcrop is usually found only on the steepest slopes, on the crest of ridges and in a few bedrock canyons along some of the streams. The margins of the stock and composition of the various rocks is known in only a crude fashion from examination of bedrock float found in the overburden and of talus.

Some understanding of the geomorphic and glacial history of this area is important in assessing its economic potential. The top of Scheelite Dome is a fairly flat surface lying between the 4500 and 5000 foot elevations. It is a remnant of an old peneplane which has been deeply disected by Pleistocene glaciation and later stream erosion. Scheelite Dome lay between two main ice tongues - one along the McQuesten Valley to the northwest and the other along the

Minto Lake valley to the southeast. The ice level was at least 1000 feet below the top of Scheelite Dome and glacial scouring in the area was apparently confined to relatively gentle widening of the lower portions of Highet and Johnson Creeks by small ice tongues which occupied their valleys. The gold placers are pre-glacial in origin and they were for the most part left intact by the ice tongues which merely overode them. In some cases the weight and movement of the ice resulted in a crumpling and mixing of the older gravels with the soft portions of the bedrock. Placer gold also occurred in terrace gravels at the mouths of some of the tributary creeks, notably Rudolph Creek, but for the most part these were removed by the ice. As the ice receded, a considerable thickness of glacial till and boulder-clay was deposited on top of the older stream gravels and in recent times the streams have cut their way down through these younger layers to expose the placer deposits. The glacial deposits are as much as 300 feet thick and cause a constriction of the streams in a narrow channel although the floor of the valleys may be as much as 500 feet wide. Thus, the distribution of placer scheelite is only partially known because of ice disturbance and because only those portions which contain gold have been investigated.

ECONOMIC GEOLOGY

Three types of mineralization have been recognized in the area, and the location of the known occurrences is shown in Figure 3:

(a) Placer gold with a little scheelite.

(b) Quartz veins containing stibnite and a little arsenopyrite.

(c) Scheelite in a quartz vein stockwork and as disseminated grains in the intrusive rocks, and in diopside skarn in limy sections of the surrounding metasediments.

Highet Creek has been one of the most productive streams in the Yukon outside the Klondike, with a cumulative production to the end of 1968 of about 51,200 ounces. The bulk of this was found from Rudolph Gulch downstream for three to four miles. Gold production decreased rapidly above Rudolph although scheelite was more abundant. The gold averaged 835 fine and was well worn and coarse, with nuggets up to 3/4 ounce in weight. In addition to scheelite, magnetite, hematite, ferberite and arsenopyrite were found with the gold, and native bismuth was found at one point. Placer production from Johnson Creek was much smaller, at about 7,500 ounces, and the productive section extended

only 4000 feet downstream from Sabbath Creek. It was coarser than that from Highet Creek with nuggets up to four ounces in weight and its fineness ranged from 760 to 820. Scheelite was quite abundant upstream from the gold placer and some magnetite, hematite and cassiterite occurred with the gold.

The stibnite-quartz veins were found near Harvey Creek, and contained small amounts of arsenopyrite, pyrite, pyrrhotite, galena, tetrahedrite and chalcopyrite. The following assays have been reported in the literature:

	%Sb	%Pb	%As	o/tAg	o/tAu
Cockfield, 1919					
character sample	33.9			0.8	
Bostock, 1939					
character sample	30.1	3.7	2.7	13.3	0.05
Green, 1966					
character sample	17.9	0.4	1.3	2.0	0.04
sample of oxides	0.8	tr	1.0	1.2	0.08
chip across 3.0'	6.6	0.1	0.9	7.9	0.02
character sample	50.5	tr		1.3	0.05

The veins did not prove to have good continuity and their economic potential is low. A vein system occurs around the margins of the Potato Hills Stock, about 45 miles northeast, but it contains more arsenopyrite and gold and minor stibnite. It is possible that small arsenopyrite-bearing veinlets in and near the Scheelite Dome Stock are the source of the gold in the placers.

The present investigation has been directed towards the size and distribution of the disseminated scheelite zone within the intrusion. The stock is medium-grained, slightly calcareous and has no magnetic expression on G.S.C. aeromagnetic Map 7212G. Historical records indicate that the headwaters of Savage and Scheelite Gulches, Highet Creek and Rudolph Gulch contained the most scheelite, as shown in Figure 3. Because of limitations of time and access, only the Savage and Scheelite Gulch areas were examined. The source of the scheelite in Rudolph Gulch and upper Highet Creek has never been pinpointed.

Physical weathering results in a breakdown of the bedrock along fracture planes, which are spaced on the average about 1 to 2 feet apart in three different sets. These fractures commonly contain narrow quartz veins up to ¼ inch wide and most of the talus and frost-heaved material seen on surface has broken along these fractures and has a thin quartz coating on the planes. Hence it is virtually impossible to sample the rock effectively without exposing bedrock by trenching or drilling. A large proportion of the scheelite in the quartz veins has been released when the rocks break along the vein and hence a large proportion of the original scheelite is now present in the soil rather in the coarse fragments in the overburden. Thus,

a visual examination is not as useful as a soil sampling program in locating tungsten concentrations. The scheelite occurs as discrete grains up to 1/4 inch in size, both in quartz veins and disseminated in the intrusive rocks. It appears to be the only metallic mineral present in significant amounts and to be most abundant where the rocks are richest in silica. Some of the quartz may be a result of silicification although there is very little hydrothermal alteration otherwise present.

Most previous effort has been directed towards the skarn zone lying just north of the baseline which was described by Bostock (1959). He reported character assays on selected specimens of up to 8.15% WO_3. The old trenches are now slumped and the skarn is poorly exposed. A low hill lying about 800 feet east of the trenches was found to contain green pyrrhotite-diopside skarn, of which a character sample assayed 4.16% WO_3. The limy horizons are poorly exposed and could be much more extensive than previously thought. The mineralization is quite rusty, indicating the presence of some pyrrhotite. A magnetometer survey by T. Sadlier-Brown of Sevensma Consultants over an area 1600 feet long and 1000 feet wide showed almost no magnetic variation and sampling in two trenches gave assays of less than 0.5% WO_3.

GEOCHEMICAL SAMPLING

A total of 68 soil and 4 silt samples were taken on a wide spacing as a test survey. The main purposes were to determine if the soil contained a measurable and variable metal content. The samples were analyzed at Chemex Labs, North Vancouver, and the assays in ppm W are plotted on Figure 4. Tungsten content varies from 0 to 45 ppm in the soil and 16 to 35 ppm in the silt at the head of Scheelite Creek. Soil assays above 10 ppm are probably anomalous. The highest values were found over the intrusive near the head of Savage and Scheelite Creeks, which was expected from the placer information and visual examination of quartz veins in talus and bedrock float. Tungsten soil sampling appears to be an effective and economical method of outlining tungsten-rich zones in this area.

The amount of tungsten in the silt seems surprisingly low but it must be remembered that the upper portion of these creeks is very steep and active and that scheelite is soluble and very friable, with four excellent cleavages. It is probably being dissolved, or broken down and washed away as quickly as it accumulates in the creeks. Concentra-

tion does not begin until the gradient of the creek drops, as in Highet and Sabbath Creeks. The presence of any scheelite in the steep parts of these creeks should be considered significant.

CONCLUSIONS AND RECOMMENDATIONS

The Scheelite Dome Stock contains a significant amount of scheelite as fairly coarse, disseminated grains. The intrusion is so poorly exposed that it is not possible to estimate the grade without bulldozer trenching or drilling. The presence of major deposits of placer gold in the streams draining the property to the south suggests that a small gold content can be expected in the intrusion as well.

Geochemical sampling has been found to be an effective primary tool for outlining target areas for sampling. In addition to soil samples, samples of silt and heavy mineral concentrate should be collected from all the streams draining Scheelite Dome, particularly on the north and east slopes where glaciation may have removed older placer deposits.

The recommended 1969 program is as follows:

(1) Claim Staking - add a further 40 protection claims east and west of the present Dark claims over the ends of the intrusion ..... $ 2,000.00 .

(2) Linecutting and Geochemical Surveys - chain, cut and picket the baseline, and establish sample points by pace and compass - sample interval 100 feet on lines spaced 400 feet apart - approx. 2500 samples - analyze for tungsten $10,000.00

(3) Bulldozer trenching - in geochemical anomalies, followed by careful mapping of the fracture and vein pattern and distribution of scheelite, sampling, assaying $13,000.00

Total $25,000.00

Respectfully submitted,
ARCHER, CATHRO & ASSOCIATES LTD.

R.J. Cathro, P. Eng.

RJC:sh