THE FIRE MTN. PROPERTY

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on

Fire Claims

Atlin Mining Division (103N-7W)

owned by

Canadian Johns-Manville Ltd.

for

Ranworth Explorations Limited
(J. J. Rankin)

&

Whiterock Explorations Limited
(Wm. McDonald)

by

J. R. Woodcock and Dennis Gorc

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November 30, 1981

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THE FIRE MTN. PROPERTY

INTRODUCTION

Field work for this report was done by Messrs. J.R. Woodcock, Dennis Gorc and Henry Awmack from August 22 to 28, 1981. This consisted of collecting rock samples for geochemical analyses* and specimens for possible petrographic work. An enlarged aerial photograph (scale approximately 1:5000) and copies of a topographical map made by Northwest Surveys for Canadian Johns-Manville were used as a base for most of the work. In addition, a strata survey was made of a geologically complex area in the southeast part of the gossan target.

Maps in this report have all been converted to a metric scale. However, the contours on the Northwest Surveys' topographical map are still in feet. This contrasts with the stadia control map which has elevations in metric. The property is all above timberline.

Location and Access

The Fire Mtn. property is on Fire Mtn., 32 miles (51 km.) E.S.E. of Atlin and 3.5 miles (5.6 km.) east of Gladys River Valley Fire Mtn. is a brilliant gossan surrounded by a string of lakes lying in the upland valleys. The peak of Fire Mtn. (elevation 5993 feet) is at latitude 59° 27.7' N, longitude 132° 47.5' W on N.T.S. map sheet 105 N-7W.

Access must be by helicopter from Atlin, where there is a year round helicopter base. Float planes could land on the lakes along Gladys River such as Angel Lake which is 4 miles (6.4 km.) northeast of Fire Mtn. Mr. Conn also reported that a twin otter has landed on small Camp Lake which lies in the valley west of Fire Mtn. and is only 2500 feet long.

History

The brilliant gossan zone with its minor exposed mineralization has been repeatedly staked over the years.

Canadian Johns-Manville Company Ltd. became interested in the area in 1971 when molybdenite was discovered in felsenmeer fragments between 5000' and 6000' elevation. The Fire claims were staked around the Ni group and the Kow and Red fractional claims were staked to cover open ground in these two groups.

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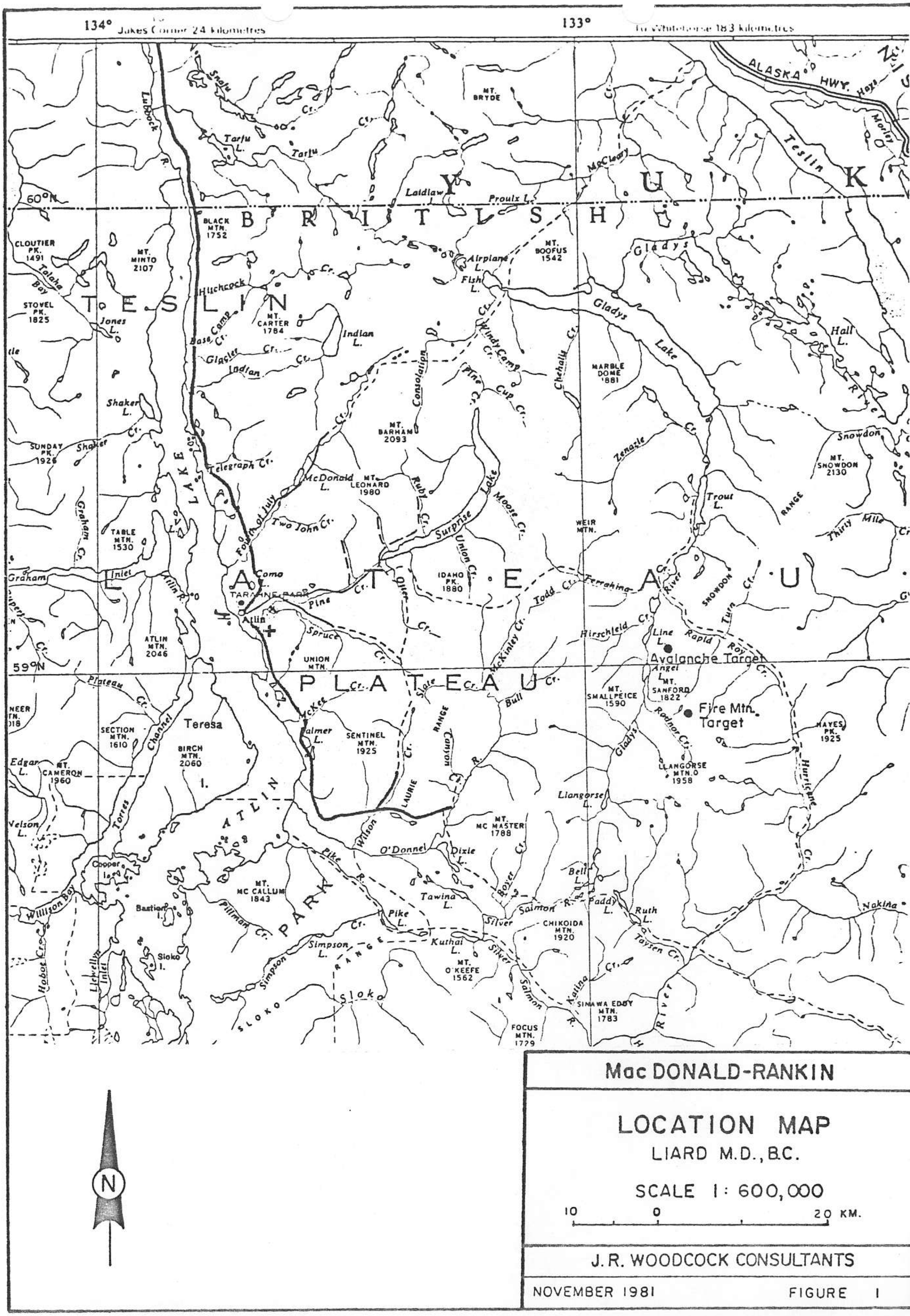
* 300 rock samples were analyzed by Vangeochem Laboratories Ltd.



Mac DONALD-RANKIN

LOCATION MAP

LIARD M.D., B.C.

SCALE 1 : 600,000

10 0 20 KM.

J. R. WOODCOCK CONSULTANTS

NOVEMBER 1981 FIGURE 1

In 1971, Canadian Johns-Manville Company Ltd. carried out:

1. A preliminary geological survey of Fire Mtn. (Assessment Report 3867).

2. A preliminary geochemical survey of Fire Mtn. (Assessment Report 3782).

3. An aerial survey and a planimetric survey (Assessment Report 3733).

4. A brief induced polarization survey.

In 1972, the Company did the following:

1. 4903 feet of B Q diamond drilling.

2. A geological report on the alteration halo on Fire Mtn. (Assessment Report 4435).

3. Survey and installation of a detailed grid system and a magnetometer survey (Assessment Report 4436).

4. More geochemical soil and survey work with the grid as a control (Assessment Report 4437).

The diamond drill program included three holes placed on the western base of Fire Mtn. early in the season, when access to the snow covered upper area was impossible. The logs for these three holes are included in the preliminary geological report by C. Aspinall (Assessment Report 3867). These were followed by three holes based on top of the mountain; the logs for these holes have not been filed for assessment work.

CLAIMS AND OWNERSHIP

When Johns-Manville Company Ltd. became interested in the property much of it was covered by the Ni 1-40 mineral claims which belonged to prospector G.C. Craft of Atlin, B.C. Johns-Manville optioned these claims; surrounded them with the Fire 1 to 120, 125, 126 mineral claims; and filled open spaces with the Kow and Red fractions.

Subsequently Canadian Johns-Manville acquired ownership of the Ni claims and in 1976, all claims were officially abandoned and restaked under the grid system by L. LeRoy as agent for Canadian Johns-Manville Company Ltd. The new 20-unit claims are the Fire 200, 201, 202, 203.

In August, 1981, Dennis Gorc, agent for J. R. Woodcock staked the Fire 204 and 205 claims to join the Avalanche Creek and the

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Fire Mtn. properties. These claims will also be transferred to Canadian Johns-Manville Company Ltd.

The accompanying claim map shows the position of these claims with respect to the Avalanche Creek property. The pertinent claim data is given in Table I.

Table I

Claims	Record Nos.	Record Dates	No. of Units
Fire 200	175	Sept. 8, 1976	20
Fire 201	176	Sept. 8, 1976	20
Fire 202	177	Sept. 8, 1976	20
Fire 203	178	Sept. 8, 1976	20
Fire 204	1479	Aug. 28, 1981	20
Fire 205	1480	Aug. 28, 1981	20

GEOLOGY

Regional Geology

Mt. Sanford and Fire Mtn. are underlain by sedimentary rocks of the Cache Creek formation; mainly cherts and argillites. These sedimentary rocks in other parts of the Atlin terrain include ultrabasic layers, volcanic formations and some thick limestone formations. Such rocks, however, have not been mapped on the Fire Mtn. property. Intruding this Cache Creek Formation are some batholithic plutons. The Surprise Lake Batholith lies north and northwest of the property and is composed largely of alaskite. It hosts the Adanac molybdenite deposit. The Mt. Llangorse Batholith lies only 2.5 miles (4 km.) south of Fire Mtn. It is composed of quartz diorite. The northerly flowing glaciation of the Pleistocene moved many erratics of this batholith northward; these are abundant on all parts of Fire Mtn.

In addition to the Mesozoic rocks, young basalts have been mapped in areas of the Atlin map sheet. These are divided by Aitken into Tertiary lavas and a Pleistocene volcanic rocks. Small exposures or remnants of these are found throughout the region; two very small exposures occur on Fire Mtn.

Major structures are common in the area. Possibly the most important near Fire Mtn. is the fault that bounds Gladys River

Valley on its east side. It is only 3 miles from the property.

Local Geology

For ease of reference, many of the small local topographical features have been given names. These names appear on the Sample Numbers map (Figure 5) and on a number of other maps.

The Fire Mtn. area is mountainous with high relief; but, except for the cirque walls, it is not rugged. All of the property is above treeline; however, outcrops are only extensive on the cirque walls. Most of the mapping must be done with the use of felsenmeer. This should be fairly reliable, except on the steep slopes where there has been down slope creep and intermixing of rock types. In addition, some glacial debris has been deposited on the tops of hills and on the slopes. Shallow glacial debris is found in many places on the hill and glacial erratics of quartz diorite occur everywhere. In addition, there is considerable debris (glacial till and stream outwash) along the lower parts of Saddle and Canyon Creeks.

The Fire Mtn. property occurs in a region of argillites and cherty argillites of the Cache Creek Group. These argillaceous rocks are exposed on Argillite Ridge to the east and also to the north of the circular valley that largely surrounds Fire Mtn. The argillites become hornfelsed on Fire Mtn. The brown biotite hornfels is well exposed in the rugged cliffs to the northwest and west of Cirque Lake, and in the western parts of Fire Mtn. Southeasterly from Cirque Lake, the hornfels gradually becomes bleached, probably by the formation of hydrothermal sericite. The intensity of this bleaching and alteration seems to reach a maximum in the vicinity of Fire Saddle. Bleached hornfels occurs on the slopes of Fire Mtn. immediately north of Fire Saddle and it extends southeasterly onto the flanks of South Peak. The hornfels alteration and the subsequent hydrothermal alteration are accompanied by abundant pyrite.

The alteration and the pyritization decrease abruptly, on the south flank of South Peak, possibly due to a fault. Thus the nice circular zoning that one generally likes to see with porphyry molybdenite deposits is very asymmetric.

With such a large zone of hornfelsing, pyrite mineralization, and hydrothermal alteration, one would expect significant intrusions. However, the surface mapping and the drill holes (Nos. 4 and 5) have only revealed small dykes or plugs. Based on surface observations of weathered felsenmeer one can probably select a few main dyke rocks or porphyries:

A. These include a white quartz-eye porphyry with a fine-grained phaneritic or aphanitic matrix which occurs north of Fire Saddle and crops out in the southeast wall of the

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cirque.

B. A dyke, approximately 10 meters wide, of crowded porphyry which contains quartz phenocrysts, plagioclase phenocrysts, and large K-feldspar phenocrysts.

C. Scattered about the slope north of Fire Saddle is float of a similar porphyry, but with less large K-feldspar phenocrysts. No exposure of this rock has been found.

D. In addition to the porphyries listed for Fire Saddle, a small dyke of crowded porphyry occurs on Porphyry Peak, east of Fire Mtn. This porphyry dyke, about 20 meters thick, strikes northeasterly and dips 70° northerly. The surrounding argillites have been metamorphosed to light grey or white chert; considerable iron sulphide has been added. The resistant cherts are the reason for the sharp peak and the oxidized sulphides are the reason for the sharp red colour.

South of Fire Saddle and occupying part of the Fire Saddle (based on the mapping in felsenmeer) is a breccia intrusive, about 140 meters long and 90 meters wide. Hydrothermal alteration is very intense. However, fragments of the quartz-eye porphyry and the crowded quartz feldspar porphyry, and possibly pieces of Saddle Dyke can be identified. Felsenmeer from this breccia and from the surrounding bleached hornfels (for 30 meters out from the breccia) is characterized by very large angular blocks (20 centimeters to 100 centimeters across). Outside of the "coarse block hornfels" the felsenmeer fragments reduce to normal size.

One can note that Saddle Dyke, to the northeast of the intrusive breccia and Saddle Dyke which occurs in the pass west of the breccia, are offset at the breccia pipe. The breccia pipe could have been intruded along the fault structure which offset this dyke.

Note that Aspinall refers to an alaskite plug in the vicinity of Fire Saddle and he mentions that this is a crowded porphyry containing a feldspar and coarse phenocrysts. He has named this alaskite. Presumably this is the quartz feldspar porphyry of Saddle Dyke and also the scattered quartz feldspar porphyry float on the slopes north of Saddle Dyke. Aspinall notes that the hornfels surrounding the porphyry is highly bleached to a white rock and, that in places, the bleached hornfels contains small quartz crystals resembling phenocrysts. Probably this is the quartz-eye porphyry with its scattered small quartz phenocrysts and its fine-grained matrix. Petrographic work is required to sort out these discrepancies.

Petrography of the Intrusion

The petrography has permitted more accurate classification and nomenclature of the intrusive rocks on Fire Mtn. Such classification is important as it is important to have quartz-rich and alkalic-rich porphyries in the vicinity of potential porphyry molybdenite deposits. This work has defined the white aphanitic quartz-eye porphyry and the crowded dark porphyry of Porphyry Peak and it has divided some of the quartz feldspar porphyries into granite porphyry, quartz monzonite porphyry and plagioclase porphyry. Such classification of the quartz feldspar porphyries may not be applicable in field work as a quick field examination does not detect some of the subtle differences. Also some of the small intrusions may contain more than one of the porphyry types.

Porphyritic Rhyolite

This is a white aphanitic rock which is about 98% matrix and only about 2% phenocrysts. Section W81-353 is rhyolite porphyry with a very altered matrix so that the type of feldspar cannot be readily identified. However, DDH thin section 4-626 is the same type of rock and the matrix is less altered so the minerals can be identified. The matrix size is about 0.016 mm and therefore the rock is aphanitic. The matrix is composed of about 40% quartz, 35% K-feldspar and about 25% alkalic plagioclase.

The scattered phenocrysts include about 1% plagioclase and 1% quartz. In hand specimen, the small quartz phenocrysts can be readily identified, but the plagioclase phenocrysts are altered to sericite clay similar to the matrix material and cannot be readily identified. Both the plagioclase and the quartz phenocrysts are partially resorbed around the edges.

Granite Porphyry

Specimen DDH 4-810 is used for most of the description of this rock type. It is characterized by a fine-grained phaneritic matrix forming about 45 to 55% of the rock, with matrix 0.15 to 3 mm across. The matrix is about 40% quartz, 40 to 50% K-feldspar, and 10 to 20% sericitized alkalic plagioclase.

The rock is characterized especially by the large poikilitic K-feldspar phenocrysts which form up to 20% of the rock in some thin sections. These crystals are so large that the percent estimates can be distorted in a single thin section. Plagioclase phenocrysts, up to 5 mm long form about 20% of the rock. Large quartz phenocrysts are also present forming 5 to 8% of the rock and somewhat smaller biotite phenocrysts also form 5 to 8% of the rock. In addition there are abundant smaller apatite crystals scattered throughout the matrix.

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In most sections, much of the plagioclase is altered to sericite plus clay in contrast to the relatively unaltered K-feldspar. The biotite phenocrysts are altered to muscovite plus opaques or, in places, chlorite.

Quartz Monzonite Porphyry

Examination of specimen W81-305 shows that this rock contrasts with the granite porphyry in that it has much fewer phenocrysts and most of these are plagioclase phenocrysts, forming about 30% of the rock. Some of them are large compound phenocrysts up to 3 mm across. In places these are replaced by K-feldspar around the rims, with much of the remaining plagioclase altered to sericite and clay. Biotite phenocrysts are also present forming 3 to 5% of the rock; these are partly altered to muscovite or chlorite plus opaques. This rock does not contain the large quartz phenocrysts or K-feldspar phenocrysts of the granite porphyry.

The matrix forms about 65 to 70% of the rock with grain size about 0.15 mm. It is composed of about 40% quartz, 30% altered alkalic plagioclase and 30% orthoclase. Parts of the matrix are coarser grained than the average; this may be due to growth or recrystallization of some of the quartz grains.

Plagioclase Porphyry

One section (W81-347) of porphyry appears to have different matrix than the other quartz feldspar porphyries. This rock contains about 55% matrix which is somewhat finer grained than that of the granite porphyry and which is composed largely of altered feldspar, probably mainly plagioclase. Only minor quartz occurs in the matrix.

The phenocrysts form about 45% of the rock. These are largely plagioclase which are up to 3 mm long and form about 35% of rock. Quartz phenocrysts, partly resorbed around the edges, form about 5% of the rock and biotite phenocrysts, partly altered, form about 3% of the rock.

The matrix has a grain size which varies from 0.01 to 0.15 mm with what appears to be a complete range in sizes.

This specimen is on strike with the coarse-grained dyke which trends westerly from Fire Saddle; however, it has a different composition than that of the granite porphyry found in the Saddle.

Diorite

The small red Porphyry Peak in Argillite Ridge, to the east

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of Fire Mtn., contains a coarse grained dyke. This rock appears to be a dark porphyry in hand specimen; however, thin section examination shows that the rock is quite altered and that the matrix content is very low (< 20%) and largely interstitial to the abundant larger crystals. These larger crystals are mainly plagioclase altered to sericite and clay. In addition, mafic phenocrysts including biotite and probably hornblende are present. These are largely chloritized.

The matrix, which forms less than 20% of the rock, is probably altered plagioclase. It contains very minor quartz.

The Breccia

One section (W81-363), identified in the field as breccia because of its included fragments, was examined in thin section. It seems to be largely altered porphyry which has a matrix of K-feldspar plus quartz (about half each) with a crystal size 0.05 to 0.01 mm. Some of the K-feldspar in the matrix is coarser than average and associated with somewhat coarser quartz. Some of this could be a replacement of plagioclase but much is merely recrystallized matrix.

The rock contains some partly resorbed quartz phenocrysts, 1.5 mm across, and some large plagioclase phenocrysts of similar size. Many of the plagioclase phenocrysts have an alteration rim of K-feldspar and much of the remainder of the crystal is completely sericitized.

A crystal fragment with very high relief and yellow birefringence may be topaz. In other places, mosaics of quartz crystals may be altered fragments of hornfels. Some definite fragments of biotite hornfels are present.

Hydrothermal Alteration

Intrusion of an underlying stock has created a zone of hornfelsing with coincident iron sulphide (mainly pyrite) and anomalous fluorine. This is apparent in the map which shows the hornfels and the limonite (Figure 11). This map is based on a hand specimen identification of the intensity of hornfelsing. This is the intensity of brown coloration varying from deep chocolate brown (with high secondary biotite) down to traces of brown and eventually to grey or black where the argillites are relatively unmetamorphosed. In the case of the Fire property, the gradation between relatively unaltered (hand specimen identification) argillites and sediments to intensely hornfelsed sedimentary rocks (a chocolate brown colour) is very sharp. This line of demarcation is shown on the map.

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In places, this hornfels alteration has been bleached to a lighter rock grading to a white rock. This bleaching is caused by the destruction of biotite. In places of intense bleaching or hydrothermal alteration, all of the biotite is gone, scattered sericite flakes are left, and the rock contains quartz veinlets with carbonate or sericite concentrations along their contacts. Also, the matrix, which is mainly quartz with minor orthoclase, appears to have been coarsened by recrystallization.

Co-extensive with this area of hydrothermal bleaching is the hydrothermal pyritization. This can be interpreted on the oxidized rocks from jarosite limonite versus geothite limonite. In general the limonites vary in straight line from jarosite to goethite in direct proportion to the pyrite content. This tool for indicating the pyrite content of the protore zone (before supergene leaching) is only reliable where the pyrite is completely leached from the rock. It is somewhat less reliable in areas where pyrite is still present in the rock.

In addition to the large circular hornfels zone shown on Figure 13, an elliptical zone of bleaching and coincident jarosite limonite occurs in the southern part of the property. This elliptical zone, 2200 meters long and 800 meters wide, is asymmetric with respect to the hornfels - fluorine zone. It probably extends beyond the hornfels zone on its western and eastern limits. Insufficient samples in these two extremities has prevented reliable demarcation of the zone.

Extending northwest from this elliptical zone of bleaching and supergene bleaching, is another smaller bleached zone which includes much unoxidized pyrite. The bleaching within this zone is strictly hypogene whereas the bleaching in the southern elliptical zone could be large hypogene but also partly supergene.

Mineralization

The widespread pyrite which occurs largely along fractures within the biotite hornfels and within the hydrothermally altered zone has been noted. Pyrrhotite also occurs in the hornfels.

In addition, molybdenite, in quartz veinlets or in fractures is very widespread. It has been noted in the biotite hornfels northwest of Cirque Lake and in many places in the cliffs around the head of the cirque. Molybdenite also occurs as scattered flakes and rosettes within the bleached hornfels. Adjacent to Fire Saddle, molybdenite occurs in the quartz-eye porphyry, in the bleached hornfels, and in the breccia pipe. Scattered quartz-molybdenite veinlets occur throughout drill holes 4 and 5.

Aspinall notes that chalcopyrite, galena, sphalerite and arsenopyrite occur in trace amounts in some of the diamond drill core.

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ROCK GEOCHEMISTRY

This report is concerned mainly with the rock geochemistry on and around the large gossan of Fire Mtn. The 300 rock samples were analyzed for copper, molybdenum, manganese and fluorine. The results are presented in Figures 5 to 7 inclusive.

This area of Fire Mtn. is quite high with the peak elevation up to 5991 feet and with all of the area above timberline. Except for the cirque walls around Cirque Lake, the area is not rugged. Outcrops are scarce except for the cliffs of the cirque walls. Throughout, much of the sampled felsenmeer had to be used for the rock chip samples. In places, this may have been transported a short distance down the gentle upland slopes; however, in most cases it is considered accurate enough for the geochemical sampling. The felsenmeer versus rock samples are indicated on all of the maps by different symbols; the difference has been taken into consideration when drawing some of the contours. A greater problem than downward creek of felsenmeer probably is the complete weathering of this rock. In many of the places on top of the hill, pyrite has been completely oxidized and presumably some of the acid-soluable metals have been leached. Thus, the fluorine geochemistry should be more definitive and less affected by leaching.

In many stockwork molybdenite deposits, fluorine is a very definitive element in pinpointing the center of the system. The results of fluorine geochemistry will be discussed first and the patterns for the other elements compared with the fluorine pattern. On Figure 6, contours for 500, 1000, and 2000 ppm fluorine have been drawn. The 1000 ppm contour and the incomplete 500 ppm contour both suggest a center to the system in the vicinity of Fire Mtn. Ridge (near the bottom of hole 5). Inside of the 1000 foot contour there are two small areas with values > 2000 ppm and several small areas with values < 1000 ppm. The remainder of the values are somewhat erratically mixed.

The area of detailed sampling in the vicinity of Fire Saddle was dictated by the presence of intrusions, a highly altered intrusive breccia, and quartz-molybdenite veinlets in altered rock. This area of especially interesting rock does show small lows in the fluorine geochemical pattern. These lows and this interesting area are somewhat asymmetrical to the center of the system, being displaced slightly to the southeast.

The molybdenum has an overall distribution pattern similar to that of the flyorine with the 6 ppm molybdenum contour coinciding to a large extent with the 1000 ppm fluorine contour. Inside of this, however, there are some variations in detail. The molybdenum peaks (> 50 ppm) include one large central area which is superimposed upon the interesting Fire Saddle with its fluorine lows. It also extends northwesterly onto the fluorine high and southwesterly to another small fluorine high.

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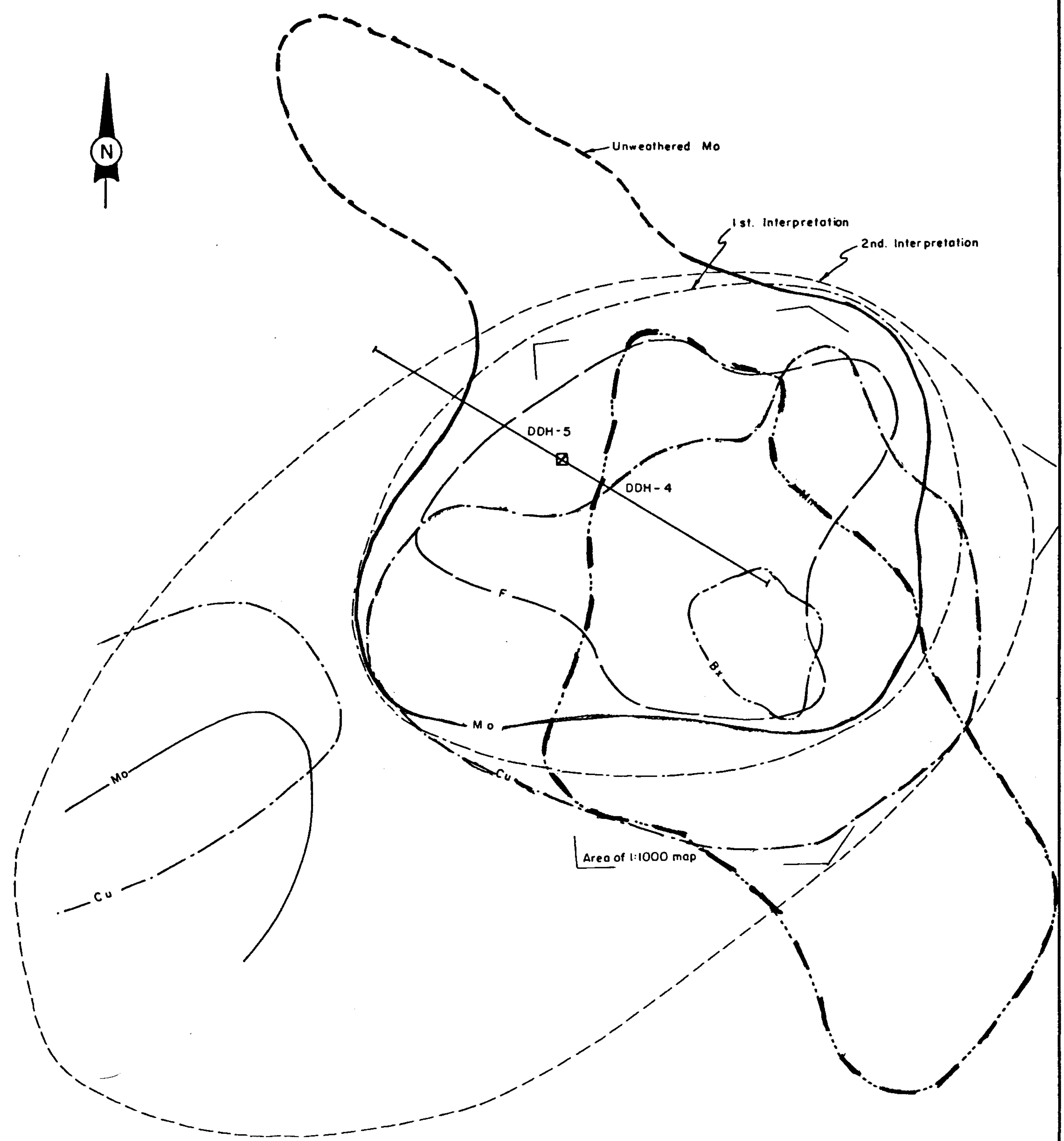
There are some southwestward extensions to the molybdenum anomaly which cannot be explained because of lack of outcrop and because of intense weathering of the felsenmeer in this area. These include the small peaks to the north and to the south of the upper part of Fire Creek. Also rock exposures in the lower reaches of Fire Creek do have some anomalous molybdenum values. This is outside the hornfels zone and the reason for it is not evident.

Copper reacts somewhat different to the weathering environment than molybdenum in that its soluability increases with increasing acidity whereas the soluability of molybdenum increases with increasing alkalinity. Therefore, a comparison of the two patterns is interesting. Within the area of molybdenum anomalies, both the main anomaly at Fire Saddle and the southwestward extension, there is a distinct copper low (< 12 ppm). The only other features on the copper geochemical map include a few highs (> 50 ppm). These two and three sample highs are scattered, mostly along the west and northwest sides of the hornfels zone. The reason is not evident. One could suggest a copper halo; however, the limited extend of these anomalous values makes such an interpretation unreliable.

In stockwork molybdenum prospects, manganese generally gives a low over the center of mineralization. This is more common place than the classical manganese halo which is suppose to occur with porphyry copper deposits. At Fire Mtn., the manganese is low (< 100 ppm) over the eastern and northern part of the sampled area. This overall manganese low has probably been inherited from the sedimentary rocks, and subjected to some subsequent depletion by the hydrothermal process. The rocks underlying Fire Saddle and the breccia pipe and extending southwestward to South Peak have unusually low manganese content (< 30 ppm). This small manganese low is partly coextensive with the anomaly centers for the other elements.

A number of samples have been analyzed at Chemex Laboratories Ltd. for tungsten and 33 of these have been analyzed for tin. Analytical results for tin were all 1 ppm except for sample G81-767 which has 5 ppm. Plot of the tungsten (Figure 10) shows that values are background or about 2 ppm in the unaltered outlying areas and that these values increase up to about 20 ppm through the hornfels zone. The values within the more interesting target areas vary from 25 to 200 ppm.



LEGEND

- ⊠ DIAMOND DRILL HOLE COLLAR
- GEOLOGICAL CONTACT BRECCIA
- MOLYBDENUM
- COPPER
- MANGANESE
- FLUORINE

MacDONALD-RANKIN

FIRE MTN. PROPERTY

LIARD M.D., B.C. — NTS 104N-7

GEOCHEMICAL SUMMARY

SCALE 1:5000

0 — 200 Metres

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NOV. 1981 | FIGURE Nº. 12

CONCLUSIONS

1. The Fire Mtn. prospect is an outstanding target for a stockwork or porphyry-molybdenite deposit. The area of sulphur (iron sulphides indicated by gossan), alteration, and anomalous fluorine (> 500 ppm) is a circular target with a diameter of about 2500 meters. In this zone, most of the sedimentary rocks have been converted to a biotite hornfels presumably by contact metasomatism. A large part has been bleached by hydrothermal alteration.

   A comment on the asymmetry of the bleached or hydrothermally altered zone with respect to the large circular hornfels zone can be made by a comparison with the related intrusive complex and the alteration zone at Lime Creek deposit (Kitsault molybdenum). At Lime Creek an elliptical complex stock about 700 meters wide and 1000 meters long, forms the center and the cause of the conspicuous biotite hornfels zone. In the northern part of the complex stock is a circular zone of hydrothermal alteration and molybdenite mineralization, about 800 meters in diameter. On the north side, this zone lies against the contact of the stock but on its south side it passes through the center of the stock. South of the circular zone of alteration and mineralization, the stock is relatively unaltered. Thus this is a case where the center of alteration and mineralization has been asymmetric to the center of intrusion and hornfelsing.

2. In addition to these favourable features, there are a number of small prophyry intrusions or dykes including rhyolite or fine-grained quartz-eye porphyry and coarser grained quartz feldspar porphyries. There is also an altered intrusive breccia. Quartz molybdenite veinlets are widely scattered in the target area but are especially concentrated in the southeast part of the target area.

3. In an attempt to understand the Fire Saddle zone and select possible drill sites, some pertinent anomalies in the vicinity of Fire Saddle have been superimposed on Figure 12. In addition, this synopsis shows the outline of the breccia pipe and the position of drill holes 4 and 5.

   Before discussing the patterns, a few comments are necessary on some of the individual anomalies.

   (a) The molybdenum anomaly extends from the central zone in a northwesterly direction; however, one can attribute this northwesterly extension to the fact that it is in an area of cliffs where rock exposures are relatively unweathered and unleached, compared to the samples on the upland areas which consist mainly of felsenmeer.

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(b) The reason for the extension for the manganese low to the southeast is not apparent; however, it is probably some inherited characteristic of the sedimentary rocks.

(c) The fluorine anomaly as indicated is not a positive anomaly but an area of relatively low values that is surrounded by high balues.

(d) The copper and the molybdenum and also a positive fluorine anomaly extend southwestward an unknown distance from Fire Saddle.

4. There are several possible interpretations about the best outline for the potential mineralized zone. The most obvious one would be a slightly elliptical zone about 550 meters by 450 meters which encompasses the areas of intrusions, the breccia pipe, and the best parts of the various anomalies.

The second interpretation could be an elliptical zone trending southwest and ecnompassing the main anomaly of Fire Saddle and the smaller peaks of the molybdenum and copper to the southwest. Such an elliptical zone might be 1000 meters long and about 450 meters wide. This interpretation would suit the outline of the larger bleached zone.

5. This large gossan zone, the hornfels, the alteration and the molybdenum mineralization were formed by intrusion of an underlying stock. Most porphyry molybdenite deposits are related to porphyry stocks, with the best mineralization near the apex of the stocks. In addition to the main stock complex, the classical picture has dykes of various porphyries, especially above the apex of the stock. From this general data one can conclude that the stock responsible for this vast zone of sulphides and alteration is still unroofed. Therefore, it is important that deep drill holes investigate the contact area of any underlying stock and determine if the mineralization near this contact is of ore grade.

6. Six holes have been drilled in the system. The first three holes were placed outside of the main system along the west margin of the gossan zone. Hole number 6 was placed within the hornfels and gossan zone but west of the interesting Fire Saddle area. Holes 4 and 5 were collared at the edge of the Fire Saddle target with hole 4 directed towards the more interesting part of this target. Both holes number 4 and 5 contain quartz-molybdenite veinlets. Hole 4 has more quartz sericite alteration and considerably more widespread quartz molybdenite veinlets than hole 5. In addition to the quartz-molybdenite veinlets, there are places with molybdenite paint and places with some disseminated molybdenite.

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Woodcock estimated that one unsplit box of core from hole 5 would grade at least 0.15% MoS_2. Some sections of core from hole 4 have been split; but we have not obtained the assay results. Selected specimens of core from hole 4 were assayed by Canadian Johns-Manville to aid in visual estimates. The highest assays reported are #332 - 0.81% Mo, #482 - 0.28% Mo, #335 - 0.21% Mo, #384 - 0.093% Mo.

Thus it appears from Woodcock's interpretation that holes 4 and 5 were placed in the right part of the property and hole 4 was drilled in a suitable direction. However, it was not deep enough.

As an aid in giving perspective on relative merits of unexplored stockwork molybdenite prospects, Woodcock classifies unexplored molybdenite prospects from 1 to 5 as follows:

1. Molybdenite mineralization discovered; but not worth staking.
2. Molybdenite discovery worth staking and mapping but not worth further work (e.g. Tidewater Prospect at Alice Arm).
3. Molybdenite prospect staked and mapped; further work would entail diamond drilling. Such prospects are too good to drop; the owner might like to find a joint venture partner. Whether or not the property will be drilled will depend partly on the geographical location and the relevant drilling costs (e.g. Trout Lake, Ball Creek).
4. The molybdenite discovery is mapped (including alteration studies and rock geochemistry). The resulting picture demands diamond drilling with no question (e.g. Hudson Bay Mountain at Smithers, Aylwin Creek near New Denver).
5. The discovery is adequately exposed and sufficiently attractive that one can realize after the first day of examination that the property will need to be diamond drilled. It is merely a matter of mapping the property to establish the best drill sites (e.g. Lime Creek and the Dak River at Alice Arm; possibly Endako before it was trenched).

To give further perspective on the merits of the Fire Mtn. prospect, we will review the history of exploration activity for molybdenite in British Columbia. The first phase of activity started in the late 1950's and, was well underway by 1959. It peaked about 1966 and fell off sharply in the late 1060's. The second phase of intense activity started about 1975 and peaked around 1980.

In the early stages of the exploration, well-known and good prospects were immediately acquired and drilled. These included Lime Creek and Endako (class 5), and a little later Hudson Bay Mountain (class 4.5). Subsequent to this early phase of exploration, work in the early to middle 1960's concentrated on new prospects or forgotten old prospects. In 1966, Newmount staked the Dak River or Ajax deposit near Alice Arm. This was the best unexplored "new" prospect that Woodcock saw during this early phase of intense exploration activity. It would be categorized as a class 5.

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The second phase of exploration activity lasted throughout the late 1970's. This saw less exploration on well known good surface prospects and more emphasis on the exploration for blind deposits, based on more sophisticated geological and geochemical definitions. This phase saw the discovery and exploration of the Trout Lake property of Newmount (class 3). A number of class 3 prospects were mapped and drilled in southern British Columbia under Woodcock's direction. Throughout this recent phase of exploration activity the most outstanding, relatively unexplored, prospect examined by Woodcock is the Fire Mountain prospect (about a class 4.5).

RECOMMENDATIONS

1. For further work, a camp should be established in Fire Saddle, a short distance southwest of the crest where it will be protected from the strong easterly winds. Water for the camp and probably for the drilling, if done early in the season, could be pumped from the melting snow just to the northeast. The snowbank stays on the north flank of South Peak throughout the season and melting waters might be collected in a sump below this snowbank.

2. A vertical drill hole, at least 2000 feet deep, will be recommended for this target. This could initially be done with a Longyear Super 38 using both NQ and BQ rods so that they can be reduced should problems arise.

3. The big problem is the site for this drill hole. Most stockwork or porphyry molybdenite deposits have diameters of 600 to 1000 meters and so one might conclude that the target could hardly be missed if the hole was placed vertical; however, there could be complications that are not obvious at surface such as a plunge to the system or some faulting. Therefore, it is important to gain as much geotechnical information as possible before spotting the expensive deep hole. Additional rock chip sampling in the southwest and northeast parts of the bleached zone and closer spacing in the southwest part of the target will define this target more closely; however, it is doubtful that it will resolve the reason for the separation of the copper and the molybdenum peaks into two zones--the main zone and the small southeast extension.

4. Induced polarization work could help; about 11 km. would be needed. The induced polarization lines will have to take advantage of the topography and therefore, they will have to run in a northwesterly direction. Six crosslines, 200 meters apart, would suffice. In addition, lines at right angles and running northeasterly down the two accessible

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ridges could be included. Such I.P. work should be done with 400 meter electrode spacing, moving at 200 meter intervals along the line. Such work should give considerable important information on the pyrite in the system and may also indicate structures such as possible bounding faults or a plunge to the system.

5. All of the core for holes 4 and 5 should be split and continuous 3-meter sections analyzed geochemically for molybdenum. Any values that are high (> 200 ppm) should be assayed for total Mo. In addition, a number of other geochemical elements (fluorine, copper, sulfur, manganese, tungsten). should be analyzed on every fourth sample to help establish trends in this area of interest. In addition, some of hole number 6 should be split to establish the geochemical metal values in unweathered rock in the outlying hornfels zone.

6. When the results of the additional geochemical work and the geophysical work (if done) are complete, the geologist will need to decide on whether the deep hole should be preceeded by about three vertical 300-meter holes spaced along the of the ellipse at about 250 meter intervals and one of these subsequently deepened or whether the deep hole could be drilled without the benefit of this preliminary information.

November 30, 1981

J. R. Woodcock

J. R. Woodcock

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Aitken, J.D., 1959, Atlin Map Area, B.C.: Geol. Sur. of Can., Memoir 307.

Aspinall, C., April, 1973, A Geochemical Report on Molybdenum and Copper Concentration in Soils and Talus Fines, Fire Mtn., Atlin Mining Division: Assessment Report 4437.

The control for this soil survey is a picket line grid. The molybdenum and copper results are presented on two separate maps.

Aspinall, C., August, 1972, Preliminary Geochemical Report, Mt. Sanford Area, Atlin Mining Division: Assessment Work Report 3782.

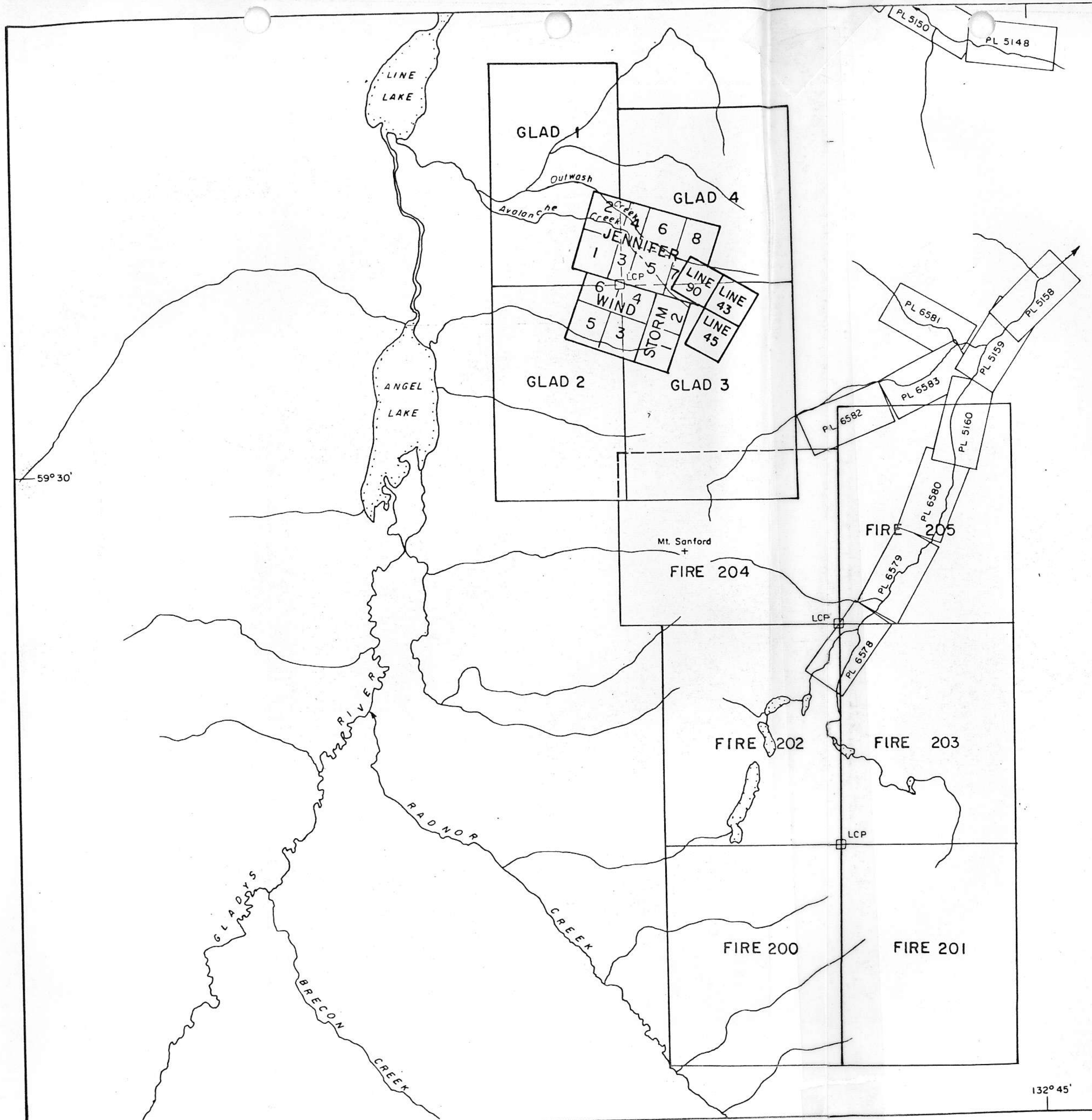
The geological samples included talus fines, soil samples, and stream sediments. These were analyzed for Mo, Cu, Ag, W, Sn, U, Fe, Mn. Much of the sampling was done along contours; at the base of many hills; and in the drainage system. These results are presented on topographical maps.

Aspinall, C., May, 1972, Photogrammetric Surveying, Mt. Sanford Area, Atlin Mining Division: Assessment Report 3733.

This short report accompanies the topographical map made by Northwest Surveys Corporation.

Aspinall, C., April, 1972, Preliminary Geological Report on the Fire-Ni Mineral Claim Group, Atlin Mining Division, B.C.: Assessment Work Report 3867.

This report gives considerable information on the geology, the alteration and the mineralization of the property. It also includes the drill logs for holes 1 to 3 inclusive.



LEGEND

CLAIMS OWNED BY MacDONALD – RANKIN

PL PLACER LEASE

NOTE : Sources of information for this map include government claim maps for 104 N-7W & 10W, maps from a Canadian Johns – Manville Co. report by R. Mulligan dated Nov. 10, 1976 and personal observations by D. Gorc.

MacDONALD – RANKIN

FIRE MTN. & AVALANCHE PROPERTIES
104 N-7W & 10W – ATLIN M.D., B.C.

CLAIM MAP

SCALE 1:50,000

0 1 2 KM.

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SEPTEMBER 1981 FIGURE 2