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Adanac Mining & Exploration Ltd. (N.P.L.)

EXECUTIVE OFFICE

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December 18, 1969

Dr. A. Sutherland Brown
Geologist
Department of Mines & Petroleum Resources
Victoria, B. C.

Dear Dr. Sutherland Brown:

Thank you for sending the enclosed report on the Adera claims for our perusal. The report is excellent and Adanac has no objection to publication of any of its contents. I have taken the liberty of pencilling several corrections on the first page with respect to the claims held by Adanac. Also, we are not aware of a magnetometer survey performed by Adanac. Perhaps the mention of such a survey refers to some previous holder of the claims.

Yours very truly,

ADANAC MINING & EXPLORATION LTD. (N.P.L.)

J.D. Pelletier

J.D. Pelletier,
President.

JDP/la
Enc.

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PROPERTY FILE

Preliminary report made avai'-ble to the owner in advance of publicat. .. Not to be published in whole or in part before publication by the British Columbia Department of Mines and Petroleum Resources.

Title Ann. Rept.

Author ASB

Date and Typist December 3, 1969 bm 1

ATLIN MINING DIVISION

ADERA

By A. Sutherland Brown

LOCATION: (59° 42.5', 133° 24'; 104N11/W) On upper Ruby Creek some 21 miles by road from Atlin (see property 109, Fig. A).

CLAIMS: ADERA group of claims, ~~15~~ 12 claims covering main showings, also KEY 1 to ~~16~~ 44, RU 1 to 8, ~~FOX 1 to 16~~, PACIFIC 1 and 2, NI 1 to 4

ACCESS: Seventeen miles by road from Atlin via Pine Creek and Surprise Lake to the Adanac camp; 4 miles from camp to showings.

OPERATOR: Adanac Mining and Exploration Ltd., 355 Burrard Street, Vancouver 1; John D. Pelletier, president; James Wallis, resident manager.

METAL: Molybdenum.

WORK DONE: Thirty-eight thousand feet of diamond drilling, BQ, NQ, and HQ core, some soil geochemistry ~~and a magnetometer survey.~~ Exploration started in the late fall of 1968.

REFERENCE: Aitken, J. D., 1959, Geol. Surv., Canada, Mem. 307.

DESCRIPTION:

Geology of the Region

The Adanac property is situated on upper Ruby Creek. The topography, characteristic of the Teslin Plateau, consists of large round-topped mountains of concordant summit heights isolated by broad drift-covered valleys with steep sides. The showings extend from 4,800 feet to about 5,100 feet elevation mainly in the valley.

The body of molybdenite mineralization on the Adera claims occurs at the periphery of a small boss called the Mount Leonard Boss which in all probability is connected at shallow depth to the main Surprise Lake Batholith. Both the boss and the main batholith are composed very largely of alaskite, Title Adanac Adera Claims

Author ASB

Date and Typist December 4, 1969 bm

TABLE SHOWING MINERAL COMPOSITION OF ALASKITE PHASES

	Quartz Monzonite Porphyry (1)	Coarse Alaskite (2)	Crowded Porphyry (3)	Sparse Porphyry (4)
	Average of 5	Average of 2	Average of 4	Average of 9
Quartz	28.5	38.	37.5	36.7
Potash Feldspar	34.5	35.	31.0	34.3
Plagioclase	31.8	25.	29.3	26.6
Biotite	3.4	1.5	2.0	1.8
Opaque	0.8	0.5	0.3	0.3
Accessories				
Apatite	*	✓	*	✓
Zircon	✓	✓	✓	*
Fluorite	*			*
Sphene	✓	✓	*	✓
Brown Mineral	✓	*	✓	✓
Zoned Plagioclase Composition	An_{34-24}	An_{18-12}	An_{24-10}	An_{32-11}
Average Phenocryst Per Cent	10-20	—	45	10
Grain size				
Phenocrysts	1-10 mm.	2-20 mm.	0.5-10 mm.	1-6 mm.
Average matrix	0.3-0.5 mm.	—	0.07 mm.	0.1-0.3 mm.

* Abundant

✓ Present

that is, a two feldspar granite with less than 5 per cent mafic minerals. The Mount Leonard Boss intrudes a sequence of rocks ranging from the Permo-Pennsylvanian Cache Creek metavolcanic rocks with remnants of the ultramafic Atlin Intrusions of similar age, to the Fourth of July Batholith of probable Jurassic age. The alaskite intrusions are judged to be of mid-Cretaceous age. They are overlain by valley filling flows of olivine basalts and on Ruby Mountain by the remnants of a central volcano that is Late Tertiary and Pleistocene (*see* Aitken, 1959).

Detailed Geology

The valley floor of upper Ruby Creek is largely covered by coarse drift and the lower slopes by felsenmeer. Outcrops are limited to small parts of the main tributary streams and steep upper slopes. However, information from extensive diamond drilling permits compilation of a reasonably accurate geological map (Fig.). This map was drawn in August from examination of available outcrop and a relatively large part of the core produced to that date. The topography is based on a company survey of drill holes with additional barometer traverses by the writer. Additional information was received from the company in the autumn to augment that gathered in the field.

The main part of the map is underlain by various phases of the Mount Leonard Boss which are in contact along the northern border with older rocks. The original stratiform rocks are represented by a small outcrop of amphibolitic gneiss that may originally have been a tuff. It is now a highly foliated rock of variable grain size composed principally of hornblende and andesine plagioclase in variable but subequal amount with minor ilmenite and biotite. The gneissocity trends about north 10 degrees east and dips about 75 degrees east. The amphibolitic gneiss is separated by a tongue of unfoliated porphyritic aplite from the Fourth of July Batholith. The latter is composed of biotite hornblende granodiorite with a marked foliation sub-parallel to that of the amphibolite. Outcrop and felsenmeer of the granodiorite extend westward to the steep slopes north of Molly Lake where the foliation trends more easterly. The granodiorite is slightly unusual as it is a potassium-rich, melanocratic rock composed of about 40 per cent plagioclase normally zoned from An_{50} to An_{34}, 17 per cent perthite in part as myrmekite, 15 per cent quartz, 21 per cent hornblende, and 6 per cent biotite with notable amounts of apatite and zircon. It exhibits marked cataclasis and recrystallization shown by shattered quartz, preferred orientation of plagioclase and hornblende, tails of aligned biotite on lenses of hornblende, virtual destruction of much of the zoning of plagioclase, poikilitic hornblende, and myrmekite.

The Mount Leonard alaskite pluton is composed of numerous phases. In the area of Figure , four phases are mappable. These phases are texturally very different but chemically nearly identical (see Fig. and the accompanying Table). All are actually alaskites of subequal total quartz, perthite, and oligoclase with 5 per cent or less mafic minerals (see Fig.). One phase which may contain 5 per cent mafic minerals or a little less and more than the average amount of oligoclase is called a quartz monzonite porphyry (1). The other phases are: (2) coarse alaskite, (3) crowded quartz-perthite-oligoclase porphyry, and (4) sparse quartz-perthite-oligoclase porphyry. The average mineral composition, percentage of phenocrysts, and the grain size of these phases is shown in the Table .

The visible amounnt of oligoclase in the perthite is here shown with the plagioclase.

Although very similar mineralogically, these phases are quite distinct in hand specimen see Plate . (1) The quartz monzonite porphyry appears like a medium-grained mottled rock of chalky feldspar and dark grey quartz with random large phenocrysts. (2) The coarse alaskite is a pegmatitic very coarse mottled rock of irregular texture with dark quartz and light grey feldspar. (3) The crowded porphyry contains about 50 per cent phenocrysts in a very fine matrix with prominent rounded dark quartz phenocrysts. (4) The sparse porphyry is somewhat variable, commonly having 10 to 20 per cent phenocrysts in a fine aplitic matrix but may have very few phenocrysts in narrow dykes or chill zones. On the surface all tend to stain a rusty brown but particularly the sparse porphyries which take on a light brown salt and pepper aspect.

Microscopically the quartz monzonite porphyry (1) is seen to have a nearly seriate texture from large phenocrysts to fine aplitic matrix. Perthite of bead and string type contains only 5 to 10 per cent oligoclase. Alteration is relatively intense with plagioclase partly changed to sericite or muscovite and biotite to a chlorite with a light blue anomalous interference colour. Apatite and fluorite are particularly abundant accessories. The coarse alaskite (2) has a highly irregular texture with grains as large as 2 centimetres. Perthite has about 30 per cent oligoclase (An_{12}) as string networks with aligned twinning. The plagioclase has normal zoning over the interval An_{18-12}. Biotite is partly altered to penninite chlorite. Zircon, apatite, and brown mineral are all important accessories. The crowded porphyry (3) has large and middling sized phenocrysts in a very fine aplitic matrix. Fretted borders of plagioclase phenocrysts are common. Perthite of string network type contains about 20 per cent oligoclase. Plagioclase and biotite may be slightly altered. Apatite and sphene are conspicuous among the accessories. The sparse porphyries (4) are the most variable in composition and texture. All are aplitic rocks the main difference being their variable percentage of phenocrysts. These may range downward from 20 per cent to 1 or 2 per cent with about 10 per cent being most common. Most specimens have compositions close to coarse alaskite and crowded porphyry (see Fig.) but some have slightly different compositions. Chill facies of any phase would be similar in composition to the sparse porphyries.

It is fairly clear that all phases represent about the low melting or eutectic composition of the system Qu-An-Ab-Or system.

<u>Structural Relations</u>.—The relative age sequence of the phases is fairly clear. The quartz monzonite porphyry (1) is the oldest. It is intruded by all other phases and is the most altered. The coarse alaskite appears next oldest for it is cut by crowded porphyry, sparse porphyry,

and aplite dykes and also is altered more than these phases. However the coarse alaskite may also grade into crowded porphyry. The latter (3) is cut by aplite dykes and grades into sparse porphyry so that it may be the same age or slightly older than some of the sparse porphyry. The sparse porphyry (4) is itself cut by aplitic dykes and also grades into almost phenocryst-free aplite.

Longitudinal sections (Fig.) illustrate the structural relations. They show the intrusion of the quartz monzonite porphyry (1) by the other phases, the flat sheet-like nature of the main coarse alaskite body, and the gradation of various younger phases. It shows that the eastern dyke complex of coarse alaskite exposed in the creek grades downward to sparse porphyry possibly through crowded porphyry. Gradation from sparse porphyry to crowded porphyry is shown further west in the creek, between the creek and drill holes on 4 south line, and elsewhere. Between coarse alaskite and crowded porphyry it is shown in diamond-drill hole 8W 4S and in 4W 8N.

In the crowded and sparse porphyry in the vicinity of the creek showings, there are some large tabular bodies that look like dykes but may well be large inclusions. They have a composition nearly identical to the quartz monzonite porphyry (1) but have a fine aplitic matrix and include some hornblende as well as biotite.

In summary, the quartz monzonite porphyry (1) is clearly the oldest phase and the other phases have somewhat complex relations that indicate that they are successively younger from (2) to (3) to (4) but that they may also grade into the next youngest phase. Clearly all phases are as closely related in age as they are in chemistry.

Young dykes that cut mineralized veins as well as all phases of the pluton occur in small number. They are mostly quite altered stony fine-grained grey-green amygdaloidal andesites or possibly basalts and are composed of highly sericitized plagioclase and completely chloritized hornblende in a microporphyritic, trachytic texture. Carbonate occurs as an alteration mineral and with quartz in amygdules.

Faulting

A number of diamond-drill holes intersected steep gouge zones of faults of unknown movement. Diamond-drill hole 10N OW was drilled entirely in gouge. This hole is located along what was previously taken to be a geological contact but now seems to be a steep fault oriented about north 60 degrees east possibly dipping north at about 80 degrees. A small fault of similar orientation was observed in outcrop in the northern tributary. The 10N fault appears to cut off the ore zone and may drop it several hundred feet in the north block.

Another probable fault is indicated on the sections by sharp changes of elevation of the bottom of the coarse alaskite sheet. This is interpreted as related to steep faulting evident in drill hole 8N 8W. The strike of the fault is estimated to be about north 30 degrees east, and the western block is raised about 150 feet relative to the eastern.

Mineralization

Molybdenum mineralization is exposed in quartz veins on Ruby Creek in crowded porphyry. It has been known as a molybdenite occurrence since at least 1905 and was shown on Geological Survey of Canada Map 1082A. It has been staked and dropped repeatedly in recent years, and was relocated by the present company in 1967. Drilling started in the late fall of 1968. The mineralization is somewhat unusual for in part it consists of very large and spectacular rosettes of molybdenite erratically distributed in otherwise barren quartz veins. Characteristically these veins are nearly flat, dipping about 10 degrees northward. The larger ones are commonly 0.5 centimetre to 1 centimetre thick and have a continuity over at least 25 to 50 feet. These flat veins occur every 4 inches to 2 feet apart with major veins about each foot. The veins may have some drusy cavities lined with clear dark quartz crystal terminations. Commonly the only metallic mineral is molybdenite but pyrite may be present in small amounts. Clear yellow powellite is another rare but widely distributed mineral. The molybdenite is found in flatish rosettes up to 1 inch in diameter that tend to occur in clusters in what elsewhere may appear as barren vein. Also present are fractures coated with very fine-grained molybdenite or thin veinlets of quartz and very fine-grained molybdenite. In general both the dry fractures and thin veinlets strike westerly and dip steeply. In addition the rocks are well jointed with a northerly strike and steep dip most common. Figure is a stereoprojection showing poles to the veins and joints that were measured in the area of the showings. A strong tendency to an orthogonal system is evident in the distribution of the flat veins, westerly dry molybdenite fractures and northerly joints. In addition some westerly striking veins dip at moderate attitudes and give a partial girdle with a westerly axis.

Outcrop of sparse porphyry near the western border of Adera No. 8 claim shows a similar type of mineralization and orientations with the main flat veins dipping gently southward.

In other outcrop areas pronounced fracture stockwork and a variable quartz stockwork are evident but little or no molybdenite is present. Minor galena-bearing quartz veins or pyrite, arsenopyrite, quartz veins occur near the contact with the granodiorite in the northern tributary creek.

The large amount of drilling has outlined a mineralized body that roughly parallels the lower contact of the coarse alaskite sheet with mineralization in the lower part of the coarse alaskite sheet and the adjacent sparse or crowded porphyry beneath it. The quartz monzonite porphyry is either unmineralized or very sparsely mineralized. The mineralized body that may be of economic grade steps downward from being almost entirely in the coarse alaskite sheet in the west to mostly in the porphyries in the east (see Fig.). The surface projection of the mineralized body is closely similar to the outline of the coarse alaskite and crowded porphyry phases south of the 10 north fault.

In this zone of better mineralization the pattern evident in the creek showings is seemingly present although the strike orientation is uncertain. However flat veins up to one-half inch thick and steep narrow fine-grained quartz molybdenite veinlets and dry fractures also predominate and veins and dry fractures of moderate dip also occur.

Alteration in the mineralized zone is relatively slight and includes minor sericitization of plagioclase, and chloritization of biotite. Rarely some veinlets show narrow envelopes with some potassic flooding. Beyond the mineralized body there exists a halo of greater alteration but it is rarely intense except adjacent to faults. In the alteration halo barren quartz, quartz pyrite veins, and dry pyrite fractures occur. Sericite and chlorite alteration are most intense and the white mica may be fairly coarse. The alteration halo and fracture stockwork extend through the quartz monzonite and sparse porphyries to the limits of the map. Fluorite occurs as a major accessory mineral in much of the alteration halo.

The company has announced that the drilling up to November 15, 1969, has outlined probable mineable reserves of 69,876,000 tons of 0.141 per cent molybdenite. A continuing programme of exploratory drilling plus underground testing and bulk sampling is planned for 1970.