GEM MOLYBDENITE PROSPECT

82ESW001 GEM

The molybdenite showings are on the Gem Crown-granted mineral claim, Lot No. 3311S, owned by R. C. Johnston of Rock Creek, B. C., and optioned to J. O. Howells of Osoyoos, B. C.

The prospect is 1¼ miles in an air-line westerly from the town of Osoyoos. It may be reached by following a motor-road south-westerly from Osoyoos, elevation 950 feet, for 2 miles to the camp of the Dividend mine, elevation 1200 feet, thence by going north-westerly through sage-bush for half a mile to the workings, elevation 1375 feet.

Joseph T. Murphy, deceased, located and staked the showings as a copper prospect in 1931, did a little surface work and between the year 1935 and 1937 sank a 20-foot shaft on the copper showing. In 1942, the present owner of the claim, Mr. Johnston, gave an option to Mr. Howells who, during the year, cleaned out the shaft and dug a short stripping westerly from it. The showings were examined by the writer in December, 1942.

The Gem claim extends over low bluffs about 150 feet above the drift-covered floor of the Osoyoos valley. These low bluffs are at the base of Kruger mountain the top of which lies 2 miles westerly. The workings are on a small, flat area approximately 100 feet in diameter, which extends easterly to the top of low, rock bluffs and westerly

to the base of high bluffs which extend upward to Kruger Mountain.

The showings lie within, and close to, the south-easterly border of a large area of Osoyoos granodiorite and related rocks, which extends north-westerly for 6 miles and north-easterly for 1½ miles. The showings are 1400 feet southerly from the contact of the batholith with an area of limestone and chert sediments.

The workings consist of an old shaft, and a recently dug trench. The shaft was sunk several years ago on a shear-zone 1-2 feet wide that contains some chalcopyrite and the green copper carbonate, malachite. This shaft was cleaned out in 1942 by Mr. Howells, and at the same time a trench 75 feet long was dug westerly from the shaft.

The trench is approximately 5 feet wide and 2 feet deep. The floor slopes unevenly downward from the shaft.

The following paragraph summarizes the occurrence of molybdenite in this deposit and subsequent paragraphs describe the occurrence in greater detail.

The molybdenite is found as 1/8th-inch rosettes of molybdenite flakes widely scattered in a lens of pink granite. It is not found in stringers or veins. The mineralized area measures about 3 feet wide by 80 feet long. The grade of ore is low, the arithmetical average of 7 samples takes in the mineralized area over an average width of 3 feet being: Molybdenum (Mo), 0.28 per cent. Only a small tonnage is indicated.

The molybdenite in this deposit is not found in a typical pegmatite, but the writer believes that both the pink granite host rock, and the molybdenite, are pegmatitic in origin. Inasmuch as the limited extent of the molybdenite mineralization depends on the validity of this assertion, a full description of the rocks and mineralization will be given in its support.

As exposed in the workings, the lens of pink granite is at least 110 feet long and ranges in width from 0 to 3 feet. The change from 0 to 3 feet occurs within 3 feet of the top of the lens so that all exposures further along and below it suggest a generally tabular body, about 3 feet wide.

The lens strikes easterly, dips from 45 to 60 degrees southward, and plunges 5 to 10 degrees westerly. The lens is exposed in the shaft, and in the high easterly and low westerly ends of the trench but because of its westerly plunge, it is not exposed along a high section that is found in the trench between points 30 and 45 feet respectively, westerly from the shaft.

Transverse faults or shear-zones displace the granite lens at two places. A shear-zone, striking north 70 degrees east and dipping 45 degrees north-westward, crosses the shaft diagonally from the south-west to the north-east corner. This shear-zone consists of sheared rock ranging from 1 foot to 3 feet in width. The movement along the shear-

zone has been reverse. It has displaced the hanging-wall part of the lens, which lies in the trench, about 3 feet horizontally to the south, and 3 feet vertically, with respect to the foot-wall part of the lens which lies in the shaft. At a place 60 feet westerly from the shaft a shear-zone, strike north 45 degrees east and dip 75 degrees north-westward, cuts the lens. This shear-zone ranges from 3 to 6 ins. in width. Movement along this shear-zone has also been reverse, so that the westerly continuation of the lens beyond the fault has been moved northerly and raised an unknown amount. Reverse movement along the shear-zone is indicated by the greater width, 4 feet, of the lens west of the fault where the floor of the trench is high, as compared with a narrower width, 2 feet east of the fault, where the floor is 3 feet lower. Because of the westerly plunge of the top of the lens, these relations in width would not exist, were there no reverse movement along the fault.

Quartz-diorite forms the walls of the mineralized granite lens. It is medium grained and greenish-grey in colour. Where it lies over the granite lens it is lighter in colour, somewhat greasy in lustre, and contains small indefinite blebs of pink feldspar. Under the microscope it is seen to consist of quartz, plagioclase-feldspar, chlorite, epidote and a little titanite. Along the section of trench, between 30 and 45 feet westerly from the shaft,

the quartz-diorite lies directly over the lens of pink granite. It is still quite massive and unsheared, but is characterized by a greasy appearance and the development of irregular, pink areas of perthitic feldspar 1/16th to 1/8th inch in diameter. This feldspar has probably formed from solutions which emanated from the pink granite lens during its period of crystallization.

The pink granite is medium grained and ranges in colour from white to pink; dark-coloured minerals are absent. As seen under the microscope, it consists of abundant perthitic feldspar and quartz, some secondary albite-plagioclase feldspar, and scattered flakes of molybdenite. Because of its mineralogy, the rock could be called an alaskite, a name applied to granites which lack dark minerals. However, the term pink granite will be used by the writer in referring to this rock.

The texture and relations between the minerals as seen under the microscope, suggest that the pink granite represents a rock closely related in origin to pegmatites. The relative amounts of quartz and perthitic feldspar vary; in some places the feldspar is much more abundant than the quartz, and in others they are about equal. Some of the quartz is seen as elongated blebs cutting across grains of perthite and some is found with albite-plagioclase and pyrite in veinlets which also cut the perthite. The perthite grains are frequently replaced along their cleavages by sericite and, in places, by foils of muscovite.

Much of the perthite has well-shaped crystal terminations which suggest growth in either open-spaces, or in a very dilute, non-viscous environment, such as would obtain in the early stages of the formation of a pegmatite. These characteristics of the pink granite indicate its close relationship to ordinary pegmatites. On the basis of its mineralogy and mineral relationship it could be described as a "fine-grained pegmatite".

The molybdenite rosettes are widely disseminated in concentrations that range from rosettes spaced 1/4-inch apart to those several inches apart. Such concentrations represent assays over 3 feet that range from: Molybdenum (Mo), 0.03 to 0.62 percent. A few scattered grains of chalcopyrite, and an occasional quartz-pyrite veinlet are also found in the pink granite. The molybdenite rosettes are, however, not conspicuously intergrown with either of these two sulphides.

Oxidation of the mineralized rock has resulted in the formation of powellite from molybdenite and malachite and limonite from the chalcopyrite and pyrite.

Close to the surface, much of the molybdenite has been altered to fluorescent powellite (calcium molybdate). This oxidation product commonly rims molybdenite flakes or, where oxidation has been more intense the powellite entirely replaces the molybdenite rosettes.

Malachite and limonite have formed mainly along the two shear-zones described above. Copper solutions have

seeped out along fractures from the mineralized granite and deposited malachite over wide areas. The presence of malachite and some chalcopyrite in the shaft-shear appears to have been the reason for the sinking of the shaft, the molybdenite having been encountered only accidentally in the sinking operation. Both malachite and limonite are abundant in decomposed material in the easterly part of the trench.

Vein molybdenite is absent. The molybdenite rosettes are found as constituent material of the pink granite, similar in occurrence to the perthite feldspar and quartz. The molybdenite is contemporaneous in age with these minerals. As with the feldspar and quartz, the molybdenite seems to belong to a pegmatitic stage of formation, rather than to a vein-forming period, post-dating the formation of the host rock.

The best mineralization is found in the west wall of the shaft and at a point in the trench 60 feet westerly from the shaft. Molybdenite is found in only small amounts in the east wall of the shaft and it is entirely absent in an outcrop of the pink granite 35 feet easterly from the shaft. At the west end of the trench, 75 feet from the shaft, the amount of molybdenite is small and it appears to be decreasing in a westerly direction.

Assay No.	Width	Location	Description of Sample	Molybdenum (Mo) percent
511 E	4'	In trench 70' west of shaft		0.13
512 E	3'	In trench, 63' west of shaft		0.53
513 E	3'	In trench, 60' west of shaft		0.62
514	3'	In trench, 55' west of shaft	Rusty decomposed rock	0.23
515	3'	In trench, at west side of shaft	Rusty, leached rock, very close to original surface of ground	0.33
516	3'	On west wall of shaft, 12' below collar	Across full width of pink granite	0.06
517	3'	On east wall of shaft, 12' below collar	Across full width of pink granite	0.03

The tonnage to be expected from this deposit is small and the grade of ore is low. The molybdenite is unevenly distributed, without any apparent structural control, within a lens of pink granite the extent of which is very uncertain. The probable pegmatitic origin of this molybdenum, and apparent contemporaneity in age with that of the pink granite rather than a hydrothermal origin as a vein-mineral deposited in a fracture or fractures after the complete crystallization of the host-rock, militate against there being any quantity of mineable material.

John S. Stevenson,
B. C. Dept. of Mines,
January 27, 1943.