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Torwest Resources Ltd

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RED Mountain Feb. 25th, 1965.

Mr. Chairman, Fellow Geologists and Engineers:

I am sure that many of you here are familiar with the history of the Rossland area. Like Barkerville, Cobalt and Elliott Lake, this camp has seen its boom times, only to lapse, for economical reasons, into almost total obscurity.

In 1887, the first claim in the Rossland area, the Lily May, was recorded. It was relocated in 1889 by Oliver Bordeaux of Colville and Newlin Hoover of Nelson. While doing assessment work on this claim in the following year, prospectors staked the Center Star and the War Eagle. In order to finance their recordings of these claims, they sold the Le Roi claim, which they had additionally staked on the extension of the Centre Star, to the Deputy Recorder at Nelson, Mr. E.S. Topping. The strugglos and the successes of the Le Roi mine fighting litigation, internal dissention and economic conditions is spectacular. In company with its sister mines, they were responsible for the erection of the famous Trail Smelter. From the first shipment of ore in 1891 to the Montana Smelter to the final Trail shipment in 1929, the Rossland mines produced over 2,000,000 tons of copper-gold ore valued at $60,000,000.

Since the closing of the mines, the area has seen sporadic and short-lived attempts at production. Leasing became very popular and several individuals made handsome profits in this manner.

In early 1964, 10 individually owned crown grants lying on the west flank of Red Mountain were acquired and formed into a group which was offered to the Torwest interests. It was theorized that these claims lay astride a structure parallelling the famous north break from which the production mines had emerged. In addition, the group contained an old mine - the Jumbo - from which some 30,000 tons of gold-copper ore had been shipped.

The Torwest block is located almost wholly within the Mount Roberts series of sediments and volcanics. No producers of consequence have emerged from this formation. The early production mines of the area lay within the Rossland volcanics, a series of

intrusive and extrusive formations of normally siliceous nature.

Before going into the geology of the Torwest ground, it might be well to relate a history of the geological processes that produced the present-day structures. My authority for this is C.W. Drysdale's well-recognized Memoir #77 "Geology and Ore Deposits of Rossland, B.C." I quote freely from his report.

During a part of the Carboniferous Period, the district was covered by the ocean, along the shores of which ~~volcanic action saw~~ vast amounts of volcanic dust or tuff deposited in beds along with the normal clays and sands. The sedimentary materials represented by the Mount Roberts formation are all fine-grained and indicate deposition in waters without strong currents.

Near the end of the Paleozoic era, the region was uplifted and began a condition of continental erosion and sedimentation, which has lasted to the present time.

During the Triassic period, an intrusion of augite porphyry took place, in the form of sills and irregularly shaped masses, which spread out between the bedding planes of the older formations and probably reached the surface to form agglomerates, tuffs and lava flows.

A most important geological event from the economic standpoint took place towards the close of the Jurassic period, known throughout the Cordilleran region as the Jurassic mountain-making revolution. It gave birth to the Sierra Nevada mountains in the U.S. and the Coast ranges, as well as other ranges in B.C., and was accompanied by much igneous activity and accompanying mineralization. The Trail granodiorite intruded the Rossland formations during this period. A younger but closely related intrusion took the form of an irregular, in places flat lying, monzonite mass.

The Cretaceous period brought with it a long period of erosion, which was followed near the end of this period by the Laramide Revolution which uplifted the whole Cordillera and outlined the present ranges. The Columbia Mountain system, in which Rossland lies, formed one of the axes of maximum uplift and the vein fissures of the mines

were probably further shattered and sheared to form channels, possibly, for more mineralizing solutions.

The early Tertiary period continued the erosion and sedimentation cycle. The mid Tertiary saw the intrusion of the widespread Coryell plutonic rocks. At this time, the vein fissures were probably further fractured and the sulphide deposits locally enriched by gold brought in by the alkaline mineralizing solutions connected with the batholith.

During the glacial period, the Cordilleran ice caps which moved over the whole countryside only slightly modified the upland topography.

The work program as set out by Torwest went in this manner. Initial work on the Rossland project began on February 5th, 1964 with the cutting of base and picket lines. A 3600' baseline was run through the middle of the property on an east-west bearing with north-south picket lines being turned off at 200' intervals along the line. These picket lines were extended 1000' in both directions.

Along these cut lines geophysical surveys were conducted by Moreau, Woodward and Company Ltd. of Toronto in late February of that year. The surveys involved consisted of a magnetometer and an electro-magnetic type called Turam.

The electro-magnetic survey located six relatively shallow conductors. The magnetometer survey exposed several high magnetic areas, some corresponding to the electro-magnetic anomalies, others quite independent. It is of interest to note that the surveys only covered the northern half of what is called the "A" zone. The EM survey over this section showed no significant change. The magnetics displayed a strong trend lying off to the east of the "A" zone.

Drilling began on March 3rd, employing one machine of "A" core size and using wire-line equipment. The initial program consisted of checking out the EM anomalies. To this end, six holes proved the anomalous conditions to have been caused by an abnormal concentration of pyrrhotite and pyrite. Three holes in the high magnetic sections proved the existence of heavy pyrrhotite in 2 cases and strong magnetite in the other.

The drill target was now switched to depth testing of the Jumbo mine. Eight holes in this area showed scattered erratic values in gold mineralization that presented no definite pattern. Some of the results obtained ran from a high of 5.16 oz. gold per ton over 6-1/2 feet to a low of .30 oz. per ton across 5 feet. Some 6,978 feet were drilled in this phase of the operation.

In late May with the disappearance of the snow, a surface examination coupled with a sampling campaign was carried out over the claims. From this emerged an area well mineralized in molybdenum in the east half of the Coxey claim. On surface, this represented an area 1200' long and 300 feet wide. The samples chipped from the many trenches in this area averaged 3/4% to 1% MoS_2 with some running up into the 2% and 3% classification. To initially check this area out, 6 short pack sack holes were distributed along the strike of the structure. Three holes which were put into the "A" zone checked out at .457% MoS_2. Two holes to the south of the "A" zone carried no values, whereas the 6th hole located only 100 feet from the Coxey south boundary intersected scattered values. The stage was now set to investigate this promising area.

Drilling of the moly show began in late June of 1964 and ended Nov. 15 of that year, at which time Metal Mines Ltd. of Toronto assumed the management of the drill program. During this period, 3 large drills were used, resulting in some 9,647 feet being drilled in the "A" zone, a further 1,255 feet resulted in the "B" zone being located and 896 feet were spent on other interesting molybdenum outcroppings.

The Coxey claim lies on the lower south-west flank of Red Mountain. It rises 600 feet vertically over its 1400 foot width. However, this rise is punctuated by a series of moderately flat plateaus and steep rising slopes, resulting in a terrace effect. This surface expression disappears and gives way to a more even slope as the mountainside is traversed to the north and south of the Coxey claim. Overburden along this westerly slope is relatively shallow. The average thickness in the vicinity of the 2 ore structures is from one to 2 feet.

The top of Red Mountain is at an elevation of 5150. The "A" orebody is in the 4500' elevations, whereas the "B" structure lies at the 4300' horizon.

The Coxey claim is underlain by a series of tuffs and argillites in which the predominating strike is north-south with a gentle dip to the west. These formations have been intruded by a series of north-south trending andesite and lamprophyre dykes of variable widths which rarely exceed 10 feet. In places, the andesite takes on a sill-like attitude.

Lying immediately south of the "A" zone is a stock-like mass of granodiorite which has been intensely brecciated and recemented. Tongues of granodiorite and diorite extend in random directions from this plug.

The pyroclastic material covers 3/4 of the Coxey claim. The south-west portion of the claim is underlain by argillite.

The tuff beds are represented by distinctly different phases, dependent on their location. In the ore zone drilling, there is a noticeable change at depth. On the surface, a distinct difference exists between the formations lying north and south of the intrusive breccia.

In the "A" ore zone, the tuffs - considered to be of andesitic composition - exhibit a fine grained texture which is oftentimes thinly-bedded and of a grey to greenish-grey colour. Fine magnetite is often distributed along the bedding planes giving the rock a laminated appearance. The area is well brecciated with the fractures being sealed with pyrite, pyrrhotite, molybdenite and occasional quartz and magnetite. In addition, these sulphides appear as a fine dissemination through the formation with an occasional heavy blob or lens. Chlorite, which plays a prominent part in the localization of the molybdenite, is a strong alteration product. It was axiomatic in the "A" zone drilling that where there was no chlorite there was no molybdenite. Where this secondary product was present, the MoS_2 mineralization appeared either along the fringes or as blebs scattered through it.

At a relatively shallow depth, this formation gives way to a multi-coloured, normally well bedded hybrid variety of tuff. For lack of a better name, it was called a"skarn tuff." The sulphides, with the exception of molybdenite and magnetite continued on through this formation. The chlorite alteration became noticeably absent. Garnets and epidote appeared. The mottling effect varied from white through pink to purple. No molybdenum values are recorded in this zone.

South of the breccia stock, the tuffs display a bleached appearance,possibly due to a hydrothermal reaction from the magnetic juices. This effect noticeably decreases as the ground is traversed further south of the Coxey claim. Fracturing is strong in this area and the MoS_2 mineralization is represented more as a fracture filling than as the dessiminated variety. The pyrrhotite and pyrite, however, appear as a fine salt and pepper effect through the formation. Occasionally, fine molybdenite is associated with these sulphides. No secondary minerals are present.

A rather sharp sulphide association-change takes place almost at the Coxey's southern boundary with the Novelty claim. In a trench some 30' north of the boundary, the above picture holds true. In a short adit some 50' south of the boumdary within the Novelty claim, one of the prevailing sulphides is arsenopyrite. Gold and silver values are recorded along with the arsenical iron.

Several isolated instances of agglomerate have been noted in the drill core. Moderate moly mineralization was associated in only one case.

The andesite dykes or sills are a fine to medium grained, light to dark green, homogenous rock. Fracturing is very light, with the result that economic values in MoS_2 are non-existent. In many instances, the andesites resort to a true flow structure exhibiting amygdules or a porphyritic nature.

The granodiorite breccia consists of fragments of a greyish, granular, crystalline rock varying from fine to medium grained enclosed in a groundmass of light green, fine grained material. The fragments vary from 1" in diameter up to huge blocks several feet in thickness. Mineralization is light throughout the plug but commercial

values apparently lie along the contact within the tuffs. Occasional evidences of moly rimming fragments have been exposed but normally the extent of these structures is of small proportions.

The argillites of the area form a dark, hard, well bedded formation. No sulphides other than the universal, finely disseminated pyrite has been noted in this strata.

Though the beds of the Mt. Roberts group nearly everywhere dip to the west, there are many local and sometimes abrupt variations both of the dips and strike. Within the Torwest group, the strike is usually north to north-north-west and the angle of the westerly dip commonly varies between 10 and 30 degrees.

A zone of fracturing extending up to 300 - 400 feet wide stretches southward through the Coxey claim. This zone includes the granodiorite plug previously mentioned. Within this area, the rocks are usually highly brecciated presenting on a fresh surface a fragment pattern varying in size from a few inches to many feet in diameter but still preserving their banded structures. This occurrence, evidently formed in post-Jurassic times since the granodiorite also has been included, is classified by Drysdale as being "the most conspicuous zone of brecciation seen in the Rossland area".

Faulting is quite evident in the drill core. Two major lineaments are evinced by drilling, topography and underground exposures. The two faults running north-south and dipping fairly steeply to the east border the "A" zone. The easterly of the two faults has been filled by lamprophyric material. No evidence of the throw or offset is known but the surface exposure of the granodiorite plug has been moved south on the east side by some 50 - 75 feet through this mechanical action. The westerly fault is exposed in the workings of the lower Coxey tunnel where it displays itself as a quartz filled structure carrying chalco, molybdenite and pyrite over its 2 to 3 feet width. Neither of the structures show a mineral buildup in the near vicinity as would be expected if they served as solution channelways. They are thought to be post mineral faults.

The "A" ore body, as stated, lies between these two fault structures. In dimension, it is roughly 350 feet in a north-south extent and 200 feet in an east-west direction. It has almost a uniform depth of 50 - 55 feet from surface. In cross sections, a very gentle dip to the west is exhibited. Mineralization through the zone is fairly consistent although there are the occasional high-grade sections. Near the south limits as the zone approaches the granodiorite breccia, the mineralization takes on a patchy, finger-like appearance. At depth, as mentioned earlier, there is an abrupt transition from economical to non-commercial ore.

Commercial values in the orebody are contained only within the molybdenite. Chalcopyrite is occasionally present, but in grade and quantity that will in no way interfere with the metallurgy. The highest copper assay obtained was 0.08% across 5 feet. There are no values whatsoever in the precious metals. Reports received concerning the metallurgical tests being conducted by International Nickel say the ore will present no problem whatsoever and that good recovery and grade is expected.

The "B" zone, upon which a limited amount of drilling has been done, is of a different geological nature from the "A". This zone outcrops near the northern boundary of the claim, then rakes south at a 30° angle. The average thickness of the zone is from 25 - 30 feet. It has been traced by drill holes for 400 feet to the south in which direction it is still open. Very little drilling has been done on the east-west dimensions. To date, its grade is very similar to the "A" zone. Like the "A", no impurities or by-products are expected.

In the "B" zone, while the mineralization still appear within the tuff classification, its association changes radically. No longer was chlorite a necessary constituent for moly mineralization, the other sulphides, although present, were not seemingly as strong and the tuff became more silicious or adapted a cherty appearance. Another notable feature of the "B" zone is the appearance of the oxidation product, molybdenite, at many locations on surface. There was only one known, very minor instance of this secondary mineral in the "A" zone.

The 2 mineralized areas are separated by roughly 300 feet of unexplored ground. At the present time, Metal Mines are systematically probing this area with vertical holes at 100 foot spacings. Several of the holes have shown some moly mineralization. Whether these holes are the beginning of a pattern that will link the 2 structures together will not be known for several weeks yet. It has been theorized that the "B" zone is the remnant down-dip portion of the "A" zone, that uplifting with subsequent erosion has brought the "A" zone to the present surface while removing a portion of the intervening mineralized structure. A mineralized link between the 2 zones might well give this theory the push necessary into that well-filled geological-theory graveyard.

A few facts and figures before leaving:

1. The location of the "A" zone along a side hill makes the mining operation more along the lines of a quarrying procedure.

2. Stripping ratio on the "A" zone is almost negligible. Mineralization starts from surface and there is very little overburden.

3. On the "B" zone, present thinking is that if a commercial tonnage can be outlined, it will be an underground proposition. If so, the lower Coxey adit, which underlies the zone some 50', could be readily transformed into a haulage adit.

4. When Metal Mines took up their option agreement with Torwest on November 15, 1964, the following drill figures were applicable:

Torwest had drilled 18,776 feet of "A" core in 89 holes. All but 17 holes had to do with the moly mineralization.

Tonnage calculation at this date was some 340,000 tons of better than .5% grade.

5. Metal Mines check drilling involved "A" and "B" core size drilling on a 50' grid completely covering the "A" zone. Their results have substantially verified the Torwest calculations.