

BRITANNIA MINING AND SMELTING CO. LIMITED

BRITANNIA BEACH. B. C.

September 19, 1930

Nevada Consolidated Copper Co.,  
Nevada Mines, McGill, Nevada

Attention Mr. E.H.Mohr:

We acknowledge receipt of your letter dated August 29 requesting information on the practice of blanketing mill tailings at Britannia.

In discussing this item a short chronology of blanket practice is given along with some of the things that seemed to have a bearing on it.

The operation of passing the general mill tailings over blankets for additional gold recovery was started here in January 1925 and stopped in June 1926. When the operation was begun the overflows of the Dorr rake classifiers in circuit with the ball mills were very low thus permitting gold particles to be kicked over that were too coarse to float in the rougher machines, especially when a depressant was used for the iron pyrite. These coarse particles escaped in the tailings and were recoverable on blankets. In the early months of 1926 the overflows of all classifiers were increased in height to the extent that coarse gold which formerly had gone over was now retained in the grinding circuit and no doubt it must have been ground much finer as fully indicated by the falling off of gold recovery in the tailings blanket plant after the change was effected. Another change made in operation in late 1925 and adopted as standard practice in 19?? was that of adding xanthate near the tail end of all rougher machines to float the coarse chalcopyrite and a considerable percentage of pyrite. This concentrate contained a considerable quantity of relatively coarse gold and was reground and retreated to the end that a fair overall gold recovery was made by flotation, however there was still a considerable percentage of the gold that would not float in the second flotation operation and this gold seemed to be too fine to be recovered in the tailings blanket plant when treating the whole of the mill tailing. Early in 1927 we secured a contract for the sale of about 200 tons of pyrite concentrates per day and the best way found to produce these concentrates was to make a bulk flotation of both the chalcopyrite and pyrite, then to thicken and regrind with a depressant (lime), then float out the chalcopyrite and lastly float out the pyrite simply by adding a small amount of xanthate. The pyrite in this case contained gold value up to \$1.50 per ton for which we received no pay. It was then discovered that a large percentage of the gold in the pyrite was free gold therefore a blanket plant was installed over which the cleaner tailings (505 thru 200) were passed before flotation of the pyrite. This reduced the gold content of the pyrite from \$1.50 per ton to around 60 70 cents per ton and gave a blanket concentrate assaying 5 oz gold, equivalent to a recovery of 5 to 15% of the total gold in mill headings. The blanket concentrate was mixed with our finished copper concentrate. As noted above it was not likely that we could have recovered this gold from the general mill tailings, 936% on 65 mesh) by treating it on blankets as the current necessary to move the coarse sands would have carried the gold over, but, by treating the cleaner tailings by themselves on blankets adjustments were secured giving a fair blanket recovery of the gold.

To EHM, Sep 19, 1930

The gold content of Britannia ores over a number of years has varied from 24 to 34 cents per ton and our investigations show that most of the gold is free gold. Smelter recoveries have averaged around 64% with a loss 36% in the pyrite and general mill tailings. Distribution of the gold lost shows that 15% is in the pyrite and 85% in the general tailings. Approximately 45% of the gold in the general tailings is locked up in 35% of the material this being the plus 65 mesh material and mainly quartz grains. Nearly all this portion of the gold can be ground free and recovered provided the grinding is all through 65 mesh. Concerning the remainder of the gold we have no information as to how it is tied up. Very little of the gold can be recovered from the pyrite regardless of how fine it be ground.

Regarding the details of blanket operation, we first started tests in a launder 12 wide using various materials for catching gold. It was found that a blanket with a fairly long nap was the best for our purpose. The launder was gradually increased to 50 feet in length. This experiment was followed by building a unit 5 feet wide by 60 feet long. It was found that this unit would handle from 500 to 750 tons without banking of the sands and make a fair recovery of the coarse gold. Three more units were installed or enough to handle 3000 tons of tailing per day, the tonnage at that time. The blankets used cost \$3.75 per pair and had a very good nap at start which gradually wore down smooth in a month's time when the blanket was turned over. Blankets were laid beginning at the lower end of the plant and proceeding to the head end allowing a lap of 6 inches where blankets joined. Long bars of half by one and a half inch steel were used a the side to blankets to prevent material from working under. These were easily thrown aside in cleaning up. The new blankets were always used at the head of the plant where most of the gold was recovered. One man, day shift, looked after the entire plant. Head blankets were cleaned about twice a week while others were cleaned once each week. After cutting off the feed to a unit the coarse sands were washed off with a moderate pressure of water from a hose. The blanket was then taken up and the gold concentrates washed off with a high pressure hose while the blanket was wound around a roller. In cleaning up a full unit it was necessary to wash down the floor under the blanket as a considerable quantity of gold worked thru the blanket. The best month under this operation from treating 3000 tons of tailings per day gave a net profit of around \$1000 after deducting costs of operation. As noted previously the recovery gradually petered out due to changes made in the milling plant, however, all costs of blanket plant installation were recovered in addition to a nice little profit while the plant was in operation.

The operation of our present blanket plant is somewhat similar to that described above excepting that units are only about 30 inches in width and possibly 40 feet in length. We have two plants, 5 sections in first and 10 in the second. All blankets in the first plant are cleaned up each day. Most of the gold is recovered here. In the second plant it requires about 10 days to two weeks for the gold to build up to 5 oz when clean ups are made. The grade of plants are determined by experiment. They should have ample grade to prevent banking without the use of too much water. Clean ups are determined by experiment. We have had head blankets to assay 100 oz gold per ton, but these were run a considerable period before cleaning.

To EHM, Sep 19, 1930

Our present blanket plant handle around 300 tons of cleaner tailings daily, the material being about 80% through 200 mesh. On this fine material blankets have a rather long life. It was the practice to save the old blankets and then burn them, however when they get worn down smooth most of the gold can be washed out with a high pressure hose.

While we have discontinued blanketing general mill tailings, we still find it very profitable to blanket our intermediate product of cleaner tailings. We have given our gold problem a lot of study and while we have made some advances we are still open for suggestions that might possibly improve our practice.

We trust the above information will be helpful to you in finding a point in your flowsheet where you might work in a blanketing operation to advantage for additional gold recovery. We thank you very much for your kind offer to advise us as to your methods etc., and wish to advise you that we are holding nothing up our sleeves in the way of practice that may be helpful to others who have like problems.

Very truly yours,

Britannia M & S Co.,

By

Consulting Metallurgist.