REPORT

OF

The Granby Consolidated

Mining, Smelting and Power Company, Ltd.

FOR THE YEAR ENDING

JUNE 30th, 1916

ANNUAL REPORT OF THE SUPERINTENDENT OF SMELTERS.

FOR THE YEAR ENDING JUNE 30, 1916.

ANYOX SMELTER,

Anyox, B. C., July 27, 1916.

Mr. F. M. Sylvester, Managing Director,
The Granby Consolidated Mining, Smelting & Power Co., Ltd.,
Vancouver, B. C.

Dear Sir:—

The second year of operations at this plant shows decided improvement over the preceding year from a metallurgical standpoint and in many other ways.

We operated 1,167.43 furnace-days out of a total of 1,414 days. On account of power shortage during the winter months we lost 141 furnace-days; on account of ore shortage 2 days, Smelter strike 11 days, Mine strike 5 days, making a total of 159 furnace-days lost for reasons not attributable to Smelter troubles. We averaged 3.2 furnaces out of four for the year.

On the lower or tapping floor we have solved a great many problems incidental to handling a large tonnage of corrosive molten material, which has all tended toward the lengthening of campaigns. The molten material handled aggregated 250,000 tons.

The charging system was changed this year to Anaconda type charge-cars, which dump the ore into pockets, the charge being pushed into furnaces by plows operated by compressed air when needed. This has been a decided improvement over the old method, and has been our chief aid in extending the length of campaigns.

No. 4 Furnace, which has a shaft depth five feet greater than the original furnaces, was operated ten and one-half months. It was watched carefully to see if the increased depth was an improvement. There seems to be no gain in the grade of matte used, increased tonnage or percentage of coke used. However, there does seem to be some gain in the length of campaign and reduced crust formation due to the increased drop of charge. For this reason, if we install another furnace, we will have it made the same as No. 4, but do not think there is sufficient advantage gained by the increased depth of shaft to warrant changing the old furnaces to conform to this height.

In the smelting of our own ores we have made an effort to keep to the proper proportion of No. 1 and No. 2 orebodies, both as to quantities and analyses. As regards tonnage, we have smelted approximately equal parts of No. 1 and No. 2 ores, but I believe we have been a little on the low side on silica. The average of the total orebodies will be somewhat higher in silica than the average analysis for the year 1915-1916. As regards copper content, the ores are about the average of the whole body.

We have come to the conclusion that true pyritic smelting can not be done with the main ores as we did in starting up, *i.e.*, with very low coke and no fluxes. This can be done at times, but not frequently enough to say it is the practice. The percentage of SiO_2 free is very small, most of it being present as combined silicates. The Al_2O_3 is also high and will probably exceed in the total orebodies the average for this year. We find it necessary to use fairly high coke and limestone as flux. To date, the ores coming to the Smelter have varied greatly in their silica content from lot to lot. This has created a tendency to uneven running and the use of a slightly greater quantity of coke and flux than would have been used otherwise. I see no remedy for this condition until the Mine is opened more as the development progresses or until such time as a sorting-table and screening plant are installed.

"We have not yet been able to make a converter grade of matte in the first smelting operation, as the degree of oxidation is low, and the matte fall from the ore-smelting is too great for the converters to handle. Therefore, we have used one furnace practically throughout the year as a regrading-furnace, which means that three furnaces were operated smelting green ore, while the fourth furnace was used for regrading matte. I believe now that the better method would be to take all the matte straight to the converters, irrespective of grade, and convert direct. This would increase our tonnage of green ore and tend to lower costs all around, and, at the same time, help our recoveries. The reason we are not carrying out this practice at the present time is lack of converter capacity.

"Tons of ore per furnace-day have increased from 630 to 692, and tons of charge from 846 to 929. I would call attention to the fact that during the year we smelted 88,853 tons of foreign ore, which means that one blast-furnace was used thirty-five per cent. of its time for the total year in the smelting of this ore to the exclusion of our own ores, and that higher cost of mining resulted, due to a lesser tonnage shipped from our own Mines. We have 46,480 tons of flue-dust stored awaiting the installation of a sintering plant.

"No changes have been made in the Converting Department. The converters worked steadily with the exception of the five winter months, during which time they only worked 57 out of 152 days on account of lack of power. Additional converter capacity is needed in this department.

"The cost of smelting and converting was $1.804 per ton of ore. This figure is $0.073 less than the previous year, but it is higher than we anticipated. The increase in wages due to the rise in price of copper added $0.0457 per ton of ore. The use of about 20,000 tons of barren quartz in the regrading and converting of matte (used on account of the scarcity of quartz with values) added $0.068 per ton of ore. At the present time we are endeavoring to take care of this point with the opening of the Maple Bay properties. Lime flux added $0.152 to the costs per ton of ore. Ore carrying excess lime would be advantageous in cutting this cost down. The shipping of 21,428 tons of matte to the Grand Forks plant for conversion into blister-copper, on account of power shortage, added $0.02 per ton of ore. Coke was a few cents higher on account of quality and handling in and out of storage due to the irregularity of vessels' schedules caused by strikes of longshoremen. This added $0.01 to our costs. Owing to the European War, all supplies advanced ten per cent. over normal prices. This meant an addition to our costs of $0.04, making a total increase of $0.335, the greater part of which amount will be eliminated from our costs in time.

"During the past year there was considerable new work which was found necessary to charge to operation. I refer to such items as fire-protection of the 6-ft. water-pipe from the dam to the power-house and of the railroad trestles; some Agglomerator charges, new roof for Main Smelter buildings, ore-bin extension, and charge-cars.

"It will be seen from the above that it is reasonable to expect a reduction in our costs for the coming year. Ore costs would have shown $0.06 less had the profits made by the different departments, operating as independent concerns, been credited back. Another large item of expense which shows against our costs for the past year is auxiliary power supplied for five months during the winter. Our new steam plant now under construction will take care of this heavy expense and allow us to run to capacity throughout the coming winter. The sintering plant, when installed, will take care of our flue-dust and increase the recovery of copper per ton of ore.

"While I think the past year's work shows up fairly satisfactorily, considering the many problems we have had to overcome, I believe the current fiscal year will show a decided improvement in costs, tonnages, and recoveries.

I wish to express my appreciation of the services of Mr. A. J. Bone, Superintendent, and the staff as a whole for their loyalty to the Company and attention paid to the work during the past year.

GRAND FORKS SMELTER.

Operations at this plant for the fiscal year ending June 30, 1916, were characterized chiefly by the handling of nearly one-half million tons of material which was very low in copper content and highly silicious. Up to the present time, this material has not been taken into the ore reserves, but on account of the very high price of copper which has prevailed during the past year it became profitable to handle. This partially accounts for the high costs of that period. However, for the first six months of the year the costs were the lowest in the history of the plant, being $1.233 for smelting and converting.

Owing to the high price of copper, the increase of wages added 1.7 cents to costs. Coke was 1.3 cents higher per ton of ore, due to the silicious nature of the ore. Anyox matte added .7 cents. The slow running of the furnaces, due to high silica slags, offsets the increase of this year's costs over last year.

With eight furnaces in blast, there were from 195 to 200 men on the pay-roll.

There was no new construction during the year, but repairs have been kept up and the plant is in first-class operating condition.

I wish to give credit to Mr. W. B. Bishop, Superintendent, and the staff under him for the good work done and the loyalty displayed during the past year.

Respectfully submitted,

W. A. WILLIAMS,

Superintendent of Smelters.

SUPERINTENDENT'S ANNUAL REPORT ON THE ANYOX SMELTER

FOR THE YEAR ENDING JUNE 30, 1916.

Anyox, B. C., July 25, 1916.

Mr. W. A. Williams,
Superintendent of Smelters,
The Granby Consolidated Mining, Smelting & Power Co., Ltd.,
Anyox, B. C.

Dear Sir:

During the year ending June 30, 1916, the Anyox Plant of the Granby Company treated 822,919 tons of ore, yielding 29,562,177 pounds copper. Tons of charge treated, exclusive of coke, was 1,103,825. We sent 21,428 tons of matte, averaging 14 per cent. copper to Grand Forks for conversion. Smelting and converting cost $1.804 per ton of ore.

Anyox ore as smelted was more siliclous and aluminous than the previous year. We handled a greater proportion of No. 2 ore, amounting to 48.4 per cent. of total Anyox ore, compared to 35.6 per cent. in 1915. Foreign ores comprised 12.15 per cent. of total ore as against 3.76 per cent. in 1915. These foreign ores for the most part are non-pyritic and call for more coke. Coke was higher in ash and physically inferior.

Except during that period when the converter plant was idle, we practiced double smelting, matte resulting from ore smelting being tapped into ladles and poured into launders leading to matte pits outside the building, from whence it was returned to the bins. The re-grading charge consists of matte, quartz, lime rock and sometimes silicious ores when such can be had suitable for this purpose. During the year the cranes handled approximately 250,000 tons of molten material.

Tons of ore smelted per furnace day increased 9.8 per cent. over the year previous. The length of campaigns increased 73 per cent. Time lost due to break downs during campaigns showed a decrease of 66 per cent. Time lost during campaigns directly attributable to the smelter was a bare 3 per cent. We averaged 3.2 furnaces per calendar day. The fourth furnace was not available until the middle of August and power shortage accounts for some idle furnaces during the winter. Settler slag contained 0.23 per cent. copper as against 0.26 per cent. in 1915.

No. 4 Furnace was blown in the first time on August 16th, 1915. It is five feet higher than the original three furnaces and has horizontal cast iron feed plates from which the charge is shoved by plows worked by compressed air cylinders. This feeding arrangement having proved its worth, the other furnaces were likewise equipped during the winter. The additional height of No. 4 also appears an advantage, but not so marked as to warrant changing the others.

The converters operated 266 calendar days and produced 21,412,761 pounds blister from matte averaging 20.86 per cent. Cu. No changes or additions to this department were made during the year.

Additions to the ore bins, enlarging their capacity about 25 per cent., were completed. Considerable difficulty was experienced in the winter with ore freezing in the bins. Plans are on foot to raise the temperature of the air under the bins so that the trouble and expense caused by frozen ore will be avoided in future.

The sampling and crushing plant responded in a highly satisfactory manner to the greatly increased duty thrust upon it.

The average number of men employed, including salaried employees, charged to smelting and converting was 278. The average tons charge smelted per man was 10.85. In this connection it should be remembered that during the winter months, when tonnage was curtailed, a proportionate curtailment in labor could not be affected, as such things as the removal of snow, mucking frozen ore in the bins, etc., increased the labor charge per ton smelted.

In conclusion I wish to express my appreciation of the loyalty and serious efforts put forth by our men.

Yours respectfully,

A. J. BONE,

Smelter Superintendent.