

September 9, 1929

Mr C.V.Drew,
Cerro de Pasco Copper Corp.,
44 Wall Street,
New York, N.Y.

Dear Mr.Drew:

I had already recently informed you verbally of the decisions of the European Zinc Carter made at a meeting the beginning of July. These decisions were to prolong the syndicate until the end of December of this year with automatical quarterly renewal unless any one member cancels the agreement by thirty days' previous notice.

It was furthermore agreed to, beginning August of this year, curtail production by 10% monthly. These decisions were subject to the final approval of all members. After various delays such final approval has now been received and the above decisions therefore are ratified and in force.

Yours very truly,

R. SCHREIBER

COPY

September 24, 1929

The Ore & Chemical Corp.,
40 Rector St.,
New York.

Gentlemen: Attention Mr.R.Schreiber

We have your letter of September 19th. Our understanding is that so far no action on our part is called for.

Yours truly,

C.V.DREW

COPY

THE ORE & CHEMICAL CORPORATION
40 Rector Street
New York

September 19, 1929

Cerro de Pasco Copper Corp.,
44 Wall Street,
New York, N.Y.

Dear Sirs: Attention Mr.C.V.Drew

We beg to refer to our letter of August 30th notifying you that we have to claim force majeure for part quantity under Metallgesellschaft's contract with you.

Detailed information now received enables us to fix the quantity in question. Contracts between Metallgesellschaft and the ultimate receiver, various plants of whom are now closed down on account of force majeure, provided for shipment of approximately 2,800 tons of Cerro de Pasco zinc concentrates to this receiver during the period from now on to the end of March of next year. Unless a switch is possible to other smelters, Metallgesellschaft will have to ask for suspension of shipment of 2,800 tons during that period.

When giving you our monthly shipping instructions we will definitely state by what quantity the tonnage for shipment during the respective months should be reduced. Since the arrangements between Metallgesellschaft and the ultimate receiver calls for shipment of 1,000 tons out of the 2,800 tons during November, Metallgesellschaft will most probably have to reduce the November shipments under their contract with you by 1,000 tons. About this we will let you know definitely latest by the end of this month when ordinarily we will have to give you shipping instructions for November.

Metallgesellschaft is still trying hard to arrange a switch so as to, if at all possible, make suspensions under their contract with you unnecessary.

Yours very truly,

THE ORE & CHEMICAL CORPORATION

R. SCHREIBER

COPY

A1274

September 26, 1929

Mr. C. V. Drew, VicePres.,
Cerro de Pasco Copper Corp.,
44 Wall Street, New York City.

Dear Mr. Drew:

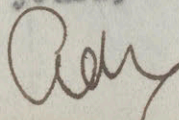
ZINC CONCENTRATES CONTRACT

I have not a copy of the Metallgesellschaft zinc contract but I should think Schreiber's letter of the ninth was in order. You have assented to the Cartel arrangement and if you have taken no steps to be personally represented at its meetings I presume you are bound by its decisions as to pro rata restriction of output. You can easily check up on the matter through the A S & R.

About the letter of the nineteenth I am not so sure. I suggest you read the force majeure clause carefully. If Metall has various contracts acting as go-between for miners and smelters in the case of a shutdown at some smelter they can almost select whose tonnage is to be shut off. It seems to me that some inquiry as to the European situation might be made with profit from some source outside Metall. If they do not actually curtail at present they may be establishing acquiescence on your part for later use.

Perhaps I am too meticulous but I think all communications from these people warrant the most careful consideration.

Very truly yours,



October 1, 1929

CERROCOP LIMA:

Metallgesellschaft request us arrange following shipments for November:

1 lot 500 tons Antwerp

1 " 875 " "

to be kept strictly separate and separate bills of lading.

Metallgesellschaft claim can not refine balance of 2200 tons for November on account of strikes at refineries and request us to hold the 825 tons under force majeure clause in contract.

September 28, 1929

Zinc Concentrates
November shipments

Cerro de Pasco Copper Corp.,
44 Wall St.,
New York City.

Gentlemen: Attention: Mr. Fitzpatrick

According to cable advice received from Metallgesellschaft we would thank you to arrange the following shipments during the month of November:

1 lot of 500 tons to Antwerp
1 " " 875 " " "

These lots must be kept strictly separate, and separate bills of lading must be issued for each one of these lots.

For the balance we regret to be unable to give you any instructions due to the fact that several of the receiving works are on strike, as we informed you previously. So far Metallgesellschaft were not able to switch the quantities destined for this customer to one of the other smelters. Therefore please consider the 825 tons by which our above instructions fall short of the monthly shipping tonnage of 2200 tons, as part of the quantity of about 2800 tons for which Metallgesellschaft claimed force majeure.

Very truly yours,

THE ORE & CHEMICAL CORPORATION

R. SOMMER

COPY

October 1, 1929

CONFIDENTIAL

Daniel C. Griffith & Co.,
7 & 8 Victoria Ave.,
Bishopsgate,
London E.C.2, England.

Gentlemen:

We are in receipt of letter as per attached copy from The Ore & Chemical Corporation, New York agents of the Metallgesellschaft with whom we have our contract for refining zinc concentrates. For some time they have been giving us tentative notices of strikes in Europe at the zinc refineries which might prevent them from disposing of the full 2200 tons of our zinc concentrates for November. Their letter is now a definite notification that they are unable to receive more than 1375 tons for November, or 825 tons less than the full quantity. We have no reason to think the Metallgesellschaft would claim anything that was not based on fact but as a matter of business precaution we would like to have you advise us whether or not you have knowledge of such strikes at zinc refineries or have the means of ascertaining where such strikes have occurred and to what extent they have reduced their ability to have concentrates refined. We would be willing to go to a reasonable expense to find out the facts in the case. It might be that this action on the part of the Metallgesellschaft is more in the nature of endeavoring to restrict production of zinc than bowing to force majeure. We shall be pleased to hear from you on this subject at your early convenience.

Yours truly,

enc.

A-209

June 21, 1935

Mr. V. Drew, Vice-Pres.,
Cerro de Pasco Copper Corp.,
44 Wall Street, New York City.

Dear Mr. Drew:

ZINC CONCENTRATES

I do not know anything about the flash roasting at Trail and I do not think a letter from me would carry any further than one from Mr. Kingsmill. I do think I could find out something if I should chance to run in Mr. Blaylock--say at the Annual Meeting of the AIME.

While on the subject of Trail I note that they have secured US Patent #1,967,053, July 17, 1934, for refining lead-bismuth alloys (20 to 40% Bi), preliminary to electrolytic separation. I think we should secure a copy.

Very truly yours,

Cady

MONTHLY REPORT
OCTOBER 1936

9

Mr. Harold Kingsmill,
General Manager,
Lima.

Dear Sir:

Attached are reports by Mr. Wright and Mr. Reinberg. Mr. Wright covers pilot milling of Cerro lead-zinc ore. Mr. Reinberg reports progress in the design and construction of the new 100 ton Betts plant as well as the plating of cathode bars and the production of acid for the new plant.

The lead refinery operated normally during the month except for the loss of about 1-1/2 days for repairs to the generator consisting in grinding the commutator and the installing of a complete new set of brushes. The lead production amounted to 745,002 short tons.

The bismuth plant treated anode residue from the Betts plant, producing 81954 lbs. of refined bismuth. Operating data are shown in the attached reports for the combined lead and bismuth refineries for the six months period, April-September incl., also for the month of October.

Shipment #7 of tin Dross was made in October. Details are as follows:

No. of sacks,	120
Gross wt., kilos,	10800
Net wt., wet, kilos,	10700
Net wt., dry, kilos,	10659
Molasses	2.8
Assays,	

<u>Ag</u>	<u>oz/t</u>	<u>Cu</u>	<u>oz/t</u>	<u>Cd%</u>	<u>Pb%</u>	<u>Sn%</u>	<u>As%</u>	<u>Sb%</u>	<u>Bi%</u>
	9.4	.02	.07		57.0	22.4	1.39	5.05	.69

Attached is a compilation of interesting data in connection with thallium by Dr. Barker.

Yours truly,

T. E. Harper, Jr.

LEAD AND BISMUTH REFINERIES
COMBINED SUMMARY FOR APRIL
TO SEPTEMBER INCL. 1936

ASSAYS	Ag. Oz./t	AuOz./t.	% Cu	% Pb	% As	% Sb	% Bi	% Fe	% Zn
Charged,									
B.F. Bullion,	43.4	.02	.11	92.0	.78	3.07	3.66		
D.R.P. Bullion,	57.2	.07	.13	85.8	2.75	2.14	8.37		
Tamboraque Bullion,	795.0	45.80	.10	93.5	-	1.00	.10		
Average,	40.9	10.29	.12	91.3	1.10	2.92	4.41		
Produced,									
Refined Lead,	.004	-	.0002	99.997	.0001	.0003	.0011	nil	.0002
Refined Bismuth,	.10	-	.0002	.001	nil	.0002	99.990	nil	nil
Cerro Base,	.89	-	.0013	44.7	.0006	.0001	55.3	nil	
Silver Bullion,	19300.0	77.20	2.47	8.7	-	-	18.6		
Copper Matte,	1860.2	3.02	34.4	24.4	-	-	6.10	16.5	
Furnace Cobbing,	37.0	.13	1.41	16.0	-	-	3.70		
Kettle Dross,	44.7	.04	1.69	83.6	2.13	3.32	4.10		
Slag,	1.18	-	.26	39.0	5.5	25.4	1.42		
Weights, sh. tons, Ag & Au Oz.									
Charged,									
B.F. Bullion,	4815.599	209371	96.3	5.42	4430.2	37.5	147.8	170.13	3.45
D.R.P. Bullion,	921.404	52649	62.3	1.19	790.0	25.3	19.7	77.02	
Tamboraque Bullion,	9.414	7484	431.2	.01	8.8	-	.1	.01	
Total,	5746.417	269504	589.9	6.62	5235.0	62.8	167.6	253.16	3.89
Produced,									
Refined Lead,	4922.318	-	-	-	4922.3	-	-	-	-
Refined Bismuth,	191.431	-	-	-	-	-	-	191.43	
Cerro Base,	16.785	15	-	-	7.5	-	-	9.28	
Silver Bullion,	13.763	265203	1061.0	.34	1.2	-	-	2.28	213
Copper Matte,	4.112	7649	12.4	1.41	1.0	-	-	.29	85
Furnace Cobbing,	31.158	1152	4.1	.44	5.0	-	-	1.15	
Kettle Dross,	117.395	5236	4.6	1.98	98.1	2.5	3.9	4.02	
Slag,	274.022	323	-	.76	106.8	15.1	68.6	3.68	39
Total,	5570.984	279578	1082.1	4.93	5141.9	17.6	72.5	213.09	1.20

LEAD AND BISMUTH REFINERIES
COMBINED SUMMARY
OCTOBER 1950

<u>Analysis</u>	<u>Ag Ounc./t.</u>	<u>Au Ounc./t.</u>	<u>Cu%</u>	<u>Pb%</u>	<u>As%</u>	<u>Sb%</u>	<u>Bi%</u>	<u>Ta%</u>	<u>Te%</u>
<u>Character</u>									
S.F. bullion,	41.1	.63	.11	92.1	.85	3.10	3.60	.05	
D.R.P. bullion,	38.2	.07	.14	85.3	3.14	2.42	7.69	.05	
Average,	40.4	.05	.12	89.0	1.94	2.70	5.60	.05	
<u>Intermediates</u>									
Anode Residue,	306.1	.41	.52	15.1	12.5	21.6	39.3	.30	
<u>Products</u>									
Refined Lead,	tr.	-	.0001	99.997	.0001	.0002	.0010	nil	nil
Refined Bismuth,	.03	-	.0001	.0007	nil	.0002	69.998	nil	nil
Silver Bullion,	23093.6	36.64	.27	2.1	-	-	17.4	.49	nil
Kettle Dress,	44.5	.05	2.12	82.1	3.35	3.50	5.57		
Slag,	.77	-	.11	39.7	0.7	20.0	.54	nil	
<u>Weights, sh. ton Ag & Au Oz</u>	<u>Total</u>	<u>Ag</u>	<u>Au</u>	<u>Cu</u>	<u>Pb</u>	<u>As</u>	<u>Sb</u>	<u>Bi</u>	<u>Ta</u>
<u>Charged</u>									
S.F. bullion,	437.732	20457	14.9	.55	458.3	4.2	15.4	17.92	.25
D.R.P. bullion,	447.105	26009	31.3	.62	301.6	17.1	10.8	35.20	.22
Total	944.837	46526	46.2	1.17	839.9	18.3	26.2	53.16	.47
<u>Shipped</u>									
Refined Lead,	745.602	-	-	-	745.6	-	-	-	-
Refined Bismuth,	50.637	-	-	-	-	-	-	50.70	-
Silver Bullion,	.379	4753	13.9	-	-	-	-	.07	-
Kettle Dress,	17.923	796	.9	.36	14.7	.6	.6	1.00	.01
Slag,	70.272	3-	-	.08	27.9	0.1	14.0	.59	-
Total,	890.873	9605	14.8	.46	768.2	0.7	14.6	58.36	-

RESEARCH DEPARTMENT
 MONTHLY NEWS LETTER
 OCTOBER 1956

Mr. F. E. Harper, Jr.,
 Director of Research,
 La Oroya.

Dear Sir:-

Pilot Milling
Cerro Lead-Zinc Ore

In October the pilot mill began treating lead-zinc ore from individual levels of the Cerro Mine. The purpose of the current campaign is to determine the relative amenabilities of ore from different sections, and whether or not selective mining and treatment would be warranted.

Ore from 800 Level. The first individual lot of ore, 550 tons from the 800 level, has been treated. Samples taken some time ago from the 800 level, and tested in the laboratory, had indicated that ore from this section of the mine would be more refractory, owing to marmatite-pyrite intergrowth, than ore from the 600 level. In the pilot milling of these ores, however, just the opposite obtained, i.e. ore from the 800 level was the more amenable. Either the original samples were labeled incorrectly or the ore from any one section is far from uniform.

The effect of the time-lag in treatment on metallurgical results, as discussed last month, was again evident. For example, the recovery of lead in the lead concentrate was better than 80 per cent at the beginning of the test-run on the 800-level ore, but dropped to 70 per cent at the close of a 3-week run. The weighted average results obtained from this lot of ore were, however, quite good:

Ore from 800 Level
(Period of treatment: 20 days)

	% Weight	Assays				
		OzAg	% Pb	% Zn	% Fe	% Insol.
Heading	100.0	3.9	7.3	20.3	28.0	5.0
Lead Concentrate	9.4	23.0	60.5	3.9	10.7	0.8
Zinc Concentrate	40.5	2.7	2.9	45.5	15.3	0.8
Tailing	50.1	1.2	0.9	2.9	41.5	9.2
	Ratio Conct.	Distribution				
		% Ag	% Pb	% Zn	% Fe	% Insol.
Lead Concentrate	10.6	56.1	77.7	1.8	3.6	1.5
Zinc Concentrate	2.5	28.3	16.1	91.0	22.2	6.5
Tailing		15.6	6.2	7.2	74.2	92.0
Effective Recoveries		84.4	93.8	91.0		

The lead concentrate contained 0.4% copper and 0.2% bismuth.

Particular attention is called to the unusually low zinc content of the lead concentrate. This is not due to an improvement in metallurgical technique, but to the intrinsic nature of the zinc minerals in this particular section of the mine. For some unknown reason the zinc minerals have undergone a selective superficial oxidation without the other constituents of the ore having been appreciably affected. Oxidation is, of course, much more effective than the addition of any known flotation reagent in accomplishing depression. The superficially oxidized and depressed zinc minerals are subsequently activated by the addition of copper sulphate, and zinc recovery is therefore not materially impaired.

Ore from 600 Level. During the last week of October a test-run was begun on ore from the 600 level. Treatment of this ore is still in progress. The results to date, however, are radically different from those obtained in milling the previous lot of ore, and several changes in method of treatment have been necessary.

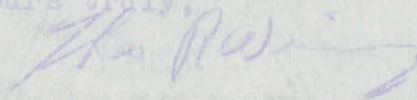
The differences in results were caused by: 1) a very high zinc content in the feed - 26 per cent; 2) readily floatable marmatite, which tended toward an excessive contamination of the lead concentrate; and 3) a particularly intimate association of marmatite and pyrite, which resulted in the production of a large proportion of middling grains.

The high zinc content of the feed necessitated an increase in zinc rougher flotation capacity. The readily floatable marmatite made it necessary to sacrifice lead recovery for grade of lead concentrate. The middling particles of marmatite and pyrite - like that shown in the photomicrographs accompanying the August News Letter - are abundant even in the finest size fractions. A substantial liberation of marmatite from pyrite is therefore impossible and, as a consequence, high recovery of zinc in the form of high grade concentrate cannot obtain.

Inasmuch as the nature of the principal zinc mineral (marmatite: zinc-iron sulphide) precludes a high grade zinc concentrate in any case, and as iron is a detrimental constituent, recovery of zinc must always be sacrificed to a certain extent for grade of concentrate. In treating this lot of ore, a zinc concentrate of fair grade (44% Zn) cannot be obtained without producing a 4-per cent zinc tailing. Concentrates of higher grade would naturally entail higher tailing losses.

If desirable, ore from the 800 level could be treated separately. Ore from the 600 level, however, would require dilution with other classes of ore in order to simplify its concentration and to counteract its inherently harmful characteristics.

Yours truly,



Theo. R. Wright.

RESEARCH DEPARTMENT
MONTHLY NEWS LETTER
OCTOBER 1936

Mr. T. E. Harper, Jr.,
Director of Research,
La Graya.

Dear Sir:-

Design work for the 100-ton Betts Plant was continued during the month, the following drawings being completed:

Nos. 12-600-01 to 05 incl.	---	Trackwork
13-102-40 to 44 "	---	Tank House Details
13-107-09 to 22 "	---	Anode Casting Arrangement
13-400-01 to 07 "	---	Electrical Details
14-102-01 to 12 "	---	Baghouse Enclosure, St. Det.

The tank house cranes were received, erected, and placed in operation during October. Tanks are now being placed in permanent position and lined with Harvel compound, lining of 35 tanks having been completed by the end of the month.

Electroplating of cathode bars is being carried on as fast as the bars are received from the shops, a total of 1800 bars having been completed at the end of the month. Manufacture of fluosilicic acid is also being continued at full capacity (approximately 5 tons per month).

The fabrication of busbars for tank tops and connections by electro-deposition has not proved satisfactory to date, and as time is lacking for further experimental work, rolled bars are being ordered from the States for this purpose.

Yours very truly,

G. Reinberg

G. Reinberg.

Research Dept.
La Oroya

October 18, 1945.

Mr. V. L. Mc Cutchan,
Manager of Operations,
La Oroya.

Dear Sir:

Composite Sample
Cerro Lead-Zinc Ore

This report supplements the progress report of September 11, 1945 on the Cerro lead-zinc ore, and concludes for the present the work on the composite sample received by the Research Department on August 22.

Laboratory Flotation Results. The amenability of this sample to standard flotation technic is as follows:

Composite Sample Cerro Lead-Zinc Ore Samples No. 756-762, Test No. 18.						
	<u>%Wt</u>	<u>OzAg</u>	<u>%Pb</u>	<u>%Zn</u>	<u>%Insol</u>	<u>%Fe</u>
Heading	100.0	61.85	12.5	25.4	13.3	16.4
Rghr. lead conc't	18.7	26.85	59.8	8.4	1.8	7.8
Zinc concentrate	44.9	2.93	0.9	49.8	0.7	12.9
Tailing	36.4	1.26	2.5	4.0	34.7	25.2
	<u>Conc. Ratio</u>	<u>%Ag</u>	<u>%Pb</u>	<u>%Zn</u>	<u>%Insol</u>	<u>%Fe</u>
Rghr. lead conc't	5.35	73.4	89.5	6.2	2.5	8.8
Zinc concentrate	2.25	19.1	3.2	88.0	2.3	35.3
Tailing	.	7.5	7.3	5.8	95.2	55.9

Lead Flotation. 0.09 lbs. ethyl dixanthogen per ton ore was added to the ball mill. After the grind, the pulp was conditioned two minutes with 0.25 lbs. sodium cyanide, and floated with 0.03 lbs. pine oil, and 0.05 lbs. Z-5. 0.3 lbs. thiocarbanilide can be used successfully in place of the ethyl dixanthogen, but some difficulty is encountered in obtaining high lead recovery.

The rougher lead concentrate as tabulated above was not cleaned.

Zinc Flotation. The lead flotation tailing was conditioned 25 minutes with 2 lbs. copper sulfate per ton original ore feed. 1.5 lbs. lime was then added, and the zinc was floated with 0.015 lbs. pine oil, 0.035 lbs. Z-5, and 0.06 lbs. Z-3. The Z-3 was added near the end of the float.

The zinc concentrates were cleaned once, and the zinc middling product was combined with the tailing.

Pulp Density. At the start of flotation the pulp density was approximately 1.33 gms/cc which is equivalent to about 33.3% solids by weight, or 11.1% solids by volume.

Conditioning Time and Temperature. For the zinc flotation a long conditioning time of 25 minutes appears to be beneficial in obtaining good recovery, and selectivity between zinc and iron. At reduced temperatures which probably will be obtained in the pilot concentrator, the zinc is slower floating. This effect can be partially overcome by the use of 0.05 to 0.1 lb. thiocarbanilide in the ball mill along with the ethyl dixanthogen. The collecting properties of the thiocarbanilide carry over into the zinc flotation to aid zinc recovery.

Acidity. The pulp acidity for both the lead and zinc flotation was pH 6.5. The soluble sulfates derived from the ore aid in flotation selectivity, and make a pH adjustment unnecessary on this sample.

Fineness of Grind. A grind of 74% minus 200 mesh was used in the above test. A fine grind is needed for good zinc recovery without a disproportionate sacrifice in grade of zinc concentrate. Also, a fine grind of zinc has been found beneficial since the fine marmatite particles are easier to "lift" in the flotation cell. Lead is liberated, and floats readily at a much coarser grind.

Grinding and Microscopic Analyses. A screen analysis was made on a relatively coarse grind in the laboratory ball mill to determine fineness for liberation, and the selective grinding action upon the lead and zinc. Assays and a microscopic examination were made on the products as follows:

Screen analysis:

<u>Screen Fraction</u>	<u>%wt</u>	<u>OzAg</u>	<u>Assays</u>			
			<u>%Pb</u>	<u>%Zn</u>	<u>%Ins</u>	<u>%Fe</u>
plus 28 mesh	11.5	2.55	4.4	12.5	23.0	25.1
28/48	16.5	4.38	8.2	24.1	15.9	19.3
48/100	25.6	6.81	11.9	28.2	11.2	16.5
100/200	17.8	8.00	15.2	28.2	9.9	15.2
minus 200 mesh	28.6	8.22	17.2	25.8	10.9	14.7

Microscopic Analysis: Above the 28 mesh particle size only a small amount of galena is present, and occurs mostly in middling particles. Considerable marmatite is present of which a substantial portion occurs in middlings, and in intimate mixtures with pyrite.

Most of the galena occurs, and is free below 28 mesh. The marmatite contains much pyrite and gangue in particle sizes above 100 mesh. The minus 100 mesh marmatite particles are well liberated except for small amounts which are so intimately mixed with pyrite that no practical grinding scheme would give good liberation.

Selective Grinding of Galena. A selective grinding action takes place at a coarse grind which results in the bulk of the galena being present and liberated in the fine screen fractions. The selective grinding action is less apparent with the harder zinc minerals. A concentration of iron and insol. takes place in the coarser fractions.

Unit Lead Flotation Cell. The use of a unit cell in the grinding circuit is here suggested to help overcome the detrimental effect of too fine a grind upon the flotation of the lead minerals. The grinding circuit should be adjusted to a grind of about 70-75% minus 200 mesh for good zinc flotation. The effect of the unit cell would be to remove as much liberated galena as practicable from the circulating ball mill-classifier load before over-grinding takes place.

The unit cell in conjunction with a 20 or 28 mesh vibrating screen should be placed between the ball mill discharge and classifier in such a way that the pulp would pass over the screen before entering the cell unit. Arrangements would be needed for a return of both screen oversize, and the unit cell tails to the classifier.

The unit cell would supplement the flotation circuit. The selective lead-zinc sections would remain more or less as arranged in the Cerro pilot concentrator.

Reagent additions to the cell should consist of cyanide and pine oil only. No collector, other than ethyl dixanthogen added to the ball mill feed, should be used.

Sampling. If this composite sample proves to be more or less representative of the amenability of the Cerro lead-zinc ore, no serious treatment problems are anticipated. However, in view of highly oxidized samples received in the past by the Research Department that were not amenable to simpler flotation schemes, it is suggested that a general re-survey of stope faces may be worth considering to ascertain the distribution of non-sulfide lead, ferrous sulfate, carbonaceous material, and primary slimes in the ore. With this information in conjunction with laboratory check tests, it should be possible to resolve ore treatment difficulties into certain ore types or locations, and to furnish a clearer idea of the specific ore dressing problems involved.

Very truly yours,

Elis H Gates

cc: BTC
ARM
WFW
DSS
HEB
JOH
GR

Cerro de Pasco Copper Corporation

Office of C. V. Drew,
15th floor.
Telephone Beekman 3900-4

44 Wall Street,
New York,

Cable Address:
"Cerrocop, New York,"
"Cerrocop, Lima."

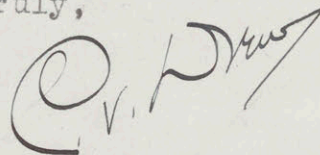
August 18, 1927

Dear Mr. Addicks:

By any chance do you expect to take the September trip of the American Electrochemical Society described in the enclosed circular or do you know any one who proposes going who might collect a little information for us in respect to electrolytic refining of zinc as proposed at Kellogg and who could get some line on the costs at Trail of the Betts process plant of the Consolidated Mining & Smelting Company to compare with the figures furnished us by Colcord?

Please let me know as soon as possible when you expect to be in New York. If next week I would like very much to talk with you about the proposed selling arrangement. Mr. Vogelstein is back now and I presume he will want to talk it over almost any day. The more we think about it the less we like it - in fact, Mr. Haggin has quite definitely expressed himself as being opposed to the suggested changes and would very much prefer to continue the arrangement under which we sold copper in June. As I think I told you, we have sold no copper during July or August.

Yours truly,



CC to N.Y. Office of L.A.

CONTENTS NOTED
AUG 22 1927
LAWRENCE ADDICKS

A-150.

51 Maiden Lane.

New York, N. Y., Sept. 26, 1927.

Mr. C. V. Drew,
Vice Pres., Cerro de Pasco Copper Corp.,
44 Wall St., New York, N. Y.

Dear Mr. Drew:

I shall mail you, probably tomorrow, my summary of the electrolytic zinc situation and then tackle my analysis of the Betts process, which will take several days to complete.

Yours very truly,

Adx/B.

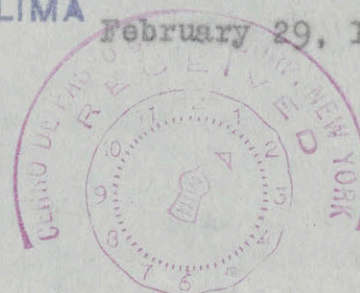
*L. A.
B.*

CONTENTS NOTED
OCT 5 1927
LAWRENCE ADLICKS

FIRST CARBON
WITH ORIGINAL
MAILED SA STA. TERESA

LIMA February 29, 1928.

MAR 7



MAR 23

Cerro de Pasco Copper Corporation,
44 Wall Street,
New York.

Dear Sirs:

Zinc Concentrates

Your letter of January 11, suggesting the idea of calcining concentrates was submitted to Mr. Colley for analysis and I now enclose, for your information, copy of his reply of February 21.

Yours truly,

Original signed by
Harold Kingsmill.

General Manager.

HK-w.
Encls.

La Oroya,
February 21, 1928

Mr. Harold Kingsmill,
General Manager,
Lima.

ZINC CONCENTRATES

Dear Sir:

Replying to your letter of January 25th enclosing New York's letter of January 11th, I am unable to verify the profit of \$6.18 per ton of 60% concentrate as calculated therein.

In the first place, we never have produced steadily a concentrate of 60% Zn content and I doubt if it would be practical to do so.

In the second place, it does not seem possible for a 60% zinc concentrate to roast to a 75% calcine.

The last monthly average analysis of zinc concentrate, that for January 1928, is as follows:

Insoluble	3.8%
Fe	6.2%
Pb	2.2%
Cu	0.8%
Zn	52.6%
Ag	10.4 oz.

This can be calculated to sulphides approximately as follows:

Insoluble	3.8%
FeS ₂	13.3%
PbS	2.5%
CuS	1.2%
ZnS	78.5%
Total	<u>99.3%</u>

If a 60% concentrate were produced there would be 89.5% ZnS, leaving 10.5% for other metals which if proportioned as above would give the following:

ZnS	89.5%
FeS ₂	6.7%
PbS	1.3%
CuS	0.6%
Insoluble	1.9%
Total	<u>100.0%</u>

If this were roasted the products would be:

ZnO	74.8%
Fe ₂ O ₃	4.5%
PbO	1.2%
CuO	0.5%
Insoluble	1.9%
Total	<u>82.9%</u>

which with 60 units of zinc would give a calcine of 72.3%.

These figures are all approximate because zinc sulphide will not be entirely converted by roasting to oxide and, too, probably some small amount of zinc sulphate may be formed. Also the sulphides of iron, copper and lead, etc. may in part be converted to sulphates as well as oxides, all of which would tend to increase the weight of the calcine and diminish the percentage of zinc. But these estimated percentages are close enough for such approximations as these.

Attached is a statement in which the costs of shipping concentrate and calcine and the liquidating value of each are calculated using the same data as those used in New York's letter of January 11th. It will be seen that the costs per ton of concentrate compare as follows:

Shipping calcine	\$22.81
Shipping concentrate	21.12
	<u> </u>
Difference in favor of shipping concentrate	\$ 1.69
	<u> </u>

The liquidating values show \$6.11 per ton of 2000 pounds in favor of shipping calcine. The difference between these two is \$4.42 per short ton in favor of shipping calcine.

This seems to us too small a profit to warrant undertaking the necessary changes in the plant and such a delicate operation as the roasting of zinc sulphide down to 1% fixed sulphur.

There are several doubtful features in the New York estimate of costs. Thus it is doubtful if roasting could be done for \$1.00, probably \$2.00 would be closer to the actual outcome. Also, the costs incurred in changing the plant would have to be amortized against the concentrate roasted. This amortization of cost might amount to \$1.00 per ton of concentrate which with \$1.00 extra possible roasting cost would reduce the visible profit to \$2.42.

The Oroya plant is not well fixed to take care of such an operation, it would be difficult to get the concentrate to the roaster, difficult to separate the fine dust, and inconvenient to remove the calcine. Furthermore, it would take time and cost money to train the crew to this new scheme.

Altogether the available profit, be it \$2.42 or \$4.42 per ton of concentrate, does not seem large enough to encourage the Corporation in undertaking this venture.

As pointed out in a letter to you dated January 28th it would seem rational to expect the European smelters to allow the Corporation a rebate for roasting the concentrate. If this could be arranged it might add as much as \$2.00 to the profit, and this would raise the total possible maximum gain to \$6.42 but it is doubtful if even this amount would warrant the inconvenience and difficulty which would be incurred in carrying out zinc roasting in the Oroya plant.

But, as pointed out above, the production of a 60% zinc concentrate does not seem practical and it is fairer and safer to calculate the profits of roasting, say a 55% concentrate.

Based on the January analysis such a concentrate would contain:

ZnS	82.1%
FeS ₂	11.4%
PbS	2.1%
CuS	1.0%
Insoluble	3.3%
Ag	10.0 oz.
Total	<u>99.9%</u>

This roasted would yield:

ZnO	68.6%
Fe ₂ O ₃	7.6%
PbO	2.0%
CuO	0.8%
Insoluble	3.3%
Total calcine	<u>82.3%</u> containing 66.8% zinc

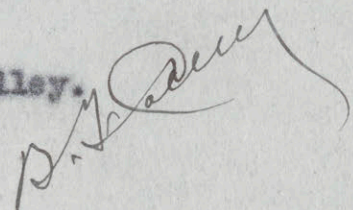
and 12.1 oz. of silver.

HK - 4
2-21-28

There is attached a second calculation made in the same way as that for a 60% concentrate, which shows a net profit for shipping calcine of \$3.72, which is slightly lower than that for shipping calcine made from 60% zinc concentrate. This is to say that the lower grade of the zinc concentrate will give a slightly greater advantage in shipping raw concentrate.

Very truly yours,

B. T. Colley.



cc RS
AAW
TEH Jr.

STATEMENT NO. 1

Casapalca Concentrate Containing 60% Zinc and 11.2 ozs. Silver

Shipped Direct
to Europe

Roasting in Oroya
and Shipping

-	Freight to Oroya		\$1.82
-	Roasting in Oroya		1.00
-	Roasting losses		1.00
\$6.12	Freight Casapalca to Callao		-
-	Freight to Callao	- 82.9% of \$7.90	6.55
4.00	Sacking and Loading	- 82.9% of \$4.00	3.32
3.90	Callao Charges	- 82.9% of \$3.90	3.23
6.50	Ocean Freight	- 82.9% of \$6.50	5.39
0.60	Insurance, Inspection, Assaying	- 82.9% of \$0.60	0.50
<u>\$21.12</u>			<u>\$22.81</u>

Difference in Favor of Shipping Concentrate

\$22.81
21.12
\$ 1.69

Liquidation Value per ton of Concentrate Containing 60% Zinc and 11.2 ozs. Silver

<u>Concentrate</u>			<u>Calcine</u>	
60% - 8 = 52% at \$27	= \$14.040	Zinc	72.3% - 8 = 64.3% at \$27 =	\$17.361
12.5 - 5 = 7.5 ozs. X 50% =		Silver	15 - 5 = 10 ozs. X 50% =	
3.75 ozs. X 25.2d	= .394	Totals	5 ozs. X 25.2d	= .525
	<u>\$14.434</u>			<u>\$17.886</u>
Less Treatment	4.500	Less Treatment		4.500
Less fine for over 55%	.250			-
	<u>\$ 9.684</u>	Total net for 2240 pounds		<u>\$13.386</u>
		Total per ton of Concentrate		<u>X 82.9%</u>
	<u>\$ 9.684</u>	of 2240 pounds		<u>\$11.097</u>

Difference in Favor of Calcine per ton of 2240 pounds

\$11.097
9.684
\$ 1.413
X 4.85
\$ 6.84

For ton of 2240 pounds

For ton of 2000 pounds equals \$ 6.11
Less difference in favor of shipping raw concentrate 1.69

Net profit for shipping calcine \$ 4.42

STATEMENT NO. 2

Casapalca Concentrate Containing 55% zinc and 10.0 oz. Silver

Shipped Direct
to Europe

Roasting in Oroya
and Shipping

-	Freight Casapalca to Oroya		\$1.82
-	Roasting in Oroya		1.00
-	Roasting losses		1.00
\$6.12	Freight Casapalca to Callao		-
-	Freight Oroya to Callao	- 82.3% of \$7.90	6.51
4.00	Sacking and Loading	- 82.3% of \$4.00	3.29
3.90	Callao Charges	- 82.3% of \$3.90	3.21
6.50	Ocean Freight	- 82.3% of \$6.50	5.35
0.60	Insurance, Inspection, Assaying	- 82.3% of \$0.60	0.49
<u>\$21.12</u>			<u>\$22.67</u>

Difference in Favor of Shipping Concentrate

\$22.67
21.12
\$ 1.55

Liquidation Value per ton of Concentrate Containing 55% zinc and 10.0 oz. Silver

<u>Concentrate</u>			<u>Calcine</u>	
55% - 8 = 47% at \$27	= \$12.690	Zinc	66.8% - 8 = 58.8% at \$27	= \$15.876
11.2 - 5 = 6.2 ozs. x 50% =		Silver	13.6 - 5 = 8.6 ozs. x 50% =	
3.1 oz. x 25.2d	= .325		4.3 oz. x 25.2d	= .452
	<u>\$15.015</u>	Totals		<u>\$16.328</u>
Less Treatment	4.500	Less Treatment		4.500
	-	No fine		-
	<u>\$ 8.515</u>	Total net for 2240 pounds		<u>\$11.828</u>
		Per ton of Concentrate		<u>x 82.3%</u>
	<u>\$ 8.515</u>	of 2240 pounds		<u>\$ 9.734</u>

Difference in Favor of Calcine per ton of 2240 pounds

	<u>\$9.734</u>
	<u>8.515</u>
	<u>\$1.219</u>
	<u>x 4.85</u>
Per ton of 2240 pounds	<u>\$5.91</u>
For ton of 2000 pounds equals	<u>\$5.27</u>
Less difference in favor of shipping raw concentrate	<u>1.55</u>
Net profit for shipping Calcine	<u>\$3.72</u>

Cerro de Pasco Copper Corporation

*Office of C.V. Drew:
15th floor
Telephone Beekman 3900-4*

*44 Wall Street,
New York,*

*Cable Address:
"Cerrocop, New York,"
"Cerrocop, Lima."*

December 9, 1927

CONTENTS NOTED
DEC 13 1927
LAWRENCE ADDICKS

Mr. L. Addicks,
51 Maiden Lane,
New York City.

Dear Sir:

Referring to your letter of December 5. Herewith copy of summary of Hydro-Electric Operating Expense for the past thirteen years. The average costs indicated include not only net operating charges but also current expenditures for replacements and renewals. Some of the items included might be considered capital charges if a Government field agent were on the job but all of these expenditures are in addition to the original capital expenditure, so it appears to me that in estimating the cost per horsepower based on our experience in our present size of plant not less than 1/4¢ per KWH should be taken ~~exclusive~~ ^{of} inclusive of capital charge. For a plant of the size required for a zinc plant with a favorable load factor it might be safe to go as low as 2/10¢ in addition to capital. Please consider the foregoing as confidential, and oblige

Yours truly,

C. V. Drew

CONTENTS NOTED
DEC 12 1927
LAWRENCE ADDICKS

2

Year	Avg. KW oper- ated	Avg. KW Dstbd. sub- sta.	Avg. HP Dstbd. sta.	Total Operat- ing costs per year	Avg. Costs per HP per year	Avg. Costs Per HP per Mo.	\$ per KW Yr.	Costs per KW HR.
1914	3077	2,813	3,771	54,807.71	19.48	1.62	26.11	.298
1915	6703	6,177	8,280	160,214.99	25.94	2.16	34.77	.397
1916	8851	8,143	10,916	124,080.49	15.24	1.27	20.43	.233
1917	10281	9,557	12,811	90,723.36	9.49	.79	12.72	.145
1918	10677	9,993	13,995	158,990.57	15.71	1.31	21.06	.240
1919	12495	11,602	15,552	154,494.81	13.32	1.11	17.85	.204
1920	12644	11,726	15,719	212,105.45	18.09	1.51	24.25	.277
1921	12776	12,638	16,941	257,868.07	20.40	1.70	27.34	.312
1922	13237	13,065	17,513	155,376.69	11.89	.99	15.94	.182
1923	13753	13,600	18,231	165,967.01	12.20	1.02	16.35	.187
1924	11830	11,663	15,634	203,684.30	17.46	1.46	23.40	.267
1925	10706	10,532	14,118	153,977.31	14.62	1.22	19.60	.224
1926	13958	13,784	18,477	358,293.30	25.99	2.17	34.84	.398
Total		135,293	181,358	2,248,584.06	avg.16.62		22.28	.254

CONTENTS NOTED
DEC 12 1927
LAWRENCE ADDICKS

A-80.

51 Maiden Lane.

New York, N. Y., May 19, 1928.

Mr. Edward H. Clark,
Vice Pres., Cerro de Pasco Copper Corp.,
44 Wall Street, New York, N. Y.

Dear Mr. Clark:

DeLaval Electrothermic Zinc Process:

I had quite a talk at the Cyanamid offices yesterday morning about the situation at Trollhätten, Sweden. The installation of the new furnaces is going steadily on and they expect them to be in working order by the first of September. I am firmly of the opinion that you should send a 1000-ton sample of roasted zinc concentrates to them for trial.

Mr. Strauss told me Wednesday that the A.S. & R. Company had already arranged to send a sample of their material and that they were so enthusiastic about the possibilities of the process that they certainly would have bought into the company had it been possible for them to have obtained a 50% interest. The weak spot, in his opinion, was the question as to whether the zinc produced was of sufficient purity to command full premium accorded electrolytic zinc.

Mr. Edward H. Clark, - - Sheet #2. - A-80 - May 19, 1928.

The Trollhätten plant is being operated and is controlled by a Swedish company which has been running on a small scale for many years. The Cyanamid Corporation has not bought this company but has bought the ~~the~~ ^{world} rights to the process outside of the operations of this company. They have done so purely with the belief that by applying their expert electric furnace knowledge to the development of the equipment they will put the process beyond competition. They are installing equipment of a 50 ton a day capacity for trial as designed by them, and after the demonstration has been made it is an open question as to what the policy will be. They will be prepared to sell licenses to those who wish to construct a plant, or may even construct a plant themselves on a custom basis.

From their point of view they do not recommend its installation in Peru, as they believe that the additional power consumption as compared to Tainton would impose too great a handicap, but they feel that operating costs in Norway, where they would recommend building any future installation, would be very low, not only on power but on labor and investment as compared with Peru.

From my point of view they are interesting because it is self-evident that they believe they can operate at a much lower cost than present retort smelters or future electrolytic plant in Europe. This means that you should

Mr. Edward H. Clark, - - - Sheet #3. - A-80.- May 19, 1928.

get a lower returning charge than has heretofore been possible, thereby reducing the margin of saving to be shown by the Tainton installation in Peru. There will, of course, be a point at which ~~he~~^{you} will not feel justified in building the Tainton installation, due first to the risks of foreign investment, and second the zinc market risks, both of which would be avoided if you were able to place your material at some such plant as is suggested in Norway, to be built by others.

As to the purity of zinc, what they have been turning out in the past has been 99.65 to 99.85% zinc. They are, at present, conducting some electric furnace experiments at Niagara Falls and believe they will be able to bring this grade up, but in any event they have not suffered in the market from this cause up to date.

Next winter you are going to have to make some important decisions as to your zinc policy and I think you ought to do whatever is possible to evaluate the Electro-thermic process. You should be able either to dismiss it from the discussion, or to feel that you are justified in holding off if necessary for its final development. Otherwise you will be in the position of authorizing a \$7,000,000 investment with the possibility of a cheaper method coming to the front almost before it is in operation.

I think, therefore, that the following cable or its equivalent should be sent to Peru:

Mr. Edward H. Clark, - - Sheet #4. - A-80.- May 19, 1928.

"Refer previous correspondence Electrothermic zinc process in Sweden stop. Operations new plant at Trollhätten to commence in September and essential we deliver our sample lot one thousand tons roasted zinc concentrates there by end September Stop. What is desired is ordinary sinter not crushed more than necessary for shipment running if possible not over one percent sulphur stop. Additional sulphur can be treated but will unfavorably affect recoveries stop. While we appreciate roasting of this material will be a nuisance presume it can be arranged by using roasting equipment temporarily idle stop. Please advise what steps you will take in this direction."

Yours very truly,

Adx/B.

Lawrence Addicks
per B.

Dictated but
not revised

CONTENTS NOTED
MAY 28 1928
LAWRENCE ADDICKS

A-115.

51 Maiden Lane.

New York, N. Y., August 3, 1928.

Mr. C. V. Drew,

Vice Pres., Cerro de Pasco Copper Corp.,

44 Wall St., New York, N. Y.

Dear Mr. Drew:

Electrolytic Zinc.

I return herewith Kingsmill carbon on Quiulacocha
Concentrator.

I fully agree thorough commercial runs are a
condition precedent to the serious consideration of any such
investment as may be involved in a zinc plant in Peru.

Yours very truly,

*L. A.
B.*

Adx/B.

Enclosure.

CONTENTS NOTED
AUG 20 1928
LAWRENCE ADDICKS

A-169.

November 17, 1928

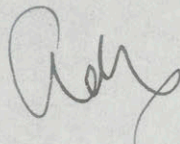
Mr. C. V. Drew, Vice-Pres.,
Cerro de Pasco Copper Corp.,
44 Wall Street, N.Y.C.

Dear Mr. Drew:

ZINC REFINERY

I return herewith the papers accompanying your
letter of yesterday. I have no additional comment to make.

Very truly yours,

A handwritten signature in cursive script, appearing to be 'R. H. ...', is written below the typed closing.

Cerro de Pasco Copper Corporation

*Office of C. V. Drew,
15th floor,
Telephone Beekman 3900-4*

44 Wall Street,

New York, November 16, 1928

*Cable Address:
"Cerrocopi, New York,"
"Cerrocopi, Lima."*

Zinc Refinery.

Dear Mr. Addicks:

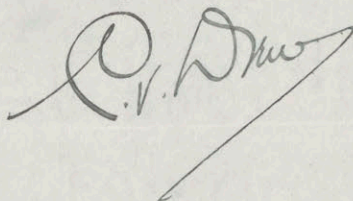
I have revised my letter considerably and have taken the liberty of changing some of the figures in your letter of July 26 to confirm my revised comparative statement.

I enclose copies as follows:

Revised draft of my letter to Peru
Copy of Comparative Statement
Extracts of your two letters
Photostat of Graton's letter
Copy of my second letter to Peru referring to yours and Graton's

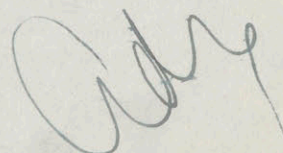
Will you please look over and return the bunch by Monday's mail, with comments if any.

Yours truly,



To
Mr. L. Addicks,
Bel Air, Md.

enc.



Written from Bel Air.

A-164.

November 10, 1928

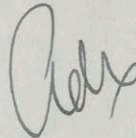
Mr. C. V. Drew, Vice-Pres.,
Cerro de Pasco Copper Corp.,
44 Wall Street, New York City.

Dear Mr. Drew:

ZINC REFINERY

I have your letter of November 9th. As I have not a copy of my letter of July 26th at hand I have telegraphed Mr. Bulfin to send me one and shall reply to your questions on Monday.

Very truly yours,

A handwritten signature in cursive script, appearing to be 'A. J. ...', written in dark ink.

A-47.

51 Maiden Lane.

New York, N. Y., Feb. 23, 1929.

Mr. C. V. Drew,
Vice Pres., Cerro De Pasco Copper Corp.,
44 Wall St., New York, N. Y.

Dear Mr. Drew:

Zinc Refinery Location.

Noting Mr. Smith's figures on cost of producing liquid sulphur dioxide, I should be interested to know how much of this cost is for power, for comparison, and at what rate power has been charged per KWH. Also how much four to ten times as large a plant would probably affect the situation. I suspect with only fifteen tons of sulphur a day the costs were out of all reason.

Next, I suggest asking Mr. Moore to have his people consider what advantages might accrue from the use of 100% SO₂.

Also asking Mr. Landis whether he had considered at all whether such a market is possible.

I note, with interest, the growing pulp industry in Scandinavia as indicated by the statistics sent me.

Yours very truly,

Adx/B.

L.A.
B.

A-41.

51 Maiden Lane.

New York, N. Y., Feb. 18, 1929.

Mr. C. V. Drew,
Vice Pres., Cerro de Pasco Copper Corp.,
44 Wall St., New York, N. Y.

Dear Mr. Drew:

Zinc Refinery Locations.

My conclusions from our conferences with ^{the} paper people are:

(1) The only practicable way of selling the paper mills by-product sulphur from our zinc concentrates is as liquid sulphur dioxide. Letting them roast the concentrates, letting us make the bisulphite liquor or piping them roaster gas are all unpromising. The technology of liquefying sulphur dioxide from smelter fumes was worked out at Tacoma some years ago and I have no doubt Mr. Smith will be able to secure some information at the A. I. M. E. meeting next week.

(2) I am satisfied the paper people will secure enough advantage from employing 100% SO₂ gas instead of 15%, as at present, to justify them in allowing us their full sulphur cost of \$23 a ton (at Three Rivers). Liquid SO₂ will permit shipping to not too distant mills while probably freight charges will prevent competition in kind from other smelters some distance away. I rather doubt that the sulphur