

016060

TR. MK. REG. U.S. PAT. OFF

Re. Slag Smelter Process

46-48% Pb-Zn
 Pb 20% - 24%
 Zn 28
 Fe 8-12%
 Ag 7.5 Ag.
 Au .09

- measure capacity by amount of carbon burning rate
- Germany France, Roumania
- 130 t. tons carbon per day
 1000-1100 t. tons of Zn per week.
- 45,000 t. tons Pb
 - 60,000 t. tons Zn per year with
 high grade charge 50-55% Zn
 60-65% Pb
 than figures would come down.
- balance between amt of slag & amt
 of coke - don't like to exceed 50% FeO
 in the slag.
- possibly we can think of allowing
~~15%~~ 15% Fe in coal.
- down payment based on size of furnace
- royalty based on metal
 > 1% of metal prices for Zn, Pb, Cu.
- re. Pb - reduction based on refining cost
 \$7.00 long
- * \$1600 per sq. ft. of cross sectional area
 @ 185 sq. ft. of shaft - \approx \$1,000,000 for usual
 size

ISP act as tech. consultants
for a ~~at~~ \$90,000 fee.

- talking about 60,000 s. tons of coke
a year. (coke has to be as good
as required for lead blast furnaces)
- 400-500 tons of coke per day
for a standard size
- 97% of Ag. + probably of Au.
- 70-75% rec. of copper
- 90% of Zn
- 92% of Pb
- prefer not to do test work
- 320-350 personnel on 24 hr day basis
- 400 kWh's per ton of carbon
- 2 1/2 - 2 yrs to construct.

PMK

IMPERIAL SMELTING PROCESSES LIMITED

6 ST. JAMES'S SQUARE,

LONDON, S.W. 1.

ENGLAND.

TELEPHONE: WHITEHALL 2300

TELEGRAPHIC ADDRESS:

PROCESISCO LONDON

TELEX NO. 24639

M. I. FREEMAN (CHAIRMAN)
S. W. K. MORGAN (MANAGING DIRECTOR)
A. A. CLARK H. W. A. REPARD
D. A. TEMPLE H. L. THOMPSON
S. E. WOODS

PLEASE REPLY TO:

ST. ANDREW'S ROAD
AVONMOUTH
TELEPHONE: AVONMOUTH 3631
TELEGRAPHIC ADDRESS:
PROCESISCO AVONMOUTH
TELEX NO. 44286

28th April, 1966.

Mr. J.H. Stovel,
Executive Vice President,
Kerr-Addison Mines Ltd.,
44 King St. West,
Toronto,
CANADA.

Dear Mr. Stovel,

IMPERIAL SMELTING PROCESS
VANGORDA CREEK

We wish to confirm having cabled you as follows:-

"Re Imperial Smelting Process our preliminary assessment shows standard 185 sq. ft. I.S.F. capable of treating 178100 tons Vangorda Bulk concentrate per year producing 45300 tons slab zinc and 40500 saleable lead in bullion. Recovery of zinc approx. 89.6%, lead 94.6%, silver 93.5%. All weights tons of 2000 lb. All figures subject to confirmation. Letter will follow in few days."

Regards, Temple Procesoisco

During my visit to Toronto we undertook to prepare a preliminary metallurgical assessment of the Imperial Smelting Process treating the Vangorda materials. Please find enclosed three copies of the summary of this assessment, Calculation 643. You will see that we have assumed the use of a standard size (185 sq. ft. shaft area) Imperial Smelting Furnace as at Swansea, Cockle Creek, Noyelles-Godault and Duisburg etc. As you are aware we are building a larger size furnace at our Avonmouth Works which will treat approximately

IMPERIAL SMELTING PROCESSES LIMITED

Mr. J.H. Stovel

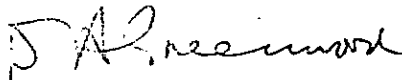
28th April, 1966.

60% more materials with a proportional increase in zinc and lead output. Once you have this metallurgical information we will be very pleased to provide any further data on the process, i.e. sintering, capital costs of equipment and perhaps if you would kindly let us know what additional information you require we will be very pleased to send it to you.

I hope that it will be possible for you or one of your colleagues to come over and see us some time in the not-too-distant future.

With kind regards,

Yours sincerely,



for D.A. TEMPLE
CHIEF METALLURGIST

11/DAT/DAQ/VC

Enc. 3 Copies Summary of Calculation 643

IMPERIAL SMELTING PROCESSES LIMITED

PRELIMINARY ASSESSMENT FOR VANGORDA CREEK

Summary of Calculation 643

Analyses of Raw Materials

| | Bulk Concentrate | Lime-stone | Hard Burnt Lime | Sand | Coke & Coke Ash | Coke ash as % Fixed C |
|--------------------------------|------------------|------------|-----------------|------|-----------------|-----------------------|
| Zn | 28 | | | | | |
| Pb | 24 | | | | | |
| Fe | 12 | | | | | |
| Fe as FeO | 15.44 | 0.5 | 0.5 | 1.0 | | 1.04 |
| CaO | - | 54 | 94 | 0.5 | | 0.62 |
| SiO ₂ | 4.5 | 2 | 2 | 97.0 | | 5.20 |
| Al ₂ O ₃ | (Say) 1.0 | (Say) 0.5 | 1 | 0.5 | | 4.14 |
| Others | (Say) 1.0 | (Say) 0.5 | 1 | 0.5 | | 0.36 |
| S | 28 | | | | | |
| Cu | 0.85 | | | | | |
| Ag (oz/st) | 7.5 | | | | | |
| Au (oz/st) | 0.09 | | | | | |
| Fixed C | | | | | 87 | |
| Ash | | | | | 11 | |

Main Performance Factors

| | <u>Economic</u> | <u>Design</u> |
|--|-----------------|---------------|
| Carbon burnt per day (short tons) | 145.6 | 168 |
| Days operation per year | 315 | 320 |
| Zinc in slag | 6% | 6% |
| Zinc in dross and blue powder (as % C) | 15% | 17% |
| Lead in dross and blue powder (as % C) | 17 | 15 |
| I.S.P. Carbon Estimation | 72.5% | 67.5% |

SUMMARY OF ANNUAL PERFORMANCE

(All weights in short tons - rounded off)

| | Annual Performance | | Standard 185 sq.ft. ISF | |
|------------------------------------|--------------------|----------------------|-------------------------|----------------------|
| | Economic | | Design | |
| Carbon in hot coke burnt in I.S.F. | 45860 | | 53750 | |
| Concentrate used | 178100 | | 223200 | |
| New zinc | 49900 | | 62500 | |
| New lead | 42700 | | 53600 | |
| New copper | 1500 | | 1900 | |
| New silver | 1,335,500 oz. | | 1,673,800 oz. | |
| New gold | 16000 oz. | | 20100 | |
| New sulphur | 49900 | | 62500 | |
| Limestone | 25200 | | 31600 | |
| Sand | Nil | | Nil | |
| Sinter to I.S.F. (approx.) | 187900 | | 237300 | |
| Hard burnt Lime (to ISF) | 1500 | | 1600 | |
| Slab zinc (1.2% Pb) | 45300 | | 56800 | |
| Lead bullion | 43400 | | 55700 | |
| Total Lead in bullion | 41300 | | 53100 | |
| Lead addition to condenser | 800 | | 2300 | |
| Net lead in bullion | 40500 | | 50800 | |
| Copper in bullion | 1200 | | 1500 | |
| Silver in bullion | 1,249,400 oz. | | 1,566,300 oz. | |
| Reject Slag | 65900 | | 81800 | |
| <u>DISTRIBUTION OF NEW METALS</u> | | | | |
| | <u>Zinc</u> | <u>Lead</u> | <u>Zinc</u> | <u>Lead</u> |
| | % | % | % | % |
| Slab zinc | 89.7 | 1.3 | 89.8 | 1.3 |
| Net lead in bullion | - | 94.7 | - | 94.8 |
| Slag | 7.9 | 1. | 7.9 | 1. |
| I.S.F. loss | 1.4 | 1.1 | 1.3 | 1.0 |
| Sintering loss | 1.0 | 1.8 | 1.0 | 1.8 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |
| <u>ANALYSES</u> | | | | |
| | <u>Sinter</u> | <u>Slag</u> | <u>Sinter</u> | <u>Slag</u> |
| | | (on zinc-free basis) | | (on zinc-free basis) |
| | % | % | % | % |
| Zn | 29.9 | - | 29.9 | - |
| Pb | 25.4 | - | 25.6 | - |
| FeO | 14.7 | 46.1 | 14.6 | 46.5 |
| CaO | 7.3 | 25.1 | 7.2 | 25.0 |
| SiO ₂ | 4.5 | 17.9 | 4.5 | 17.8 |
| Al ₂ O ₃ | 1.0 | 6.3 | 1.0 | 6.1 |

11/DAG/VC
28.4.1966.