

June 28, 1950

Mr. T. G. Deggendorfer
Box 840
Kellogg, Idaho

Dear Sir:

Mr. Somerville has asked me to write you something in explanation of our general method for the determination of silver in materials containing bismuth, with particular reference to Silver Summit concentrates. I am also sending a few of the special cupels we make for the sweating operation. These are straight XXX bone ash with no addition and are quite soft and I trust they reach you in good order.

Mr. Somerville tells me that you buy your cupels. If you use some of the patent cupels it might be difficult to get this type. We make our cupels with a very simple DFC old style cupel press and have no difficulty in adapting it to this sweating cupel.

I am enclosing our whole procedure for Silver Summit concentrates. You will appreciate that we make no variations in it. We have settled hundreds of lots of Aramayo concentrates between ourselves, Ledoux and Company and several Eastern umpires on this basis.

Ledoux and Company use the thiocyanate combination method and Tacoma uses the sweating method. Our experience is that the sweated beads "check" very well, in fact, when a material gives wild silvers we immediately check for bismuth. If the sweated beads do not check it is usually because the temperature has not been high enough. They should be sweated up to the softening point before the muffle is turned off.

I trust that the enclosed method is self-explanatory and I hope you will feel free to ask anything about it you wish. Please let me know if the cupels arrive in good condition.

Yours very truly,

A. H. MELLISH

ANM:EG

cc DASomerville
PTBenson

SILVER ASSAY BISMUTH-BEARING MATERIAL

Weigh on 1/4 AT. charges into 20 gram crucibles containing 20 - 24 "special" flux. Add 90 grams litharge, 3 grams silica and nitre sufficient that the resultant lead button is 30 - 32 grams in weight. Mix and cover with about 30 grams litharge and sprinkle with salt. Fuse at about 1070 degrees C till quiet. Pour and when cool remove slag.

Cupel in the usual manner to feathers. Cool. Weigh roughly. Make blanks of proof silver to this rough weight and note the accurate weight of the blank or proof. Place the proof in center indentation in sweating cupel, grouping the assay beads around proof. Proofs are run with original and duplicate. Now bring the temperature in muffle up to softening point of beads, then close muffle and turn off heat. Allow beads to cool enough to remove from furnaces. Weigh all beads and proofs - increasing the bead weights by the loss in weight of proofs. Then part for gold in usual manner.

- Note (1) Special Flux: 25 parts by weight soda ash
 10 parts by weight pearl ash
 11 parts by weight powdered borax glass
- (2) Sweating Temperature (by optical pyrometer) 980 - 1000° C.