ANACONDA Aluminum Company **Internal Correspondence**

Date: June 27, 1983

Subject: Primary Metals R&D Monthly Report - June 1983

From/Location: E. L. Cambridge

To/Location: J. G. Kaufman

R&D PROJECTS

High Purity Alumina

Economic analyses of 1, 3, 5, 10 & 25 tpd high purity alumina plants indicate that it is economically advantageous to treat the bleed stream as a waste product rather than build a bleed stream treatment section if the production is less than or equal to 5 tpd. For greater than 5 tpd the opposite is true. Capital cost estimates based primarily on vendor quotes, for 1 and 3 tpd pilot plants to produce 99.95-99.98% alumina will be complete by month end.

AD-120 PROCESS

A. Ore to PCACH

Operation of the laboratory crystallizer has shown that slurry recirculation rate is the key parameter affecting ACH crystal size. USBM results, obtained using an order of magnitude larger crystallizer, showed crystal size to be independent of circulation rate. The small diameter recirculation loop of our lab crystallizer may be causing particle attrition. We must sort out the reasons for these differences as particle size control is critical for the process. This is a compelling reason for obtaining the USBM equipment.

Concerning the USBM equipment, Donald Kesterke of USBM met with us last week to review the draft memorandum of agreement. Following Stan Becker's recommendations, we incorporated some minor changes for USBM consideration. Kesterke did not anticipate any problems with their legal people as a result. Therefore, there is a good chance we can obtain the USBM equipment and have it on site by September.

Because of problems with the Kynor coated parts on the continuous screw feeder, the ACH lab-scale fluid bed calciner will not be fully operational before the beginning of August. This delay should not seriously impact the overall program schedule.

The bleed stream pilot project is on schedule. Site preparation modifications and rejuvenation of existing equipment should be complete by July 11. Plans for staffing and operating the pilot plant are complete. The 8 week debugging, testing and operating campaign will begin in late August.

B. Chlorination

CxCly results equivalent to Alcoa's latest HTFB results (12 ppm PCB & 67 ppm other CxCly) have been obtained with an economically viable steam activated Collier coke.

A two-stage reactor assembly to destroy CxCly in-process, has been constructed and is being debugged. The second stage is an activated coke filter which in concept, should absorb the CxCly from the chlorination section off-gases. The impregnated filter coke would then be recycled to the chlorination stage as the carbon reductant and the CxCly destroyed.

C. Other

A comprehensive AD-120 program cost estimate will be developed by month end to support preparation of an AFC for the proposed joint program with Alcoa.

ASV Magnetics-Columbia Falls

Buswork modifications on Pots 516, 517, 518 and 519 have been completed. Transfer of buswork from Pot 304 to Pot 520 has been postponed until late August because of Line 1 restart. Pot 518 remains out of service and will not be restarted until Line 1 restart is complete. New target metal pad depths ranging from 14 to 17 inches vs normal 19-21 inches were established on the three operating test pots to evaluate operating stability.

Lithium Bath at Columbia Falls

Test pots are stable with bath temperatures ranging from 950 to 958°C. A test is being planned to use a zinc tracer to determine base line metal pad inventories, and permit an accurate determination of current efficiency. The temperature reduction being achieved should result in a CE increase of 1-1.5% which is below the level of detection for traditional CE determination by weighing tapped metal for a small group of cells.

Anode Optimization

Significant progress was made on standardizing laboratory procedures and improving data productivity. Problems still remain in our ability to reproduce elongation results. Baked apparent densities were reproduced within 0.01 grams/cc. No definitive conclusions can be drawn from the data so far.

TECHNICAL SUPPORT/SERVICES

Mitsubishi Technology

The Mitsubishi technology exchange was held the week of May 30 at the Columbia Falls plant. The Mitsubishi team made specific proposals for a 20 pot test of their anode technology and a 2 pot test of cathode technology.

Columbia Falls is formulating a specific plan to address the Mitsubishi proposals. We are working with the plant in a support role particularly in the area of laboratory anode simulation.

Anode Operation-Columbia Falls

The Mitsubishi team also evaluated the problems Columbia Falls has had with ARCO coke. Their major conclusions were:

- Since ARCO coke is low in ash and other impurities, the kinetics of pitch oxidation is greater than that of the coke and results in dusting.

- ARCO coke is very soft and tends to break down during mixing and handling. This causes an ultimate lack of coarse material in the green anode which results in excess shrinking and cracking.

These conclusions do not differ significantly from our previous recommendations. Columbia Falls will prepare a specific action plan as a result.

PERSONNEL

Subodh Das has accepted a transfer to Basic Resources operations in Louisville, effective June 1.

E. L. Cambridge

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