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I attended the PSC meeting at the Owensboro Community college in June 2013 concerning the aluminum plants and Big Rivers Electric Corp. case no. 2012-00535.

I worked in the Aluminum Industry for 33 years. First at NSA, then Southwire and now Century Aluminum at the same location. I worked through five of the twenty aluminum plant closings in the U.S. during that period. In each case it was the cost of electric power that ended their competitive business.

In the world as a whole most countries subsidize the electric power to their steel and aluminum industries. Iceland has geothermal power, Dubai has flare gas, Canada has hydro power, India and China just pitch in. This guarantees jobs for their people. The power charge is usually just enough to cover maintenance and salaries, about 1/3 what we pay in the U.S.

POWER: It takes 7.5 KWH of electric power to produce one pound of aluminum. Based on Big Rivers current electric power rate of \$.046/KWH this would be:

7.5 KWH/lb. Al x \$.046/KWH = \$.345/lb. Al

Alumina Ore: Alumina is Al₂O₃

It takes more than a pound of alumina to make a pound of aluminum.

Aluminum atomic weight 27

Oxygen atomic weight 16

Al₂O₃ = 2x27 + 3x16 = 102

Al₂/102 = 2x27/102 = .529

Therefore one pound of alumina produces .529 pounds of aluminum. 1/.529 = 1.89 It takes 1.89 pounds of alumina to produce one pound of aluminum. The current price of alumina on the London Metal Exchange is \$315.50/metric ton. One metric ton = 2,204.6 lbs. \$315.50/2,204.6lbs. = \$.1431/lb.

Therefore 1.89 x \$.1431 = \$.27/lb Al

I do not have the current contract price for alumina for Century.

Anode Carbon: It takes ½ pound of baked carbon to produce one pound of aluminum. In 2002 when I retired I made a high quality anode carbon for \$258/ton. According to my colleagues are the world this was low. If you take inflation of 2 ½ % for 10 years that would be: 1.28 x \$258/2,000lb = \$.165/lb. Since it takes ½ pound to produce one pound of aluminum this would be: 1/2 x \$.165 = \$.083/lb. Al

Maintenance: In my 33 years in the business I found that the plant maintenance averaged 10% of the cost of electricity, alumina and carbon.

(\$.345 + \$.27 + \$.083) x 10% = \$.0698/lb Al.

Annual Production: There are five potlines with 112 pots per line. Each pot can produce 2,500 lbs. aluminum per day. Not all pots are running so using a factor of 95% the annual production would be:

$$5 \times 112 \times 2,500\text{lbs. All day} \times .95 \times 365.24 \text{ day/yr.} = 485,769,200 \text{ lbs. Al/yr.}$$

Salaries: From information in the M&I newspaper
 $771 \times (\$60,000 + \$25,000 \text{ fringes}) = \$57,825,000\text{yr.}$

Salaries/production = \$.119/lb Al

Cost Summary;

Electric Power	\$.345/ lb Aluminum
Alumina	.27
Carbon	.083
Maintenance	.0695
Labor	.119

Cost Plant site
\$.8865 / lb. Aluminum

This does not take into account delivery cost, storage or local, state or federal taxes. That information was above my pay grade.

The London Metal Exchange sets the selling price for aluminum. The LME selling price of aluminum on

9-24-12 was \$.85/lb. The price in Feb. 2013 was \$.96/lb. The price is volatile and swings up and down \$.05 to \$.10/lb. A rule of thumb is if the LME is \$2,000/metric ton than the selling price is \$.907/lb. The gives you a loss of 4% to a profit of 8% based on production cost during the past year. The companies mentioned overseas were running 20% + profits in the same period.

The only wiggle room in the process is the electric power. The U.S. power rate to aluminum and steel plants needs to be tied closer to the "World Free Market" power rate to these industries. These metals are strategic to the health of our country (buildings, planes, cars, power transmission lines, food packaging, jobs, ect.

Another thing should be considered. If Century closes then Big Rivers Coleman plant has to shut down. These power plants are designed to run between 50 and 110% capacity. Since Century Al. is 80% of their capacity the power plant would have to shut down the same shift. Since the burden of cost would fall on Alcan (now Century 2) in Sebree they would have to shut down also. The Big Rivers power plant at Reed would also have to shut down. Big Rivers would still have their newest Wilson plant at Livermore capable of handling their remaining load. So the number of jobs lost is:

(Century 771 + Coleman 150 + Reed 150 + Alcan 500) = 1,571 jobs

1,571 x \$75,000/yr. = \$117,825/yr.

An economist explained to me during the other plant closings that the effect is greater than this. You multiply the industrial jobs lost by 4 and then cut the annual salaries in half so the real effect is:

1,571 jobs x 4 x \$75,000/2 = \$235,650,000/yr. This is the real loss to Hancock, Daviess and Henderson counties. This is worth getting excited about.

Century Aluminum has their headquarters in California. They own a large aluminum reduction plant in Iceland where they pay almost nothing for electric power. They are in the European Common Market so they pay no taxes. Shutting down Century Hawesville (chapter 7) Automatically cancels all contracts for power, alumina, petroleum coke ect. They can cut clean and move East.

The impact of losing \$235,650,000/yr. to Western Ky. is hard to imagine. If nothing is done everyone's electric power bill will go up 40% with four plants closing. If Big Rivers produces part of the electric power and allows the remaining to flow through all plants can continue to operate. The Bill for coal severance tax relief for Big Rivers will also need to pass. With this method everyone's electric power bill will go up 20%.

We can no longer be isolationist, we are caught up in a world market economy. We need to think and react globally.

Sincerely yours,

Mike Benton

**Mike Benton
Retired Staff Process Engineer**

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