

Tacoma, Washington  
May 2, 1950

J. D. MacKenzie, Vice President  
NEW YORK OFFICE

Dear Sir:

I came to Tacoma after the visit to Tooele, East Helena, Bunker Hill and Trail with Mr. Hardy, Mr. Whittington--engineer in Steel's office, Mr. Plapp--power engineer for Mexico and young Hennebach in charge of the slag fuming plant at El Paso.

We spent nearly two days at the Tooele Plant. This plant was of particular interest to us as it is the only one, other than El Paso, fuming a slag containing upward of 0.5% to 0.6% fluorine. The Tooele Plant, as you no doubt have already been informed, is short of smelting material. Their high zinc slag from the dump is exhausted and the fuming furnace is only operating at the rate of 360 tons as compared with the 450 to 500 tons of better days in the previous years.

The destructive effect of fluorine at this plant is very evident at the U tube cooler and baghouse where the temperature of the smoke is subject to local condensation of the water vapor in the smoke. The repairs on these units have been costly in recent years. Tooele has adapted the expedient but radically wrong practice of cooling the smoke in the range of 1500° to 2000° with water sprays instead of air and radiation, with the result of a very high dew point in the smoke which is the cause of their deterioration in the units of the plant operating at the lower temperature. But the steel on the flue subjected above the dew point and exposed to temperatures of 1000° to 1300° does not show any unusual deterioration other than normal oxidization from high temperature. In comparison to El Paso the chlorine content of the Tooele smoke is very low.

At this plant, as in the instance of other plants visited, we discussed the question of boiler in conjunction with the fuming plant and to quote to you the very opinion of Mr. Bardwell and his assistants, they did not hesitate stating they were not in favor of a boiler with this type of an operation. We did not question their opinion. But I can recall clearly when four years ago they were favorably inclined to a boiler.

After visiting Tooele we spent two days at East Helena with Messrs. Baldwin and Thompson, and at this time wish to say to you they opened the book to us and demonstrated in detail the fundamentals responsible for tonnage, low fuel ratio and high zinc elimination. East Helena Plant still remains the outstanding example of performance in zinc fuming operation, in efficiency and simplicity. The Tooele Plant is a close second.

Mr. Thompson operated the Bunker Hill fuming plant, also helped to start El Paso, and knows the Trail operation, so we discussed the

question of boiler in conjunction with this fuming furnace and now find that neither he nor Mr. Baldwin are favorably inclined to boiler. I know from past dealing that Mr. Baldwin never did like a boiler in conjunction with this operation, but could not help to take notice of Mr. Thompson's radical change of opinion. Two years ago he was favorably inclined to boiler. He told me of his disappointment in the El Paso installation, the lack of control in the pulverizing equipment so essential to melting the slag and fuming the zinc, and also the distraction of the operator's attention from the furnace operation proper to the production of steam. I brought this subject up for discussion with him several times to make sure my ears were not deceiving me. Even spoke to Mr. Baldwin alone on this particular subject to find out for certain if this was not a matter of personal opinion rather than judgment of facts and found that independently of each other, with the exception of minor details, both concur in their opinion.

Following our visit to East Helena we spent two days at the Bunker Hill Plant and were cordially received. They were very obliging with information copied from their records and held a meeting with their plant operators for us to obtain first hand personal opinion.

Everyone at this plant did not hesitate to express their personal views on the adverse effect of the boiler in their zinc fuming operation. They have committed themselves in the production of steam to the extent of not being able to handle cold slag and only a limited amount of shells from the laddles. Moreover, they do not know whether their pulverizing layout would meet the requirements for the oxidizing-reducing operation practiced at East Helena. They are now planning to reduce the steam production generated and put more efforts to the production of zinc where the real money is made.

It was a disappointment to us not to be able to obtain the information on the flexibility of their pulverizing equipment. The El Paso pulverizing units, which were supposed to be duplicates of Kellogg, are very limited in flexibility and really not designed to duplicate East Helena operation. I heard from several on this trip that the B. & W. Company engineers place the blame for the inefficiency of their grinding equipment on the American Smelting and Refining Company engineers.

Whether this is the case or not, after this trip and from my observation on the last visit to El Paso, it looks to me like we have at El Paso more of a power house than a zinc fuming operation. The original plan was for the boiler to provide cheap steam only when available without interference whatever to the fuming furnace.

Our visit to Kellogg was very much worthwhile. We copied and applied most of their design to the El Paso installation. Mechanically their operation is efficient. The drop across their boiler and economizer is only 0.75" as compared with 4.0" at El Paso and Trail. Their

entire plant is still operating with only one fan with a total of 4.5", as compared with 10" at El Paso and 13" at Trail.

Their mechanical baghouse will soon need a costly general overhauling. The continuous operating screw conveyors under the flue, coolers and baghouse, which we copied from them in the El Paso installation, can be dispensed with in a new plant. Their hoppers are badly pounded out of shape, and the dust does not run by itself to the conveyors. East Helena, Tooele and Trail have no difficulty drawing dust from hoppers.

Kellogg is still running two to three percent lead in the slag and unable to de-lead the zinc fume in the kiln. Their sinter is poor quality and the blast furnace is operated more like a melting furnace than a metallurgical unit and they still copy Trail's methods of development.

From Kellogg we drove to Trail and spent three days. The Trail zinc furnace handles only hot slag. The ladle shells are returned to the blast furnaces.

Unlike El Paso and Bunker Hill, their fuming furnaces are operated to handle all the tonnage of slag produced by the blast furnaces totally independent of steam production. The steam is used for heating and mostly processing and it does not matter if the steam pressure or the quantity is irregular. Coal is their cheapest fuel and the same cost whether it is burned in the boiler at the ammonium sulphate plant or the zinc furnace. Operating an oxidizing-reducing cycle is immaterial to them as long as the two fuming furnaces take care of the slag from the blast furnaces with what they call an economical zinc elimination.

Their new method of charge preparation in long rotary kilns has been in operation for some time. The sinter produced from it is very poor but they are satisfied. This layout was their great hope of producing a high grade SO<sub>2</sub> and the climax of their year of experimentation toward that end, but the best they can do is 2.3% SO<sub>2</sub> and they conceded to me that my method of recirculation was the best.

Here below is a comparison of the zinc fuming plant operation:

	<u>Coal</u>	<u>Tons Slag Per Day</u>	<u>Percent Coal to Slag</u>	<u>Slag Shells Cold Slag</u>	<u>Size of Furnace</u>
El Paso	Associated	540	23.5	20% ?	8' x 21'
Tooele	Utah	500	17.8	13%	8' x 15'
East Helena	Montana	660	18.0	22%	8' x 21'
East Helena	Fernie	660	<u>14.0</u>	22%	8' x 21'
Bunker Hill	Fernie	415	22.5	8%	8' x 15'
Trail	Fernie	450	27.0	None	10' x 24'

We were told in East Helena that the Fernie coal used during the coal strike here in the States, worked remarkably well both from the standpoint of fuel economy and zinc elimination. They are contemplating blending some of this coal with Montana coal.

Unlike other plants with boilers, East Helena and Tooele economize on coal and, moreover, the attention of everyone is concentrated on the operation of the fuming furnace and not distracted by the pressure or flow of steam at the boiler.

As I see it, after this trip and watching El Paso operation, the power engineers apparently have not fully understood the workings of a zinc fuming furnace. The rate of coal fed to a fuming furnace, as demonstrated by East Helena and Tooele, has to fluctuate from a rate of 90 pounds per minute to 200 pounds per minute. There is no such thing as an average with regard to the utilization of the heat generated.

In so far as Chihuahua is concerned, if power figures to be a worthwhile investment, the boiler on the zinc fuming installation can only be considered as an auxiliary to supply steam when available and that is one thing well understood by Mr. Plapp, power engineer of the Mexican department.

Yours very truly,

ALL:EG

A. L. LABBE