

August 24, 1987

**DRAFT**

TO: Jerry Gray  
FROM: Don Hull  
SUBJECT: Possible sulfur occurrence

On August 19, 1987, I visited with Allen Throop about a possible sulfur occurrence on the Rogue River National Forest in Jackson county, Oregon near Foster Creek drainage. Allen has the details on the identity of the operator (Ray Hackema?). It appears from a distance that the possible resource is pyrite in mazama volcanic ash. It is possible that Hackema is trying to develop this occurrence for agricultural applications. The occurrence is on or near S<sup>31</sup> of T 29 S, R 4 E.

DAH:rm  
cc: Ron Geitgey

April 1, 1940

Nichols Engineering & Research Corp.  
80 Wall Tower  
New York City, New York

Attention: Mr. F. B. Schilling  
Director of Sales

Gentlemen:

Thank you for the copies of Bulletins #205 and 206. The party interested in production of sulphur dioxide is located at The Dalles, Oregon, Mr. W. H. Seufert is, I think, the president of the corporation.

Thanking you for your courtesies, I am

Very truly yours,

Metallurgical Chemist

LLM:rw



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March 26, 1940

State Department of Geology  
and Mineral Industries  
329 S.W. Oak Street  
Portland, Oregon

RECEIVED  
APR 1 1940

STATE DEPARTMENT OF GEOLOGY  
& MINERAL INDS.

Att: Mr. Leslie L. Motz,  
Metallurgical Chemist

Gentlemen:

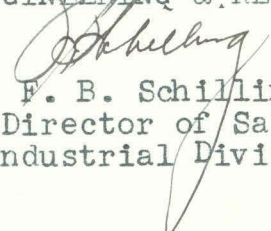
We are pleased to enclose herewith, in accordance with your letter of March 15th, copy of our Bulletin No. 205 which describes the Nichols Freeman flash roasting system. Also enclosed is copy of "Heat Engineering" with article on page 5 which further describes the operation of this system.

We are also enclosing copy of our Bulletin No. 206 which covers the features of the Nichols Herreshoff multiple hearth furnace which has been used extensively for many years throughout the chemical and metallurgical industries for the desulphurization of sulphide ores and concentrates.

If we can be of any further service, please do not hesitate to call upon us. We would also be interested in hearing from you regarding further developments by the group in Oregon referred to in your letter. Perhaps you can provide us with the names of some of the interested parties so that we could contact them.

We trust that we may have the pleasure of hearing further from you in connection with this subject.

Very truly yours  
NICHOLS ENGINEERING & RESEARCH CORP.

  
F. B. Schilling  
Director of Sales  
Industrial Division

FBS/BR  
Enc.



March 15, 1940

Nichols Engineering and Research Corp.  
40 Wall Street  
New York, N. Y.

Gentlemen:

In the November issue of Pacific Chemical and Metallurgical Industries appeared an article by Mr. H. W. Goddard of your company entitled, "The Production of Sulphur Dioxide Gas by Flash Roasting". We are interested in this subject inasmuch as a group here in Oregon is trying to produce sulphur dioxide by burning lead-zinc concentrates.

We would appreciate any literature you may have on the Nichols-Freeman flash roasting system.

Very truly yours,

Leslie L. Motz  
Metallurgical Chemist

LLM:HE



December 19, 1939

Mr. Geo. L. Wernmark  
First National Bank Building  
The Dalles, Oregon

Dear Sir:

Replying to your letter of December 8th, you have placed me at a considerable disadvantage in asking for our opinion of Mr. Shannon personally and of his process. We took pains to look into this matter a few months ago and had our metallurgist, Mr. Motz, spend some time taking samples and checking the process. I visited the plant personally in the company of Dr. Stafford, head of the Department of Chemistry at the University of Oregon, and Mr. Gleeson, head of the Chemical Engineering Department of Oregon State College.

The results of our findings have been transmitted in detail or in substance to Mr. W. J. Seufert, and I suggest that you communicate with him. I prefer not to go into detail in answering the questions you ask.

Respectfully yours,

EKN:vm

Director





**GEO. L. WERNMARK**  
First National Bank Building  
The Dalles, Oregon

• NORTHWESTERN MUTUAL FIRE ASSOCIATION • NORTHWEST CASUALTY COMPANY

OREGON DEPARTMENT - PORTLAND - OREGON

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DEC 9 1939

STATE DEPT OF GEOLOGY  
& MINERAL INDS.

December 8, 1939

The State Department of Geology & Mineral Industries  
329 S.W. Oak Street  
Portland, Oregon

Gentlemen:

Several times I have been approached by representatives of the Seufert Electro Metallurgical Company to invest in the sulphur dioxide venture. I do not know Mr. Shannon or his ability as a metallurgist or a mining man, but I would like to know if you think Mr. Shannon is a man of a great deal of ability in this field; and whether you think this venture would be economically sound as well as technically perfect.

I realize that this will be somewhat of a gamble, but any information that you can forward me as to the uses and the possibility of a plant like this would be greatly appreciated.

Thanking you in advance, I am

Very truly yours,

*Geo. L. Wernmark*

GLW:HD

*N*



• A • THIRD • OF • A • CENTURY • OF • SERVICE • SECURITY • SAVINGS •



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FIELD GEOLOGIST  
LESLIE L. MOTZ  
ANALYST

STATE DEPARTMENT OF GEOLOGY AND  
MINERAL INDUSTRIES

329 S. W. OAK STREET  
PORTLAND, OREGON

2102 Court St.  
Baker, Oregon  
September 9, 1939

RECEIVED  
SEP 11 1939

STATE DEPT OF GEOLOGY  
& MINERAL INDS.

Mr. Earl K. Nixon, Director  
State Dep't of Geol. & Min. Ind.  
329 S.W. Oak St.  
Portland, Oregon

Dear Mr. Nixon:

Seufert Smelter

Attached is the assay report on the samples taken at the Seufert Electrometallurgical Co. plant on August 30, 1939. It is difficult to correlate the data because of the lack of weights of ore fed to furnace, slag formed, and products collected. Recovery of the metals is therefore not calculated. A study of these data reveals that the operators have much to learn about the process, not only from the standpoint of what products can be produced but where they are deposited or could be collected. It was considered that Sample No. 6, the heavy material settled in the bottom of the channel from the furnace to the waste-heat boilers, was too contaminated with "oxides" from the so-called "tin ore" to give a representative view of the situation at that point. This sample was therefore not run for the metals other than to get an idea whether or not gold and silver could be precipitated at this relatively hot point.

It is still my opinion that the metallurgical aspects of the process are of prime importance to the operators. Chemical analyses continuously made by a competent man are going to do more than all the changing around of pumps, blowers, etc. in being able to insure the future of the plant.

I have enclosed two copies of the assay report. No report has been sent to any of the parties interested since I thought the Department may make a formal report of the work.

Sincerely yours

*Leslie*  
Leslie L. Motz  
Assayer





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STATE DEPARTMENT OF GEOLOGY AND  
 MINERAL INDUSTRIES

329 S. W. OAK STREET  
 PORTLAND, OREGON

September 9, 1939

Samples taken at SEUFERT ELECTROMETALLURGICAL CO. plant  
 at The Dalles on August 30, 1939

- Sample No. 1 -- Small pile of concentrates at west  
 end of furnace room.
- 2 -- Large pile of concentrates in center  
 of furnace room.
- 3 -- Lead-zinc sludge, taken from earthen-  
 ware crock near settling tanks.
- 4 -- Lead-zinc sludge, taken in bottle  
 during last run.
- 5 -- Slag gathered from dump.
- 6 -- Heavy material settled between furnace  
 and waste-heat boiler.

| No.              | GOLD<br>oz./T | SILVER<br>oz./T | COPPER<br>% | LEAD<br>% | ZINC<br>% | IRON<br>% | SULPHUR<br>% | INSOLUBLE<br>% |
|------------------|---------------|-----------------|-------------|-----------|-----------|-----------|--------------|----------------|
| 1                | 0.02          | Trace           | 7.5         | 3.2       | 21.0      | 20.4      | 32.6         | 9.6            |
| 2                | 0.03          | Trace           | 14.7        | 5.0       | 20.8      | 10.3      | 27.8         | 10.5           |
| 3                | Trace         | Nil             | 3.1         | 8.8       | 47.5      | 1.3       | 7.4          | Trace          |
| 4                | Trace         | Nil             | 2.5         | 5.2       | 49.0      | 1.5       | 7.6          | Nil            |
| 5                | 0.03          | Nil             | 5.3         | 0.8       | 8.1       | 20.3      | 2.0          | 54.3           |
| 6                | 0.04          | Trace           |             |           |           |           |              |                |
| Water from No. 4 |               |                 |             |           | 0.02      |           |              |                |

*Leslie L. Motz*  
 Leslie L. Motz, Assayer



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STATE ASSAY LABORATORY  
 2102 COURT STREET  
 BAKER, OREGON

September 9, 1939

Samples taken at SEUFERT ELECTROMETALLURGICAL CO. plant  
 at The Dalles on August 30, 1939

- Sample No. 1 -- Small pile of concentrates at west end of furnace room.
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*Leslie L. Motz*  
 Leslie L. Motz, Assayer



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STATE DEPARTMENT OF GEOLOGY AND  
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329 S. W. OAK STREET  
PORTLAND, OREGON

2102 Court St.  
Baker, Oregon  
Nov. 4, 1939

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NOV 6 1939

STATE DEPT. OF GEOLOGY  
& MINERAL IND'S.

Mr. Earl K. Nixon, Director  
State Dept of Geol. & Min. Ind.  
329 S.W. Oak St.  
Portland, Oregon

Dear Mr. Nixon:

Re: Seufert Smelter

On my way back to Baker last Tuesday, I saw smoke pouring from the towers of the smelter; so I dropped in to see how things were going. They were making a test run, trying to produce some SO<sub>2</sub>. The only running I could see was the helpers running around like chickens with their heads off. They were concentrating their efforts on the last two towers which liberate and dry the gas. However, the first absorption towers, where the gas is washed from the main gas stream and absorbed in the water, were not receiving any attention. And the fumes coming from the top of the main tower choked every one on the lot. The Rot-Clone broke down, so they have some other piece of equipment in there.

Ed Seufert told me he was trying to get in touch with a man who had worked at Trail in the SO<sub>2</sub> plant. If he were available, they mean to get him to point out the best operation.

Shannon talked to me for quite a while. He wants you to write him a letter to the effect that there is nothing new in the set-up of the Seufert Electrometallurgical Co. He would like you to stress the fact that the operations have been successful for many years, but that the application and combination is the unique feature of this plant. I think he wants to interest other capital in the plant. I told him I rather doubted that you would be able to write such a letter for that purpose; but I told him you may give him something to think about.

A few minutes there certainly brings out the oft repeated observation that they ought to have someone around who knows what the score is. Too many changes are made without reason.

Sincerely

*Leslie*



COPY

2102 Court St.,  
Baker, Oregon  
September 9, 1939

Mr. Earl K. Nixon, Director  
State Dept. of Geol. & Min. Ind.  
329 S. W. Oak St.,  
Portland, Oregon.

Dear Mr. Nixon :

Seufert Smelter

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I have enclosed two copies of the assay report. No report has been sent to any of the parties interested since I thought the Department may make a formal report of the work.

Sincerely yours,

(signed) Leslie L. Motz  
Assayer



COPY

September 9, 1939

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at The Dalles on August 30, 1939

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| 5                | 0.03          | Nil             | 5.3         | 0.8       | 8.1       | 20.3      | 2.0          | 54.3           |
| 6                | 0.04          | Trace           |             |           |           |           |              |                |
| Water from No. 4 |               |                 |             |           | 0.02      |           |              |                |

(signed) Leslie L. Motz, Assayer



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STATE DEPARTMENT OF GEOLOGY AND  
MINERAL INDUSTRIES

329 S. W. OAK STREET  
PORTLAND, OREGON

The Dalles, Oregon  
August 30, 1939

Mr. Earl K. Nixon, Director  
State Dep't of Geol. & Min. Ind.  
329 S.W. Oak St.  
Portland, Oregon

RECEIVED  
AUG 31 1939

STATE DEPT OF GEOLOGY  
& MINERAL INDS.

Dear Mr. Nixon:

Arrived back here at 12:30 and went out to the smelter. The furnace was still torn up and would not be in operation for two or three days. So I took samples of the ores, slag, ~~sludge~~, and settled solids from the waste heat boiler. These are the best I can get at the present time, and would be as good as could be obtained except after operation of the furnace for a couple days. I am leaving this evening for Baker so as to be able to do the necessary analysis and thus give a scanty picture of the set-up.

Sincerely yours

*Leslie L. Motz*  
Leslie L. Motz  
Assayer





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STATE DEPARTMENT OF GEOLOGY AND  
MINERAL INDUSTRIES

329 S. W. OAK STREET  
PORTLAND, OREGON

2102 Court St.  
Baker, Oregon  
August 25, 1939

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SEP 1 1939

STATE DEPT OF GEOLOGY  
& MINERAL INDS.

Mr. Earl K. Nixon, Director  
State Dep't of Geol. & Min. Ind.  
%State Geological Survey  
Wallowa Lake Lodge  
Joseph, Oregon

Dear Mr. Nixon:

Your telegram was received today. I assayed today to clear up the accumulated samples. I am leaving in the morning (Saturday) for The Dalles, arriving in the early afternoon. Will stay there until Monday morning when I will call you at the Portland office. In order to facilitate matters, I am going to try to do some of the analysis work in their laboratory

Enclosed is a letter-report I wrote and was keeping here for you to see when you arrived.

If you are going thru The Dalles on train, let me know and I'll meet you to give you any immediate dope you want.

Sincerely yours

*Leslie*  
Leslie L. Motz  
Assayer





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STATE DEPARTMENT OF GEOLOGY AND  
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329 S. W. OAK STREET  
 PORTLAND, OREGON  
 2102 Court St.  
 Baker, Oregon  
 August 23, 1939

RECEIVED  
 SEP 1 1939

STATE DEPT OF GEOLOGY  
 & MINERAL INDS.

Mr. Earl K. Nixon, Director  
 State Dep't of Geol. & Min. Ind.  
 329 S.W. Oak St.  
 Portland, Oregon

Dear Mr. Nixon:

The Seufert Electrometallurgical Company plant at The Dalles involves no new process; it merely combines two operations -- the production of metals from sulphide ore and the production of sulphur dioxide gas from the treatment of this ore. However, determination of the conditions of operation of this particular plant are essential. The commercial feasibility of the smelter cannot be known until the process is studied in all its aspects. The problem consists in determining what solids, gases, and liquids and how much of them exist in the system; what temperatures prevail thruout the plant; what efficiencies of production are attained; and what the operation will cost.

A thorough and systematic sampling procedure will have to be conducted with simultaneous samples and temperature readings being taken at strategic points thruout the system. Sampling and analysis of solids within the system should more or less be governed by Table 1; gases by Table 2; and liquids by Table 3.

TABLE 1 -- SOLIDS

|           | Concen-<br>trate | Slag | Roto-Clone<br>products | Settled<br>before<br>Roto-Clone |
|-----------|------------------|------|------------------------|---------------------------------|
| Moisture  | X                |      |                        |                                 |
| Iron      | X                |      |                        |                                 |
| Lead      | X                | X    | X                      | X                               |
| Zinc      | X                | X    | X                      | X                               |
| Gold      | X                | X    | X                      | X                               |
| Silver    | X                | X    | X                      | X                               |
| Sulphur   | X                | X    | X                      | X                               |
| Insoluble | X                |      |                        |                                 |





Aug. 3, 1939

TABLE 2 -- GASES

|                      | Roto-Clone<br>exhaust | Leaving<br>Washing<br>Tower | Escaping<br>Absorption<br>Tower | Entering<br>Compressor |
|----------------------|-----------------------|-----------------------------|---------------------------------|------------------------|
| SO <sub>2</sub>      | X                     | X                           | X                               | X                      |
| O <sub>2</sub>       | X                     | X                           | X                               |                        |
| CO <sub>2</sub> & CO | X                     |                             | X                               | X                      |

TABLE 3 -- LIQUIDS

|                                | Settling<br>Tank<br>liquor | Washing<br>Tower<br>Spray | Absorption<br>Tower<br>Spray | Entering<br>Boiling<br>Tower |
|--------------------------------|----------------------------|---------------------------|------------------------------|------------------------------|
| Zinc                           | X                          |                           |                              |                              |
| H <sub>2</sub> SO <sub>4</sub> | X                          |                           | X                            | X                            |
| SO <sub>2</sub>                | X                          | X                         | X                            | X                            |
| CO <sub>2</sub>                |                            | X                         | X                            | X                            |

Samples of the three phases should be conducted on the plan Mr. Shannon outlined on the plant blue-print. In addition to the analysis work, the temperatures should be carefully recorded to help determine the controlling factors of the plant operation. A study of these various products and the conditions forming them should result in an efficient operation.

Altho there are still many mechanical difficulties to be corrected, the chemist has control of the plant in his determination of the most practicable conditions. Careful and thorough sampling and analysis are therefore the answer to this problem.

Sincerely yours

*Leslie L. Motz*  
Leslie L. Motz  
Assayer



STATE GOVERNING BOARD

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DIRECTOR



RECEIVED  
DEC 6 1938

STATE DEPT OF GEOLOGY  
& MINERAL INDS.

STATE DEPARTMENT OF GEOLOGY AND  
MINERAL INDUSTRIES

704 LEWIS BUILDING  
PORTLAND, OREGON

Baker, Oregon  
Dec. 5, 1938

Mr. Earl K. Nixon, Director  
State Dep't of Geol. & Min. Ind.  
329 S.W. Oak St.  
Portland, Oregon

Dear Mr. Nixon:

Re: Seufert Smelter

Enclosed please find the report on the sample submitted to you by Mr. Seufert. I have been busy on the qualitative analysis today and have not had time to get the quantitative analysis made. However, in the qualitative schedule I tested for all the acid radicals and a few of the metals. You mentioned in your letter of Nov. 26 that you thought there may be oxides or carbonates present. Accordingly, I tested for the possible acid radicals. No lead was detected, and the qualitative test roughly indicated over 50 percent zinc. The material is more oxide than sulphate; which is to be expected since zinc sulphate is unstable at elevated temperatures, breaking down into the oxide and sulphur dioxide and trioxide gas.

Very truly yours

*Leslie*

Leslie L. Motz  
Assayer

M  
Enc.  
cc.: Mr. Seufert

*Seufert*



## STATE DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES

## ASSAY REPORT

Office Number 36-12-8Grants Pass, Oregon  
Baker, OregonDec. 5, 1938Sample submitted by W. J. SeufertThe DallesSample description Sample of white material in bottle sent by Mr. Nixon, received  
Dec. 5, 1938..

The assay results given below are made without charge as provided by Chapter 176, Section 10, Oregon Laws 1937, the sender having complied with the provisions thereof.

NOTICE: The assay results given below are from a sample furnished by the above named person. This department had no part in the taking of the sample and assumes no responsibility, other than the accuracy of the assay of the material as furnished it by the sender.

| Sample Number         | GOLD  |       | SILVER         |       | Percent | Value | Percent | Value | Total Value |
|-----------------------|---|-------|----------------|-------|---------|-------|---------|-------|-------------|
|                       | Ounces per ton  | Value | Ounces per ton | Value |         |       |         |       |             |
| Qualitative analysis: | no detection of carbonate, sulphide, nitrate, or chloride radicals. |       |                |       |         |       |         |       |             |
|                       | no detection of lead, copper, or iron metals.                       |       |                |       |         |       |         |       |             |
|                       | detection of zinc.  |       |                |       |         |       |         |       |             |
|                       | detection of oxide and sulphate radicals.                           |       |                |       |         |       |         |       |             |
|                       | This sample indicates roughly 55% Zn.                               |       |                |       |         |       |         |       |             |

## Market Quotations:

Gold       \$       per oz.  
Silver     \$\$\$     per oz.  
           \$\$\$     per lb.  
           \$       per lb.

State Assay Laboratory

Leslie L. Watz  
Assayer



November 8, 1939

Mr. W. H. Seufert  
The Dalles, Oregon

Dear Bill:

I saw Herb Byram very briefly in Grants Pass the day before yesterday, and he indicated that he desires to sell his interest in the Byram-Oscar property. It is my understanding from you that you also would sell to a competent party.

A group came into the office this morning inquiring about this very property, and I have recommended that it is worthy of serious consideration. I have suggested that they get in touch with Mr. Oscar to see what his attitude is. If you are not of a mind to dispose of your interest in this property, please let me know.

With best wishes, I am

Sincerely yours,

EKN:vm

Director



October 20, 1939

Mr. W. J. Seufert  
The Dalles, Oregon

Dear Bill:

Attached hereto are reports on our inspection and sampling of your test smelter. I am sorry to say that these are not very optimistic. There seem to be some matters which are very fundamental in the process on which Mr. Shannon has little or no information--vital matters which should have received attention very early in the stage.

I am sending these to you with some reluctance because no one likes to get bad news. I ask you to keep these data confidential. They are sent for your own information.

Motz' report is as it came to us. The other data marked, "A", is a group of impressions furnished me by one of the other technicians whose additional comments are off-the-record. They should carry considerable weight.

If you have not already done so, I believe you can make a decision on the basis of these data as to where the difficulty with the entire plan lies and what action to take or how to proceed.

I trust that you survived the Bonneville meeting the other evening.

Sincerely yours,

EKN:vm  
encl.2

Director

cc: Motz  
Stafford  
Gleeson



C  
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P  
Y

OREGON STATE COLLEGE  
School of Engineering and Industrial Arts  
Corvallis, Oregon

Department of  
Chemical Engineering

October 11, 1939

Mr. Earl K. Nixon, Director  
State Dept. of Geology and Mineral Industries  
329 S. W. Oak Street  
Portland, Oregon

Dear Mr. Nixon:

This is in answer to your letter of October 6 with which you enclosed the report from Mr. Motz showing the assays on samples taken from the Seufert smelter at The Dalles, Oregon.

I am in agreement with Mr. Motz that it is difficult to correlate the data when quantitative figures are lacking. However, the indications are certainly far from what they should be to substantiate the statements made to us regarding the efficiency of the process. I call your attention to the following:

1. Upon the assumption that samples No. 1 and 2 represent feed, then the gold content of the slag is equivalent, if not more, than that of the feed. I believe the gold content of sample No. 6 is a matter of mechanical carry-over and could just as well be slag particles as anything else. Naturally, the loss in weight that might be expected by the elimination of sulphur, etc. would increase the gold content of such transported material. I would conclude that the gold values are not being carried overhead as intimated.

2. It was my understanding that the sludge that settled out from the rotoclone was primarily a lead sludge and that the zinc was in solution. Note that samples 3 and 4 show exactly the opposite condition, namely, that you have practically all of the zinc still present as solid material along with the lead. Such was to be expected, since the sulphur content fed to the equipment was insufficient to put the zinc in solution, even if it had been entirely recovered as acid. Note that the liquid portion of sample 4 contains a very small amount of zinc in solution, substantiating the foregoing.

3. I would be inclined to believe from the percentage sulphur results of samples 3 and 4 that some oxidation had taken place to give you sulphates, or that you have a carry-over of sulphides clear through the system. Otherwise, it is not possible to account for the high sulphur percentages in these samples.



4. It is obvious that the iron is being separated as slag.

5. The foregoing facts, coupled with the knowledge that the fundamentals of the process are as yet undetermined and with the obvious difficulties that will be encountered in SO<sub>2</sub> recovery by the proposed system, lead me to believe that you should pay no further attention to the process unless some decided changes in policy are inaugurated. Certainly I would advise those who requested your opinion that it is unfavorable from present indications.

As much as I hate to see a conscientious effort go by the board, I believe that you can save others some money and some difficulty to yourself by winding the matter up rather definitely insofar as your department is concerned. If in the future we can be of help in this regard, especially from a fundamental approach, we will attempt to be of as much service as possible.

Very truly yours,

(signed): G. W. GLEESON

George W. Gleeson  
Professor of  
Chemical Engineering

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OREGON STATE COLLEGE  
School of Engineering and Industrial Arts  
Corvallis, Oregon

August 24, 1939

Mr. Earl K. Nixon  
State Dept. Geology and Mineral Industries  
329 S. W. Oak Street  
Portland, Oregon

Dear Mr. Nixon:

That which follows is a brief summary of impressions gained in our "spot" survey of the metal recovery process at The Dalles, Oregon, as witnessed by the writer, Dr. Stafford and yourself upon August 22, 1939.

It is the writer's understanding that finally divided ore is dried and flash burned. Zinc, lead and copper eventually go to oxides and pass over with the products of combustion. Sulphur is converted to  $SO_2$  with some possible  $SO_3$ . Gold, silver and platinum pass overhead by a mechanism not known. The remainder of the ore materials are fused and tapped from the furnace as slag. The overhead oxides and metal values are separated from the gaseous products, the  $ZnO$  passing into solution in the separation. Subsequently, the  $SO_2$  is recovered from the gas as such.

Fuel oil is required when the feed is so small that too little heat is generated by combustion of the sulphur. Oxygen control represents a vital point in satisfactory operation. Electrolytic recovery of the zinc is proposed and the lead is to be smelted.

It appears that all of the above processes are old art, the important feature of the plant being the combination of processes and mechanical devices to accomplish the operation.

At the outset it appears peculiar to the writer that no quantitative information has been obtained relative to recoveries from operations as extensive as these appear to be. Obviously, the first and most important question is the degree to which the known processes do what is claimed for them. It is, therefore, my first conclusion that the operators of the plant be held responsible for some initial test figures as regards efficiency of the process and that any recommendations or statements from your office be withheld pending the presentation to you of at least figures of overall significance regarding recovery of metal values. Such a preliminary test need not be concerned with too great detail, especially the efficiency of  $SO_2$  recovery, etc. I would list the following items as pertinent to any initial test:

I. Ore Analysis

- A. Amount fed to process per unit time (capacity)
- B. Mineral Analysis
  - 1. Gold
  - 2. Silver
  - 3. Zinc
  - 4. Lead
  - 5. Copper
  - 6. Iron
  - 7. Sulphur
- C. Amount and nature of flux
  - 1. Qualitative test for above elements



- II. Slag Analysis
  - A. Amount and nature of slag
  - B. Mineral Analysis
    - 1. All of above elements
- III. Deposited Overhead Oxides, etc.
  - A. Amount and nature
  - B. Mineral Analysis
    - 1. All elements as above
- IV. Soluble material
  - A. Amount of Solution
  - B. Concentration
    - 1. All elements above plus acidity
- V. Sludge
  - A. Amount and nature
  - B. Mineral Analysis
    - 1. All elements above

Such preliminary analyses should provide for mineral balances in the process with the exception of the sulphur. Such balances would quickly reveal the location of particular concentrations and verify the statements made regarding the operation. It is considered that the foregoing is elemental and data which should be at hand prior to ever contemplating extensive test procedures.

As regards the more extensive tests which were contemplated, it is my opinion that the personnel for such tests should be entirely separate from the present organization and under the supervision of an independent and unbiased party. Since some rather extensive preparations must be made prior to actual testing, I would suggest that a capable man be obtained for a period of time in advance so that he may spend a week or two in preparation. Let him select the men he feels are necessary and train them for a week and then proceed with the tests.

Naturally, it may be possible for your department to cooperate and my services are available to the extent of my free time, as I know to be the case with Dr. Stafford.

As regards the definite items in the test procedure, to anyone capable to conduct the work they are more or less self evident. Insofar as any of the items listed or contemplated are concerned, they are all standard procedures, and it simply remains to provide facilities and men capable of making the analyses.

In segregating the test procedures from the operation, a much more reliable program could be enforced. It would be up to the operating staff to maintain operation upon a predetermined schedule as they see fit and have no reference whatsoever to the test results, since it is always a temptation to change operating conditions to influence test results. This does not preclude the operators from making all of the tests for their own purposes which they desire.

As regards the extent of the tests, I do not believe the extended period is necessary. After steady operation is attained, a two or three day test run should prove sufficient, since it is a continuous process. Test results could then be calculated and correlated and repeated under different conditions if desirable.

As regards the economy of the process, you know as well as I do that small scale operation never shows the economy of the larger units. I believe cost factors can be estimated, especially labor, power, investment, etc., as a profitability estimate to a degree of greater accuracy than from small plant readings. In this respect, I believe the services of an accountant to be unnecessary.

As regards market conditions, etc., it should not be the responsibility of the party making the tests to enter into this picture unless retained to do so. As I



Mr. Earl K. Nixon

-3-

August 24, 1939

understand the problem, it is the feasibility of the process that is to be ascertained and not the economic possibility, at least not by the same group of individuals.

All in all, the process appears to have reached the point where something has been done, but it is not known just what. It would appear that high grade technical assistance is sorely needed and if provided in the form of a disinterested party, should contribute to the status of the process and to the technical accomplishment as well.

Personally, I should not care to go into the matter in greater detail until some of the more general questions are answered in a more satisfactory manner.

Very truly yours,

(signed) George W. Gleeson, Professor of  
Chemical Engineering



RECEIVED  
SEP 9 1939

THE DEPARTMENT OF CHEMISTRY  
UNIVERSITY OF OREGON  
EUGENE

September 8, 1939

STATE DEPT OF GEOLOGY  
& MINERAL INDS.

Mr. Earl K. Nixon  
State Department of Geology and Mineral Industries  
329 S. W. Oak Street  
Portland, Oregon

My dear Mr. Nixon:

Many thanks for the outline of the proposed electrometallurgical operation at The Dalles. The details seem to have been worked out very well indeed. I shall be interested to know what the eventual outcome is.

Enclosed is memorandum indicating the car mileage involved upon the trip to The Dalles.

Very truly yours,



O. F. Stafford

OFS am



September 9, 1939

Mr. W. S. Nelson, Manager  
The Dalles Chamber of Commerce  
The Dalles, Oregon

Dear Mr. Nelson:

Thanks for your letter of September 7th.

I think I realize the situation and I am inclined to think that you have acted wisely in the light of the psychological set-up. I have not yet heard from Motts; will advise you when I do.

If you carry on with an extended test, I have located a competent metallurgist who, I suggest, should take care of the work for your account.

With kindest regards, I am

Cordially yours,

EKN:vm

Director



THE DALLES CHAMBER OF COMMERCE

THE DALLES, OREGON

"AN INLAND SEAPORT SERVING AN EMPIRE"

September 7, 1939.

Confidential....

Mr. Earl K. Nixon  
State Department of Geology & Mineral Ind.,  
329 S. W. Oak Street  
Portland, Oregon

My dear Mr. Nixon:

This is a delayed acknowledgment of your letter of August 29, which I have read thoroughly and weighed your suggestions carefully. After receipt of the letter we continued our efforts directed toward a cooperative arrangement with the thought in mind that we could be helpful in at least working out some of the economics of the operation.

We suggested, if agreeable to you, that we join with them in a run to determine costs but to cover a stated period, probably two weeks. We did this because there was a little feeling that our organization was not cooperative to the extent they required and expected. They, meaning Mr. Seufert and Mr. Shannon, came before our Board and asked for an endorsement of a corporation they proposed to organize.

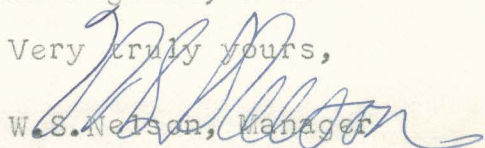
The endorsement requested would imply soundness of securities offered and the returns that could be obtained from such an operation. In the first place it is beyond our policy to give such an endorsement but we were willing to go just as far as we could in assisting them to get some capital but we insisted that it be enough to make the venture sound. As to scientific processes we naturally would leave that to you and to others that you might select.

The net result of all of this has been that we have offended Mr. Shannon, who felt that because we did not meet an over-due payroll that we were non-cooperative and generally useless in matters of this nature. I understand that Mr. Shannon has made comment elsewhere intending to indicate that he has severed diplomatic relations with us. Well, in these days of war and strife, I imagine it arises from the general trend prevalent throughout the world.

I thought it well to write you confidentially and let you know what developed since your letter and so that you may understand the situation should you hear the other side.

With kindest personal regards, I am

Very truly yours,

  
W.S. Nelson, Manager

cc: Mr. Motz



*Proposal whereby SO<sub>2</sub> is produced and sold; Zinc as bisulphite (?) is autothepiled; and Lead base bullion is melted for Selby treatment*

PROPOSED ELECTRO METALLURGICAL OPERATION  
90-DAY TEST RUN  
ESTIMATED COSTS

|  | First<br>15 Day<br>Period | Second<br>15 Day<br>Period | Third<br>15 Day<br>Period | Fourth<br>15 Day<br>Period | Fifth<br>15 Day<br>Period | Sixth<br>15 Day<br>Period |
|--|---------------------------|----------------------------|---------------------------|----------------------------|---------------------------|---------------------------|
| Estimated Capacity                               | 45 Ton                    | 75 Ton                     | 120 Ton                   | 150 Ton                    | 180 Ton                   | 180 Ton                   |
| Cost of Concentrated Ore<br>f.o.b. bunker @ \$20 | 900.00                    | 1,500.00                   | 2,400.00                  | 3,000.00                   | 3,600.00                  | 3,600.00                  |
| Fuel Oil 200 gal a day @ .05                     | 150.00                    | 150.00                     | 150.00                    | 150.00                     | 150.00                    | 150.00                    |
| Power - Est. 20 h.p.                             | 78.75                     | 78.75                      | 78.75                     | 78.75                      | 78.75                     | 78.75                     |
| <b>* Operating Labor:</b>                        |                           |                            |                           |                            |                           |                           |
| 1 Manager @ 50.wk                                | 108.35                    | 108.35                     | 108.35                    | 108.35                     | 108.35                    | 108.35                    |
| 1 Chief Chemist @ \$35 wk                        | 75.85                     | 75.85                      | 75.85                     | 75.85                      | 75.85                     | 75.85                     |
| 3 Operating Chemists @ 75.wk.                    | 162.50                    | 162.50                     | 162.50                    | 162.50                     | 162.50                    | 162.50                    |
| 2 Lab. Chemists @ \$50 wk.                       | 108.35                    | 108.35                     | 108.35                    | 108.35                     | 108.35                    | 108.35                    |
| 1 Assay Chemist @ 50 wk.                         | 108.35                    | 108.35                     | 108.35                    | 108.35                     | 108.35                    | 108.35                    |
| 1 Master Mechanic @ 35.wk.                       | 75.85                     | 75.85                      | 75.85                     | 75.85                      | 75.85                     | 75.85                     |
| 3 Furnace Men @ \$75                             | 162.50                    | 162.50                     | 162.50                    | 162.50                     | 162.50                    | 162.50                    |
| Laboratory Supplies                              | 105.00                    | 105.00                     | 105.00                    | 105.00                     | 105.00                    | 105.00                    |
| Payroll Taxes & Ins.                             | 62.15                     | 62.15                      | 62.15                     | 62.15                      | 62.15                     | 62.15                     |
| 3 Cost. Accountants, Superv.                     | 330.00                    | 330.00                     | 330.00                    | 330.00                     | 330.00                    | 330.00                    |
| 1 Stenographer                                   | 45.00                     | 45.00                      | 45.00                     | 45.00                      | 45.00                     | 45.00                     |
| Supplies - Office                                | 15.00                     | 15.00                      | 15.00                     | 15.00                      | 15.00                     | 15.00                     |
| Tel & Tel & Postage                              | 15.00                     | 15.00                      | 15.00                     | 15.00                      | 15.00                     | 15.00                     |
|  | 2,502.65                  | 3,102.65                   | 4,002.65                  | 4,602.65                   | 5,202.65                  | 5,202.65                  |

\*Wages subnormal account experiment.



PROPOSED ELECTRO METALLURGICAL OPERATION  
90-DAY TEST RUN  
ESTIMATED PRODUCTION

|   | First<br>15 Day<br>Period<br>Value | Second<br>15 Day<br>Period<br>Value | Third<br>15 Day<br>Period<br>Value | Fourth<br>15 Day<br>Period<br>Value | Fifth<br>15 Day<br>Period<br>Value | Sixth<br>15 Day<br>Period<br>Value |
|---|------------------------------------|-------------------------------------|------------------------------------|-------------------------------------|------------------------------------|------------------------------------|
| Estimated Capacity  | 45 Ton                             | 75 Ton                              | 120 Ton                            | 150 Ton                             | 180 Ton                            | 180 Ton                            |
| Estimated Out-turn  |                                    |                                     |                                    |                                     |                                    |                                    |
| Lead (200# per ton)   | 427.50                             | 712.50                              | 1,140.00                           | 1,425.00                            | 1,710.00                           | 1,1710.00                          |
| Zinc (637# per ton)   | 860.00                             | 1,433.25                            | 2,293.25                           | 2,866.50                            | 3,439.80                           | 3,439.80                           |
| Gold & Silver   | 90.00                              | 150.00                              | 240.00                             | 300.00                              | 360.00                             | 360.00                             |
| Sulphur Dioxide<br>(400# per ton)                                       | 810.00                             | 1,350.00                            | 2,160.00                           | 2,700.00                            | 3,240.00                           | 3,240.00                           |
| <u>Total Value</u>  | 2,187.50                           | 3,645.75                            | 5,833.25                           | 7,291.50                            | 8,749.80                           | 8,749.80                           |
| Less:   |                                    |                                     |                                    |                                     |                                    |                                    |
| Freight on Lead to Selby,<br>California.<br>(11.59 a T -40,000 lb.Min.) | 52.15-                             | 86.93-                              | 139.08-                            | 173.85-                             | 208.62-                            | 208.62-                            |
| Zinc (Unsaleable in present<br>condition)                               | 860.00-                            | 1,433.25-                           | 2,293.25-                          | 2,866.50-                           | 3,439.80-                          | 3,439.80                           |
| Net Value Produced  | 1,275.35                           | 2,125.57                            | 3,400.92                           | 4,251.15                            | 5,101.38                           | 5,101.38                           |
| Production Cost .....   | 2,502.65                           | 3,102.65                            | 4,002.65                           | 4,602.65                            | 5,202.65                           | 5,202.65                           |
| Loss or Gain .....  | 1,227.30                           | 977.08                              | 601.73                             | 351.50                              | 101.27                             | 101.27                             |



*Proposed inventory  
Sb2 only is produced from  
lower grade ore.*

ABSTRACT OF COST FACTORS AND PRODUCTION VALUES-90 DAY TEST RUN

|   | 90 Tons<br>First 30 Days<br>Unit Cost | 165 Tons<br>Second 30 Days<br>Unit Cost | 210 Tons<br>Third 30 Days<br>Unit Cost | Grand<br>Totals |
|---|---------------------------------------|---|--|-----------------|
| Management                              |                                       |   |  |                 |
| 1 General Manager                       | 300.00                                | 300.00                                  | 300.00                                 | 900.00          |
| 1 Stenographer                          | 90.00                                 | 90.00                                   | 100.00                                 | 280.00          |
| 1 Bookkeeper (part time)                | 90.00                                 | 90.00                                   | 125.00                                 | 305.00          |
| 1 Chief Chemist                         | 240.00                                | 240.00                                  | 240.00                                 | 720.00          |
| 1 Assistant Chemist                     | 120.00                                | 120.00                                  | 120.00                                 | 360.00          |
|   | 840.00                                | 840.00                                  | 885.00                                 |                 |
| Raw Materials:                          |                                       |   |  |                 |
| Ore per ton - \$12.00                   | 1,080.00                              | 1,980.00                                | 2,520.00                               | 5,580.00        |
| Furnace Room:                           |                                       |   |  |                 |
| 3 Operators                             | 600.00                                | 600.00                                  | 600.00                                 | 1,800.00        |
| 3 Helpers                               | 360.00                                | 360.00                                  | 360.00                                 | 1,080.00        |
| Fuel                                    | 138.00                                | 228.00                                  | 288.00                                 | 654.00          |
| Power                                   | 120.00                                | 120.00                                  | 204.00                                 | 444.00          |
| Oil, etc.                               | 15.00                                 | 30.00                                   | 45.00                                  | 90.00           |
|   | 1,233.00                              | 1,338.00                                | 1,497.00                               |                 |
| Chemical Control:                       |                                       |   |  |                 |
| 3 Operators                             | 540.00                                | 540.00                                  | 540.00                                 | 1,620.00        |
| Light and Power                         | 30.00                                 | 45.00                                   | 60.00                                  | 135.00          |
| Lime                                    | 29.10                                 | 43.20                                   | 60.00                                  | 132.30          |
| Miscellaneous                           | 15.00                                 | 22.50                                   | 30.00                                  | 67.50           |
|   | 614.10                                | 650.10                                  | 690.00                                 |                 |
| Other Costs:                            |                                       |   |  |                 |
| Stationery, Postage, Phone              | 30.00                                 | 30.00                                   | 45.00                                  | 105.00          |
| Social Sec. & Comp.                     | 146.40                                | 146.40                                  | 146.40                                 | 439.20          |
| Medical                                 | 34.20                                 | 34.20                                   | 34.20                                  | 102.60          |
| Taxes & Insurance                       | 37.50                                 | 37.50                                   | 37.50                                  | 112.50          |
| Depreciation                            | 150.00                                | 150.00                                  | 150.00                                 | 450.00          |
| Miscellaneous                           | 240.00                                | 240.00                                  | 240.00                                 | 720.00          |
| Total Operating Costs                   | 638.10                                | 638.10                                  | 653.10                                 | 1929.30         |
|   | 4,405.20                              | 5,446.80                                | 6,245.10                               |                 |
| MATERIALS RECOVERED                     |                                       |   |  |                 |
| S02 800 lbs. per T @ 4 1/2¢ lb.         | 3,240.00                              | 5,400.00                                | 7,560.00                               | 16,200.00       |
| Loss or Gain. . . . .                   | -1,165.20                             | -46.80                                  | 1,314.90                               |                 |
| RECOVERIES - FROZEN VALUES              |                                       |   |  |                 |
| Lead & Zinc 500 lbs per T @ 2 1/2¢      | 1,125.00                              | 2,062.50                                | 2,625.00                               | 5,812.50        |
| Gold & Silver - \$2 per T               | 180.00                                | 230.00                                  | 420.00                                 | 830.00          |
| Net Loss or Gain, all values considered | 139.80                                | 2,245.70                                | 4,359.90                               | (232,500.00)    |

*5.5 Tons/day*

*9 Tons/day*

*7 Tons/day*



August 29, 1939

Mr. W. S. Nelson, Manager  
Chamber of Commerce  
The Dalles, Oregon

Dear Mr. Nelson:

I have just had an opportunity to discuss the smelter situation with Mr. Motz this morning and have arranged for Mr. Motz to have a further conference with Dr. Gleeson this evening here in Portland.

I realize that our reluctance to recommend that you go ahead with your expenditure in underwriting the test run of the furnace is somewhat embarrassing to Mr. Shannon, but I feel that we have perfectly adequate information to justify our position, which is that unless we are able to get some further facts on whether or not the plant may be expected to produce substantially what Shannon represents, we are not in a position to make any recommendation to you nor would we care to participate any further in the negotiations. In making this statement, I am not indicting Mr. Shannon nor anyone else. I like his spirit and enthusiasm but am not convinced as yet that the process is sound either technically or economically, and until we have the facts which Mr. Motz will be able to obtain in the next few days, I urge that you exercise caution and make no commitments which might be embarrassing both to yourself and to this Department.

Processes, such as the one Shannon contemplates, must first be technically sound and, what is just as important, must be economically sound. Neither you nor we have any information of a quantitative nature obtained by Mr. Shannon or anyone else which demonstrates that the process is technically sound. There is a very fair chance that it is if properly controlled with adequate technical management. If we can demonstrate that the process itself is reasonably fool proof, we can so recommend, and the remainder is up to you and the other principals.

This Department is very anxious, indeed, to see your smelter process in satisfactory operation, but we would never forgive ourselves for being a party to letting you become involved in something which could easily have been prevented at this stage of the game by a relatively small amount of accurate technical observation. I see little point in making up exhaustive figures on plant costs and operation until we can convince ourselves that the process itself is technically "right".



Mr. W. S. Nelson

-2-

August 29, 1939

Mr. Motz will return to The Dalles tomorrow, and I hope you can arrange it so he can obtain samples and data at various points in the process so that among Mr. Motz, Dr. Stafford and Dr. Gleeson a satisfactory and prompt answer can be given you.

Thanking you, I am

Cordially yours

Director

EKN:hk

cc Mr. Seufert



August 29, 1939

Mr. Lon Shannon, President  
Shannon Research Corporation  
The Dalles, Oregon

Dear Mr. Shannon:

Dr. Gleeson has sent me a list of available literature which applies to the absorption of sulphur dioxide. You are doubtless familiar with some of these publications, but I thought I should send you the list in case you cared to check up some of those with which you are not familiar. The list follows:

1. Adams. "Absorption of Sulphur Dioxide in Water". Trans.A.I.ChE 28:162 (1932)  
Ind. and Eng.Chem. 25:424 (1933)
2. Beuschlein. "Theory of Absorption Applied to Sulphite Tower"  
Paper Trade Journal 99:No.12:75 (1934)
3. Johnstone. "Progress in Removal of Sulphur Compounds from Waste Gases". Combustion 5:No.2:19 (1933)
4. Johnstone. "Recovery of SO<sub>2</sub> from Waste Gases". Ind. & Eng.Chem. 27:589 (1935)  
Ind. and Eng. Chem. 27:659 (1935)  
Ind. and Eng. Chem. 30:101 (1938)
5. Keyes. "Absorption of SO<sub>2</sub> from Flue Gases" J.Soc.Chem.Ind. 692 (1934)
6. Reiley. "The Absorption of Sulphur Dioxide in Water"  
Paper Trade Journal 107:No.11:93 (1938)
7. Cantelo, et al. Ind. and Eng. Chem. 19:989 (1927)
8. Weidmann et al. Ind. and Eng. Chem. (News Edition) 14:105 (1936)
9. Haslam et al. Trans. A.I.ChE 15:Part I:177 (1923)
10. Shewood. Text. "Absorption and Extraction" McGraw-Hill Co.
11. Dean et al. "Fixation of Sulphur from Smelter Smoke".  
Rept.Invest. U.S.B.M. 3339 May 1937

With best wishes,

Sincerely yours,

Director

EKN:hk



OREGON STATE COLLEGE  
SCHOOL OF ENGINEERING AND INDUSTRIAL ARTS  
CORVALLIS, OREGON

DEPARTMENT OF  
CHEMICAL ENGINEERING

August 28, 1939

RECEIVED  
AUG 29 1939

STATE DEPT OF GEOLOGY  
& MINERAL INDS.

Mr. Earl Nixon, Director  
State Dept. Geology and Mineral Industries  
329 S. W. Oak Street  
Portland, Oregon

Dear Mr. Nixon:

In connection with the Seufert operations at The Dalles, I thought it might be well to transmit to them a small bibliography which I happened to have available regarding the absorption of  $\text{SO}_2$ . If you care to forward it, I recommend the following:

1. Adams. "Absorption of Sulphur Dioxide in Water"  
Trans. A.I.ChE 28:162 (1932)  
Ind. and Eng. Chem. 25:424 (1933)
2. Beuschlein. "Theory of Absorption Applied to Sulphite Tower"  
Paper Trade Journal 99:No. 12:75  
(1934)
3. Johnstone. "Progress in Removal of Sulphur Compounds from Waste Gases"  
Combustion, 5:No. 2:19 (1933)
4. Johnstone. "Recovery of  $\text{SO}_2$  from Waste Gases"  
Ind. and Eng. Chem. 27:587 (1935)  
Ind. and Eng. Chem. 27:659 (1935)  
Ind. and Eng. Chem. 30:101 (1938)
5. Keyes. "Absorption of  $\text{SO}_2$  from Flue Gases"  
J. Soc. Chem. Ind. 692 (1934)
6. Reiley. "The Absorption of Sulphur Dioxide in Water"  
Paper Trade Journal 107:No. 11:93  
(1938)
7. Cantelo, et. al.  
Ind. and Eng. Chem. 19:989 (1927)



Mr. Earl Nixon

-2-

August 28, 1939

8. Weidmann, et. al.  
Ind. and Eng. Chem. (News Edition)  
14:105 (1936)
9. Haslam, et. al.  
Trans. A.I.ChE 15:Part I:177 (1923)
10. Shewood. Text. "Absorption and Extraction"  
McGraw-Hill Co.
11. Dean, et. al. "Fixation of Sulphur from  
Smelter Smoke"  
Rept. Invest. U.S.B.M. 3339  
May, 1937

So far as this particular part of the process is concerned, the information available is quite extensive.

Very truly yours,

*George W. Gleeson*

George W. Gleeson,  
Professor of  
Chemical Engineering

GWG:jn



May 26, 1939

Mr. Joseph Daniels  
Professor of Mining Engineering  
University of Washington  
Seattle, Washington

Dear Professor Daniels:

This is in reply to your letter of May 22nd in regard to the Shannon Research Association of The Dalles, Oregon.

The subject company has been fussing for several months with a so-called fuming furnace. Briefly the process is as follows: Base ores, containing lead, zinc, gold, silver, copper, et cetera, are ground fine, dried, and blown in powder form into an oil-fired kiln. The inside temperature is stated to be between 2500 and 3000 degrees Fahrenheit. The gases pass through a cooling train and an oxide powder is precipitated and cooled in a bag house. A small amount of slag is taken out of the bottom of the furnace. It is alleged that all or most of the gold, silver, and copper as well, of course, as the more volatile lead and zinc are collected as an oxide powder in the bag house. I cannot verify the results. It appears that the difficulty, so far as commercial utilization of the process goes, is that the end product, the oxide powder, is complex in nature and that recovery of the precious values is a sticker.

I have suggested to these people that they confine their activities to one type of ore and lick the problem in that regard. It is my understanding that they have been trying everything. So far as I know, they have not demonstrated a commercially practical process, although I have felt that they have the germ of a smart idea if they are able to lick the metallurgy of the oxide powder.

Trusting that the above will be of some interest to you, I am

Respectfully yours,

EKN:vm

Director



UNIVERSITY OF WASHINGTON  
SEATTLE

COLLEGE OF MINES  
MINING, METALLURGICAL, AND  
CERAMIC ENGINEERING

May 22, 1939

IN COOPERATION WITH  
UNITED STATES BUREAU OF MINES  
NORTHWEST EXPERIMENT STATION

RECEIVED  
MAY 23 1939

STATE DEPT OF GEOLOGY  
& MINERAL INDS.

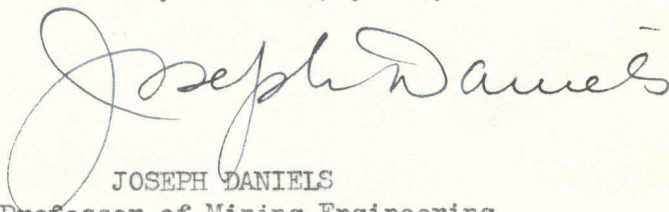
Mr. Earl K. Nixon, Director,  
Dept. of Geology & Mineral Industries,  
329 S. W. Oak St.,  
Portland, Oregon.

Dear Sir:

I have an inquiry from an old friend in the East inquiring about the Shanon Research Association, Post Office Box 307, The Dalles, Oregon. Can you give me any information about this group, what they are actually doing, and what they plan? The information I have indicates that they are expecting to put in a smelter and produce sulphur dioxide as a by-product.

Any information you can give me will be very greatly appreciated.

Very sincerely yours,



JOSEPH DANIELS  
Professor of Mining Engineering

JD:EC





# Shannon Research Association

THE DALLES, OREGON

METALLURGICAL ENGINEERS AND CHEMISTS

P. O. BOX 307

RECEIVED  
MAR 21 1939

March 19, 1939

Mr. Earl K. Nixon  
State Dept. of Geology  
329 S.W. Oak St.  
Portland, Oregon

STATE DEPT OF GEOLOGY  
& MINERAL INDS.

Dear Mr. Nixon:

We have your letter of March 17, and wish to thank you for giving us consideration in the things we are trying to do.

You are no doubt familiar with the manner in which improvements in metallurgical practice usually come into being. In the early days of adapting the blast furnace to the smelting of leady ores bearing precious metals, a period of "muscular metallurgy" was very characteristic of the methods in use. The losses of both lead and the precious metals were tremendous, yet as long as that was the best method known to unlock the values in these ores, it was used, and gradually improved upon, until a high degree of perfection was finally attained.

The problem we face today is much like the one faced by those responsible for the development of the blast furnace. The proper types of ores for lead blast furnace reduction are becoming worked out and limited in extent as the old placer deposits were in the old days. This condition stimulates us to attack the new frontier represented by the small and patchy deposits of complex ores which dot the Columbia River Lava District.

Now, we may kid the public once in a while, when such kidding will do no harm to the public, and still advance our main objective. But we don't kid ourselves. We know that any permanent success is based on the facts you give in your letter. We take exception to your statement that we should concentrate our efforts and not try to deal with too many types of minerals. Our reasons for doing this is our belief that we are not just pioneering a single development, but that our process if successful at all will open up an entirely new era of mining practice in The Columbia Lava District. Naturally anything of this nature is every bit as much of a gamble as was the early efforts of one Thomas A. Edison to usher in a new era of illumination and power transmission. No doubt the earlier attempts will result in inefficient operation, but that is better than no operation at all.

We wish to assure you that we are absolutely sincere in our efforts, and have no desire to defraud. We desire the whole-hearted support and assistance of your department, and similar bodies in Washington and Idaho. It might be to advantage if you could arrange to spend a little more time than you suggested with us on your projected trip to Baker. We'll anticipate your visit with pleasure.

Respectfully,

*Jon Shannon*



March 17, 1939

Mr. Lon Shannon  
The Dalles, Oregon

Dear Mr. Shannon:

Thank you for your letter of February 13th with enclosures all pertaining to the work you are doing and your plans in connection with the fuming furnace.

Your communication arrived while I was in the East and, since returning, I have been almost continuously occupied with legislative matters at Salem.

It is probable that my making a suggestion is being done with doubtful propriety, but I feel that you will recognize my sincerity when I say that it seems to me your most valuable contribution to metallurgy would be to actually work out and demonstrate by a practical test run your ability to process lead and zinc sulphide ores, that is to say, make 100% checks on head assays, on production, on tail assays or slag, keeping your data on the material feed of the slag and of the powder produced. By doing this, you would have a practical result. Until you do it, there will always be some who doubt the capacity of your process.

In other words, I would consolidate your efforts and not try to work on too many types of minerals or ores.

Before you would care to go into the matter of advising various mining operators on engineering and metallurgy with a point of putting in one of your furnaces in return for stock, I am sure that you would do best to demonstrate beyond peradventure of a doubt that your process is sound. I do not mean to imply that I think the process isn't sound. My position is that you must demonstrate it to a skeptical world.

I told Mr. Kobal and Mr. Siefert, when I visited the plant several months ago, that it looked to me that they had the germ of a smart idea. Whether you can carry it to fruition or not was yet to be determined at that time.

I do not wish you to construe this letter as critical but rather as an attempt to give sound and practical advice. If you could carry out practically, as you suggest, the business of supplying mining operations with small reduction plants which would make an oxide product which would sell readily, you would, I think, do the State a definite service, and incident-



tally would make some money for yourself. On my next trip to Baker I should like to stop by and say, "Hello". Meantime, best wishes and more power to you.

Very truly yours,

EKN:vm

Earl K. Nixon, Director



# Shannon Research Association

RECEIVED  
FEB 14 1939  
THE DALLES, OREGON  
STATE DEPT. OF GEOLOGY  
& MINERAL INDS.

METALLURGICAL ENGINEERS AND CHEMISTS

P. O. BOX 307

February 13, 1939

Mr. Earl K. Nixon  
State Dept. of Geology  
Salem, Oregon

Dear Mr. Nixon:

I am enclosing herewith a copy of an article that appeared in The Dalles Optimist, January 13, 1939, also an article which we recently wrote setting forth our views on the possibility of commercializing our mineral resources without the expenditure of prohibitive sums of money.

We have been doing extensive research work on the various minerals available in commercial quantities in the Pacific Northwest and feel that now is the most opportune time to get things started. Any information that you have pertaining to the so-called minor metals referring to mining or processing will be deeply appreciated by us.

Assuring you of our desire to cooperate with you and your department in the splendid work you are doing we are,

Yours very truly,

THE SHANNON RESEARCH ASSOCIATION

*Lon Shannon*  
Lon Shannon

*(Red handwritten mark)*



February 14, 1939

Mr. Lon Shannon  
The Shannon Research Association  
The Dalles, Oregon

Dear Sir:

This will acknowledge receipt of your letter of February 13th. Mr. Nixon is out of the city at present, but your letter will have his attention upon his return.

Very truly yours,

STATE DEPARTMENT OF GEOLOGY  
AND MINERAL INDUSTRIES

vm

Secretary



August 29, 1939

Dr. G. W. Gleeson  
Professor of Chemical Engineering  
Oregon State College  
Corvallis, Oregon

Dear Dr. Gleeson:

Thank you kindly for your letter of August 24. I have gone over this carefully and agree with your conclusions as regards the attitude we should take toward the smelter operation.

Last Thursday I stopped at The Dalles on the way to the Wallowas and talked both to Nelson and to Seufert. I told both of them that some quantitative results would have to be obtained before we would care to make any recommendation as to whether or not the Chamber of Commerce is justified in underwriting a two or three months pilot operation. I agreed to have Leslie Motz go to The Dalles and stay two or three days for the purpose of obtaining samples for assay. Motz arrived on the scene Saturday evening, and I talked to him over the telephone yesterday. The plant has been closed down the last day or two while some changes are being made to the furnace to prevent losses in the slag pit. Motz ran some of the slag gathered while we were there and some of the oxide powder and found a dollar or two in gold in both samples. This indicates, of course, that there is a serious question as to the recovery of metallics, especially gold, copper and platinum, in the fuming process.

I advised Motz to have them fire up and collect samples of the feed, the slag, the gases, and the sludge from the retort for assay at Baker when he returns. I also gave him over the phone the outline contained on page 2 of your letter and have since sent him a copy of your entire letter.

I understand the Chamber of Commerce held a meeting last evening for further discussion of their participation. I suggested to Motz that he advise both Seufert and Nelson to take no definite action on my recommendation until we have completed this preliminary investigation. I told him to advise the Chamber, which had invited him to be present at the meeting, that they have not enough quantitative information to justify any commitments as yet.

I shall keep both you and Dr. Stafford fully advised of the result of Motz's work, with the idea that in some manner we may be able either to



Dr. G. W. Gleeson

-2-

August 29, 1939

help out the group to a successful operation of the furnace or to save a lot of money to would-be investors by demonstrating holes in the process or idea.

Sincerely yours

Director

EKN:hk

cc Dr. Stafford



OREGON STATE COLLEGE  
SCHOOL OF ENGINEERING AND INDUSTRIAL ARTS  
CORVALLIS, OREGON

DEPARTMENT OF  
CHEMICAL ENGINEERING

August 24, 1939

RECEIVED  
AUG 26 1939

STATE DEPT. OF GEOLOGY  
& MINERAL INDS.

Mr. Earl K. Nixon  
State Dept. Geology and Mineral Industries  
329 S. W. Oak Street  
Portland, Oregon

Dear Mr. Nixon:

That which follows is a brief summary of impressions gained in our "spot" survey of the metal recovery process at The Dalles, Oregon, as witnessed by the writer, Dr. Stafford and yourself upon August 22, 1939.

It is the writer's understanding that finally divided ore is dried and flash burned. Zinc, lead and copper eventually go to oxides and pass over with the products of combustion. Sulphur is converted to  $SO_2$  with some possible  $SO_3$ . Gold, silver and platinum pass overhead by a mechanism not known. The remainder of the ore materials are fused and tapped from the furnace as slag. The overhead oxides and metal values are separated from the gaseous products, the  $ZnO$  passing into solution in the separation. Subsequently, the  $SO_2$  is recovered from the gas as such.

Fuel oil is required when the feed is so small that too little heat is generated by combustion of the sulphur. Oxygen control represents a vital point in satisfactory operation. Electrolytic recovery of the zinc is proposed and the lead is to be smelted.

It appears that all of the above processes are old art, the important feature of the plant being the combination of processes and mechanical devices to accomplish the operation.

At the outset it appears peculiar to the writer that no quantitative information has been obtained relative to recoveries from operations as extensive as these appear to be. Obviously, the first and most important question is the degree to which the known processes do what is claimed for them. It is, therefore, my first conclusion that the operators of the plant be held responsible for some initial test figures as regards efficiency of the process and that any recommendations or statements from your office be withheld pending the presentation to you of at least figures of overall significance regarding recovery of metal values.



August 24, 1939

Such a preliminary test need not be concerned with too great detail, especially the efficiency of SO<sub>2</sub> recovery, etc. I would list the following items as pertinent to any initial test:

- I. Ore Analysis
  - A. Amount fed to process per unit time (capacity)
  - B. Mineral Analysis
    1. Gold
    2. Silver
    3. Zinc
    4. Lead
    5. Copper
    6. Iron
    7. Sulphur
  - C. Amount and nature of flux
    1. Qualitative test for above elements
- II. Slag Analysis
  - A. Amount and nature of slag
  - B. Mineral Analysis
    1. All of above elements
- III. Deposited Overhead Oxides, etc.
  - A. Amount and nature
  - B. Mineral Analysis
    1. All elements as above
- IV. Soluble material
  - A. Amount of Solution
  - B. Concentration
    1. Allelements above plus acidity
- V. Sludge
  - A. Amount and nature
  - B. Mineral Analysis
    1. All elements above

Such preliminary analyses should provide for mineral balances in the process with the exception of the sulphur. Such balances would quickly reveal the location of particular concentrations and verify the statements made regarding the operation. It is considered that the foregoing is elemental and data which should be at hand prior to ever contemplating extensive test procedures.

As regards the more extensive tests which were contemplated, it is my opinion that the personnel for such tests should be entirely separate from the present organization and under the supervision of an independent and unbiased party. Since some rather extensive preparations must be made prior to actual testing, I would suggest that a capable man be obtained for a period of time in advance so that he may spend a week or two in preparation. Let him



August 24, 1939

select the men he feels are necessary and train them for a week and then proceed with the tests.

Naturally, it may be possible for your department to cooperate and my services are available to the extent of my free time, as I know to be the case with Dr. Stafford.

As regards the definite items in the test procedure, to anyone capable to conduct the work they are more or less self evident. Insofar as any of the items listed or contemplated are concerned, they are all standard procedures and it simply remains to provide facilities and men capable of making the analyses.

In segregating the test procedures from the operation, a much more reliable program could be enforced. It would be up to the operating staff to maintain operation upon a predetermined schedule as they see fit and have no reference whatsoever to the test results, since it is always a temptation to change operating conditions to influence test results. This does not preclude the operators from making all of the tests for their own purposes which they desire.

As regards the extent of the tests, I do not believe the extended period is necessary. After steady operation is attained, a two or three day test run should prove sufficient, since it is a continuous process. Test results could then be calculated and correlated and repeated under different conditions if desirable.

As regards the economy of the process, you know as well as I do that small scale operation never shows the economy of the larger units. I believe cost factors can be estimated, especially labor, power, investment, etc. as a profitability estimate to a degree of greater accuracy than from small plant readings. In this respect, I believe the services of an accountant to be unnecessary.

As regards market conditions, etc., it should not be the responsibility of the party making the tests to enter into this picture unless retained to do so. As I understand the problem, it is the feasibility of the process that is to be ascertained and not the economic possibility, at least not by the same group of individuals.

All in all, the process appears to have reached the point where something has been done, but it is not known just what. It would appear that high grade technical assistance is sorely needed and if provided in the form of a disinterested party, should contribute to the status of



Mr. Earl K. Nixon

-4-

August 24, 1939

the process and to the technical accomplishment as well.

Personally, I should not care to go into the matter in greater detail until some of the more general questions are answered in a more satisfactory manner.

Very truly yours,

*G. W. Gleeson*

George W. Gleeson,  
Professor of  
Chemical Engineering



September 7, 1939

Dr. O. F. Stafford  
Department of Chemistry  
University of Oregon  
Eugene, Oregon

Dear Doctor Stafford:

With regard to the Seufert smelter operation, I sent Mr. Motz to The Dalles for a couple of days last week, and he found that they were down, making some repairs to eliminate certain losses in the slag pit. He came on to Portland and gave me some data, which is attached, covering estimates made by Shannon on what they hope to do during a smelter test period. While in Portland, Mr. Motz was fortunate enough to catch Dr. Gleeson and went over the matter, so this data is merely for your record. Dr. Gleeson, I believe, received a copy of it from Motz.

Motz returned to The Dalles and stayed a day or so and was able to get a series of samples representing a preliminary test run. I do not think the samples were obtained under the most favorable conditions with a smoothly running plant, but I gained the opinion from Motz that his study and assaying of them may suffice to allow us to decide whether or not to recommend that the Chamber of Commerce underwrite a smelter test run for 60 or 90 days. Motz has not yet made his report to me.

I wrote to Seufert and Nelson while Motz was in Portland asking that decision be reserved until we had had a further chance to study Motz' preliminary findings.

With best wishes, I am

Cordially yours,

EKN:vm  
encl.

Director

cc: Dr. G. W. Gleeson



November 26, 1938

Mr. W. J. Seufert,  
The Dalles,  
Oregon.

Dear Mr. Seufert:

Following up our discussion in my office the other evening, I had a good talk with Mr. Motz at the Baker State Assay Laboratory in regard to the problems you are having at your smelter. I made an arrangement with Mr. Motz, if it meets with your approval, to spend a few days at the smelter in order to study the process and see what we can do to help carry the scheme to commercial success. Would you know what time would be proper for Motz to do this work? I am very anxious to have him do so if it suits your convenience. In the meantime, I understand that you plan to take a number of sample products, head and tail samples, etc., and run over to Baker to talk the thing over with Mr. Motz. This I suggest you do as soon as possible.

With best wishes, I am,

Cordially yours,

Earl K. Nixon, Director

EKN:fas

*Copy to Motz*



June 14, 1938

Mr. W. J. Seufert  
The Dalles  
Oregon

Dear Mr. Seufert:

Recalling our conversation sometime back in regard to the possibility of your building a ferro-alloy plant, I thought it might be well to advise you that there is a man, Mr. E. R. Brown, O'Brien, Oregon, who is in a position to produce up to 200 tons of high-grade chrome per month this summer. He supplied the Rustless Mining Company with a substantial order of chrome last summer on contract and made good on his arrangement.

This chrome comes out of the Grants Pass district, carries a guarantee of 48% to 53% chromic and Mr. Brown is prepared to deliver at f.o.b. cars at Grants Pass, Oregon, for \$12 per ton.

It occurred to me that if you are serious in your plans of building a plant, that you might desire to buy and stock a quantity of high-grade chrome ore during the summer months when it is available this summer against the time next winter and spring when it will not be available. You may write direct to Mr. Brown if you choose.

Thanking you with best wishes, I am,

Very truly yours,

STATE DEPT. OF GEOLOGY  
AND MINERAL INDUSTRIES

Earl K. Nixon, Director

EKN:lf



March 7th, 1938

Mr. W. J. Seufert,  
403 Third Street,  
The Dalles, Oregon.

Dear Mr. Seufert:

Your letter recalled that I promised to help you select a competent geologist who might be able to assist you in licking your smelter problem.

While in San Francisco recently I had a long talk with Mr. Hugh McMichael, smelter expert of the American Smelting & Refining Co., and we discussed your process. Mr. McMichael told me that there is a Mr. L. B. Harrison, 5-- Blair Avenue, Piedmont, Calif. Harrison was with the A.S. & R. many years as a smelter expert, and is now practically retired. He lives only a couple of blocks from Mr. McMichael, and, I gather, would be an unusually capable man for your purpose, if he would agree to do your work.

If you should choose to secure his services and he goes on the job, Mr. McMichael promised me as a personal favor that he would look in on the matter on one or more of his trips to Tacoma, and follow the work in an effort to give any necessary help. He would also be in a position to compare notes with Mr. Harrison.

I do not know what you would have to pay Mr. Harrison, but from my talk with McMichael, whom I know very personally, I think you would get value received and would have an expert indeed.

I wrote to the Bureau of Mines and received a reply indicating that they would be pleased to make suggestions if they had more complete data on which to form opinions. They would like to have a flow sheet and assays of heads and tails. If you would care to send these to me I will forward the data to the proper party, or will put you in direct connection with the parties in question.

Thanking you, and with best wishes, I am,

Cordially yours,

Earl K. Nixon, Director



Sept. 19, 1939

Mr. Ray Nelson,  
Cottage Grove, Oregon.

Dear Mr. Nelson:

Replying to your letter of September 10th, in which you wish to be advised as to the identity of the group who is attempting to operate a smelter designed to treat complex sulphide ores, I wish to refer you to Mr. Lon Shannon, President of the Seufert Refining Company at The Dalles, Oregon. I suggest that you communicate directly with Mr. Shannon who, I believe, will be pleased to consider what you have to offer.

Respectfully yours,

Director.

EKN/DJ  
cc: Shannon



RECEIVED  
SEP 11 1939

STATE DEPT OF GEOLOGY  
& MINERAL INDS.

Cottage Grove, Ore

Sep. 10-1939.

Dept. of Geo. + Min. Industries.

gentlemen

I receive the greatest  
information + value from the "One-Bin"  
Please retain my name on your list

I note in the August number that you  
state that "a group is setting up to  
make a group of products from the  
complex sulfide ores".

I would like very much to find out  
more about this. Can I write them  
direct - or do you have information.

I am interested in electrically  
reducing Bohemia District ores to  
finished products of chemical nature -  
to save shipping costs of raw metals  
any information will be gratefully  
received by, Ray Nelson.