

Hecla Mining Company

Wallace, Idaho

June 4, 1941

Mr. W. H. Schacht, Pres.,
Copper Range Company,
Painesdale, Mich.

Dear Mr. Schacht:

The answer to your letter of
May 19th has been delayed as I have been in Colorado
for some time.

The main reason for the 48" double submerged
Akins classifiers in the Star Mill is the capacity of
the pool in the overflow end. The ore treated is
rather colloidal and slow settling. We are bothered
to some extent with tramp oversize carrying over the
wier.

As to the raking capacity, the flights are
never crowded to their full carrying ~~carrying~~ load and
run along with a medium amount of sands. When operating
with a grind 80% minus 200 mesh, quite a lot of slippage
occurs along the flights and I doubt the capacities shown
in the catalog are correct.

In making a comparison of the merits of the Dorr
Bowl Classifier and the Akins submerged type I think the
material to be handled is largely a deciding factor. We
have used both types with good results.

Very truly yours,

W. L. Feigler

Supt. Mills

30% oversize
500 tons

COPPER RANGE CO.	
W. H. SCHACHT, PRESIDENT	
RECEIVED	
JUN 9 1941	
Ans'd	
Filed	
Copies	

Adams Township, MI

PHELPS DODGE CORPORATION

MORENCI BRANCH
MORENCI, ARIZONA.

June 3d, 1941

Mr. William H. Schacht
President and General Manager
Copper Range Company
Painesdale, Michigan

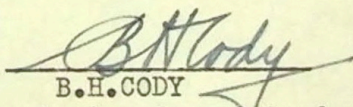
Dear Sir:

This will acknowledge receipt of your telegram of May 27th and your letter to Mr. Barker of May 19th which he referred to me for answer.

The Morenci Reduction Works Concentrator is still under construction so information in regard to the behavior of the Akins classifier when operating with 10ft. x 10 ft. Marcy mills is not available. Until the new Concentrator has been in operation over a sufficient period of time to give reliable data, we are not in a position to furnish the information that you request.

Yours very truly

2cc./EW


B.H. CODY
Concentrator Superintendent
Morenci Branch



Adams Township, MI

70 Barker
70 Goody

Reference my letter to Mr. Barker May 19th. Would appreciate it greatly if you would send me print of ~~your~~ new Morenci flow sheet.

Fidelity Union Skin
ESLTON MFG. CO.
MICHIGAN

Adams Township, MI

PHELPS DODGE CORPORATION

NEW CORNELIA BRANCH
CONCENTRATOR DEPARTMENT
AJO, ARIZONA

May 22, 1941.

Mr. Wm. H. Schacht, President,
Copper Range Company,
Painesdale, Michigan.

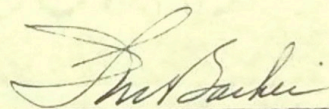
Dear Mr. Schacht:

I am passing your inquiry of May 19th to
Mr. B. H. Cody, Concentrator Superintendent at
Morenci for answering.

*Phelps Dodge Corp.
Morenci, Ariz.*

Although I am familiar with the Morenci
installation you inquire about, I am sure Mr. Cody
will be glad to give you more specific information
than is available to me.

Yours very truly,



L. M. Barker,
Concentrator Superintendent.

cc - Mr. Cody.

COPPER RANGE CO.	
W. H. SCHACHT, PRESIDENT	
RECEIVED	
MAY 27 1941	
Ans'd	
Filed	
Copies	

May 19, 1941

Mr. W. L. Zeigler, Mill Superintendent
Hocla Mining Company
Wallace, Idaho

Dear Mr. Zeigler:

When Mr. Martin, representing the Atkins Classifier, was in my office recently he referred to the performance of their 48" submerged type machine on your ore as doing 500 tons of 80% through minus 200 mesh.

We have a grinding problem that we are considering in which we want to handle 1200 tons per day; the specific gravity is 2.7 and it is a combination of sandstone and shale rock. We want to overflow about 70% through 200 mesh with a density of about 19% solids and what I would like to know is the performance that you are obtaining from the 48" submerged type classifier. I understand you are using a duplex in closed circuit with your mill.

Is the tonnage of new feed 500 tons per 24 hours? What is the specific gravity of the ore, your circulating load and the rpm of the spiral?

From the Atkins classifier diagram in the Colorado Iron Works Company's Bulletin 24-H, page 25, for a 2.7 specific gravity ore, they give a capacity of 280 tons for a 48" single spiral per revolution and assuming twelve revolutions, the total sand making capacity would be 3360 tons and with a duplex 6720 tons. Now if you are handling 500 tons and with a circulating load of 5, you would be handling 3000 tons. I am wondering why you installed classifier capacity of more than twice your feed and circulating load. Was it necessary to do this in order to obtain overflow capacity for the 500 tons of 80% through 200 mesh.

In any of your installation have you used Dorr Bowl Classifiers? In your experience how do they compare with the Atkins submerged type for handling products of high percentage through 200 mesh?

Very truly yours,

WHS/WFN

President

May 19, 1941

Mr. L. M. Barker, Concentrator Superintendent
New Cornelia Branch
Phelps Dodge Corporation
Ajo, Arizona

Dear Mr. Barker:

I was discussing with Mr. Martin, representing the Atkins Classifier, your new installation at Morenci where I understand you are handling 1500 tons of new feed through a 10 x 10 Marcy mill in closed circuit with two Duplex 54" submerged spiral classifiers. I further understand that these make a product of which 70% will pass through 200 mesh and with nothing on 65% mesh and the solids being 19%, the specific gravity of the ore being 2.7 and the feed to the mill is $-3/4$.

We are considering an installation to treat a combination of a sandstone and shale rock and expect to make a product about the same as you have, i.e., 70% through 200 mesh of about 19% solids.

In referring to the Atkins Classifier catalog, Colorado Iron Works Company, Bulletin 24-H, page 25, they give a sand breaking capacity for a 54" simplex classifier on 2.7 specific gravity ore a capacity of 400 tons per 24 hours per spiral revolution. I am assuming that the rpm of the spirals of this size is eleven revolutions, which makes 4400 tons and for a duplex it should therefore be 8800 tons. Now I understand that your circulating load is five to one making your total load 6 x 1500 tons or 9000 tons against a rated capacity as per the catalog of 8800 tons per Duplex Classifier.

I am wondering now whether Mr. Martin was correct in saying that you are using two duplex machines with each mill inasmuch as the rated capacity of one duplex unit seems to be close to what you are handling.

I would like to have you advise me whether it is one or two duplex units that you are using and if two, why did you decide on the additional capacity of nearly 100%. Was this necessary in order to obtain an overflow capacity of 1500 tons of 70% through 200 mesh.

I would appreciate any further comments you care to make on the Atkins classifier as compared to the Dorr Bowl type as we are seriously considering the installation of the Atkins.

Mr. L. M. Barker

-2-

May 19, 1941

I had hoped to have had the pleasure of meeting with you last winter with George Ruppe but I will have to look forward to this a little later on.

Very truly yours,

WHS/WPN

President

Fidelity Union Bank

ESTABLISHED 1854

MADE IN U.S.A.

January 22, 1941

Mr. Morris F. LaCroix, Treasurer
Copper Range Company
24 Federal Street
Boston, Mass.

Dear Morris:

The report from the American Cyanamid Company on White Pine tests has just been received and I am enclosing a copy herewith.

When you are through with it, will you be kind enough to send it to my office so that it may be kept with the other information we have on White Pine tests.

The composite mill test is still being delayed on account of bearing trouble but every effort is being made to iron out this difficulty as soon as possible.

We also have a report from the Michigan College of Mining and Technology covering tests on ten tons of White Pine rock obtained from the lot now being held at Freda for the composite mill test. A copy of this report will be mailed to you within the next few days.

Barring unforeseen difficulties, production for January should total 1,500,000 pounds or more; this would make January a better month than December.

With kindest regards, I am

Very truly yours,

PFB/WPN

Vice President

Encl.

Freda, Michigan
December 11, 1940

Mr. W. H. Schacht, President
Painesdale, Michigan

Dear Sir:

I was at the Michigan College of Mines yesterday afternoon, in conference with Mr. N. Manderfield and Mr. Walter Keck, discussing just how soon they could run through the ten tons of White Pine rock in the College Test Mill. They have completed with the assistance of help from our plant in crushing and reducing the ore to a milling size.

The Mill test starts today at the College and they should average about 1-1/2 tons milled per day when going good so that without interference both Mr. Manderfield and Mr. Keck state it should be completed about Dec. 20th. Following this is the assaying and analysis of the ores, process and results, they state about one week later than the 20th or about Dec. 28th.

With this information of the time required at the College we should not crush our rock here until we have their mill results for to obtain the best results. In the meantime I will arrange to make up a hydraulic bleed for the Primary Ball Mill Discharge and make a one cell Flotation unit for the Secondary Ball Mill bleed to go into use when we mill White Pine Rock.

J. L. Engels
Superintendent

BANK BOND



IRON & STEEL PRODUCTS, Inc.

CABLE ADDRESS
"IRONSTEEL"

BUYERS
SELLERS
TRADERS

"Anything containing IRON or STEEL"

CHICAGO, (HEGEWISCH STATION) ILL.
December 9, 1940.

FILE:

OUR LINE:

- FREIGHT CAR REPAIR PARTS
- FREIGHT CARS
- INDUSTRIAL and DUMP CARS
- PASSENGER CARS
- LOCOMOTIVES and TENDERS
- LOCOMOTIVE CRANES and WORK EQUIPMENT
- SCRAP IRON and STEEL Including STEEL ALLOYS
- ABANDONED PLANTS and RAILWAYS
- LIQUIDATORS
- APPRAISERS
- CRANES: Overhead and Gantry
- STEEL BUILDINGS
- PLANT SITES
- BRIDGES
- TURNTABLES
- TANKS: Storage
- MOTORS
- GENERATORS
- BOILERS
- TURBINES
- DIESEL ENGINES
- MACHINERY and EQUIPMENT
- AIRCRAFT
- SHIPS; ALL TYPES
- MERCHANT IRON and STEEL
- SHEET PILING
- WIRE: Bundling
- SURPLUS and OBSOLETE STOCKS
- RAILS and ACCESSORIES

Copper Range Company
Mr. B. D. Noetzel, Purchasing Agent
Houghton, Michigan.

Dear Mr. Noetzel:

Subject: Rod Mill

Confirming our telephone conversation of yesterday, we attach specifications of an Allis Chalmers 6' x 12' Rod Mill with Wuest gear, hard iron shell and end liners, arranged for direct connection to motor three speed reducer 100 H.P., 1200 R.P.M. 440 volt, 3 phase, 60 cycle slip ring type motor. The enclosed specifications fully describe this Rod Mill. It is available on the market today due to a change of process in the plant in which it was used. The price is \$7,500.00 f.o.b. car Houghton, Michigan, subject to inspection and prior sale.

We also wish to bring to your attention a 6' x 12' Hardinge Conical End Rod Mill which is complete with Falk Gear Reduction but less motor. This unit was built in 1928 and used for approximately two years. The price is ... \$7,000.00, f.o.b. car Houghton, Michigan. This price also includes a charge of rods. This offering likewise is made subject to prior sale and subject to the approval of the Receivers of the Company at which this mill is located.

We trust the above will be given further consideration and for any other data which you should have prior to inspection kindly wire us and we will make every effort to supply any additional information you may require.

We hope that we will be in a position to serve you in this respect and expecting to hear from you soon, we remain

Yours very truly,

PRESIDENT

hgg
108

enc-Specification Sheet

COPPER RANGE CO.
W. H. SCHMIDT, PRESIDENT

RECEIVED
DEC 12 1940

Ans'd _____
Filed _____
Signed _____

4519 Hamilton Ave., N.E.,
Cleveland, Ohio,
December 11, 1940.

Mr. B. D. Neetzel,
Box 232,
Houghton, Mich.

Dear Sir:

We wish to acknowledge receipt of your telegram of December 11th. We can furnish the following guaranteed rebuilt motors:

1 - 300 HP, 1170 RPM, 2200 volt, 3 phase, 60 cycle, General Electric, type I, form K, frame E15B, serial 3085727

Price \$1000.00

1 - 350 HP, 575 RPM, 440 volt, 3 phase, 60 cycle, General Electric, type I, form K, frame 17B, serial 5054675

Price \$1350.00

4 - 400 HP, 1750 RPM, 2200 volt, 3 phase, 60 cycle, Westinghouse, type CS, frame 935.68, serials 4847794 and so forth.

Price \$1000.00 each

1 - 400 HP, 1180 RPM, 2200 volt, 3 phase, 60 cycle, General Electric, type KT, form EL, serial 5178625

Price \$1200.00

1 - 600 HP, 1175 RPM, 2300 volt, General Electric, type KT, frame 569, serial 5172678

Price \$1600.00

Also the following slip ring motors:

2 - 300 HP, 1170 RPM, 220 volt, 3 phase, 60 cycle, Westinghouse, type CW, serials 2227062 etc.

Price \$1250.00 each

2 - 400 HP, 875 RPM, General Electric, type I,
form M, frame E17, serial numbers 3094261 etc.

Price \$1600.00 each

Any of the above motors can be furnished at other voltages.
The price addition would depend upon whether they can be reconnect-
ed or rewound.

Prices are net FOB cars Cleveland.

We can furnish starting or control equipment if necessary.

In the event that these motors are not exactly in line
with your requirements, please let us know as we have many others
in stock.

Yours very truly,

Alvin Friedman

Copy for
Mr. W. H. Schacht
Dec., 13, 1940.

COPPER RANGE Co.
W. H. SCHACHT, PRESIDENT
RECEIVED
DEC 13 1940
Ans'd
Filed
Copies

New York, N. Y.
December 10, 1940

Copper Range Company
Painesdale, Michigan

Attention of Mr. F. F. Beaudin, Vice President

Gentlemen:

This will acknowledge your letter of December 5, in which you inquired of the progress of the metallurgical test work we are conducting on samples of copper ore from your property.

The flotation test work on these samples has been in active progress but the attainment of satisfactory results has been a great deal more difficult than we originally anticipated. In view of your comments regarding the disposition of the various strata represented by these samples, it appears imperative that a treatment scheme be devised to handle a mixed feed. Much of the delay in completing this investigation has been due to what appeared to be a refractory condition created in the mixed sample which could not be correlated with the performance of each type of ore when treated individually. We believe this feature has now been remedied.

As soon as the assays of current tests are available, we will prepare a progress report covering our investigation to date so that we may have the benefit of your comments.

Very truly yours,

AMERICAN CYANAMID COMPANY

Signed:

G. B. Walker,
Ore Dressing Laboratory

GBW/brn

15 Park Row,
New York
Dec. 10, 1940

Copper Range Company,
P. O. Box 232,
Houghton, Michigan.

Attention:
Mr. B. D. Noetzel,
Purchasing Agent.

Dear Mr. Noetzel:

Very glad to hear from you again.

No size was specified, so we are offering you an assortment of sizes of rod mills:

6458-1

1 - 3' O.D. x 12' Continuous Tube or Rod Mill, made by Joshua Hendy Co., San Francisco. Open feed and discharge trunnions, 12" x 12" trunnion bearings. Mill equipped with heavy wave type iron block lining 2" to 2-3/4" thick. Gears - large 2" circular pitch 90 teeth 7" face, cast iron cast teeth; Pinion - cast iron, cast teeth, 15 teeth, 7" face, 2" circular pitch. Equipped with scoop feeder with 3-3/4" x 5-1/2" opening; clutch of contracting band type with wood block faces, 31" dia. 4" face, pinion shaft 3-15/16" dia., with 60" dia. x 10-1/2" pulley. Steel shell 1/2" thick. Price, overhauled and in good mechanical condition, \$900.00, f.o.b. our Newark, N. J. shops.

466-A

1 - 4' dia. x 8' long Hardinge Rod Mill with conical ends, discharge ports in cylinder, wave type Titanite lining (special iron), 23" dia. main bearings, 117 tooth C.I. main gear, 17 tooth C.S. pinion, 3-7/16" dia. counter-shank bearings and countershaft. Including one charge of steel rods, approximately 3" diameter. Approx. shipping weight of mill - 34,000 lbs. Approx. shipping weight of rods - 8000 lbs. Price \$2300.00, f.o.b. cars New Jersey shipping point.

466-A

4 - 6' O.D. x 12' Hardinge Rod Mills, each having 33" dia. x 14" main bearings, inside diameter of discharge trunnion 26"; chrome steel liners 3" thick, with rubber backing between lining and shell; shell 3/4" steel plate. No feeder included, except aluminum spout; equipped with Falk herringbone cast steel machine-cut gear and pinion, countershaft direct connected to Falk reducer by flexible Falk

coupling. Reducer of Falk type GH - ratio 6.06 to 1.
Was direct connected to 125 H.P. G.E. slip ring motor,
1200 RPM. Motor not included. Price \$4500.00 each,
f.o.b. cars New Jersey shipping point.

We are enclosing herewith two drawings giving details of the 6' x
12' Hardinge Rod Mills. We know that these mills are in good con-
dition because we inspected them last week.

Should none of these mills be of interest, will you be good enough
to specify the size preferred?

Very truly yours,

CONSOLIDATED PRODUCTS CO. INC.

W. T. Hand

240
A

PHELPS DODGE CORPORATION

NEW CORNELIA BRANCH

AJO, ARIZONA

November 30, 1940

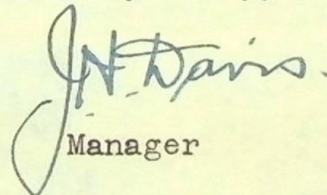
Mr. A. L. Engels, Superintendent
Copper Range Company
Freda, Houghton County, Michigan

Dear Mr. Engels:

As requested in your letter of November 22nd, I am enclosing herewith copy of letter from Mr. Barker to me, giving data on our grinding practices asked for in your letter. I believe that Mr. Barker's letter covers all the points mentioned by you. Also enclosed is print of Drawing G-697, covering the scoop used on all mills.

I trust that the enclosed information is what you want.

Yours very truly,


Manager

JHD:AG

Encs.

PHELPS DODGE CORPORATION

NEW CORNELIA BRANCH
CONCENTRATOR DEPARTMENT
AJO, ARIZONA

November 29, 1940.

Mr. J. H. Davis, Manager,
Phelps Dodge Corporation,
New Cornelia Branch,
Ajo, Arizona.

Dear Sir:

With reference to the inquiry of Mr. A. L. Engels concerning our grinding practices, I am sorry to say that there is not available at the present time a copy of our mill flow sheet. Nor are there available any copies of the paper covering our practices which was published by the A. I. M. E. in 1939. We can only refer Mr. Engels to the 1939 volume of A. I. M. E. transactions on Milling.

We have made one change in grinding practices since that paper was published in that we have altered our flow sheet from a modified two stage method to a single stage closed circuit practice. This change was dictated by the following considerations:

1. Ball charges in the second stage in the original flow-sheet could not be efficiently rationed to the work to be done.
2. As a result of (1) classifier efficiency in the second stage was poor.
3. Single stage grinding offered operating flexibility, possibilities for better ball rationing and improved classifier conditions, all of which combined to yield a greater unit capacity.

In answer to Mr. Engels' specific questions: All of our mills are ball mills. They were originally Marcy roller mounted rod mills but by the substitution of discharge ends were converted to overflow type ball mills. Shells are 6'6" by 16' inside dimensions, but rail type breast, or barrel, liners and cast end liners reduce these dimensions to approximately 5'9" by 15' in a newly lined mill. Ball charge varies from a total weight of 25 tons to 28 tons when liners are about worn out.

Heads are lined to present a vertical face to the ball charge but head castings have a pitch of 15° 30' outwardly to the discharge or feed openings.

Mills are direct driven at 23.1 R.P.M. through magnetic clutch, Maag pinion and ring gear, by 300 H.P. synchronous motors. Enclosed herewith is B.P., G-697, of the scoop used on all mills.

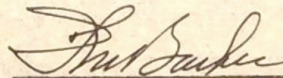
One 78" Akins simplex classifier is operated in closed circuit with each mill.

Following are typical screen analyses of ball mill feed and grinding products:

Mesh	Feed	Ball Mill Discharge	Classifier Sand	Classifier Overflow
	% Mat.	% Mat.	% Mat.	% Mat.
3	7.2	2.0	2.8	-
4	20.6	3.6	5.4	-
6	15.2	2.8	3.8	-
8	9.8	2.2	3.0	-
10	12.4	3.4	4.4	-
14	6.3	2.8	3.8	-
20	4.3	3.6	4.6	-
28	4.3	6.6	8.4	-
35	3.2	10.6	13.2	-
48	2.4	13.2	17.2	2.7
65	2.1	13.0	14.4	9.3
100	2.2	9.0	7.8	14.7
150	2.2	6.6	4.2	12.0
200	1.9	4.8	3.2	10.3
- 200	5.9	15.8	3.8	51.0

Average unit capacity of the ball mills approximates 675 tons per day and power consumption for grinding, including feeding and classification, is 7.45 K.W.Hrs. per ton of feed.

Yours very truly,



L. M. Barker,
Concentrator Superintendent.

Encl. - B.P. G-697.

PHELPS DODGE CORPORATION

New Cornelia Branch
Concentrator Department
Ajo, Arizona

November 29, 1940

Mr. J. H. Davis, Manager,
Phelps Dodge Corporation
New Cornelia Branch,
Ajo, Arizona

Dear Sir:

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1. Ball charges in the second stage in the original flow sheet could not be efficiently rationed to the work to be done.
2. As a result of (1) classifier efficiency in the second stage was poor.
3. Single stage grinding offered operating flexibility, possibilities for better ball rationing and improved classifier conditions, all of which combined to yield a greater unit capacity.

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<u>**Mesh</u>	<u>Feed % Mat.</u>	<u>Ball Mill Discharge % Mat.</u>	<u>Classifier Sand % Mat.</u>	<u>Classifier Overflow % Mat.</u>
3	7.2	2.0	2.8	-
4	20.6	3.6	5.4	-
6	15.2	2.8	3.8	-
8	9.8	2.2	3.0	-
10	12.4	3.4	4.4	-
14	6.3	2.8	3.8	-
20	4.3	3.6	4.6	-
28	4.3	6.6	8.4	-
35	3.2	10.6	13.2	-
48	2.4	13.2	17.2	2.7
65	2.1	13.0	14.4	9.3
100	2.2	9.0	7.8	14.7
150	2.2	6.6	4.2	12.0
200	1.9	4.8	3.2	10.3
- 200	5.9	15.8	3.8	51.0

Average unit capacity of the ball mills approximate 675 tons per day, and power consumption for grinding, including feeding and classification, is 7.45 K.W.Hrs. per ton of feed.

Yours very truly,

L. M. Barker,
Concentrator Superintendent

BANK

FRAGILE

Freda, Michigan
August 31, 1940

Mr. W. H. Schacht, President,
Painesdale, Michigan

Dear Sir:

Complying with your request we have shipped today,
by express, three samples of White Pine rock for such treatment
as you have requested to;

American Cyanamid Co, Ore Dressing Laboratory
1937 Main St.,
Stamford, Conn.

These samples are representative of the average rock
shipped to us from White Pine property.

One sack (109 lbs. net) White Pine Parting Shale taken from
R.R.Cars No. 3031 & 3073.

One sack (102 lbs. net) White Pine No. 2 Sandstone taken from
R.R.Cars No. 3017 & 3069

One sack (94 lbs. net) White Pine No. 1 Sandstone, sample
sent to us from Mine by Mr. Stott.

All samples were broken down to pass through a 1-3/4"
square opening mesh screen.

Samples were properly cut, quartered and should be a
fair representative sample of the shale and sandstones.

Yours truly,

A. L. Engels
Superintendent

RECORDED

BY MK 301

COPPER RANGE CO.	
W. H. SCHACHT, PRESIDENT	
RECEIVED	
SEP 5 1940	
Ans'd
Filed
Copies

COPPER RANGE COMPANY

WILLIAM H. SCHACHT,
President and General Manager.

BERNARD I. MANDERFIELD,
Superintendent.

JOHN M. WAGNER,
Assistant Treasurer.

HENRY COMBELLACK,
Chief Clerk.

PAINESDALE, MICHIGAN. August 31, 1940.

Mr. W. H. Schacht, President
Copper Range Company
Painesdale, Michigan

Dear Mr. Schacht:

We have today (August 31, 1940) taken an average sample, amounting to approximately 150 lbs. of product, from six loaded railroad cars (Nos. 3011, 3019, 3035, 3042, 3055 and 3054). This was mined from the 1st Sandstone beds, White Pine Mine, Ontonagon County, Michigan.

This sample is a general average of all six cars, taken by chip samples from larger chunks and proportionate grab samples of small pieces and fines according to a rough percentage of coarse rock and finer pieces in each of the above cars. Approximately 30 lb. sample was taken from each of the six cars. The combined sample comprising an average 150 lb. sample for laboratory mill test by the American Cyanamid Company.

The above sample was delivered to the Freda Mill Office at 11:30 a. m., August 31, 1940, for shipment to the American Cyanamid Company.

Very truly yours,

George F. Stott
George F. Stott,
Geologist.

GFS/WPN

August 31, 1940.

Mr. W. H. Schacht, President
Copper Range Company
Painesdale, Michigan

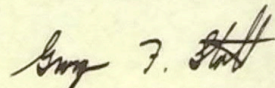
Dear Mr. Schacht:

We have today (August 31, 1940) taken an average sample, amounting to approximately 150 lbs. of product, from six loaded railroad cars (Nos. 3011, 3019, 3035, 3042, 3055 and 3054). This was mined from the 1st Sandstone beds, White Pine Mine, Ontonagon County, Michigan.

This sample is a general average of all six cars, taken by chip samples from larger chunks and proportionate grab samples of small pieces and fines according to a rough percentage of coarse rock and finer pieces in each of the above cars. Approximately 30 lb. sample was taken from each of the six cars. The combined sample comprising an average 150 lb. sample for laboratory mill test by the American Cyanamid Company.

The above sample was delivered to the Freda Mill Office at 11:30 a. m., August 31, 1940, for shipment to the American Cyanamid Company.

Very truly yours,



George F. Stott,
Geologist.

GFS/WPN

August 22, 1940.

American Cyanamid Company
30 Rockefeller Plaza
New York, N. Y.

Gentlemen:

We are contemplating opening a new property but before this is done a number of laboratory mill tests will be necessary. We will be making our own tests and others will be made by the Minerals Separation North American Company and the Michigan College of Mining and Technology.

If you care to make some tests for us will you be kind enough to advise us the weight of the samples and the size of the rock desired, and whether there will be any charge for this service and where samples should be sent.

The ore occurs as both native copper and calcacite in three narrow lodes which are contiguous. We desire, if possible, separate tests on each lode and also tests on combining the material from the three lodes. The lodes are of two types of rock, the center one being a shale in which two-thirds of the copper occurs as sulfide and the lodes on either side of this shale are sandstone and carry about two-thirds of their copper content as native copper.

Our tests to date indicate fairly good extraction by the use of Xanthate flotation with 0.25 pound of potassium ethyl xanthate and 0.10 pound pine oil followed by a scavenger flotation with 0.15 pound sherosepe T and 0.45 pound fuel oil making an extraction on combined material from the three lodes of from 80% to 85%. The copper in the shale is very finely divided and the extraction on this runs lower than on the sandstone where the copper occurs more in the native state. The extraction of the copper in the shale will run about 70% and in the sandstone will run slightly under 90%.

We are hopeful that these results can be further improved.

Very truly yours,

H. H. Schacht
President

WHS/WPN

MINERALS SEPARATION NORTH AMERICAN CORPORATION

OFFICE OF THE CHIEF ENGINEER
220 BATTERY STREET, SAN FRANCISCO, CAL.
CABLE ADDRESS NOMOLOGY

San Francisco, Calif.,

August 27, 1940.

EHNm

Mr. W. H. Schacht, President,
Copper Range Company,
Painesdale,
Michigan.

Dear Mr. Schacht:

I beg to acknowledge and thank you for your letter of August 23rd, with enclosed copy of your letter of August 22nd to American Cyanamid Company, and advising us that you are shipping us three 100 pound samples of your shale and sandstones, as described.

On receipt of these samples we will give them our very earnest attention, and I hope that we will be able to develop something in the treatment of them that will be of interest to you.

I am very glad to have the information you give in your letter to American Cyanamid Company, but there is one reagent which is unknown to us under the name you use, and that is, Sherosope T. Is this what is sometimes known as "mahogany soap", or just what is it, and where can it be had. We would like to have some so that we can make parallel tests with it.

Very truly yours,

Edward N. Mutter
Chief Engineer.

COPPER RANGE Co.	
W. H. SCHACHT, PRESIDENT	
RECEIVED	
AUG 31 1940	
Ans'd
Filed
Copies

Freda, Michigan
August 23, 1940

Mr. W. H. Schacht, President
Painesdale, Michigan

Dear Sir:

Complying with your request I have shipped, by freight, three samples of White Pine rock of 100 lbs. each for such treatment as you have requested to the Mineral Separation North American Corp. of San Francisco, California and for the attention of E. H. Nutter or V. Quigley.

Samples sent are:

One sack (100 lbs) White Pine Parting Shale taken from R.R. cars No. 3073 and 3031
One sack (100 lbs) White Pine No. 2 Sandstone taken from R. R. cars No. 3069 and 3017
One sack (100 lbs) White Pine No. 1 Sandstone sent to me by truck from Painesdale, requested and designated by Mr. Manderfield.

Each shipment of samples have been broken down to minus two inch size.

Tags describing number and name of each sample are enclosed on the top and inside of the sample sacks.

Yours truly,

A. L. Engels
Superintendent

(cont)

COPPER RANGE Co.	
W. H. SCHACHT, PRESIDENT	
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AUG 24 1940	
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February 21, 1939

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Mr. Bernard Manderfield
Copper Range Mining Company
Painesdale, Michigan

Dear Mr. Manderfield:

Due to an oversight, a copy of the latest report of flotation tests on the White Pine samples was not sent to you. As we haven't additional copies, kindly pass this one on to Mr. Stott.

This report shows that, with the present treatment, much better metallurgical results are obtained than with previous methods. This latest treatment has commercial possibilities and undoubtedly can be shaped into a commercial process.

I regret that this report has been held up.

Very truly yours,

Walter E. Keck
Assistant Professor

WEK:S

Copy

MICHIGAN COLLEGE OF MINING AND TECHNOLOGY

Houghton, Michigan
October 17, 1938

Mr. W. H. Schacht, President
Copper Range Company
Painesdale, Michigan

Dear Mr. Schacht:

The report of the flotation tests on the White Pine parting shale and sandstone samples is enclosed. These tests show that the parting shale is more refractory to flotation than the sandstone -- a fairly good tailing was made from the sandstone under the most favorable conditions whereas the parting shale tailing were unsatisfactory under all conditions.

Copies of this report are also being sent to Messrs. Schubert and Manderfield.

I trust this work answers the question on the relative flotation amenabilities of parting shale and sandstone.

Very truly yours,

Signed:

Walter E. Keck

Copy

MICHIGAN COLLEGE OF MINING AND TECHNOLOGY

Houghton, Michigan
October 17, 1938

Mr. W. H. Schacht, President
Copper Range Company
Painesdale, Michigan

Dear Mr. Schacht:

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Very truly yours,

Signed:

Walter E. Keck

Copy

Dear Mr. Engels:

In a previous letter you asked me what mines were operating rod mills and what companies were manufacturing this type of mill.

In the Southwest, I understand that the Nevada Consolidated Copper Company at Ely, Nevada, is operating 3 - 9' x 12' rod mills. Rod Mills were formerly operated by Hollinger and International Nickel in Canada, Phelps Dodge at Ajo, Greene Cananea, Homestake, Anzconda, Moctezuma, and Federal Lead. I believe most of these have been converted into ball mills. I know definitely that Phelps Dodge at Ajo has made the change and also International Nickel Company.

Where the ore is soft, as at Ely, Nevada, the rod mill would probably render satisfactory service, but in mines where the ore is medium or fairly hard, I question whether it will do as well as the ball mill. In view of the many rod mill conversions into ball mills in such mines as Phelps Dodge at Ajo, International Nickel and others, the preference at least on the harder ores appears to be in favor of the ball mills.

As you probably know the tendency in most mines has been to produce as fine a grinding mill feed as possible. A minus 1/4" or minus 3/16" feed is ideal for the ball mills and has enabled the mines to achieve the lowest possible grinding costs. The argument which the rod mill people are advancing is that this type mill is able to take coarser feed, say, a minus 1" or minus 3/4" and that it operates better when the feed is coarse. This may be quite true on some of the softer ores such as are found at Ely, Nevada, where the ore disintegrates readily and where neither the crushing nor the grinding is much of a problem.

For information with respect to rod mills, we suggest getting in touch with the Hardinge Company, Inc. or the Mine & Smelter Supply Co.

I hope that this letter will be of some aid to you and if you feel that I can be of any further assistance, please do not hesitate to write me.

Yours very truly,

NORDBERG MANUFACTURING COMPANY
O. C. Gruender