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Office of Enforcement
OCT 17 2013
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October 10, 2013

Andrew Tauriainen
1001 I St., 16th Floor
Sacramento, CA. 95814

Dear Andrew:

I am sending you copies of the letters you requested from MC 169, Box 82 Folder 8 regarding the Walker Mining Co. Your $25 fee covers 10 copies; there was an additional 20 copies @ $.25 ea.; please remit an additional $5. Thanks.

Sincerely,

Brian Shovers

Brian Shovers
Library Manager
Montana Research Center
bshovers@mt.gov
406-444-741

Archival collections at the MHS Research Center will be unavailable from October 15, 2013 until April 15, 2014 for improvement to our collections storage facility. Other Research Center collections, such as books, newspapers and photographs, will be open during this time. Please contact us for additional information.

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ANACONDA COPPER MINING COMPANY
ANACONDA, MONTANA
Collection No. _____ Bx/Fd No. _____

T 5
W-22-2

WILBUR JURDEN
CONSULTING ENGINEER

January 8, 1929

Mr. J. O. Elton, Manager,
International Smelting Co.,
Salt Lake City, Utah.

Dear Sir:-

Enclosed herewith please find two copies of an estimate we have prepared covering an extension to the concentrator at Walker Mine, in accordance with your instructions.

You will note the total for this estimate amounts to $72,150.00. This figure does not include any money for engineering and drafting, as it is my understanding that no drafting will be required and that supervision at Walker will be done by the operating staff. If, however, there is to be any of the time of these men charged to the construction work I think an item of about 3% should be added to the estimate to cover such charge; also, we have not included any money for spare parts, as I understand that you have sufficient spare parts on hand to take care of the new work.

COPY

This estimate is somewhat higher than the figure you had in mind, but in going over it I can't find any place where it would be safe to cut it and in my opinion the amount shown should be covered if an appropriation for this work is granted.

Yours very truly,

Wilbur Jurden

CC-Mr.Frederick Laist

WJ-RL
Encl.

F. 15373—1M—6-9-28

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ANACONDA COPPER MINING COMPANY

ENGINEERING DEPARTMENT

ANACONDA REDUCTION WORKS

ESTIMATE NO. ..... DWG NO. ..... DATE January 7th, 1929.

Quantity	DESCRIPTION	Material Delivered	Unit on Labor	Labor	TOTAL
	WALKER MINE - EXTENSION TO CONCENTRATOR, INCLUDING 36'-0" EXTENSION TO FINE ORE BIN, 1 - 18" PAN FEEDER, 1 - #75 MARCY BALL MILL, 1 - PNEUMATIC FLOTATION MACHINE, ETC.				
	Removing ends of present building			1,647	1,647
640	Cu. Yds. Excavation		1.50	1,260	1,260
360	Cu. Yds. Concrete	5,400		5,760	11,160
57	Tons Structural Steel	5,950	45.00	2,565	8,515
62	Squares Corrugated Steel	447		372	819
17	M.B.M. Lumber for Ore Bins and Nailing Strips	680		765	1,445
95	Lin. Ft. 18" Conveyor Belt	342		15	357
10	18" Troughing Idlers	140	1.50	15	155
4	18" Return Idlers	32	1.50	6	38
	Labor for moving Head Pulley			75	75
1	18" Pan Feeder, complete with speed reducer and motor	3,700		540	4,240
1	No. 75 Marcy Mills, complete with liners feed scoop, grates, bolts, helical gears, pinions, etc.	11,950		2,250	14,200
1	150 HP, 900 RPM Motor, complete with control equipment	2,100		260	2,360
1	150 HP Speed Reducer	2,700		240	2,940
	Amount Carried Forward -	33,441		15,770	49,211

Estimated by H. S. Vernon. Approved by .....

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Quantity	DESCRIPTION	Material Delivered	Tax on Labor	Labor	TOTAL
	Brought Forward -	33,441		15,770	49,211
1	5 HP Motor, complete	209		40	249
1	6'-0" x 18'-4" Dorr Classifiers	3,500		480	3,980
1	Sample Box	60		55	115
1	Pneumatic Flotation Apparatus, with 10 - 3'-0" x 3'-0" Units, double cell roughers and 3 - 3'-0" x 3'-0" double cellcleaners, complete	4,900		900	5,800
1	4" Centrifugal Pump, complete with motor	695		106	781
1	Reagent Feeder	350		140	490
11	M.B.M. Lumber for Launder System	583		440	1,023
	Miscellaneous Items	750		350	1,100
	Painting	375		420	795
	Electrical Work, Power and Lighting	1,200		850	2,050
		46,043		19,551	65,594
	Contingencies - 10%				6,556
				$	72,150

FORM 477 4-12-24 1M

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OFFICERS
J. R. WALKER
PRESIDENT
J. O. ELTON
VICE-PRESIDENT
J. B. WHITEHILL
SEC'Y-TREAS.

WALKER MINING COMPANY

621 KEARNS BUILDING

DIRECTORS
J. R. WALKER
C. A. WALKER
J. O. ELTON
J. B. WHITEHILL
B. R. HOWELL

L 5
W 23-2

SALT LAKE CITY, UTAH,
March 25, 1929.

Mr. Frederick Laist, Gen. Met. Mgr.,
Anaconda Copper Mining Company,
Anaconda, Montana.

ACKNOWLEDGED RECEIPT
SAYING SAME WOULD BE CALLED
TO YOUR ATTENTION.

Dear Mr. Laist:

The enlargement at the Walker Mill has been authorized.

I count on leaving for the Walker Sunday afternoon March 31, and would like very much to have Mr. Morrow go out with me. I do not feel competent to pass on the general arrangement. Geisendorfer and McKenzie are making a lay-out which they think is the proper one to put in. If we can go out Sunday we would be there not later than Wednesday night, returning to Salt Lake at 4 o'clock P.M. on Thursday April 4.

I will appreciate it very much if you can spare Mr. Morrow because I need his advice.

Yours very truly,

J. O. Elton,
Vice-President.

JOE:VS

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Collection No. _____

INTERNATIONAL SMELTING COMPANY
ANACONDA, MONTANA

April 6th, 1929.

FREDERICK LAIST
GENERAL METALLURGICAL MANAGER

Mr. J. O. Elton, Manager,
International Smelting Company,
Kearns Building,
Salt Lake City, Utah.

Dear Jim:

Morrow was just telling me about his trip to the Walker. I told him that it was perfectly all right with me to secure the increased capacity by crowding the flotation machines closer together.

From what he tells me, you prefer this and MacKenzie says the work can be done without appreciable loss of production, which was my principal objection to the proposal. He also tells me that the motors have been ordered in order to take advantage of low prices.

By the way, please let me know if you think it would be advisable to switch from Chief Consolidated into Walker. Chief Consolidated doesn't seem to be giving a very good account of itself.

With kind personal regards, I remain

Yours very truly,

COPY

FL/FS

F. 192 8-19-27-500

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Collection No. ____ Bx/Fd No. ____

I-5
W-23-2

International Smelting Company

ANACONDA
from mi[illegible]sumer
TRADE MARK

J. O. ELTON.
MANAGER

SALT LAKE CITY, UTAH.

April 12, 1928

Mr. B. B. Thayer,
25 Broadway,
New York.

Dear Mr. Thayer:

WALKER ORE CONTRACT

I am inclosing three copies of the contract for copper ores and copper concentrates between the Walker Mining Company and the International Smelting Company for a period of six years, beginning with January 1, 1928.

This contract is in effect an extension of the present contract which expired on January 1, 1928, except that it was continued because of the indebtedness clause.

For some little time Mr. Walker, President of the Walker Mining Company, has been endeavoring to get the minority directors to petition for a five-year's extension of the Walker Mining Company's notes held by the International Smelting Company. These notes will expire on January 1, 1929. While all the directors wanted the notes extended, Messrs Baglin and Storey, two of the minority directors objected to a renewal of the contract, saying that they considered the contract was not fair. After considerable investigation carried on independently by George Baglin, he found that it was impossible to get rates on copper ores from the other smelters that were materially lower than the International Smelting Company rates. As you know, about two years ago we reduced the treatment rates on Walker concentrates $1.50 per ton, however, reserving the right to discontinue the reduction at any time.

At the last directors' meeting both Baglin and Storey said that they were in favor of requesting a renewal of both contracts and notes, all to expire on January 1, 1934, providing the rates as now in effect are continued.

When Mr. Laist was here last week, Mr. Sackett and I discussed this whole matter with him. We are all of the opinion that it is good business to do as requested by the minority directors, that is, to extend the notes and write a new contract the same as the old one except that the rates incorporated therein shall be the same as those used in present settlements. Please refer to page 17 of the contract, the paragraph headed RELEASE.- You will see after reading

F 191-8-19-27-500

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International Smelting Company

ANACONDA
from mi[illegible]sumer
TRADE MARK

J. O. ELTON.
MANAGER

SALT LAKE CITY, UTAH.

this paragraph that the International Smelting Company is fully protected from loss in case conditions change. The wording of this contract is substantially the same as that used in the old contract except that changes were made in the figures so as to bring the rates up to date. While the basic rate in the old contract was $3.00 per ton, it is given as $1.15½ in the new contract. On the face of it, it looks as though a reduction of $1.84½ was given. This difference is made up of $1.50 given two years ago, and a credit for lower priced coal and an increase for labor.

The rates as contained in the contract are in line with other contract rates being offered at this time in this district.

Since I am a director and vice-president of the Walker Mining Company, I did not think it would be right for me to sign this contract for the International Smelting Company. I am therefore sending it on to you with the recommendation that it be signed by the proper officials of the International Smelting Company. One copy is for the New York file and two copies are to be returned to the Salt Lake office. This contract has been signed on behalf of the Walker Mining Company by J. R. Walker and by J. B. Whitehill, as attestor.

I am sending copy of this letter, together with unsigned copy of the contract to Mr. Laist for his file.

I thought it best to address this letter to you instead of to Mr. Kelley, with the full explanation of the matter, so that in case you approve of going ahead with this contract and the extension of the notes, you can take the matter up with Mr. Kelley.

Thanking you for attending to this matter, I am

Very truly yours,

JOE:H
Inc.
CC:FL

J. O. Elton,
Vice-President.

F 192-10-4-26-5M

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International Smelting Company

J. O. ELTON,
MANAGER

I-5
W-23-34

SALT LAKE CITY, UTAH, December 14, 1928

ACKNOWLEDGED
12-19-28

Mr. Frederick Laist,
General Metallurgical Manager,
Anaconda Copper Mining Company,
Anaconda, Montana.

Dear Sir:

Inclosed please find copy of Walker Mining Company's flow sheet, which gives the information concerning the size and location of the trommel screens.

I am sending copy of this flow sheet to Mr. Morrow.

Very truly yours,

J. O. Elton,
Manager.

JOE:H
CC:BSM
Inc.

F. 15838—11-12-20—5M

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Anaconda Copper Mining Company

Washoe Reduction Works.

COPY

Anaconda, Mont.
January 11, 1923.

Mr. B. S. Morrow,
Superintendent of Concentration,
Washoe Reduction Works.

Dear Sir:-

SUBJECT:

POWER CONTRACT, GREAT WESTERN POWER COMPANY OF CALIFORNIA and the WALKER MINE PROPERTY.

My interpretation of the contract is as follows:-

Readiness to Serve Charge is based on the Maximum Demand as recorded by a recording wattmeter and not on connected load. Charge is covered by schedule under "If Maximum Demand is less than 2000 H.P." Energy Charge under same heading.

It is possible that the Maximum Demand of this property comes under the heading "Special Conditions" and is based on a 3 minute instead of 15 minute interval.

Minimum Charge is based on highest monthly Maximum Demand during current month or preceding 11 months. Minimum charge not less than $50.00 per month.

I would suggest that you get information regarding Readiness to Serve Charge, how it is metered and the Time interval of Maximum. Also minimum Charge in case of shut-down of Property.

Yours very truly,

L. E. Larsen,

Asst.Electrical Supt.

F. 15388—11-12-20—5M

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Collection No. ____ Box No. ____

Anaconda, Montana,
January 12, 1923.

Mr. Frederick Laist,
Manager,
Anaconda Reduction Works.

Dear Sir:-

Complying with agreement made at recent conference in your office in regard to the design of a Concentrator for the Walker Mining Company, I submitted Schedule P-11, General Power Service of The Great Western Power Company of California to Mr. L.E. Larsen, Assistant Electrical Superintendent.

Mr. Larsen has furnished me with his interpretation of Schedule P-11. A copy of Mr. Larsen's letter is attached.

After examining Schedule P-11, I have come to the conclusion that this schedule is not the contract under which the Walker Mining Company purchases electric power, but that it is the schedule governing conditions under which power is used. My decision is further influenced by a diagnosis of a copy of the bill rendered to the Walker Mining Company for the month of September, 1922. The bill referred to is in reality a copy of the actual statement, as rendered, made by Mr. Torkelson while at the Walker. Copy of statement is enclosed.

The following comparisons between bill and Schedule P-11 will serve to clarify the above decision.

K.W.Hours per meter reading,		231,600
Maximum demand charge		403.2 K.W.
200 K.W. at $1.50	$	300.00
203.2 K.W. at $1.25		254.00
Maximum demand charge	$	554.00

Above agrees with Schedule P-11.

Energy Charge,

K. W. Used, -	231,600
Estimated transformer loss account metering on low tension side of transformer, 2-1/2%	5,790
Total K.W. Hours charged	237,390

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Please note that an allowance for transformer loss is not mentioned in Schedule P-11.

Calculation of energy Charge:-

100,000 K.W.H. at 1.2¢	=	$ 1,200.00
137,390 K.W.H. at 1.0¢	=	1,373.90
Total Energy Charge		$ 2,573.90

The above charge is as per schedule P-11:

SUMMARY

Maximum demand charge,	$ 554.00
Energy charge,	2,573.90
T o t a l	$ 3,127.90
Authorized additional charge at 6%	187.67
Total charge as rendered	$ 3,315.57

Please note that there is no statement of an additional charge mentioned in Schedule P-11. It is therefore evident that Schedule P-11, while furnishing the general conditions governing the purchase of electric power from The Great Western Power Co. by the Walker Mining Co. is not a copy of the contract under which the power is purchased.

In order that the contract may be more fully analyzed, I would suggest that you ask Mr. Elton to send you a copy of the actual contract.

In addition to the information given in Mr. Larsen's letter, he tells me that at least one Power Company in California, The Pacific Gas & Electric Co. will not furnish power for certain installations if squirrel cage motors are used. This condition applies principally in instances where lighting circuits, etc. come of the line that furnishes the industrial company. In cases where the power is taken off the high tension lines and is stepped down at the plant, Mr. Larsen states that the Power Company would probably furnish power but would attach certain penalties which would increase the rate.

The reason for such action is that squirrel cage motors have a high starting torque, Mr. Larsen

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suggests that wound rotor motors might be a more satisfactory installation at the Walker.

In view of the fact that the power problem at the Walker is an electric problem, I would suggest that this phase of the Walker design be placed in the hands of Mr. Woodward and that he be furnished with all details as to the estimated power consumption, schedules under which power is furnished, etc.

Very truly yours,

David L. Morrow.
Supt.of Concentration.

CC.Mr.Tanner
Mr.Forsyth

BSM-RL

Encl.

6 46

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WALKER MINING COMPANY

Spring Garden, Cal.,
Nov. 4, 1922.

Mr. Frederick Laist, Manager,
Anaconda Copper Mining Company,
Anaconda, Montana.

Dear Sir:-

I submit herewith a report of work done since Sept. 27th, to date.

The crushing division stands as per my report of September 27th. The Mitchell screen arrived last night. Began framing for the screen today.

The Callow cell bottoms and the 8 x 12 filter arrived here on the 17th and the 19th of October, respectively.

There was no work done on the regular construction job between September 30th and Oct. 18th.

I recommended to Mr. Elton that certain changes be made in the mill, and they are as follows:

A four by four man tunnel has been run under the Dorr Tank. Repairs on valve and piping can now safely be made. As it was before this change was made, a man had to crawl on his stomach in muck to get at the valve under the tank. Had a leak occurred when repair man was under the tank, he had no possible chance of escape.

A sump was built in such a position that the spill from the flotation machines can run into it, and then at will a gate can be opened and the spilled concentrates run into the elevator and returned to the flotation circuit. This spill occurs only when the power goes off, which it frequently does. The valves are then opened to let out the material contained in the machines, so that it will not clog the blankets. This material ran into the elevator boot and overflowed and ran down the tail race.

Large braces were placed in the mill foundation to keep shafting in line, and to stop excessive vibration. Bracing has been placed outside of mill to keep it from sliding down hill. The lower half of the mill has no cross bracing in at all, not even knee braces. This is being cared for now.

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The flotation elevator was found to be elevating the flotation feed and dumping a great deal of it back into the boot. This happened because the splash plate was placed sixteen inches from the buckets, instead of two inches, and more than half of the material would spill down between the buckets and splash plate.

The boilers had not been inspected since they were installed. The safety valves were two hundred pound valves, and in poor condition. I called Mr. Hart's attention to this and recommended that he write the State Boiler Inspector to come at once and look the boilers over. On Oct. 28th the boilers were inspected and found safe for only 85 pounds pressure. Four 2½ inch safety valves were orderedand set to pop at 85 pounds.

A crawl runway has been placed over the Marcy mills, and runs out of the mill to the road, so the ball mill liners can be brought in and out with ease. There was a great waste of time handling liners before.

The timing of the automatic valve on the Oliver Filter was found to be wrong, and the blow back air would get into the vacuum line and cause pressure in the barometric leg and thereby make an air lift of it; and consequently blow grit and water into the vacuum pump. This has been cared for.

The mine skip is unsafe. I mentioned this to Mr. Hart, and told him that if the Mine Inspector saw it he would condemn it at once. The skip has no guides, safety dogs or bonnet. A safety skip is being designed now.

A number of other changes have been made but are too small to mention in this report.

Mr. Elton instructed me to get the necessary data for a new mill. This I have been doing.

Weirs were constructed at various places so that an accurate measure of the available water supply could be had. I am enclosing weir reading for the first part of October. There is just enough water to treat 600 tons of ore per 24 hours, without reclaiming. These figures are conservative because they were taken at the time of the year when the flow is at its lowest.

Getting carpenters has been a difficult matter. Mr. Hart has exhausted all means at his command to get men for this job.

From Sept. 12th to Oct. 8th four carpenters were working From Oct. 8th to Oct. 25th two carpenters were working. By this time it was found impossible to get carpenters, so Mr. Hart made a contract with Mr. Ratta (who built the Company houses on contract) to complete this work. To date Mr. Ratta has been able to get only two carpenters. These added to the two we had makes four now working. Mr. Ratta should have eight men working as his contract ends November 20th.

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I have two muckers doing carpenter work. They are not good carpenters, but better than none at all.

Instead of purchasing a new 75 HP motor for the blower as I recommended, I am using the saw mill motor. This is not used on the saw mill in Winter. In the Spring this motor will be sent back to the saw mill and an old hoist motor out of the mine will be used on the blower. This motor is belt connected to the blower. Pulleys of proper size to give the right speed to blower are used. This arrangement saves the cost of a new motor.

A new vacuum pump and receiver was ordered Oct. 14th but is not yet here.

We are pushing this job with all possible speed.

My wire of November 7th is misleading. This report explains what is meant by "No material or machinery and only two carpenters."

New estimate attached.

Very truly yours,

FCT:MWT

(Signed) F. C. Torkelson

P. S. Snow is 26 inches deep and still coming.

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Tunnel Weir (No 1)

Sept. 30	4698 gallons per hour		Dry weather
Oct. 3	4698 " " "		Rain Oct. 2nd - Snow Oct. 3rd.
Oct. 5	4698 " " "		
Oct. 7	4698 " " "		
Oct. 8	4698 " " "		
Oct. 10	4698 " " "		

Averave flow 4698 gal. per hour

Flume Weir (No. 2)

Sept. 30	4561 gallons per hour	
Oct. 3	4561 " " "	
Oct. 5	4035 " " "	
Oct. 7	6813 " " "	Increase due to stoppage of
Oct. 8	6228 " " "	overflow, and rain Oct. 2nd
Oct. 10	6228 " " "	and snow Oct. 3rd.

Average flow 5404 gal. per hour

East of Flume Weir (No. 3)

Sept. 30	6291 gallons per hour	
Oct. 3	7452 " " "	
Oct. 5	8046 " " "	
Oct. 7	4698 " " "	Decrease due to stoppage of overfl
Oct. 8	4698 " " "	on Flume Weir (No. 2) - because
Oct. 10	4698 " " "	overflow from No. 2 drained into

Average flow 4980 gal. per hour (No. 3.

Reservoir Weir (No. 4)

Sept. 30	6291 gallons per hour	
Oct. 3	6291 " " "	
Oct. 5	6291 " " "	
Oct. 7	6291 " " "	
Oct. 8	6291 " " "	
Oct. 10	6291 " " "	

Average flow 6291 gallons per hour.

Weir east of Reservoir (No. 5)

Sept. 30	999 gallons per hour	
Oct. 3	999 " " "	
Oct. 5	1323 " " "	Rain Oct. 2nd and Snow Oct. 3rd
Oct. 7	999 " " "	caused increase on the 5th.
Oct. 8	999 " " "	
Oct. 10	999 " " "	

Average flow 1053 gal. per hour.

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Total average 23,426 gals. per hour.

$\frac{23426}{240}$ equals 98 tons of water per hour

98 x 24 equals 2,352 tons per 24 hrs.

In addition to the water measured there is a small amount that could be diverted to reservoir and used.

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NEW ESTIMATE.

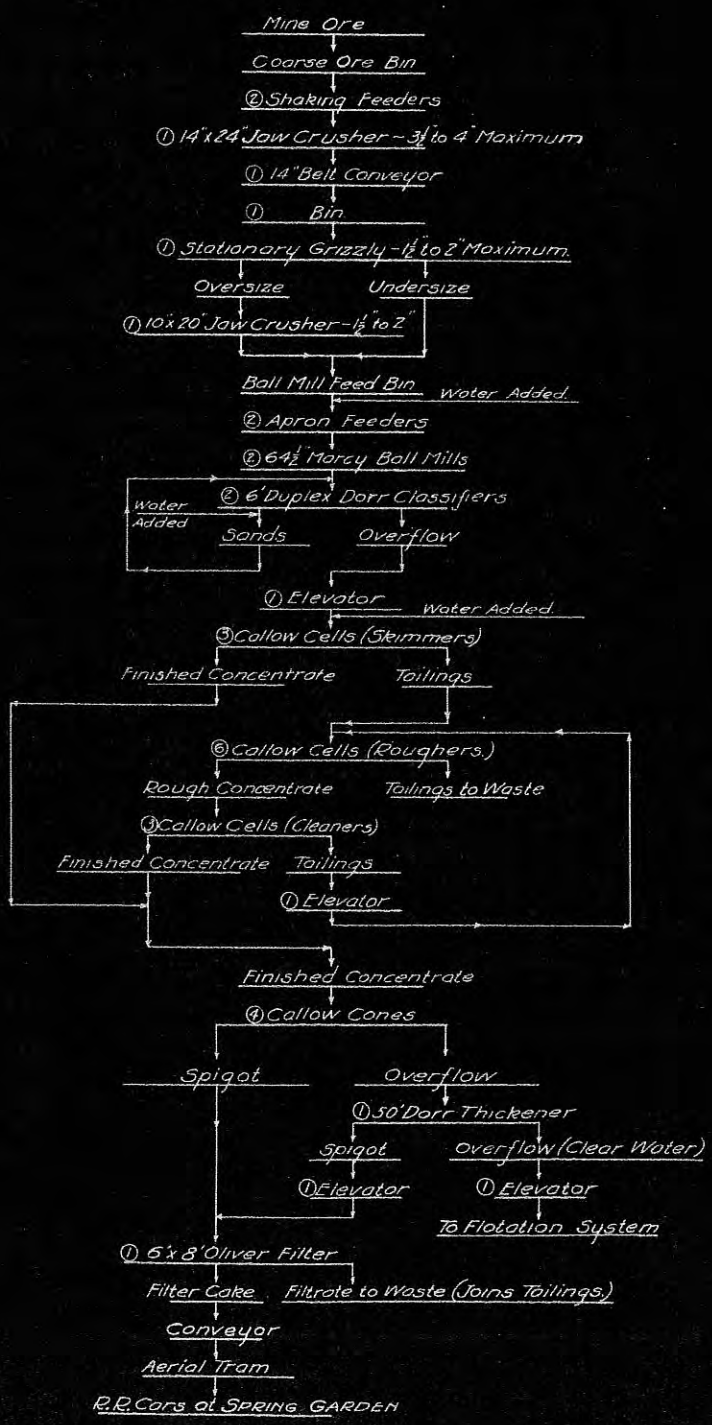
Amount of old estimate is $3,785.
Of this amount $2,300 has been spent.

Cost of 8 x 12 filter installed	$1,000.00
New Vacuum pump and receiver.....	2,000.00
Mitchell Screen installed.....	1,300.00
New Head Sampler and Tail Sampler.....	300.00
Installation of gas engine on tram drive....	500.00
Cost of changes made necessary by the installation of the above	500.00
	$5,600.00
Plus 10%	560.00
Plus the $2,300.00 spent	2,300.00
Total.....	$8,460.00

—WALKER MILL—

FLOW SHEET IN USE AUGUST 2 - 1922

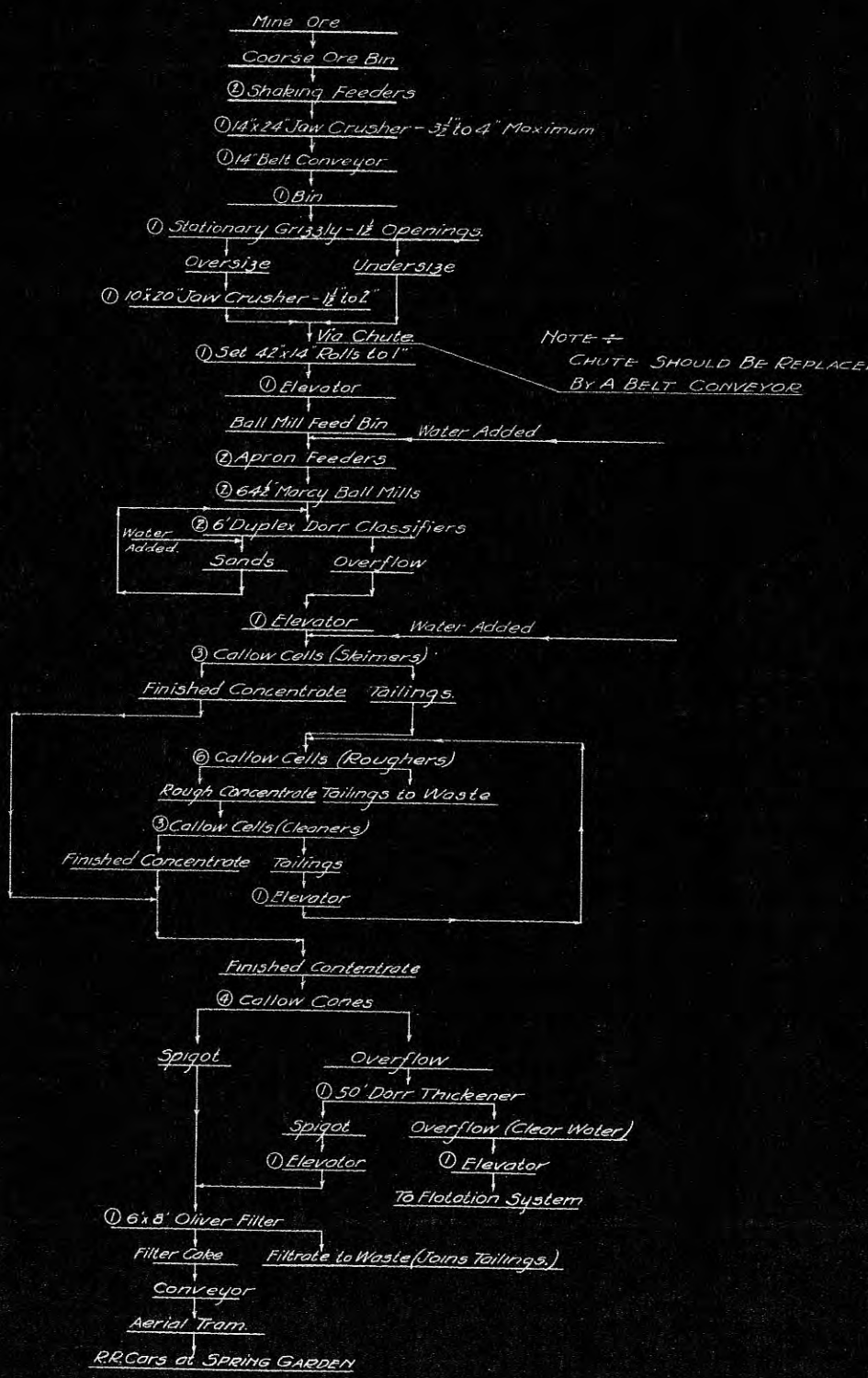
FLOW SHEET Nº 1



—WALKER MILL—

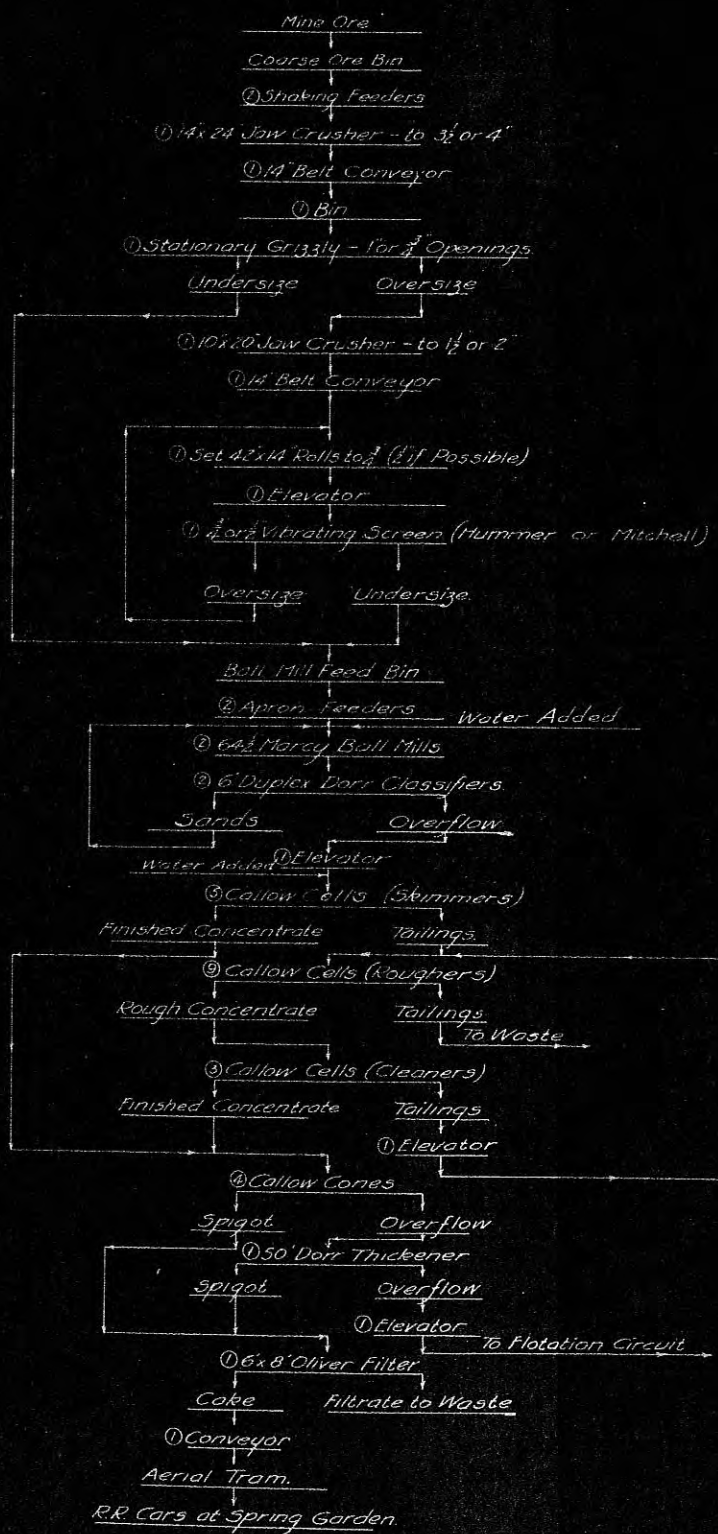
FLOW SHEET PERMISSABLE WITH PRESENT EQUIPMENT.

FLOW SHEET No 2



—WALKER MILL—

PROPOSED FLOW SHEET



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Collection No. _____ By/Fd No. _____

International Smelting Company

25 BROADWAY

NEW YORK, August 31, 1922.

Mr. Frederick Laist, Manager,
Anaconda Reduction Works,
Anaconda, Montana.

Dear Fred:

I wish to acknowledge receipt of your letter of August 25th attached to which was Mr. Morrow's report on the Walker Mill. In order that you might get the right perspective on this proposition I think a little history would be beneficial.

This mill is a "botch", an inheritance from the previous management. It was designed by Allis-Chalmers Co. and erected during Hansen's management. Originally it had in it some Wilfley tables, which, however, produced no results by reason of the magnetite contents of the ore in the upper level. This magnetite made the ore very hard, in fact, so hard that frequently they unloaded pebbles of ore from the mills harder than the steel balls. The tonnage of the mill ran about 150 tons per day. I was naturally anxious to increase it and had Mr. Kuchs talk to Marcy as to the best method of accomplishing it. I held that the ratio of reduction on this ore in the Marcy Mill was entirely too high and that we should introduce another crushing step by means of rolls. Marcy held we would not get over 20% increase, but I insisted and we turned over the problem of putting in this extra crushing equipment to Mr. Capron. The rolls were installed and shortly after the mill closed down, owing to post-war conditions.

Further developments in the mine have, I am told, shown less magnetite and the grade of the ore has materially increased. Since we have begun operations, Mr. Litton tells me that the rolls as installed cannot be operated by reason of too flat a feed and the inability to clean up the spillage of the discharge. I note that Mr. Morrow in his flow sheet has introduced a belt feed and an elevator to handle the discharge.

I was not as optimistic as Mr. Morrow as to the increase in tonnage by additional crushing preceding the ball mill, but since there has been a change in the magnetite contents, he is probably right. Naturally with the higher copper content there will be needed additional ball capacity. The Walker Mine has now a developed tonnage that can support a 400-ton mill. The question came up as to why not build an addition to the present mill from which we expected to get 200 ton capacity with the addition of crushing unit. I was opposed to this by reason of the inefficiency of the present mill and by reason that I did not feel the present mill would last for 5 years, and that repairs on a mill on its last legs would be excessive. At the end of that we would be confronted with the building of a new mill, anyway. However, I was confronted with the problem of financing, as the Walker Mining Co. being incorporated in Arizona had reached its legal limit of indebtedness. Mr. Kelley and I have had some discussions as to the refinancing in order

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that we might get our money back and provide for a new mill. The problem can be brought under two headings:

1st - Refinancing and build a new mill to handle 400-tons per day.

2nd - Remodel the present mill and reduce the indebtedness by its earnings to a point where advances can be made for new construction.

I am personally in favor of the second scheme, and particularly in view of Mr. Morrow's report that the present mill can be brought to 300 tons per day without great expense. This increase of capacity would tide us over to a point where we could build a new mill practically out of earnings. I do not believe, however, that the present mill would last over five years, - it slid down the hill several inches last year.

I would like Mr. Morrow's opinion as to what he considers the life of the present mill, and as to the advisability of a new mill.

I am asking Mr. Elton to request you to draw up the changes so that they can be installed at Walker, and your suggestion of sending a roll man there is a good one. We have a good mine and I would like to see everything else in line with our ways of doing things. Mr. Elton will take the matter up with you in the near future.

Thanking you for your interest, I remain,

Yours very truly,

General Manager.

Smith/J
cc - JOE

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INSPECTION OF

WALKER MINING COMPANY'S CONCENTRATING PLANT

LOCATED NEAR SPRING GARDEN,

PLUMAS COUNTY, CALIFORNIA

and

RECOMMENDATIONS FOR INCREASING CAPACITY

OF

THE PRESENT CONCENTRATOR

- - - - - - - - -

Bayard S. Morrow, B.S.M.E.
Superintendent of Concentration
Anaconda Copper Mining Company.

- - -

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In order that the Walker Mining Company's present concentrating problem may be intelligently discussed, the writer submits two flowsheets. Flowsheet No.1 is the one in use at the time of the writer's visit, and flowsheet No.2 is the flowsheet permissable with present equipment as installed.

As the Walker Mining Company's present concentrating problem is primarily one of increasing the capacity of the present mill with a minimum of expenditure it is advisable to present the possible means of increasing capacity.

The possible means of increasing capacity naturally fall into two distinct lines,-

I. Introduction of gravity concentration;

II. Increasing the present ball mill and flotation capacity.

These lines will be discussed separately.

I. INTRODUCTION OF GRAVITY CONCENTRATION:

The proper place to introduce gravity concentration apparatus would be between the rolls and the ball mills. Several schemes are possible, viz, -

1. Passing present ball mill feed over a 1" screen, sending the oversize to the ball mills and jigging the undersize on a Hancock Jig.

2. Roll crushing to 1" and jigging the roll product on a Hancock Jig.

3. Roll crushing to 1", sizing the roll product and treating as follows: Minus 1" and plus 1-1/2 m.m. to a Hancock Jig. Minus 1-1/2 m.m. to Wilfley tables.

4. Roll crushing all material to 1-1/2 m.m. and treating on Wilfley tables.

In each case the tailing from the gravity equipment would be sent to the ball mills and thence to the flotation circuit. In case 1, the oversize from the one inch screen would also be sent to the ball mills and flotation circuit.

Introduction of gravity concentration as outlined herein has many disadvantages. The disadvantages held in

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common by the four schemes proposed are:-

a. Cost of installation of the gravity machines, the attending elevators and screens.

b. The cost of installing and operating sufficient dewatering equipment to eliminate, from the water required in gravity concentration, the water not required in the ball mill and flotation circuit. This is a decided factor and would have to be overcome.

c. Securing a suitable location for gravity equipment. The present building is not strong enough to support gravity equipment, other than tables, except on the lower floors. Such a location for jigs means more elevating, etc. The difficulties peculiar to the various schemes are, -

1. a. The 1" oversize in present ball mill feed is not less than 30% of the mill heads, therefore the jig feed would be not over 70% of the mill heads.

b. The 1" undersize would contain a very considerable amount of minus 20 mesh material from which a Hancock jig would not make a satisfactory recovery.

Therefore, the increase in capacity would be small because but a small percentage of the total feed could be removed as concentrate.

2. a. The increase in capacity would be greater than in scheme 1 but not marked.

b. There would be more minus 20 mesh material on which the jig would make a poor recovery.

3. a. This scheme means installing two sets of gravity machines, a jig and tables. While the weight of concentrate produced would be more than in two, the writer believes that the scheme is not warranted.

4. a. Another set of rolls would be required as well as trommels and tables.

b. A satisfactory increase in capacity could be obtained.

c. Almost any desired grade of concentrate could be obtained.

d. All disadvantages held in common by schemes 1, 2, 3 and 4 prevail.

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The writer believes this scheme to be the most feasible of the gravity schemes but that it is not warranted in the present mill due to the construction and operating difficulties involved in order to incorporate the necessary equipment into the present building. In addition, some additions to the present mill building might be necessary.

As a whole, gravity concentration is not warranted in order to increase the capacity of the present mill for the following reasons:-

1. Cost of remodeling present mill would be high as compared to increase in capacity effected.

2. Getting rid of excess water between the gravity machines and the ball mill and flotation circuit would entail extra equipment and would mean an additional operating expense.

3. Foundations and structure of present mill building are not strong enough to support any great additional weight.

4. Any increase in capacity will be less than the weight of the gravity concentrate produced because the gravity apparatus will reject, to a great extent, the material that is difficult to grind.

5. Table concentration, only, offers possibilities and this necessitates an additional set of rolls.

II. INCREASING THE PRESENT BALL MILL AND FLOTATION CAPACITY:

Increasing the present ball mill and flotation capacity can be accomplished in two ways.

1. Installing more ball mills and Callow cells.

2. Increasing capacity of present ball mills and installing sufficient additional Callow capacity to take care of the increased tonnage.

The installation of another ball mill would be expensive and the writer does not believe that it is necessary.

In the writer's opinion, the delivery of a 3/4" or 1/2" maximum sized particle in the feed to the two 64-1/2 Marcy ball mills should enable them to grind approximately 150 tons each or a total of 300 tons per twenty-four hours. The capacity would, therefore, be increased from 200 tons

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per twenty-four hours to 300 tons or by 50 percent.

In order to insure a maximum tonnage of 3/4" or 1/2" maximum sized particles through the rolls it will be necessary to install one vibrating screen between the present elevator and the rolls. The oversize from the screen will return to the rolls and the undersize to the ball mill feed bin. Both the "Hummer" and "Mitchell" vibrating screens are efficient machines and the writer has no choice between the two.

In order to provide sufficient Callow capacity the writer proposes to install two additional Callow Skimmer Cells and three additional Callow Rougher Cells.

The writer's proposed flowsheet is submitted herewith. At this point remarks as to the methods of operation under the proposed flowsheet are pertinent.

First. Crushing from run of mine to 1-1/2" or 2". This operation can probably be handled in the same manner as at present.

Second. Roll crushing to 3/4" or 1/2".
Crushing from 1-1/2 or 2" to 3/4" or 1/2" in one set of rolls is a difficult proposition and could not be accomplished in the present instance were it not for the fact that the 42" x 14" rolls are well over capacity and if operated three shifts per day should crush to 3/4" at least.

Third. Screening.
One "Hummer" or "Mitchell" screen will have ample capacity and will remove nearly all - 3/4" or -1/2" material. The operating expense will be small and the repairs will not be an item of great expense.

Fourth. Fine Grinding.
For a feed containing nothing larger than 3/4" particles, the writer recommends the following initial ball charge.

3-1/2"	Balls,	35%	by weight
3"	"	35%	" "
2"	"	30%	" "
1"	"	10%	" "

The following current ball charge is recommended,-

3-1/2"	Balls,	35%	by weight
3"	"	40%	" "
2"	"	25%	" "

The current charge can best be determined by trial or experiment. The idea is to maintain a condition

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wherein the maximum contact between ore particles and balls is obtained.

The mill circuit should be maintained at a high density, say, 60% solids or better.

The Dorr Classifiers are capable of returning a greater sand load than at present. If coarse material short circuits through the mills the classifiers will return it to the mill.

Fifth. Skimmer Cells.
Under the new freight rates it seems feasible to produce a lower grade concentrate from these machines than now prevails.

The writer suggests that this be done in order to relieve the roughers and produce a tailing of lower copper content.

Sixth. Rougher Cells.
A fifty percent increase in the number of cells has been allowed for. By operating these cells to produce a low tailing and low concentrate an additional recovery is possible.

Seventh. Cleaner Cells.
A lower grade concentrate seems feasible and will naturally be produced from a lower grade rough concentrate. Of course the feasibility of shipping a lower grade concentrate should be determined by calculating the net returns per pound of copper to the Walker Mining Co.; As the writer is not in possession of all the terms of the smelter contract, he is unable to present this calculation.

Eighth. The present dewatering equipment is ample to care for the increased tonnage of concentrate.

Ninth. Elevators.
Should any elevators lack capacity space buckets at thirteen inch intervals, lower dump plates to 5' from center of head shaft and increase the belt speed.

Anaconda uses following belt speeds for wet elevators, -

42" Head pulley 451' to 550'
54" " " 580'

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In case of the elevator between ball mills and Skimmer Cells, the writer suggests adding the flotation water between the elevator and the cells in order to increase capacity.

The writer believes that the proposed flowsheet will handle 300 tons of ore per twenty-four hours and that the concentrates produced will amount to not less than 80 tons per twenty-four hours on a 5.75% mill feed.

Respectfully submitted,

Dayard Morrow B.S.M.E.

Supt. of Concentration,
Anaconda Copper Mining Co.