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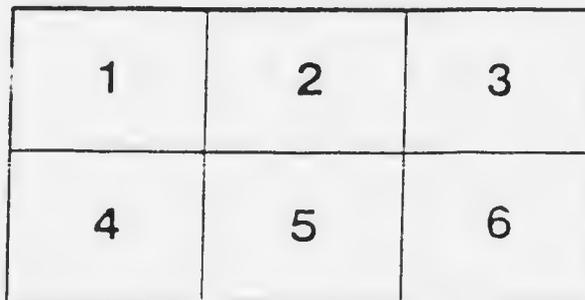
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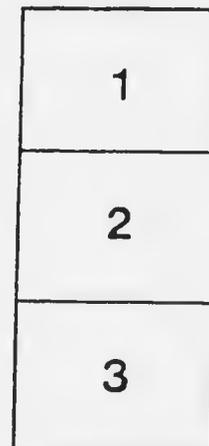
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MICROCOPY RESOLUTION TEST CHART

(ANSI and ISO TEST CHART No. 2)



1.0



2.8



2.5



3.2



2.2



3.6



2.0



4.0



1.8



1.1



1.25



1.4



1.6



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Record of Ore-Treatment by the Lockwood Copper Recovery Process at Butte, Montana.

Mine—Butte-Duluth. Mining Co.—H. A. F. & A. F. Co., Lessees Under Receivers.

Date	Kind of Ore:	Percentage of Commercial Minerals:		
July	Oxide Silicate of Copper,	Copper: 0.84%	Gold: oz.	Silver: oz.
2	Crysocola, Malachite, Azurite.	Lead: "	Zinc: "	
1918				

Analysis: (No Analysis on File.)
Assayed for Copper Only, Showing 0.84% Copper.

Ore Not Roasted	Hours at	Fahr.
Showing,—	Copper as Sulphide%
Showing,—	Copper as Oxide0.84%

Remarks: This test was taken with very incomplete equipment. Partial record only.

Amount of charge		50 lbs. of ore
Amount of solution		100 lbs. @ 60° Fahr.
Amount of acid		lbs.
Proportion of ore to solution, as	1 to 2	by weight.
Percentage of acid, H ₂ SO ₄ , 66° Baume	1 to 5.4	by volume.
Percentage of acid used	0.80	% of solution
Proportion of acid regenerated		%
Duration of agitation before current on		%
Resulting solution	00	hours.
Duration of deposition		% cu.
Total duration of agitation, including the time of deposition	24	hours.
Direct current	24	hours.
Direct current	Average amperage	6.87 amperes.
Direct current	Average voltage	2.19 volts.
Direct current	Total amperes used	422.89 amperes.
Amount of copper deposited on cathodes		lbs.
Total amount of current used		K.W.H.
Amount current used per lb. copper recovered.		K.W.H.
Amount of copper recovered per K.W.H. used	0.80	lbs.
Percentage of recovery from solution	88	%
Net recovery from ore	78	% of entire assay content.
Copper remaining in tails, unextracted	0.10	%
66° B. acid used per lb. copper recovered	1.28	lbs.

Ratio of Anode Surface to Cathode Surface, 1.5 to 1.
 Density, 1.5 to 1.
 Average Current Density, 1.52 Amperes per sq. ft.
 Current Efficiency, 80.8%
 Energy Efficiency, 37%

Costs of treatment, based on treating 100 tons of copper ore per day of 24 hours:

Crushing, mesh	\$0.	per lb. of copper recovered
Roasting	\$0.	" " " " "
Leaching, acid 66 deg. H ₂ SO ₄ , @ \$	\$0.	" " " " "
Recovery, current @	\$0.	" " " " "
\$..... per KWH used		
Power	\$0.	" " " " "
Labor, men at \$	\$0.	" " " " "
per day		
Total cost of treatment	\$0.	per lb. of copper recovered

Mining costs, taxes, office—overhead, etc., extra.
Assay of product, pure electrolytic copper 99 % cu. GLC

Record of Ore-Treatment by the Lockwood Copper Recovery Process at Butte, Montana.
 Mine—Butte-Duluth. Mining Co.—H. A. F. & A. F. Co., Lessees Under Receivers.

Date	Kind of Ore:	Percentage of Commercial Minerals:		
Aug. 8 1918	Oxide Silicate of Copper, Crysocolla, Azurite, Malachite.	Copper: 1.97%	Gold: oz.	Silver: oz.
		Lead: %	Zinc: %	

Analysis: (Analysis Not on File.)
 Assayed for Copper Only, Showing 1.97% Copper.

Ore Not Roasted	Hours at ° Fahr.	
Showing,— Copper as Sulphide		%
Showing,— Copper as Oxide		1.97%

Remarks:

Amount of charge	2,000 lbs. of ore.	
Amount of solution	3,000 lbs. @ 60° Fahr.	
Amount of acid	lbs.	
Proportion of ore to solution, as	1 to 1.49	by weight.
Percentage of acid, H ₂ SO ₄ , 66° Baume	1 to 3.03	by volume.
Percentage of acid used		%
Amount of acid regenerated per lb. of copper recovered	0.79	lbs.
Proportion of acid regenerated		%
Duration of agitation before current on	00	hours.
Resulting solution		% cu.
Duration of deposition	81	hours.
Total duration of agitation, including the time of deposition	81	hours.
Direct current Average amperage	2.70	amperes.
Direct current Average voltage	1.81	volts.
Direct current Total amperes used		amperes.
Amount of copper deposited on cathodes		lbs.
Total amount of current used	39,584	K.W.H.
Amount current used per lb. copper recovered		K.W.H.
Amount of copper recovered per K.W.H. used	0.80	lbs.
Percentage of recovery from solution	90.30	%
Net recovery from ore	81.	% of entire assay content.
Copper remaining in tails, unextracted	0.19	%
	Net	1.95 lbs.
66° B. acid used per lb. copper recovered	2.74	lbs. (assuming that all is lost).

Ratio of Anode Surface to Cathode Surface, 1:1.
 Current Density, 4.25 to 1.31 Amperes per square foot.
 Average Current Density, 2.01 Amperes per sq. ft.
 Current Efficiency, 56%.
 Energy Efficiency, 37%.

Costs of treatment, based on treating 100 tons of copper ore per day of 24 hours:

Crushing, 20 mesh	\$0.01250	per lb. of copper recovered
Roasting	\$0.	" " " "
Leaching, acid 66 deg. H ₂ SO ₄ , @ \$30 ton	\$0.03360	" " " "
Recovery, current @ \$1 per H.P. month, plus \$0.0061 per KWH used	\$0.01225	" " " "
Power (Conn. HP. 300) (KWH \$0.0098)	\$0.00750	" " " "
Labor, 5 men at \$7.00 per day	\$0.02000	" " " "
Total cost of treatment	\$0.08585	per lb. of copper recovered

Mining costs, taxes, office—overhead, etc., extra.

Assay of product, pure electrolytic copper 99.76 % cu. GLC

Mining costs, \$0.030 per lb. of copper recovered.

Above etc., \$0.006 per lb. of copper recovered.

N. B.—All above figures based on 1918 war-time costs.

Record of Ore-Treatment by the Lockwood Copper Recovery Process at Butte, Montana.
 Mine—Butte-Duluth. Mining Co.—H. A. F. & A. F., Lessees Under Receivers.

Date	Kind of Ore:	Percentage of Commercial Minerals:		
Aug. 18 1918	Oxide Silicate of Copper, Crysocolla, Azurite, Malachite.	Copper: 1.5%	Gold: oz.	Silver: oz.
		Lead: "	Zinc: "	

Analysis: (Analysis Not on File.)
 Assayed for Copper Only, Showing 1.5% Copper.

Ore Not Roasted	Hours at	Fahr.
Showing,—	Copper as Sulphide %
Showing,—	Copper as Oxide 1.5%

Remarks: Outside Engineer took this test, furnished us only part of his record.

Amount of charge	2,000 lbs. of ore.
Amount of solution	3,000 lbs.
Amount of acid	lbs.
Proportion of ore to solution, as	to
Percentage of acid, H ₂ SO ₄ , 66° Baume	%
Percentage of acid used	%
Proportion of acid regenerated	%
Duration of agitation before current on	hours.
Resulting solution	% cu.
Duration of deposition	hours.
Total duration of agitation, including the time of deposition	hours.
Direct current Average amperage	Amperes.
Direct current Average voltage	volts.
Direct current Total amperes used	amperes.
Amount of copper deposited on cathodes	lbs.
Total amount of current used	K.W.H.
Amount current used per lb. copper recovered	K.W.H.
Amount of copper recovered per K.W.H. used	0.70 lbs.
Percentage of recovery from solution	%
Net recovery from ore	85 % of entire assay content.
Copper remaining in tails, unextracted	%
66° B. acid used per lb. copper recovered	2.5 lbs.

Energy Efficiency, 35%.
Current Density, Average 2.25 Amperes per sq. ft.

Costs of treatment, based on treating 100 tons of copper ore per day of 24 hours:

Crushing, 35 mesh	\$0.0125	per lb. of copper recovered
Roasting	\$0.	" " " " "
Leaching, acid 66 deg. H ₂ SO ₄ , @ \$28.00 ton	\$0.0350	" " " " "
Recovery, current @ \$1 per H.P. month, plus \$0.061 per KWH used	\$0.0140	" " " " "
Power	\$0.0100	" " " " "
Labor, 9 men at \$5 & \$6 per day	\$0.0200	" " " " "
Total cost of treatment	\$0.0915	per lb. of copper recovered

Mining costs, taxes, office—overhead, etc., extra.
 Assay of product, pure electrolytic copper 99.76% cu.
 Mining costs \$0.030 per lb. copper recovered.
 Above etc. 0.006 per lb. copper recovered.

N.B.—All above figures based on war-time costs GHD

Record of Ore-Treatment by the Lockwood Copper Recovery Process at Vancouver, B. C.

Mine—Texada Island, B. C. Mining Co.—N. Explor. Co.

Date	Kind of Ore:	Percentage of Commercial Minerals:		
May 17 1919	Sulphide, Chalcopyrite, Pyrite in Gangue of Calcium Iron Garnet.	Copper: 2.88%	Gold: oz.	Silver: oz.
		Lead: %	Zinc: %	

Analysis:	Insoluble	58.51%	Iron	14.04%	Magnesia	0.00%
	Alumina	0.31%	Lime	10.02%	Oxygen, Loss and Undetermined	10.27%
	Copper	2.88%	Sulphur	3.97%		

Ore Roasted 9 Hours at 1200° Fahr.

Showing,—	Copper as Sulphide	0.11%
Showing,—	Copper as Oxide	2.60%

Remarks: Total copper present in assay after roast: 2.71%

Amount of charge	1,000 lbs. of ore.
Amount of solution	3,000 lbs.
Amount of acid	60 lbs.
Proportion of ore to solution, as	1 to 3
Percentage of acid, H ₂ SO ₄ , 66° Baume	2.0 % of solution.
Percentage of acid used	%
Proportion of acid regenerated	%
Duration of agitation before current on	4 hours.
Resulting solution	1.44 % H ₂ SO ₄ .
Duration of deposition	0.431 % cu.
Total duration of agitation, including the time of deposition	61 hours.
Direct current	65 hours.
Average amperage	amperes.
Direct current	2.1 volts.
Average voltage	
Direct current	Total amperes used
	5428.9 amperes.
Amount of copper deposited on cathodes	24.22 lbs.
Total amount of current used	11.617 K.W.H.
Amount current used per lb. copper recovered	0.479 K.W.H.
Amount of copper recovered per K.W.H. used	2.08 lbs.
Percentage of recovery from solution	96.77 %
Net recovery from ore	89.39 % of entire assay content.
Copper remaining in tails, unextracted	0.097018 %
66° B. acid used per lb. copper recovered	1.56 lbs.

Costs of treatment, based on treating 100 tons of copper ore per day of 24 hours:

Crushing, 20 mesh	\$0.00700	per lb. of copper recovered
Roasting	\$0.00700	" " " " "
Leaching, acid 66 deg. H ₂ SO ₄ , @ \$30 ton	\$0.02340	" " " " "
Recovery, current @ \$0.01 per KWH used	\$0.00479	" " " " "
Power	\$0.00700	" " " " "
Labor, 5 men at \$6.00 per day	\$0.00625	" " " " "
Total cost of treatment	\$0.05544	per lb. of copper recovered

Mining costs, taxes, office—overhead, etc., extra.
 Assay of product, pure electrolytic copper 99.76 % PWT

Record of Ore-Treatment by the Lockwood Copper Recovery Process at Vancouver, B. C.

Mine—Vancouver Island. Mining Co.—L. A. S. Co., Victoria, B. C.

Date	Kind of Ore:	Percentage of Commercial Minerals:		
Sept. 13	Sulphide	Copper 1.12%	Gold: oz.	Silver: oz.
1919		Lead: %	Zinc: %	

Analysis:	Insoluble	49.15%	Iron (FeO)	21.20%	Magnesia	Trace
	Alumina	4.08%	Lime (CaO)	14.55%	Oxygen, Loss and	
	Copper	1.12%	Sulphur	2.05%	Undetermined	7.85%

Ore Roasted 8 Hours at 1200° Fahr.		
Showing,—	Copper as Sulphide	0.10%
Showing,—	Copper as Oxide	1.02%
Showing,—	Copper in Tails	0.02%

Remarks:

Amount of charge	50 lbs. of ore.
Amount of solution	300 lbs.
Amount of acid	0.75 lbs.
Proportion of ore to solution, as	1 to 6
Percentage of acid, H ₂ SO ₄ , 66° Baume	0.25 % of solution.
Percentage of acid used	64.8 %
Proportion of acid regenerated	35.2 %
Duration of agitation before current on	2 hours.
Resulting solution	% cu.
Duration of deposition	26 hours.
Total duration of agitation, including the time of deposition	28 hours.
Direct current..... Average amperage	6 amperes.
Direct current..... Average voltage	2.1 volts.
Direct current..... Total amperes used	amperes.
Amount of copper deposited on cathodes	0.56 lbs.
Total amount of current used	0.327 K.W.H.
Amount current used per lb. copper recovered	0.654 K.W.H.
Amount of copper recovered per K.W.H. used	1.52 lbs.
Percentage of recovery from solution	100. %
Net recovery from ore	89.28 % of entire assay content.
Copper remaining in tails, unextracted	0.02 %
66° B. acid used per lb. copper recovered	1.5 lbs.

Costs of treatment, based on treating 100 tons of copper ore per day of 24 hours:

Crushing, 20 mesh	\$0.00705	per lb. of copper recovered
Roasting	\$0.01700	" " " " "
Leaching, acid 66 deg. H ₂ SO ₄ , @ \$30.00 ton	\$0.02250	" " " " "
Recovery, current @ \$0.01 per KWH used	\$0.00654	" " " " "
Power	\$0.00750	" " " " "
Labor, 5 men at \$6.00 per day	\$0.01500	" " " " "
Total cost of treatment	\$0.07559	per lb. of copper recovered

Mining costs, taxes, office—overhead, etc., extra.	
Assay of product,	pure electrolytic copper..... 99.76 % cu. GLC

Record of Ore-Treatment by the Lockwood Copper Recovery Process at Vancouver, B. C.

Mine—Contact, Nevada. Mining Co.—W. H. S. & Co., Seattle, Washington.

Date	Kind of Ore:	Percentage of Commercial Minerals:		
Sept. 27	Carbonate, Oxide and Sulphide.	Copper 6.43%	Gold: oz.	Silver: oz.
1919	Complex Ore.	Lead: %	Zinc: %	

Analysis:	Insoluble	79.10%	Iron	3.73%	Magnesia	Trace
	Alumina	0.56%	Lime	0.82%	Oxygen, Loss and	
	Copper	6.43%	Sulphur	0.31%	Undetermined	9.05%

Ore Roasted 2 Hours at 1400° Fahr.

Showing,—	Copper as Sulphide	0.15%
Showing,—	Copper as Oxide	6.28%

Remarks: N. B.—Trial run only, treatment formula not worked out for best results.

Amount of charge	50 lbs. of ore.
Amount of solution	300 lbs.
Amount of acid	5 lbs.
Proportion of ore to solution, as	1 to 6
Percentage of acid, H ₂ SO ₄ , 66° Baume	1.6 % of solution.
Percentage of acid used	0.77 % per 1% Cu.
Proportion of acid regenerated	48. %
Duration of agitation before current on	4 hours.
Resulting solution	% cu.
Duration of deposition	48 hours.
Total duration of agitation, including the time of deposition	52 hours.
Direct current—Average amperage	28 amperes.
Direct current—Average voltage	2.18 volts.
Direct current—Total amperes used	amperes.
Amount of copper deposited on cathodes	2.955 lbs.
Total amount of current used	2.929 K.W.H.
Amount current used per lb. copper recovered	0.99 K.W.H.
Amount of copper recovered per K.W.H. used	1.02 lbs.
Percentage of recovery from solution	100. %
Net recovery from ore	91.91 % of entire assay content.
Copper remaining in tails, unextracted	0.52 %
66° B. acid used per lb. copper recovered	1.69 lbs.

Costs of treatment, based on treating 100 tons of copper ore per day of 24 hours:

Crushing, 20 mesh	\$0.00700	per lb. of copper recovered
Roasting	\$0.00560	" " " " "
Leaching, acid 66 deg. H ₂ SO ₄ , @ \$30 ton	\$0.02535	" " " " "
Recovery, current @ \$0.01 per KWH used	\$0.00991	" " " " "
Power	\$0.00750	" " " " "
Labor, 5 men at \$6.00 per day	\$0.00394	" " " " "

Total cost of treatment \$0.05930 per lb. of copper recovered

Mining costs, taxes, office—overhead, etc., extra.

Assay of product, pure electrolytic copper 99.76 % cu. GLC

Record of Ore-Treatment by the Lockwood Copper Recovery Process at Vancouver, B. C.

Mine—Regal, Princeton, B. C.

Mining Co.—W. C. M. & Co.

Date	Kind of Ore:	Percentage of Commercial Minerals:		
Sept. 12 1919	Sulphide	Copper 1.92%	Gold: Tr.	Silver: 0.31oz.
		Lead: "	Zinc: "	

Analysis: Insoluble	77.72%	Iron	6.30%	Magnesia	3.71%
Alumina	2.10%	Lime	2.65%	Oxygen, Loss and	
Copper	1.92%	Sulphur	1.44%	Undetermined	4.16%

Ore Roasted 8 Hours at 1250 Fahr.

Showing,— Copper as Sulphide	0.09%
Showing,— Copper as Oxide	1.83%

Remarks:

Amount of charge	1,000 lbs. of ore.
Amount of solution	3,000 lbs.
Amount of acid	30 lbs.
Proportion of ore to solution, as	1 to 3
Percentage of acid, H ₂ SO ₄ , 66 Baume	1.0 % of solution.
Percentage of acid used	65.0 %
Proportion of acid regenerated	35.0 %
Duration of agitation before current on	3 hours.
Stock	1.005 % cu.
Resulting solution	1.588 % cu.
Duration of deposition	26 hours.
Total duration of agitation, including the time of deposition	29 hours.
Direct current Average amperage	242.0 amperes.
Direct current Average voltage	2.07 volts.
Direct current Total amperes used	amperes.
Amount of copper deposited on cathodes	18.3 lbs.
Total amount of current used	13.04 K.W.H.
Amount current used per lb. copper recovered	0.712 K.W.H.
Amount of copper recovered per K.W.H. used	1.40 lbs.
Percentage of recovery from solution	99.9 %
Net recovery from ore	94.26 % of entire assay content.
Copper remaining in tails, unextracted	0.11 %
66° B. acid used per lb. copper recovered	1.63 lbs.

Costs of treatment, based on treating 100 tons of copper ore per day of 24 hours:

Crushing, 20 mesh	\$0.00700	per lb. of copper recovered
Roasting	\$0.00750	" " " " "
Leaching, acid 66 deg. H ₂ SO ₄ , @ \$30.00 ton	\$0.02245	" " " " "
Recovery, current @ \$0.01 per KWH used	\$0.00712	" " " " "
Power	\$0.00750	" " " " "
Labor, 5 men at \$6.00 per day	\$0.00819	" " " " "
Total cost of treatment	\$0.05976	per lb. of copper recovered

Mining costs, taxes, office—overhead, etc., extra.

Assay of product, pure electrolytic copper 99.76 % cu. PWT

Record of Ore-Treatment by the Lockwood Copper Recovery Process at Vancouver, B. C.
 Mine—Regal, Princeton, B. C. Mining Co.—W. C. M. & Co.

Date Kind of Ore: Percentage of Commercial Minerals:
 Sept. Sulphide Copper 1.92% Gold: oz. Silver: oz.
 1 Lead: % Zinc: %
 1919

Analysis:	Insoluble	77.72%	Iron	6.30%	Magnesia	3.71%
	Alumina	2.10%	Lin	2.65%	Oxygen, Loss and	
	Copper	1.92%	Sulphur	1.44%	Undetermined	4.16%

Ore Roasted 8 Hours at 1200° Fahr.
 Showing,— Copper as Sulphide 0.15%
 Showing,— Copper as Oxide 1.77%

Remarks:

Amount of charge	1,000 lbs. of ore.
Amount of solution	3,000 lbs.
Amount of acid	35 lbs.
Proportion of ore to solution, as	1 to 3
Percentage of acid, H ₂ SO ₄ , 66° Baume	1.16 % of solution.
Percentage of acid used	65.0 %
Proportion of acid regenerated	35.0 %
Duration of agitation before current on	2 hours.
Stock	1.056 % cu.
Resulting solution	1.632 % cu.
Duration of deposition	24 hours.
Total duration of agitation, including the time of deposition	26 hours.
Direct current Average amperage	225.4 amperes.
Direct current Average voltage	2.08 volts.
Direct current Total amperes used	5409.6 amperes.
Amount of copper deposited on cathodes	17.2 lbs.
Total amount of current used	11.25 K.W.H.
Amount current used per lb. copper recovered	0.654 K.W.H.
Amount of copper recovered per K.W.H. used	1.53 lbs.
Percentage of recovery from solution	98.24 %
Net recovery from ore	89.58 % of entire assay content.
Copper remaining in tails, unextracted	0.20 %
66° B. acid used per lb. copper recovered	2.3 lbs.

Costs of treatment, based on treating 100 tons of copper ore per day of 24 hours:

Crushing, 20 mesh	\$0.00750	per lb. of copper recovered
Roasting	\$0.00750	" " " " "
Leaching, acid 66 deg. H ₂ SO ₄ @ \$30 ton	\$0.03450	" " " " "
Recovery, current @ \$0.01 per KWH used	\$0.00654	" " " " "
Power	\$0.00700	" " " " "
Labor, 5 men at \$6.00 per day	\$0.00630	" " " " "

Total cost of treatment \$0.06934 per lb. of copper recovered

Mining costs, taxes, office—overhead, etc., extra.
 Assay of product, pure electrolytic copper 99.76 % cu. PWT

Record of Ore-Treatment by the Lockwood Copper Recovery Process at Vancouver, B. C.

Mine—Regal, Princeton, B. C.

Mining Co.—W. C. M. & Co.

Date	Kind of Ore:	Percentage of Commercial Minerals:			
Sept. 23 1919	Sulphide	Copper 1.9%	Gold: oz.	Silver: oz.	
		Lead: %	Zinc: %		

Analysis: Insoluble	77.72%	Iron	6.30%	Magnesia	3.71%
Alumina	2.10%	Lime	2.65%	Oxygen, Loss and Undetermined	4.16%
Copper	1.92%	Sulphur	1.44%		

Ore Roasted 8 Hours at 1200° Fahr.

Showing,— Copper as Sulphide	0.09%
Showing,— Copper as Oxide	1.83%

Remarks:

Amount of charge	1,000 lbs of ore.
Amount of solution	3,000 lbs.
Amount of acid	30 lbs.
Proportion of ore to solution, as	1 to 3
Percentage of acid, H ₂ SO ₄ , 66° Baume	1.0 % of solution.
Percentage of acid used	70.0 %
Proportion of acid regenerated	30.0 %
Duration of agitation before current on	2 hours.
Resulting solution	1.92 % cu.
Duration of deposition	24 hours.
Total duration of agitation, including the time of deposition	26 hours.
Direct current. Average amperage	242 amperes.
Direct current. Average voltage	2.08 volts.
Direct current. Total amperes used	5808 amperes.
Amount of copper deposited on cathodes	18.3 lbs.
Total amount of current used	13.04 K.W.H.
Amount current used per lb. copper recovered	0.712 K.W.H.
Amount of copper recovered per K.W.H. used	1.40 lbs.
Percentage of recovery from solution	100. %
Net recovery from ore	94.26 % of entire assay content.
Copper remaining in tails, unextracted	0.11 %
66° B. acid used per lb. copper recovered	1.63 lbs.

Costs of treatment, based on treating 100 tons of copper ore per day of 24 hours:

Crushing, 20 mesh	\$0.00700	per lb. of copper recovered
Roasting	\$0.00750	" " " " "
Leaching, acid 66 deg. H ₂ SO ₄ @ \$30 ton	\$0.02245	" " " " "
Recovery, current @ \$0.01 per KWH used	\$0.00712	" " " " "
Power	\$0.00750	" " " " "
Labor, 5 men at \$6.00 per day	\$0.00819	" " " " "

Total cost of treatment.....\$0.05976 per lb. of copper recovered

Mining costs, taxes, office—overhead, etc., extra.

Assay of product, pure electrolytic copper..... 99.76 % cu. GLC

Record of Ore-Treatment by the Lockwood Copper Recovery Process at Vancouver, B. C.

Mine—Regal, Princeton, B. C. Mining Co.—W. C. M. & Co.

Date	Kind of Ore:	Percentage of Commercial Minerals:		
Sept.	Sulphide	Copper 2.39%	Gold: Tr.	Silver: 0.31oz.
		Lead: %	Zinc: %	

1919

Analysis: Insoluble	77.72%	Iron	6.30%	Magnesia	3.71%
Alumina	2.10%	Lime	2.65%	Oxygen, Loss and	
Copper	2.39%	Sulphur	1.44%	Undetermined	3.69%

Ore Roasted 8 Hours at 1200° Fahr.

Showing,— Copper as Sulphide	0.21%
Showing,— Copper as Oxide	2.18%

(or Sulphate)

Remarks:

Amount of charge	1,000 lbs. of ore.
Amount of solution	3,000 lbs.
Amount of acid	40 lbs.
Proportion of ore to solution, as	1 to 3
Percentage of acid, H ₂ SO ₄ , 66° Baume	1.3 % of solution.
Percentage of acid used	70.0 %
Proportion of acid regenerated	30.0 %
Duration of agitation before current on	1½ hours.
Resulting solution	1.44 % cu.
Duration of deposition	25 hours.
Total duration of agitation, including the time of deposition	26½ hours.
Direct current.....Average amperage	284 amperes.
Direct current.....Average voltage	2.1 volts.
Direct current.....Total amperes used	7100 amperes.
Amount of copper deposited on cathodes	21.8 lbs.
Total amount of current used	15.1 K.W.H.
Amount current used per lb. copper recovered	0.675 K.W.H.
Amount of copper recovered per K.W.H. used	1.54 lbs.
Percentage of recovery from solution	100. %
Net recovery from ore	95.05 % of entire assay content.
Copper remaining in tails, unextracted	0.1183 %
66° B. acid used per lb. copper recovered	1.8 lbs.

Costs of treatment, based on treating 100 tons of copper ore per day of 24 hours:

Crushing, 20 mesh	\$0.00750	per lb. of copper recovered
Roasting	\$0.00750	" " " "
Leaching, acid 66 deg. H ₂ SO ₄ , @ \$30 ton	\$0.02700	" " " "
Recovery, current @ \$0.01 per KWH used	\$0.00675	" " " "
Power	\$0.00700	" " " "
Labor, 5 men at \$6.00 per day	\$0.00627	" " " "

Total cost of treatment.....\$0.06202 per lb. of copper recovered

Mining costs, taxes, office—overhead, etc., extra.
 Assay of product, pure electrolytic copper..... 99.76 % cu. GLC

Record of Ore-Treatment by the Lockwood Copper Recovery Process at Vancouver, B. C.
 Mine—Parsons Mine. Mining Co.—P. M. Co., near Capitan, New Mexico, U. S. A.

Date	Kind of Ore:	Percentage of Commercial Minerals:		
March 1920	Quartzite, Heavily Stained by Ferric Oxide, and Showing Azurite, Malachite, Tenorite and Some Sulphides.	Copper: 10.75%	Gold: oz.	Silver: oz.
		Lead: "	Zinc: %	

Analysis:	Insoluble	46.55'	Iron	13.05'	Magnesium Carbonate	5.01'
	Alumina	0.35'	Lime—		Calcium Carbonate	6.79'
	Copper	10.75'	Sulphur	4.14'	Oxygen, Loss and Undetermined	13.36'

Ore Roasted 4 Hours at 1200 Fahr.

Showing,— Copper as Sulphide 0.00%

Showing,— Copper as Oxide 10.75%

(or Sulphate)

Remarks:

Amount of charge	50 lbs. of ore.
Amount of solution	200 lbs.
Amount of acid	6.25 lbs.
Proportion of ore to solution, as	1 to 4
Percentage of acid, H ₂ SO ₄ , 66° Baume	3.125 % of solution.
Percentage of acid used	65.0 %
Proportion of acid regenerated	35.0 %
Duration of agitation before current on	3 hours.
Resulting solution	5.5 % cu.
Duration of deposition	99 hours.
Total duration of agitation, including the time of deposition	102 hours.
Direct current..... Average amperage	18 amperes.
Direct current..... Average voltage	2.2 volts.
Direct current..... Total amperes used	1782.0 amperes.
Amount of copper deposited on cathodes	5.25 lbs.
Total amount of current used	3.92 K.W.H.
Amount current used per lb. copper recovered	0.746 K.W.H.
Amount of copper recovered per K.W.H. used	1.34 lbs.
Percentage of recovery from solution	100.0 %
Net recovery from ore	97.66 % of entire assay content.
Copper remaining in tails, unextracted	0.25 %
66° B. acid used per lb. copper recovered	1.19 %

Costs of treatment, based on treating 100 tons of copper ore per day of 24 hours:

Crushing, 20 mesh	\$0.00650	per lb. of copper recovered
Roasting	\$0.00650	" " " " "
Leaching, acid 66 deg. H ₂ SO ₄ @ \$30 ton	\$0.01785	" " " " "
Recovery, current @ \$0.01 per KWH used	\$0.00746	" " " " "
Power	\$0.00750	" " " " "
Labor, 5 men at \$6.00 per day	\$0.00142	" " " " "
Total cost of treatment	\$0.04723	per lb. of copper recovered

Mining costs, taxes, office—overhead, etc., extra.

Assay of product, pure electrolytic copper 99.76 % cu. GLC

Record of Ore-Treatment by the Lockwood Copper Recovery Process at Vancouver, B. C.
 Mine—Anaconda. Mining Co.—A. M. Co., Whitehorse, Yukon T.

Date	Kind of Ore:	Percentage of Commercial Minerals:		
July 26 1919	Sulphide	Copper: 8.92%	Gold: oz.	Silver: oz.
		Lead: %	Zinc: %	

Analysis:	Insoluble	63.22%	Iron	9.14%	Magnesia	Trace
	Alumina	0.71%	Lime	12.03%	Oxygen, Loss and	
	Copper	8.92%	Sulphur	2.71%	Undetermined	3.27%

Ore Roasted 8 Hours at 1100 Fahr.

Showing,—	Copper as Sulphide	0.12%
Showing,—	Copper as Oxide	8.41%
Showing,—	Copper in Tails	0.51%

Remarks:

Amount of charge	2,000 lbs. of ore.
Amount of solution	3,000 lbs.
Amount of acid	180 lbs.
Proportion of ore to solution, as	2 to 3
Percentage of acid, H ₂ SO ₄ , 66° Baume	6 % of solution.
Percentage of acid used	1 % per 1% cu.
Proportion of acid regenerated	40 %
Duration of agitation before current on	3 hours.
Resulting solution	% cu.
Duration of deposition	94 hours.
Total duration of agitation, including the time of deposition	97 hours.
Direct current Average amperage	560 amperes.
Direct current Average voltage	2.2 volts.
Direct current Total amperes used	amperes.
Amount of copper deposited on cathodes	167.91 lbs.
Total amount of current used	115.8 K.W.H.
Amount current used per lb. copper recovered	0.689 K.W.H.
Amount of copper recovered per K.W.H. used	1.45 lbs.
Percentage of recovery from solution	%
Net recovery from ore	94.28 % of entire as-say content.
Copper remaining in tails, unextracted	0.51 %
66° B. acid used per lb. copper recovered	1.06 lbs.

Costs of treatment, based on treating 100 tons of copper ore per day of 24 hours:

Crushing, 20 mesh	\$0.00700	per lb. of copper recovered
Roasting	\$0.00750	" " " "
Leaching, acid 66 deg. H ₂ SO ₄ , @ \$30 ton	\$0.01590	" " " "
Recovery, current @ \$0.01 per KWH used	\$0.00689	" " " "
Power	\$0.00750	" " " "
Labor, 5 men at \$6.00 per day	\$0.00178	" " " "

Total cost of treatment \$0.04657 per lb. of copper recovered

Mining costs, taxes, office—overhead, etc., extra.
 Assay of product, pure electrolytic copper 99.76 % cu. GLC

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