

THE CLEVELAND - CLIFFS IRON COMPANY  
MINING DEPARTMENT  
ANNUAL REPORT OF GENERAL MANAGER  
FOR YEAR ENDING DECEMBER 31st. 1932

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THE CLEVELAND-CLIFFS IRON COMPANY  
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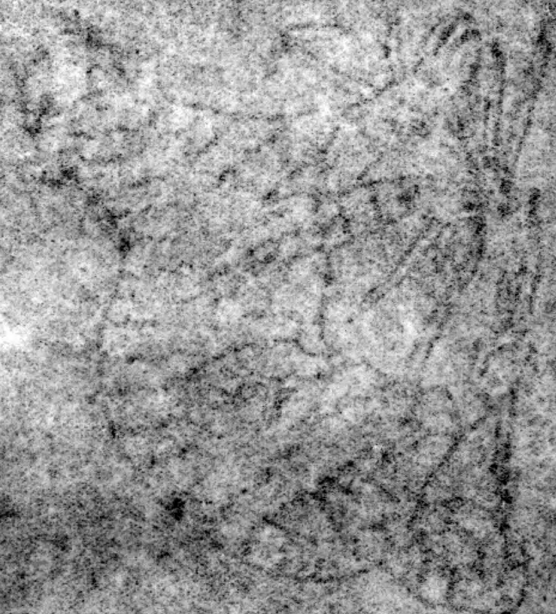
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MINN

MINN

Ishpeming, Michigan  
March 9, 1933

Mr. Wm. G. Mather, President  
1460 Union Trust Bld.  
Cleveland, Ohio

Dear Sir:-

I beg to submit the report of the operations of the Mining Department for the year 1932.

The inventories, maps, statements relative to the 1932 report have gone forward to you under separate cover.

The colored portions of the maps show the work for the year. The reports of the different mines of the Company were made by the Superintendents in charge and the Reports of the Engineering, Mechanical, Electrical, Geological, Safety and Welfare Departments by the heads of these Departments.

During the year, the depression has still been upon us and work has been *continued on a greatly reduced basis*. All of our mines on the Old Range operated on a two days basis from January 1st to June 1st when they were shut down. The Negaunee Mine, however, was closed on May 1st and the Spies on March 1st. No mining was done on the Mesaba but in order to help out in the bad unemployment situation, stripping was carried on at the Canisteo. During the idle period, the necessary timbering was done in the soft ore mines to keep the main drifts and raises from closing. On November 1st, all of the underground mines were reopened on a two day basis. This was solely for the purpose of trying to do our part to help out in the very bad unemployment situation.

On May 16th, a reduction in all salaries and wages of 15% was put into effect. In addition to this and all other reductions in salaries which have been made, in a great many cases the working time was arbitrarily limited to a reduced number of days. The earning power of everyone, therefore, has been greatly reduced.

Early in the spring, when it was realized not only on account of the general conditions in the country but also due to the fact that we had in stock at each mine a very large tonnage of ore, it was a foregone conclusion that the mines would be forced to close. Previous to their closing, we tried to do everything in our power to help out in the general situation. With your approval, the planning of community gardens was strongly advocated not only in the press but before all organized bodies in Marquette County. Public opinion was thus built up and the project was enthusiastically received. In Ishpeming, Negaunee, Gwinn, North Lake and also in Marquette, the Company plowed up large areas; fenced, fertilized and divided into lots a very large number of gardens. Applicants were all registered and in cases where they could not purchase their own seed, the Company provided it for them. After the gardens were planted, a severe drought existed and in order to save practically a total loss, it was necessary to run water lines to these areas. Water was allowed to flow into barrels in the center of each area and men, women and children carried it to their gardens in pails and saved their crops.



This County was also visited by a very severe blight of grasshoppers. It was necessary to purchase poison and under the expert supervision of the County Agricultural Agent, this pest was successfully combatted.

After the gardens were well under way, we realized that something else must be done in order to keep the men occupied for the entire summer. With your approval, we laid out into lots, large areas of second growth timber in the vicinity of all of these towns. We tried, as far as possible to lay out these lots to contain about ten cords or about the average requirement for two families. It was realized that the cutting of this timber by men inexperienced in this class of work had to be closely supervised, otherwise serious accidents would occur. This supervisory work was carried on by our engineers, they being paid \$50.00 per month. All applicants were required to register, giving all necessary information relative to the size of their house, number of rooms, financial standing, etc. The allotment of this wood was not limited to Company men. This operation developed into an exceedingly large project. After the timber was cut, the men had no means of getting it to their homes and we had to appeal to all of the cities and also to the County to help in this operation. The entire project was carried through to a most successful conclusion. This wood chopping and planting of the gardens was deeply appreciated by a very large number of people in Marquette County who participated and nothing the Company has ever done has furthered its good name more than these activities. Although the cost was considerable, it was money well expended and by the co-operation of the people in the reduction of budgets, this has been returned to the Company many fold. I am firmly convinced we would not have had this splendid co-operation if it had not been for our broadminded action. It is needless for me to tell you the great value to this community in getting the men off the streets and keeping their hands busy. From what I know of the conditions in other counties in Northern Michigan, I will say without the slightest hesitation that we have been better off in Marquette County during 1932 than any other County in the Peninsula. Following is a statement of the garden and woods operations:

	<u>Number of Gardens</u>	<u>Number Wood Permits</u>	<u>Cords of Wood Cut</u>
Ishpeming	598	1,373	8,567
Negaunee	591	1,114	6,468
Gwinn	84	136	841
Marquette	400	420	2,297
TOTAL	1,673	3,043	18,173
Cords per person			5.97

During the year, I and my lieutenants have devoted much time towards the reduction of budgets. Mr. Stakel, a member of the Board of Supervisors from Ishpeming Township, has been particularly active. He has made himself familiar with County accounting and has gathered a large amount of information relative to other counties and has been chairman of the Marquette County Budget Committee. In order to accomplish reduction in budgets, it was not only necessary to appear before School Boards in all of the towns but to gather together the Secretaries of all of the Township School Boards. The necessity for drastic reduction was presented to them and

the Company received the most splendid co-operation. In the Cities we had to appear before Budget Committees and make the same plea. We had the co-operation and backing of the great mass of the population and drastic reductions were put into effect, saving the company a very large sum of money. In the Mining Department and the Cliffs Power & Light Company, the saving due to reduction of budgets was \$245,596.31. As we had done all of the work in Marquette County along these lines, we should also be credited with the saving made by the Land Department in Marquette County of \$77,577.31. This total, \$323,173.62, is a substantial sum of money.

Although the number of days worked have been greatly reduced, the number of men working on the stagger system has been practically the same as in former years. Safety authorities, from their statistics, tell you that there is a greater hazard in working on the stagger system than comes naturally to men who work steadily and are constantly being warned of hazards. We realized that this was true and have put forth special efforts to improve our former safety records. The following statement will show plainly what has been accomplished. It is needless for me to tell you that our success along these lines has been a matter of the deepest satisfaction to me.

	<u>Days Worked</u>	<u>Lost Time Accidents</u>	<u>Frequency per 1000 days</u>	<u>Severity per 1000 days</u>	<u>Fatalities</u>
1928	584,417	123	.228	16,387	4
1929	647,374	85	.142	16,274	4
1930	767,945	83	.108	17,300	5
1931	495,414	27	.054	15,553	3
1932	189,101	9	.048	7,678	0

The Cleveland-Cliffs Iron Company as an organization, received the very marked distinction of being awarded a certificate of honor by the Joseph A Holmes Safety Association. The following is the citation:

"For having operated three underground and three open pit mines more than a year without a lost time accident, with a production of more than 2,600,000 tons of ore and rock. The underground mines were the Morris Lloyd, Cliffs Sjaft and Gardner Mackinaw, in Michigan; the open pits were the Tilden in Michigan and the Holman Cliffs and Hill Trumbull in Minnesota."

I quote from an article on safety written by Mr. Daniel Harrington of the Bureau of Mines, also Secretary of the Jos. A. Holmes Safety Association:

"As a result of its numerous safety activities, of which the bonus is an important part, The Cleveland Cliffs Iron Company has achieved a standing in safety in mining second to no mining organization in the United States."

On September 1, 1932, the Company's lease on the Wade Mine was cancelled and on December 5th, 1932, notice of cancellation was given on the Dean Mine. Due to the non-payment of taxes, the lease on the Empire Mine was cancelled. Negotiations have been carried on with the M. A. Hanna Company for the exchange of the Erickson with the Ravenna-Prickett. These negotiations were successfully completed in the early part of 1933. Extended negotiations were



carried on with the Inland Steel Company for the lease of the Morris Mine. This was brought to a very successful conclusion, almost entirely through the efforts of Mr. S. L. Mather, and the deal went through on December 7, 1932, although they did not actually assume the management of the property until January 1, 1933.

Respectfully submitted

A handwritten signature in dark ink, appearing to be 'S. L. Mather', written in a cursive style.

Manager

SRE:DP

COMPARISON OF TOTAL DAYS WORKED AND TONS  
OF ORE MINED FOR YEARS 1932 and 1931

	1932 DAYS	1931 DAYS	1932 DAYS	1931 DAYS
Stephenson	224 $\frac{3}{4}$	442 $\frac{1}{2}$		
Princeton	227	367		
Miscellaneous Payroll	2,328 $\frac{1}{2}$	3,938 $\frac{3}{4}$		
Shops and Storehouse	3,164 $\frac{3}{4}$	7,660 $\frac{3}{4}$		
Sherwood	287 $\frac{1}{4}$	984		
C.C.I.Co. - Miscellaneous & Gen.	13,068	27,885 $\frac{1}{4}$		
Negaunee Mine " "	1,258 $\frac{3}{4}$	3,448 $\frac{3}{4}$		
Athens " "	360	846 $\frac{1}{2}$		
Cliffs Power & Light Company	9,580 $\frac{3}{4}$	12,970		
Mesaba Range Properties	23,739 $\frac{3}{4}$	42,625		
General Roll Undistributed	19,560	31,483		
Francis		12 $\frac{1}{4}$		
Republic		26		
<b>TOTAL</b>	<b>73,799<math>\frac{1}{2}</math></b>	<b>132,689<math>\frac{3}{4}</math></b>		
<b>Grand Total - All Operations</b>	<b>188,786<math>\frac{3}{4}</math></b>	<b>495,434</b>		
<b>Net for Operating Mines</b>	<b>114,987<math>\frac{1}{4}</math></b>	<b>362,744<math>\frac{1}{4}</math></b>	<b>114,987<math>\frac{1}{4}</math></b>	<b>362,744<math>\frac{1}{4}</math></b>
Total Tons	474,424	2,537,021		
% Decrease	81.3			
Tons Per Man per Day	4.125	6.99		
<u>OPEN PIT PRODUCTION - TONS</u>				
Tilden	19,957	137,010	968 $\frac{1}{2}$	4,488 $\frac{1}{4}$
Hill Trumbull	-	202,479	-	17,994 $\frac{3}{4}$
Bingham North Star	-	56,416	-	4,044
Holman Brown	-	239,998	-	16,530
<b>TOTAL</b>	<b>19,957</b>	<b>635,903</b>	<b>968<math>\frac{1}{2}</math></b>	<b>43,057</b>
Open Pit Tons per Man per Day	20.61	14.77		
Net U.G.Days			114,018 $\frac{3}{4}$	319,687 $\frac{1}{4}$
Net U.G.Production	454,467	1,901,118		
U.G.Tons per Man per Day	3.99	5.95		

Note: - No ore was mined from Minnesota properties in 1932.  
 Negaunee Mine idle May 1st to Nov. 1st, 1932.  
 Spies Virgil idle March 1st to Nov. 1st, 1932.  
 All other Michigan Mines idle June 1st to Nov. 1st, 1932.



STATEMENT SHOWING COMPARATIVE COST FOR ALL EXPLOSIVES USED AT HARD ORE MINES

	1929	1930	1931	1932
PRODUCT.....	421,314	407,925	291,057	82,119
<u>Powder</u>				
Pounds - Gelamite "A" .....			19,150	29,500
Gelamite 2X.....			19,250	32,000
50% L.F. ....	262,100	231,600	130,646	8,350
60% L.F. ....	140,900	228,350	129,150	3,800
60% Gelatine.....			12,700	6,500
#2-3-4- Special.....	14,700			
E.P. 23 .....	4,250			
<u>Total Pounds.....</u>	<u>421,950</u>	<u>459,950</u>	<u>310,896</u>	<u>80,150</u>
<u>Total Cost .....</u>	<u>\$ 55,207.66</u>	<u>\$59,952.66</u>	<u>\$39,783.27</u>	<u>\$10,047.13</u>
Fuse - Feet .....	593,500	645,990	432,368	128,157
Caps - Number.....	125,900	130,000	79,470	24,488
Cap Crimpers .....	10	1	6	
Connecting Wire .....			9	11
Delay Fuses .....			225	275
Fuse Lighters.....			4,450	2,500
Fuse Containers.....	100		2	
Tamping Bags.....			29,900	
Blasting Machine.....			1	
<u>Total Cost-Fuse,Caps,etc.....</u>	<u>\$5,043.55</u>	<u>\$5,181.52</u>	<u>\$3,563.05</u>	<u>\$1,031.02</u>
<u>Total Cost All Explosives....</u>	<u>\$60,251.21</u>	<u>\$65,134.18</u>	<u>\$43,346.32</u>	<u>\$11,078.15</u>
Average Price per Lb.-Powder..	.1308	.1303	.1279	.125
Cost per Ton - Powder.....	.1310	.1469	.1367	.1223
Cost per Ton - Fuse, etc.....	.0120	.0128	.0122	.0126
<u>Cost per Ton all Explosives..</u>	<u>.1430</u>	<u>.1597</u>	<u>.1489</u>	<u>.1349</u>
Pounds Powder per Ton of Ore..	1.0015	1.1275	1.0681	.9760

Open Pit Mines not included.

Cost per ton all explosives decreased .014 or 9.4%.

The product in 1932 decreased 209,938 tons or 71.8% in comparison with 1931.

The total cost for all explosives decreased \$32,268.17 or 74.4%.

This due to curtailment of working schedule at the hard ore mines.

JSM:DP

STATEMENT SHOWING COMPARATIVE COST OF ALL EXPLOSIVES USED AT SOFT ORE MINES

	1929	1930	1931	1932
PRODUCT.....	2,149,826	2,797,426	1,609,267	372,348
<u>Powder</u>				
Pounds - 35% .....		35,000		
40% .....	137,066	362,247	50,286	8,725
50% .....	449,850	329,060	301,840	87,400
55% .....	21,382	4,350	-	-
60% .....	469,981	462,083	247,870	3,690
1X and 2X Gelamite..		249,392	234,311	73,875
Gelamite A.....			8,900	25,240
<u>Total Pounds Powder.....</u>	<u>1,078,279</u>	<u>1,442,132</u>	<u>843,207</u>	<u>198,930</u>
<u>Total Cost Powder.....</u>	<u>\$144,456.48</u>	<u>\$185,009.94</u>	<u>\$106,464.82</u>	<u>\$24,696.02</u>
Fuse - Feet .....	3,086,716	4,386,169	2,475,567	616,363
Caps - Number.....	534,829	707,928	396,091	98,058
Fuse Cutter. ....	31	1	2	7,450
Connecting Wire - Pounds.....	18	62		
Tamping Bags.....	93,400	58,300	141,800	27,400
Sealing Compound - Pints.....	9	21,	10	2
Powder Bags.....	93	121	61	7
Fuse and Cap containers.....	81	7	2	2
Fuse Lighters.....			19,000	
Delay Fuses.....			500	130
<u>Total Cost Fuse, etc.....</u>	<u>\$25,205.15</u>	<u>\$31,976.93</u>	<u>\$19,742.29</u>	<u>\$4,756.35</u>
<u>Total Cost - All Explosives..</u>	<u>\$169,661.63</u>	<u>\$216,986.87</u>	<u>\$126,207.11</u>	<u>\$29,452.37</u>
Average Price per Lb. Powder..	.1339	.1283	.1263	.1241
Cost per Ton - Powder.....	.0672	.0661	.0662	.0663
Cost per ton - Fuse, etc.....	.0117	.0114	.0122	.0128
<u>Cost per ton All Explosives.</u>	<u>.0789</u>	<u>.0775</u>	<u>.0784</u>	<u>.0791</u>
Pounds of Powder per Ton of Ore	.5015	.5155	.5240	.5343

The product in 1932 decreased 1,236,919 tons or 76.9% in comparison with 1931.

The total cost for all explosives decreased \$96,754.74 or 76.7%.

This due to curtailment of working schedules at all the soft ore mines.



STATEMENT SHOWING COMPARATIVE COST FOR ALL MINE TIMBER USED AT SOFT ORE MINES

	1929	1930	1931	1932
Product - Tons .....	2,149,826	2,797,426	1,609,267	347,579
<u>Timber</u>				
Feet - 6 to 8 .....	607,310	545,779	362,294	94,373
8 to 10 .....	448,870	535,590	210,599	62,778
10 to 12 .....	244,916	246,070	227,377	64,492
12 to 14 .....	97,467	93,586	110,468	50,821
14 to 16 .....	1,443	4,177	14,110	5,152
7 to 9 .....	-	437,735	138,996	-
9 to 12 .....	-	123,801	29,241	-
Treated Timber.....	-	7,892	1,760	711
Total Feet .....	1,400,006	1,994,630	1,094,845	278,327
Total Cost .....	\$ 93,115.35	\$142,297.16	\$83,193.29	\$21,585.99
<u>Lagging</u>				
Feet - 5' .....	1,388,900	1,405,900	340,638	27,625
6' .....	-	1,177,382	747,670	2,144
7' .....	3,969,698	4,193,004	2,870,862	969,062
8' .....	644,744	505,618	-	13,704
Total Feet .....	6,003,342	7,281,904	3,959,170	1,012,535
Total Cost .....	\$44,669.80	\$54,263.34	\$28,398.21	\$6,748.16
Covering Boards - Feet.....	105,247	993,129	354,187	-
Total Cost .....	\$1,998.12	\$12,437.37	\$4,451.44	-
Poles - Feet.....	2,734,607	4,219,572	2,581,462	665,435
Total Cost .....	\$41,178.44	\$58,843.98	\$35,612.05	\$9,135.63
Wire Fencing - Rods .....	-	6,875	5,716	370
Total Cost .....	-	\$5,179.00	\$4,567.06	\$315.49
<b>Total Cost for All Timber.....</b>	<b>\$181,001.71</b>	<b>\$273,020.85</b>	<b>\$156,222.05</b>	<b>\$37,785.27</b>
Average cost per foot - Timber	.0665	.0713	.0760	.0776
" " " 100 Ft.- Lagging	.744	.745	.717	.666
" " " " -Cover Bds.	1.898	1.252	1.256	-
" " " " -Poles	1.510	1.394	1.379	1.373
" " " rod - Wire Fenc.	-	.753	.799	.853
Feet of timber per ton of ore.....	.6512	.7130	.6803	.8007
Feet of Lagging per ton of ore.....	2.792	2.603	2.460	2.913
Feet of poles per ton of ore.....	1.272	1.508	1.604	1.914
Feet of covering Bds.per ton of ore	.0049	.355	.220	-
Feet of wire fencing per ton of ore	-	.121	.0586	.0176
Cost per ton for Timber.....	.0433	.0508	.0516	.0621
" " " for Lagging.....	.0208	.0194	.0176	.0194
" " " for Poles.....	.0192	.0210	.0221	.0263
" " " for Cover Bds.....	.0009	.0044	.0029	-
" " " for WireFencing.....&	-	.0058	.0029	.0009
<b>Cost per Ton for All.....</b>	<b>.0842</b>	<b>.0976</b>	<b>.0971</b>	<b>.1087</b>

Note: - The Gardner Mackinaw Mine not included in 1932 figures as their product was mostly from development work during the year.

The product in 1932 decreased 1,261,688 tons or 78.4%.

The total cost for all timber decreased \$118,436.78 or 75.8%.

This due to curtailment of working schedules during 1932.

## STATEMENT SHOWING TOTAL COST OF SUPPLIES CHARGED TO "COST OF ORE AT MINES"

## SOFT ORE MINES

YEAR	1929		1930		1931		1932	
PRODUCT	2,149,826		2,797,426		1,609,267		372,348	
CLASSIFICATION	Amount	Per Ton	Amount	Per Ton	Amount	Per Ton	Amount	Per Ton
General	107,893.25	.0502	131,887.31	.0471	81,863.81	.0509	19,482.83	.0523
Iron and Steel	38,877.35	.0181	50,884.74	.0182	25,795.75	.0160	4,691.68	.0128
Machinery	137,101.96	.0638	154,614.44	.0553	62,589.77	.0389	12,457.69	.0334
Explosives	177,543.73	.0826	216,842.35	.0775	126,553.63	.0786	27,100.07	.0727
Lumber and Timber	211,095.62	.0982	312,235.17	.1116	184,066.64	.1144	41,529.30	.1115
Fuel	30,389.23	.0141	32,702.59	.0117	20,568.90	.0128	13,376.96	.0359
Electric Power	434,631.89	.2021	483,576.60	.1729	336,176.50	.2089	123,365.53	.3313
Miscellaneous	33,943.70	.0158	39,195.76	.0140	64,271.17	.0399	4,117.33	.0111
TOTAL	1,171,476.73	.5449	1,421,938.96	.5083	901,886.17	.5604	246,121.44	.6610

## HARD ORE MINES

YEAR	1929		1930		1931		1932	
PRODUCT	421,314		407,925		291,057		82,119	
CLASSIFICATION	Amount	Per Ton	Amount	Per Ton	Amount	Per Ton	Amount	Per Ton
General	43,232.11	.103	38,098.52	.093	30,082.56	.103	4,581.34	.056
Iron and Steel	20,364.82	.048	18,242.35	.045	12,219.13	.042	1,960.90	.024
Machinery	55,344.08	.132	41,954.95	.103	23,715.20	.081	3,000.15	.036
Explosives	60,275.62	.143	65,134.18	.160	43,346.32	.149	11,078.15	.135
Lumber and Timber	7,052.74	.017	12,367.87	.030	7,803.59	.027	1,555.34	.019
Fuel	5,422.23	.013	4,320.58	.011	3,463.12	.012	3,532.52	.043
Electric Power	78,560.22	.186	77,919.19	.190	57,905.58	.199	23,259.17	.283
Miscellaneous	5,575.37	.013	5,186.43	.013	7,962.62	.027	1,044.71	.013
TOTAL	275,827.19	.655	263,224.57	.645	186,499.12	.640	50,012.38	.609

No ore mined from Minnesota properties in 1932.  
 Negaunee Mine idle May 1st to November 1st 1932.  
 Spies Virgil idle March 1st to November 1st, 1932.  
 All other Michigan mines idle June 1st to November 1st, 1932.

The product decreased 1,235,919 tons or 76.9% in comparison with 1931.

The total cost of supplies decreased \$655,764.73 or 72.7% in comparison with 1931.

This due to curtailment in working schedule.



LABOR SUMMARY - ALL COMPANIES

PRODUCT - TONS	1929		1930		1931		1932	
	DAYS	AMOUNT	DAYS	AMOUNT	DAYS	AMOUNT	DAYS	AMOUNT
Surface.....	236,998 $\frac{3}{4}$	1,084,390.09	282,969 $\frac{1}{4}$	1,330,588.07	184,235 $\frac{1}{4}$	861,633.10	65,217 $\frac{3}{4}$	250,112.23
Cost per Ton.....		.3067		.2912		.3396		.5272
Underground .....	365,484	1,856,635.99	430,126	2,256,081.04	260,729 $\frac{1}{4}$	1,329,358.41	94,885 $\frac{1}{4}$	401,467.75
Cost per Ton.....		.5254		.4939		.5240		.8462
Supts. and General Roll....	48,880	377,455.05	54,850	424,159.51	50,469 $\frac{1}{2}$	389,532.13	28,683 $\frac{3}{4}$	138,460.30
Cost per Ton.....		.1069		.0929		.1535		.2918
Grand Total.....	651,362 $\frac{3}{4}$	3,318,491.13	767,945 $\frac{1}{4}$	4,010,828.62	495,434.	2,580,523.64	188,786 $\frac{3}{4}$	790,040.28
Cost per Ton.....		.939		.978		1.0171		1.6652
Average Rate per Day.....		5.09		5.23		5.21		4.18
Tons per Man per Day.....		5.43		5.95		5.12		2.51

Note:- The above is the total of all wages and salaries for all employees of the Mining Department, including the Cliffs Power & Light Company.  
 10% decrease in wages effective October 1st, 1931  
 15% " " " " May 16th, 1932  
 Decrease in product compared with year 1931 - 2,062,597 tons or 81.3%.  
 Decrease in wages paid " " " " \$1,790,483.36 or 69.4%.

WORKING SCHEDULE, 1932

CLIFFS SHAFT, MAAS, ATHENS: Operated 1-8 hr. shift, 2 days per week from Jan. 1st to June 1st, and from Nov. 1st to Dec. 21st. From June 1st to Nov. 1st the mines were idle, pumping. During the course of the two days per week operations, the mines actually worked 4 days with one-half the crew working each day.

MORRIS LLOYD MINE: Operated 1-8 hr. shift, 2 days per week from Jan. 1st to June 1st when mine closed. Idle pumping from June 1st to Nov. 1st when development of 6th Level Lloyd Mine started. Morris taken over by Inland Steel Company Jan. 1st, 1933.

GARDNER MACKINAW MINE: Operated 1-8 hr. shift 2 days per week from Jan. 1st to June 1st and from Nov. 1st to December 31st. Idle pumping from June 1st to Nov. 1st. From Nov. 1st the mine actually operated 6 days per week with three crews working 2 days each week.

SPIES VIRGIL MINE: Operated 2 days per week from Jan 1st to March 1st and from Nov. 1st to Dec. 31st. Idle pumping from March 1st to Nov. 1st. During course of 2 days week operations the mine actually worked 4 days with one half crew working each day.

NEGAUNEE MINE: Operated 1-8 hr. shift 2 days per week from Jan. 1st to May 1st and from Nov. 1st to Dec. 31st. Idle pumping from May 1st to Nov. 1st. During course of 2 day week operation mine actually worked 4 days with one half crew working each day.

WADE? ALEXANDRIA MINE: Closed May 1st, 1931.  
 Closed August 17, 1931.

All other Mesaba properties remained idle in 1932 with exception of Canisteo Mine where stripping operations were conducted.

CLIFFS SHAFT MINEANNUAL REPORTYear 19321. GENERAL.

The Cliffs Shaft Mine only operated seven months in the year 1932, but very little ore was hoisted in November. A 2-day a week schedule was in effect for the first five months, January to June. The property was idle from June 1st to November 1st. Only a small pumping crew was employed during the idle months. The number of men employed during the working period was also reduced gradually during the year, as, for instance, 325 men were employed in January, which dropped to 321 in February, to 316 in March, and 313 in May. In December the figure was 285 men.

2. PRODUCTION,SHIPMENTS ANDSTOCKPILE BALANCES.a. Production by Grades:

<u>GRADE</u>	<u>TONS</u>
Cliffs Shaft Lump - - - - -	49,429
Cliffs Shaft Crushed- - - - -	21,160
Cliffs Shaft Run-of-Mine- - - - -	566
TOTAL CLIFFS SHAFT - - - - -	71,155
Bancroft Lump - - - - -	7,675
Bancroft Crushed- - - - -	3,289
TOTAL BANCROFT - - - - -	10,964
GRAND TOTAL ORE- - - - -	82,119
ROCK- - - - -	10,006
TOTAL ORE AND ROCK - - - - -	92,125

Production averaged 1,368 tons per day.

The production each year by grades, since 1927, is as follows:

<u>Year.</u>	<u>LUMP ORE</u> <u>TONS</u>	<u>FINE ORE</u> <u>TONS</u>	<u>RUN-OF-MINE ORE</u> <u>TONS</u>	<u>TOTAL</u> <u>TONS</u>
1927	288,804	113,726		402,532
1928	275,018	116,844		391,862
1929	295,600	125,714		421,314
1930	226,059	94,910	86,956	407,925
1931	153,717	65,113	72,227	291,057
1932	57,104	24,449	566	82,119

b. Shipments.

Shipments for 1932 from pocket and stockpile follow:

<u>Grade</u>	<u>Pocket.</u>	<u>Stockpile</u>	<u>TOTAL,</u>	<u>TOTAL LAST</u> <u>YEAR</u>
Cliffs Shaft Lump	164	25,341	25,505	17,999
Cliffs Shaft Crushed	0	3,727	3,727	12,099
Cliffs Shaft Run-Of-Mine	566	8	574	70,541
TOTAL CLIFFS SHAFT	730	29,076	29,806	100,639



CLIFFS SHAFT MINE.  
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2. PRODUCTION, SHIPMENTS, ETC.

b. Shipments. (Cont'd)

<u>GRADE.</u>	<u>POCKET</u>	<u>STOCKPILE</u>	<u>TOTAL</u>	<u>TOTAL LAST YEAR.</u>
TOTAL, Cl. Shaft For'd	730	29,076	29,806	100,639
Bancroft Lump Ore				10,210
Bancroft Crushed				285
Bancroft Run-Of-Mine				<u>1,686</u>
TOTAL BANCROFT,				<u>12,181</u>
GRAND TOTAL,	730	29,076	29,806	112,820
TOTAL LAST YEAR,	84,996	27,824	112,820	
DECREASE,	84,266	1,252	83,014	

Shipments for the years since 1927 as follows:

<u>YEAR</u>	<u>CLIFFS SHAFT</u>		<u>RUN OF MINE</u>	<u>BANCROFT</u>		<u>RUN OF MINE</u>	<u>TOTAL TONS.</u>
	<u>LUMP</u>	<u>CRUSHED</u>		<u>LUMP</u>	<u>CRUSHED</u>		
	<u>TONS</u>	<u>TONS</u>	<u>TONS</u>	<u>TONS</u>	<u>TONS</u>	<u>TONS</u>	
1927	240,781	98,848		22,051	4,639		366,319
1928	267,291	93,078		20,049	8,315		388,733
1929	305,278	133,433		43,472	28,747		510,930
1930	126,231	30,460	73,881	27,178	4,436	13,075	275,261
1931	17,999	12,099	70,541	10,210	285	1,686	112,820
1932	25,505	3,727	574	0	0	0	29,806

c. Stockpile Balances:

The balance on hand on December 31st, 1932 is a little larger than last year.

	<u>GRADE</u>	<u>TONS</u>
Cliffs Shaft Lump Ore	- - - - -	215,804
Cliffs Shaft Crushed Ore	- - - - -	<u>115,844</u>
	TOTAL CLIFFS SHAFT	331,648
Bancroft Lump Ore	- - - - -	35,474
Bancroft Crushed Ore	- - - - -	<u>28,051</u>
	TOTAL BANCROFT ORE	63,525
	GRAND TOTAL ORE	395,173

The amount of ore in stock since 1927 follows:

Ore on Hand,	December 31st,	1927	- - - - -	73,507	Tons
Ore on Hand,	"	31st,	1928	- - - - -	76,634 "
Ore on Hand,	"	31st,	1929	- - - - -	31,959 "
Ore on Hand,	"	31st,	1930	- - - - -	164,623 "
Ore on Hand,	"	31st,	1931	- - - - -	342,860 "
Ore on Hand,	"	31st,	1932	- - - - -	395,173 "

**CLIFFS SHAFT MINE  
ANNUAL REPORT  
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**2. PRODUCTION,  
SHIPMENTS &  
INVENTORIES  
(Continued)**

**d. Division of Product by Levels:**

LEVEL.	"A" SHAFT	"B" SHAFT	TOTAL
	TONS	TONS	TONS
First - - - - -	0	4,025	4,025
Second- - - - -	2,906	0	2,906
Third - - - - -	2,848	1,145	3,993
Fourth- - - - -	4,403	0	4,403
Fifth - - - - -	7,012	982	7,994
Sixth - - - - -	3,941	2,070	6,011
Seventh - - - - -	12,497	2,509	15,006
Eighth - - - - -	3,588	4,464	8,052
Ninth - - - - -	2,262	84	2,346
Tenth - - - - -	12,329	809	13,138
Eleventh- - - - -	4,747	0	4,747
Twelfth - - - - -	0	1,004	1,004
Thirteenth- - - - -	0	2,995	2,995
Fourteenth- - - - -	0	5,391	5,391
Fifteenth - - - - -	0	108	108
TOTAL ORE- - - - -	56,533	25,586	82,219
ROCK - - - - -			10,006
TOTAL ORE AND ROCK - - - - -			92,125

**e. Production by months:**

MONTH	OPFG DAYS	C.S.	C.S.	C.S.	BANC.	BANC.	ROCK.
		LUMP	CRUSHED	R OF M	LUMP	CRUSHED	
Jan.	8	7,327	3,141		1,565	670	1,164
Feb.	9	8,352	3,576	65	1,397	599	1,282
Mar.	9	8,199	3,514	325	1,400	600	1,570
Apr.	8	7,455	3,195	97	853	365	1,414
May.	9	8,088	3,469	79	1,241	534	1,468
Nov.	9	3,542	1,495		335	142	1,296
Dec.	8	6,466	2,770		884	379	1,812
TOTALS, 60		49,429	21,160	566	7,675	3,289	10,006

**f. Ore Statement:**

	MINE RUN		CLIFFS SHAFT BANCROFT		BANCROFT CLIFFS SHAFT		TOTAL	TOTAL LAST YEAR
	CLIFFS SHAFT	BAN- CROFT	LUMP	CRUSHED	LUMP	CRUSHED		
On Hand 1-1-32			191,188	98,411	27,799	24,762	342,860	164,623
Output for Year	566	0	49,429	21,160	7,675	3,289	82,119	291,057
Transfers	8			8				
TOTAL,	574	0	241,309	119,571	35,474	28,051	424,979	455,680
Shipments	574	0	25,505	3,727	0	0	29,806	112,820
Bal. on Hand,	0	0	215,804	115,844	35,474	28,051	395,173	342,860

**g. Delays:**

DATE	HOURS	CAUSE	TONS LOST
March 21st	1	"A" Shaft skip stuck in dump,	100
April 18th	1	Compressor pipe broken.	150
May 27th	2	Tenth Level gate broken,	250
Year	4		500



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3. ANALYSIS:

Average Analysis on 1932 Output:

<u>GRADE</u>	<u>IRON</u>	<u>PHOS.</u>	<u>SILICA</u>
Cliffs Shaft Lump	58.84	.101	7.11
Cliffs Shaft Crushed	55.66	.103	11.05
Cliffs Shaft Mine Run	60.82	.095	5.45
Bancroft Lump	60.77	.108	5.68
Bancroft Crushed	58.70	.111	8.71

Average Analysis on Straight Cargoes:

	<u>MINE</u>			<u>LAKE ERIE.</u>		
	<u>IRON</u>	<u>PHOS.</u>	<u>SILICA</u>	<u>IRON</u>	<u>PHOS.</u>	<u>MOISTURE</u>
Cliffs Shaft Lump	59.41	.107	7.12	59.08	----	.31

Complete Analysis for Season 1932.

	<u>IRON</u>	<u>PHOS.</u>	<u>SILICA</u>	<u>MANG.</u>	<u>ALUM.</u>	<u>LIME</u>	<u>MAG.</u>	<u>SUL.</u>	<u>LOSS</u>
Selected Lump	59.10	.102	7.40	.53	2.41	1.37	1.00	.012	1.90
Run-Of-Mine	58.90	.095	7.45	.52	2.36	1.47	1.05	.013	2.03

Above analysis of powders from samples taken at Lake Erie ports in 1932:

c. Ore in stock Dec. 31st, 1932:

<u>GRADE.</u>		<u>IRON</u>	<u>PHOS.</u>	<u>SILICA</u>	<u>MOIST.</u>
Cliffs Shaft Lump	Dried	59.05	.109	7.10	
	Natural	58.75	.108	7.06	0.50
Cliffs Shaft Crshd	Dried	56.16	.110	10.46	
	Natural	55.04	.108	10.26	2.00
Bancroft Lump	Dried	60.53	.105	6.56	
	Natural	60.23	.104	6.53	0.50
Bancroft Crushed	Dried	56.91	.111	8.61	
	Natural	55.77	.109	8.44	2.00

4. ESTIMATE OF ORE RESERVES:

Ore in sight as of Dec. 31st, 1932.

CLIFFS SHAFT ORE.

Developed ore,	4,510,467	Tons
Prospective Ore,	29,200	"
<u>TOTAL.</u>	<u>4,539,667</u>	"
Unavailable ore,	3,268,000	"
Available ore,	1,271,667	"
<u>TOTAL.</u>	<u>4,539,667</u>	"

CLIFFS SHAFT MINE.  
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4. ESTIMATE OF ORE RESERVES.

a. Ore in Sight - Cliffs Shaft Grade.

	Total Developed.	Prospective	Available	Unavailable
	TONS	TONS	TONS	TONS
"A" Shaft-Pillars	1,654,084	24,000	521,584	1,108,500
Floors	1,679,659	-	757,359	922,300
<u>Gross Total</u>	3,333,743	24,000	1,278,943	2,030,800
"B" Shaft-Pillars	761,400	12,000	38,000	711,400
Floors	778,816	-	253,016	525,800
<u>Gross Total</u>	1,540,216	12,000	291,016	1,237,200
"A" and B GRAND TOTAL,	4,873,959	36,000	1,569,959	3,268,000
Less 10% for Rock				
and 10% for Loss in Mining,		6,800	298,292	
CLIFFS SHAFT NET TOTAL,		29,200	1,271,667	
<u>SUMMARY</u>				
Prospective			29,200	
Available			1,271,667	
GRAND NET TOTAL AVAILABLE			1,300,867	

a. Bancroft Ore.

	TONS
Developed ore - - - - -	360,364
Prospective Ore - - - - -	4,900
TOTAL ,	365,264
Unavailable Ore - - - - -	159,300
Available Ore - - - - -	205,964
TOTAL ,	365,264

	TOTAL DEVELOPED	PROSPECTIVE	AVAILABLE	UNAVAILABLE
	TONS	TONS	TONS	TONS
Pillars - - - - -	251,277	6,000	139,277	106,000
Floors - - - - -	168,300	-	115,000	53,300
GROSS TOTAL	419,577	6,000	254,277	159,300
Less 10% Rock and 10% Loss in Mining		1,100	48,313	
Bancroft Net Total - - - - -		4,900	205,964	

SUMMARY

Prospective	4,900
Available	205,964
Grand Net Total Available	210,864

ASSUMPTIONS

- 8, 9 and 10 cu. ft. per ton
- 10% Deduction for Rock
- 10% Deduction for Loss in Mining
- No Bessemer Ore.



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4. ESTIMATE OF ORE RESERVES (Continued)

ORE RESERVES AS REPORTED TO STATE TAX COMMISSION

Non-Bessemer Ore

Cliffs Shaft available reserves as of Dec. 31st, 1932,	1,300,867 Tons
Bancroft " " " "	210,864 "

The following table gives the ore in sight on Dec. 1st, 1932; the product for the year; the balance in sight, and the new ore developed during the year.

	1929	1930	1931	1932
	<u>TONS</u>	<u>TONS</u>	<u>TONS</u>	<u>TONS</u>
Estimated available ore in Mine Dec. 1st,	1,358,000	1,388,316	1,506,700	1,538,300
Production,	<u>414,419</u>	<u>412,786</u>	<u>303,638</u>	<u>87,480</u>
BALANCE	943,581	975,530	1,203,062	1,450,820
Ore in Mine Nov. 30th,	1,388,316	1,506,700	1,538,300	1,522,230
New Ore Developed	<u>444,735</u>	<u>531,170</u>	<u>335,238</u>	<u>71,410</u>
Excess over Production	30,316	118,384	31,600	16,070

Analysis of Ore Reserves:

<u>Run-of-Mine Ore:</u>	IRON	PHOS.	SIL.	MANG.	ALUM.	LIME	MAG.	SUL.	IGN.	MOIST
Dried	58.30	.108	6.71	.400	2.45	1.50	1.20	.018	2.25	
Natural	57.02	.106	6.56	.390	2.40	1.47	1.17	.018	2.20	2.20

5. LABOR & WAGES.

a. Comments.

1. Labor.

Men were rotated as much as possible so as to provide two days a week work for the largest number of men. For instance, instead of three pumpmen, we employed ten. The same was true of policemen, hoisting engineers, firemen, etc.

b. Comparative statement of Wages & Product:

	1932	1931	<u>Increase</u>	<u>Decrease.</u>
Product	82,119	291,057		208,938
No. of Shifts and Hours	1-8-Hr	1-8-Hr		
No. of Days Operated	60	201		141
<u>AVG. NO. OF MEN EMPLOYED</u>				
Surface	46	67		21
Underground	<u>180</u>	<u>245</u>		<u>65</u>
Total	226	312		86
<u>AVERAGE WAGES PER DAY</u>				
Surface	3.72	4.36		0.64
Underground	<u>4.26</u>	<u>4.90</u>		<u>0.64</u>
Total	4.11	4.77		0.66
<u>WAGES PER MONTH OF 25 DAYS:</u>				
Surface	93.00	109.00		16.00
Underground	<u>106.50</u>	<u>122.50</u>		<u>16.00</u>
Total	102.75	119.25		16.50
<u>WAGES PER MONTH OF 22 DAYS:</u>				
Surface	81.84	95.92		14.08
Underground	<u>93.72</u>	<u>107.80</u>		<u>14.08</u>
Total	90.42	104.94		14.52

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5. LABOR & WAGES (Cont'd)

Comparative statement of wages and product. (Cont'd)

	<u>1932</u>	<u>1931</u>	<u>Increase</u>	<u>Decrease</u>
<u>WAGES PER MONTH OF 17 Days</u>				
Surface	\$63.24	\$74.12		\$10.88
Underground	<u>72.42</u>	<u>83.32</u>		<u>10.88</u>
Total,	69.87	81.09		11.22
<u>WAGES PER MONTH OF 13 DAYS</u>				
Surface	48.36	56.68		8.32
Underground	<u>55.38</u>	<u>63.70</u>		<u>8.32</u>
Total,	\$53.43	62.01		8.58
<u>WAGES PER MONTH OF 9 DAYS</u>				
Surface	33.48	39.24		5.76
Underground	<u>38.34</u>	<u>44.10</u>		<u>5.76</u>
Total,	\$36.99	42.93		5.94
<u>PRODUCT PER MAN PER DAY</u>				
Surface	12.27	18.75		6.48
Underground	<u>4.69</u>	<u>5.52</u>		<u>.83</u>
Total,	3.39	4.26		.87
<u>LABOR COST PER TON.</u>				
Surface	.303	.232	.071	
Underground	<u>.908</u>	<u>.888</u>	<u>.020</u>	
Total	1.211	1.120	.091	
<u>AVERAGE PRODUCT.</u>				
Stoping & Trammig	13.47			
Stoping & Trammig including Haulage men, -	10.98	10.32	0.66	
AVG. WAGES, Cont. Miners,	4.70	5.24		0.54
AVG. WAGES, Cont. Labor	4.73	5.33		0.60
<u>TOTAL NUMBER OF DAYS.</u>				
Surface	6,692	15,517 $\frac{1}{4}$		8,825 $\frac{1}{4}$
Underground	<u>17,590<math>\frac{1}{2}</math></u>	<u>52,719<math>\frac{1}{4}</math></u>		<u>35,128<math>\frac{1}{2}</math></u>
Total	24,182 $\frac{1}{2}$	68,236 $\frac{1}{2}$		44,054
<u>AMOUNT FOR LABOR.</u>				
Surface	\$24,933.67	67,696.62		\$42,762.95
Underground	<u>74,565.24</u>	<u>258,405.18</u>		<u>183,839.94</u>
Total	\$99,498.91	326,101.80		\$226,602.89

Proportion of Surface to Underground.

1928, - - - - -	1 to 3.67
1929, - - - - -	1 to 3.66
1930, - - - - -	1 to 3.76
1931, - - - - -	1 to 3.66
1932, - - - - -	1 to 4.60

6. SURFACE.

a. Buildings & Repairs:

Repairs were almost nil. The total expended on all mine buildings was only \$312.94.

"A" Shaft House.

The skip dump and pocket in "A" shaft were in such bad shape that they had to be rebuilt. Cost as follows:

Labor - - - - -	\$725.81
Supplies - - - - -	<u>869.65</u>
TOTAL,	\$1,595.46



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SURFACE.

a. Buildings & Repairs.

The two movable shaft runners that run from the surface up to the dump, are now rigidly held by two heavy castings. The dump was entirely rebuilt of new plate backed by new fir timber. The old pocket was torn out, entirely reconstructed and lined with rails instead of plate. The front of the pocket is now full size, the sides of the pocket being parallel from top to bottom. The old finger chute of wood consisting of five sections, was torn out and replaced by a new set of steel fingers, 8 in number, that span the entire width of the pocket. Jams in this pocket are now very rare.

Crusher Building

The partition between the top lander and car dumper at the top of the Crusher Building was removed, and one man now attends to both jobs.

UNDERGROUND.

b. Development, "A" Shaft.

Second Level, Bancroft Vein.

No. 34 is raising on the footwall on the 1100 east coordinate line 200 ft. north of the south line of the Bancroft lease.

Sixth Level, North Vein.

In the northeast corner of the sixth level, #28 is opening up a new stope on the 3200 east coordinate line. The ore which was very narrow at the beginning, is getting much wider and longer, and is of good quality.

No. 8 contract is also developing considerable new ore both on the sill floor and on the sub 75 ft. above the level. The ore on the sub is now 200 ft. long and 80 ft. in width, and the new branched raise that No. 8 put up 60 ft. farther East, is also up high enough to reach the sub level.

Sixth Level Incline Vein.

No. 12 continues to develop new tonnage in their old stope close to the incline shaft. Both ribs and the back of the stope are still in ore.

Eighth Level, North Vein.

On the west end of the North Vein, Contract No. 4 is still crosscutting south along the 1700 east coordinate line, and were probably within a very few feet of the ore at the end of the year. This ore lies to the north of the big east and west fault, separating the North and Main veins.

In the extreme northeast corner of the level, No. 25 contract continues to develop new ore, 150 ft. east of the east line of the Bancroft lease. This ore, however, is mixed.

In the southeast corner of the North Vein, No. 44 drifted east on the 500 south coordinate line to provide a haulage road and raises for the ore in the southeast side of the North vein.

NINTH LEVEL, North Vein

No. 44 exploring in the extreme east end of the North Vein on this level, is still drifting in ore close to the 3200 east coordinate line.

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7. UNDERGROUND

b. Development, "A" Shaft.

Ninth Level, North Vein.

No. 64, on the east side of the Bancroft Vein, after passing through ore, went into jasper and back into ore again at the end of the year. The ore is probably the downward extension of the 60 ft. vein discovered in diamond drill hole No. 418 on the 9th level.

On the west side of the same vein, No. 10 has now finished crosscutting the entire width of ore discovered in diamond drill hole No. 421. The drift has gone through about 220 ft. of ore. We will now turn East and West and follow the footwall. This ore is undoubtedly the North Vein faulted down to this elevation, and there is a good chance that this same ore will extend to the 15th level.

Tenth Level, Main Vein.

No. 70 on the 10th level extended the main haulage drift east and parallel to the 600 south coordinate line. The drift started in jasper, but ran into ore in December. We hope to be able to get raise up under No. 44's ore on the 9th Level.

ELEVENTH LEVEL, Main Vein.

Contract No. 68, drifting east between the 600 and 800 south coordinate lines, is still breasted in hard siderite and chert. We have now passed the point where the ore is located in d.d.hole No. 234 on the 10th level, and the drift will be stopped and a raise started to come up under the ore.

TWELFTH LEVEL, South Vein.

No. 5 which has been drifting all year in the footwall, has now reached the point where the downward extension of No. 3's old stope on the 10th level and 11th level should intersect the new drift. The drift, with the exception of the last few cuts, has been in siderite.

FIFTEENTH LEVEL.

No. 58, drifting north to reach the ore found in d.d.h. No. 422, was within 40 ft. of their objective at the end of the year. The drift has been driven about 900 ft. through footwall material. After the ore is reached, a raise will be put up to the 10th level.

"B" SHAFT.

THIRD LEVEL, North Vein.

Contract No. 72 opened up a fairly large new stope just west of d.d.hole No. 99 in the North Vein. They also drove two exploring cross-cuts between the 200 and 400 west coordinate lines, but found only mixed ore.

SIXTH LEVEL, North Vein.

No. 37 contract extended their drift further west along the hanging, and also drove a crosscut back into the foot. The entire drift was in footwall material.

SIXTH LEVEL, Fault Vein.

No. 33 contract is raising to find the ore discovered in d.d.h. No. 47. At the close of the year the raise was breasted in high grade ore.



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7. UNDERGROUND

b. Development "B" Shaft

EIGHTH LEVEL, North Vein.

Contract No. 57, drifting east from their old stope, went thru some mixed material but were breasted in jasper about 300 ft. northeast of "B" shaft in December.

TENTH LEVEL, Sec. 9 Exploration.

Contract No. 47, drifting southwest in the footwall, is headed for d.d.hole No. 10, which shows ore a little above the 10th level elevation. Beyond d.d.hole No. 10 lie a number of drill holes in the NW $\frac{1}{4}$  of Sec. 9 that show high grade ore at varying elevations.

FIFTEENTH LEVEL, Sec. 3 Drift.

The main drift headed northwest for Sec. 3 shaft site, is in approximately half way. We have crossed under all of the lake, and are now breasted under the houses on W. Empire street. The drift went thru hard diorite during the year, and will probably continue in diorite until we strike the big fault on the south side of the ore, which is probably 300 to 400 ft. north of the present breast.

c. Stoping, "A" Shaft.

FIRST LEVEL, Bancroft Vein.

Two contracts, Nos. 9 and 34, mined ore in the southwest corner of the Bancroft Lease. No. 9 out through an old pillar on the east side of the vein, and No. 34 stope raised on the footwall to the limit of mining 50 ft. above the level.

SECOND LEVEL, Bancroft Vein.

No. 34, raising on the foot 200 ft. North of the south line of the Bancroft Lease, and 1200 ft. northeast of "A" shaft, found that the ore in the back of the vein pinches out a short distance above the level.

SECOND LEVEL, North Vein.

No. 30 took out a floor 20 x 25 ft. along the north line of the property near the 1100 east coordinate line.

SECOND LEVEL, Main Vein.

No. 27 continued to take out known reserves in the south central portion of the main vein, 500 ft. northwest of "A" shaft. The ore here is mixed with seams of jasper, and the rock was scraped back into the old stopes, and the old floors covered with this lean material.

THIRD LEVEL, Bancroft Vein.

No. 29 mined out a nice clean area between the 3rd and 4th levels on the 1200 east coordinate line 180 ft. north of the south line of the Bancroft Lease. This ore appears to be pitching to the southeast, and will in all probability be found north of the main east and west footwall drift on the 5th level.

THIRD LEVEL, North Vein.

No. 30 contract continued to take out the floor between the 2nd and 4th levels close to the southwest corner of the Bancroft Lease.

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7. UNDERGROUND.

c. Stoping "A" Shaft (Cont'd)

FIFTH LEVEL, Bancroft Vein.

Three contracts, Nos. 51, 61 and 66, took out backs and cut through available pillars in the southeast corner of the Bancroft Lease.

FIFTH LEVEL, North Vein.

Contract No. 32 on the east end and No. 49 on the extreme west end of the North Vein, mined known reserves. No. 32 took out the ore between the floor of their sub and the back of the 5th level stopes, a short distance east of the east line of the Bancroft Lease, while No. 49, working to the west of the lease, mined out the floor of old No. 30's stope around their raise which comes up from the 8th level.

FIFTH LEVEL, Southeast Vein.

Two contracts, Nos. 2 and 6, have nearly finished taking out all the available ore left in the southeast vein close to the South boundary of the Cliffs Shaft Mine.

SIXTH LEVEL, North Vein.

Beginning on the west end of the North Vein and going East, No. 16 stope, raising, mined out an area 40 ft. square at the sixth level elevation. A little farther east, No. 20 took out two floors, while No. 59, still farther east, also took out a large floor between the 6th and 7th levels. In the central portion of the same vein, No. 52 after putting up a new raise from the level below, mined out the 6th level floor around this raise.

SIXTH LEVEL, Southeast Vein.

Contract No. 45 continued to stope out the ore on the foot between the 6th level and 7th level on the 1200 south coordinate line in the east end of the Southeast Vein.

SEVENTH LEVEL, Bancroft Vein.

No. 62 took out the floor of the 7th level in the extreme west end of the vein. A new raise was put up from the 8th level, holing into the centre of the east-west portion of the stope, and the floor has been mined on both sides of this new raise.

SEVENTH LEVEL, North Vein.

No. 54, one of the best contracts in the mine, stoped south and west near the 1800 east coordinate line.

On the east end of the same vein No. 23 raised up from the foot, while No. 67 in the southeast corner of the level, advanced the breast of their stope 35 ft. farther west between two old stopes running parallel east and west along the 500 south coordinate line.

EIGHTH LEVEL, Bancroft Vein.

Contract No. 15 continued to take out the floor of their old stope between the 8th and 10th levels. The ore in the floor, which had become narrow due to the pinching together of the foot and hanging, opened up again and was of good width at the end of the year.



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7. UNDERGROUND.

c. Stopeing "A" Shaft. (Cont'd)

EIGHTH LEVEL, Southeast Vein.

Contract No. 41 took out the back of their old stope in the extreme west end of the vein.

NINTH LEVEL, Main Vein.

Three gangs, Nos. 24, 26 and 53, took out floors between the 9th and 10th levels.

NINTH LEVEL, Southeast Vein.

In the extreme west end of the Southeast Vein, No. 65 mined considerable high grade ore out of the back of an abandoned stope.

TENTH LEVEL, Main Vein.

Seven contracts, Nos. 3, 7, 11, 21, 39, 50 and 70, mined developed ore near the 10th level elevation. No. 3 in the southwest corner of the level took out the floor of the old subs through the new raise put up from the 11th level. Three other gangs, Nos. 7, 21 and 39, in the north central part of the vein, are all mining floors between the 10th and 11th levels. Near the 2400 east coordinate line No. 11 and No. 50 are both breast stoping south, the former up on the foot above the level, and the other on the sub level above the 10th level. In the northeast end of the main vein #70 breast stoped Southeast along the hanging in the general direction of the ore discovered in diamond drill hole No. 234.

"B" SHAFT

SUBS ABOVE 1st LEVEL, Main Vein.

No. 17 breast stoped southeast in the ore discovered in diamond drill hole 285, care being taken to go no higher than the 1218 ft. elevation.

No. 18 took out floors on the 1145 ft. sub 300 ft. south of "B" shaft.

FIRST LEVEL, Southeast Vein.

Contracts No. 1 and 35 mined ore off the back and foot of the stope 100 ft. North of the South line of the Cliffs Shaft Mine.

SIXTH LEVEL, North Vein.

Contract No. 42 continued to mine floors between the 6th and 7th levels on the 200 west coordinate line.

SEVENTH LEVEL, North Vein.

Two gangs, No. 13 and 36, were employed in the North Vein on the 7th level. The former breast stoped north and west between old No. 69's drift and diamond drill hole No. 281. The latter took out the floor around No. 67's new raise that came up from the 8th level.

SEVENTH LEVEL, Main Vein.

Nos. 19 and 38, both stope raising, mined considerable high grade ore between the 7th and 8th levels along the north limb of the Main Vein between the 800 and 1200 west coordinate lines. Both contracts found more ore than we were aware of. No. 19 particularly, found considerable ore back of what we supposed to be the jasper foot-wall.

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7. UNDERGROUND.

c. Stopping. "B" Shaft (Cont'd)

TENTH LEVEL, Fault Vein.

No. 14 breasted north through the pillar, proving the fault vein ore to join the main vein. At the intersection of the 1300 west and 600 south coordinate lines, this contract also started to take up the floor of their stope.

TWELFTH LEVEL, Fault Vein.

Three gangs, Nos. 31, 43 and 56, all mined developed reserves. No. 31 took out the ore between the back of the level and the floor of their stope. Nos. 43 and 56 both beat out floots between the 12th and 13th levels.

THIRTEENTH LEVEL, Main Vein.

Two contracts, Nos. 46 and 48, mined floors in the central part of the vein.

e. Drifting and Raising.

The amount of drifting and raising done, will naturally show a decrease for 1932 because of a much shorter working schedule.

YEAR	ROCK DRIFTS AND RAISES.	ORE DRIFTS AND RAISES	TOTAL.
1932	1,357'	585'	1,942'
1931	3,577'	3,212'	6,729'
1930	6,496'	3,704'	10,200'
1929	5,443'	3,082'	8,525'
1928	4,762'	1,848'	6,610'
1927	4,874'	2,494'	7,368'
1926	3,051'	2,907'	5,958'

Although the total footage decreased in 1932, the footage per working shift of 32.4, compares very favorably with 33.4 for 1931. I mean by that that there was no letup in our development work program.

f. Explosives, Drilling & Blasting.

<u>STOPPING &amp; DEVELOPING IN ORE.</u>		AVERAGE	AMOUNT	AMOUNT
KIND.	QUANTITY	PRICE	1932	1931
Gelamite "A"	15,500	12.50	1,937.50	1,255.89
Gelamite "2K"	31,300	12.50	3,912.50	2,422.50
50% L.F. Powder	3,300	12.15	1,008.88	15,287.52
60% " "				12,223.11
60% Gelatine	4,950	13.06	646.40	281.87
<b>TOTAL</b>	<b>60,050</b>	<b>12.50</b>	<b>7,505.37</b>	<b>31,470.89</b>
Caps, No. 6 Blasting,	18,498	11.36M	210.14	775.64
Fuse, Egel Brand	95,872	5.443M	521.87	1,980.67
Connecting Wire lbs	8	.407	3.26	5.16
Delay Blasting Caps	238	10.72C	25.52	19.05
Fuse Lighters	2,000	7.09M	14.18	32.18
Crimpers				3.75
Fuse Containers				2.25
Tamping Bags				48.38
Prop. Cost of Blasting Machine				17.50
<b>TOTAL, Fuse Caps, etc.,</b>			<b>774.97</b>	<b>2,884.58</b>
<b>TOTAL, All Explosives</b>			<b>8,280.34</b>	<b>34,255.47</b>



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7. UNDERGROUND.

f. Explosives, Drilling & Blasting.

STOPING & DEVELOPING IN ORE. (Cont'd)

	<u>1932</u>	<u>1931</u>
PRODUCTION - - - - -	82,119	291,057
Lbs. Powder Per Ton of Ore - - - - -	.7312	.8512
Cost per Ton for Powder - - - - -	.0914	.1080
Cost Per Ton, Fuse, Caps, Etc., - - - - -	.0094	.0100
Cost Per Ton, All Explosives- - - - -	.1008	.1180

Following are comparative figures for the past three years.

YEAR	LBS. POWDER <u>PER TON OF ORE</u>	COST PER TON <u>FOR POWDER</u>
1932	.7213	.0914
1931	.8512	.1080
1930	.8738	.1128

It will be noted that there is a marked reduction in 1932, due to closer supervision of blasting. The reduction in price of powder is only 2%, but the reduction in cost is 15% for the year, and 19% for the two year period.

EXPLOSIVES USED FOR DEVELOPMENT IN ROCK  
AND NO. #3 Drift.

<u>KIND.</u>	<u>QUANTITY</u>	<u>AVERAGE PRICE</u>	<u>1932 AMOUNT</u>	<u>1931 AMOUNT</u>
Gelamite "A"	14,000	12.50	\$1,750.00	\$1,185.74
Gelamite "2X"	700	12.50	87.50	31.88
50% L.F. Powder	50		6.12	741.13
60% " "	3,800		503.51	4,889.26
60% Gelatine	1,550		194.63	1,464.37
TOTAL POWDER	20,100		2,541.76	8,312.38
No. 6 Blasting Caps,	5,990	11.76	70.47	151.69
Fuse, Eagle Brand	32,285	5.45	175.98	473.56
Connecting Wire, Lbs.	3	.35-	.97	.64
Delay Blasting Caps	37	12.38C	4.58	8.76
Fuse Lighters	500	8.10	4.05	7.42
Crimpers				.75
Fuse Containers				2.25
Tamping Bags				15.90
Prop. Cost of Blasting Machine				17.50
TOTAL, Fuse, Caps, etc.,			256.05	678.47
TOTAL, All Explosives			2,797.81	8,990.85
FOOTAGE - - - - -			1,357	3,577
COST PER FOOT, Rock Development, All Explosives -			2.06	2.51
TOTAL EXPLOSIVES USED, Per Cost Sheet - - - - -			11,078.15	43,346.32
AVERAGE COST PER POUND FOR POWDER - - - - -			.125	.127

I wish to call attention to the marked reduction in the cost per foot.

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8. COST OF OPERATING.

a. Comparative Mining Costs.

	<u>1932.</u>	<u>1931</u>	<u>INCREASE</u>	<u>DECREASE.</u>
PRODUCT - - - - -	82,119	291,057		208,938
Underground Costs - - - -	1.391	1.511		.120
Surface Costs - - - - -	.243	.223	.020	
General Mine Accounts - -	.530	.327	.203	
COST OF PRODUCTION- - - -	2.164	2.061	.103	
Depreciation - - - - -	.064	.055	.009	
Taxes - - - - -	.919	.553	.366	
Loading and Shipping	.026	.013	.013	
TOTAL COST AT MINE- - - -	3.174	2.671	.503	

Underground costs showed a decrease of 12¢ per ton for 1932. Cost of Production increased only .103 per ton, which is accounted for in the distributive or overhead costs, such as Ishpeming Office Expense, Pensions, Hospital Expense, etc.

Wages were reduced 10% on Oct. 1st, 1931, and 15% on May 16th 1932, but the latter cut did not influence the 1932 costs as much as the first one.

b. Detailed Cost Comparison.

	<u>1932</u>		<u>1931</u>		<u>Increase</u>		<u>Decrease</u>	
	<u>AMOUNT</u>	<u>PER TON</u>	<u>AMOUNT</u>	<u>PER TON</u>	<u>AMOUNT</u>	<u>PER TON</u>	<u>AMOUNT</u>	<u>PER TON</u>
A Exploring in Mine	591.17	.007	7251.84	.025			6660.67	.018
B Dev. in Rock	11950.02	.145	39703.74	.136	.009		27753.72	
C Dev. in Ore	4389.72	.053	28464.81	.098			24075.09	.045
D Stoping,	25902.82	.315	104726.82	.360			78624.00	.045
E Timbering	2227.22	.027	9191.32	.032			6964.10	.005
F Trammig	26486.88	.323	108821.40	.374			82334.52	.051
G Pumping	16071.64	.196	25812.81	.089	.107		9741.17	
H Compressors & Air Pipes	8923.50	.107	27865.80	.096	.011		18962.30	
I Back Filling	1812.07	.023	7933.40	.027			6121.33	.004
J Und.Suptce.	5332.09	.065	17181.86	.059	.006		11849.77	
K Compressors & Power Drills	232.54	.003	9475.33	.033			9242.79	.030
L Hand Tram Equipment	693.61	.009	3760.30	.018			3066.69	.009
M Scrapers & Mech. Eqpt.	4701.82	.057	24200.23	.082			19498.41	.025



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8. COST OF OPERATING.b. Detailed Cost Comparison (Cont'd)

	1932		1931		Increase		Decrease	
	<u>AMOUNT</u>	<u>PER TON</u>	<u>AMOUNT</u>	<u>PER TON</u>	<u>AMOUNT</u>	<u>PER TON</u>	<u>AMOUNT</u>	<u>PER TON</u>
N Elect. Tram Equipment,	4543.47	.056	23072.04	.079			18528.57	.023
O Pumping Machinery,	357.82	.005	2225.80	.008			1867.90	.003
P Hoisting,	4996.14	.061	15913.27	.055	.006		10917.13	
Q Stocking Ore	2499.17	.030	10935.14	.038			8435.97	.008
R Screening & Crushing,	2858.22	.036	13392.10	.046			10533.88	.010
S Dry House,	3391.72	.041	4981.57	.017	.024		1589.85	
T Gen. Surface	2366.45	.029	7348.15	.025	.004		4981.70	
U Hoisting Equipment,	2711.99	.033	4357.87	.015	.018		1645.88	
V Shaft,	444.98	.005	1512.58	.006			1067.60	.001
W Top Tram Equipment,	364.27	.004	1767.93	.006			1403.66	.002
X Docks, Trestles and Pockets,	101.05	.001	3179.77	.010			3078.72	.009
Y Mine Bldgs.	223.95	.003	1500.27	.005			1276.32	.002
Z-1 Insurance,	187.10	.002	131.21	.000	55.89	.002		
Z-2 Mining Engr.	1220.64	.015	4117.38	.014		.001	2896.74	
Z-3 Mech. and Elect. Engrg.	837.56	.010	2047.99	.007		.003	1210.43	
Z-4 Analysis & Grading,	1224.29	.015	5039.15	.017			3814.86	.002
Z-5 Personal Injury Exp.	7470.80	.091	18944.05	.065		.026	11473.25	
Z-6 Safety Dept.	538.71	.007	1532.87	.005		.002	994.16	
Z-7 Telephones & Safety Dev.	476.95	.006	2794.10	.010			2317.15	.004
Z-8 Local & Gen. Welfare,	3698.08	.045	8627.26	.030		.015	4949.18	
Z-9 Special Exp. Pensions & Allowances,	11847.31	.144	16494.89	.057		.087	4647.58	
Z-10 Ishp. Office	10592.19	.129	19135.00	.066		.063	8542.87	
Z-11 Mine Office	5442.56	.066	13179.80	.045		.021	7737.24	

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8. COST OF OPERATING.

b. Detailed Cost Comparison. (Cont'd)

Every account except one shows a decrease in the amount of money expended in 1932. This is natural, when you consider that the 1931 costs cover 201 operating shifts, whereas there were only 60 shifts in the 1932 schedule. Then, there was the 10% cut in wages as of Oct. 1st, 1931, and the 15% cut effective May 16th, 1932. There will be no explanation, therefore, of any of the above items unless they show some unusual increase in unit cost, or some greater decrease than can be expected from the reduced operating schedule.

d. STOPPING.

A detailed cost for the past two years follows:

	<u>1932 COST</u>		<u>1931 COST</u>	
	<u>AMOUNT</u>	<u>PER TON</u>	<u>AMOUNT</u>	<u>PER TON</u>
Contract Labor	\$15,606.47	.203	\$59,630.86	.224
Other Labor	1,822.66	.023	9,631.81	.036
TOTAL,	17,429.13	.226	69,262.67	.260
Total Supplies	8,473.69	.110	35,464.15	.133
TOTAL LABOR & SUPPLIES	\$25,902.82	.336	104,726.82	.393
<u>Detail of Supplies</u>				
General Supplies	434.60	.006	1142.27	.004
Iron & Steel	52.19	.001	2,330.91	.009
Oil and Grease	100.57	.001	232.05	.001
Machinery Supplies	613.10	.008	4,268.03	.016
Explosives	6,872.05	.089	25,680.55	.096
Lumber & Timber	26.38	.000	183.74	.001
Sundries	17.68	.000	154.05	.001
Exp. Accts. Distributed	357.10	.005	1,472.55	.085
Total	8,473.69	.110	35,464.15	.133
TONS,	76,902		266,037	

The saving in supplies is largely due to careful handling of drill steel. All this steel was inventoried and redistributed, and enough spare steel found to keep the ming going. There is also a big saving in supplies for drilling machines, tripods, etc. The decrease in Explosives cost per ton is also very marked.

G PUMPING.

A detail of the pumping expense for the 12 months of the past two years follows:

	<u>1932.</u>	<u>1931.</u>
Pumpman, Labor	\$7,359.29	\$6,769.60
Other Labor		310.28
TOTAL,	7,359.29	7,079.88
Oil, Waste & Packing,	116.06	282.67
Tools & Miscl. Supplies	68.90	13.46
Electric Light	399.54	326.70
Compressor Charge	1,102.61	
Electric Power	19,092.85	18,110.10
TOTAL SUPPLIES	20,779.96	18,732.93
TOTAL OPERATING COSTS,	28,139.25	25,812.81
Gallons of Water Pumped	1932	369,057,075
"	1931	350,061,850
"	1930	446,403,100
"	1929	461,403,025
"	1928	463,182,750



CLIFFS SHAFT MINE  
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8. COST OF OPERATING.

b. Detailed Cost Comparison. (Cont'd)

G PUMPING, Continued,

Cost for 1932 shows an increase for a number of reasons. First, more water was pumped, the total increasing from 5 to 6%, Second, we added a compressor charge to take care of the operating of compressors for the air pumps at the bottom of both shafts, and Third, for five months when the mine was idle, pumpmen helpers at an aggregate expense of approximately \$300.00 per month, were added to the payroll.

H COMPRESSORS & AIR PIPES.

The reduction in production for 1932 was 72%, compared with a reduction of 68% in the cost for Compressors and Air Pipes. A detail for the past two years follows:

	<u>1932.</u>	<u>1931</u>
Labor, - - - - -	\$2,282.61	\$3,759.50
Tools and Miscl. Supplies- - - - -	.48	16.55
Electric Light - - - - -	55.15	120.79
Cooling Pump - - - - -	149.04	203.37
Electric Power - - - - -	6,279.48	19,750.20
Heating Expense - - - - -	371.66	505.38
Oil, Waste & Packing - - - - -	77.85	216.91
TOTAL SUPPLIES - - - - -	6,933.66	20,813.20
TOTAL OPERATING EXPENSE - - - - -	9,216.27	24,572.70
Cost per 1000 Cu.Ft.- - - - -	.048	.042
Cu.Ft. Air Compressed	188,127,000	592,506,000

The cost of maintaining and extending air lines in the mine was practically nothing for the year. We have not spent \$20.00 for new pipes or fittings since May 1931.

J UNDERGROUND SUPERINTENDENCE.

Since Nov. 1st, we have had no Mine Foreman in "B" Shaft.

K COMPRESSORS & POWER DRILLS.

Expense for 1932 was nil. No new machines were purchased, and very few drilling machine parts were purchased.

M SCRAPERS AND MECHANICAL EQUIPMENT.

We spent only \$2,216.46 in 1932, compared with \$9,760.05 in 1931 for repair parts for scraping equipment. The detail that follows gives the comparison.

	<u>1932.</u>	<u>1931</u>
3/8 in. Wire Rope - - - - -	\$ 6.51	\$19.85
1/2 in. " " - - - - -	29.54	365.93
5/8 in. " " - - - - -	1021.68	4807.83
3/4 in. " " - - - - -	00	231.58
Electrical Supplies - - - - -	178.93	2982.76
48 in. Blades - - - - -	365.91	1065.24
42 in. " - - - - -	24.32	156.30
Shoes, Gears, Plates, - - - - -	356.03	130.56
Other Supplies, - - - - -	233.54	00
TOTAL - - - - -	\$2216.46	\$9760.05

There has been no letup in the salvaging of every possible piece of equipment that can be repaired and put back into use. It is to be expected, however, that replacements will have to be made before long, because it is obvious that when costs have been cut from \$18,000 per year as they were in 1930, to \$2200 a year as they were in 1932, that we have cut to the bone.

CLIFFS SHAFT MINE.  
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8. COST OF OPERATING.

b. Detailed Cost Comparison. (Cont'd)

N ELECTRIC TRAM EQUIPMENT.

The cost comparison for the years 1931 and 1932 follows:

	<u>1932</u>	<u>1931</u>
Generators - - - - -	\$2.09	44.83
Locomotives- - - - -	-1504.39	8501.06
Wiring - - - - -	653.01	2740.46
Main Line Track- - - - -	-1575.58	6762.75
Main Line Cars - - - - -	-1058.00	4803.68
Spotting Engines - - - - -	77.35	219.26
TOTAL, - - - - -	\$4875.42	\$23072.04
Cost Per Car - - - - -	.134	.186

The cost per car of ore and rock trammed decreased one third due largely to the cut in supplies for repairs to locomotives. The battery cost for the storage battery locomotives used to run very high, but by shifting the locomotives and making changes that permitted us to discontinue the use of two of these locomotives, we were able to save the cost of two new batteries.

P HOISTING.

The unit cost naturally shows an increase, because of the five months shut down. One man is kept in the engine house all the time, each man working only eight hours.

U HOISTING EQUIPMENT.

This account shows the unit cost to have doubled, and this is largely due to the expense of re-building the "A" shaft skip dump and pocket.

This pocket and dump had been in poor shape for some time, in fact the dump itself was never built properly. We started at the collar of the shaft and cleaned out all of the guides, timber, plates, etc., up to the platform, located half way up to the top of the shaft house. New 12 x 12 fir timbers were run both N-S and E-W from wall to wall of the shaft house, to which the new dump was fastened. Heavy U-shaped castings were used to hold the skip runners securely and keep them from wobbling when the skip enters the dump. Two new dump plates and guides were built and bolted to a tier of 12 x 12" timbers, that also formed part of the new pocket. Then the new pocket was built with straight sides, and a new finger chute installed that has eight fingers instead of five. The old fingers were wood, but the new ones are made of 6 in. discarded steel shafting. The mouth of the new pocket is so large that jams are impossible.

The detailed cost of this work is as follows:

LABOR	\$725.81
Supplies	869.65
TOTAL	\$1595.46

In the above accounts, A to Z-11 inclusive, are included the supplies shown on the table which follows. A detail of the supply cost for the years 1931 and 1932 shows these figures:



CLIFFS SHAFT MINE  
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8. COST OF OPERATING.

b. Detailed Cost Comparison, (Cont'd)

	<u>1932</u>	<u>PER</u>	<u>1931</u>	<u>PER</u>	<u>INCREASE</u>	<u>DECREASE</u>
	<u>AMOUNT</u>	<u>TON</u>	<u>AMOUNT</u>	<u>TON</u>		
Gen'l Supplies	4,581.34	.056	30,082.56	.103		.047
Iron & Steel	1,960.90	.024	12,219.13	.042		.018
Oil & Grease	1,071.60	.013	2,675.13	.009	.004	
Mach'y Supplies	1,928.55	.023	23,716.20	.081		.058
Explosives	11,078.15	.135	43,346.32	.149		.014
Lumber & Timber	1,555.34	.019	7,803.59	.027		.008
Fuel	3,532.52	.043	3,463.12	.012	.031	
Power	23,259.17	.283	57,905.58	.199	.084	
Sundries	1,539.32	.019	5,587.36	.019		.000
Less						
Other Mines & Accounts,	494.61	.006	299.74	.001		.005
<b>TOTAL,</b>	<b>50,012.38</b>	<b>.609</b>	<b>186,499.12</b>	<b>.640</b>		<b>.031</b>

10. TAXES.

The taxes levied against the Cliffs Shaft Mine for the past two years follow:

	<u>1932</u>		<u>1931</u>	
	<u>VALUATION</u>	<u>TAXES</u>	<u>VALUATION</u>	<u>TAXES</u>
Realty - - - - -	\$2,400,000.00	\$80,368.08	\$3,000,000.00	\$119,656.20
Personal - - - - -	1,000,000.00	33,486.70	775,000.00	30,911.20
Lot 2, Sec. 2, - - -	240,000.00	8,036.81	225,000.00	8,974.22
Lot 174, Nelson	90.00	3.01	100.00	3.99
So. 35.91 Ft. Lot 179	40.00	1.34	50.00	1.99
<b>TOTAL</b>	<b>\$3,640,130.00</b>	<b>121,895.94</b>	<b>4,000,150.00</b>	<b>159,547.60</b>
Collection Fee - - -		1,218.96		1,595.48
Taxes Per Ton Produced		1.499		.553
" " " Shipped		4.131		1.428

Taxes levied by the City of Ishpeming for the past three years were as follows:

CLIFFS SHAFT MINE  
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10. TAXES.

Taxes levied by the City of Ishpeming:

	<u>1932</u>	<u>1931</u>	<u>1930</u>
State Tax - - - - -	\$38,301.72	\$46,570.45	\$47,494.76
County Tax- - - - -	84,033.94	95,544.29	99,351.40
County Road Tax - - - - -		29,295.41	34,871.38
Highway Fund Tax- - - - -	56,000.00	60,000.00	60,000.00
Library Fund Tax- - - - -	9,000.00	11,000.00	12,000.00
Fire Fund Tax - - - - -	10,500.00	11,500.00	12,000.00
School Tax - - - - -	104,000.00	165,000.00	145,000.00
One Mill Tax - - - - -	11,293.74	12,626.18	12,690.99
Sewer Fund Tax - - - - -	1,500.00	2,000.00	2,000.00
Cemetery Fund Tax - - - - -	2,500.00	3,500.00	4,000.00
City Tax - - - - -	58,000.00	64,000.00	65,000.00
Rejected Tax - - - - -	60.29	64.42	48.51
Water Fund Tax - - - - -	3,000.00	2,500.00	---
<b>TOTAL TAX - - - - -</b>	<b>\$378,189.69</b>	<b>503,600.75</b>	<b>494,457.04</b>

The total tax bill for the City of Ishpeming was reduced almost exactly 25%. The reduction in the County and County Road taxes was nearly 33%, which is the result of the economy program put on by the Board of Supervisors.

11. ACCIDENTS & PERSONAL INJURY.

We had one compensable accident at the Cliffs Shaft Mine in 1932, a motor brakeman bruising his left foot when a truck jumped the track. Following are the comparative figures for the past four years:-

	<u>1932</u>	<u>1931</u>	<u>1930</u>	<u>1929</u>
No lost time accidents - - - - -	9	30	61	62
Compensable accidents - - - - -	1	2	3	17
Lost time but no compensation paid - -	0	0	1	8

14. MAINTENANCE & REPAIRS.

The following table will show how the maintenance cost has been out. There is no use in disguising the fact, however, that some of these ~~figures~~ houses needed repairing very badly, particularly paint. The Smith Purchase, Nelson Purchase, Hyde Purchase, etc., are badly in need of paint.

	<u>1932</u>	<u>1931</u>	<u>1930</u>
Cliffs Shaft Rented Houses	\$202.76	\$862.86	\$5729.10
Angeline Rented Houses	504.81	911.27	3157.29
Second Addition Location	182.58	637.66	1221.87
Smith Purchase	74.89	166.14	301.94
Hyde Purchase No. 1	13.43	6.12	276.37
Nelson Purchase	15.96	119.61	482.58
Outhewaite Purchase	131.05	443.42	181.56
Nebraska Purchase	8.75	284.85	117.68
Salisbury Rented Houses	60.87	582.67	144.19
<b>TOTAL,</b>	<b>\$1195.10</b>	<b>4014.60</b>	<b>11,612.58</b>



CLIFFS SHAFT MINE  
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POWER:

Following are the electric power costs for 1931 and 1932.

	1932			1931		
	K.W.H	AMOUNT	PER TON	K.W.H.	AMOUNT	PER TON
Tramming - - - - -	54,900	\$823.50	.010	201,600	\$3,024.00	.010
Pumping - - - - -	1,299,426	19,491.39	.237	1,229,120	18,436.80	.063
Hoisting - - - - -	224,494	3,367.83	.041	700,053	10,500.82	.036
Stocking Ore - - - -	9,330	139.95	.002	39,900	598.50	.002
Screening & Crushing	20,380	305.70	.004	60,710	910.65	.003
Dry House- - - - -	6,730	100.99	.001	13,942	209.12	.001
General Surface- - -	12,861	193.02	.002	15,602	234.04	.001
Mine Office- - - - -	3,108	46.62	.011	3,476	52.14	.000
Shops - - - - -	14,110	211.62	.002	20,264	303.94	.001
Compressors- - - - -	432,248	6,483.67	.079	1,338,291	20,074.36	.069
Electric Haulage - -	65,727	985.90	.012	229,360	3,440.40	.012
Heating Plant- - - -	4,651	69.72	.001	8,054	120.81	.001
Loading by Hand- - -	90	1.35	.000	-	-	-
<b>TOTAL- - - - -</b>	<b>2,148,057</b>	<b>32,221.26</b>	<b>.392</b>	<b>3,860.372</b>	<b>57,905.58</b>	<b>.199</b>

<u>COST PER</u>		
1000 Gals. Pumped- -	.052	.053
1000 Cu.Ft. Air - -	.034	.034
Tons Ore Stocked - -	.002	.003
Ore & Rock Hoisted -	.004	.003
Ore & Rock Trammed -	.010	.002

17. CONDITION OF PREMISES.

Last years report has this line in it, "The houses in all the locations need painting, and as it has been ten years since the last job of painting was done, if they are not taken care of very soon, we are going to have very heavy repair bills later on." I can only add that another year has gone by and all of our rented buildings have depreciated more than usual, and the condition is becoming worse as repairs are put off.

18. NATIONALITY OF EMPLOYEES.

	<u>AMERICAN</u> <u>Born.</u>	<u>FOREIGN BORN</u>	<u>TOTAL</u>
English - - - - -	55	16	71
Swedish - - - - -	31	28	59
Finnish - - - - -	37	94	131
Italian - - - - -	0	10	10
German - - - - -	2	1	3
French - - - - -	20	6	26
Irish - - - - -	8	3	11
Norwegian - - - - -	11	4	15
Scotch - - - - -	1	1	2
<b>TOTAL - - - - -</b>	<b>165</b>	<b>163</b>	<b>328</b>

CLIFFS SHAFT MINE.  
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WOODS AND GARDENS OPERATIONS.

One of the most successful and worthwhile projects ever undertaken by this Company, were the woods operations and garden lots.

Late in May the garden project was organized and in full swing by the 1st of June. Plowing, discing and harrowing equipment was borrowed, and close to 800 gardens prepared for planting. Of these, about 600 were new gardens and averaged 1/4 to 1/5 of an acre in size. The Company not only prepared the ground, but fenced in the various areas, furnished seed and fertilizer. We were fortunate in having a good growing season although rainfall was light in June, and with the exception of some damage done by grasshoppers, all the gardens turned out a good crop.

The woods operations turned out to be a man's sized job. The Company accepted 1,388 applications for wood in the Ishpeming and North Lake districts. These men cut nearly 9,000 cords of wood, located one half mile to six miles from town. The best wooded areas were very hilly and it required a lot of planning and effort to get this wood out of the woods in the summer months. The hauling to town presented the biggest problem but the job was licked before winter set in by the fine cooperation given us by the City of Ishpeming, County Road Commission and Tilden Township loaning us all the available trucks they had that were suitable for traveling on the temporary roads through the woods. Sundays were the big hauling days, and on the Sunday before Labor Day and on Labor Day, we hauled 741 cords of wood to town. The trucks averaged from 1 to 1 3/4 cords, which seems little until you consider that a cord of green maple weighs close to three tons.

The money spent on wood and garden lots was as follows:

GARDEN LOTS.

	<u>LABOR</u>	<u>SUPPLIES</u>	<u>TOTAL.</u>
May - - - - -	\$ 639.30	54.71	\$694.01
June - - - - -	468.87	33.94	502.81
July - - - - -	4.55	23.17	27.72
August - - - - -	5.46		5.46
September - - - - -	28.62		28.62
October - - - - -	6.51		6.51
TOTAL - - - - -	\$1153.31	111.82	1,265.13

WOOD LOTS.

June - - - - -	81.91		81.91
July - - - - -	343.02	147.96	490.98
August - - - - -	761.91	499.72	1261.63
September - - - - -	995.78	774.73	1770.51
October - - - - -	466.20	536.58	1002.78
November - - - - -	1.96	96.29	98.25
TOTAL - - - - -	\$2,650.78	2,055.28	4,706.06



MORRIS-LLOYD MINE

ANNUAL REPORT

Year 1932

1. GENERAL

Production for 1932 was the lowest for a great many years because of curtailment. Ore was hoisted for five months only, January to May inclusive, on a 2-day a week schedule. During the idle period, June to November, only a small crew of timbermen were employed underground repairing drifts and raises. Pumping, of course, was not interrupted, as all the mine workings were kept unwatered. On November 1st, a rock development project was started and continued until Dec. 31st at the Lloyd Mine. A rock drift crosscut was driven to the Lloyd shaft location on the 6th level, and raising to the 4th level was well under way by the end of the year.

The Morris Mine working places became quite warm and the air was so poor that it was found necessary to install a second hand 40,000 cu.ft. capacity fan temporarily on surface at the Morris shaft collar.

As a result of the Inland Steel Company lease of the Morris Mine, new stockpile grounds had to be prepared during the latter part of the year. Negotiations relative to the Morris Mine transfer, which had been in progress since 1931, finally resulted in sub-leasing to the Inland Steel Company all the Chase leases and most of the Cleveland Cliffs Iron Company fee property in Sec. 1-47-28.

2. PRODUCTION

SHIPMENTS AND STOCKPILE BALANCES.

a. Production by Grades.

Production for 1932 was as follows:

GRADE	TONS
Morris Ore - - - - -	35,932
Morris High Manganese - - - - -	6,768
Morrisville- - - - -	9,158
Lloyddale - - - - -	<u>31,018</u>
TOTAL - - - - -	82,876

Production by Grades since 1925 as follows:

YEAR	MORRIS	MANGANESE	SILICA	LLOYD	LLOYDDALE	TOTAL
1925	100,568	000	59,945	105,316	000	265,829
1926	110,863	3,436	53,088	49,678	73,097	290,162
1927	173,118	1,357	33,871	58,251	60,217	326,814
1928	134,455	33,347	49,754	32,161	106,447	356,164
1929	196,072	11,310	55,275	59,560	113,213	435,430
1930	197,768	15,124	60,403	52,502	139,574	465,371
1931	156,605	7,332	43,324	15,907	125,990	349,158
1932	35,932	6,768	9,158	000	31,018	82,876



MORRIS-LLOYD MINE.

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2. PRODUCTION, SHIPMENTS AND STOCKPILE BALANCES.

b Shipments

Shipments were exceedingly light, being only 7% of the average for the past five years. Following are the figures for 1932.

GRADES	POCKET	STOCKPILE	TOTAL	LAST YEAR
Morris	000	13,327	13,327	30,906
Morris Manganewe	6,768	000	6,768	7,332
Morrisville	000	000	000	24,064
Lloyd	000	000	000	9,103
Lloyddale	000	5,926	5,926	94,648
Lloyd Silica	000	000	000	6,561
TOTAL,	6,768	19,253	26,021	172,614
TOTAL, Last Year	120,543	52,071	172,614	
Decrease	113,775	32,818	146,594	

1928	1-8-Hr Shift	5 days a week.	Jan. 1st to Dec. 31st
1929	1-8-Hr "	5 "	Jan. 1st to Apr. 11th
1929	1-8-Hr "	6 "	Apr. 11th to Dec. 31st
1930	1-8-Hr "	6 "	Jan. 1st, to July 16th
1930	1-8-Hr "	5 "	July 16th to Dec. 31st
1931	1-8-Hr "	5 "	Jan. 1st to April 30th
1931	1-8-Hr "	4 "	Apr. 30th to June 8th
1931	1-8-Hr "	3 "	June 8th to Nov. 15th
1931	1-8-Hr "	2 "	Nov. 15th to Dec. 31st
1932	1-8-Hr "	2 "	Jan. 1st to June 1st
1932	Mine Idle		June 1st to Nov. 1st
1932	Morris Idle, Lloyd 3 8-hr shifts	6 days a week	Nov. 1st to Dec. 31st.

Tonnage shipped for the past five years as follows:

GRADES	1928	1929	1930	1931	1932
Morris	193,093	242,740	176,068	30,906	13,327
Morris Mg	22,849	21,966	15,124	7,332	6,768
Morrisville	2,391	72,236	18,445	24,064	000
Lloyd	66,440	179,191	28,809	9,104	000
Lloyddale	83,736	101,459	50,125	94,648	5,926
Ld. Silica	24,675	20,642	11,220	6,561	.000
TOTAL	393,184	638,234	299,791	172,615	26,021

c Stockpile Balances.

The figures for the close of the year 1932 are the largest ever recorded at the Morris-Lloyd Mine.

Ore on stock Dec. 31st, 1932 as follows:

GRADE	TONS
Morris - - - - -	290,660
Morrisville - - - - -	71,309
Lloyd - - - - -	35,749
Lloyddale - - - - -	193,576
Lloyd Silica - - - - -	12,645
TOTAL	603,939



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Year 1932.

2. PRODUCTION, SHIPMENTS  
AND STOCKPILE BALANCES.c. Stockpile Balances.

Figures showing balances on hand since 1925, clearly show the trend of the times:

YEAR	MORRIS	MANG.	MORRISVILLE	LLOYD	LLOYDDALE	LLOYD	TOTAL
						SILICA	
1925	164,842		15,759	154,733		14,538	349,872
1926	194,820		34,873	164,763	6,354	14,538	415,259
1927	219,820	1,271	31,786	164,399	12,930	14,579	444,785
1928	167,324	10,656	53,282	124,884	35,939	15,680	407,765
1929	120,656		15,679	5,253	47,693	15,680	204,961
1930	142,356		46,347	28,946	137,142	15,750	370,541
1931	268,055		62,151	35,749	168,484	12,645	547,084
1932	290,660		71,309	35,749	193,576	12,645	603,939

e. Production by months

MONTH	DAYS	MORRIS	MANG.	M. VILLE	LLOYD	L. DALE	LLOYD	TOTAL	ROCK.
							SILICA		
Jan.	8	8,087	662	1,136		6,213	<del>16,092</del>	16,092	723
Feb.	9	6,580	1957	1,846		6,825		17,208	1392
Mar.	9	5,707	2850	2,682		6,309		17,548	1071
Apr.	8	6,807	1299	1,496		4,744		14,346	690
May	10	8,757		1,998		6,927		17,682	1062
TOTAL	44	35,932	6,768	9,158		31,018		82,876	4958

f. Production from Chase Leases by Months.

LEASES	No. 9	No. 24	No. 25	No. 26	No. 27-28	TOTAL.
Minimum						
Required	10,000	15,000	15,000	15,000	22,500	77,500
An. Tonnage						
January	8,797					8,797
February	8,753					8,753
March	9,517					9,517
April	8,033					8,033
May	<u>9,486</u>					<u>9,486</u>
TOTAL	44,586					44,586

Production from Leases since 1925.

YEAR	No. 9	No. 24	No. 25	No. 26	No. 27-28	TOTAL
1925	77,244	29,526	10,367	2,425		119,562
1926	53,102	47,876	14,604	303		115,885
1927	88,956	48,931	10,040	952		148,879
1928	119,115	29,090				148,205
1929	197,284	8,787				206,071
1930	206,188	000				206,188
1931	160,841	1,653				162,494
1932	44,586					44,586



MORRIS-LLOYD MINE

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YEAR 1932

2. PRODUCTION, SHIPMENTS & STOCKPILE BALANCES.

f (Cont'd)

Total royalties accrued and total production from Chase leases from opening of Mine to Dec. 31st, 1932.

LEASE NO.	ACCRUED TO DEC.31st,1932.	MINED TO DEC.31st,1932.	BALANCE.
9	242,283	1,616,281	1,373,998
24	346,088	233,588	112,500
25	346,088	51,246	294,842
26	336,713	9,043	327,670
27	314,213	178	314,035
28	157,107 <sup>m</sup>	000	157,107
TOTALS,	1,742,492	1,910,336	167,844

Table showing balances due from all leases, Nos. 9 to 28 combined since 1925.

YEAR	TONS ACCRUED	TONS MINED	BALANCE
1925	1,199,992	878,028	321,964
1926	1,277,492	993,913	283,579
1927	1,354,992	1,142,792	212,200
1928	1,432,492	1,290,997	141,495
1929	1,509,992	1,497,068	12,924
1930	1,587,492	1,703,256	115,764
1931	1,664,992	1,865,750	200,758
1932	1,742,492	1,910,336	167,844

g. Ore Statement

	LLOYD	LLOYD* DALE	LLOYD SILICA	MORRIS MORRIS	MORRIS- VILLE.	HI MANG.	TOTAL	LAST YEAR
On Hand-Jan-1'32	35,749	168,484	12,645	268,055	62,151	0	547,084	370,541
Output for Year	000	31,018	000	35,932	9,158	6,768	82,876	349,158
TOTAL	35,749	199,502	12,645	303,987	71,309	6,768	629,960	719,699
Shipments,	000	5,926	000	13,327	000	6,768	26,021	172,615
BAL. IN STOCK,	35,749	193,576	12,645	290,660	71,309	000	603,939	547,084
Decrease in Output . . . . .							266,282	

h. Delays

DATE.	HOURS DELAYED	REASON	TONS LOST
Mar.8th	1-1/2	Changing skip rope	50
Apr.7th	3	Changing skip rope	100
Apr.12th	2	Top Tram Car off track	75
May 20th	2	Top Tram Car off track	75
	6 1/2 Hrs		300

3. ANALYSES

Average Mine Analysis on output for 1932.

GRADE	IRON	PHOSPHOROUS	SILICA
Morris	58.35	.066	10.29
Morrisville	57.70	.059	20.15
Hi-Manganese	60.27	.062	7.53
Lloyddale	57.87	.153	8.50



MORRIS-LLOYD MINE

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YEAR 1932

3. ANALYSES.

Average Analysis on straight cargoes.

	<u>MINE</u>			<u>LAKE ERIE.</u>	
	Iron	Phos.	Silica	Iron	Moisture
Morris	58.82	.089	8.23	58.50	10.46

Analysis of ore in stock on December 31st, 1932.

GRADE.	IRON	PHOS.	SIL.	MANG.	ALUM.	LIME	MAGN.	SULP.	LOSS	MOIST.
Morris-Dry	58.61	.070	8.75	0.50	2.55	0.83	0.29	.012	2.88	
" Nat.	52.31	.062	7.81	0.45	2.28	0.73	0.26	.011	2.57	10.75
Lloyd-Dry	59.03	.126	6.32	0.25	2.27	1.19	0.38	.012	4.61	
Natl	52.39	.112	5.61	0.22	2.03	1.05	0.34	.011	4.08	11.25
L.Dale Dr	58.18	.116	7.29	0.25	2.65	1.26	0.44	.011	5.02	
Natl	51.63	.147	6.47	0.22	2.35	1.12	0.39	.010	4.46	11.25
M.Ville Dr	51.54	.064	19.00	0.45	2.74	0.98	0.37	.011	2.58	
Natl	46.13	.057	17.00	0.40	2.45	0.88	0.33	.010	2.31	10.50
L.Sil. Dr	52.59	.082	15.09	0.22	2.76	1.10	0.36	.012	4.54	
Natl	46.81	.073	13.43	0.20	2.46	0.97	0.32	.011	4.04	11.00

Analysis of ore reserves on December 31st, 1932.

	Iron	Phos.	Sil.	Mang.	Alum.	Lime	Magn	Sulp	Loss	Moist
Morris-Dr	58.94	.066	9.01	0.51	2.55	0.82	0.29	.013	2.82	
Natl	52.48	.059	8.02	0.45	2.28	0.73	0.26	.012	2.57	10.75
Lloyd- Dr	58.98	.127	6.68	0.25	2.29	1.18	0.38	.012	4.81	
Natl	52.45	.111	5.93	0.22	2.04	1.05	0.34	.011	4.08	11.25
L.Dale Dr	58.25	.187	7.08	0.25	2.65	1.26	0.44	.011	5.02	
	51.56	.166	6.28	0.22	2.35	1.12	0.39	.010	4.46	11.25

4. ORE RESERVES - Assumption

12 cu. ft. Equals One Ton  
 10% Deduction for rock  
 10% Deduction for loss in mining

Ore in sight as of December 31st, 1932.

MORRIS MINE.

Above 7th Level, C.C.I.Co. lands	102,123 Tons
Above 7th Level, Chase Lease No. 9	464,151
Above 7th Level, " " 24	18,011
Above 7th Level, " " 25	22,937
Above 7th Level, " " 26	9,687
Above 8th Level, C.C.I.Co. land	396,691
Above 8th Level, Chase Lease No. 9	877,686
Above 8th Level, " " 24	18,394
Above 8th Level, " " 25	10,326
Above 8th Level, " " 26	16,463
Below 8th Level, C.C.I.Co. land	57,290
Below 8th Level, Chase Lease No. 9	306,282
Total Ore in Morris Mine	2,300,041

SUMMARY

Ore on C.C.I.Co. lands	556,104 Tons
Ore on Chase Lease No. 9	1,648,119
Ore on Chase Lease No.24	36,405
Ore on Chase Lease No.25	33,273
Ore on Chase Lease No.26	26,140
TOTAL,	2,300,041

MORRIS-LLOYD MINEANNUAL REPORTYEAR 19324. ORE RESERVES, (Cont'd)MORRIS MINE.

Ore above 7th level	616,909 Tons
Ore above 8th Level	1,319,560
Ore below 8th Level	<u>363,572</u>
TOTAL,	2,300,041 Tons

LLOYD MINE.

Ore above 3rd level	25,873 Tons
Ore below 3rd level	<u>9,353</u>
TOTAL, Lloyd Mine	35,226 Tons

LLOYD MINE EAST

	LLOYD ORE	LLOYDDALE	TOTAL ORE
Above 3rd Level		167,752 Tons	167,752 Tons
Between 3rd & 4th Levels		358,218	358,218
Between 4th & 6th Levels	513,621 Tons	1,540,863	2,054,484
Below 6th level	<u>70,537</u>	<u>211,613</u>	<u>282,150</u>
TOTAL,	584,158	2,278,446	2,862,604 Tons

SUMMARY

Lloyd Ore	619,384 Tons
Lloyddale Ore	<u>2,278,446</u>
TOTAL ORE, Lloyd East Mine and Lloyd,	2,897,830 Tons

RECAPITULATION

MINE	MORRIS ORE	LLOYD ORE	LLOYDDALE ORE	TOTAL ORE
Morris Mine	2,300,041			2,300,041 Tons
Lloyd Mine		35,226		35,226
Lloyd Mine East		<u>584,158</u>	<u>2,278,446</u>	<u>2,862,604</u>
TOTAL ORE	2,300,041	619,384	2,278,446	5,197,871 Tons

Estimated tonnages as reported to the State Tax Commission:

## All Non-Bessemer Grades.

	Morris Shaft	Lloyd & Lloyd East	TOTAL
Morris Ore	2,300,041		2,300,041
Lloyd Ore		619,384	619,384
Lloyddale Ore		<u>2,278,446</u>	<u>2,278,446</u>
TOTAL,	2,300,041	2,897,830	5,197,871

The following table shows the ore reserves for the past 5 years and a summary of the new ore developed:

	1928	1929	1930	1931	1932
In Mine Nov.30,	2,612,722	2,335,103	3,063,817	3,353,909	5,316,963
Production,	<u>356,437</u>	<u>429,934</u>	<u>461,837</u>	<u>367,853</u>	<u>82,876</u>
Balance	2,256,285	1,905,169	2,601,980	2,986,056	5,234,087
In Mine Dec.1st	2,335,103	3,063,817	3,353,909	5,316,963	5,197,871
New Ore Devlpd	78,818	1,158,648	751,929	2,330,907	-36,216

5. LABOR & WAGESa. General.

Because of curtailment and a great number of unemployed men, there was no labor turnover, and the men were willing to give their best efforts.

b. Comparative Statements. Product, Shifts and Hours

	1931	1932	Incr.	Decr.
Product	349,158	82,876		266,282
No. Shifts and Hours	1-8-hr	1-8-hr		



MORRIS-LLOYD MINEANNUAL REPORTYEAR 19325. LABOR AND WAGESb. Comparative StatementsProduct, Shifts and Hours. (Cont'd)Average Number of men employed:

YEAR	SURFACE	UNDERGROUND	TOTAL
1925	45	145	190
1926	45	149	194
1927	50	178	228
1928	52	173	225
1929	55	176	231
1930	56 $\frac{1}{2}$	192 $\frac{1}{2}$	249
1931	55	210	265
1932	35	111	146

	1932	1931	Increase	Decrease
Surface	35	55		20
Underground	<u>111</u>	<u>210</u>		<u>99</u>
TOTAL	146	265		<u>119</u>

Average Wages Per Day

	1932	1931	Increase	Decrease
Surface	\$3.75	\$4.42		\$0.67
Underground	<u>4.46</u>	<u>5.12</u>		<u>0.66</u>
Total	4.28	4.97		<u>0.69</u>

YEAR	SURFACE	UNDERGROUND	TOTAL
1925	\$4.34	\$5.02	\$4.86
1926	4.32	5.02	4.85
1927	4.33	5.14	4.94
1928	4.34	5.09	4.90
1929	4.35	5.08	4.90
1930	4.35	5.27	5.06
1931	4.42	5.12	4.97
1932	3.75	4.46	4.28

Wages per month of 25 days.

	1932	1931	Increase	Decrease
Surface	\$93.75	\$110.50		\$16.75
Underground	<u>111.50</u>	<u>128.00</u>		<u>16.50</u>
Total,	107.00	124.25		<u>17.25</u>

Wages per month of 22 days.

	1932.	1931	
Surface	\$82.50	\$97.24	14.74
Underground	<u>98.12</u>	<u>112.64</u>	<u>14.52</u>
Total	\$94.16	109.34	15.18

Wages per month of 17 days.

	1932	1931	
Surface	\$63.75	\$75.14	11.39
Underground	<u>75.82</u>	<u>87.04</u>	<u>11.22</u>
Total	72.76	84.49	11.73

Wages per month of 13 days.

	1932	1931	
Surface	\$48.75	\$57.46	8.71
Underground	<u>57.98</u>	<u>66.56</u>	<u>8.58</u>
Total	55.64	64.61	8.97

MORRIS-LLOYD MINEANNUAL REPORTYEAR 19325. LABOR & WAGES. (Cont'd)Wages per month of 9 days:

	1932	1931	Increase	Decrease
Surface	\$33.75	\$39.78		\$4.42
Underground	<u>40.14</u>	<u>46.08</u>		<u>5.94</u>
TOTAL,	38.52	44.73		6.21

Product Per Man Per Day:

	1932	1931	Increase	Decrease
Surface	25.77	30.19		4.42
Underground	<u>8.46</u>	<u>8.72</u>		<u>0.26</u>
TOTAL,	6.37	6.76		0.39

YEAR.	SURFACE	UNDERGROUND	TOTAL
1925	20.45	6.85	5.13
1926	21.42	6.97	5.26
1927	20.93	6.61	5.71
1928	23.09	7.59	6.22
1929	25.53	8.22	6.54
1930	27.65	8.52	6.54
1931	30.19	8.72	6.76
1932	25.77	8.46	6.37

Labor cost per ton:

	1932	1931	Increase	Decrease
Surface	.152	.146	.006	
Underground	<u>.552</u>	<u>.588</u>		<u>.036</u>
TOTAL	.704	.734		.030

YEAR	SURFACE	UNDERGROUND	TOTAL
1925	.212	.733	.945
1926	.201	.721	.922
1927	.207	.777	.984
1928	.188	.671	.859
1929	.171	.618	.789
1930	.157	.619	.776
1931	.146	.588	.734
1932	.152	.552	.704

Average Product Stopping and Tramming:

	1932	1931	Incr.	Decr.
Product for Stopping & Tramming	17.50	18.06		0.56
Average Wages Contract Miners,	5.14	5.63		0.49

Total Number of Days:

	1932	1931	Incr.	Decr.
Surface	4,798	11,564 $\frac{3}{4}$		6,766 $\frac{3}{4}$
Underground	<u>13,769<math>\frac{1}{2}</math></u>	<u>40,049<math>\frac{3}{4}</math></u>		<u>26,280<math>\frac{1}{4}</math></u>
	18,567 $\frac{1}{2}$	51,614 $\frac{1}{2}$		33,047



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5. LABOR & WAGES. (Cont'd)

Amounts for Labor:

	1932	1931	Increase	Decrease
Surface	\$17,988.02	\$51,133.97		\$33,145.95
Underground	<u>61,499.55</u>	<u>205,272.48</u>		<u>143,772.98</u>
TOTAL	79,487.57	256,406.45		176,918.88

Proportion of Surface to Underground Men:

	1925	1	to	3.22
	1926	1		3.31
	1927	1		3.56
	1928	1		3.33
	1929	1		3.20
	1930	1		3.41
	1931	1		3.82
	1932	1		3.18

6. SURFACE.

a. Buildings.

Repairs on mine buildings were held down to a minimum. Buildings had in previous years been kept up in very good shape, and if no repairing is done for a year or two, there will be no unusual depreciation.

b. Stockpile Grounds.

New stocking grounds were prepared at the Morris shaft for the Inland Steel Company. It was decided to locate the new area directly North of the present Morris ore pile on Sec. 1-47-28.

A steam shovel was used to excavate the sand which was hauled to the dump in 5-yard stripping cars by the Tilden Mine locomotives. The dump was located north of the timber yard, and was reached by extending the coal dock track north along the edge of the hill overlooking the Carp River swamp.

The stockpile collar was made of lean ore loaded from the Lloyd Mine rock pile with the Cliffs Power & Light Company's excavator. Five dump trucks were used to haul the lean ore to the stocking area, where it was dumped and rolled with the 15-ton gasoline roller borrowed from the City of Ishpeming.

Work on this project started on Nov. 17th, and was finished on Dec. 28th. The cut was very shallow, varying from 3 ft. to 8 ft., and because the weather turned very cold and there was little snow on the ground, the shovel had to dig a considerable amount of frozen material, which was not only difficult to dig, but also hard to handle in the small 5-yard wooden stripping cars. The old coal area had to be filled, as the permanent trestle leading to the new stocking grounds was planned to be built through the centre of this depression. This proved to be a mean job, because it was done while the weather was the coldest and the frozen chunks were hard to break up and level off.

A total of 12,850 yards of stripping was moved, at a cost of \$4,581.78, or .3565 per yard. There isn't any question but what the unseasonable cold weather for the first half of December doubled the cost of doing this work. Despite the fact that a watchman kept the two locomotives and shovel fired up all night, still 1½ hours was spent at the beginning of each shift thawing out the equipment.

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6. SURFACE.

b. Stockpile Grounds. (Cont'd)

The real serious delay, however, occurred in digging and disposing of the frozen material. As proof of the above statement, our records show that just before the cold snap after the job was organized and running smoothly, that we handled between 900 and 1,000 yards a day. After the cold weather hit us, our average dropped to 500 yards a day.

It cost us \$951.79 to put down the lean ore collar, which figures .2815 per yard for 3,380 yards.

Following is a resume' of the cost:

	LABOR	SUPPLIES	TOTAL
Stripping	\$3,260.63	\$1,321.15	\$4,581.78
Laying Sollar	618.30	333.49	951.79
Engineering & Suptc.	<u>162.57</u>	<u>2.80</u>	<u>165.37</u>
TOTAL,	\$4,041.50	1,657.44	5,968.94

	YARDS MOVED	TOTAL COST	PER YARD
Stripping	12,850	\$4,581.78	\$.3565
Laying Sollar	3,380	951.79	.2815

7. UNDERGROUND

a. Development

Seventh Level:

MORRIS MINE

Considerable drifting and raising was done to define the outline of deposit "B", socalled between the 1800 and 2200 west co-ordinate lines near the south side of Chase Lease No. 9. The raises that were put up from the main level were connected on the 110 ft. Sub level which we planned as a main transfer scraping level. From the 110 ft. sub a large number of small raises were carried up to the hanging of the deposit, which in turn were connected at 20 ft. intervals horizontally, preparatory to sub-stoping.

Eighth Level:

On the 70 ft. sub level, located between the 7th and 8th levels, an extension to the main deposit was discovered. This ore area is 85 ft. wide and 175 ft. long, and extends down from the 000 ft. elevation up to the plus 100 ft. sub level. On the 000, this newly discovered ore area joins the main or #33 deposit.

LLOYD MINE

Sixth Level.

On the extreme east end of the 6th level, two crosscuts were driven in the ore body. The most easterly one cut through 45 ft. of high grade ore. The other drift, located near the 1700 east coordinate line, was breasted in ore at the close of the year.

The rock crosscut to the Lloyd shaft was driven 880 ft. The shaft station was reached in December, and raising started before December 31st. The major portion of the crosscut was driven after Nov. 1st. In the early part of the year we worked only four days a week, day shift only on this project, but after Nov. 1st, nine different gangs were employed on 3-8 hr. shifts 6 days per week, the gangs being rotated once each week. The material drifted through was grawacke and cherty slate. After the shaft location was reached, an 8 x 12 ft. raise was started in the center of the shaft, only half of the raise was cribbed, the timbered portion being divided into two



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7. UNDERGROUND

a. Development:

Sixth Level: (Cont'd) LLOYD MINE

compartments, one side for the ladder road and the other for the bucket.

The rock crosscut cost almost exactly \$16.00 per foot, which includes all the overhead not ordinarily charged to Rock Drifting when a property is also producing ore.

b. Stoping:

MORRIS MINE.

Chase Lease No. 9.

No. 61 Deposit.

Mining in this deposit was confined to the 230 ft. sub level between the 1600 and 1800 west coordinate lines on the East end of the deposit, and some ore was also taken out in the southeast corner of the 170 ft. sub level on the west side.

No. 21 Deposit:

A small portion of No. 21 deposit lies along the east side of Chase Lease No. 9. The ore was stoped from the 210 ft. elevation down to the 150 ft. scraping sub level.

Deposit "B":

But very little actual stoping was done above the 110 ft. scraping transfer level, all of the development work having been previously described under Section "A".

MAIN DEPOSIT.

The ore in the main deposit was sliced by the regular sub level system of mining on the 60 ft. sub level in the south central portion of the deposit.

On the west limit near the south side of the Chase Lease No. 9, stoping operations took out ore near the 1800 west coordinate line from the plus 60 to the plus 10 ft. sub level.

At a point about half way between the 7th and 8th levels, a new timber transfer drift was driven connecting the main raises in the main deposit above the 8th level.

Excelsior Iron Cos. Land:

Ore was mined above the 7th level in both the main deposit and deposit No. 21. Slicing in the main deposit was carried on on the 120 and 170 ft. sub levels in the extreme east end of the subs.

A little ore was stoped close to the boundary line between Chase Lease No. 9 and the Excelsior Iron Cos. lands on the 190 and 210 ft. sub levels.

LLOYD MINE EAST.

Main Deposit:

All of the gangs working in the east end of the mine were taking ore out of the main deposit.

Beginning at the top of the deposit in the east end, two contracts stoped the ore from the 1140 ft. elevation down to the main scraping transfer level 40 ft. below. Continuing west lower down along the hanging in the main deposit, a new sub level stope was opened up from the raises on the west end of the 990 ft. sub level. Stoping was actually started on the 1010 and 1030 ft. sub levels.

MORRIS-LLOYD MINEANNUAL REPORTYEAR 19327. UNDERGROUNDStoping (Cont'd)LLOYD MINE EAST (Main Deposit)

In the central portion of the deposit pillars were stoped out from the 910 to the 820 ft. sub levels along both the foot and hanging.

In the south central area between the 820 and 795 ft. sub levels, several contracts sub-level sliced out pillars on the 810 and 820 ft. sub levels.

In the extreme southwest corner of the main deposit two gangs continued to stope from the 810 to the 775 ft. scraping transfer level. Practically all the ore available above the 4th level is mined in this territory.

The following table shows the increased efficiency because of change in mining methods and mechanization of mines from 1920 to date:

YEAR	TONS PER MINER
1920	9.27
1921	10.20
1922	13.82
1923	15.54
1924	15.67
1925	17.10
1926	17.33
1927	17.46
1928	20.26
1929	23.29
1930	23.75
1931	23.94
1932	22.17

The efficiency curve climbed steadily up to 1929, after which the rise was checked, last years figures showing a small decrease. This can easily be accounted for by the slowing up of shipping because the Morris-Lloyd Mine in a normal year shipped steadily from the pockets to the charcoal furnaces all winter, thus getting the benefit of considerable of the overrun on the monthly production.

d. Timbering:

The timbering expense and the cost per ton for timbering varies probably more in the Morris-Lloyd Mine than it does in the average underground soft ore property, because our general mining practice may be sub level slicing or sub level stoping, depending on the size and shape of the ore lenses and the character of the foot and hanging.

It will be noted on the Timber Statement following, that the unit cost for timbering dropped to a price lower than any for the past nine years. The average price per foot remained the same as last year because of the fact that it was not necessary to purchase any new timber even though the prices were lower.

This lowering of the unit cost may be explained in two ways; by getting a larger percentage of ore from the sub level stopes, and by more universal use of 9 ft. legs and caps although you add 3 linear feet to a complete set, thereby increasing the cost about 13%, you actually take out almost 30% more ore per cut.



MORRIS-BLOYD MINE

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7. UNDERGROUND.

d. Timbering:

STATEMENT SHOWING TIMBER USED 1st FIVE MONTHS FOR YEAR 1932.

KIND.	LIN. FT.	AVG. PRICE	AMOUNT	AMOUNT
		PER FT.	1932	1931
6 to 8 in. Timber	11,703	.042	\$485.95	\$4,337.58
8 10 " "	13,352	.067	903.13	4,609.86
10 12 " "	8,224	.089	737.67	2,985.10
12 14 " "	2,775	.128	354.92	1,309.83
Total Timber 1932	36,054	.069	2,481.67	13,242.37
" " 1931	217,722	.061		13,242.37
5 ft. Lagging	21,675	.794C	172.00	2,271.52
7 " "	137,347	.677	928.48	2,690.60
8 " "	10,304	.830	85.53	2,307.50
TOTAL LAGGING,	169,326	.701-C	1,186.01	7,269.62
3½" Poles	97,595	1.50	1,464.04	4,400.45
Wire Fencing, 110 Rds	1,815	5.16	93.54	1,186.49
TOTAL, Poles & Fencing	99,410	1.57	1,557.58	5,586.94
TOTAL, Lagging, Poles & Fencing	268,736	1.02	2,743.59	12,856.56
" " " " 1931	1,291,039	.99		12,856.56

	1932	1931
PRODUCT, Tons - - - - -	82,876	349,158
Feet of timber per ton of ore - - - - -	.435	.623
Feet of Lagging " " " - - - - -	2.043	2.777
Feet of Lagging per ft. of timber - - - - -	4.699	4.454
Cost per ton for timber - - - - -	.0299	.0378
Cost per ton for lagging - - - - -	.0143	.0209
Cost per ton for Poles, Lagging and Fencing - - - - -	.0188	.0160
Cost per ton for all timber, - - - - -	.0630	.0747
Equiv. of Stull Timber to Board Measure - - - - -	63,198	351,489
Feet of Board measure per ton of ore - - - - -	.762	1.006

	COST PER TON	AMOUNT.
Cost of Timber, Poles, Lagging & Fencing	1932 .0630	\$5,225.26
	1931 .0747	26,098.93
	1930 .0729	33,914.29
	1929 .0687	29,885.03
	1928 .0777	27,690.94
	1927 .0857	27,993.33
	1926 .0752	21,787.65
	1925 .0666	17,701.50
	1924 .0676	16,664.69
	1923 .0585	15,207.16

(Note) Fencing 3½ ft. wide.

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7. UNDERGROUNDe. Drifting and Raising:

Neither footage nor cost for drifts and raising done in 1932 is comparable with the previous year because of unusual conditions.

During November and December both the raising and drifting costs included the bulk of the engine house, dry house, office, etc., expense, whereas in ordinary years only about 10% of these items are charged up to development work.

f. Statement of Explosives Used:

<u>BREAKING ORE</u>	<u>QUANTITY</u>	<u>AVERAGE PRICE</u>	<u>1932 AMOUNT</u>	<u>1931 AMOUNT</u>
Gelamite 1X & 2X lbs	42,151	12.50	\$5,286.65	\$ 0
TOTAL POWDER	42,151	12.50	5,286.65	\$20,539.80
Fuse - Feet	148,518	5.48	818.06	3,065.27
Blasting Caps	24,702	11.20	277.51	990.78
Tamping Bags	12,000	2.00	24.16	48.60
Cap Sealing Compound				1.20
Fuse Lighters	1,500	5.40	9.45	58.44
Hand Crimpers				.42
Total Fuse, Caps, etc.			1,129.18	4,164.71
TOTAL ALL EXPLOSIVES,			6,415.83	4,704.51
PRODUCT, Tons - - - - -			82,876	349,158
Pounds Powder per ton of ore - - - - -			.509	.461
Cost Per Ton for Powder - - - - -			.064	.059
Cost Per ton, Fuse, Caps, etc., - - - - -			.014	.012
Cost per ton, All Explosives- - - - -			.078	.071
<u>DEVELOPMENT IN ROCK.</u>				
Gelamite Powder - 1X	10,475	12.50	1,312.13	3,697.51
TOTAL POWDER,	10,475	12.50	1,312.13	3,697.51
Fuse, Feet	26,172		145.70	340.61
Blasting Caps	3,280		36.90	92.34
Tamping Bags				.14
Fuse Lighters	500		4.05	5.02
Total Fuse, Caps, etc.			186.65	438.11
TOTAL, All Explosives			1,498.78	4,135.62
Feet of Rock Drifting - - - - -			602	1,735
Cost per foot for powder - - - - -			2.180	2.131
Cost per foot, Fuse, Caps, etc., - - - - -			.310	.253
Cost per foot, All Explosives - - - - -			2.490	2.384
GRAND TOTAL EXPLOSIVES USED IN MINE - - - - -			\$7,914.61	28,840.13
Cost per ton for all explosives used - - - - -			.095	.083
Average price per pound for powder - - - - -			.125	.1275

The comparison of 1931 and 1932 shows that both the quantity and cost per ton for powder for Breaking Ore, increased in 1932. This is easily explained from two angles, one being that we broke more ore in development drifts and raises in 1932. Take the first five months in 1931 and 1932, and the labor statement shows these figures. It will be noted that comparatively speaking, twice as much ore was won from development work in 1932 than in 1931.



MORRIS-LLOYD MINE.ANNUAL REPORTYEAR 19327. UNDERGROUND.f. Statement of Explosives Used. (Cont'd)

<u>Tons of Ore Mined:</u>	1932	1931
Stopping - - - - -	73,788	161,891
Developing in Ore - - - - -	9,088	11,504
TOTAL- - - - -	82,876	173,195

Then, as mentioned before, we received very little credit for overrun in 1932 because of the slowing up of shipments to charcoal furnaces.

Table showing explosives used in rock drifts for past 3 years:

	<u>1932</u>	<u>1931</u>	<u>1930</u>
Feet of Rock Drifting	602	1,735	3,061
Cost per ft. for powder	2.180	2.131	2.403
Cost per ft. for Fuse, Caps, etc	.310	.253	.246
Cost per ft. All Explosives	2.490	2.384	2.649

It will be noted that the 1932 cost lies between that for 1931-30.

8. COST OF OPERATINGComparative Mining Costs:

	<u>1932</u>	<u>1931</u>	<u>Increase</u>	<u>Decrease</u>
Product	82,876	349,158		266,282
Underground Costs	.994	1.044		.050
Surface Costs	.174	.152	.022	
Gen.Mine Expense	.308	.242	.066	
Cost of Production	1.476	1.438	.038	
Depreciation	.120	.203		.083
Taxes	.339	.217	.122	
Loading & Shipping	.010	.015		.005
Total Cost at Mine	1.959*	1.873*	.086	
No. Days Operating	44	189		145
No. Shifts & Hours	1-8-hr	1-8-hr		
Average Daily Product	1,884	1,847	37	

\* 1932 figures are for first 5 months only; 1931 are 12 month figures.

Despite greatly reduced operating schedule, the total cost at mine for the five operating months of 1932 compares very favorably with the cost for the previous year. This is, of course, partly and probably due in a great degree to the reduction in wages. There was a ten percent reduction effective Oct. 31st, 1931, which did not influence the 1931 costs very much, and another cut of 15% effective May 16th-1932, which had very little effect on the 1932 costs as shown above.

1932 costs are also lower due to increased operating efficiency, and because all expenses were cut to the bone. Following is the detailed cost comparison. It would be foolish obviously to explain each item in detail, because one cannot compare a 44-day operating year with an 189 day year. Explanations are only made in detail when the difference in cost is not due to general curtailment.

MORRIS-LLOYD MINEANNUAL REPORTYEAR 19328. COST OF OPERATINGDETAILED COST COMPARISON

<u>ACCOUNT.</u>	<u>1932*</u>		<u>1931**</u>		<u>Increase</u>		<u>Decrease</u>	
	<u>AMOUNT</u>	<u>PER TON</u>	<u>AMOUNT</u>	<u>PER TON</u>	<u>AMOUNT</u>	<u>PER TON</u>	<u>AMOUNT</u>	<u>PER TON</u>
a. Exploring in Mine	372.26	.004	5900.13	.017			5527.87	.013
b. Dev. Rock	4702.34	.057	15089.13	.043		.014	10386.79	
c. Dev. in Ore	7030.81	.085	31824.42	.091			24793.51	.006
d. Stoping	26331.13	.317	128858.84	.369			102527.71	.052
e. Timbering	14318.20	.173	68171.64	.195			53853.44	.022
f. Trammig	7673.16	.093	36189.19	.104			28516.03	.011
g. Ventilation	767.45	.009	1368.59	.004		.005	601.14	
h. Pumping	7421.45	.090	18151.52	.052		.038	10730.07	
i. Compressors & Air Pipes	7090.26	.086	29002.67	.083		.003	21912.41	
j. Undg. Suptce	3391.09	.040	12730.15	.036		.004	9339.06	
k. Compressors & Power Drls	15.06		395.62	.001			380.56	.001
l. Scrapers and Mech. Loaders	1870.76	.023			1870.76	.023		
m. Elect. Tram	1316.14	.016	15970.71	.047			14654.57	.031
n. Pump Mach'y	109.04	.001	735.61	.002			626.57	.001
o. Hoisting	5097.65	.062	20074.13	.057		.005	14976.48	
p. Stkg. Ore	3044.45	.037	9803.18	.028		.009	6758.73	
q. Crushing & Screening,	149.89	.002	1310.33	.004			1160.44	.002
r. Dry House	2978.41	.036	6398.13	.018		.018	3419.72	
s. Surface Exp	1302.62	.016	4898.53	.014		.002	3595.91	
t. Hoist Eqpmt	870.97	.010	3430.82	.010			2559.85	
u. Shaft	341.70	.004	1160.17	.003		.001	818.47	
v. Top Tram Eq.	529.05	.006	1580.52	.005		.001	1051.47	
w. Docks, Trestles and Pockets	76.60	.001	1219.17	.003			1142.57	.002
x. Mine Bldg's	56.98	.000	3380.00	.010			3323.02	.010
y. Insurance	240.99	.003	137.64	.000	103.35	.003		
z. Engineering	1116.80	.014	3921.50	.011		.003	2804.70	
z1. Mech. Engrg	595.66	.007	1976.27	.006		.001	1380.61	
z2. Analysis	1582.10	.019	9691.18	.028			8109.08	.009
z3. Per. Injury	4948.70	.059	15079.36	.043		.016	10130.66	
z4. Safety Dept.	320.04	.004	1396.25	.004			1076.21	
z5. Telephones & Safety Devices	639.83	.008	2840.64	.008			2200.81	
z6. Local Welfare	2636.50	.032	8885.26	.026		.006	6248.76	
z7. Special Exp. Pensions, etc	4108.52	.050	13653.54	.039		.011	9545.02	
z8. Insp. Office	5231.00	.063	15058.60	.043		.020	9827.60	
z9. Mine Office	4098.56	.049	11751.23	.034		.015	7652.67	

\* Costs for 1932 cover 5 months only to June 1st.

\*\* Costs for 1931 cover 12 months.



MORRIS-LLOYD MINE.ANNUAL REPORTYEAR 19328. COST OF OPERATINGb. Development in Rock:

The cost per foot for the past three years was, viz.,

	LABOR <u>PER FOOT.</u>	SUPPLIES <u>PER FOOT</u>	TOTAL <u>PER FOOT.</u>
Year 1932	\$4.32	\$3.49	\$7.81
Year 1931	5.04	3.66	8.70
Year 1930	6.31	4.11	10.42

The decrease in unit cost per foot is largely labor, which has been reduced 14% or more than the wage reduction accounts for.

d. Stoping

Detailed costs for the years 1931 and 1932 as follows:

	<u>1932</u> <u>AMOUNT</u>	COST <u>PER TON</u>	<u>1931</u> <u>AMOUNT</u>	COST <u>PER TON</u>
General Supplies	\$562.72	.007	\$3918.38	.011
Iron and Steel	86.78	.001	1029.22	.003
Oil and Grease	49.36	.001	281.67	.001
Machinery Suppl.	797.27	.009	8073.18	.023
Explosives	4593.88	.055	18264.95	.052
Lumber & Timber			69.26	
Electric Power	318.58	.004	1465.80	.004
Sundries			197.86	.001
Shop Expense	308.24	.004	1275.29	.004
Scrapers			2132.98	.006
TOTAL SUPPLIES	6716.83	.081	36,690.59	.105
P.Roll Labor	18,775.17	.227	86,385.71	.247
Shop Expense	839.13	.009	5,782.54	.017
Total Labor	19,614.30	.236	92,168.25	.264
GRAND TOTAL,	26,331.13	.317	128,858.84	.369

Comparing the last three years shows up these figures:

	C O S T P E R T O N		
	LABOR	SUPPLIES	TOTAL.
Year 1930 - - - -	.292	.115	.407
1931 - - - -	.264	.105	.369
1932 - - - -	.236	.081	.317

The unit cost for supplies was cut more this last year than it was the previous year. Labor cost was cut between 10 and 11%, accounted for by the cut in wages.

g. Ventilation

As mentioned in last years Annual Report, the Morris Mine workings could never be properly ventilated without installing a large blower fan. When the mine stopped producing, and all hoisting and tramping closed, in a short time the air became so bad that carbide lamps would not burn. As no repairing could be done, we were forced to install a 45,000 cu.ft. fan temporarily at the Morris shaft collar. The fan was purchased second hand from the Archibald Mine, and its installation worked a miracle as far as the air was concerned, as in 2 or 3 days underground conditions were the best they had been in years.

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8. COST OF OPERATING:

h. Pumping:

Pumping costs were lowered, although more water was handled, some of it from a greater depth.

Detailed costs for the two years showing the entire 12 months period for both 1932 and 1931 is as follows:

	<u>1932</u>	<u>1931</u>
Pumpmen, Labor	\$2,840.90	\$4,409.69
Other Labor	<u>101.98</u>	<u>108.08</u>
TOTAL LABOR	\$2,942.88	4,517.77
Oil, Waste, etc.,	321.48	400.97
Tools & Miscl.	56.71	73.58
Prop. Air Charge	600.00	600.00
Electric Power	<u>12,933.10</u>	<u>12,559.20</u>
TOTAL SUPPLIES,	13,911.29	13,633.75
TOTAL OPT'G EXP.,	16,854.17	18,151.52
Gals. Water Pumped	213,788.532	205,406.448
Cost per 1000 Gals.	.079	.088

The above shows a large reduction in labor, which was accomplished by having the foremen in charge of the underground repair crew spend part of his time looking after the pumps on the lower levels during the period the mine was idle.

m. Electric Tram Equipment:

A very large decrease was made in the maintenance cost of all the underground electric tram equipment.

A comparison for the past three years follows:

	<u>1932</u>	<u>1931</u>	<u>1930</u>
Generators	15.61	46.02	99.91
Locomotives	202.95	1536.88	3373.87
Wiring	322.70	1162.55	2588.41
Main Line Tracks	1632.34	5507.19	9906.04
Main Line Cars	107.14	7646.60	11845.34
Spotting Engines		<u>71.47</u>	<u>36.52</u>
TOTAL COST,	2,280.74	15,970.71	27,850.03
Tons Ore Trammed	82,876	349,158	465,371

The above costs clearly show that the large decrease in cost is much more proportionally than the decrease in ore trammed. It will be noted that repairs on locomotives and cars were practically nil.

o. Hoisting:

Detailed costs of operating hoists for the last two years:

	<u>*1932*</u>	<u>1931</u>
Engineers' labor	\$2,245.99	\$5,685.43
Other Labor	<u>.97</u>	<u>10.35</u>
TOTAL	2,246.96	5,695.78
Oil, waste, etc.,	24.95	131.30
Tools, etc.,	52.03	91.70
Electric Power	4,233.29	13,641.45
Proportion of heat	<u>419.21</u>	<u>513.90</u>
Total Supplies,	4,779.48	14,378.35
TOTAL OPERATING EXPENSE	7,026.44	20,074.13

\* Entire 12 months 1932.



MORRIS-LLOYD MINE.ANNUAL REPORTYEAR 1932.8. COST OF OPERATINGx. Mine Buildings:

The following details show how little money was spent on maintenance of mine buildings.

	<u>1932*</u>	<u>1931</u>
Office	0	21.40
Shops	2.70	61.53
Shaft House		1773.68
Engine House	.25	996.54
Dry House	34.88	292.56
Miscellaneous	<u>42.01</u>	<u>53.73</u>
TOTAL,	79.84	3199.44

\*Entire 12 months 1932.

10. TAXES

The following tables show tax data for both Ely and Ishpeming townships. All of the Morris Mine is in the former township, and the Company's fee property on Section 6, is in Ishpeming Township.

Ely Township  
Morris-Mine.

	<u>1932</u>		<u>1931</u>	
	<u>VALUATION</u>	<u>TAXES</u>	<u>VALUATION</u>	<u>TAXES.</u>
Realty	\$480,600.00	\$13,374.49	\$625,600.00	\$20,491.52
Personal	715,000.00	19,897.52	455,000.00	14,903.53
TOTAL,	1,195,600.00	33,272.01	1,080,600.00	35,395.05
Collection Fees		332.72		353.95
TOTAL TAXES,		33,604.73		35,749.00

Ishpeming Township  
Lloyd and Lloyd  
East Mine

Realty	611,380.00	16,594.94	701,450.00	21,534.19
Personal	505,000.00	13,705.08	590,000.00	18,112.73
TOTAL,	1,116,380.00	30,300.02	1,291,450.00	39,646.92
Collection Fee,		303.00		396.47
TOTAL TAXES,		30,603.02		40,043.39
GRAND TOTAL,	2,311,980.00	64,207.75	2,372,050.00	75,792.39
Product, Tons		82,876		349,158
Taxes Per Ton Production,		.7747		.2171
Shipments, Tons		26,021		172,615
Taxes Per Ton Shipped		2.4670		.4391

MORRIS-LLOYD MINE.

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10. TAXES.

Taxes raised in Ely Township:

	<u>1932</u>	<u>1931</u>	<u>1930</u>
State - - - - -	\$8,888.68	\$10,010.47	\$7,997.50
County- - - - -	19,501.77	20,537.56	16,729.49
County Road - - - - -	0.00	6,297.15	5,871.89
Highway Improvement - - - - -	8,000.00	8,600.00	8,000.00
Road Repairs- - - - -	9,500.00	12,000.00	7,000.00
School- - - - -	13,000.00	13,000.00	13,000.00
One Mill- - - - -	2,620.88	2,714.44	2,136.68
Bridge- - - - -	0.00	3,500.00	3,000.00
School Building - - - - -	4,000.00	8,000.00	8,000.00
Township Contingent - - - - -	4,000.00	4,000.00	4,000.00
Rejected Tax- - - - -	128.62	62.00	40.38
Special Tax - - - - -	<u>3,300.00</u>	<u>0.00</u>	<u>1,200.00</u>
TOTAL TAXES - - - - -	\$72,939.95	\$68,721.62	\$76,975.94

Taxes raised in Ishpeming Township:

State - - - - -	5,095.48	6,248.24	5,276.77
County - - - - -	11,179.47	12,818.94	11,038.16
County Road - - - - -	0.00	3,930.50	3,874.29
Township Contingent - - - - -	3,000.00	3,000.00	3,000.00
Highway Improvement - - - - -	1,000.00	1,000.00	2,000.00
Road Repairs- - - - -	5,500.00	7,000.00	6,500.00
School Tax- - - - -	13,497.36	16,306.23	18,590.18
One Mill - - - - -	1,502.64	1,693.77	1,409.82
Rejected Tax - - - - -	3.88	4.96	17.64
Bridge Tax - - - - -	<u>0.00</u>	<u>0.00</u>	<u>500.00</u>
TOTAL TAX - - - - -	\$40,778.83	\$52,002.64	\$52,206.86

Comparing the 1932 taxes with those of the previous two years, shows clearly the effect of the tax reduction campaign waged in this county last summer and fall.

11. ACCIDENTS & PERSONAL INJURIES

The accident record for the past three years follows:

	<u>1932</u>	<u>1931</u>	<u>1930</u>
Fatal Accidents	0	1	1
Compensible Accidents	0	4	8

13. Equipment

Because of curtailment nothing was purchased in the line of new equipment. A second hand blower fan was purchased from the Archibald mine for the Morris Mine.

14. MAINTENANCE AND REPAIRS

As mentioned previously in a number of places in this report, all maintenance and repairing was kept down to a minimum and costs were nil.



MORRIS-LLOYD MINEANNUAL REPORTYEAR 1932.15. POWER.

The following tables give detailed costs and quantities of electric power used:

	<u>1932</u>		<u>1931</u>	
	<u>K.W.H.</u>	<u>AMOUNT</u>	<u>K.W.H.</u>	<u>AMOUNT.</u>
Pumping	862,206	\$12,933.10	837,280	\$12,559.20
Compressors	714,943	10,724.13	1,496,208	22,443.12
Electric Haulage	76,891	1,153.37	222,595	3,338.92
Hoisting	282,220	4,233.29	909,430	13,641.45
Miscellaneous	165,015	2,475.23	207,325	3,109.88
<b>TOTAL,</b>	<b>2,101,275</b>	<b>31,519.12</b>	<b>3,672,838</b>	<b>55,092.57</b>

17. CONDITION OF PREMISES.

Maintenance costs in the mine location were kept down to a minimum. Absolutely no work was done except where repairs were imperative. Residents in the location were given kalsomine only during 1932. The total cost of all repairs, including store, Superintendent's residence, Club House, etc., was only \$1,189.54 for the 128 dwellings, or \$9.29 per house.

18. NATIONALITY REPORT

Nationality report for the Morris-Lloyd Mine for period ending May 31st, 1932;

Finnish.....	96
French .....	56
English.....	37
Italian.....	35
Scandanavians..	33
Irish.....	1
Austrian.....	1
<b>TOTAL.....</b>	<b>259</b>

TILDEN MINE  
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1. GENERAL

The Tilden Mine was idle the entire year except for eleven (11) days when ore was loaded and three (3) days loading rock for the D.S.S. & A. Railway Company. There was no regular operating schedule, the pit operating when boats were named. The operation was confined entirely to loading of ore and we only employed part of our regular crew at a time.

Up until July we employed the mine mechanic three days per week, who with the Captain, did most of the repair work to the equipment. Since July we have only employed a day and night watchman. The Captain acts as day watchman and three men divide the time as night watchman.

2. PRODUCTION  
SHIPMENTS &  
INVENTORIES

a. Production by Grades

Tilden Silica	19,957 tons
Tilden Low Phosphorus	-
Total	19,957 tons

This production compares with 137,010 tons produced during 1931, a decrease of 117,053 tons.

b. Shipments

The shipments from the Tilden Mine for 1932 were the same as the production figures, as all the ore mined was forwarded to Lake Erie and Lake Michigan ports.

c. Stockpile Inventories

There is no ore in stock. We estimate approximately 10,000 tons of broken ore left in the West Pit from the blast made November 1, 1930.

e. Product by Months

<u>Month</u>	<u>Days</u> <u>Operated</u>	<u>Average Daily</u> <u>Tonnage</u>	<u>Total</u> <u>Tons</u>
July	6	1,760	10,558
August	3	1,639	4,917
October	2	2,241	4,482
Total	11	1,814	19,957



TILDEN MINE  
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2. PRODUCTION  
SHIPMENTS &  
INVENTORIES

f. Ore Statement

	<u>Year</u> <u>Tons</u>	<u>Last Year</u> <u>Tons</u>	<u>Increase</u>	<u>Decrease</u>
On hand Jan.1,1932	None	None		
Output for year	19,957	137,010		117,053
Total	19,957	137,010		117,053
Shipments	19,957	137,010		117,053
Balance on Hand	None	None		

1932      1-9 Hour Shift as tonnage required for boats named.

1931      1-9 Hour Shift 5 days per week Jan.1 to Feb. 16, 1931  
           1-9 Hour Shift 4 days per week Feb.16 to June 1, 1931  
           1-9 Hour Shift 3 days per week June 1 to Oct. 23, 1931

1930      1-9 Hour Shift 6 days per week April 23 to July 21,1930  
           1-9 Hour Shift 5 days per week July 21 to Oct. 1, 1930

g. Delays

There were no mechanical or electrical delays during the 11 operating days of the 1932 season.

h. Delays from Lack of Current

There were no delays during the season of 1932 from lack of current.

3. ANALYSIS

a. Average Mine Analysis on Output

<u>Grade</u>	<u>Iron</u>	<u>Phos.</u>	<u>Sil.</u>	<u>Mn.</u>	<u>Alum.</u>	<u>Lime</u>	<u>Mag.</u>	<u>Sulp.</u>	<u>Loss</u>	<u>Moist.</u>
Tilden Silica										
Dried	39.25	.041	41.75	.09	1.00	.32	.18	.008	.23	
Natural	38.43	.040	40.88	.08	.98	.31	.17	.008	.22	2.09

b. Average Analysis on Straight Cargoes

<u>Grade</u>	<u>Boat</u>	<u>Date</u>	<u>Mine</u>			<u>Lake Erie</u>		
			<u>Iron</u>	<u>Phos.</u>	<u>Sil.</u>	<u>Iron</u>	<u>Moist.</u>	<u>IronNail.</u>
Tilden	Harvester	7-22-32	39.59	.061	40.17	38.65	2.40	37.72
Silica	Goderich	7-26-32	38.81	.032	42.03	39.20	1.62	38.57
	Harvester	8-17-32	39.24	.036	42.27	40.02	.86	39.68
	Pioneer	11-13-32	39.94	.046	40.78	39.60	2.61	38.59
	Average		39.36	.044	41.31	39.36	1.89	38.62

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4. ESTIMATE  
OF ORE  
RESERVES

a. Developed Ore

1. West Pit

Assumption: 14 cu. ft. equals one ton  
10% deduction for rock.

Grade: Tilden Silica.

Ore in sight Jan. 1st, 1932, Upper Bench	707,775 tons
Ore mined during 1932, Upper Bench	19,957 tons
Ore in sight Jan. 1st, 1933, Upper Bench	687,818 tons
Ore in sight Jan. 1st, 1933, Lower Bench	1,870,000 tons
 Total developed ore Jan. 1st, 1933, West Pit	 2,557,818 tons

2. East Pit

Assumption: 14 cu. ft. equals one ton.  
10% deduction for rock.  
All tonnage above 1500 ft. elevation  
(Track grade from Crushing Plant)

Grade: Tilden Silica  
Tilden Low Phosphorus

Ore in sight Jan. 1st, 1932	
Grading above .015 Phos.	2,054,115 tons
Ore Mined during 1932	
Grading above .015 Phos.	None
Ore in sight Jan. 1st, 1933	
Grading above .015 Phos.	2,054,115 tons
 Ore in sight Jan. 1st, 1932	
Grading below .015 Phos.	3,467,288 tons
Ore Mined during 1932	
Grading below .015 Phos.	None
Ore in sight Jan. 1st, 1933	
Grading below .015 Phos.	3,467,288 tons
 Total Developed Ore Jan. 1st, 1933, East Pit	 5,521,403 tons

3. East and West Pits

Total Developed Ore Jan. 1st, 1933, West Pit	2,557,818 tons
Total Developed Ore Jan. 1st, 1933, East Pit	5,521,403 tons
East and West Pits	8,079,221 tons



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4. ESTIMATE  
OF ORE  
RESERVES

b. Prospective Ore

In addition to the developed ore, there is probably a very large tonnage to the North and East of the area developed by the East Pit drilling, while at the West Pit there is probably a large tonnage of ore to the North and West, which due to the heavy overburden in the swamp to the north, and the existence of a dike of considerable size between the present pit and the ore to the northwest, it would be too expensive to secure.

e. Estimated Analysis

	<u>Iron</u>	<u>Phos.</u>	<u>Sil.</u>	<u>Mang.</u>	<u>Alum.</u>	<u>Lime</u>	<u>Mag.</u>	<u>Sul.</u>	<u>Ign.</u>	<u>Moist.</u>
<u>1. West Pit</u>										
Dried	42.50	.045	35.10	.120	.67	.48	.31	.014	.90	
Natural	41.44	.045	34.22	.118	.65	.47	.30	.013	.88	2.50
<u>2. East Pit</u>										
Dried	38.20	.017	42.12	.120	.67	.48	.31	.014	.90	
Natural	37.24	.017	41.07	.118	.65	.47	.30	.013	.88	2.50

Of the tonnage estimated for the East Pit, the low phosphorus tonnage will average under .015, and the silicious grade material .022.

f. Estimate of Production

The following is the estimate of tonnage and analysis of ore to be produced from the Tilden Mine during 1933. These figures are conservative and based on expected shipments of this grade. They can be increased materially without any difficulty.

<u>Grade</u>	<u>Tonnage</u>	<u>Iron</u>	<u>Phos.</u>	<u>Sil.</u>	<u>Sul.</u>	<u>Moist</u>	<u>Iron Nat'l.</u>
Tilden Silica	45,000	40.00	.040	40.00	.009	2.50	39.00
Tilden Low Phos.	5,000	37.50	.015	43.00	.009	2.50	36.52

5. LABOR  
AND  
WAGES

a. Comments:

1. Labor and Wages

On account of the very limited operation during 1931 only minor repairs were made to the equipment during the winter of 1932. The repairs were mostly made by the Captain and mechanic, the latter who was employed three days a week until July. The tonnage loaded was small and only part of the regular crew was employed at a time. Exclusive of the Captain, Mechanic and watchman, the men were only given six or seven days employment during the year.

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5. LABOR &  
WAGES

a. Comments

1. Labor & Wages

The present crew consists of the Captain as day watchman and three men dividing the time as night watchman.

Wages were reduced as of May 16th, 15%, making a total reduction since October 1931 of 23.5%. The new wage scale pays common labor \$2.90 per day.

2. New Construction

There was no new construction work done during 1932.

b. Comparative Statement of Wages and Product

	<u>1932</u>	<u>1931</u>	<u>Increase</u>	<u>Decrease</u>
Production, Tons	19,957	137,010		117,053
No. of Shifts and Hours	1-9	1-9		
Average number of men working	23	32	9	
Average wages per day	3.89	5.02		1.13
Tons per man per day	45.15	40.56	4.59	
Labor cost per ton labor Stmt.	.0856	.124		.0384
Labor cost per ton Cost sheet	.188	.144	.044	
Total number of days	634½	3378½		2743¾
Amount paid for labor, per labor statement	\$ 2,465.67	\$16,957.55		\$14,491.88
Amount paid for labor per cost sheet	3,758.87	19,724.64		15,965.77

The large differences above are explained by the mine making no winter repairs to equipment, by the very small production and the 23.5 per cent reduction in wages since the close of the 1931 operating season at the Tilden.

6 SURFACE

There were no repairs made to buildings or work done on surface during 1932.



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7. OPEN PIT  
OPERATIONS

a. Stripping

There was no stripping done at either the East or West Pits during 1932. For statements of stripping cost to date see 1931 Annual Report.

e. Open Pit Operations

The Tilden Mine was idle until Monday, July 11, when the No. 31 shovel was moved back from the East to the West Pit. Although we only loaded approximately 20,000 tons, it paid to move the shovel, as the tonnage is almost doubled operating two shovels instead of one, as the operation of the second shovel requires just five additional men. Further, by operating two shovels, a more average grade of ore is shipped. The center of the West pit is lean while the East and West ends are higher grade material. The cost of moving the shovel was approximately \$100.00 for labor and \$25 for power. It took three days to move the shovel, during which time the crushing plant was put in operating condition and the tracks gone over.

Loading of ore was started on Thursday, July 14th, and continued for six days, loading 10,558 tons. The pit was idle again until Thursday, August 11th, when it was operated for three days, loading 4,917 tons. The average daily tonnage was small as the No. 31 shovel, loaded rock for a half day on two days. The rock had been cast to one side as the ore was sorted, until it had to be loaded and wasted to allow the loading of additional ore. The ore at the West end of the pit is badly mixed with dike rock, and it was necessary to load and waste 1,592 tons of ore and rock from this end of the pit.

The next loading was not done until October 22nd, when the pit was operated for two days loading 4,482 tons. This was the last for the season and the equipment was tied up for the winter.

Previous to this last loading, we operated the shovel at the West end of the pit sorting out the rock from the ore. Instead of loading and wasting this rock, we loaded out 315 yards or approximately 550 tons for the D. S. S. & A. Railway Company, for use in banking their tracks along Lake Gogebic. We received a second order in November and loaded 285 yards of rock for their account. We not only made a nice profit on the loading of this rock over the cost of wasting it but we decreased our ore loading costs due to having sorted the rock out before hand and thereby securing a larger daily production.

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7. OPEN PIT  
OPERATIONS

e. Open Pit Operations

The following is a statement covering the sale of rock to the D.S.S. & A. Railway Company:

Loaded October 20 & 21, 315 yds. @ \$ .80	\$ 252.00
Labor and Supplies for loading, approximately	<u>50.00</u>
Profit	202.00
Loaded November 15, 285 yds. @ \$ .875	\$ 249.37
Labor and Supplies for loading, approximately	<u>47.00</u>
Profit	202.37
Profit on two shipments	\$ 404.37

The reason for the increase in price on the rock loaded on November 15th over that loaded in October, was due to having tied up the pit equipment for the winter and then having to get it ready again. The increase in price, however, more than took care of this expense.

No operations were conducted in the East Pit during the year 1932.

f. Drilling, Blasting and Explosives

There was no drilling or blasting done except a very limited amount of block holing or secondary drilling and blasting while loading the 19,957 tons.

8. COST OF  
OPERATING

a. Comparative Mining Costs

	<u>1932</u>	<u>1931</u>	<u>Increase</u>	<u>Decrease</u>
Production	19,957	137,010		117,053
Average Daily Product	1,814	1,651	163	
Tons per man per day	45.15	40.56	4.59	
Number of days operating	11	83		72
Number shifts and hours	1-9	1-9		
Budget - Estimate Production	60,000	300,000		240,000
Budget - Est. Cost at Mine	.734	.538	.196	
<u>COST</u>				
Pit operating accounts	.456	.390	.066	
Pit general accounts	.170	.089	.081	
Cost at Mine per cost sheet	<u>.626</u>	<u>.479</u>	<u>.147</u>	



TILDEN MINE  
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8. COST OF OPERATING

a. Comparative Mining Costs (Cont.)

	<u>1932</u>	<u>1931</u>	<u>Increase</u>	<u>Decrease</u>
<u>DEPRECIATION</u>				
Plant and Equipment	.077	.077		
Movable Equipment		.006		.006
Taxes	.301	.106	.195	
Stripping	.016	.016		
Supply inventory	.000	.000		
Total Cost at Mine	1.020	.684	.336	
Idle Expense	.338	-	.338	
GRAND TOTAL AT MINE	1.358	.684	.674	
<u>EXPENSE BEYOND MINE</u>				
Rail Freight	.700	.640	.060	
Lake Freight	.760	.760		
Cargo Insurance & Analysis	.010	.010		
Shrinkage	.017	.013	.004	
Total Cost Lower Lakes	2.845	2.107	.738	

b. Detail Cost Comparison

1. Days & Shifts

The mine did not operate on any definite schedule during 1932, operating only a total of 11 days for the season. The pit was worked when boats were named. During 1931 the Pit averaged 3 days per week.

2. Production

The 1932 production was only 14.5% that for 1931. The average daily product was better than for 1931 and the tons per man per day shows an increase including the idle period, which was the entire year, exclusive of the eleven operating days.

3. Cost of Production

The cost of production of .626 per ton compares with \$ .479 for 1931, an increase of .147 per ton. The actual operating accounts show a decrease, but due to the small production the accounts taking a proportion of the Winter Expense (Idle Expense up to July 1st) show an increase. On a tonnage basis the winter expense for 1932 was \$ .282 per ton compared with \$ .088 per ton for 1931, an increase of \$ .194 per ton.

The total cost on cars of \$ 1.358 compares with \$ .684 for 1931, - an increase of \$ .674. This is due to the winter expense, idle expense (October, November and December) and taxes. The taxes as listed do not represent the actual cost per ton for taxes on the ore produced compared with the previous year. A portion is absorbed in the Idle Expense.





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8. COST OF  
OPERATING

b. Detailed Cost Comparison (Continued)

4. Open Pit Costs

	1932		1931		Increase		Decrease	
	Amount	Per Ton	Amount	Per Ton	Amount	Per Ton	Amount	Per Ton
<u>GENERAL MINE EXPENSE</u>								
18. Insurance	108.92	.005	76.44	.000	32.48	.005		
19. Mining Engineering	111.17	.001	1,248.67	.004			1,237.50	.001
20. Mech. & Elect. Engineering	206.34	.010	1,822.18	.006			1,615.84	.004
21. Analysis & Grading	99.80	.005	4,710.90	.016			4,611.10	.011
22. Personal Injury	184.70	.009	2,598.23	.009			2,413.53	
23. Geological	15.07	.001	117.67	.001			102.60	
24. Safety Department	157.30	.008	162.70	.001		.007	4.40	
25. Welfare Expense	123.00	.006	459.20	.004		.002	336.20	
26. Special Expense	169.00	.008	844.50	.007		.001	675.50	
27. Ishpeming Office	230.00	.011	1,133.08	.008		.003	903.08	
29. Mine Office	2,093.03	.106	5,000.82	.037		.069	2,907.79	
TOTAL GEN. EXP.	3,398.33	.170	11,976.26	.089		.081	8,577.93	
<u>COST OF PRODUCTION</u>								
30. Depr. Plant & Equipment	12,501.27	.626	65,544.02	.479		.147	53,042.75	
31. Movable Equipmt.			822.18	.006			822.18	.006
32. Amortization Strip.	319.31	.016	2,192.16	.016			1,872.85	
33. Taxes	6,000.00	.301	14,534.86	.106		.195	8,534.86	
COST AT MINE	20,357.28	1.020	93,642.99	.684		.336	73,285.71	
34. Inventory Adjustment			23.02	.000			23.02	.000
TOTAL COST	20,357.28	1.020	93,666.01	.684		.336	73,308.73	
35. Idle Expense	6,751.25	.338			6,751.25	.338		
TOTAL COST AT MINE	27,108.25	1.358	93,666.01	.684	66,557.76	.674		

TILDEN MINE  
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8. COST OF  
OPERATING

(Continued)

b. Detailed Cost Comparison (Continued)

4. Open Pit Costs

GENERAL

The amount of money shows a decrease in each item except Idle Expense due to the reduced operation and production, - also a reduction in wages of 23.5% since Oct. 1, 1931 when operations were closed at the Tilden. On account of the difference in operating conditions, it is difficult to compare cost sheets.

1. Drilling & Blasting

All the ore loaded in 1932 was from the West Pit, while in 1931 a small tonnage came from the East Pit, where the costs were higher. At the East Pit, due to lower bank, we did not break as large a tonnage per foot of hole and per pound of powder as at the West Pit.

2. Electric Shovel Operating

3. Electric Shovel Maintenance

4. Locomotives & Cars Operating

5. Locomotives & Cars Maintenance

6. Track Expense

All of these operating accounts show a small decrease except Shovel Maintenance. The decrease is due to operating with a minimum crew on a reduced wage scale and securing a larger average daily product. The increase for Shovel maintenance is due to a larger proportion of winter expense being charged to shovels.

11. Crushing & Screening

This item shows an increase in cost per ton on account of the expense of rewinding the two motors that operate the reduction crushers. These were burnt out the latter part of the 1931 season and only repaired temporarily at the time.

12. General Open Pit Expense

13. Open Pit Superintendence

These two accounts show an increase in cost per ton as the watchmen's time and Captain's time from January to July were charged to these accounts respectively and further, their time during July, August and September, when ore was loaded, being charged to operating, shows an increased cost per ton as product was smaller.

15. Waste Pile Expense

The decrease in waste pile expense is explained by our having sold to the D.S.S. & A.Ry. Co. rock during 1932 instead of wasting same. In 1931 we wasted a very large tonnage from the East Pit.



TILDEN MINE  
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8 COST OF  
OPERATING  
(Continued)

b. Detailed Cost Comparison (Continued)

4. Open Pit Costs

18-23. General Mine Expense Accounts

Most of these items are distributive accounts and show an increase due to the general curtailment at all the properties and very low production at the Tilden.

33. Taxes

This item only shows the taxes charged during the operating months, amounting to \$6,000.00. Included in the Idle Expense is \$4,584.31 for taxes, making the

Total for 1932	\$10,584.31
" " 1931	<u>14,534.86</u>
Decrease 1932	\$ 3,950.55

The cost per ton for taxes on the respective productions is \$ .530 for 1932 compared with \$ .106 for 1931.

35. Idle Expense

The cost for the months of October, November and December, 1932, which includes \$4,584.31, (\$.2297 per ton) taxes, is charged to Idle Expense. In previous years this expense has been included in Winter Expense and distributed to the operating accounts.

<u>Total Cost at Mine</u>	
1932	\$ 1.358 per ton
1931	<u>.684 per ton</u>
Increase	.674 per ton

The main items making up this increase are as follows:

	<u>1932</u>	<u>1931</u>	<u>Increase</u>
Winter Expense	.282	.088	.194
(Part actually Idle as includes nothing but watching)			
Taxes (Total including that charged to Idle Expense)	.530	.106	.424
Idle Expense (Exclusive of Taxes)	<u>.108</u>	<u>.000</u>	<u>.109</u>
	.921	.194	.727

This increase of \$ .727 on these three items compares with the actual total increase of \$ .674. In other words, the operating accounts show a decrease of \$ .053 which is partly explained by reduction in wages and a very economical operation.

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10. TAXES

Tilden Township  
Tilden Mine

	<u>1932</u>		<u>1931</u>	
	<u>VALUATION</u>	<u>TAXES</u>	<u>VALUATION</u>	<u>TAXES</u>
N $\frac{1}{2}$ of NW $\frac{1}{4}$ of Sec. 26-47-27	195,000	7,358.67	300,000	11,158.62
Supplies & Equipment	80,000	3,018.94	80,000	2,975.64
S $\frac{1}{2}$ of NW $\frac{1}{4}$ of Sec. 26-47-27	400	15.10		
N $\frac{1}{2}$ of NE $\frac{1}{4}$ " " 26-47-27	1,400	52.84	1,400	52.07
S $\frac{1}{2}$ of NE $\frac{1}{4}$ " " 26-47-27	900	33.97	900	33.48
SE $\frac{1}{4}$ of SW $\frac{1}{4}$ " " 23-47-27 (included under Foster 1932)			4,000	148.78
TOTAL	277,700	10,479.52		
Collection Fees		104.79		
Total Tilden 1932		10,584.31		

Ogden Mine

Lot 3 Sec. 13, 47-27	150	5.66	150	5.60
Part of Lot 4, Sec. 13-47-27	100	3.77	100	3.72
Lot 5, " " 13-47-27	150	5.66	150	5.60
SE $\frac{1}{4}$ of SW $\frac{1}{4}$ " " 13-47-27	200	7.55	200	7.44
Total Ogden & Tilden, 1931	600	22.64	386,900	14,390.95
Collection Fees		.23		143.91
Total		22.87		14,534.86
Rate		3.744		

Arrangements will be made with the Appraiser of Mines to include the entire N $\frac{1}{2}$  of Section 26, 47-27 as the Tilden Mine and thus reduce the valuation for 1933 by \$2,700 which is added by the Local Assessor.

11. PERSONAL  
INJURIES

There were no accidents of any nature during 1932, of course the mine was only operated a total of about two weeks. The Tilden Mine maintains a perfect record having gone since December 14th, 1929 without a lost time accident. During this period 444,010 tons have been produced by 9,349 man days.

12. NEW CONSTRUCTION  
AND PROPOSED  
NEW CONSTRUCTION

No new construction of any nature was undertaken during the past year.

14. MAINTENANCE  
AND REPAIRS

1. Shovels

The electric shovels were in good conditions and except for a general cleaning of the main bearings and moving parts, no extraordinary repairs were made during 1932.



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14. MAINTENANCE  
AND REPAIRS  
(Continued)

2. Locomotives

During January and February, the Captain and Mechanic, the latter who was employed three days a week, made repairs to the locomotives. They repacked and reseated all steam and air valves, and overhauled the air pumps, check valves and injectors.

3. Cars

The steps and brake riggings on the cars were straightened and air hoses and air connections gone over before the operating season started in July.

4. Crushing Plant

The two motors for the reduction crushers were rewound by the Electrical Department. These motors were burnt out the latter part of the 1931 season by lightning coming in on the line. At the time temporary repairs were made by cutting out coils. Other minor adjustments were made to the plant during April when the machinery was gone over, preparing for the operating season.

5. General

Safety baskets were made for three of the churn drills. These baskets are constructed so as to prevent the mast sheave falling to the ground in case the shaft should break.

18. NATIONALITY  
REPORT

	<u>American</u> <u>Born</u>	<u>Foreign</u> <u>Born</u>	<u>Total</u>
English	7	3	10 - 30%
Swedish	5	1	6 - 19%
Finnish	5	5	10 - 30%
French Canadian	2		2 - 6.5%
Irish	4		4 - 11.5%
Norwegian	1		1 - 3%
Total	24	9	33 - 100%

NEGAUNEE MINE  
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1. GENERAL:

The Negaunee Mine operated two days per week from Jan. 1st to May 1st, then closed for six months or until Nov. 1st, and operated two days per week from Nov. 1st to Dec. 31st.

Production was below normal in April due to closing down at end of month and only 50% of normal in November when it reopened. In December production was 80% of normal due to it being impossible as yet to place the former number of gangs on ore production. Actual crushing of haulage drifts, raises and sub-levels did not progress during the idle period as rapidly as when the mine was in operation, but rotting of timber proceeded at an accelerated rate, due to lack of movement of air in the mine. The main ventilating fan was operated as formerly and also several booster fans to force air into the sub-levels. The air, however, was dead in many areas due to lack of movement of motor trains, no compressed air exhausting from drill machines, scraper and timber hoists, etc. The sub-levels, raises and some areas on the main levels became very hot and rotting of timber proceeded at a rapid rate. This was not noticeable immediately on reopening, but within a few weeks showed up in many places in the mine. Consequently many gangs are repairing raises, building new chutes, retimbering at top of raises and replacing sets on the sub-levels. This diversion of labor from ore production to repair work continued during December and will not be completed for some time. Production will gradually come back, but timbering costs will continue high for a period that cannot be accurately forecast.

During the operating period ore was hoisted four days per week, two of these days represented the former night shift. The underground crew has been divided so that approximately the same number work on each crew, the surface crew outside of the landers, work only two days each week. Employment is staggered so that each man works the equivalent of two days per week.

During the first four months of the year the working crew was maintained at practically a constant number. During the idle period 28% of the men were given employment on repair work and as pumpmen, hoisting engineers, etc. When the mine reopened in November the men were taken on gradually as working places were prepared and production gotten underway. By the end of November 72% of the crew were back at work. In December some additional men were taken on so that at the end of the year approximately 81% of the men were back at work. Every economy is being put into effect and it is hoped to obtain a fairly good cost with a smaller crew than in the early part of the year. Some changes have been made in the surface operations that will decrease costs.

The lack of shipments from stockpile in 1932 made it necessary to provide additional stocking ground when the mine reopened in November. Accordingly 216 feet of wood stocking trestle was built to the East from the end of the East steel trestle on a sollar that had been prepared and used in former years. This did not provide quite sufficient stocking area to take care of the product to May 1st, 1933, so 120 feet of additional ground was graded and leveled, ready for sollar plank to be laid; the trestle will be erected next spring.

Stoping was continued in nearly all the areas that were being mined in 1931, with the exception of the area under the hanging in the Southwest part of the ore body where mining was completed early in 1932. A further concentration of mining was thus effected, which was very desirable as it is impractical to keep many areas open on the present operating schedule.

Early in the year work was completed on the steel and concrete storage pocket on the thirteenth level. Development of this new level was started late in November and will be continued in 1933. Nearly all the drifts on this level will be in the rock footwall and on the present operating schedule it will require several years to complete the necessary drifting and additional time will be required for raising.



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1. GENERAL: (Cont.)

During the year some expense was incurred in work designed to improve ventilation. Concrete dams were installed in the old rock drifts near No. 2 Shaft, (the main ventilating shaft), to prevent the escape of air to surface through the caved area. In addition drifts were driven and raises put up to improve ventilation in the areas being <sup>mined</sup> and this work was still underway at the end of the year.

During the operating periods, as well as when the mine was closed, it was necessary to maintain a large force of timbermen on repair work. Mining progresses so slowly on the present operating schedule in a mine opened for a production in excess of 600,000 tons per year that maintenance of existing openings is a serious problem. The longer they have to be kept open, the more serious it becomes, as rotting progresses uniformly when operating and at a much faster rate when the mine is idle. To offset this condition mining has been concentrated in a few areas and efforts are being made to improve ventilation.

The Negaunee Mine laboratory made the analysis for all the Marquette County mines of the Cleveland-Cliffs Iron Co. until the mines were shut down on June 1st. During the idle period analysis of shipments were made at the Cliffs Shaft laboratory at Ishpeming. On reopening the mines Nov. 1st it was decided to continue the analysis work at Ishpeming as this laboratory could be operated at a slightly lower cost than the Negaunee Mine laboratory, due to electric driers and individual heating plant.

Monthly meetings of foremen were held with good results during the operating period of 1932. The safety rules were reviewed and discussed, some new rules suggested and adopted, all accidents discussed, also elimination of waste, discipline and many other important subjects. These monthly meetings are accomplishing more than formerly as the foremen have gradually overcome their shyness and now take part in all the discussions.

2. PRODUCTION,  
SHIPMENTS &  
INVENTORIES:

a. Production by Grades:

	<u>1932</u>	<u>1931</u>	<u>Decrease</u>
Negaunee Bessemer Ore	0	0	--
Negaunee Ore	84,046	338,696	254,650
Total Ore	84,046	338,696	254,650
Rock	2,568	7,872	5,304
Total Hoist	86,614	346,568	259,954

b. Shipments:

<u>Grade of Ore</u>	<u>Packet Tons</u>	<u>Stockpile Tons</u>	<u>Total Tons</u>	<u>Total Last Year</u>
Negaunee Bessemer	0	0	0	24,913
Negaunee Ore	7,656	2,368	10,024	134,536
Total	7,656	2,368	10,024	159,449
Total Last Year	97,854	61,595	159,449	
Decrease	90,198	59,227	149,425	

c. Stockpile Inventories:

<u>Grade of Ore</u>	<u>Dec. 31, 1932</u>	<u>Dec. 31, 1931</u>	<u>Increase</u>
Negaunee Bessemer	0	0	--
Negaunee Ore	475,811	401,789	74,022
Total	475,811	401,789	74,022

NEGAUNEE MINE  
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2. PRODUCTION,  
SHIPMENTS &  
INVENTORIES:  
(Continued)

d. Division of Product by Levels:

The ore hoisted from the various levels was as follows:

	<u>1932</u>		<u>1931</u>	
10th Level			1,288	.4%
11th Level	38,822	46.2%	173,471	51.2%
12th Level	45,224	53.8%	163,937	48.4%
Total	84,046	100.0%	338,696	100.0%

e. Production by Months:

The production by months is as follows:

<u>Month</u>	<u>Bessemer</u>	<u>Negaunee</u>	<u>Total</u>	<u>Rock</u>
January	-	15,793	15,793	376
February	-	16,720	16,720	196
March	-	16,752	16,752	224
April	-	13,316	13,316	156
November	-	8,186	8,186	604
December	-	13,279	13,279	1,012
Total	-	84,046	84,046	2,568
Total 1931	2,142	338,696	340,838	7,872
Decrease	2,142	254,650	256,792	5,304

The product by leases was distributed as follows:

	<u>1932</u>	<u>1931</u>	<u>Decrease</u>
Negaunee Mine	79,736	323,424	243,688
American Mining Co.	4,310	15,272	10,962
Total	84,046	338,696	254,650

f. Ore Statement:

	<u>Negaunee</u>	<u>Total</u>
	<u>Last Year</u>	
On Hand Jan. 1, 1932	401,789	220,400
Product for Year	84,046	338,696
Overrun		2,142
Total	485,835	561,238
Shipments	10,024	159,449
Balance on Hand	475,811	401,789
Decrease in Output	254,650	
Increase in Ore on Hand	74,022	

1932 - 1 8-hour shift, 2 days per week, Jan. 1st to April 30th  
 Mine idle May 1st to Nov. 1st  
 1 8-hour shift, 2 days per week, Nov. 1st to Dec. 31st

1931 - 1 8-hour shift, 4 days per week, Jan. 1st to April 13th  
 3 days per week, April 13th to Nov. 16th  
 2 days per week, Nov. 16th to Dec. 31st

g. Delays:

There was no product hoisted on March 23rd, when the south skip rope broke as the skip was being loaded at the twelfth level pocket. The loss of product was 800 tons.

h. Delays from Lack of Current:

There were no delays in 1932.



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3. ANALYSIS:a. Average Mine Analysis on Output:

<u>Grade</u>	<u>1932</u>			<u>1931</u>		
	<u>Iron</u>	<u>Phos.</u>	<u>Silica</u>	<u>Iron</u>	<u>Phos.</u>	<u>Silica</u>
Negaunee	60.72	.101	6.91	60.29	.101	6.79

b. Average Analysis on Straight Cargoes:

<u>Grade</u>	<u>Mine</u>			<u>Lake Erie</u>	
	<u>Iron</u>	<u>Phos.</u>	<u>Silica</u>	<u>Iron</u>	<u>Moisture</u>
Negaunee	61.10	.113	6.69	60.45	10.22

4. ESTIMATE  
OF ORE  
RESERVES:a. Developed Ore:

Assumption: 12 cubic feet equals one ton  
10% deducted for rock  
10% deducted for loss in mining  
Percentage of Bessemer equals 5%

Above 9th Level:

No. 1 Shaft Pillar	1,148,681 Tons	
No. 2 Shaft Pillar	<u>113,906 "</u>	
Total Above 9th Level		1,262,587 Tons
Between 10th and 11th Levels		751,110 "
Between 11th and 12th Levels		<u>1,737,960 "</u>
Total Developed Ore Above 12th Level, 12-31-32		<u>3,751,657 "</u>

No new ore was developed in 1932. The estimate was obtained by subtracting the product by levels from the estimate of the previous year.

Statement showing ore reserves and new ore development for the following years:

	<u>1928</u>	<u>1929</u>	<u>1930</u>	<u>1931</u>	<u>1932</u>
Ore in Mine Jan. 1st	5,290,042	5,046,197	4,702,191	4,160,089	3,831,393
Production	<u>454,563</u>	<u>552,417</u>	<u>579,740</u>	<u>340,838</u>	<u>79,736</u>
Balance	4,835,479	4,493,780	4,122,451	3,819,251	3,751,657
Ore Reserves, Dec. 31	<u>5,046,197</u>	<u>4,702,191</u>	<u>4,160,089</u>	<u>3,831,393</u>	<u>3,751,657</u>
New Ore Developed	210,718	208,411	37,638	12,142	0

The large increase in ore reserves in 1928 and 1929 was due to opening the twelfth level.

b. Prospective Ore:

No prospective ore is shown in above estimate.

c. Estimated Analysis:

	<u>Ore Reserves: Approximate Expected Natural Analysis:</u>									
	<u>Iron</u>	<u>Phos.</u>	<u>Silica</u>	<u>Mang.</u>	<u>Alum</u>	<u>Lime</u>	<u>Mag.</u>	<u>Sul.</u>	<u>Igni.</u>	<u>Moist.</u>
Bessemer	52.80	.044	5.80	.220	2.30	.900	.290	.008	1.50	12.00
Negaunee	52.50	.095	6.50	.210	2.60	1.200	.360	.009	2.10	12.00

	<u>Ore in Stock: Average Natural Analysis:</u>									
	<u>Iron</u>	<u>Phos.</u>	<u>Silica</u>	<u>Mang.</u>	<u>Alum</u>	<u>Lime</u>	<u>Mag.</u>	<u>Sul.</u>	<u>Igni.</u>	<u>Moist.</u>
Negaunee	52.96	.086	6.16	.200	2.55	1.10	.380	.010	1.94	12.00

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5. LABOR  
AND  
WAGES:

a. Comments:

(1) Labor:

Employment has been staggered as far as possible to give each man two days work per week. On reopening the mine in November the men were taken on gradually and at the end of the year only 81% of the former employees were back at work. It is not expected that all former employees will be hired as economies have been effected that eliminates about (15) men.

(2) New Construction:

There were no active E & A.'s this year and no new construction was undertaken.

b. Comparative Statement of Wages and Product:

	<u>1932x</u>	<u>1931</u>	<u>Increase</u>	<u>Decrease</u>
PRODUCT	84,046	338,696		254,650
No. Shifts and Hours	1-8	1-8		
<u>AVERAGE NO. MEN WORKING:</u>				
Surface	36	51		15
Underground	<u>127</u>	<u>222</u>		<u>95</u>
Total	163	273		110
<u>AVERAGE WAGES PER DAY:</u>				
Surface	3.86	4.39		.53
Underground	<u>4.34</u>	<u>4.71</u>		<u>.37</u>
Total	4.22	4.98		.76
<u>AVERAGE WAGES PER MONTH:</u>				
	9.85 days	13.8 days		
Surface	44.28	65.84		21.56
Underground	<u>40.78</u>	<u>66.15</u>		<u>25.37</u>
Total	41.55	68.09		24.54
<u>PRODUCT PER MAN PER DAY:</u>				
Surface	16.95	32.08		15.13
Underground	<u>5.87</u>	<u>8.58</u>		<u>2.71</u>
Total	4.36	6.77		2.41
<u>LABOR COST PER TON:</u>				
Surface	.228	.137	.091	
Underground	<u>.739</u>	<u>.598</u>	<u>.141</u>	
Total	.967	.735	.232	
<u>AVERAGE PRODUCT MINING:</u>				
Stoping	21.54	21.80		.26
Ore Development	<u>7.19</u>	<u>6.85</u>	<u>.34</u>	
Total	21.25	21.24	.01	
AVERAGE WAGES CONT. LABOR	4.86	5.70		.84
<u>TOTAL NUMBER OF DAYS:</u>				
Surface	4,957 $\frac{3}{4}$	10,559 $\frac{1}{4}$		5,601 $\frac{1}{2}$
Underground	<u>14,317</u>	<u>39,460</u>		<u>25,143</u>
Total	19,274 $\frac{3}{4}$	50,019 $\frac{1}{4}$		30,744 $\frac{1}{2}$



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5. LABOR  
AND  
WAGES:  
(Cont.)

b. Comparative Statement of Wages and Product: (Cont.)

	<u>1932x</u>	<u>1931</u>	<u>Increase</u>	<u>Decrease</u>
<u>AMOUNT FOR LABOR:</u>				
Surface	19,129.01	46,338.39		27,209.38
Underground	62,142.96	202,658.80		140,515.84
Total	81,271.97	248,997.19		167,725.22

AVERAGE WAGES PER MONTH BASED ON MEN CARRIED ON MINE PAYROLL:

	<u>9 Days per Monthxx</u>
Surface	40.26
Underground	39.06
Total	39.05

- x Includes 6 months operating and 6 months idle period.  
xx 15% reduction in wages - May 16th, 1932.

Proportion of Surface to Underground Men:

1932 - 1 to 3.53 -	1 8-hr. shift 2 days per week, Jan. 1st to Apr. 30th
	Mine Idle May 1st to Oct. 31st
	1 8-hr. shift 2 days per week, Nov. 1st to Dec. 31st
1931 - 1 to 4.35 -	1 8-hr. shift 4 days per week, Jan. 1st to Apr. 13th
	1 8-hr. shift 3 days per week, Apr. 13th to Nov. 16
	1 8-hr. shift 2 days per week, Nov. 16th to Dec. 31

6. SURFACE:

a. Buildings, Repairs:

Only minor repairs to buildings were made during the year, the total cost being 1/9 of the cost in the previous year.

b. Stockpiles:

The long wooden trestle paralleling the East Steel Trestle was filled to capacity before the mine shut down in April. Stocking from the East Steel Trestle was then started in the area formerly reserved for Bessemer ore. On reopening the mine in November nine wooden bents were erected at the end of the East Steel Trestle. This ground had been used before for stocking ore so that a collar was already provided. The ground further to the East was leveled for a distance of 100 feet to prepare for four more bents in case it should be necessary to erect additional trestle before the opening of the shipping season.

c. Tracks, Roads, Etc.

There was no expense in connection with roads or tracks in 1932. The following statement gives the cost for water used at mine in the past four years. The saving, since installing the hot well near the boilers in 1931, is greater than was anticipated.

	<u>1932</u>	<u>1931</u>	<u>1930</u>	<u>1929</u>
1st Quarter	58.11	104.72	180.01	257.57
2nd "	68.68	57.41	175.71	279.79
3rd "	51.25	76.31	219.47	305.55
4th "	40.43	46.55	147.36	173.39
Total	218.47	284.99	722.55	1016.30

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6. SURFACE:  
(Cont.)

e. Grounds:

There was no expense incurred in 1932, other than for cutting grass on lawn and care of planted areas.

7. UNDERGROUND:

a. Shaft Sinking:

No sinking in 1932. Some charges were made to this account, due to completing the installation of shaft pocket on the thirteenth level and cutting plat.

b. Development:

There was relatively little development work in 1932. Development in rock was 311 feet, drifting and raising, an increase of 4% over the previous year. Development in ore was only 105 feet, drifting and raising, a decrease of 86% from amount in 1931.

Eleventh Level:

Development work on this level was confined to a rock raise to the tenth level. This raise, located in the North footwall area, was put up for an airway, to improve ventilation in a section of the eleventh level where there was no movement of air during the idle period.

Twelfth Level & 360' Transfer Sub-Level:

The last rock drift to be driven on the main twelfth level was extended 46 feet after the mine reopened. Work was then temporarily stopped, but will soon be resumed and the drift extended 56 feet which will complete it and incidentally all drifting now considered necessary on the twelfth level.

During the year 1290A Raise was extended 90 feet in ore above the twelfth level to the elevation of the 385' sub-level where the hanging was encountered.

In order to mine several footwall ore pillars on the 395' sub-level and the footwall of the eleventh level that could not be reached from the twelfth level raises in this area (beyond economical scraper haul), a transfer sub-level was opened from No. 1284 Raise at the elevation of the 360' sub-level. No. 1284 Raise was still in the footwall at this elevation and a drift was started in rock in a Northerly direction to come under the pillars. At the end of the year this drift was in 42 feet with 88 feet yet to be driven to complete it, after which three transfer raises will be extended 45 feet each, to the elevation of the eleventh level.

Thirteenth Level:

The tail track drift South of the shaft was driven 66 feet the last of the year. It will be extended 40 feet further and ground excavated for a motor repair pit at the end of the drift. This will provide room for train of eight motor cars beyond the thirteenth level pocket.

The summary of development work for the year is as follows:

	<u>Drifting</u>		<u>Raising</u>		1932	1931
	<u>Rock</u>	<u>Ore</u>	<u>Rock</u>	<u>Total</u>	<u>Total</u>	<u>Total</u>
11th Level			120'	120'	720'	
360' Transfer Sub	42'			42'		
12th Level	46'	90'	37'	173'	292'	
13th Level	66'			66'	60'	
Total	154'	90'	157'	401'	1072'	

There were an average of three contracts on development work during 1932, as compared with four in 1931.



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7. UNDERGROUND:  
(Continued)

c. Stoping:

(1) General Remarks:

During the six months operating period of 1932 mining was principally confined to three areas, the North and South footwall just below the tenth level and the North Central portion of the ore body just below the eleventh level. The two transfer systems in use in 1931 were both out of commission early in 1932, one due to crushing and one due to mining having practically reached the elevation of the transfer sub-level.

During the first four months of 1932, there were an average of (25) contracts stoping and in December, (22). These contracts worked four days a week, with two gangs of miners working alternate weeks, so that each man worked the equivalent of two days per week.

(2) Detail in Stoping:

500' Sub-Level: South Footwall:

Mining at this elevation in 1932 was confined to a small area under the hanging between No. 1 and 2 Dikes. This area is very wet and heavy, making mining difficult and slow. There is a fairly large pillar of ore in this area.

In 1931 a new crosscut was driven on the eleventh level and raises put up in this area, but before mining could be started, several of the raises crushed and it proved very difficult to open the others on the sub-level on account of water. It was finally decided to mine only a small area under the hanging on two or three successive sub-levels in hopes that this plan would drain off the water and improve mining conditions in the balance of the ore area. Mining of this small area was completed in the spring.

488' Sub-Level: South Footwall:

Mining was started in the above mentioned small area under the hanging last spring and resumed again on reopening the mine in November. Two contracts worked here and by the end of December half of the area had been mined.

488' Sub-Level: North Footwall:

This small footwall area near the Maas boundary was opened for mining late in 1931 and mining has since been underway. Five contracts worked here and at the end of the year the area was 3/4 mined.

475' Sub-Level: east half of

The ore in the area between No. 1 and 2 Dikes was formerly handled through a transfer sub-level (450' sub-level). When mining reached the elevation of the 475' sub-level, the transfer sub-level crushed and raises had to be put up direct from the eleventh level. The raises were completed in 1931 and mining started on the 475' elevation. By the end of December 1932, the three remaining pillars were being mined. Three contracts worked here during 1932.

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7. UNDERGROUND:  
(Continued)

c. Stoping: (Cont.)

425' Sub-Level:

Mining on the North footwall in the North Central portion of the ore body has been retarded for various reasons during the past several years. The eleventh level crosscuts crushed when mining had progressed only a short distance below the tenth level. The twelfth level footwall drift was then opened and raises put up 150' - 175' to this area, but the upper part of these raises crushed and some other method for handling the ore in this area had to be adopted. A transfer sub-level was then opened at the 385' sub-level elevation in the footwall. The footwall is very flat in this area and soon after opening the transfer sub and completing the raises, crushing started. By constant repairing this area was kept open and mining was fairly continuous on the 425' sub-level up to the shutdown last spring. During the idle period all drifts in this area crushed and it became necessary to open another transfer sub-level. This new transfer was opened in November at the 360' sub-level elevation from 1284 Raise and mining will be resumed when the transfer sub-level and raises are completed. There is a pillar on the footwall remaining to be mined on the 425' sub-level.

Eleventh Level:

The only work (other than repairing) done on the eleventh level in 1932 consisted of a rock raise in the footwall for an airway. Formerly all the air in the North footwall area came to the eleventh level through the operating raises and at times these raises would be blocked to such an extent that the required amount of air did not reach the eleventh level. The new airway is in the footwall and will be open at all times. This raise was completed in December.

395' Sub-Level:

The greater portion of the ore mined in 1932 came from this sub-level in the central part of the ore body through the 1270 and 1290 series of raises. On this sub-level the hanging receded so that mining extended to the West to the Maas boundary. When the working schedule was reduced to two days a week the isolated areas being mined were abandoned when completed and mining concentrated in this area. In December ten contracts were mining here; this area is now over 80% mined.

370' Sub-Level:

Early in the year two contracts finished mining a few small pillars under the hanging in the area above the 1240 system of raises. Mining was then abandoned in this territory until the mine goes back to full production schedule.

360' Sub-Level:

On account of poor ventilation and rapid rotting of cribbing in the raises during the idle period it was decided to drive a ventilation drift and put up a raise from this drift to the eleventh level footwall drift at a point near the Maas boundary. This would improve ventilation in the 1290 and 1270 series of raises where mining was in progress on the 395' sub-level. The drift was driven and the raise completed a short time after the mine closed. The air is forced up 1298A Raise by means of control doors and hence through the sub-level going to the twelfth through the various raises.



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7. UNDERGROUND:  
(Continued)

c. Stoping: (Cont.)

360' Sub-Level: (Cont.)

A new transfer sub-level was opened at this elevation from 1284 Raise in November and in December a drift was advancing North into the footwall. The new transfer will replace the transfer on the 385' sub-level which crushed during the idle period. It will be used in mining the ore on the footwall at the elevation of the eleventh level and a small area on the 395' sub-level.

Twelfth Level:

The work done on the twelfth level during 1932 consisted of putting up one raise and a small amount of rock drifting on the main level.

1290A Raise, located in the drift parallel with the Maas boundary, was extended to the 385' sub-level. It passed through mixed jasper and ore the entire distance of 90 feet which indicates that very little ore will be encountered in the immediate vicinity of the raise.

The connection between No. 4 Crosscut and the drift parallel with the Maas boundary was not completed in 1931. This connection is needed to improve ventilation on the twelfth level and some work was done here in November and the early part of December. The drift advanced 46 feet in the jasper hanging and when work was temporarily stopped in December it was within 60 feet of holing to No. 4 Crosscut. Work will be resumed here as soon as other rock work now in progress is completed.

Thirteenth Level:

Only a small amount of work was done on this new level in 1932. Work on the pocket was completed and drifting started on the level the last of November. The tail track drift South of the shaft pocket was nearly completed at the end of the year. This drift will be extended 125 feet and at the end a motor repair pit will be excavated. When this work is done, drifting to the North towards the ore body will be started.

d. Timbering:

The cost per ton for all timber was 8% higher than in 1931, and also higher than it has been for the past five years. The main increase was in cost for stull timber which was 43% higher than in the previous year. This was due to the curtailed operating schedule and lower daily product, also to the use of larger sized timber to offset the decrease in strength account of the timber in yards being dry. The curtailed operating schedule increased the ratio of repairs to the product. The six months idle period increased the speed of rotting of timber and since reopening, more repair work has been necessary especially in the raises. Careful attention was given to covering down the floors of sub-levels the same as in the previous year which was a factor in cost for all timber as compared with the years prior to 1931.

Nine foot legs and caps are now in general use in mining operations.

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7. UNDERGROUND:  
(Continued)

d. Timbering: (Cont.)

Statement of Timber Used:

	<u>Linear</u> <u>Feet</u>	<u>Avg. Price</u> <u>per Foot</u>	<u>Amount</u> <u>1932</u>	<u>Amount</u> <u>1931</u>
6" to 8" Cribbing	17,807	.0415	738.04	2,763.85
8" Stulls	25,248	.0667	1,685.96	3,550.40
10" "	19,220	.0904	1,737.64	5,294.08
12" "	10,035	.1162	1,166.38	3,292.27
14" "	1,972	.1328	261.85	823.00
16" "	366	.1412	51.71	96.94
Total - 1932	74,648	.0756	5,641.58	
Total - 1931	216,574	.0731		15,820.54
Lagging - 7 Ft.	246,477	.699	1,723.47	5,949.66
Poles - 9½ Ft.	113,902	1.372	1,563.67	10,181.08
Total - 1932	360,379		3,287.14	
Total - 1931	1,557,450			16,130.74
Wire Fencing (70 Rods)			59.50	1,457.42
Grand Total - 1932			8,988.22	
Grand Total - 1931				33,408.70
Product			84,046	338,696
Feet of Timber per Ton of Ore			.8882	.6396
Feet of Lagging per Ton of Ore			2.932	2.476
Feet of Lagging per Foot of Timber			3.301	3.872
Feet of Wire Fencing per Ton			.0154	.364
Cost per Ton for Timber			.0671	.0467
Cost per Ton for Lagging			.0205	.0176
Cost per Ton for Poles			.0186	.0300
Cost per Ton for Wire Fencing			.0007	.0043
Total Cost per Ton			.1069	.0986
Equivalent of Stull Timber to Board Measure			148,947	474,110
Feet of Board Measure per Ton of Ore			1.772	1.40
Total Cost for Timber, Lagging, Poles, Etc.				
<u>Year</u>	<u>Amount</u>	<u>Cost per Ton</u>		
1932	8,988.22	.1069		
1931	33,408.70	.0986		
1930	52,500.62	.0906		
1929	45,512.75	.0899		
1928	40,882.06	.0738		

e. Drifting and Raising:

There was comparatively little drifting and raising done in 1932, due to the two day a week operating schedule and six months idle period.

The following is a statement of drifting and raising for the years 1932 and 1931:

<u>Year</u>	<u>Drifting</u>	<u>Raising</u>		<u>Total</u>
	<u>Rock</u>	<u>Ore</u>	<u>Rock</u>	
1932	154'	90'	157'	401'
1931	110'	783'	189'	1082'
Increase	44'			
Decrease		693'	32'	681'



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7. UNDERGROUND:  
(Continued)

f. Explosives, Drilling and Blasting:

The cost for explosives was practically the same in both years. The cost per lb. for powder decreased 3% in 1932 and the lbs. of powder per ton of ore increased 3.9%.

Statement of Explosives Used: (Ore Development and Stopping)

	<u>Quantity</u>	<u>Average Price</u>	<u>Amount 1932</u>	<u>Amount 1931</u>
40% Gelatin Powder				11.50
50% " "	30,775	.1235	3,787.58	14,019.00
60% " "				3,129.51
Gelamite 2X "	850	.1250	106.25	12.50
" 1X "				12.50
" "A" "	3,600	.1268	456.61	102.00
Total Powder - 1932	35,225	.1235	4,350.44	
Total Powder - 1931	136,300	.1273		17,287.01
Fuse - Feet	109,208	5.59 M.	610.68	2,251.74
Caps - No. 6	17,152	11.31 M.	194.05	729.58
Tamping Bags	7,100	2.25 M.	15.98	79.68
Fuse Lighters	1,400	7.41 M.	10.38	32.67
Total Fuse, Etc. - 1932			831.09	
Total Fuse, Etc. - 1931				3,093.67
Total All Explosives - 1932			5,181.53	
Total All Explosives - 1931				20,380.68
Product			84,046	338,696
Pounds of Powder per Ton of Ore			.4191	.4025
Cost per Ton - Powder			.0518	.0510
Cost per Ton - Fuse, Caps, Etc.			.0099	.0091
Cost per Ton - All Explosives			.0617	.0601
	<u>Sinking, Rock Development, Etc.</u>			
Total Powder - 1932	2,350	.1264	296.99	
Total Powder - 1931	7,800			1,062.77
Total Fuse, Caps, Etc. - 1932			66.02	
Total Fuse, Caps, Etc. - 1931				191.88
Total All Explosives - 1932			363.01	
Total All Explosives - 1931				1,254.65
Total Explosives Used in Mine			5,544.54	21,635.33
Average Price per lb. for Powder			.1235	.1273

Comparison of cost of all explosives for period 1927 to 1932 inclusive:

<u>Year</u>	<u>Cost per Ton</u>	<u>Product</u>
1927	.0629	487,880
1928	.0676	454,563
1929	.0571	555,919
1930	.0574	579,740
1931	.0601	338,696
1932	.0617	84,046

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7. UNDERGROUND:  
(Continued)

g. Mining and Loadings:

With the curtailment in number of working places due to working two crews of miners on alternate weeks in each working place it has been possible to discard the air scraper hoists and to use electric units of 10 and 15 H.P. with larger scrapers. Due to large program of repairs necessary on account of curtailed operations during 1932 the gain by use of the larger units is not apparent on the cost sheet, except in cost for stopping. One compressor has furnished air while in 1931 two compressors were necessary part of each day. There has also been a decided decrease in maintenance cost, as the air hoists are much more expensive to maintain.

h. Ventilation:

During the year the 120,000 cu. ft. fan at No. 2 Shaft was kept operating continually, day and night. The decrease in operating schedule and six months idle period made it necessary to provide fresh air at all times to combat rotting of timber. Several booster fans were also in commission and considerable expense was incurred in drifting and raising to provide new airways. Concrete bulkheads were installed in drifts near No. 2 Shaft to prevent the escape of air through the old workings to caves connecting with surface.

As a result of the work done in No. 2 Shaft in 1931 this shaft has been in excellent condition throughout 1932. Ice does not form as readily as formerly due to casing the downcast compartment and thereby cutting off some of the water.

In spite of the efforts to overcome rotting of timber it has progressed at a rapid rate, especially in the raises that are not in use when the mine is operating, as also in practically all the raises during the idle period. More ventilation doors have been built in the working areas in order to divert air up the raises to the sub-levels. More attention to ventilation is necessary during periods when operations are curtailed as in 1932.

i. Pumping:

The number of gallons pumped per minute in each month of the year for the past four years are shown in the following statement:

<u>Month</u>	<u>1932</u>	<u>1931</u>	<u>1930</u>	<u>1929</u>
January	942	990	1118	1285
February	982	914	1183	1226
March	963	891	1095	1153
April	973	878	1058	1155
May	1000	847	958	1179
June	835	960	1087	1303
July	918	972	1073	1223
August	885	923	1071	1274
September	889	953	1063	1279
October	786	931	1075	1231
November	920	839	934	1202
December	<u>771</u>	<u>875</u>	<u>1011</u>	<u>1250</u>
Total Average	905	914	1060	1230



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7. UNDERGROUND:  
(Continued)

i. Pumping: (Cont.)

There was a small decrease in amount of water pumped in 1932, amounting, however, to only (9) gals. per minute as compared with (146) gals. per minute in the previous year. This is the third year in which there has been a decrease as compared with five previous years in which there was an increase.

The average number of gallons pumped per minute for the past eight years was as follows:

<u>Year</u>	<u>Gals. per Min.</u>
1932	905
1931	914
1930	1,060
1929	1,230
1928	1,198
1927	1,144
1926	819
1925	705

j. Underground in General:

At various places in this report comment has been made on conditions underground due to the reduced operating schedule and six months idle period. Emphasis will be placed in this paragraph on the long continued after effects of the curtailment as regards condition of timber throughout the mine. It is safe to say that outside of the main airways, rotting of timber has progressed 50% faster than under normal continuous operation, i.e. five or six days per week. Repairs have been made to some ten or twelve raises that are in use, but the condition of the idle raises even now is such that re-cribbing and planking is necessary before they can be used. In some cases it will be impossible to make repairs due to caving and loose ground and when mining is resumed new raises will be required. Extensive repairs will soon be necessary on the main levels to replace rotted timber, also more than normal repairs were underway in November and December to traveling roads on the sub-levels that are open. The effect on cost per ton will continue for a long time after operations again become normal.

k. Idle Period:

The mine closed down the last of April, was idle six months, and work was resumed on November 1st. The miners' tools and equipment were brought to surface in May and during the idle period and the early part of November were overhauled and put in good condition. It was decided to work three crews of miners repairing during the idle period, two days each per week, as this would give the maximum number of men eight days work per month. The work done during the idle period covered repairs on main levels, on sub-levels and in raises, driving of a drift to improve ventilation, putting up two raises for ventilation, repairs to shaft and overhauling of equipment. Approximately 75 men were employed during this period. The mine was kept in good condition, also the surface. On reopening the men were taken back gradually, in no case until they were needed and at the end of the year 81% of the former crew were back at work. It is planned to operate with a smaller crew, about fifty less men than formerly to cut down on cash outlay. This will decrease production and increase cost per ton, even so, it will reduce the increase of ore in stock (now over 500,000 tons if overrun is included) and save cash.



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7. UNDERGROUND:  
(Continued)

k. Idle Period: (Cont.)

The mine is developed for a production of 600,000 tons per year; the actual product in 1932 was less than 1/6 of the potential production. The bad effects of the idle period will persist for several years during which time repairs will be above normal.

8. COST OF OPERATING:

a. Comparative Mining Costs:

	<u>1932</u>	<u>1931</u>	<u>Increase</u>	<u>Decrease</u>
PRODUCT	84,046	338,696		254,650
Underground Costs	1.119	1.102	.017	
Surface Costs	.221	.175	.046	
General Mine Expenses	.448	.238	.210	
Cost of Production	1.788	1.515	.273	
Depletion - Original Cost		.099		.099
Increment		.338		.338
Depreciation - Plant & Equip.	.033	.031	.002	
Taxes	.723	.544	.179	
Loading & Shipping	.003	.011		.008
Total Cost at Mine	2.549	2.538	.009	
Administrative & General Exp.	.048	.024	.024	
Miscellaneous Income	.026	.014	.012	
Idle Expense	1.451		1.451	
Reopening Mine	.023		.023	
TOTAL COST	4.043	2.548	1.495	
No. of Days Operated	52	166		104
No. Shifts & Hours	1-8	1-8		
Average Daily Product	1,616	2,040		424

COST OF PRODUCTION:

	<u>1932</u>	<u>%</u>	<u>1931</u>	<u>%</u>	<u>Increase</u>	<u>Decrease</u>
Labor	.782	43.9	.756	49.9	.026	6.0%
Supplies	1.006	56.1	.759	50.1	.247	6.0%
Total	1.788	100.0	1.515	100.0	.273	

b. Detailed Cost Comparison:

(1) Days and Shifts:

<u>Year</u>	<u>Days Worked</u>	<u>Shifts &amp; Hours</u>	<u>Men Employed</u>	<u>Total Days Worked</u>
1932	52	1-8	163	19,274 $\frac{1}{2}$
1931	166	1-8	273	50,019 $\frac{1}{2}$
Decrease	114		110	30,744 $\frac{1}{2}$

(2) Wages:

In 1932 wages were reduced 15% on May 16th and salaries were reduced on Feb. 1st and June 1st respectively.

In 1931 wages were reduced 10% on Oct. 1st and salaries 16-2/3% on June 16th.



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8. COST OF  
OPERATING:  
(Cont.)

b. Detailed Cost Comparison: (Cont.)

(3) Comparison of Production:

Production 1932	84,046 Tons
Production 1931	<u>338,696 "</u>
Decrease	254,650 "

(4) Comparison of Number of Men and Wages:

	<u>No. Men</u>	<u>No. Days</u>	<u>Amount</u>	<u>Rate per Day</u>
1932	163	19,274 $\frac{1}{2}$	81,271.97	4.22
1931	<u>273</u>	<u>50,019<math>\frac{1}{2}</math></u>	248,997.19	4.98
Decrease	110	30,744 $\frac{1}{2}$	167,725.22	.76

(5) Tons per Man per Day:

The tons of ore mined per man per day were as follows:

	<u>1932</u>	<u>1931</u>	<u>Decrease</u>
Surface	16.95	32.08	15.13
Underground	<u>5.87</u>	<u>8.58</u>	<u>2.71</u>
Total	4.36	6.77	2.41

(6) Cost of Production:

1932	\$ 150,216.73	Cost per Ton \$ 1.788
1931	<u>513,360.80</u>	" " " <u>1.515</u>
Decrease	\$ 363,144.07	
Increase		\$ .273

	<u>Total Cost</u>				<u>Cost per Ton</u>		
	<u>Labor</u>	<u>%</u>	<u>Supplies</u>	<u>%</u>	<u>Labor</u>	<u>Supplies</u>	<u>Total</u>
1932	65,648.78	43.9	84,567.95	56.1	.782	1.006	1.788
1931	<u>256,188.90</u>	<u>49.9</u>	<u>257,171.90</u>	<u>50.1</u>	<u>.756</u>	<u>.759</u>	<u>1.515</u>
Incr.				6.0	.026	.247	.273
Decr.	190,540.12	6.0	172,603.95				

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8. COST OF OPERATING: (6 Months - 1932 compared with 12 Months - 1931.)

b. Detailed Cost Comparison:  
(7) Detail of Accounts:

	1932		1931		Increase		Decrease	
Days per Week	2		4-3-2					
Shifts and Hours	1-8		1-8					
Production, Tons	84,046		338,696				254,650	
Avg. Daily Product - Tons	1,632		2,040				408	
Number of Days Worked	51½		166				114½	
		Per		Per		Per		Per
<u>Underground Costs:</u>	<u>Amount</u>	<u>Ton</u>	<u>Amount</u>	<u>Ton</u>	<u>Amount</u>	<u>Ton</u>	<u>Amount</u>	<u>Ton</u>
1. Exploring in Mine	278.47	.003	417.50	.001		.002	139.03	
2. Sinking in Shaft	3184.09	.038	13857.79	.041			10673.70	.003
3. Development in Rock	1782.74	.021	2154.13	.006		.015	371.39	
4. Development in Ore	531.93	.006	4468.42	.013			3936.49	.007
5. Stopping	26329.88	.313	141542.28	.418			115212.40	.105
6. Timbering	21850.40	.260	89086.79	.263			67236.39	.003
7. Trammig	7024.66	.084	28392.00	.084			21367.34	.000
8. Ventilation	2570.89	.031	4144.02	.012		.019	1573.13	
9. Pumping	15483.63	.184	32661.54	.096		.088	17177.91	
10. Compressors & Air Pipes	7802.24	.093	25753.77	.076		.017	17951.53	
12. Undg. Superintendence	3634.85	.043	12467.65	.037		.006	8832.80	
13. Cave-In			.46	.000			.46	.000
14. Maint:Comps. & P Drills	300.00	.004	1847.76	.005			1547.76	.001
15. Scrapers & M Lders	1717.50	.020			1717.50	.020		
16. Electric Tram Eqpt.	1160.57	.014	14698.93	.043			13538.36	.029
17. Pumping Machy	412.60	.005	1770.41	.005			1357.81	.000
<u>Total U.G. Costs</u>	<u>94064.45</u>	<u>1.119</u>	<u>373263.45</u>	<u>1.102</u>		<u>.017</u>	<u>279199.00</u>	
<u>Surface Costs:</u>								
18. Hoisting	5969.33	.071	19339.64	.057		.014	13370.31	
19. Stocking Ore	2246.37	.027	6286.03	.019		.008	4039.66	
21. Dry House	3280.92	.039	5990.19	.018		.021	2709.27	
22. General Surface Expense	1392.43	.017	4584.04	.014		.003	3192.61	
23. Maint:Hoisting Eqpt.	1533.61	.018	4656.06	.014		.004	3122.45	
24. Shaft	938.20	.011	6105.88	.018			5167.68	.007
25. Top Tram Eqpt.	712.23	.008	2101.84	.006		.002	1389.61	
26. Docks, Tres & Pkts	2332.82	.028	9208.06	.027		.001	6875.24	
27. Mine Buildings	132.98	.002	1018.85	.003			885.87	.001
<u>Total Surface Costs</u>	<u>18538.89</u>	<u>.221</u>	<u>59290.59</u>	<u>.175</u>		<u>.046</u>	<u>40751.70</u>	
<u>General Mine Exps.</u>								
28. Insurance	165.99	.002	76.75	.000	89.24	.002		
29. Mining Engineering	846.24	.010	1934.03	.006		.004	1087.79	
30. Mech. & El. Engineering	669.43	.008	1950.26	.006		.002	1280.83	
31. Analysis and Grading	2140.15	.026	8138.11	.024		.002	5997.96	
32. Personal Injury	9464.74	.113	14240.87	.042		.071	4776.13	
33. Safety Department	367.52	.004	1412.58	.004			1045.06	.000
34. Telephones & S Devices	633.46	.008	1828.93	.005		.003	1195.47	
35. Local & Gen. Welfare	2022.86	.024	5480.33	.016		.008	3457.47	
36. Spec Exp., Pensions, Etc.	11366.26	.135	17694.44	.052		.083	6328.18	
37. Ishpeming Office	5638.84	.067	16585.96	.049		.018	10947.12	
39. Mine Office	4297.90	.051	11464.50	.034		.017	7166.60	
<u>Total Gen. Mine Exps.</u>	<u>37613.39</u>	<u>.448</u>	<u>80806.76</u>	<u>.238</u>		<u>.210</u>	<u>43193.37</u>	
<u>COST OF PRODUCTION</u>	<u>150216.73</u>	<u>1.787</u>	<u>513360.80</u>	<u>1.515</u>		<u>.272</u>	<u>363144.07</u>	
40. Taxes	60777.71	.723	184239.36	.544		.179	123461.65	
<u>TOTAL COST</u>	<u>210994.44</u>	<u>2.510</u>	<u>697600.16</u>	<u>2.059</u>		<u>.451</u>	<u>486605.72</u>	



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8. COST OF  
OPERATING:  
(Cont.)

b. Detailed Cost Comparison: (Cont.)  
(7) Detail of Accounts:

GENERAL:

Decrease in expenditures in practically all the accounts is due to shorter working schedule.

UNDERGROUND COSTS:

1. Exploring in Mine:

This charge is direct charge from Ishpeming Office for geological work.

2. Sinking in Shaft:

The charge this year is for equipping pocket on the new thirteenth level and also cutting plat.

3. Development in Rock:

	<u>Drifting</u>	<u>Raising</u>	<u>Total Feet</u>	<u>Cost Per Foot</u>
1932	154'	157'	311'	5.73
1931	110'	189'	299'	7.21
Increase	44'		12'	
Decrease		32'		1.48

An increase of \$ .015 per ton is due to putting up several raises in rock and to rock drifting on the new thirteenth level.

4. Development in Ore:

	<u>Drifting</u>	<u>Raising</u>	<u>Total Feet</u>	<u>Cost Per Foot</u>
1932	15'	90'	105'	5.06
1931		783'	783'	5.71
Increase	15'			
Decrease		693'	678'	.65

A decrease of \$ .007 per ton occurs in this account due to large decrease in development work.

5. Stoping:

	<u>Labor</u>		<u>Supplies</u>	
1932	20,455.43	77.7%	5,874.45	22.3%
1931	95,924.67	67.8%	45,675.31	32.2%
Decrease	75,469.24		39,800.86	9.9%
Increase		9.9%		

There is a decrease in cost per ton of \$ .105. This is due in part to showing the cost for new scraper hoists and repairs, to a new account designated as No. 15 "Scrapers and Mechanical Loaders." In 1931 ten new scraper hoists were charged to the "Stoping" <sup>scraper</sup> account. The cost of these scraper hoists and the repairs for all the equipment in the mine for 1931 accounts for a large part of the decrease in cost per ton.

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8. COST OF OPERATING:  
(Cont.)

b. Detailed Cost Comparison: (Cont.)  
(7) Detail of Accounts:

6. <u>Timbering:</u>	<u>Labor</u>		<u>Supplies</u>		<u>Total Cost</u> <u>Per Ton</u>
1932	12,898.41	59.0%	8,951.99	41.0%	.260
1931	50,479.42	56.7%	38,607.37	43.3%	.263
Decrease	37,581.01		29,655.38		.003

Timbering cost per ton is about the same as last year. Actual proportionate labor repairing was considerably higher, but due to 15% reduction in wages this is not apparent.

7. Tramming:

Cost per ton is the same for both years.

8. Ventilation:

This account shows an increase of \$ .019 per ton over 1931. This is due to operating the main ventilating fan every day in the week during the working period to prevent rotting of timber. In 1931 operations were on a 4-3 and 2 day schedule which also produced a larger tonnage, thereby reducing the cost per ton in 1931.

9. Pumping:

	<u>Gallons Pumped</u>		<u>Gals.</u> <u>Per Min.</u>	<u>Cost</u> <u>For Power</u>
1932 - 6 Mos. Working Period	- 242,672,906		905	11,965.83
1931 - 12 " " "	- 482,294,599		914	24,234.27
Decrease			9	

Cost per ton in 1932 was \$ .184 as against \$ .096 in 1931. This is due to the shorter working schedule in 1932 and decreased product.

10. Compressors and Air Pipes:

	<u>Operating</u> <u>Comp. Cost</u>	<u>Cost for</u> <u>Air Pipes</u>	<u>Cu. Ft.</u> <u>of Air</u>	<u>Cu. Ft. Air</u> <u>per Ton</u>
1932	6,265.70	1,536.54	161,775,000	1,925
1931	23,151.08	2,602.69	520,641,000	1,832
Decrease	16,885.38	1,066.15	358,866,000	
Increase				93

The cost per ton for 1932 was \$ .093 as against \$ .076 for 1931. The increase is due to smaller production and reopening in November in which month there was a small tonnage.

12. Underground Superintendence:

This account shows an increase of \$ .006 per ton which is due to the decrease in production.

14. Maintenance: Compressors and Power Drills:

The cost in 1932 is for repairs to intercooler on compressor. No new drills were purchased in 1932.



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8. COST OF OPERATING:  
(Cont.)

b. Detailed Cost Comparison: (Cont.)  
(7) Detail of Accounts:

15. Scrapers and Mechanical Loaders:

This is the first year this account has been shown on the cost sheet. The cost for this equipment was previously shown under "Stoping." The cost for this year covers only maintenance of this equipment as no new scraper hoists were purchased.

16. Electric Tram Equipment:

	<u>Gen. &amp; Motors</u>	<u>Locomotives</u>	<u>Wiring</u>	<u>Tracks</u>	<u>Cars</u>
1932	52.54	476.93	139.25	480.09	11.76
1931	201.23	1755.81	329.08	3168.59	9244.22
Decrease	148.69	1278.88	189.83	2688.50	9232.46

Decrease in this account is due to shorter working schedule and the purchase of eighteen new motor cars in 1931.

17. Pumping Machinery:

Cost per ton in this account for the both years is the same.

SURFACE COSTS:

18. Hoisting:

	<u>Power Cost</u>	<u>Cost per Ton for Power</u>
1932	4,463.42	.053
1931	14,380.20	.042
Decrease	9,916.78	
Increase		.011

Increase in cost per ton is due to shorter working schedule with smaller production.

19. Stocking Ore:

	<u>Tons Stocked</u>	
1932	76,390	90.9% of Total Product
1931	240,842	71.1% " " "
Decrease	164,452	
Increase		19.8% " " "

Increase in cost per ton is due to stocking larger percentage of product and also to stocking the ore on wooden trestles which require more attention.

21. Dry House Expense:

	<u>Coal to Boiler House - Tons</u>	<u>Cost</u>
1932 - 6 Months	691	3,717.58
1931 - 12 Months	985-1100	4,924.26
Decrease	294-1100	1,206.68

The mine was idle during the warm weather period, May 1st to Nov. 1st, so there was a proportionally greater amount heating expense in the operating months of 1932.

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8. COST OF  
OPERATING:  
(Cont.)

b. Detailed Cost Comparison: (Cont.)  
(7) Detail of Accounts:

22. General Surface Expense:

Increase in cost per ton is due to smaller production. The cost includes the mine policemen, proportion of Chief of Police wages and upkeep of the mine grounds.

23. Maintenance: Hoisting Equipment:

	<u>Sheaves</u>	<u>Wire Rope</u>	<u>Electric Hoists</u>	<u>Skips &amp; Skip Roads</u>
1932	69.69	572.30	362.83	528.79
1931	<u>21.69</u>	<u>1461.33</u>	<u>1263.45</u>	<u>1909.59</u>
Increase	48.00			
Decrease		889.03	900.62	1380.80

Increase in cost per ton of \$ .004 is due to smaller product.

24. Maintenance: Shaft:

This account shows a decrease of \$ .007 per ton. The 1932 expense is mainly for repairs to No. 3 Shaft. Extensive repairs were made in No. 2 Shaft in 1931 in addition to the ordinary repairs required in No. 3 Shaft.

25. Maintenance: Top Tram Equipment:

	<u>General Repairs</u>	<u>Wire Rope</u>
1932	583.12	129.11
1931	<u>1429.15</u>	<u>672.69</u>
Decrease	846.03	543.58

Increase in cost per ton is due to smaller production.

26. Maintenance: Docks, Trestles and Pockets:

Cost per ton for the two years are about equal. Mainly due to maintenance of wood trestles in both years.

27. Mine Buildings:

	<u>1932</u>	<u>1931</u>
Office & Warehouse	.50	24.43
Shops	11.86	18.74
Shaft House	10.11	187.14
Engine House	2.56	46.64
Dry House	27.94	169.27
Coal Dock	31.15	58.08
Timber Tunnel	6.95	
Miscellaneous	<u>41.91</u>	<u>514.56</u>
Total	132.98	1018.85

Only necessary repairs were made to the various buildings in 1932.



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8. COST OF  
OPERATING:  
(Cont.)

b. Detailed Cost Comparison: (Cont.)  
(7) Detail of Accounts:

GENERAL MINE EXPENSES:

28. Insurance:  
Expense for insurance increased due to covering building not formerly insured.
29. Mining Engineering:  
Cost per ton is higher due to smaller production.
30. Mechanical and Electrical Engineering:  
Cost per ton is higher due to smaller production.
- | <u>31. Analysis and Grading:</u> | <u>No. Determinations</u> | <u>Cost</u><br><u>per Determination</u> | <u>No. Tons</u><br><u>per Det.</u> |
|----------------------------------|---------------------------|---|------------------------------------|
| 1932                             | 4,607                     | .2527                                   | 18.2                               |
| 1931                             | 73,609                    | .2014                                   | 46.0                               |
32. Personal Injury:  
Cost per ton is higher due to smaller production.
33. Safety Department:  
No change in cost per ton.
34. Telephones and Safety Devices:  
Cost per ton is higher due to smaller production.
35. Local and General Welfare:  
Central Office charge.
36. Special Expense, Pensions and Allowances:  
Includes cost of providing gardens, wood, etc. for unemployed.
39. Mine Office:  
Cost per ton higher due to smaller production.
40. Taxes:  
Cost per ton increased due to smaller production. Tax rate and valuation actually decreased.