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7. UNDERGROUND:
(Continued)

f. Explosives:

The average price paid for explosives during the year increased 3½% from $15.33 to $15.87 per hundredweight. The use of Hercomite #2 - 1¼" x 8" for developing operations and Hercomite #2 - 2" x 24" for block cave undercutting and stoping was continued. The high pressure 60% Gelatin 5" x 5# cartridge was used exclusively for mill raise blasting in the caving and stoping operations.

The following table is a record of all explosives and supplies used on all operations during the year.

	Quantity	Average Price	Amount 1950	Amount 1949
60% Gelatin Extra 1¼" x 8"	104,300#	17.170 CWT	$ 17,908.20	$ 6,541.95
60% HP Gelatin 5" x 5#	91,250#	20.427 CWT	18,640.09	14,087.00
Gelamite 2x 1¼" x 8"	94,385#	15.633 CWT	14,755.00	10,021.61
Gelamite 2x 1½" x 8"	-	-	-	266.87
Hercomite 2x 1¼" x 8"	370,982#	14.906 CWT	55,298.52	47,018.34
Hercomite 2 - 2" x 24"	196,250#	15.009 CWT	29,455.57	18,523.77
Total Powder	857,167#	15.873 CWT	$136,057.38	
Total Powder 1949	628,970#	15.336 CWT		$ 96,459.54
Blasting Fuse	1,525,720'	8.549 M'	$ 13,042.90	$ 10,582.54
No. 6 Blasting Caps	190,940	1.469 C	2,804.01	2,393.12
No. 14 Lead Wire	110,250'	26.000 M'	2,866.50	1,547.00
Electric Blasting Caps	62,001	21.197 C	13,142.19	6,713.62
7" Fuse Lighters	43,500	9.000 M	391.50	310.50
Paper Shells	31,050	6.936 M	215.35	96.81
Large Powder Bags	122	5.357 ea.	653.53	684.81
Primacord	531,500'	3.200 C'	17,008.00	12,848.00
Total Fuse, Caps, Wire, etc.....			$ 50,123.98	$ 35,176.40
GRAND TOTAL EXPLOSIVES & BLASTING SUPPLIES.....			$186,181.36	$131,635.94

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7. UNDERGROUND:
(Continued)

f. Explosives: (Continued)

The amount of explosives used per ton of ore in the stoping and development in ore operations increased approximately 4% over the previous year.

Explosives Used in Breaking 1,251,963 Tons of Ore in Stoping and Development in Ore

	Quantity	Average Price	Amount 1950	Amount 1949
60% Gelatin 1¼" x 8"	2,175#	17.713 CWT	$ 385.26	$ 818.41
60% Gelatin HP 5" x 5#	89,255#	20.428 CWT	18,232.81	13,855.00
Gelamite 2x 1¼" x 8"	15,953#	15.546 CWT	2,480.05	1,100.01
Gelamite 2x 1½" x 8"	-	-	-	256.19
Hercomite 2x 1¼" x 8"	253,682#	14.858 CWT	37,692.58	35,042.04
Hercomite 2 - 2" x 24"	190,262#	15.014 CWT	28,565.42	18,258.84
Total Powder	551,327#	15.845 CWT	$ 87,356.12	
Total Powder 1949	450,646#	15.385 CWT		$ 69,330.49
Blasting Fuse	1,229,392'	8.547 M'	$ 10,507.28	$ 8,270.85
No. 6 Blasting Caps	153,899	1.469 C	2,260.08	1,898.47
No. 14 Lead Wire	22,375'	26.000 M'	581.75	305.50
Electric Blasting Caps	5,692	20.896 C	1,189.40	1,202.68
7" Fuse Lighters	39,750	9.000 M	357.75	220.50
Paper Shells	13,540	7.029 M	95.17	69.51
Large Powder Bags	74	5.354 ea.	396.23	445.67
Primacord	506,000'	3.200 C'	16,192.00	12,348.80
Total Caps, Wire Fuse, etc.....			$ 31,579.66	$ 24,761.98
GRAND TOTAL EXPLOSIVES & BLASTING SUPPLIES.....			$118,935.78	$ 94,092.47

	1950	1949
Product	1,251,963	1,062,164
Pounds of Powder per Ton of Ore	.440	.424
Tons of Ore per Pound of Powder	2.271	2.359
Cost per Ton for Powder	.070	.065
Cost per Ton for Fuse, Caps, Etc.	.025	.023
Cost per Ton for All Explosives	.095	.088

In addition to the above, explosives costing $22,358.79 were used in miscellaneous rock work which was charged to "Development in Rock". This compares with $16,992.53 in 1949.

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7. UNDERGROUND:
(Continued)

f. Explosives:(Continued)

Explosives Used in Driving 6,229' of Main Level Rock Drift

	Quantity	Amount	Pounds of Powder Per Foot of Drift	Cost Per Foot
60% Gelatin 1¼" x 8"	56,242#	$ 9,541.91		
Gelamite 2x 1¼" x 8"	65,017#	10,093.88		
Hercomite 2x 1¼" x 8"	14,100#	2,176.53		
Total Powder	135,359#	$21,812.32	21.73	$3.50
Miscellaneous Blasting Supplies		10,398.60		1.67
Grand Total		$32,210.92	21.73	$5.17
Grand Total 1949 - 3,141'		$14,104.09	20.28	$4.49

The increase in the cost per foot for explosives was due mainly to general price increases.

g. Loading and Tramming:

A considerable amount of experimenting was done with the main level loaders. Two of the "B" Shaft Model 120 Conway Goodman electric loaders and one Model 40 Eimco electric loader were tried on the 7th Level. One of the original Model 125 Conways was rebuilt to include a separate drive for the conveyor belt. This rebuilt loader worked very satisfactorily and in the near future the other two Model 125's will be rebuilt, incorporating the separate drive for the conveyor belt. A considerable amount of trouble was experienced with the Conway 120's and these were finally returned to Chicago for repairs and revisions. The electric drive on the Eimco Model 40 proved to be inadequate and this loader was converted to an air driven drive.

The combination battery and trolley locomotives worked very satisfactorily and are a great improvement over the straight battery and straight trolley locomotives. These locomotives eliminate trolley wires in cross-cuts and can be charged when they are operating on the main line. The same tons per trip can be handled as with the trolley locomotives without overworking the batteries.

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7. UNDERGROUND:
(Continued)

h. Ventilation:

Bringing fresh air into the mine continued to be a problem in properly ventilating the mine workings. With the main ventilating fan operating at plus 3" water gauge, the leaks in the seal between the cage compartment and the skip compartments made it practically impossible to bring down much over 20% fresh air into the mine during the summer months, and less than 40% fresh air during the winter months. On completing the 6th Level "A" and "B" Shaft connection, the old 35,000 C.F.M. fan was installed in the drift between the two shafts. This made a big difference in the ventilation between the two shafts and plans were immediately made to make provisions to accommodate the installation of the new "B" Shaft fan on this level. This is a high pressure fan, with a capacity well over 100,000 C.F.M. and will be used to bring in the fresh air down "B" Shaft and discharge up "A" Shaft.

The shaft heating fan located just below surface worked satisfactorily and no trouble was encountered with ice forming in the shaft during freezing temperatures.

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7. UNDERGROUND:
(Continued)

i. Pumping:

	960' Level	3rd Level	6th Level	Total
January	26	54	127	207
February	8	55	140	203
March	6	55	263	324
April	7	56	265	328
May	58	56	282	396
June	64	53	362	479
July	43	54	371	468
August	19	54	359	432
September	18	52	353	423
October	3	60	478	541
November	4	53	522	579
December	5	54	551	610
Total Gallons	11,567,750	28,675,884	177,781,187	218,024,821
Average G.P.M.	22	55	339	416
	5%	13%	82%	100%

The amount of underground water handled on the 3rd, 6th and 960' Levels did not vary materially from the previous year until exploration diamond drilling was started on the "B" Shaft side of the 6th Level. In January and February, the 6th Level pumping averaged under 150 G.P.M. In March it increased to 263 G.P.M. when water was encountered in Mather "B" D.D.H. #8. This volume continued to increase as additional holes were drilled and cross-cutting was started at "B" Shaft. At the end of the year, approximately 550 G.P.M. were being pumped on the 6th Level.

The water draining from the exploration drilling should help to decrease the volume and head of water above the "B" Shaft ore body and thereby materially help mining operations.

MATHER MINE "A" SHAFT
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8. COST OF OPENING, EQUIPPING, DEVELOPING AND OPERATING:

a. Comparative Mining Costs:

Mining costs increased approximately $.20 per ton over that of the previous year. An increase in depreciation accounted for $.134 of this, and the balance was due to less favorable mining areas and the shortage of good experienced miners.

	1950	1949
Product	1,251,963	1,062,164
Underground Costs	2.089	2.157
Surface Costs	.259	.278
General Mine Expense	.513	.409
Cost of Production	2.861	2.844
Depreciation: Plant & Equipment	.159	.069
Development after 12/31/44	.164	.109
Pre-Production Development	.023	.042
Movable Equipment	.007	.005
Dwellings	.006	-
Taxes	.206	.165
Loading and Shipping	.048	.039
Total Cost at Mine	3.475	3.273
Budget - Estimated Cost Per Ton	3.286	3.337
Number of Shifts and Hours	263 3-8 hr.	240-1/3 3-8 hr.
Total 8 hr. operating Shifts	789	721
Number of Operating Days	263 3-8 hr.	240-1/3 3-8 hr.
Average Daily Product	4,760	4,420

Proportion of Labor and Supplies

	Amount	Per Ton	Per Cent
Labor	$2,423,827.55	1.936	56%
Supplies	1,926,269.86	1.539	44%
Total Cost at Mine	$4,350,097.41	3.475	100%

MATHER MINE "A" SHAFT
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8. COST OF OPERATING: (Continued)

b. Detailed Cost Comparison:

	1950		1949	
	Amount	Per Ton	Amount	Per Ton
Exploring in Mine	13,997.25	.011	1,050.23	.001
Development in Rock	198,889.08	.159	156,036.84	.147
Development in Ore	19,643.25	.016	22,898.36	.022
Stoping	1,084,462.02	.866	868,832.55	.818
Timbering	640,718.92	.512	631,256.04	.594
Tramming	285,595.81	.228	216,675.52	.204
Ventilation	27,735.28	.022	19,240.81	.018
Pumping	22,530.23	.018	15,344.30	.014
Compressors and Air Pipes	77,334.39	.062	67,611.90	.064
Underground Superintendence	129,335.48	.103	98,426.53	.093
Cave-In	96,892.58	.077	15,515.56	.015
Maint. Comp. & Power Drills	3,943.28	.003	1,566.83	.001
Scrapers & Mechanical Loaders	146,447.67	.117	119,498.51	.113
Tramming Equipment	49,536.64	.040	46,576.99	.044
Pumping Machinery	11,709.92	.009	10,659.66	.010
Total Undg. Costs	2,614,986.64	2.089	2,291,190.63	2.157
Hoisting	118,257.92	.094	89,147.77	.084
Stocking Ore	38,267.95	.031	37,662.15	.035
Screening-Crushing at Mine	9,522.75	.008	-	-
Dry House	37,878.18	.030	35,586.51	.034
General Surface Expense	30,124.88	.024	25,412.40	.024
Maint. Hoisting Equipment	48,553.57	.039	31,982.36	.030
Shaft	12,060.69	.010	13,113.68	.012
Top Tram Equipment	14,196.16	.011	22,784.33	.021
Docks, Trestles & Pockets	10,404.06	.008	31,215.23	.029
Mine Buildings	5,267.39	.004	8,483.36	.009
Total Surface Costs	324,533.55	.259	295,387.79	.278
Geological	6,901.25	.005	5,305.61	.005
Mining Engineering	32,542.11	.026	27,793.26	.026
Mechanical & Elect. Engrg.	8,461.14	.007	8,432.32	.008
Analysis and Grading	60,872.18	.049	46,612.63	.044
Safety Department	7,488.38	.006	5,586.19	.005
Telephones & Safety Devices	27,285.98	.022	19,310.40	.018
Local & General Welfare	9,386.18	.007	6,990.28	.007
Spec. Exp., Pensions & Allow.	19,934.47	.016	18,095.75	.017
Ishpeming Office	65,255.43	.052	46,945.62	.045
Mine Office	65,225.10	.052	53,321.65	.050
Insurance	62,143.87	.049	38,464.31	.036
Personal Injury	35,769.22	.029	50,023.73	.047
Social Security Taxes	67,041.92	.054	50,753.13	.048
Employees Vacation Pay	162,782.60	.130	56,057.46	.053
Wage Adjustment	11,395.05	.009	-	-
Total General Mine Expenses	642,484.88	.513	433,692.34	.409
COST OF PRODUCTION	3,582,005.07	2.861	3,020,270.76	2.844

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8. COST OF OPENING, EQUIPPING & DEVELOPING:

Capital account expenditures for the year amounted to $836,549.62, which brought the total at the end of the year to $6,721,810.39. This total figure does not include an additional $318,223.11 charged in a prior year to Negaunee Mine Company "Idle Expense". The inclusion of this amount brings the grand total to date to $7,040,033.50. "General Expense" and "Maintenance" for the past six years have been charged into "Operating".

Of the above expenditures, approximately $4,000 was charged against "Operating" (Maintenance: Compressors and Power Drills) during the year and, in addition, the several depreciation accounts aggregated $450,127.41. A breakdown of these charges is shown below:

E&A NM-62.....	$ 3,920.00	@ $.003 per ton
Combined Depreciation.....	450,127.41	@ $.359 per ton
Total.....	$ 454,047.41	@ $.362 per ton

Total Capital Account Charges As Above.....	$ 836,549.62
Total Charge-Offs.....	454,047.41
Actual Net Increase in Capital Account.....	$ 382,502.21

MATHER MINE "A" SHAFT
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8. COST OF OPENING, EQUIPPING & DEVELOPING:
(Continued)

Shaft sinking, main level development, drifting and permanent ventilation connections accounted for approximately 65% of the capital account expenditures for the year, or approximately $538,000. The other large items were: $115,000 for the extensions to the permanent stocking trestles; $80,000 for the new larry cars and locomotives; $18,000 for a new tractor and $75,000 for the screening and crushing plant in the headframe.

8. COST OF OPENING, EQUIPPING AND DEVELOPING:

	E&A REFERENCE	TOTAL AUTHORIZED	TOTAL EXPENDITURES TO DEC. 31, 1950 GROSS EXPENDITURES	CREDITS A/C ORE MINED IN DEVELOPMENT	NET EXPENDITURES	UNEXPENDED BALANCE	1950 EXPENDITURES
1. BUILDINGS AND EQUIPMENT:							
a. Main Buildings.....	(10-10&19 10-10&19A)	280,000.00	279,990.27	-	279,990.27	9.73	-
b. Change House & Shop Equip...	10-26	60,000.00	60,000.00	-	60,000.00	-	-
c. Initial Shop Equipment.....	(10-4/10-4A)	5,732.73	5,732.73	-	5,732.73	-	-
d. One 35-Ton Overhead Crane...	(10-9/10-9A)	8,894.94	8,894.94	-	8,894.94	-	-
e. Temporary Equipment.....	10-18	15,000.00	14,079.62	-	14,079.62	920.38	-
f. Erecting & Equipping Storage Building.....	31	20,900.00	20,900.00	-	20,900.00	-	-
g. Compressor Plant.....	10-23/47	137,203.07	137,203.07	-	137,203.07	-	-
h. Hot Milling Equipment.....	43	2,871.20	2,871.20	-	2,871.20	-	-
i. Steam Boiler & Heating Equip.	52	58,958.60	58,958.60	-	58,958.60	-	-
TOTAL BUILDINGS & EQUIPMENT...		589,560.54	588,630.43	-	588,630.43	930.11	-
2. SURFACE							
a. Equipment:							
1. Temporary Surface Plant..	10-3	31,130.00	26,506.28	-	26,506.28	4,623.72	-
2. Truck and Tractor.....	10-1	18,575.00	18,289.42	-	18,289.42	285.58	-
3. Electric Shovel.....	18	85,000.00	85,000.00	-	85,000.00	-	-
4. Top Tram Equipment.....	(10-24/10-24A/70)	171,000.00	131,023.74	-	131,023.74	39,976.26	79,808.61
5. Timber Tunnel, Tracks, Pumphouse & Sump.....	(10-20/10-20A)	58,000.00	57,867.78	-	57,867.78	132.22	-
6. Timber Tunnel & Yards....	29/29-1	124,800.00	114,750.20	-	114,750.20	10,049.80	-
7. Mechanical Additions - Headframe.....	32	27,500.00	27,500.00	-	27,500.00	-	-
8. Crawler Crane.....	51	12,000.00	12,000.00	-	12,000.00	-	-
9. F.W.D. Truck.....	53	7,500.00	7,497.72	-	7,497.72	2.28	
10. Spare Armature for Hoist Motors & Generator.....	49	14,747.00	14,747.00	-	14,747.00	-	-
11. Crawler Mounted Crane....	58	12,500.00	12,524.01	-	12,524.01	24.01	-
12. International 4-Ton Truck	64	6,000.00	6,381.41	-	6,381.41	381.41	-
13. Willys 3/4-Ton Truck.....	67	2,100.00	2,114.84	-	2,114.84	14.84	-
14. Euclid 20-Ton Truck-Used.	68	6,342.08	6,342.08	-	6,342.08	-	-
15. Caterpillar Model D8 Tractor	73	17,804.66	17,841.26	-	17,841.26	36.60	17,841.26
Total.....		594,998.74	540,385.74	-	540,385.74	54,613.00	97,649.87
b. General:							
1. Diamond Drilling.....	9	81,000.00	80,965.78	-	80,965.78	34.22	-
2. Moving Two Houses.....	10-2	3,458.00	3,458.00	-	3,458.00	-	-
3. Drainage Well.....	10-11/56	36,896.00	28,852.93	-	28,852.93	8,043.07	-
4. Road Bldg., Paving Parking Lot, etc.....	25	23,760.00	23,736.73	-	23,736.73	23.27	604.32
5. Surface Test Hole.....	61	80,000.00	71,628.33	-	71,628.33	8,371.67	1,374.51
Total.....		225,114.00	208,641.77	-	208,641.77	16,472.23	1,978.83
TOTAL SURFACE.....		820,112.74	749,027.51	-	749,027.51	71,085.23	99,628.70
3. SHAFT, HEADFRAME AND TRESTLE:							
a. Sinking in Sand.....	(10-15/10-15A)	16,302.44	16,302.44	-	16,302.44	-	-
b. Sinking in Rock (2,870').....	(10-16/10-16A)	440,000.00	435,677.44	2,559.15	433,118.29	6,881.71	-
c. Shaft Sets (2,870').....	(10-5/10-5A)	160,975.45	159,754.21	-	159,754.21	1,221.24	-
d. Headframe Foundation & Ore Trestle.....	(10-21/10-21A)	78,000.00	77,417.73	-	77,417.73	582.27	-
e. Headframe & Trestle.....	(10-7/10-7A)	186,028.83	186,028.83	-	186,028.83	-	-
f. Extensions to Permanent Stocking Trestles.....	36/42/42-1/66	370,152.48	324,739.13	-	324,739.13	45,413.35	115,579.84
g. Headframe & Power Ho. Eqpt...	(10-22/10-22A)	225,000.00	224,451.51	-	224,451.51	548.49	-
h. Elec.Equip.for Cage & Skp.Hsts.	10-8	221,783.00	221,783.00	-	221,783.00	-	-
i. 1 Cage Hoist & 1 Skip Hoist..	10-6	143,000.00	143,000.00	-	143,000.00	-	-
j. Elevator for Headframe.....	(10-12/10-12A)	4,853.00	4,853.00	-	4,853.00	-	-
k. Double Deck Cage-Spare.....	37	7,000.00	3,134.75	-	3,134.75	3,865.25	-
l. Pinion Brake for Cage Hoist..	45	4,000.00	4,000.00	-	4,000.00	-	-
m. Crushing & Screening Plant in Headframe.....	72	75,000.00	76,219.00	-	76,219.00	1,219.00	75,274.87
TOTAL SHAFT, HEADFRAME & TRESTLE...		1,932,095.20	1,877,361.04	2,559.15	1,874,801.89	57,293.31	190,854.71

	E&A REFERENCE	TOTAL AUTHORIZED	TOTAL EXPENDITURES TO DEC. 31, 1950 GROSS EXPENDITURES	CREDITS A/C ORE MINED IN DEVELOPMENT	NET EXPENDITURES	UNEXPENDED BALANCE	1950 EXPENDITURES
4. UNDERGROUND:							
a. Plant:							
1. Pumping - 3rd Level.....	10-25/10-25A	55,000.00	53,738.88	-	53,738.88	1,261.12	-
2. Pumping Plant - 6th Level	39	227,823.06	227,823.06	-	227,823.06	-	-
Total.....		282,823.06	281,561.94	-	281,561.94	1,261.12	-
b. Equipment:							
1. Mining Equipment.....	19	44,550.00	44,550.00	-	44,550.00	-	-
2. Mining Equipment.....	28	51,700.00	51,700.00	-	51,700.00	-	-
3. Mining Equipment.....	40	61,710.00	61,710.00	-	61,710.00	-	-
4. Mining Equipment.....	41	28,050.00	28,050.00	-	28,050.00	-	-
5. Mining Equipment.....	55	23,870.00	23,870.00	-	23,870.00	-	-
6. Mining Equipment.....	62	30,000.00	20,037.10	-	20,037.10	9,962.90	3,920.00
7. Mining Equipment.....	65	60,000.00	54,583.62	-	54,583.62	5,416.38	5,036.34
8. Haulage Equipment.....	10-29/10-29A	110,000.00	110,000.00	-	110,000.00	-	-
9. Haulage Equipment.....	23	90,420.00	89,732.02	-	89,732.02	687.98	-
10. Haulage Equipment.....	46	84,755.00	84,755.00	-	84,755.00	-	-
11. Haulage Equipment.....	59	46,000.00	44,372.88	-	44,372.88	1,627.12	1,000.00
12. Underground Substations..	38	14,300.00	14,300.00	-	14,300.00	-	-
13. Main Ventilating Fan.....	48	24,200.00	17,536.23	-	17,536.23	6,663.77	-
14. Twelve Scraper Hoists....	50	33,000.00	32,980.80	-	32,980.80	19.20	-
15. Scraper Hoists.....	54	49,500.00	49,500.00	-	49,500.00	-	-
Total.....		752,055.00	727,677.65	-	727,677.65	24,377.35	7,956.34
c. Development:							
1. Main Level Development:							
Plats & Pockets.....	10-28/10-28A/26-26A/27-27A/57/63/71/74	439,460.00	360,117.40	-	360,117.40	79,342.60	15,491.85
Drifting.....	10-27/24/26-26A/27-27A-27B/33/60/71/74	1,609,911.20	1,597,942.48	80,404.67	1,517,537.81	92,373.39	299,525.65
Vent. & 2nd Outlet.....	26-26A/27-27A	53,900.00	40,955.57	-	40,955.57	12,944.43	1,279.78
Excava. & Hoist Install.	57/63	3,000.00	6,751.02	-	6,751.02	3,751.02	-
290' Winze.....	57/63/74	25,750.00	38,788.01	-	38,788.01	13,038.01	14,742.26
Preparation of Skip Pit	57/63/74	31,400.00	16,042.44	-	16,042.44	15,357.56	5.28
Shaft Sinking.....	57/63/74	341,650.00	194,842.32	-	194,842.32	146,807.68	125,624.84
Loading & Discharge Ends	71	50,000.00	15,352.53	-	15,352.53	34,647.47	15,352.53
2500' Conveyor System..	71	200,000.00	29,441.19	-	29,441.19	170,558.81	29,441.19
Pan, Screen, Crusher...	71	50,000.00	26,922.89	-	26,922.89	23,077.11	26,922.89
Vent.Conn.1000' @ $25..	71	25,000.00	9,723.60	-	9,723.60	15,276.40	9,723.60
2. Development & Mining Above Levels.....	24/26-26A/27-27A/34	203,728.80	194,487.12	49,921.83	144,565.29	59,163.51	-
3. Underground Exploration..	21	35,000.00	34,838.62	-	34,838.62	161.38	-
Total.....		3,068,800.00	2,566,205.19	130,326.50	2,435,878.69	632,921.31	538,109.87
d. Dewatering Hematite Workings.	30	66,000.00	64,232.28	-	64,232.28	1,767.72	-
TOTAL UNDERGROUND.....		4,169,678.06	3,639,677.06	130,326.50	3,509,350.56	660,327.50	546,066.21
GRAND TOTAL BEFORE CONTINGENCIES		7,511,446.54	6,854,696.04	132,885.65	6,721,810.39	789,636.15	836,549.62
Plus 10% for Contingencies.....		228,217.26	-	-	-	228,217.26	-
GRAND TOTAL INCLUDING CONTINGENCIES		7,739,663.80	6,854,696.04	132,885.65	6,721,810.39	1,017,853.41	836,549.62
General Expense.....	10-13	-	271,716.98	-	271,716.98)	-	1950 Expense
Maintenance.....	10-14	-	37,050.73	-	37,050.73	-	taken up in "Cost
Building Roads & Landscaping..	10-17	-	9,455.40	-	9,455.40	-	of Operating"
Total to Negaunee Mine Company Idle Expense.....		-	318,223.11	-	318,223.11	-	
GRAND TOTAL.....		7,739,663.80	7,172,919.15	132,885.65	7,040,033.50	1,017,853.41	836,549.62

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9. EXPLORATIONS AND FUTURE EXPLORATIONS:

Exploratory diamond drilling was continued on the 3rd, 5th, 6th and 7th Levels. One hole was drilled on the 3rd Level to determine the depth of ore below this level in #5 Cross-cut. On the 5th Level, one hole was extended south of #8 Cross-cut to further explore this area, and one hole was drilled from the end of the footwall drift to explore the area east and west of the Cambria fault adjacent to the "A" Shaft and "B" Shaft boundary. On the 6th Level, one hole was drilled to explore the area south of #4 Cross-cut, one hole was drilled below #7 Cross-cut and one hole was drilled below #9 Cross-cut to determine the extent of the ore and the location of the footwall for the 7th Level. One hole was drilled on the 7th Level to explore the area south of #3 Cross-cut.

3rd Level

Hole #65 was drilled vertically down from the end of #5 Cross-cut to test the depth of the ore below this cross-cut. Only 18' of sulphurous ore was found, indicating that this ore body pinches out just below the level.

5th Level

Hole #35 was continued to a depth of 824'. Ore was encountered in this hole from 690' to 818' at a height of approximately 100' above the level. This is the same ore found above #7 Cross-cut on the 7th Level and south of #7 Cross-cut on the 3rd Level.

Hole #66, a horizontal hole, was drilled from the east end of the 5th Level to explore the area of the Cambria-Jackson fault. This hole encountered the fault from 765' to 787' and was continued to a total depth of 1,017', where it was stopped in jasper.

6th Level

Hole #67 was drilled to explore for an extension of the ore found in #3 Cross-cut. It was believed that #4 Cross-cut had stopped short of this ore, however, the drill hole proved that this extension did not exist.

Hole #68 was drilled as part of a plan to outline the 7th Level ore body prior to its initial development. In particular, this hole was drilled down from the end of #7 Cross-cut to explore for an extension of the ore found in the cross-cut. 40' of Standard ore was found in the main formation midway between the 6th and 7th Levels. The interbedded ore was also cut with the hole.

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9. EXPLORATIONS AND FUTURE EXPLORATIONS: (Continued)

6th Level (Continued)
Hole #17 is located in Section 1 and was drilled vertically down from the end of #9 Cross-cut very close to the Cambria-Jackson fault. This hole is also a part of the program to outline the 7th Level ore body. 18' of Standard ore was found in the main formation west of the fault. No ore was found in the interbedded formation. The hole crossed the fault at 254' and entered the interbedded formation again on the east side of the fault. The interbedded formation was also jasper on the east side. Further drilling is planned in this area to explore the ore above the 7th Level.

7th Level
Hole #69 was drilled due south of #3 Cross-cut to explore this area above the 7th Level. 17' of ore was encountered approximately 80' above the level. This short run of ore was disappointing as the surface drilling indicated that there would be more ore above the 7th Level in this area. Further drilling is planned for this level as the main level development advances to the east.

MATHER MINE "A" SHAFT EXPLORATION
YEAR 1950

NO.	LOCATION	DIRECTION	DIP	DATE STARTED	DATE FINISHED	MATERIAL				FINISHED DEPTH
35	5th Level (2050') #8 Cross-cut	S.00°08'E	+2°29' Continued	7/30/47 11/28/49	9/22/47 1/13/50	611' 690' 818'	- - -	690' 818' 824'	Soft Ore Jasper Ore Soft Ore Jasper	824'
65	3rd Level (1750') #5 Cross-cut		-90°	1/25/50	1/30/50	0 18'	- -	18' 91'	Ore Soft Ore Jasper	91'
66	5th Level (2050') #9 Cross-cut	S.73°41'E	+2°54'	5/23/50	9/2/50	0 363' 375' 505' 573' 660' 663' 680' 765' 787' 792' 877' 880'	- - - - - - - - - - - -	363' 375' 505' 573' 660' 663' 680' 765' 787' 792' 877' 880' 1017'	Slate & Graywacke Dike Slate & Graywacke Soft Ore Jasper Slate Dike Slate Slate & Jasper Dike (Fault) Lean Ore Soft Ore Jasper Dike Soft Ore Jasper	1,017'
67	6th Level (2200') #4 Cross-cut	S.00°03'E	+4°29'	5/25/50	6/5/50	0	-	96'	Soft Ore Jasper	96'
68	6th Level (2200') #7 Cross-cut	S.00°08'E	-60°	9/22/50	10/11/50	0 95' 135' 165' 218' 259' 304'	- - - - - - -	95' 135' 165' 218' 259' 304' 343'	Soft Ore Jasper Ore Lean Ore Slaty Lean Ore Slate Ore Slate	343'

MATHER MINE "A" SHAFT EXPLORATION
YEAR 1950

NO.	LOCATION	DIRECTION	DIP	DATE STARTED	DATE FINISHED	MATERIAL	FINISHED DEPTH
69	7th Level (2400') #3 Cross-cut	S.00°04'E	+20°	10/25/50	11/10/50	0 - 153' Slate 153' - 195' Ore 195' - 218' Slate 218' - 228' Slaty Lean Ore 228' - 230' Dike 230' - 238' Slaty Lean Ore 238' - 255' Ore 255' - 269' Lean Ore 269' - 271' Soft Ore Jasper 271' - 274' Dike 274' - 358' Soft Ore Jasper	358'
Mather "B"							
17	6th Level (2200') #9 Cross-cut		-90°	11/24/50		0 - 62' Soft Ore Jasper 62' - 80' Ore 80' - 129' Slate & Jasper 129' - 184' Slate 184' - 220' Soft Ore Jasper 220' - 254' Slate 254' - 259' Dike (Fault) 259' - 284' Soft Ore Jasper 284' - 331' Slate	

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10. TAXES:

Taxes for both Section 2 ("A" Shaft) and Section 1 ("B" Shaft) were taken up on the "A" Shaft operating cost sheet. The total valuations of Section 2 were substantially increased in the amount of $1,000,000. The rate in Ishpeming remained practically the same.

The total valuations of Section 1 were increased in the amount of $440,000. The rate in Negaunee decreased from $52.89 to $47.92.

	1950			1949		
	VALUATION	RATE	TAXES	VALUATION	RATE	TAXES
Section 2, 47-27, except the N 600' of NE of NE and the Rights of Way						
Real	$4,350,000		$164,570.94	$2,640,000		$ 98,475.70
Personal	950,000		35,940.78	1,660,000		61,920.32
Total	$5,300,000	$37.8324	$200,511.72	$4,300,000	$37.3014	$160,396.02
Coll. Fee	-	-	-	-	-	-
Total	$5,300,000	$37.8324	$200,511.72	$4,300,000	$37.3014	$160,396.02
Mather Mine Pipe Line, parcel in Section 3, 47-27	$ 650	$37.8324	$ 24.59	$ 650	$37.3014	$ 24.25
Total Mather Mine "A" Shaft (Sec. 2, City of Ishpeming)	$5,300,650	$37.8324	$200,536.31	$4,300,650	$37.3014	$160,420.27
Jackson, Sec.1, 47-27						
Real	$ 980,000		$ 46,501.00	$ 605,000		$ 31,680.40
Personal	215,000		10,201.75	150,000		7,854.65
Total	$1,195,000	$47.4500	$ 56,702.75	$ 755,000	$52.3643	$ 39,535.05
Coll. Fee 1%	"	.4745	567.03	"	.5236	395.35
Total Mather Mine "B" Shaft (Sec.1, City of Negaunee)	$1,195,000	$47.9245	$ 57,269.78	$ 755,000	$52.8879	$ 39,930.40
GRAND TOTAL	$6,495,650		$257,806.09	$5,055,650		$200,350.67

1950

	TAXES	PER TON PRODUCED	PER TON SHIPPED
Total	$257,806.09	$0.206	$0.202

1949

	TAXES	PER TON PRODUCED	PER TON SHIPPED
Operating	$175,300.67	$0.165	$0.173
Idle	25,050.00	0.024	0.024
Total	$200,350.67	$0.189	$0.197

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11. ACCIDENTS AND PERSONAL INJURY

There were 27 compensable injuries during the year, which occasioned lost time of 1,386 days. There were also 46 non-compensable injuries, which added 111 days lost time, for a grand total of 1,497. This resulted in a severity rate of .983 days lost per thousand man hours, and a frequency rate of 47.91 injuries per million man hours, compared with Company averages for underground mines of 4.942 and 52.89. The total hours worked were 1,523,599-3/4 as compared with 1,285,830-3/4 last year, an increase of approximately 18%. The following is a brief summary of the compensable accidents:

DATE	NAME	NATURE OF INJURY
1/3/50	Earl Scanlon	Severe bruises of the heels of both feet without fracture.
1/11/50	Stanley Fredrickson	Multiple fractures of the pelvis on the right side, with severing of the urethra.
2/7/50	George Korpi	General contusions in the vicinity of the left shoulder and chest cage without fracture.
2/20/50	Ivar Laiho	Laceration of the left middle finger.
3/1/50	Charles Anderson	Fracture of five ribs on the left side.
4/19/50	Ilmari Mattila	Severe laceration of the left fing finger, with Compound fracture of the middle joint.
4/21/50	Joseph Newman	Severe contusions and simple fractures of the ends of the left ring and middle fingers.
4/25/50	Carl Raissanen	Contusion and ligament injury lower back.
5/13/50	John Oljymaki	Severe laceration at the base of the right third finger.
5/18/50	Kenneth Ball.	Abrasion of left leg.
5/31/50	Donald Roberts	Minor brain concussion and laceration of the scalp.
6/23/50	John Ducoli	Deep laceration of the lower part of right leg.
7/20/50	Richard Wills	Bruises of right foot and little toe.
8/15/50	Wayne Matta	Bruises of right ankle.
8/24/50	Dante Rovedo	Oblique fracture right leg (femur).
9/11/50	James Marietti	Fracture of first and second fingers left hand.
10/2/50	Matt Koski	Fracture of right tibia, sprain of left ankle and contusion of third lumbar vertebrae.
10/4/50	Ilmari Mattila	Laceration and puncture wound left foot.
10/4/50	Alex Marcotte	Fracture of right ankle and fourth metatarsal.
10/6/50	Walter Tuominen	Sprained lower back, bruised chest wall, with separation at the right sternal clavicular joint.
10/14/50	Philip Arsenault	Contusion right foot and ankle.
11/8/50	Herbert Nelson	Severe hematoma of the left buttocks and sprained left ankle.
11/11/50	John Carlson	Severe laceration of the left ear, with severing of the upper one-half of the ear completely from head.
12/9/50	Edward O'Leary	First, second and some third degree burns of right hand.
12/14/50	Arvo Sippola	Laceration over instep of right foot with severance of extensor tendon.
12/15/50	Glen Veale	Laceration third and fourth fingers right hand.
12/26/50	William Leppanen	Multiple lacerations of the left dorsum.

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12. NEW CONSTRUCTION AND PROPOSED NEW CONSTRUCTION:

The major item of new construction was the completion of the extensions to the permanent stocking trestles, which has already been discussed.

No new construction of any importance is contemplated for next year.

13. EQUIPMENT AND PROPOSED EQUIPMENT:

There was a considerable amount of new equipment purchased during the year for surface use. The major items were:

(1) A Caterpillar D8 tractor and angledozer.

(2) A Kennedy Van-Saun pan feeder, a 6' x 10' Simplicity screen and a 36" x 24" Allis-Chalmers jaw crusher for the screening and crushing plant in the headframe.

(3) A 240 cu. ft. bottom dump skip and scrolls

(4) Two top tram Larry cars.

(5) Three 8-ton locomotives to push the new larry cars.

On order, but not yet delivered by the end of the year, were one additional top tram larry car and two additional bottom dump skips.

The major items of new equipment purchased for underground were the 36" x 42" Pioneer jaw crusher and the Pioneer pan feeder for the 7th Level. The 2,500' conveyor belt had not yet been received by the end of the year.

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14. MAINTENANCE AND REPAIRS:

Maintenance and repairs for both surface and underground were mainly of a routine nature.

As mentioned previously, the rebuilding of the north railroad pockets was completed early in the year.

The 120-B electric stockpile shovel was completely overhauled prior to the beginning of the shipping season.

15. POWER:

	CONSUMPTION K.W. HOURS	AVERAGE MAX. DEMAND	AVERAGE DEM. FACTOR	COST OF CURRENT	AVERAGE PRICE PER K.W. HOUR
1950	15,053,000	3,100 K.W.	56%	$235,302.80	$.0156
1949	11,384,000	2,460	53.5	171,034.60	.0150
1948	11,217,000	2,355	54	155,508.80	.0139
1947	10,059,000	2,160	53	140,078.60	.0139
1946	5,570,000	1,530	48	80,677.20	.0144

The total consumption of electric power was approximately 3,600,000 kilowatt hours over that of the previous year due to the increased working schedule to six days per week. Also, during the previous year, six weeks were lost due to the strike.

16. WATER SUPPLY:

	CONSUMPTION	COST	COST PER THOUSAND GAL.
1950	15,321,480	$1,910.76	$0.124
1949	16,013,100	1,993.74	.124
1948	20,068,100	1,662.64	.082
1947	17,241,600	1,436.52	.083
1946	10,620,100	928.41	.086

The consumption of City water decreased only slightly as compared with the previous year.

Water used underground for mining operations was all obtained from the 960' Level.

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18. NATIONALITY OF EMPLOYEES:

	American Born	Per Cent	Foreign Born	Per Cent	Total	Per Cent
English	106	13.8	15	1.9	121	15.7
Finnish	290	37.6	44	5.7	334	43.3
Swedish	71	9.2	4	.5	75	9.7
Norwegian	18	2.3	1	.1	19	2.4
German	24	3.1	2	.3	26	3.4
Irish	15	1.9	-	-	15	1.9
Danish	1	.1	-	-	1	.1
Italian	43	5.6	15	1.9	58	7.5
French	100	13.0	-	-	100	13.0
Manx	1	.1	-	-	1	.1
Dutch	2	.3	-	-	2	.3
Austrian	7	1.0	2	.3	9	1.3
Polish	5	.6	-	-	5	.6
Belgian	4	.5	-	-	4	.5
Croatian	1	.1	-	-	1	.1
Swiss	1	.1	-	-	1	.1
	689	89.3	83	10.7	772	100.0

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1. GENERAL:

Production from the Morris Mine was 312,801 tons as compared with 256,245 tons a year ago when the strike curtailed production. Shipments increased from 256,749 tons in 1949 to 307,357 for the current year. The working schedule was increased to six days per week in the middle of November.

The surface pumping program continued throughout the year. A series of test wells were drilled on the western perimeter of the cave area to explore the possibility of intercepting the surface water before it entered the cave. Twenty-one wells were drilled, but failed to find a favorable water strata. The experiment has been discontinued pending further study.

Underground pumping increased from an average of 1220 G.P.M. at the beginning of the year to an average high of 1517 at the end of the year. The flow of water increased to such an extent in April that it was necessary for the Lloyd to assume its own pumping. A new 12" water discharge column was installed in July, which will give the Morris ample pumping capacity.

2. PRODUCTION, SHIPMENTS & INVENTORIES:

a. Production

	Grade	Tons
1950	Morris	312,801
1949	"	256,245

The 1950 production came from fee and leased lands in the following proportions:

	Fee	Lease	Total
	83,209	229,592	312,801
Percentage	27%	73%	100%
Percentage 1949	32.2%	67.8%	100%

A summary of the total production, fee and lease, since the Inland Steel Company took over the Morris Mine lease is listed below:

	Tons	Percent
Lease Ore Production 1933-1950	3,952,495	74.70%
Fee Ore Production 1933-1950	1,338,324	25.30%
Total	5,290,819	100.00%

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2. PRODUCTION, SHIPMENTS & INVENTORIES: (Continued)

b. Shipments

Grade	Pocket	Stockpile	Total
Morris	184,043	123,314	307,357

Grade	Fee	Lease	Total
Morris	84,832	222,525	307,357

The following table shows the shipments for the past four years:

Year	Total
1950	307,357
1949	256,749
1948	347,134
1947	278,916

Total shipments since Inland acquired lease in 1933 - 5,258,818

c. Ore in Stock

Grade	Tons
Morris	31,942

d. Production by Months

	Days Worked	Average Number of Men	Tons Per Man Per Day	Production
January	21	183	6.68	24,980
February	20	181	7.35	25,672
March	23	186	6.86	27,716
April	20	186	6.46	23,073
May	22	185	7.75	30,536
June	22	185	5.76	22,907
July	10	187	3.83	11,609
August	23	192	8.07	31,847
September	21½	184	6.56	24,432
October	24	177	7.08	30,137
November	23	186	7.02	34,204
December	25	186	5.84	25,688
Average	21	185	6.59	
Average 1949	21	172	6.48	

12 months production	305,862
Current year overrun	6,939
Total 1950 production	312,801

e. Working Schedule
The working schedule was increased to six days per week in the middle of November.

f. Delays
The mine was shut down for two weeks in July to install the new 12" water discharge column.

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3. ANALYSIS:

a. Shipments

Grade	Tons	Iron	Phos.	Sil.	Mang.	Alum.	Sul.	Moist.
Morris								
Dried	307,357	56.19	.080	12.39	.50	2.86	.015	11.41
Natural		49.779	.071	10.98	.44	2.53	.013	11.41

b. Ore in Stock (Natural)

Grade	Tons	Iron	Phos.	Sil.	Mang.	Alum.	Moist.
Morris	31,942	50.10	.068	11.11	.44	2.32	11.35

c. Ore Reserves - Expected Natural Analysis

Grade	Tons	Iron	Phos.	Sil.	Mang.	Alum.	Sul.	Moist.
Morris	3,478,709	49.64	.076	11.10	.47	2.88	.013	11.35
Hi-Sul.	487,851	52.17	.095	7.25	.40	2.27	.400	10.50

The expected silica content of the standard ore reserves was again increased, from 10.65% to 11.10%.

4. ESTIMATE OF ORE RESERVES:

Exploration and development in 1950 added 111,538 tons to the engineers' estimate after allowance for ore mined during the year. This compares with an increase of 294,354 tons in 1949. Most of this added tonnage was on Chase Lease #9, with 15,666 on the Fee Lands.

Description	Estimate 10-1-49	Production 10-1-49 to 10-1-50	Estimate Deducting Product	Actual Estimate 10-1-50	Inc.or Decr. From 1949 Est.
Chase Lease #26	26,140	-	26,140	26,140	-
Chase Lease #25	33,273	-	33,273	33,273	-
Chase Lease #24	216,696	23,943	192,753	191,902	851
Chase Lease #24-Hi-Sul.	442,721	25,608	417,113	448,330	31,217
Chase Lease #9	2,224,504	127,803	2,096,701	2,162,207	65,506
Total Chase Leases	2,943,334	177,354	2,765,980	2,861,852	95,872
CCI Lands	1,128,280	78,759	1,049,521	1,065,187	15,666
CCI Lands-Hi-Sul.	39,521	-	39,521	39,521	-
Total CCI Lands	1,167,801	78,759	1,089,042	1,104,708	15,666
GRAND TOTAL	4,111,135	256,113	3,855,022	3,966,560	111,538

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5. LABOR & WAGES:

On December 11, 1950, the Inland Steel Company entered into an Agreement with the C.I.O. to undertake a job evaluation program similar to the one with which we are all too familiar and involving the same across-the-board increase of 12½¢ per hour, with 8½¢ to be used in eliminating so-called inequities.

The average number of men at the mine increased to 185 as compared with 172 in 1949.

6. SURFACE:

During the year, a new coal dock was constructed to replace the old rotted structure.

Storm sewers were installed around the shaft and timber tunnel to prevent a flood condition at the shaft during heavy rains.

The exposed wood surfaces of the buildings were painted, and work was started on the interior and machinery of the shops.

Surface Pumping

Surface pumping averaged 1528 G.P.M. as compared with 1511 in 1949. The water table showed a decline of 2.0' for the year as compared with 2.3' for the previous year. The following comparison shows the pumping at the several wells at the beginning and end of 1950:

Well No.	GPM Dec.1949	GPM Dec.1950
1	205	200
2	Down	Down
3	82	80
3A	322	361
5	177	167
8	275	275
9	74	74
10	540	480
	1675	1637

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6. SURFACE:(Continued)

Surface Pumping (Continued)

Month	GPM Surface Pumping	Drop in Test Holes Feet
January	1651	0.2
February	1684	0.2
March	1477	0.2
April	1506	1.0
May	1652	0.5
June	1089	0.9
July	1059	1.1
August	1815	0.8
September	1715	0.4
October	1714	0.7
November	1614	1.2
December	1360	0.2
Average 1950	1528	0.2
Total 1950		2.0
Average 1949	1511	0.2
Total 1949		2.3

The average drop in the surface material above ledge since pumping started in 1937 to December 22, 1950 amounted to 41.8' as shown below:

Test Hole	Drop 8-25-37 to 12-22-50	Depth Remaining to Ledge
501	67.9	25.2
503	90.9	108.9
504	63.2	85.9
505	71.7	58.5
506	57.7	29.6
507	(123.3)	
508	(60.4)	(100.4)
509	89.4	97.3
510	34.1	89.2
511	34.1	120.3
512	41.4	120.3
514	28.5	97.7
515	16.5	112.1
516	(36.1)	
517	23.5	88.6
518	48.0	60.4
519	56.1	101.4
520	(42.5)	
521	(28.5)	
522	28.4	82.4

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6. SURFACE:(Continued)

Surface Pumping (Continued)

Test Hole	Drop 8-25-37 to 12-22-50	Depth Remaining to Ledge
523	(36.3)	
524	94.6	5.1
526	17.2	96.8
527	39.7	35.2
528	(1.7)	(101.2)
531	5.4	71.1
532	(5.8)	(78.2)
533	28.3	103.7
534	2.8	96.7
Peronto Well	(9.4)	
Total	877.0	1686.4
Avg. Drop to Dec. 22, 1950	41.8	80.3

Operating expenses for surface drainage amounted to $18,954 as compared with $14,733.00 in 1949, or $.0615 per ton in 1950 as compared with $.057 in the previous year.

7. UNDERGROUND:

a. Pumping

During the latter part of April, the flow of underground water at the Morris increased to such an extent, on one occasion reaching a peak of 1900 G.P.M. as compared to a normal of 1200, that it was necessary for the Lloyd to assume its own pumping, which arrangement was continued throughout the balance of the year. The increased flow of water continued through June, when pumping averaged 1371, tapering off to 1317 in September, and again increasing to a new high in December of 1517. A new 12" discharge column was installed in July, giving ample pumping capacity for the Morris.

The average quantities by levels are shown in the following table:

	LEVELS					
Year	4th	6th	7th	8th	9th	Total
1946	157.3	44.1	153.4	254.9	278.8	888.5
1947	149.9	34.7	144.7	287.3	352.8	969.4
1948	140.5	25.1	122.2	274.3	514.5	1076.6
1949	95.0	24.5	88.6	316.4	667.8	1192.3
1950	86.6	30.5	94.3	379.0	751.7	1342.1

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7. UNDERGROUND:(Continued)

a. Pumping (Continued)

The steadily increasing flow of water into the mine raised the underground pumping costs to a new high of $111,232.00, with a cost per ton of $.3613, as compared with $93,782.00 and $.3660, the decreased cost per ton being due to the larger tonnage produced in 1950. The total pumping cost, surface and underground, amounted to $130,186.00, or $.4228 per ton. The following table shows a comparison for the past five years:

Year	Surface	Underground	Total	Cost Per Ton
1950	$ 18,954	$ 111,232	$ 130,186	$.4228
1949	14,733	93,782	108,515	.423
1948	19,137	73,168	92,305	.265
1947	16,612	65,862	82,474	.308
1946	13,960	46,143	60,103	.324

b. Development

An average of four contracts were developing during the year.

Contract #18 continued development of the water control project on the 7th Level and above throughout the year, and at the end of the year had reached the point where everything was in readiness to pour the new dam on the 6th Level.

The new trench on the 9th Level was in operation most of the year and proved a great help in handling wet ore.

In an effort to provide a new working place and salvage an old ore body, a transfer drift was driven east from the 8th Level top timber at 1200 W. A small stope was started and successfully mined until the stope broke through to the water in the old workings above and to the west, forcing abandonment of the area.

A new turn-off drift was started on the 9th Level on the Fee Lands to turn south under the 300' transfer on the -290' sub. A single-compartment raise from this drift will cut the scraping distance in half.

As a result of exploration at 1400 W., the limits of Deposit #87 were extended downward to the 9th Level, increasing the ore reserves in this lease.

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7. UNDERGROUND:

c. Stoping - Caving

Mining operations continued on Chase Lease #24, Fee Lands and Chase Lease #9, with mining ranging from the -60' sub-level in Deposit #75B to the -290' Sub-level in Deposit 84C. An average of 13 contracts accounted for the production, divided as follows: 3 stoping and 10 sub-level caving.

Chase Lease #24

An average of four contracts mined on this lease during the year. Contract #10 continued to be the most productive on the lease in Deposit #79. Contract #12 advanced the west extension of the 9th Level drift, extending the limits of this ore body, and drove test drifts north and south.

Fee Lands

An average of four contracts were mining on the Fee Lands during the year.

The uppermost workings on the Fee Lands were those of #7 Contract in sub-caving on the -90' sub-level in Deposit #87A.

Contracts #6 and #30 continued stoping in the highly productive area near the east boundary of the Morris Mine.

Chase Lease #9

On this lease, there were an average of five contracts mining during the year, from the -90' sub-level in Deposit #87A to the -190' sub-level in Deposit #33.

Contracts #2 and #13 were sub-caving most in the year in the central portion of Deposit #75C on the -150' sub-level, while Contract #14 continued sub-caving in Deposit #33 on the -140' sub-level.

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1. GENERAL

The Tilden Open Pit Mine started the 1950 season on June 19th and operated until June 30th when the trucks were taken to the Lake Mine for loading ore. They resumed operations on July 17th and then worked continuously until September 30th except during the vacation week of August 13th to 20th. The operations were on a 5-day per week schedule until August 27th when it was increased to 6-days per week.

The total product for the year was 107,465 tons as compared with 88,503 tons in 1949. There were 53,730 tons stocked for late fall and spring deliveries and also there were 58,555 tons in stock at the end of the year. It was thought advisable to have some Low Phos. in stock as it has been necessary in previous years to start up the Pit to obtain this grade and then shut down again until sufficient Silica ore had been removed from stockpile to assure steady work for the crew when no deliveries were scheduled. There were 9,595 tons of Low Phos. in stock as of December 31, 1950.

The only churn drilling for the year was in the Summit Pit where 10 holes were drilled in the Upper Bench. This is the start of two benches in this pit but it will take several blasts before there will be sufficient width on the bench to load from the upper face.

There were two blasts put off during the year, one in the Upper Bench of the East Pit in July and the other in the Upper Bench of the Summit Pit in August. The results from both blasts was very satisfactory.

There was no equipment purchased in 1950 nor were there any stripping or other surface operations.

2. PRODUCTION, SHIPMENTS & INVENTORIES

a. Production by Grades

	1950	1949	Increase
Tilden Silica	72,955	79,130	6,175
Tilden Low Phos.	34,510	9,373	25,137
Total	107,465	88,503	18,962

b. Shipments

	Pocket	Stockpile	Total	Total Last Year
Tilden Silica	29,808	61,702	91,510	69,446
Tilden Low Phos.	23,926		23,926	9,373
Total	53,734	61,702	115,436	78,819

c. Stockpile Inventories

Grade	Balance on Hand Dec. 31, 1949	Stocked 1950	Shipped from Stockpile 1950	Balance on Hand Dec. 31, 1950
Tilden Silica	67,026	43,635	61,701	48,960
Tilden Low Phos.		10,095		10,095
Total	67,026	53,730	61,701	59,055

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2. PRODUCTION, SHIPMENTS & INVENTORIES

e. Product by Months

Month	Days Operated	Average Tonnage Per 8-Hr. Shift	Total Tons
June	10	1,694	16,943
July	5	1,836	9,182
August	16	1,961	31,378
September	23	2,171	49,962
Total	54	1,990	107,465

The tons per shift showed an increase due to only stocking 50% of the product in 1950 as compared with 65% in 1949. Some of the trucks have to be used to stock the ore and this cuts down the number hauling from the shovels.

Distribution of Product by Pits

	1950	1949
West Pit (lower bench)	50,504	54,678
East Pit (upper bench)	26,753	28,245
Summit Pit	30,208	5,580
Total	107,465	88,503

f. Ore Statement

	Tilden Silica	Tilden Low Phos.	Total	Total Last Year
On hand January 1, 1950	67,026		67,026	57,342
Output for Year	72,955	34,510	107,465	88,503
Transfers	489	489		
Total	140,470	34,021	174,491	145,845
Shipments	91,510	23,926	115,436	78,819
Balance on hand December 31, 1950	48,960	10,095	59,055	67,026
Increase in Output	6,175	25,137	18,962	

3. ANALYSIS

a. Average Mine Analysis on Shipments

Grade	Iron	Phos.	Sil.	Mang.	Alum.	Lime	Mag.	Sul.	Loss by Ignition	Moist.
Tilden Silica	40.20	.034	40.90	.09	.69	.29	.23	.013	.14	1.63
Tilden Low Phos.	36.40	.015	46.88	.07	.66	.08	.08	.009	.13	1.29

b. Average Analysis on Straight Cargoes

	Mine			Lake Erie	
	Iron	Phos.	Sil.	Iron	Moist.
Tilden Silica	40.08	.038	41.01	39.95	4.84
Tilden Low Phos.	36.30	.013	46.93	36.62	1.28

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3. ANALYSIS (Cont.)

c. Analysis of ore in Stock

	Iron	Phos.	Silica	Sul.
Tilden Silica	40.27	.044	40.61	.019
Tilden Low Phos.	39.38	.025	41.54	.016

4. ESTIMATE OF ORE RESERVES

a. Developed Ore

1. West Pit - Above floor at 1430'

Assumption: 13 Cu. Ft. equals one ton.

Total Stripped & Developed as of January 1, 1950	1,426,133 Tons
Mined during 1950	50,504 "
Total Remaining December 31, 1950	1,375,629 Tons

2. East Pit - Above floor at 1440'

Assumption: 14 Cu. Ft. equals one ton.

Total Stripped & Developed as of Jan. 1, 1950 1440' to 1500'		1,278,320 Tons
Total Stripped & Developed as of Jan. 1, 1950 above 1500'	1,748,043 Tons	
Mined during 1950	26,753 "	
Total Remaining above 1500' as of Dec. 31, 1950		1,721,290 Tons
Total Remaining above 1440' as of Dec. 31, 1950		2,999,610 Tons

3. Summit Pit - Above floor at 1620'

Assumption: 14 Cu. Ft. equals one ton.

Total Stripped & Developed as of Jan. 1, 1950	401,754 Tons
Mined during 1950	30,208 "
Total Remaining as of Dec. 31, 1950	371,546 Tons

Total Developed Ore as of Dec. 31, 1950

West Pit	1,375,629 Tons
East Pit	2,999,610 "
Summit Pit	371,546 "
Total all Pits	4,746,785 Tons

Broken ore in pits is included in the above reserves.

	West Pit Lower Bench	East Pit	Summit Pit	Total
December 31, 1950	5,373	84,894	12,968	103,235 Tons

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4. ESTIMATE OF ORE RESERVES

a. Developed Ore (Cont.)

Total Prospective Ore

West Pit
Balance remaining to be stripped — 500,000 Tons

East & Summit Pits
Total above floor at 1500' — 2,235,500 "

Total Prospective Ore Jan. 1, 1951 — 2,735,000 Tons

c. Estimated Analysis of Reserves

	Iron	Phos.	Sil.	Mang.	Alum.	Lime	Mag.	Sul.	Loss.	Moist.
1. West Pit										
Dried	39.17	.050	41.91	.09	.90	.20	.22	.009	.24	
Natural	38.50	.049	41.20	.09	.88	.20	.22	.009	.24	1.70
2. East Pit										
Dried	37.00	.020	45.00	.09	.54	.20	.17	.009	.34	
Natural	36.50	.020	44.40	.09	.53	.20	.17	.009	.34	1.34
3. Summit Pit										
Dried	36.00	.015	46.00	.09	.54	.20	.17	.009	.34	
Natural	34.50	.015	45.40	.09	.54	.20	.17	.009	.34	

f. Estimate of Production

Production in the latter years has had to be limited by the amount required to be shipped plus the amount that could be stocked, and the maximum capacity of the present stockpile ground is approximately 75,000 tons. The maximum production possible, however, is as follows:

	5 Days Per Week	6 Days Per Week
Single Shift	224,000 Tons	282,000 Tons
Double Shift	400,000 Tons	500,000 Tons

It would be possible to obtain from 50,000 tons on single shift to 100,000 tons on double shift of Low Phosphorus ore grading .015.

5. LABOR & WAGES

a. Comments

There was an increase of 12½¢ per hour in wages effective December 1st and also a proportionate raise in salaries. At the same time it was agreed that there would be a further increase of not over an average of 8½¢ per hour to adjust inequities and this matter is under consideration.

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5. LABOR & WAGES

a. Comments (Cont.)

The pit was closed during the week of August 13th to 20th and the men received their vacation pay based on 40 hours per week, as the schedule was not changed to 6-days per week until August 27th.

5 men, or 17 % received pay for three weeks.
15 men, or 49½% received pay for two weeks.
2 men, or 6½% received pay for one week.
8 men, or 27 % were ineligible, having worked less than one year.

b. Compara tive Statement of Wages and Product

	1950	1949	Incr.	Decr.
Product	107,465	88,503	18,962	
Number of Days Operated	54	54		
Average Number of Men Working	23	25		2
Average Hourly Rate	1.566	1.505	.061	
Tons Per Man Per Hour	6.881	5.326	1.555	
Labor Cost Per Ton	.228	.282		.054
Amount Paid for Labor	24,457.37	25,004.64		547.27

c. Nationality of Employees

	American Born	Foreign Born	Total
English.	9	1	10
Finnish.	7	1	8
Irish.	3		3
German	2		2
Swedish.	2		2
Italian.	2		2
French Canadian.	1		1
	26	2	28

7. OPEN PIT OPERATIONS

a. Stripping

No stripping occurred in 1950 nor will any be necessary in 1951 unless considerable more ore is required than has been the case in late years.

b. Drilling, Blasting & Explosives

Churn drill holes were put down in the West Pit in 1949 and it will not be necessary to blast them until the Pit opens in 1951. There was sufficient broken ore on hand in the East Pit and therefore no drilling was required there during the year. A blast was made in the East Pit in July of the holes drilled in 1949. In the Summit Pit, 10 holes were drilled in the Upper Bench only, and blasted in August. The broken ore will all be loaded on the Lower Bench until sufficient width develops on the Upper Bench to permit the shovels and trucks to operate.

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7. OPEN PIT OPERATIONS

b. Drilling, Blasting & Explosives

1. Drilling (Cont.)

The ground at the Summit Pit is extremely uneven, requiring considerably more time to set up and move and therefore the footage per shift, including setting up and mining, decreased and the cost per foot increased. The material drilled is more uniform with less hard seams and the footage per bit increased accordingly.

Cost of Operating 9-inch Churn Drills in 1950

Total Footage Drilled 475

Operating	Labor	Supplies	Total	Cost Per Foot
Drilling	$760.05	$ 80.96	$ 841.01	1.771
Sharpening Bits	201.78	148.95	350.73	.738
Electric Power		20.00	20.00	.042
Truck & Tractor	290.16	39.00	329.16	.693
Total Operating	$1,251.99	$288.91	$1,540.90	3.244
Maintenance				
Drills	169.10	98.97	268.07	.564
Bit Dresser	46.94	59.63	106.57	.224
Total Maintenance	216.04	158.60	374.64	.788
Grand Total	$1,468.03	$447.51	$1,915.54	4.032

Comparison of Footages and Costs

	1950			1949		
	Footage Drilled	Footage Per 8-hr Shift	Cost Per Foot	Footage Drilled	Footage Per 8-hr. Shift	Cost Per Foot
West Pit, Lower Bench				826	20.65	3.118
Summit Pit, Upper Bench	475	18.27	4.032			
Total	475	18.27	4.032	826	20.65	3.118

Footage Obtained from Bits

	1950		1949	
	Bits Used	Footage Per Bit	Bits Used	Footage Per Bit
West Pit, Lower Bench			84	9.83
Summit Pit, Upper Bench	42	11.31		
Total	42	11.31	84	9.83

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7. OPEN PIT OPERATIONS

b. Drilling, Blasting & Explosives

2. Blasting

The results obtained from the two blasts set off in 1950 were very satisfactory. The back break was slight and the fragmentation was very good requiring only normal secondary blasting.

Primary Blasting

Location	Date	No. of Holes	Footage Blasted	Estimated Tonnage	Pounds Explosives	Estimated Tons Ore Per Pound Explosive
East Pit, Upper Bench	7/28/50	40	1,944	72,700	33,300	2.18
Summit Pit, Upper Bench	8/25/50	10	457	14,200	6,850	2.07

STATEMENT OF EXPLOSIVES USED FOR YEAR 1950

Primary Blasting

Kind		Quantity	Price	Amount
Gelamite "D" 7½	lbs.	26,650	.1526	$4,067.50
Hercomite Bag X 7½	"	13,500	.1421	1,918.50
Total Powder		40,150	.1491	5,986.00
Blasting Supplies				
Primacord Bickford Fuse, Regular M'		500	32.00	16.00
Primacord Bickford Fuse, Reinf. Plastic		4,000	41.50	166.00
No. 20 Connecting Wire	lb.	6	.75	4.50
Total Blasting Supplies				186.50
Total all Explosives				$6,172.50

	1950	1949
Tons of Ore Blasted	86,900	86,900
Tons of Ore Per Lb. of Powder	2.16	2.31
Cost per Ton for Powder	.0689	.0632
Cost per Ton for Blasting Supplies	.0021	.0022
Cost per Ton for All Explosives	.0710	.0654
Average Price per Lb. for Powder	.1491	.1458

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7. OPEN PIT OPERATIONS

b. Drilling, Blasting & Explosives

2. Blasting (Cont.)

Secondary Blasting

Kind		Quantity	Price	Amount
60% Gelatin	lbs.	306	.1688	$ 51.65
60% H.P. Gelatin 5 x 5"	"	2,090	.2059	430.40
Total Powder		2,396	.2012	$482.05
Blasting Supplies				
Fuse	M'	6,491	8.58	55.68
#6 Blasting Caps	M	798	14.36	11.46
Total Blasting Supplies				67.14
Total Secondary Explosives				$549.19

	1950	1949
Product	107,465	88,503
Pounds of Powder per Ton of Ore	.0223	.0407
Cost per Ton for Powder	.0045	.0075
Cost per Ton for Fuse & Caps	.0006	.0011
Cost per Ton for All Explosives	.0051	.0086
Average Price per Lb. for Powder	.2012	.1851
Total All Explosives Used at Pit	$6,721.69	$6,439.21

Comparison of Blasting Costs

	Primary Blasting	Secondary Blasting
	Cost per Ton Blasted	Cost per Ton Produced
1950	.0710	.0051
1949	.0654	.0086
1948	.0575	.0057
1947	.0715	.0042
1946	.0494	.0098
1945	.0416	.0052

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7. OPEN PIT OPERATIONS

g. Loading Operations

No. 46 Shovel remained in the East Pit during the entire season while the No. 52 or 120-B Shovel was moved to the Summit Pit in June to load Low Phos. ore, then back to the stockpile, and thence to the West Pit for Silica. Later in the year the #52 was again moved to the Summit Pit for a short time. Both shovels required very little maintenance during the loading season.

The locality and tonnages for the two shovels loading during 1950 was distributed as follows:

Unit	Tons	Locality
No. 52 Shovel	61,701	Stockpile
	30,208	Summit Pit
	50,504	West Pit, Lower Bench
Total	142,413	
No. 46 Shovel	26,753	East Pit, Upper Bench

8. COST OF OPERATIONS

a. Comparative Mining Cost

	1950	1949
Production	107,465	88,503
Operating Cost	.732	.765
General Mine Expense	.184	.202
Stocking Ore	.010	.020
Cost of Production	.926	.987
Depreciation - Movable Equipment	.001	.000
Depreciation - Plant & Equipment	.070	.069
Depreciation - Motorized Equipment	.006	.005
Depletion - Original Cost	.003	.003
Amortization of Development	.003	.004
Amortization of Stripping	.020	.020
Taxes	.057	.068
Loading from Stockpile	.004	.014
Total Cost at Mine	1.090	1.170
Average Daily Product	1,990	1,639
Tons per Man per Day	55.05	42.61
Number of Days Operated (1 8-hr. Shift)	54	54

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8. COST OF OPERATING

b. Detailed Cost Comparison

PIT OPERATING (Combined operating & Idle Expense)

	1950		1949	
Direct Ore	Amount	Per Ton	Amount	Per Ton
Drilling & Blasting	19,341.73	.180	12,067.64	.136
Power Shovels, Operating	5,186.04	.048	6,183.76	.070
Power Shovels, Maintenance	5,574.04	.052	6,363.67	.072
Euclid trucks, Operating	3,920.45	.037	3,355.42	.038
Euclid trucks, Maintenance	4,556.35	.042	5,876.78	.067
R.D. Tractors, Maintenance	1,041.58	.010	564.35	.006
Total Direct Ore	39,620.19	.369	34,411.62	.389
General Pit Expense				
Pumping & Drainage	702.41	.000	117.90	.001
Water Supply	267.12	.003	46.99	.001
Crushing & Screening	15,377.37	.144	14,378.65	.162
General Open Pit Expense	15,063.65	.140	14,825.16	.168
Open Pit Superintendence	7,583.00	.070	3,925.00	.044
Buildings			6.89	
Total General Pit Expense	38,993.55	.363	33,300.59	.376
TOTAL PIT OPERATION	78,613.74	.732	67,712.21	.765
Stock ing Tilden Crushed Ore	1,124.61	.010	1,705.48	.020
GRAND TOTAL	79,738.35	.742	69,417.69	.785
General Mine Expense				
Mining Engineering	693.01	.006	1,387.58	.016
Mechanical & Electrical Engineering	193.27	.002	476.72	.005
Analysis & Grading	1,109.66	.010	825.58	.009
Safety Department	255.92	.002	174.49	.002
Special Expense	542.64	.005	437.57	.005
Ishpeming Office Expense	1,717.36	.016	983.25	.011
Local & General Welfare	259.05	.002	171.02	.002
Mine Office	6,055.04	.057	5,678.55	.064
Insurance	3,348.85	.031	2,800.73	.032
Personal Injury Expense	913.19	.009	1,282.25	.014
Social Security Taxes	1,304.18	.012	1,027.88	.012
Geological	283.30	.003	94.44	.001
Employees' Vacation Pay	3,120.00	.029	2,576.04	.020
Total General Mine Expense	19,795.47	.184	17,916.10	.202
COST OF PRODUCTION	99,533.82	.926	87,333.79	.987
Taxes	6,182.62	.057	5,936.68	.068
TOTAL	105,716.44	.983	93,270.47	1.055

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8. COST OF OPERATING

b. Detailed Cost Comparison (Cont.)

The decrease in cost was due to the increased production of almost 20,000 tons during the same number of operating shifts. There was an increase in idle and winter expense of approximately 20% due to more repairs to equipment and higher charges to General Mine Expense.

There is no comparison shown of the separate accounts as there were no unusual increases or decreases in cost except as noted in the general overall comparison.

Cost of Production

	1950				1949			
	Labor	%	Supplies	%	Labor	%	Supplies	%
Cost per Ton, Operating	.243	47	.274	53	.300	53	.265	47
Cost per Ton, Idle	.303	74	.106	26	.222	53	.200	47
Total	.546	59	.380	41	.522	53	.465	47

There was an increase in labor cost during the idle months as considerable repairing was necessary to the crushers, crusher plant, and trucks. The truck repairs were mostly due to their use at the Lake Mine where they had to operate under very adverse conditions. A larger percentage of the different drilling was also charged out as the broken ore in the pits was nearly cleaned up.

Idle & Winter Expense

This expense is combined with the operating costs under the separate accounts but the following table is inserted as a matter of record.

	Labor	Supplies	Total
January	$3,636.28	$1,009.31	$4,645.59
February	2,495.53	942.70	3,438.23
March	2,793.41	911.86	3,705.27
April	3,308.69	950.80	4,259.49
May	2,908.02	1,565.92	4,473.94
October	6,563.26	2,611.57	9,174.83
November	5,166.16	1,546.87	6,713.03
December	5,683.35	2,044.82	7,728.17
Total	$32,554.70	$11,583.85	$44,138.55

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10. TAXES

Tilden Township

Tilden Mine

	1950		1949	
	Valuation	Taxes	Valuation	Taxes
N½ of Sec. 26, 47-27 320 Acres	120,000	2,432.50	140,000	2,817.41
Personal Supplies & Equipment	185,000	3,750.12	155,000	3,119.27
Collection Fees		61.83		
Total	305,000	6,244.45	295,000	5,936.68

11. PERSONAL INJURY

There were no lost time accidents at the Tilden Mine in 1950.

13. EQUIPMENT AND PROPOSED NEW EQUIPMENT

E & A, CC-246

This E & A was authorized for the purchase of an RD-8 Caterpillar tractor to replace the present equipment which would require approximately $8,000.00 to repair having been in service for 11 years.

ATHENS MINE
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The Athens Mine operated on a schedule of five days per week on a full two-shift basis for the first eight months of the year and on a six day two shift basis during the last four months. In addition to the regular two-shift basis a number of men worked on a three shift schedule, developing and drawing ore from No. 3 block area above the 8th Level. All the ore above the 4th Level in the Corbit Lease has now been mined and the mining of the ore below the level is proceeding satisfactorily but slowly. The cost of keeping the 4th Level open in the final stages of completing the mining in the Corbit Lease above the level was tremendous and of course this expense has now been eliminated as the level in this territory is of no further use and has been abandoned. The mining of the ore remaining in the Corbit Lease should be completed in about six months.

Production from the Athens Mine in 1950 was 612,000 tons as compared with 550,000 in 1949. During the year the heavy production shifted from the 4th Level to the 8th Level where the ore in the deposit north of the large E-W dike is being block caved. Block caving in this territory will be completed in February of 1951 and then production will shift to the 10th Level where block No. 4 is being developed.

The increase was due to the fact that there was no idle strike period as in 1949 and also to better mining opportunities throughout the mine.

During the year the 10th Level main haulage drift was advanced 650 feet westerly in rock to a point 40 feet from the Bunker Hill property line. From this drift a crosscut was advanced 220 feet north through the north ore deposit near the East end. Block No. 4 is being developed from this crosscut and will come into production in about two months.

The cost of timbering and repairing throughout the mine was heavy during the year but not to the extent of 1949 due to abandonment of a portion of the 4th Level and a change in the timbering of grizzly drifts, in block caving. Instead of using the squared and intricately framed timber sets in the grizzly drifts the sets are now constructed of round timber with a standard 5 foot cap and a 7 foot leg. This change not only formed a stronger support but also saved several thousands of dollars in costs during the course of the year.

There was more development work done in 1950 than in the previous year. In 1950 there was 4,930 feet of ore development and 2,231 feet of rock development as compared with 3,017 feet of ore and 1,596 feet of rock development in 1949. Development consisted of main level haulage drifts, working raises, ventilation drifts and raises preparatory to block caving.

The underground workings at the Athens Mine at the present time are in very good condition and prospects are bright for good production during 1951 if the results of subsidence do not interfere with hoisting facilities. Subsidence has been marked during the year, but it so happens that the hill on which the engine house is located is moving as a unit and at level keel so that it has not thrown the equipment out of alignment.

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2. PRODUCTION SHIPMENTS AND INVENTORIES:

a. Production By Grades:

	1950	1949	Increase	Decrease
Athens Ore	369,792	189,950	179,842	
Mitchell Lease Ore	113,082	84,157	28,925	
Corbit Lease Ore	129,126	272,816		143,690
Lucky Star Ore		3,077		3,077
Total Ore	612,000	550,000	62,000	
Rock	22,870	18,230	4,640	
TOTAL Hoist	634,870	568,230	66,640	

b. Shipments:

Grade of Ore	Pocket Tons	Stockpile Tons	1950 Total Tons	1949 Total Tons
Athens Ore	231,805	124,593	356,398	193,826
Mitchell Lease Ore	77,955	34,835	112,790	85,650
Corbit Lease Ore	67,416	72,630	140,046	282,480
Lucky Star Ore				3,077
Total	377,176	232,058	609,234	565,033
Total Last Year	317,782	247,251	565,033	
Increase	59,394		44,201	
Decrease		15,193		

c. Stockpile Inventories:

Grade of Ore	Dec. 31, 1950	Dec. 31, 1949	Increase	Decrease
Athens Ore	38,360	24,966	13,394	
Mitchell Lease Ore	7,147	6,855	292	
Corbit Lease Ore	5,601	16,521		10,920
Total	51,108	48,342	2,766	

d. Division of Products by Levels:

	1950 Tons	1950 Percent	1949 Tons	1949 Percent
4th Level	117,247	19.16	306,792	55.78
6th Level	232,451	37.98	167,427	30.44
7th Level	---	---	---	---
8th Level	197,099	32.21	13,942	2.55
9th Level	65,203	10.65	52,343	9.52
10th Level	---	---	9,496	1.73
Total	612,000	100.	550,000	100.

e. Production by Months:

Month	Athens	Mitchell	Corbit	Lucky Star	Total	Rock
January	22,285	4,161	17,437	---	43,883	1,520
February	26,576	4,468	14,094	---	45,138	1,560
March	31,445	4,029	16,147	---	51,621	1,850
April	24,783	3,783	13,394	---	41,960	2,025
May	27,032	9,096	12,757	---	48,885	1,325
June	36,187	9,290	11,262	---	56,739	2,000
July	22,349	5,751	7,011	---	35,111	1,180
August	38,618	10,846	12,118	---	61,582	1,175
September	32,607	15,200	5,601	---	53,408	3,405
October	30,020	15,851	5,035	---	50,906	2,310
November	34,703	10,791	6,049	---	51,543	1,880
December	34,687	7,602	5,227	---	47,516	2,640
Total	361,292	100,868	126,132	---	*588,292	22,870

*Does not include current year's stockpile overrun.

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2. PRODUCTION SHIPMENTS AND INVENTORIES: (Cont'd)

e. Production by Months: (Cont'd)

	Athens	Mitchell	Corbit	Lucky Star	Total	Rock
Current Year's Stockpile Overrun	8,500	12,214	2,994	—	23,708	—
Total 1950	369,792	113,082	129,126	—	612,000	22,870
Total 1949	189,950	84,157	272,816	3,077	550,000	18,230
Increase	179,842	28,925			62,000	4,640
Decrease			143,690	3,077		

f. Ore Statement:

ORE STATEMENT - DECEMBER 31st 1950

	Athens	Mitchell Lease	Corbit Lease	Lucky Star	1950 Total	1949 Total
On Hand January 1, 1950	24,966	6,855	16,521	—	48,342	63,375
Out-put for year	361,292	100,868	126,132	—	588,292	532,747
Prior Year Stockpile Overrun						0
Current Year's Overrun	8,500	12,214	2,994	—	23,708	17,253
Total	394,758	119,937	145,647	—	660,342	613,375
Shipments	356,398	112,790	140,046	—	609,234	565,033
Balance On Hand	38,360	7,147	5,601	—	51,108	48,342
Increase in Output	178,695	19,007			55,545	
Decrease in Output			139,080	3,077		
Increase in Ore On Hand	13,394	292			2,766	
Decrease in Ore On Hand			10,920			

SHIPMENTS FOR YEAR 1950

Grades	Pocket	Stockpile	1950 Total	1949 Total
Athens	231,805	124,593	356,398	193,826
Mitchell Lease	77,955	34,835	112,790	85,650
Corbit Lease	67,416	72,630	140,046	282,480
Lucky Star				3,077
Total	377,176	232,058	609,234	565,033
Total Last Year	317,782	247,251	565,033	
Increase in Shipments	59,394		44,201	
Decrease in Shipments		15,193		

g. Delays:

Date	Hours		Tons Lost
Jan. 18	4	Top Tram cars froze account of cold	400
24	8	Break down Dry Heating Plant Boiler	800
Feb. 1	1½	Shaft Inspection	125
8	1½	Shaft Inspection	125
15	1½	Shaft Inspection	125
22	1½	Shaft Inspection	125
22	1	Cutting Skip Rope	100
Mar. 1	1½	Shaft Inspection	125
8	1½	Shaft Inspection	125
15	1½	Shaft Inspection	125
20	16	Break down in Skip Pit	1660
21	16	Break down in Skip Pit	1660

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g. Delays: (Cont'd)

Date		Hours		Tons Lost
Mar.	22	1½	Shaft Inspection	125
	29	1½	Shaft Inspection	125
	29	1	Repairing Skip	100
April	5	1½	Shaft Inspection	125
	11	1½	Repairing U. G. Pockets	150
	11	2	Delay on landing account of storm	200
	12	1½	Shaft Inspection	125
	12	½	Measuring pocket - Blocked	50
	14	½	Delay on landing & in skip pit	60
	18	2	Replacing Skip shoes	200
	19	1½	Shaft Inspection	125
	26	1½	Shaft Inspection	125
May	3	1½	Shaft Inspection	125
	4	3/4	Cutting Skip Rope - Acct Stretch	75
	8	2½	Cutting Skip Rope - Acct Stretch	250
	10	1½	Shaft Inspection	125
	11	3/4	Shaft Inspection	75
	12	1	Cutting Skip Rope - Acct Stretch	100
	17	1½	Shaft Inspection	125
	24	¼	Chunk stuck in measuring pocket	25
	24	2½	Generator - Skip hoist - Run hot	225
	24	1½	Shaft Inspection	125
	29	1	Chunk stuck in measuring pocket	100
	31	1½	Fingers jammed on measuring pocket	125
	31	1½	Shaft Inspection	125
June	1	½	Changing bolts of liners - Head Frame	25
	2	3/4	Delay account Measuring Pocket	90
	6	1	Repairing Skip	100
	7	1½	Shaft Inspection	125
	13	2½	Cleaning Pump Sump	220
	14	½	Chunks in Measuring Pocket	50
	14	½	Skip Pit	50
	14	1½	Shaft Inspection	125
	15	1	Chunks in Measuring Pocket	100
	19	1¼	Chunks in Measuring Pocket	140
	20	1	Chunks in Measuring pocket	100
	21	½	Chunks in Measuring pocket	75
	21	1½	Shaft Inspection	125
	22	3	Repairs to Shaft	300
	22	½	Low Air Pressure	50
	26	1	Changing roller on skip	100
	26	½	Dirt Hanging up in U. G. pocket	50
	27	1	Chunks in Measuring Pocket	100
	27	1	Shaft Inspection	100
	28	½	Repairing water line in shaft	50
	28	½	Chunks in measuring pocket	50
	29	1½	Chunks in measuring pocket	125
	29	3/4	Cutting skip rope - Acct Stretch	75
July	6	1½	Shaft Inspection	125
	6	½	Chunks in measuring pocket	75
	7	½	Chunks in measuring pocket	50
	11	½	Cutting skip rope - acct stretch	50

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2. PRODUCTION SHIPMENTS AND INVENTORIES: (Cont'd)
g. Delays: (Cont'd)

Date		Hours		Tons Lost
July	11	½	Cutting skip rope - acct stretch	50
	12	1½	Shaft Inspection	125
	13	1	Dirt hanging up in measuring pocket	100
	13	½	Changing skip shoes	50
	19	1½	Shaft Inspection	125
Aug.	1	3/4	Dirt hanging up in measuring pocket	75
	1	¼	Generator set - Engine House	25
	2	1½	Shaft Inspection	125
	3	½	Putting new rope of skip hoist (pit)	50
	9	1½	Shaft Inspection	125
	15	1	Dirt hanging in measuring pocket	100
	16	1½	Shaft Inspection	125
	17	1½	Dirt Hanging in measuring pocket	150
	17	½	Putting new rope on skip pit hoist	50
	18	2	Dirt hanging in measuring pocket	200
	23	½	Dirt hanging in measuring pocket	50
	23	½	Repairing head sheave linings	50
	23	1½	Shaft Inspection	150
	28	1	Repairing 8th Level Pocket	100
	30	1½	Shaft Inspection	125
	31	½	Changing rollers on skip	50
Sept.	2	½	Chunks in measuring pocket	50
	6	1½	Shaft Inspection	150
	6	½	Skip repairs	50
	6	½	Change rope in skip pit	50
	7	½	Cutting skip rope	50
	7	½	Repair door on U. G. pocket	50
	7	½	Chunks in Measuring pocket	50
	9	2	Measuring pocket jammes	200
	11	1½	Steel plate loose in 8th Level Pocket	150
	13	1½	Shaft Inspection	150
	13	1	Door stuck on measuring pocket	100
	14	½	Changing air cylinder U. G. pocket	50
	14	½	Repair on Landing	50
	18	½	Change rope sheave on landing	50
	19	¼	Change bolt on head sheave lining	25
	19	¼	Chunks in measuring pocket	25
	19	¼	Change rope on skip pit hoist	25
	20	3	Chunks in measuring pocket	300
	20	1½	Shaft Inspection	125
	21	½	Chunks in measuring pocket	50
	23	2	Chunks in measuring pocket	200
	24	1	Repairing measuring pocket	100
	24	½	Repairing head frame sheave lining	50
	25	1	Shaft pocket hanging up	100
	26	1	Chunks in measuring pocket	100
	27	1½	Shaft Inspection	150
	27	½	Replace bolts head sheave lining	50
	27	½	Repairs to skip	50
	28	1	Replacing liners on head frame sheave	100
	28	1	U. G. pocket hanging up - head to blast	100

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2. PRODUCTION SHIPMENTS AND INVENTORIES: (Cont'd)
g. Delays: (Cont'd)

Date		Hours		Tons Lost
Sept.	30	1½	Repair Shaft	150
	30	½	Repair head frame sheave	50
Oct.	1	½	U. G. Pocket hanging up	50
	3	½	Chunks in measuring pocket	50
	5	½	Chunks in measuring pocket	50
	5	1	Repairs to fingers on measuring pocket	100
	6	1	Repairs to skip	100
	6	1	Chunks in measuring pocket	100
	7	½	Changing rope on skip pit hoist	50
	9	3/4	Measuring pocket hanging up	75
	11	1½	Shaft Inspection	125
	18	1½	Shaft Inspection	125
Nov.	1	1½	Shaft Inspection	125
	6	1	Electric power off - acct storm	100
	8	1½	Shaft Inspection	150
	8	½	Chunks in pocket	50
	13	1	Cutting south skip rope - acct stretch	100
	15	1½	Shaft Inspection	150
	15	½	Electric power off - acct storm	50
	21	2½	Changing skip	250
	29	1½	Shaft Inspection	125
Dec.	6	1½	Shaft Inspection	125
	7	½	Replacing skip shoes	50
	7	½	Replacing water line in shaft	50
	7	½	Chunks in measuring pocket	50
	13	½	Change skip shoes	50
	13	1½	Shaft Inspection	150
	20	1½	Shaft Inspection	150
	27	1½	Shaft Inspection	150
Totals		196½ Hours		18770 Tons

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

	1950				1949			
Grade	Tons	Iron	Phos.	Sil	Tons	Iron	Phos.	Sil.
Athens & Corbit Ore	498,918	58.89	.116	9.20	465,843	58.45	.117	9.32
Mitchell Ore	113,082	58.76	.113	9.29	84,157	58.75	.123	9.25

b. Average Analysis On Straight Cargoes:
There were no straight cargo shipments in 1950.

c. High Sulphur Ore:
There was no high sulphur ore encountered in th Athens Mine during 1950.

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4. ESTIMATE OF ORE RESERVES:

a. Developed Ore:

Assumption: 12.75 Cubic feet equals one ton
10 per cent for rock & loss in mining Per cent of Bessemer - None

	Athens Lots	Mitchell Lease	Corbit Lease	Total Tons
4th Level and Above	12,765	196	8,780	21,741
4th to 6th Level	297,226	411,327	37,678	747,231
6th to 7th Level	36,507	70,714		107,221
7th to 8th Level	164,093			164,093
8th to 9th Level	376,733			376,733
9th to 10th Level	562,939			562,939
Below 10th Level	430,687			430,687
Total Gross Tons	1,881,950	482,237	46,458	2,410,645
Less Sept. Production	32,607	15,200	5,601	53,408
Total Gross Tons As Of Sept. 30, 1950	1,849,343	467,037	40,857	2,357,237
Less Production Sept. 30 to Dec. 31, 1950	99,410	34,244	16,311	149,965
Total Gross As Of Dec. 31, 1950	1,749,933	432,793	24,546	2,207,272
Less 10% For Mining And Rock	184,934	46,704	4,086	235,724
Net Tons 1950	1,564,999	386,089	20,460	1,971,548
Net Tons 1949	1,916,877	471,013	174,650	2,562,540
Increase				
Decrease	351,878	84,924	154,190	590,992

The above tabulation shows a decrease of 590,992 tons in the estimate of ore reserves on December 31, 1950 as compared with that of December 31, 1949. Deducting the 590,992 tons from the 1950 production which was 612,000 tons shows that 21,008 tons were developed in 1950. Comparing these figures with production shows that 17,914 tons of Athens Ore and 28,158 tons of Mitchell Ore was developed in 1950 and a loss of 25,064 tons in the Corbit Lease. This was due to the fact that the reserves in the Corbit Lease were overestimated in 1949.

b. Prospective Ore:

All the ore in the mine is considered developed.

c. Estimated Analysis:

Ore Reserves:

Approximate Expected Natural Analysis

Tons	Iron	Phos	Sil	Mang	Alum	Lime	Mag	Sul	Loss	Moist
	51.00	.100	8.00	.30	2.75	.40	.76	.010	1.40	13.50

Ore In Stock

	Tons	Iron	Phos	Sil	Mang	Alum	Lime	Mag	Sul	Loss	Moist
Athens	38,360	58.56	.115	9.40	.42	3.00	.52	1.06	.013	1.78	13.36
Mitchell	7,147	57.81	.113	10.50	.44	3.10	.52	1.06	.013	1.78	13.40
Corbit	5,601	58.56	.115	9.40	.42	3.00	.52	1.06	.013	1.78	13.36

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c. Estimated Analysis: (Cont'd)
Ore In Stock: (Cont'd)

Tons	Iron	Phos.	Sil.	Mang.	Alum.	Lime	Mag	Sul.	Loss	Moist
609,234	58.60	.120	9.64	.53	2.78	.61	.92	.012	1.55	13.35

5. LABOR AND WAGES:

a. Comments:

The average number of statistical employees in 1950 was 346 as compared with 338 in 1949, an increase of 8 men. During the year there were 22 men hired and 6 received by transfer from other mines. There were 26 separations in 1950. Separations consisted of 6 who quit for various reasons, 2 discharged, 10 transfered to other mines, 4 entered military service, 2 retired and 2 died.

The average wages per month including the captain and clerks, decreased from $293.21 in 1949 to $282.75 in 1950. The decrease was due to the change in working schedule. In 1949 the mine operated on a 5 day per week schedule for 6 months where as in 1950 it was eight months on a 5 day per week and 4 months on a 6 day per week schedule.

b. Comparative Statement of Wages and Product:

Product	1950	1949	Increase	Decrease
Product	612,000	550,000	62,000	
No. Shifts & Hours	3 - 1/8Hour	1 - 1/8Hour	2	
	266 - 2/8Hour	245 - 2/8Hour	21	
Average No. Men Working:				
Surface	73	59½	13½	
Underground	273	278½		5½
Total	346	338	8	
Average Wages Per Day:				
Surface	11.27	11.35		.08
Underground	12.89	12.81	.08	
Total	12.59	12.57	.02	
Average Wages Per Month:	(Based On Mine Payroll Including Captain & Clerks)			
Surface	255.23	265.23		10.00
Underground	289.34	299.57		10.23
Total	282.75	293.21		10.46
Product Per Man Per Day:				
Surface	31.09	31.59		.50
Underground	8.32	8.16	.16	
Total	6.57	6.49	.08	
Labor Cost Per Ton:				
Surface	.371	.370	.001	
Underground	1.546	1.568		.022
Total	1.917	1.938		.021
Average Product Mining:				
Stoping	26.69	26.64	.05	
Development In Ore	7.10	5.46	1.64	
Total	24.11	24.03	.08	

ATHENS MINE
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5. LABOR AND WAGES: (Cont'd)

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

Average Wages Per Day:	1950	1949	Increase	Decrease
For Contract Miner	13.54	13.33	.21	
Total Number of Man Days:				
Surface	19,686 1/2	17,408 3/4	2,277 3/4	
Underground	73,518 1/2	67,382 1/4	6,136 1/4	
Total	93,205	84,791	8,414	
Amount For Labor:				
Surface	226,978.27	165,533.64	61,444.63	
Underground	946,125.30	874,192.45	71,932.85	
Total	1,173,103.57	1,039,726.09	133,377.48	
Average Wages Per Month as Per Labor Statement - Less Captain & Clerks:				
Surface	253.85	264.96		11.11
Underground	288.50	298.95		10.45
Total	282.12	292.96		10.84

Proportion of Surface to Underground Men:
1950 - - - - - - - - 1 to 3.74
5 - 2/8 Hr. Jan. 1st to Aug. 26th
6 - 2/8 Hr. Aug. 26th to Dec. 31st
1949 - - - - - - - - 1 to 4.20
6 - 2/8 Hr. Jan. 1st to June 30th
5 - 2/8 Hr. July 1st to Dec. 31st

c. Operating Schedules - 1950:

Month	Days Mine Worked Per Week	Days Per Month	Days Men Worked Per Week	Avg. Shifts Worked Per Month By Each Man
January	5	21	5	21
February	5	20	5	20
March	5	23	5	23
April	5	20	5	20
May	5	22	5	22
June	5	21	5	21
July	5	14	5	14
August	6	25	6	25
September	6	25	6	25
October	6	26	6	26
November	6	25	6	25
December	6	24	6	24
Total		266		266
Avg. For Year Mine Operated		22.2		
Avg. For Year Worked By Each Man				22.2

6. SURFACE:

a-1 Buildings:

All mine plant buildings are settling and cracking due to subsidence. The Dry, being nearest to the cave shows the most movement. This building is moving and cracking up so badly that it is now requiring almost constant repairing to maintain steam and water lines. If after the spring breakup the subsidence is accelerated it is very probable that the Dry will have to be abandoned.

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6. SURFACE: (Cont'd)

a-2 Docks, Trestles and Pockets:

The usual wood trestle for stocking ore was erected between the two steel trestles.

The south steel trestle shows some movement caused by subsidence.

The railway loading pockets were kept in good repair with the usual replacement of worn plates.

a-3 Stocking Grounds:

After the shipping season ended the stocking grounds were leveled off and wood slabs were placed at intervals to designate where the rock collar is when the pile is being loaded out next year.

b. Stockpiles:

(1) Ore:

Ore at the Athens Mine was stocked in two piles in 1950 the Athens ore under the North Steel Trestle and the Mitchell ore under the South Steel Trestle. The wood trestle between the two steel trestles was not used for stocking, but was pushed 30 or 40 feet south so the toe of the north pile could be extended to the south. Loading from the stockpile was started on May 5th and completed on December 2nd.

(2) Rock:

The rock was stocked under the wood trestle extending southwest from the shaft on caving ground. As it accumulated under the bents it was bulldozed into the cave.

c. Cave To Surface:

The most serious problem at the present time is subsidence. The cave proper continues to settle causing a draw and movement of the entire area covered by the surface plant. The draw at one point extends across Ann Street up to the Duluth South Shore Railway's main track. From a survey made in October it was found that iron pin No. 604 located just north of the shaft has settled 2 3/8 inches and had moved 8 inches south and 4 inches west. From the same survey iron pin Athens No. 2 located about 120 feet east of the Engine House showed a settlement of 5 5/8 inches and a movement of 17 3/8 inches to the south and 1 7/8 inches east. The ground on the north side of the Engine House has settled 4 3/4 inches and the south side 6 3/8 inches. The outcrop north of Ann Street on the south line of the Duluth South Shore & Atlantic Railway's right-of-way has gone down 2 3/8 inches. The thing that most concerns the operating of the Athens Mine is the movement of the shaft and the Engine House. To date the Engine House is moving as a unit except for a few small cracks which show no displacement but if this area should start to break up it would probably throw the machinery out of kilter and stop operation.

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6. SURFACE: (Cont'd)

c. Deep Wells:

No. 1 Deep Well continued operating throughout the year. A daily inspection of the pump was made to keep it properly lubricated and in good operating condition.

d. Breitung Shaft:

Pumping was continued throughout the year from the Breitung Shaft. This pump is visited daily to take care of lubrication and see that it is in good working condition.

e. Water Purchased for Heating, Cooling, Etc.:

	1950		1949		1948	
	Gallons	Amount	Gallons	Amount	Gallons	Amount
1st Quarter	7,188,000	506.16	8,019,000	564.33	5,671,000	400.00
2nd Quarter	7,835,000	551.45	7,481,000	526.67	4,774,000	337.18
3rd Quarter	8,476,000	596.32	6,787,000	478.09	5,771,000	406.97
4th Quarter	8,403,000	591.21	5,357,000	377.99	6,476,000	456.32
Total	31,902,000	2,245.14	27,644,000	1,947.08	22,692,000	1,600.47

Product — Tons	612,000	550,000	506,600
Cost Per Ton	.002726	.002824	.00316

f. Ground and Fences:

All fences were kept in good repair throughout the year.

All lawns and grounds were kept in good condition throughout the year. The vacant lot just east of the office was added to the office lawn and a new road constructed due north from the shaft to Ann Street.

7. UNDERGROUND:

a. Shaft Sinking:

There was no shaft sinking in 1950.

b. Development, General Remarks:

The Nos. 4 and 5 transfer drifts of the Block #2 encountered extreme bottom and side pressures and collapsed. The No. 5 transfer was re-opened and maintained with excessive repair work. The block cave in general encountered tremendous pressures through out and was completed during the year.

The development of Block #3 above 8th level in the new ore body north of the big dike was started. There were two transfers driven onthe -780' sub-level and 8 mills going up from No. 1 (east) transfer on both sides and 10 mills from the No. 2 transfer on both sides. Four grizzly drifts were driven on the -760' Sub-level and a total of 68 finger raises were put up from the grizzly drifts. In this block the use of round timber sets were tried in place of the convential square timber sets on the grizzly subs and proved to be highly satisfactory in holding up the grizzly drifts even when the extreme pressures were encountered. This Block Cave area was practically completed during the year.

ATHENS MINE
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7. UNDERGROUND: (Cont'd)
b. Development, General Remarks: (Cont'd)

The tonnage drawn from transfer #1 excluding development was 70,546 tons. The tonnage drawn from transfer #2 during the year was 30,373 tons and the remainder of the block was finished by February 12, 1951, with and additional 15,277 tons being drawn from transfer #2.

A third transfer was driven on the west side of transfer #2 on the -780' sub-level. However no grizzly subs were put in as the height of the ore at this point didn't warrent them. This transfer will be a modified block cave tending to be more of a sub-level cave.

Due to the movement of the shaft and the possibility of a break in the water discharge pipe, a connection of the Athens discharge pipe was made with the Negaunee Shaft discharge pipe on the 1000 foot level and the Athens water could be pumped out at the Negaunee Shaft if it were necessary to do so.

The mining raises Nos. 673,683, and 685, were completed and cut out just below the 4th Level. A ventilation raise, No. 962, was put up from the 9th to the 8th level to provide ventilation for the new ore body.

Development of the 10th Level for the mining of the new ore deposit north of the big E - W dike was started during the year. A new track, using 60 lb. rail was laid from the shaft in. A new haulage drift was advanced in the big E - W dike from the old haulage drift, 650 feet westerly to within 40 feet of the Bunker Hill property line. Just a short distance west of where the new haulage drift takes off from the old one a crosscut was advanced 200 feet north. Work has been started from this cross-cut for the development of Block #4. This Block came into partial production on March 8, 1951. Considerable work was required to put the old main drift in condition for laying the new track. The drift had to be widened in several places, the ditch deepened and the area near the dike contact had to be retimbered.

In the area of the new ore body above the 10th level, Block Cave #4 will be put in on the east end of the ore body. The #2 transfer is being driven on the -940' sub-level.

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7. UNDERGROUND: (Cont'd)

b. Development, General Remarks: (Cont'd)

Development Work Sheet

Location	Feet of Drifting		Feet of Raising		Total Feet	
	Ore	Rock	Ore	Rock	Ore	Rock
1000' Level		48				48
-430' Sub-level		13		16		29
-440' Sub-level		115	28	38	28	153
-500' Sub-level				18		18
6th Level			282		282	
-645' Sub-level	454		80		534	
-760' Sub-level	1959	298	967	81	2926	379
-780' Sub-level	463	259	340	93	803	350
8th Level		73		96		169
-800' Sub-level		96				96
9th Level				39		39
-940' Sub-level	161	74	26	25	187	99
10th Level	106	846	64	5	170	851
Total	3143	1820	1787	411	4930	2231

b-1 Development In Ore:

The greatest percentage of the ore drifting development was that done in the Block Caving areas. Some drifting was done on the -645' Sub-level in the new ore body and were used as caving drifts. The cross-cut #10400 was driven partly in ore and the #2 transfer of Block Cave #4 on the -940' Sub-level was driven partly in ore. The remainder of the drifting was done in Block #3 on the -780' and -760' Sub-levels.

There were two main ore raises put up from the 6th level to the fourth level for mining purposes. These raises were Nos. 683, and 685. The major portion of the ore raises were those put up as mill raises from the -780' sub-level and as finger raises from the grizzly drifts on the -760' sub-levels. These being in the new ore body in Block #3. Two raises were put up from the tenth level to the transfer drift on the -940' Sub-level. These were raises Nos. 1042 and 1044.

b-2 Development In Rock:

The rock drifting during the year was about equally divided between main level drifting and sub-level drifting. The main level drifting was done on the 10th level main haulage and a cross-cut to the north from the main haulage drift.

On the -430' Sub-level a connection drift was completed and a raise put up to the fourth level. A connection drift was driven north in Corbit Lot 13 and a raise put up to the Fourth level elevation. Practically all of the remaining rock drifting was done in the Block Cave Area #3 on the -780' and -760' sub-levels.

The remaining rock raising was done in connection with the Block Caves Nos. 3 & 4 which included raising from the level to transfers, transfers to grizzly subs, and air and supply raises between subs. The greater amount being put in Block Cave #3 on the -780' and -760' sub-levels.

ATHENS MINE
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7. UNDERGROUND: (Cont'd)
c. Stoping:
(1) General:

The production for 1950 was obtained principally from the 6th and 8th levels which accounted for 70.19% of the production. The increase in production from the 8th level was due to the Block Cave in the new ore body which accounted for 32.21% of the years production. Production from the 4th level decreased from 55.78% in 1949 to 19.16% in 1950 as the mining of the Corbit Ore above 4th level was completed during the year. The production from the 9th level remained about the same, being 9.52% in 1949 and 10.65% in 1950.

Mining of Corbit Lease Ore above the 4th Level was completed in September thus eliminating ore tramming and extensive repairs on the level. At the present time the ore below the level is being mined by sub-level caving.

The Block Cave No. 2 above the 4th level was completed during the year and the Block Cave No. 3 above the 8th level in the new ore body was practically completed. The remainder of the mining was done by top-slicing, sub-level caving, and by combinations of top-slicing and sub-level caving.

The location of the mining contracts at the end of 1950 & 1949 are shown as follows:

1950		1949	
0	above 4th level	7	above 4th level
12	above 6th level	12	above 6th level
5	above 8th level	4	above 8th level
3	above 9th level	4	above 9th level
6	above 10th level	0	above 10th level
Total 26		Total 27	

The contracts are divided as follows:

1950		1949	
Mining -	13 top slicing	Mining -	8 top slicing
Mining -	5 sub-caving	Mining -	10 sub-caving
Developing -	3 raising	Developing -	5 raising
Developing -	2 drifting	Developing -	4 drifting
Long Hole Drilling -	3	Long Hole Drilling -	0
Total	26	Total	27

Above the 4th level ore was mined from the following sub-levels: -355', -365', -385', and 4th level.

Between 4th & 6th levels, ore was mined from the following sub-levels: -405', -415', -430', -440', and -460'.

Between 6th & 8th levels, ore was mined from the following sub-levels: -645', -675', 7th level, -720', -760' and -780'.

Between 8th & 10th levels, ore was mined from the following sub-levels: -815', -830', -840', -855', -865', and -875'.

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7. UNDERGROUND: (Cont'd)
c. Stoping: (Cont'd)
(2) Detail of Stoping: (Cont'd)

Above 4th Level - Mitchell Lots 8, 9, 11; Athens Lots 10, 12; Corbit Lot 13:
The mining above the 4th level was largely confined to the Corbit Lot 13 where Block Cave #2 was worked. This Block Cave was completed during the year as was all the mining above the 4th level. The mining in the Athens & Mitchell Lots was confined mostly to the removal of 4th level pillars from the subs below 4th level.

Between 4th & 6th Levels - Mitchell Lots 9, 11; Athens Lots 10, 12; Corbit Lot 13:
The mining in this area was carried out by contract Nos. 1, 3, 4, 10, 11, 12, 15, 17, 22, 25, 30, and 40 on the -405', -415', -430', -440' and-460' sub-levels. Both sub-level caving and top-slicing were used to extract the ore.

Between 6th & 8th Levels:
In the new ore body, or the body to the north of the dike, contract Nos. 21, 23, 24, and 28 sub-level caved the area above the 7th level from the -645', -675', and 7th level. The area between 7th and 8th levels on the west end was Block Caved from the -780' sub-level. Contract No. 5 sub-level caved the portion just to the east of the block cave from the -760' sub and contract No. 24 sliced and caved the east end of the new ore body from the -720' sub-level.

The only ore extracted from the old ore body above 8th to the 6th level was some removal of pillars from the subs below the 8th level.

Between 8th and 9th Levels:
In the area south of the big dike contracts No. 2, 18, 19, and 27 were top-slicing and sub-level caving on the -815', -830', -840', -855', -865' and -875' sub-levels. Mining in this area on the -815', -830', and -840' was completed during the year.

Between 9th and 10th Levels:
There was no stoping done between these levels during the year.

d. Timbering:
There was an increase of only $7,750.56 in the cost of timbering or 6 cents per ton in 1950, despite the large increase in costs of labor and materials. This was due to the abandoning of a portion of the Fourth Level were repairs were extremely heavy and the change-over from squared to round timber in the grizzly drifts of Block-caving operations. The round timber has proven to be a much stronger support and costs considerably less than the squared timber.

In addition to timber a considerable amount of steel was used for supports. Steel used was the 4 inch "H" section and 8 inch "I" beam.

THE ATHENS IRON MINING COMPANY
ATHENS MINE

TIMBER STATEMENT FOR THE YEAR ENDING DECEMBER 31, 1950

KIND	LINEAL FEET	AVG. PRICE PER FOOT	AMOUNT 1950	AMOUNT 1949
6" to 8" Cribbing	81,242	.0893	7,252.05	5,543.19
8" to 10" Stulls	14,008	.1173	1,643.56	1,545.29
10" to 12" "	48,984	.2075	10,163.07	12,993.87
12" to 14" "	36,866	.2646	9,756.13	8,812.71
14" to 16" "	13,753	.3391	4,663.69	7,392.79
Special Squared Timber-Block Mining	3,450	.5797	200.00	7,635.38
Total 1950	198,303	.1698	33,678.50	
Total 1949	201,784	.2177		43,923.23
		Per 100'		
7' Lagging	860,545	1.4701	12,651.11	13,133.69
9½' Poles	599,106	2.9751	17,824.21	11,618.77
Total 1950	1,459,651	2.0878	30,475.32	
Total 1949	1,188,008	2.0835		24,752.46
Wire Netting	907½		90.42	98.64

	1950	1949
PRODUCT FOR YEAR	612,000	550,000
Ft. Timber per Ton of Ore	.3240	.3669
Ft. Lagging per Ton of Ore	1.4061	1.4813
Ft. Poles per Ton of Ore	.9789	.6787
Ft. Lagging per Ft. of Timber	4.3395	4.0375
Cost per Ton for Timber	.0550	.0799
Cost per Ton for Lagging	.0207	.0239
Cost per Ton for Poles	.0291	.0211
Cost per Ton for Wire Netting	.0001	.0002
Cost per Ton for Timber, Lagging, Poles & Netting	.1050	.1250
Equivalent of Stull Timber to Board Measure	431,814	589,632
Ft. of Board Measure per Ton of Ore	.0706	1.0721
Lin. Ft. of Netting per Ton of Ore	.0015	.0018
Sq. Ft. of Netting per Ton of Ore	.0062	.0075

		AMOUNT	COST PER TON
Total Cost of Timber, Lagging, Poles, Etc. for Year	1950	64,244.24	.1050
	1949	68,774.33	.1250
	1948	79,243.23	.1564
	1947	78,082.59	.1537
	1946	53,734.65	.1463
	1945	72,844.22	.1661
	1944	77,935.27	.1850
	1943	82,305.17	.1589
	1942	82,410.65	.1209
	1941	67,589.93	.1041

ATHENS MINE
ANNUAL REPORT

7. UNDERGROUND: (Cont'd)
d. Timbering:(Cont'd)
Statement of Timber Used: (Cont'd)

		Amount	Cost Per Ton
Total Cost of Tbr. Lagging, Poles, Etc. For Years	1950	64,244.24	.1050
	1949	68,774.33	.1250
	1948	75,243.23	.1485
	1947	78,082.59	.1537
	1946	53,734.65	.1463
	1945	72,844.22	.1661
	1944	77,935.27	.1850
	1943	82,305.17	.1589
	1942	82,410.65	.1209
	1941	67,589.93	.1041

e. Drifting And Raising:
The following table gives a comparision of total feet of drifting and raising in ore and rock in 1950 and 1949:

	Drifting		Raising		Grand
Year	Ore	Rock	Ore	Rock	Total
1950	2917	656	1755	261	5589
1949	1634	1305	1383	291	4613
Increase	1283		372		976
Decrease		649		30	

f. Explosives, Drilling and Blasting:
Statement of Explosives Used: (Ore Development And Stoping)

KIND		QUANTITY	AVERAGE PRICE	AMOUNT 1959	AMOUNT 1949
No. 2-x Hercomite Powder	Lbs.	151,175	15.02	22,702.31	13,528.50
No. 2 Hercomite Powder		50	15.50	7.75	
No. 1-x Gelamite Powder		34,413	15.59	5,364.21	8,068.51
No. 2-x Gelamite Powder		500	16.75	83.75	
60% H.Pr. Gelatin, 5 x 5		25,650	20.53	5,265.00	6,080.00
Total Powder 1 9 5 0		210,888	15.85	33,423.02	
Total Powder 1 9 4 9		176,608	15.67		27,677.01
Fuse	Ft.	710,097	8.45	5,998.16	4,229.40
Caps	Ea.	84,000	14.76	1,239.58	938.90
Electric Caps & Delays	Ea.	1,838	19.82	364.30	210.16
Primacord Fuse	Ft.	204,500	32.02	6,549.00	5,808.00
Shot Firing Cord	Ft.				23.51
Connecting Wire	Lbs.	32	.80	25.60	14.40
Fuse Lighters	M.	22,500	9.00	202.50	157.50
Tamptite Shells	M.	850	7.40	6.29	
Master Lighters	M.				4.50
Total Fuse, Caps, Etc.				14,385.43	11,386.37
TOTAL ALL EXPLOSIVES				47,808.45	39,063.38

ATHENS MINE
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7. UNDERGROUND: (Cont'd)
f. Explosives, Drilling and Blasting: (Cont'd)
Statement of Explosives Used: (Ore Development And Stoping) (Cont'd)

KIND		QUANTITY	AVERAGE PRICE	AMOUNT 1950	AMOUNT 1949
PRODUCT				612,000	550,000
Pounds Powder Per Ton of Ore				.3446	.3211
Tons of Ore Per Lb. of Powder				2.9020	3.1142
Cost Per Ton for Powder				.0546	.0503
Cost Per Ton for Fuse, Caps, Etc.				.0235	.0207
Cost Pet Ton for All Explosives				.0781	.0710
SINKING, ROCK DEVELOPMENT, ETC.					
No. 1-x Gelamite Powder	Lbs.	2,491	15.70	390.99	1,030.90
No. 2-x Hercomite Powder	Lbs.	1,260	15.46	194.78	
Total Powder 1 9 5 0		3,751	15.62	585.77	
Total Powder 1 9 4 9		6,760	15.25		1,030.90
Fuse	Ft.	19,995	8.46	169.20	243.15
Caps	Ea.	2,500	14.85	37.13	71.00
Electric Caps & Delays	Ea.	540	18.95	102.34	121.70
Shot Firing Cord	Ft.				17.71
Tamptite Shells	M.	350	8.06	2.82	6.29
Total Fuse, Caps, Etc.				311.49	459.85
TOTAL ALL EXPLOSIVES				897.26	1,490.75
TOTAL ALL EXPLOSIVES USED AT MINE				48,705.71	40,554.13
Avg. Price Per Pound For Powder				.1584	.1566

i. Pumping:

The following table gives data on pumping at the Athens and Breitung Shafts:

Period	Avg. KW Per Day - Athens	KW Per Month Breitung Pump	Avg. Gal. Per Min. - Athens	Total Cost Both Mines From The Athens Cost Sheet
January	4307	5020	346	3607.71
February	3987	3500	341	3257.59
March	4073	2150	324	3237.34
April	4100	5120	324	3463.22
May	4939	5120	422	3869.94
June	5687	5630	471	4287.29
July	5520	5740	450	4309.78
August	4674	5660	409	3689.52
September	4497	5500	387	3588.46
October	4526	5420	375	3623.55
November	4437	5240	367	3524.06
December	4257	5420	350	3696.58

ATHENS MINE
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7. UNDERGROUND: (Cont'd)
i. Pumping: (Cont'd)

Period	Avg. KW Per Day - Athens	KW Per Month Breitung Pump	Avg. Gal. Per Min. - Athens	Total Cost Both Mines From The Athens Cost Sheet
1939 Avg.	3991	4391	331	2291.90
1940 Avg.	4141	858	351	2381.69
1941 Avg.	4008	1883	354	2351.56
1942 Avg.	4435	2258	388	2668.91
1943 Avg.	4351	3358	372	2701.08
1944 Avg.	3696	1688	308	2528.62
1945 Avg.	3951	2853	332	2356.83
1946 Avg.	3909	1839	320	2456.08
1947 Avg.	3958	3665	340	2599.82
1948 Avg.	3823	1887	320	2834.89
1949 Avg.	4029	3130	334	3032.33
1950 Avg.	4584	4960	381	3679.59

The Number of Gallons pumped per minute at the Athens Mine in each month of the year for the past Nine years is given in the following statement:

Month	1950	1949	1948	1947	1946	1945	1944	1943	1942	1941
January	346	294	331	297	303	306	315	359	399	330
February	341	291	329	290	331	302	297	334	388	327
March	324	296	307	287	282	293	296	330	373	324
April	324	299	307	292	327	342	295	356	374	334
May	422	324	327	363	366	365	307	404	402	334
June	471	336	329	385	330	359	312	411	402	367
July	450	337	323	376	321	359	314	431	393	386
August	409	356	331	374	314	355	313	429	394	363
September	387	396	323	368	316	338	311	390	384	363
October	375	373	321	357	316	329	312	364	397	360
November	367	361	310	346	304	325	316	337	379	365
December	350	350	307	346	302	307	308	328	368	397
Average	381	334	320	340	320	332	308	372	388	354

8. COST OF OPERATING:
a. Comparative Mining Costs:

	1950	1949	Increase	Decrease
Product	612,000	550,000	62,000	
Underground Costs	2.154	2.181		.027
Surface Costs	.269	.280		.011
General Mine Expense	.494	.420	.074	
Cost Of Production	2.917	2.881	.036	
No. of Days Operated	269	246	23	
No. Shifts & Hours	3 - 1/8Hr.	1 - 1/8Hr.	2	
	266 - 2/8Hr.	245 - 2/8Hr.	21	
Average Daily Product	2275	2245	30	

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8. COST OF OPERATING: (Cont'd)
a. Comparative Mining Costs: (Cont'd)

COST OF PRODUCTION	1950	Percent	1949	Percent	Increase	Decrease
Labor	1.984	68.0	2.014	69.9	.012	-.5%
Supplies	.933	32.0	.867	30.1	.024 - .5%	
Total	2.917	100 %	2.881	100 %	.036	

b. Detailed Cost Comparison:
(1) Days And Shifts:

Year	Days Mine Worked	Shift & Hours	Men Employed	Total Shifts Worked
1950	269	5 - 2/8Hr to 8-1-50 6 - 2/8Hr to 12-31-50	346	535
1949	246	6 - 2/8Hr to 7-1-49 5 - 2/8Hr to 1-1 50	338	491
Increase	23			44

(2) Comparison of Production:

Production - 1950	612,000	Tons
Production - 1949	550,000	Tons
Increase	62,000	Tons

(3) Comparison Of Number Of Men And Wages:

	No. Men	No. Days	Amount	Rate Per Day
1950	346	93,205	1,173,103.57	12.59
1949	338	84,791	1,065,878.07	12.57
Increase	8	8,414	107,225.50	.02

(4) Tons Per Man Per Day:

	1950	1949	Increase	Decrease
Surface	31.09	31.59		.50
Underground	8.32	8.16	.16	
Total	6.57	6.49	.08	

(5) Cost Of Production:

	Total	Cost Per Ton
1950	1,785,448.90	2.917
1949	1,584,673.90	2.881
Increase	200,775.00	.036

	Labor	Percent	Supplies	Percent
1950	1,214,060.66	68.0	571,388.24	32.0
1949	1,107,716.15	69.9	476,957.75	30.1
Increase	106,344.51		94,430.49	

ATHENS MINE
ANNUAL REPORT

8. COST OF OPERATING: (Cont'd)
b. Detailed Cost Comparison; (Cont'd)
(7) Detail of Accounts:

COST OF PRODUCTION

		1950		1949	
	UNDERGROUND COSTS:	Amount	Per Ton	Amount	Per Ton
1	Exploring in Mine	1185.01	.002	1073.72	.002
2	Development in Rock	18984.29	.031	22631.07	.041
3	Development in Ore	55837.94	.091	46201.83	.084
4	Stoping	387462.54	.633	343367.74	.624
5	Timbering	405290.06	.663	397539.50	.723
6	Tramming	143989.57	.236	131059.02	.238
7	Ventilation	20475.89	.033	21749.80	.040
8	Pumping	49725.61	.081	35103.70	.064
9	Compressors and Air Pipes	63323.30	.103	53882.04	.098
10	Back Filling				
11	Underground Superintendence	64343.46	.103	48424.14	.088
12	Cave-in or Fire in Mine	560.42	.001	317.14	.000
13	Maint: Compressors and Power Drills	3641.84	.006	5488.49	.010
14	Scrapers and Mechanical Loaders	55906.88	.091	45739.08	.083
15	Tramming Equipt.	39789.11	.065	40428.86	.074
16	Pumping Machinery	7971.48	.013	6721.72	.012
	Total Underground Costs	1318487.40	2.154	1199727.85	2.181
	SURFACE COSTS:				
17	Hoisting	62645.14	.102	51639.10	.094
18	Stocking Ore	15001.79	.025	15034.17	.027
19	Dry House	15853.60	.026	14780.19	.027
20	General Surface Expense	18532.46	.030	15155.92	.028
21	Maint: Hoisting Equipment	25767.20	.042	26223.08	.048
22	Shaft	10303.66	.017	11411.81	.021
23	Top Tram Equipment	8640.28	.014	9947.46	.018
24	Docks, Trestles and Pockets	5897.35	.010	6585.20	.012
25	Mine Buildings	1886.88	.003	3463.54	.005
	Total Surface Costs	164528.36	.269	154240.47	.280
	GENERAL MINE EXPENSES:				
26	Geological	1880.22	.003	1551.50	.003
27	Mining Engineering	12151.09	.020	10613.39	.019
28	Mechanical and Electrical Engineering	3503.86	.006	3653.64	.007
29	Analysis and Grading	26800.48	.044	23133.68	.042
30	Safety Department	5414.48	.009	4004.36	.007
31	Telephone and Safety Devices	7405.99	.012	6219.18	.011
32	Local And General Welfare	4686.60	.008	4106.03	.007
33	Special Exp., Pensions and Allowances	9055.04	.015	9752.90	.018
34	Ishpeming Office	30589.10	.049	24548.18	.045
35	Mine Office	29736.03	.048	27810.07	.051
36	Insurance	32030.12	.052	23300.97	.042
37	Personal Injury	17801.96	.029	27483.61	.050
38	Social Security Taxes	29098.54	.048	23299.17	.042
39	Employees Vacation Pay	86960.50	.142	41228.90	.076
40	Research Laboratory	37.57	.000		
41	Est. Additional Wage Adjustment	5281.56	.009		
	Total General Mine Expense	302433.14	.494	230705.58	.420
	COST OF PRODUCTION - - - - - - - - - -	1785448.90	2.917	1584673.90	2.881
	PRODUCT	612,000 Tons		550,000 Tons	

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8. COST OF OPERATION: (Cont'd)
b. Detailed Cost Comparison: (Cont'd)
(7) Detail of Accounts:

1. Exploring In Mine:
The increase in expense was $111.29 and cost per ton remained the same. There were 386 feet of drilling with bortz bits in 1950. The expense in 1949 was all Geological Department charges.

2. Development in Rock:
The decrease in expense was $3,646.78 and cost per ton $.010. The total feet of drifting and raising in rock was 917 feet in 1950 as compared with 996 feet in 1949. Drifting in 1950, 656 feet; in 1949, 796 feet. Raising in 1950, 261 feet; in 1949, 200 feet.

3. Development in Ore:
The increase in expense was $9,636.11 and cost per ton $.007. There were 1283 feet more drifting and 372 feet more raising in 1950. The increase in expense and footage was due to development of Block No. 3 in 1950.

4. Stoping:
The increase in expense was $44,094.80 and cost per ton $.009. Increase due to large product.

5. Timbering:
The increase in expense was $7,750.56 and cost per ton decreased $.060. The increase in expense was due to larger product. No New Timber Hoists were bought in either 1950 or 1949. The cost per ton for timber in 1950 was .1050 as compared with .1250 in 1949. Cost per ton for steel in 1950 was .0187 and in 1949 .0337.

6. Tramming:
The increase in expense was $12,930.55 and cost per ton decreased $.002. There was an increase of 62,000 tons in production.

7. Ventilation:
The decrease in expense was $1,273.91 and cost per ton $.007. The charge for electric power was $314.77 less in 1950. Two Midget Blowers costing $540.00 were bought in 1949 as compared with none in 1950, and one of the ventilation raises was concreted in 1949.

8. Pumping:
Expense increased $14,621.91 and cost per ton increased $.017.
Gallons of water pumped in 1950 - 199,518,654
Gallons of water pumped in 1949 - 176,437,598
Gallons increased 23,081,056
Average Gallons per minute in 1950 - 381
Average Gallons per minute in 1949 - 334
Increase in gallons per minute - 47

The cost for electric power was $27,886.30 in 1950.

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8. COST OF OPERATING: (Cont'd)
b. Detailed Cost Comparison: (Cont'd)
(7) Detail of Accounts: (Cont'd)

9. Compressors and Air Pipes:
Expenditures increased $9,441.26 and cost per ton increased $.005.

Cubic Feet air compressed in 1950 -	1,161,045,000
Cubic Feet air compressed in 1949 -	992,700,000
Increase	168,345,000

Cost of electric power in 1950 -	$39,898.42
Cost of electric power in 1949 -	$32,634.08
Increase	7,264.34

10. Back Filling:
There was no expense to this account in 1950.

11. Underground Superintendence:
The increase in expense was $15,919.32 and cost per ton $.015.

12. Cave-in and Fire in Mine:
The increase in expense was $243.20 and cost per ton $.001. The increase in expense was due to extending the fence around the caved area.

13. Compressors and Power Drills:
The decrease in expense was $1,846.65 and cost per ton $.004. In 1950 eight Pickhammers were purchased to a cost of $1,310.00 as compared with the following equipment bought in 1949; six RB-12 Ing-Rand Jackhammers $1,710.00; four L-29 Ing-Rand Pickhammers $620.00; one LeRoi HC-23 Rock Drill with column $825.00; one S-91 Joy Mfg. Co. Stoper $565.00; and four Ing-Rand Jacklegs $634.00.

14. Scrapers and Mechanical Loaders:
The increase in expense was $10,167.80 and cost per ton $.008. There were no scrapershoist purchased in 1950 and only seven new Holcomb scrapers costing $2,138.36. In 1949 there were two 20 H.P. and one 25H.P. Ingersoll-Rand electric scraper hoists purchased second hand costing $1,305.00 and nine new Holcomb scrapers $2,415.13.

15. Electric Tram Equipment:
The decrease in expense was $639.75 and cost per ton $.009.
Detail:

	Generators	Locomotives	Wiring	M. L. Track	M. L. Cars
1950	1492.25	7840.41	3343.28	18636.11	8477.06
1949	279.01	8491.34	2454.99	17894.70	11308.82
Increase	1213.24		888.29	741.41	
Decrease		650.93			2831.76

Increase in expense to Generators due to overhauling one of the generators. Decrease to Locomotives and Main Line Cars due to less repairs. Increase to wiring due to extensions and repairs to trolley lines.

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8. COST OF OPERATING: (Cont'd)
b. Detailed Cost Comparison: (Cont'd)
(7) Detail of Accounts: (Cont'd)

16. Pumping Machinery:
The increase in expense was $1,249.76 and cost per ton $.001. Increase due to repairs to pumps.

SURFACE COSTS:

17. Hoisting:

	Ore	Rock	Total
Product 1950 - Tons	612,000	22,870	634,870
Product 1949 - Tons	550,000	18,230	568,230
Increase	62,000	4,640	66,640

The increase in expense was $11,006.04 and cost per ton $.008. The electric power charge was $6,529.87 greater in 1950 and the tonnage hoisted was 66,640 tons more.

18. Stocking Ore:

Tons Stocked in 1950:	211,267
Tons Stocked in 1949	214,965
Decrease	3,698

The decrease in expense was $32.38 and cost per ton $.002. 211,267 tons were stocked in 1950 as compared to 214,965 tons in 1949.

19. Dry House Expense:
The increase in expense was $1,073.41 and cost per ton decreased $.001.

20. General Surface Expense:
The increase in expense was $3,376.54 and cost per ton #.002. During the year the lot east of the mine office was leveled off, top soil hauled in and seeded with grass. A new road built from the highway into the mine property and a fence erected on two sides of the lot.

21. Hoisting Equipment:

	Electric Hoists	Hoisting Ropes	Skip and Skip Roads	Sheaves
1950	9,235.75	5,437.90	10,775.43	318.12
1949	5,576.54	7,402.98	12,082.93	1,160.63
Increase	3,659.21			
Decrease		1,965.08	1,307.50	842.51

The decrease in expense was $455.88 and cost per ton $.006. The increase in expense to Electric Hoists was due to rewinding and overhauling skip hoist generator set. There was one 1 3/8" skip rope and one 1 1/4" cage rope charged in 1950 as compared with two 1 3/8" skip ropes and one 1 1/4" cage rope in 1949.

The decrease to skips and skip roads and to sheaves was due to less repairs.

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8. COST OF OPERATING: (Cont'd)
b. Detailed Cost Comparison:(Cont'd)
(7) Detail of Accounts: (Cont'd)

22. Shaft:
The decrease in expense was $1,108.15 and cost per ton $.004.

	Steel Sets	U. G. Pockets
1950	2,369.34	7,934.32
1949	2,423.77	8,988.04
Decrease	54.43	1,053.72

23. Top Tram Equipment:
The decrease in expense was $1,307.18 and cost per ton $.004.

	Engines & Motors	Wire Rope	Sheaves Rollers. Etc.	Track & Cars
1950	1,192.74	1,196.80	1,065.05	5,185.69
1949	947.85	286.58	742.84	7,970.19
Increase	244.89	910.22	322.21	
Decrease				2,784.50

Increase in expense to Engines & Motors due to overhauling motors. The increase to Wire Rope due to more rope replacements and to Sheaves, Rollers, Etc. due to more replacements of rollers and sheaves. The decrease to Tracks and Cars was due to building two new steel top tram cars in 1949.

24. Docks, Trestles, and Pockets:
The decrease in expense was $687.85 and cost per ton $.002. Decrease due to less expense building wood stocking trestle.

25. Mine Buildings:
The decrease in expense was $1,576.66 and cost per ton $.002

The detail of expense is as follows:

Office	8.07	Replacing window lights & light switch.
Shops	198.74	Repairing doors and windows.
Shaft House	352.92	Repairing steel frame.
Engine House	338.05	Tarring roof and painting.
Heating Plant Building	185.44	Repairing walls & change piping.
Dry House	167.61	Repairing walls, painting, Etc.
Coal Dock	13.35	Replacing fir planking.
Top Tram Building	6.06	Replacing light switches & broken windows.
Storage Building	16.85	Repairing roof.
Garages	599.80	Moving garage & putting in overhead doors on Supt's garage. Also building temporary garage for Hydro-crane.
Total	1886.89	

GENERAL MINE EXPENSE:

26. Geological:
The increase in expense was $328.72 and cost per ton $.000.

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8. COST OF OPERATING: (Cont'd)
b. Detailed Cost Comparison: (Cont'd)
(7) Detail of Accounts: (Cont'd)

27. Mining Engineering:
The increase in expense was $1,537.70 and cost per ton $.001. Covers time and expense of engineers and helpers.

28. Mechanical and Electrical Engineering:
The decrease in expense was $149.78 and cost per ton $.001. The charge to this account covers the time spent by mechanical and electrical departments on inspection and repairs.

29. Analysis and Grading:

	Sampling At Mine	Central Laboratory Exp.	Shipping Dept. Exp.	Trucking Samples, Etc.
1950	5093.84	16451.47	3750.52	1504.65
1949	4174.85	15554.54	3778.35	1355.74
Increase	918.99	896.93		148.91
Decrease			27.83	

Determination 1950 - 76826; Cost per determination $.2141394
Determination 1949 - 70309; Cost per determination $.2212311

The increase in expense was $3,666.80 and cost per ton $.002.

30. Safety Department:

	First Aid Safety Supplies	Safety Goggles Hats, Respirators	First Aid Helmet Practice
1950	206.46	836.03	165.25
1949	182.14	604.50	36.20
Increase	24.32	231.53	129.05

	First Aid Misc.	Ishpeming Office Charge
1950	637.14	3569.60
1949	—	3181.52
Increase	637.14	388.08

The increase in expense was $1410.12 and cost per ton $.002.

31. Telphones and Safety Devices:

	1950	1949	Increase	Decrease
Lights at Shaft & Levels	2893.43	2012.79	880.64	
Mine Telephone	499.48	362.69	136.79	
Safety Gates	1041.74	798.05	243.69	
Sign Boards & Signals	1227.01	1386.46		159.45
Fire Equip. & Fire Patrol	1744.33	1659.19	85.14	
Total	7405.99	6219.18	1186.81	

The increase in expense was $1,186.81 and cost per ton $.001.

32. Local and General Welfare:
The increase in expense was $580.57 and cost per ton $.001.

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8. COST OF OPERATING: (Cont'd)
b. Detailed Cost Comparison: (Cont'd)
(7) Detail of Accounts: (Cont'd)

33. Special Expense, Pensions and Allowances:

	Legal	Examination	Retirement	Pensions & Allowances	Employment Office
1950	609.39	322.50	6705.77	304.81	1112.57
1949	490.00	390.00	7360.66	389.08	1123.16
Increase	119.39				
Decrease		67.50	654.89	84.27	10.59

The decrease in expense was $697.86 and cost per ton decreased $.003.

34. Ishpeming Office:
Ishpeming office expense is pro-rated to the various mines on the basis of labor costs. The increase in expense was $6,040.92 and cost per ton $.004.

35. Mine Office:

	Salaries	Central Warehouse Expense	Miscellaneous
1950	20366.89	7240.46	2128.68
1949	18245.93	7947.51	1616.63
Increase	2120.96		512.05
Decrease		707.05	

The increase in expense was $1925.96 and cost per ton $.003.

36. Insurance:

	Property	Group	Catastrophe	Group Annuity
1950	1834.89	23692.46	406.68	6096.09
1949	1643.64	13037.17	490.09	8130.07
Increase	191.25	10655.29		
Decrease			83.41	2033.98

The increase in expense was $8729.15 and cost per ton $.010.

37. Personal Injury:

	Compensation and Doctors	Compensation Department	Hospital Loss
1950	8398.05	1512.38	7891.53
1949	16991.31	1348.09	9144.21
Increase		164.29	
Decrease	8593.26		1252.68

The decrease in expense was $9681.65 and cost per ton $.021.

38. Social Security Taxes:

	Unemployment Insurance Tax	Old Age Benefit Tax
1950	13510.05	15588.49
1949	13045.74	10253.43
Increase	464.31	5335.06

The increase in expense was $5799.37 and cost per ton $.006.

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8. COST OF OPERATING: (Cont'd)
b. Detailed Cost Comparison: (Cont'd)
(7) Detail of Accounts: (Cont'd)

39. Employees Vacation Pay:
The increase in cost was $45731.60 and cost per ton $.006
Increase due to setting of reserves for vacation pay.

40. Research Laboratory:
The cost to this account for 1950 was $37.57 and cost per ton $.000.
There was no charge in 1949.

41. Est. Additional Wage Adjustment:
The cost to this account for 1950 was $5281.56 and cost per ton $.009. There was no charge in 1949.

9. EXPLORATION:

The following is a record of exploration drilling done in 1950:

Hole No.	Location	Dip	Course	Depth	Ore	Iron Formation	Intrusive
41	4thLev.-S3261' - E183'	-90°	Vert.	61'	61'		
42	7thLev.-S3052' -W1185'	2°10'	N73°29'W	138'	9'	129'	
43	7thLev.-S3052' - W1180'	1°15'	S84°16'W	62'	60'	2'	
44	1000' Lev. Near Shaft	2°00	South	125'		107'	18'

33.68% Drilling In Ore
61.66% Drilling In Iron Formation
4.66% Drilling In Intrusive

Hole number 41 was drilled to determine the depth of the ore below the 4th Level in the Corbit Lease.

Holes numbers 42 and 43 were drilled on the 7th Level in the deposit north of the big E - W dike to determine the westward extension of the ore-body.

Hole number 44 was drilled south from a point near the shaft for the purpose of placing a geophone to determine the movement of the ground.

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10. TAXES:

COMPARATIVE STATEMENT OF TAXES FOR THE YEARS 1950 AND 1949

DESCRIPTION	1950 VALUATION	1950 TAXES	1949 VALUATION	1949 TAXES
ATHENS MINE				
Including Stockpiles, Supplies and Equipment as places by the State Tax Commission.				
Real Estate	1,770,000	83,986,.50	1,145,000	59,957.12
Personal Property	300,000	14,235,.00	845,000	44,247.83
Collection Fee		982.22		1,042.05
Total Athens Mine	2,070,000	99,203.72	1,990,000	105,247.00
HARVEY ADDITION				
Proportion of Lots:				
1	400	18.98	400	20.95
2	200	9.49	200	10.47
3 Fontaine Pur. Liber 23-3	Now Athens mine		300	15.71
2 Gayette Pur. Liber 24-609	" " "		2,800	146.62
5 & 6 .33 A Cederblade	1,100	52.20	1,100	57.60
6 .36 A	1,750	83.04	1,750	91.64
7 Lahman, Liber 20-82	1,250	59.31	1,250	65.46
7 Liber 28-81	1,600	75.92	1,600	83.78
7 Liber 30-213	Now Athens mine		700	36.66
8 Blair, Liber 19-72				
BOYER LOTS				
Boyer Lot 5, Hendrickson Purchase	Now Athens mine		1,850	96.87
" 7, Royea "	" " "		285	14.92
" 8, DeMarzi "	" " "		2,550	133.53
" 9, Lahti "	" " "		380	19.90
STERLING ADDITION				
Lot 1, W 13' Lot 2 & W 6 1/2' Lot 3	1,850	87.78	1,850	96.87
Lot 7, Vassanen	Now Athens mine		2,850	149.24
Lot 9, Bjornberg	1,350	64.06	1,600	83.78
Lot 10, Delarye	1,450	68.80	1,450	75.93
Lot 11, Two Houses	2,950	139.98	2,950	154.47
Lots 12 & 13	3,450	163.70	3,450	180.66
Lot 14, Wick	1,750	83.04	1,750	91.64
Lot 15, Johnson	1,600	75.92	1,600	83.78
Lots 16 & 17 Roma	1,700	80.67	1,700	89.02
Lot 18 C.C.I.Co.	1,750	83.04	1,750	91.64
Lot 19 Turpinen	2,150	102.02	2,150	112.58
Lot 20 Savola	1,250	59.31	1,250	65.46
Lot 22 Pachette	1,600	75.92	1,600	83.78
Lots 23 & 24 C.C.I.Co.	1,800	85.41	1,800	94.26
Lot 25 Farmland	1,600	75.92	1,600	83.78
Lot 26 C.C.I.Co.	1,550	73.55	1,550	81.16
Lot 27 Maki	1,500	71.18	1,500	78.55
Lot 28 C.C.I.Co.	1,700	80.67	1,700	89.02
Lot 29 Mattson	1,750	83.04	1,750	91.64
Lot 30 Rund	1,850	87.78	1,850	96.87
Lots 31 to 38 Inc. C.C.I.Co.	5,450	258.60	5,450	28538
Lot 72 Lehman	100	4.75	100	5.24
Lots 73, 74 & all 75	300	14.23	300	15.71
Collection Fee		22.17		30.74
Total Rented Buildings	46,750	2,240.48	58,715	3,105.31
TOTAL ATHENS IRON MINING CO.	2,116,750	101,444.20	2,048,715	108,352.31

11. ACCIDENTS AND PERSONAL INJURY:

The following table gives number and time lost from compensable accidents in the past seven years.

	1950	1949	1948	1947	1946	1945	1944	1943	1942
Fatal	0	0	0	0	0	0	0	0	0
Time Lost Over 4 Mos.	2	2	1	3	1	0	2	4	2
1 To 4 Mos.	5	5	5	6	2	7	7	9	7
Less Than 1 Mo.	12	8	7	16	8	7	12	18	5
Total Compensable Accidents	19	15	13	25	11	14	21	26	16
Number of Cases paid compensation for accidents prior to Jan. 1st of each year	5	4	4	2	1	4	4	4	4
Number of Cases paid difference in wages. (Included in above total)	1	1	1	2	0	2	2	1	2

Nature and Classification of Compensable Accidents:

On December 31, 1950 payments were being made on five accidents which occurred prior to January 1, 1950. One receives partial compensation and four are occupational disease cases.

Acc. No.	Date of Accident	Name	Injury	Days Lost
541	1-6-50	Emil A. Jarvi	Bruised little finger rt. hand with severe lacerations & loss of nail.	26
542	2-7-50	Raymond Langlois	Fracture lower 1/3 rt. fibula.	58
543	2-10-50	Waino Martonen	Bruised rt. forearm. Fracture left ulna mid 1/3.	26
544	3-9-50	Joseph Tremethick	Fracture rt. tibia and fibula	111
545	4-13-50	Oscar Maki	Posterior dislocation upper extremity right shoulder.	244
546	4-14-50	Gerald Cox	Instep of left foot bruised. Fracture 3rd metatarsal.	13
547	4-19-50	John J. Stampee	Contusion with secondary infection dorsum left foot.	10
548	5-13-50	Andrew Nord	Infected puncture wound right arm.	18
549	5-25-50	Arturo G. Paulon	Laceration of chin. Broken teeth.	14
550	6-7-50	Fred J. Lequia	Bruised left chest wall.	9
551	5-18-50	Isaac Pentimaki	Contusion & sprain of left knee.	20
552	7-6-50	Fred J. Lequia	Bruised and abraded rt. knee.	22
553	7-14-50	Woodrow Tamblyn	Lumbo-sacral strain.	13
554	8-4-50	Francis A Lundiin	Severe contusion rt. lumbar area & possible chip fracture rt. iliac crest.	44
555	8-21-50	Robert J. LaForest	Contusion & sprain of right ankle.	11
556	9-8-50	Francis Penberthy	Multiple contusions; laceration, forehead over left eye; fracture medial malleolus left tibia.	61
557	11-6-50	Raymond R. Grenier	Bruised foot (instep)	7
558	12-15-50	Raymond Langlois	Loss of left ring finger at phalangeal metacarpal joint. Fracture of 2nd distal phalanx left middle finger.	43
559	12-27-50	Vaino Karppinen	Bruised left foot	9

12. NEW CONSTRUCTION AND PROPOSED NEW CONSTRUCTION:

There was no new construction during 1950 and none proposed.

13. EQUIPMENT AND PROPOSED EQUIPMENT:

a. Tractors:

The Athens Mine has a fully equiped D-6 Caterpillar Tractor with bull-dozer and a crane that attaches to the rear end. This equipment is in good repair.

b. Power Shovels:

The electric shovel for loading out stockpiles was given the usual overhauling and is in good repair.

The Athens Mine Possesses 2 Model 21 and 1 Model 40 Eimco loaders for underground work. These loaders are in good repair.

b-1. Power Crane:

A 3 ton Hydro-Crane, equiped with a 3/8 yard digging clam and a 3 tine grapple for handling timber, mounted on a 2 ton Chevrolet Truck was purchased during the year.

c. Scraper Hoists:

Following is a list of scraper hoist equipment at the mine.

	1950			1949	
	Machines	Total Cost Of Repaired	Each Rep.	Total Cost Of Repaired	Each Rep.
Sullivan 40HP Elec.	3	2	$346.10	1	$339.91
" 15HP Elec.	17	11	430.13	10	222.81
" 20HP Elec.	3	4	335.93	0	----
" 25HP Elec.	5	5	362.42	3	175.09
Ing. Rand 15Hp Elec.	5	0		0	
Ing. Rand 20HP Elec.	7	5	352.17	0	
Ing. Rand 25HP Elec.	8	5	453.20	4	322.40
Total	48	32	393.95	18	4382.81

d. Drill Machines:

Purchases in 1950 and 1949 are listed below:

1950

8 - L 29 Pickhammers

1949

6 - RB 12 Ing. Rand Jackhammers
1 - HC 23 LeRoi Rock Drill & Column
1 - S 91 Joy Manfg. Co. Stoper
4 - L 29 Pickhammers
4 - Ing. Rand Jacklegs

e. Motor Haulage Cars:

A large number of the underground Rocker Dump Cars were overhauled in the mine shops during 1950.

f. Timber Hoists:

No new hoists were purchased during 1950.

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14. MAINTANCE AND REPAIRS:

a. Steel Trestles:

Very little work was required in 1950 to maintain the steel stocking trestles.

b. Comparison of Costs - 1950 with 1949:

Maintenance and repairs listed under underground costs:

	Amount	Cost Per Ton
1950	107,309.31	.175
1949	98,378.15	.179
Increase	8,931.16	
Decrease		.004

Maintenance and repairs listed by the four accounts as shown on the cost sheet:

	1950	1949	Increase	Decrease
Comp. & Power Drills	3641.84	5488.49		1846.65
Scraper Equipment	55906.88	45739.08	10167.80	
Electric Tram Equip.	39789.11	40428.86		639.75
Pumping Machinery	7971.48	6721.72	1249.76	
Total	107309.31	98378.15	8931.16	

Maintenance and repairs listed under surface costs:

	Amount	Cost Per Ton
1950	52495.35	.086
1949	57631.09	.104
Decrease	5,135.74	.018

Maintenance and repairs listed in the five accounts as shown on the cost sheet.

	1950	1949	Increase	Decrease
Hoisting Equipment	25767.20	26223.08		455.88
Shaft	10303.66	11411.81		1108.15
Top Tram Equipment	8640.28	9947.46		1307.18
D. T. & Pockets	5897.33	6585.20		687.87
Mine Buildings	1886.88	3463.54		1576.66
Total	52495.35	57631.09		5135.74

15. POWER:

Detail of electric current purchased compared with 1949:

	1950 - 12 Mos. Optg.		1949 - 12 Mos. Optg.	
		Per Ton		Per Ton
Stoping	4349.42	.007	3503.20	.006
Ventilation	12597.50	.021	11568.41	.021
Pumping	27886.30	.046	20247.85	.037
Hoisting	36748.34	.060	30082.61	.055
Stocking Ore	925.18	.001	799.28	.001
Dry House	967.92	.002	613.97	.001

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15. POWER:(Cont'd)

	1950 - 12 Mos. Optg.	Per Ton	1949 - 12 Mos. Optg.	Per Ton
Lights At Levels	1253.65	.002	853.00	.002
Compressors	39898.42	.065	31905.85	.058
Electric Haulage	6379.51	.010	3915.04	.007
Shops	520.50	.001	391.62	.001
Heating Plant	44.71	.000	20.10	.000
Offices	47.00	.000	32.57	.000
Storage Battery Loc.	38.71	.000	34.93	.000
Electric Shovel	701.30	.001	548.67	.001
Surface Lights	749.72	.001	538.43	.001
Idle Expense			5164.37	.009
Total	133108.18	.217	110219.90	.200
Main Line Meter - K.W.	8881192		7732359	
Separate Meter Readings	8618695		7517586	
Line Loss	262497		214773	
Product	612,000		550,000	
K.W. Per Ton (Inc. Line Loss)	14.5118		14.0588	
Cost Per K.W. (Avg.)	.014987648		.0142543692	
15 Min. Demand (Avg.)	1844		1560	
Load Factor (Avg.)	54.98		62.14	

17. CONDITION OF PREMISES:

The grounds and premises were kept in good condition throughout the year.

b. Athens Mine Houses:

The following statement gives the total cost of repairs and the average cost per house for 1950 and 1949:

Year	No. House	Amount Repairs	Avg. Cost Per House	Rental Income	Taxes and Insurance	Net Income
1950	28	1306.06	46.65	6157.75	2600.45	2251.24
1949	31	594.82	19.19	6012.000	3883.29	1533.89

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18. NATIONALITY OF EMPLOYEES:

The following statements show, first, the nationality by percentage and secondly, a separation of nationalities into American and Foreign born.

As To Percentage	1950	Percent	1949	Percent
Finnish	135	39.02	137	39.59
Italian	63	18.21	69	19.94
English	66	1908	51	14.74
French (Canadian)	38	10.98	43	12.43
Swedish	23	6.65	24	6.93
French (France)	1	.29	1	.29
Danish	1	.29	1	.29
German	4	1.15	4	1.16
Austrian	6	1.73	4	1.16
Norwegian	4	1.15	6	1.73
Irish	2	.58	3	.87
Greek	1	.29	1	.29
Polish	1	.29	1	.29
Scotch	1	.29	1	.29
Total	346	100 %	346	100 %

	American Bron		Foreign Born	
As To Birth	1950	1949	1950	1949
Finnish	110	108	25	29
English	59	43	7	8
Italian	36	39	27	30
French (France)	1	1	0	0
French (Canadian)	35	40	3	3
Swedish	20	21	3	3
Scotch	1	1	0	0
German	4	4	0	0
Austrian	6	4	0	0
Norwegian	4	6	0	0
Irish	2	3	0	0
Greek	0	0	1	1
Danish	1	1	0	0
Polish	1	1	0	0
Total	280		66	
Total		272		74
Percent	80.9	78.6	19.1	21.4

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1. GENERAL:

The Cambria-Jackson Mine operated on a five-day-per-week schedule from January 1st to August 28th, 1950. From that date through the end of the year a six-day-per-week schedule was maintained. The total number of operating days in 1950 amounted to 268, compared with 245 in 1949.

The production for the year 1950 amounted to 445,071 tons in a twelve-month operation, compared with 434,210 tons produced in 1949 in ten and one-half months operation. The average production per day in 1950 amounted to 1,670 tons and in 1949, 1,772 tons. The tons per man per day in 1950 amounted to 7.66, compared with 7.89 in 1949. The reduction in the above figures is the result of: 1. Larger number of men used in the Eighth Level rock development, and 2. Reduction in the working force and in working places.

During the course of mining operations in 1950 there were no unusual additions to the reserve tonnage. In practically all cases the ore outlines have been fairly well established as mining has continued downward.

Development work on the new Eighth Level was continued throughout the year, and in December the entire conveyor system was completed to an inclined distance of 620 feet. A 4-foot by 16-foot pan feeder and 80-ton pocket were completed, together with cutting of the station, supply drift, sump, and control room. The vertical distance between the Seventh and Eighth Levels is 91 feet, and from all present indications this level will allow the mining of all remaining ore reserves in the Jackson Strip.

2. PRODUCTION
SHIPMENTS &
INVENTORIES:

a. Production by Grades:

	1950	1949	Increase	Decrease
Cambria Lease	36,031	6,714	29,317	-
Jackson Strip	409,040	427,496	-	18,456
Total Ore	445,071	434,210	10,861	-
Rock	11,944	12,208	-	264
Total Hoist	457,015	446,418	10,597	-

The above figures include a stockpile overrun of 4,980 tons.

b. Shipments:

	Pocket Tons	Stockpile Tons	Total Tons	Total Tons Last Year
Cambria Lease	24,432	6,980	31,412	6,494
Jackson Strip	233,762	182,112	415,874	396,246
Total 1950	258,194	189,092	447,286	402,740
Total 1949	241,835	160,905	402,740	-
Increase	16,359	28,187	44,546	-

Shipments increased 11.1% in 1950, and were 2,215 tons more than the product for the year. On December 31st, 1950, there were 62,276 tons remaining in stock.

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2. PRODUCTION SHIPMENTS & INVENTORIES: (CONT'D)

c. Stockpile Inventories:

	Dec. 31, 1950	Dec. 31, 1949	Increase	Decrease
Cambria Lease	5,695	1,076	4,619	-
Jackson Strip	56,581	63,415	-	6,834
Total	62,276	64,491	-	2,215

d. Division of Product by Levels:

	1950	Percentage	1949	Percentage
6th Level	36,031	8.10	6,714	1.55
7th Level	409,040	91.90	427,496	98.45
Total	445,071	100.00	434,210	100.00

e. Production by Months:

Month	Cambria Lease	Jackson Strip	Total Ore	Rock
January	42	35,178	35,220	684
February	848	34,165	35,013	464
March	2,126	37,736	39,862	1,092
April	3,486	25,987	29,473	1,840
May	2,923	31,043	33,966	1,188
June	3,339	31,665	35,004	1,140
July	3,048	31,469	34,517	952
August	2,479	27,957	30,436	504
September	4,308	38,501	42,809	984
October	3,893	41,189	45,082	1,652
November	4,548	37,057	41,605	244
December	4,811	32,293	37,104	1,200
	35,851	404,240	440,091	11,944
Overrun	180	4,800	4,980	-
Total 1950	36,031	409,040	445,071	11,944
Total 1949	6,714	427,496	434,210	12,208
Increase	29,317	-	10,861	-
Decrease	-	18,456	-	264

f. Ore Statement:

	Camb.Lease	Jack.Strip	Tot.1950	Tot.1949
On hand Jan. 1, 1950	1,076	63,415	64,491	33,021
Output for year	35,851	404,240	440,091	425,856
Overrun	180	4,800	4,980	8,354
Total	37,107	472,455	509,562	467,231
Shipments	31,412	415,874	447,286	402,740
Bal. on hand Dec. 31, 1950	5,695	56,581	62,276	64,491
Increase in output	29,242	-	14,235	-
Decrease in output	-	15,007	-	60,007
Increase in ore on hand	4,619	-	-	31,470
Decrease in ore on hand	-	6,834	2,215	-

1950 - Five 2-8 hour shifts, 1-1-50 to 8-28-50.
- Six 2-8 hour shifts, 8-28-50 to 12-31-50.

1949 - Six 2-8 hour shifts, 1-1-49 to 6-27-49.
- Five 2-8 hour shifts, 6-27-49 to 12-31-49.

1948 - Six 2-8 hour shifts, 1-1-48 to 12-31-48.

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2. PRODUCTION SHIPMENTS & INVENTORIES: (CONT'D)

g. Delays:

2-28-50, 3/4 hour delay - Loss of product - 110 tons.
Changing skip hoist motor brushes.

3-7-50, 1-1/2 hours delay - Loss of product - 200 tons.
Burned-out coil on skip hoist motor.

3-13-50, 1-1/4 hours delay - Loss of product - 150 tons.
Signal cable blew out.

4-12-50, 2 hours delay - Loss of product - 150 tons.
Changing four shoes on skip and cage.

4-24-50, 5 hours delay - Loss of product - 700 tons.
Burned-out skip hoist motor.

6-12-50, 5 hours delay - Loss of product - 500 tons.
Skip hoist motor trouble.

6-15-50, 1 hour delay - Loss of product - 150 tons.
Broken skip dump block.

7-5-50, 1 hour delay - No loss of product.
Trouble on control board.

The total loss of product from the eight delays listed above amounted to 1,960 tons, as compared with six delays and a loss of 1,010 tons in 1949.

h. Delays due to Lack of Current:

3-24-50, 4 hours delay - No loss of product.
Substation blowout.

5-3-50, 50 minutes delay - No loss of product.
No power, engine house.

8-14-50, 3-1/2 hours delay - No loss of product.
Bacco Construction Company struck power line with crane.

3. ANALYSIS:

a. Average Mine Analysis on Output:

Grade	Tons	Iron	Phos.	Silica	Sulphur
Cambria-Jackson	445,071	58.50	.088	9.78	.076

b. Average Mine Analysis on Straight Cargoes:
All ore shipped was mixed with other grades.

4. ESTIMATE OF ORE RESERVES:

a. Developed Ore:

Assumption: 12.00 cubic feet equals one ton.
10% deduction for loss in mining and rock.

Percentage of Bessemer: None.

	Standard Ore				Sulphurous Ore	
	Negaunee		Ishpeming		Negaunee	Ishpeming
Area	Cambria Lease	Jackson Strip	Jackson Strip	Total	Jackson Strip	
Above 5th Lev.-Dep.#1	20,592			20,592		
Bet.5th&6thLev.-Dep.#1	9,725			9,725		
Bet.6th&7thLev.-Dep.#2		429,454			299,423	
Bet.6th&7thLev.-Dep.#3			3,817			
Bet.6th&7thLev.-Dep.#4						99,018
Tot.Bet.6th&7th Levs.		429,454	3,817	433,271	299,423	99,018
Below 7th Level-Dep.#2		30,885			135,054	
Below 7th Level-Dep.#3		1,979	7,500			
Below 7th Level-Dep.#4						207,917
Tot.Below 7th Level		32,864	7,500	40,364	135,054	207,917
Gross as of Aug.31,1950	30,317	462,318	11,317	503,952	434,477	306,935
Less Sept. Production	4,308	38,501		42,809		
Gross as of Sept.30,1950	26,009	423,817	11,317	461,143	434,477	306,935
Less Prod.(Oct.Nov.&Dec.)	13,252	63,957		77,209	46,582	
Gross as of Dec.31,1950	12,757	359,860	11,317	383,934	387,895	306,935
Less 10% for Mng.&Rock	2,601	42,382	1,132	46,115	43,448	30,694
Net Tot.as of Dec.31,1950	10,156	317,478	10,185	337,819	344,447	276,241

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4. ESTIMATE OF ORE RESERVES: (CONT'D)

b. Total Developed Ore:

	Cambria Lease	Jackson Strip	Total
1950 Estimate	10,156	327,663	337,819
1949 Estimate	29,442	458,986	488,428
Decrease	19,286	131,323	150,609

The ore estimate of the Cambria-Jackson Mine, including the Cambria Lease and the Jackson Strip, is divided between the City of Negaunee and the City of Ishpeming limits. The estimate is also divided into standard and high-sulphur grades, as indicated by exploratory drifting and diamond-drilling. The amount of ore developed during the course of mining operations, where the outline of the ore was found to be greater than originally anticipated, amounted to approximately 295,000 tons. To obtain the amount of ore developed in 1950, the estimated decrease in reserves of 150,609 tons is deducted from the 1950 production of 445,071 tons.

c. Expected Average Natural Analysis:

Grade: Non-Bessemer Trade Name: Cambria-Jackson

Tons	Iron	Phos.	Sil.	Mang.	Alum.	Lime	Mag.	Sul.	Loss	Moist.
337,819	51.23	.080	8.79	.17	2.48	.50	.18	.052	2.12	12.53

Grade: Non-Bessemer Trade Name: Cambria-Jackson Special

Tons	Iron	Phos.	Sil.	Mang.	Alum.	Lime	Mag.	Sul.	Loss	Moist.
620,688	52.50	.105	6.56	.11	2.44	.61	.44	.263	1.69	12.50
958,507										

d. Ore in Stock: Average Natural Analysis:

Grade: Non-Bessemer Trade Name: Cambria-Jackson

Tons	Iron	Phos.	Sil.	Mang.	Alum.	Lime	Mag.	Sul.	Loss	Moist.
62,276	50.54	.085	9.11	.21	2.36	.48	.17	.080	2.23	12.77

5. LABOR AND WAGES:

a. Comments:

The relationship between the mine management and the union continued to be very satisfactory during the year. There were no grievances presented, and the committee met periodically with the mine captain and the superintendent to discuss various items of mutual interest.

A general wage increase was made, effective December 1st, 1950, amounting to 12-1/2¢ per hour. This brings the minimum wage for underground employees to $1.35-1/2; surface employees, to $1.31. The average contract miners' hourly rate, including overtime, amounts to $2.09-1/2.

There were 220 men on the payroll December 31st, 1950, as compared with 228 men on December 31st, 1949. The following is a compilation of accessions and separations:

Accessions:

Straight hires	14
Temporary hires	6
Transferred from storehouse	1
Transferred from Mather "B" Mine	1
Returned from military service	1
Total	23

Separations:

Returned to school (temp. hires)	6
Transferred to Mather "B" Mine	5
Inducted into military service	4
Transferred to Mather "A" Mine	3
Deceased	3
Discharged	2
Settlement due to disability	2
Transferred to Negaunee Mine	2
Retired	2
Fatally injured	1
Transferred to general shops	1
Total	31

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5. LABOR AND WAGES: (CONT'D)

b. Comparative Statement of Wages and Product:

	1950	1949	Increase	Decrease
Product:	445,071	434,210	10,861	-
No. Shifts and Hours 1-8	3	-	3	-
2-8	265	245	20	-
Total	268	245	23	-
Average No. Men Working:				
Surface	54	50	4	-
Underground	165	172	-	7
Total	219	222	-	3
Average Wages per Day:				
Surface	11.51	11.52	-	.01
Underground	13.39	13.51	-	.12
Total	12.93	13.06	-	.13
Average Wages per Month:				
Surface	254.15	272.93	-	18.78
Underground	296.24	315.84	-	19.60
Total	285.86	306.17	-	20.31
Product per Man per Day:				
Surface	31.10	34.68	-	3.58
Underground	10.16	10.21	-	.05
Total	7.66	7.89	-	.23
Labor Cost per Ton:				
Surface	.370	.332	.038	-
Underground	1.318	1.322	-	.004
Total	1.688	1.654	.034	-
Average Product Mining:				
Stoping	25.72	27.79	-	2.07
Development in Ore	10.28	8.55	1.73	-
Total	24.54	25.28	-	.74
Average Wages Contract Labor:	14.82	14.66	.16	-
Total Number of Days:				
Surface	14,307	12,520	1,787	-
Underground	43,801	42,509	1,292	-
Total	58,108	55,029	3,079	-
Amount for Labor:				
Surface	164,687.20	144,264.88	20,422.32	-
Underground	586,551.54	574,278.63	12,272.91	-
Total	751,238.74	718,543.51	32,695.23	-
Avg.Wages per Mo.as per Labor Statement-Less Captain and Clerks:				
Surface	252.89	274.80	-	21.91
Underground	294.99	314.89	-	19.90
Total	285.15	306.39	-	21.24

Proportion of Surface to Underground Men:

1950 - 1 to 3.06
- Five 2-8 hour shifts, 1-1-50 to 8-28-50
- Six 2-8 hour shifts, 8-28-50 to 12-31-50

1949 - 1 to 3.44
- Six 2-8 hour shifts, 1-1-49 to 6-27-49
- Five 2-8 hour shifts, 6-27-49 to 12-31-49

1948 - 1 to 3.19
- Six 2-8 hour shifts, 1-1-48 to 12-31-48

Note:

	1950	1949
Proportion of Vacation Pay for Surface	5,000.00	5,271.57
Proportion of Vacation Pay for Underground	19,698.50	22,232.35
Total	24,698.50	27,503.92

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6. SURFACE:

a. Buildings:

Engine House:

There were no major changes performed during the year with regard to the engine house. Minor repairs, such as painting, reputtying of windows, filling cracks in cement foundation, etc., were carried on throughout the year. In September, a sewer line was laid north of the engine house to connect with the City system.

Dryhouse:

A new asbestos-shingle roof was put on the east side of the dryhouse in October, replacing the corrugated iron roof which loosened and commenced leaking. Four gables were also installed over each of the outside entrances on the east and west sides of the building.

Shops:

Near the middle of the year a considerable number of cracks opened up on the west side of the concrete-block shop building. This condition results from the backfilled settlement of an old caved area, and ground settlement. In October, considerable repair work was done in an effort to retard further cracking.

Shafthouse:

In August, a 12-foot by 30-foot reinforced concrete slab was poured in front of the shaft entrances. This will relieve the ice condition which frequently prevented entrance to the shaft cages. In November, a gable roof was installed approximately 24 feet above the concrete slab to also prevent an ice condition resulting from the runoff of the frost inside of the shafthouse.

Carpenter Shop Storage Shed:

In July, a storage shed was built 50 feet south of the carpenter shop to be used for the storage of shaft runners and strips, dried lumber, and other timber supplies. The roof of this building was moved from the old two-car garage which was located a short distance from the southwest corner of the dryhouse.

Crusher Foundation:

The old concrete gyratory crusher foundation, located east of the shaft, was removed by blasting in July. Its removal will provide greater storage space for timber supplies.

Coal Dock:

In September, work was started in completely inclosing the coal dock by using the corrugated iron sheets which were removed from the dryhouse roof. This inclosure will allow the storage of approximately 200 tons of coal for use during the winter months.

b. Ore and Rock Trestles:

For the third consecutive year it has been possible to maintain the two east ore trestles without dismantling during the shipping season. Due to the exceptionally late start in shipping in 1950 both trestles were filled to capacity, and it was necessary to stock some ore under the west rock trestle. In October approximately 3,000 yards of mine rock, under the west trestle, was used to level an extension into the caved area to the west. In December, six bents were erected at the end of the rock trestle making an extension of 144 feet.

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6. SURFACE: (CONT'D)

c. Railroad Tracks:
There was no change in the general railroad track layout on the mine property.

d. Fences and Caves:
In April, all fences inclosing the caved ground to the west and south of the shaft were inspected and repaired.

7. UNDERGROUND:

a. Shaft Sinking:
There was no sinking carried on in the main shaft in 1950.

b. Development:
The following table gives a comparison of the total footage of drifting and raising in ore and rock in 1950 and 1949:

	Drifting		Raising		Grand
Year	Ore	Rock	Ore	Rock	Total
1950	8,566'	1,356'	4,938'	119'	14,979'
1949	9,469'	1,724'	5,573'	560'	17,326'
Decrease	903'	368'	635'	441'	2,347'

The rock footage was entirely confined to the development of the conveyor winze and drifts on and near the Eighth Level.

The ore footage was fairly well distributed throughout the mine, and included some exploration work as well as premining development in connection with the sublevel caving mining method.

c. Stoping:

(1) General:
At the end of the year 1950 there were eighteen active contracts in operation, compared with twenty in 1949. One of these contracts, comprising nine miners, was engaged in driving the conveyor and Eighth Level drifts.

In general, mining operations throughout the year were satisfactory. During the months of May and June there was a sharp increase in the inflow of water to the mining places which temporarily made operations unsatisfactory. The ground pressure near the active sublevels was somewhat less than during the previous year, and very little repair was necessary in the main level tramming drifts. Approximately 21% of the time of all active mining contracts was charged to timber repairs and other non-productive work. A goodly portion of this was related to the Eighth Level development, during periods when equipment was being installed.

During the course of mining, particularly near the lower Seventh Level elevation, a large amount of the ore in place was interbedded with seams of jasper which resulted in an increase in the silica content of the product. This was particularly noticeable in the Central Orebody, which has narrowed down to about 45 feet from an original 120 feet on the upper sublevels.

The practice of taking down timber and supplies, and hoisting rock as well as any available ore, was continued on the midnight shift by a crew of twelve men throughout 1950.

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7. UNDERGROUND: (CONT'D)

c. Stoping: (Cont'd)

(1) General: (Cont'd)

The location and number of mining contracts at the end of 1950 as compared with 1949, are as follows:

Location of Contracts	December 31st, 1950	December 31st, 1949
Sixth level and above		
Fifth level	2	1
Sixth level	-	2
Seventh level and above		
90' sublevel	-	1
60' sublevel	2	-
25' sublevel	3	1
-25' sublevel	3	3
-50' sublevel	-	6
-80' sublevel	4	5
Seventh level	3	1
Eighth level	1	-
Total	18	20

Occupation of contracts was as follows:

	Dec. 31st, 1950	Dec. 31st, 1949
Sublevel caving, or developing for sublevel caving	6	9
Sublevel stoping	-	2
Developing for sublevel stoping	-	1
Drifting	8	5
Developing	2	1
Repairing	2	2
Total	18	20

(2) Detail of Stoping:

Cambria Lease:

Sublevels above the 6th Level:

5th Level Orebody:

The 5th level Cambria ore deposit which was developed late in 1948 has shown a vertical height of about 120 feet, divided equally above and below the 5th level elevation. Mining operations during the year were carried on on the 480-foot sublevel, 445-foot sublevel, and near the end of the year were started on the 5th level at an elevation of 428 feet. At this elevation there was a pronounced reduction in the size of the orebody as it continues downward, dipping to the southwest.

In 1950, 36,031 tons were mined, making a total of 43,601 tons of production in 1948, 1949 and 1950. According to the estimate 10,156 tons remain, and despite the reduction in the size of the orebody it would appear that this figure is conservative.

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7. UNDERGROUND: (CONT'D)

c. Stoping: (Cont'd)

(2) Detail of Stoping: (Cont'd)

Jackson Strip:

Sublevels above the 7th Level:

6th Level Pillar:

The orebody known as the East Deposit, or 6th Level Pillar, was mined during the year by five contracts, commencing on the 90-foot sublevel and extending to the 35-foot elevation, a vertical distance of 55 feet. The East Deposit is bounded on the west side by a 20-foot dike which strikes to the southwest. To the north and east of this orebody the jasper footwall continues to dip to the south and west, reducing the area on each successive 25-foot sublevel. Three branch dikes complicate the mining by branching off to the east in a very irregular pattern. During the course of mining a number of jasper areas were found adjacent to the dikes, having little or no continuity in vertical elevation. Near the end of the year a transfer was being driven southwest of Raise No. 770, in lean ore and jasper. This drift is approximately 30 feet west of the dividing dike, and it is possible that the jasper encountered lies on the dike with the ore to the east on the footwall.

Early in the year exploration work was started in the extreme northeast end of the East Deposit. Three mining contracts were located in this area throughout the remainder of the year. Raises No. 701 and No. 703 were used in connection with transfers to the west, and parallel to the north footwall. Two mining contracts mined a pillar 25 feet below the 00-foot sublevel elevation, which had been mined by the top-slicing method several years ago. Exploration was also started south of the two branch dikes on the 00-foot sublevel in an effort to mine the ore adjacent to the south dike, which was originally located by Drill Hole No. 149 drilled to the south on the 25-foot sublevel. In general, the results proved disappointing inasmuch as there was considerably less ore than was originally anticipated. By the end of the year mining operations were starting east of the south secondary transfer in a small deposit, bounded on the north side by dike and on the south by the jasper capping.

Central Deposit:

In January 1950 mining operations in the Central Orebody were being carried on by four contracts in the east end, adjacent to the east and south boundary dikes. During the course of mining several large jasper horses were found, both along the footwall as well as in the center of the deposit. Near the middle of 1950 six mining contracts were carrying on operations from Raises No. 773, No. 717, No. 720, No. 730 and No. 732 on the -80-foot sublevel, at an elevation approximately 20 feet above the 7th level. As

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7. UNDERGROUND: (CONT'D)

c. Stoping: (Cont'd)

(2) Detail of Stoping: (Cont'd)

Jackson Strip: (Cont'd)

Sublevels above the 7th Level: (Cont'd)

Central Deposit: (Cont'd)

mining progressed near the middle of the Central Deposit it was found that the jasper footwall flattened out to such an extent that the width of ore was reduced by 80 feet, and gives the appearance of being divided into two separate bodies below the 7th level.

South Deposit:

Early in 1950 a crosscut was completed west of the south end of the No. 770 Crosscut. This development drift was directed parallel to and 30 feet south of Diamond Drill Hole No. 191. Mining operations were carried on to the north and south throughout the remainder of the year from four top-timber raises, in an orebody approximately 130 feet in width by 260 feet in length. The ore was generally hard and interspersed with a number of jasper bunches, extending downward from the capping. Near the end of 1950 approximately two-thirds of the area had been mined from the -80-foot sublevel to the capping 25 feet above.

7th to 8th Level Development:

In January 1950 the 15-degree conveyor slope drift had been extended a total distance of 270 feet from the storage pockets, or 120 feet from the 7th level supply drift connection. At this time work was started in installing 236 feet of conveyor. Drifting operations were started late in February, and by May the total inclined distance from the pockets amounted to 475 feet. At that time 250 feet of conveyor were added, and drifting was started for the remaining 163 feet. In July the inclined drift had been completed to a depth of 638 feet from the storage pockets, and two raises and a skippit were finished. During the remainder of the year a third length of conveyor was added, together with the steel feeder and pocket supports. In December the run-around supply drift was connected to the 8th level pocket station, and drifting operations to the east and west were started. It might be mentioned that the entire drift was driven in medium blocky slate. The main fault dike was intersected at the 8th level station, and proved to be relatively hard. With the exception of minor adjustments the entire system has performed very satisfactorily.

7. UNDERGROUND: (CONT'D)

d. Timbering:

There was slightly less timber used in 1950 in proportion to the production. It is possible that this reduction has resulted from the wider use of four-inch H-section steel sets. It might be added that there is presently a 200-foot length of Seventh Level drift which parallels a soft dike and has been supported with steel sets for the past two years. Previously when timber was used it was necessary to retimber this drift continually. In 1950 no maintenance was necessary in this heavy section, resulting in a considerable saving.

The table below gives a statement of all types of timber used, as well as the cost and amount used per ton.

Statement of Timber Used:

	Lineal Feet		Average Price per Foot		Amount	Amount
	1950	1949	1950	1949	1950	1949
8" Stulls	13,851	20,894	.1189	.1376	1,647.28	2,874.96
10" Stulls	26,386	29,038	.1838	.1832	4,849.77	5,321.02
12" Stulls	12,120	16,580	.2655	.2429	3,218.37	4,027.68
14" and Over	2,772	2,836	.3091	.2939	856.91	833.54
Total	55,129	69,348	.1918	.1883	10,572.33	13,057.20
Hdwd.Cribbing 4"x6"	24,728	2,010	.0847	.0440	2,094.09	88.44
6" Cribbing	5,092	23,502	.0702	.0690	357.46	1,621.08
Lagging - 7'	437,395	667,610	.0148	.0167	6,468.90	11,149.09
Poles - 9-1/2'	285,785	221,873	.0297	.0293	8,494.35	6,496.13
Total	753,000	914,995	.0231	.0212	17,414.80	19,354.74
Grand Total					27,987.13	32,411.94

	1950	1949
Product	445,071	434,210
Feet of timber per ton of ore	.124	.160
Feet of cribbing per ton of ore	.067	.059
Feet of lagging per ton of ore	.983	1.538
Feet of poles per ton of ore	.64	.51
Cost per ton for timber	.0238	.0301
Cost per ton for cribbing	.0055	.0039
Cost per ton for lagging	.0145	.0257
Cost per ton for poles	.0191	.0149
Total cost per ton	.0629	.0746

e. Drifting and Raising:

A direct comparison by years as to the amounts of drifting and raising in ore and rock has been given under the "b. Development" heading.

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7. UNDERGROUND: (CONT'D)

f. Explosives, Drilling and Blasting:

There was a slight decrease in the amount of powder used per ton of ore produced. The cost of powder, however, increased 42¢ per 100 pounds. A detail of the consumption and cost is given below:

Year	Cost per Lb. for Powder	Lbs.Powder per Ton of Ore	Cost per Ton for Powder	Cost per Ton Fuse&Caps	Cost per Ton Total
1950	.1494	.4214	.0629	.0124	.0753
1949	.1452	.4223	.0613	.0145	.0758

Statement of Explosives Used: (Ore Development and Stoping:)

	Quantity	Average Price	Amount 1950	Amount 1949
Gelamite #1 - Lbs.	4,250	15.25	648.13	228.85
Hercomite #2X - Lbs.	183,300	14.92	27,353.00	26,388.83
Total Powder	187,550	14.93	28,001.13	26,617.68
Primacord - Feet	1,500	32.00	48.00	48.00
Fuse - Feet	518,254	8.43	4,369.64	4,833.27
Caps - #6	62,237	14.66	912.28	1,110.17
Fuse Lighters - Hot Wire	22,500	9.00	202.50	247.56
Detonators - Electric	-	-	-	40.08
Total Fuse, Etc.			5,532.42	6,279.08
Total All Explosives Stoping, Etc.			33,533.55	32,896.76

	1950	1949
Product	445,071	434,210
Pounds of powder per ton of ore	.4214	.4223
Cost per ton for powder	.0629	.0613
Cost per ton for fuse, caps, etc.	.0124	.0145
Cost per ton for all explosives	.0753	.0758

Statement of Explosives Used: (Sinking, Rock Development, Etc.:)

	Quantity	Average Price	Amount 1950	Amount 1949
Gelamite #1 - Lbs.	2,000	15.25	305.00	198.16
Hercomite #2X - Lbs.	3,200	15.11	483.50	1,044.00
Total Powder	5,200	15.16	788.50	1,242.16
Fuse - Feet	10,780	8.14	87.80	197.04
Caps - #6	1,323	14.47	19.14	42.63
Primacord - Feet	500	32.00	16.00	-
Detonators - Electric			-	8.93
Total Fuse, Etc.			122.94	248.60
Total All Explosives Rock Development, Etc.			911.44	1,490.76
Total All Explosives Used in Mine			34,444.99	34,387.52
Average Price per Pound for Powder			.1494	.1452
Charged to Telephones & Safety Devices			-	23.04
Charged to General Surface Expense			56.25	-
Total as per Cost Sheet			34,501.24	34,410.56
Charged to E&A #CC-278(Uncompleted Construction)			2,400.39	1,991.24
Charged to E&A #CC-373(Uncompleted Construction)			1,056.98	-
Charged to Loading by Steam Shovel			23.10	-
Grand Total			37,981.71	36,401.80

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7. UNDERGROUND: (CONT'D)

g. Mining and Loading:

During 1950 practically all production was derived from mining by the sublevel caving method. There were no new areas opened which would lend themselves to sublevel stoping. In general, the ore has very good physical characteristics and, with the exception of a few isolated areas, ideal mining conditions prevail. The ground pressure in the active mining areas is not excessive and does not require a great amount of maintenance and repair.

With reference to loading and in particular from raises to tram cars the general trend has been toward top-timber transfers, thus relieving the need of loading from chutes where under wet conditions "jackpots" may occur. In 1950 tram cars were loaded from both long raises and top-timber transfers. The scraper subs connected with the top-timber chutes are considerably slower in loading and this condition, plus the number of active chutes in main drifts, has a considerable effect on the speed with which ore can be trammed to the shaft. It might be added that this condition will be partially overcome in the development of the new 8th level by using three crosscuts where loading can be accomplished off of the main line.

h. Ventilation:

Underground ventilation in general has been very good, and it has been possible to interconnect active workings on the sublevels so as to improve and increase the flow of air.

In April a survey was made of the entire ventilation system showing that the 6th level Jeffrey Aerodyne fan was moving about 35,000 cubic feet of air per minute. This figure includes approximately 14,000 cubic feet of recirculated air which passes from the 7th level to the 6th level through old workings.

The 8th level development has been ventilated by using a portion of the 13,000 cubic feet of air coming through the Mather Mine in the west end drift, discharging the smoke and exhaust air through a high-pressure 5,000 cubic foot fan and 14-inch ventpipe which extends from the development heading to Raise No. 747. On the completion of the new 8th level a second outlet connection will be made with the Mather Mine raise to the west and a ventilation raise to the east which will exhaust on the 7th level, east of the No. 770 Crosscut.

i. Pumping:

The number of gallons per minute pumped in each year for the past eight years is shown in the following statement:

Month	1950	1949	1948	1947	1946	1945	1944	1943
January	334	289	313	281	285	317	333	369
February	297	278	315	294	293	284	285	340
March	292	254	287	279	309	315	328	335
April	325	315	345	319	396	456	344	433
May	687	363	410	538	362	460	425	619
June	603	341	362	471	314	453	389	620
July	431	337	358	460	308	439	378	583
August	378	395	335	376	289	374	347	411
September	337	375	312	359	272	341	410	395
October	305	355	299	343	255	315	408	402
November	257	333	276	323	250	299	423	340
December	277	305	293	323	276	292	397	340
Avg.G.P.M.	377	328	325	364	301	362	372	432

As shown above, the average gallons per minute pumped in 1950 were well above those of the past six years. The increase is the result of an unusually high surface inflow in May, June and July.

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8. COST OF OPERATING:

a. Comparative Mining Costs:

	1950	1949	Increase	Decrease
Product	445,071	434,210	10,861	-
Underground Costs	1.814	1.806	.008	-
Surface Costs	.269	.233	.036	-
General Mine Expenses	.424	.372	.052	-
Cost of Production	2.507	2.411	.096	-
Taxes	.197	.200	-	.003
Depletion and Depreciation	.061	.084	-	.023
Loading and Shipping	.048	.043	.005	-
Total Cost	2.813	2.738	.075	-
No. of Days Operated	268	245	23	-
Tot. No. of Shifts Operated	533	490	43	-
Average Daily Product	1,670	1,772	-	102

Total Cost at Mine:

	1950	Percent	1949	Percent	Increase
Labor	1.795	63.8	1.760	64.3	.035
Supplies	1.018	36.2	.978	35.7	.040
Total	2.813	100.0	2.738	100.0	.075

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8. COST OF OPERATING: (CONT'D)

b. Detailed Cost Comparison:

(1) Days and Shifts:

Year	Days Mine Worked	Shifts & Hours	Men Employed	Total Shifts
1950	268	533 - 8 Hr.	219	58,108
1949	245	490 - 8 Hr.	222	55,029
Increase	23	43	-	3,079
Decrease	-	-	3	-

(2) Wages:

There was an increase of 12½¢ per hour granted December 1st, 1950; additional increase of 8½¢ per hour presently being negotiated.

(3) Comparison of Production:

Year	Tons
1950	445,071
1949	434,210
Increase	10,861

(4) Comparison of Number of Men and Wages:

Year	No. of Men	No. of Days	Amount	Rate per Day
1950	219	58,108	751,238.74	12.93
1949	222	55,029	718,543.51	13.06
Increase	-	3,079	32,695.23	-
Decrease	3	-	-	.13

(5) Tons per Man per Day:

	1950	1949	Decrease
Surface	31.10	34.68	3.58
Underground	10.16	10.21	.05
Total	7.66	7.89	.23

(6) Cost of Production:

	1950	1949	Increase
Amount	1,115,616.72	1,046,968.20	68,648.52
Cost per Ton	2.507	2.411	.096

Year	Labor	Percent	Supplies	Percent
1950	787,389.23	71.0	328,227.49	29.0
1949	753,706.44	72.0	293,261.76	28.0
Increase	33,682.79	-	34,965.73	1.0
Decrease	-	1.0	-	-

8. COST OF OPERATING: (CONT'D)

b. Detailed Cost Comparison: (Cont'd)

(7) Detail of Accounts:

	1950		1949	
Days per Week	5 to 8-28-50 6 Bal. of yr.		6 to 6-27-49 5 Bal. of yr.	
Shifts and Hours	1-8 3 2-8 265		1-8 - 2-8 245	
Production, Tons	445,071		434,210	
Average Daily Production, Tons	1,670		1,772	
Number of Days Worked	268		245	
UNDERGROUND COSTS:	Amount	Per Ton	Amount	Per Ton
1. Exploring in Mine	28.71	-	1,905.86	.004
3. Development in Rock	6,496.29	.015	14,875.22	.034
4. Development in Ore	23,344.50	.052	37,996.69	.088
5. Stoping	291,721.05	.655	277,637.22	.640
6. Timbering	173,920.17	.391	180,282.85	.415
7. Tramming	153,097.31	.344	129,816.34	.299
8. Ventilation	6,273.34	.014	5,571.70	.013
9. Pumping	37,443.92	.084	29,154.04	.067
10. Compressors and Air Pipes	38,975.09	.088	35,306.79	.081
12. Underground Superintendence	23,084.81	.052	22,134.05	.051
13. Cave-in, or Fire in Mine	-	-	200.13	.001
14. Maint.:Comp. & Power Drills	3,039.81	.007	1,622.19	.004
15. Scrapers & Mech.Loaders	26,849.17	.060	27,885.25	.064
16. Tramming Equipment	21,175.91	.048	17,120.10	.039
17. Pumping Machinery	2,070.28	.004	2,626.22	.006
Total Underground Costs	807,520.36	1.814	784,134.65	1.806
SURFACE COSTS:				
18. Hoisting	34,937.19	.078	30,783.61	.071
19. Stocking Ore	16,985.93	.038	13,500.73	.031
21. Dry House	9,668.85	.022	11,403.14	.026
22. General Surface Expense	20,590.56	.046	16,611.61	.038
23. Maint.:Hoisting Equipment	15,452.35	.035	16,053.98	.037
24. Shaft	12,590.40	.028	4,467.03	.010
25. Top Tram Equipment	3,959.16	.009	2,852.78	.007
26. Docks,Trestles & Pockets	208.07	.001	-	-
27. Mine Buildings	5,158.63	.012	5,351.76	.013
Total Surface Costs	119,551.14	.269	101,024.64	.233
GENERAL MINE EXPENSES:				
28. Geological	936.55	.002	1,033.83	.002
29. Mining Engineering	7,169.58	.016	7,049.37	.016
30. Mech. & Electr. Engineering	5,444.09	.012	4,930.28	.011
31. Analysis and Grading	14,690.31	.033	14,367.31	.033
32. Safety Department	2,737.77	.006	2,186.14	.005
33. Telephones & Safety Devices	5,252.61	.012	4,303.33	.010
34. Local & General Welfare	3,132.54	.007	2,772.03	.006
35. Spec.Exp.,Pensions&Allowances	6,265.97	.014	6,730.86	.016
36. Ishpeming Office	19,830.19	.045	14,863.07	.034
37. Mine Office	26,356.74	.059	23,895.85	.055
38. Insurance	19,720.31	.044	17,154.03	.040
39. Personal Injury	22,049.81	.050	18,860.53	.044
40. Social Security Taxes	19,717.13	.044	16,127.87	.037
41. Employees Vacation Pay	31,860.00	.072	27,503.92	.063
Research Laboratory	-	-	30.49	-
Additional Wage Adjustment	3,381.62	.008	-	-
Total General Mine Expenses	188,545.22	.424	161,808.91	.372
COST OF PRODUCTION	1,115,616.72	2.507	1,046,968.20	2.411

8. COST OF OPERATING: (CONT'D)

b. Detailed Cost Comparison: (Cont'd)

(7) Detail of Accounts: (Cont'd)

UNDERGROUND COSTS:

1. Exploring in Mine:

Charges to this account made up of $13.58 in September and $15.13 in October, appearing on "direct charges" as Research Laboratory.

3. Development in Rock:

The decrease in the cost per ton is due to the fact that there was less rock drifting and raising.

4. Development in Ore:

The decrease in the cost per ton is due to the fact that there was less development footage.

5. Stoping:

The increase in the cost per ton is due to the fact that there was an increase in the working schedule; also, an increase in wages.

6. Timbering:

The decrease in the cost per ton is due to the fact that there was less timber used.

7. Tramming:

The increase in the cost per ton is due to the fact that it was necessary to transfer more ore in 1950 due to a greater concentration of mining.

8. Ventilation:

Charges to this account approximately the same in 1950 as in 1949.

9. Pumping:

The increase in the cost per ton is due to the fact that there was more water pumped.

Year	Total Gallons Pumped	Gallons per Minute
1950	197,474,699	377
1949	173,343,402	328

10. The increase in the cost per ton is due to the fact that there was more air compressed.

Year	Cubic Feet of Air Compressed
1950	545,206,500
1949	508,049,000

8. COST OF OPERATING: (CONT'D)

b. Detailed Cost Comparison: (Cont'd)

(7) Detail of Accounts: (Cont'd)

UNDERGROUND COSTS: (CONT'D)

12. Underground Superintendence:

Charges to this account approximately the same in 1950 as in 1949.

13. Cave-in, or Fire in Mine:

No charges to this account during the year.

14. Compressors and Power Drills:

The increase in the cost per ton is due to the fact that the Worthington air compressor was repaired.

15. Scrapers and Mechanical Loaders:

The decrease in the cost per ton is due to the fact that there was less equipment purchased.

16. Tramming Equipment:

The increase in the cost per ton is due to the fact that there was more repairs.

17. Pumping Machinery:

The decrease in the cost per ton is due to the fact that there was no new equipment purchased.

SURFACE COSTS:

18. Hoisting:

The increase in the cost per ton is due to the fact that there was more electric power used.

19. Stocking Ore:

The increase in the cost per ton is due to the fact that there was an extension made to the rock trestle; also, due to the fact that 3,000 yards of rock were moved into an old partially filled caved area.

21. Dry House:

The decrease in the cost per ton is due to the fact that no additional equipment was purchased.

22. General Surface Expense:

The increase in the cost per ton is due to the fact that there were more charges for surface improvements in 1950 than in the previous year.

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8. COST OF OPERATING: (CONT'D)

b. Detailed Cost Comparison: (Cont'd)

(7) Detail of Accounts: (Cont'd)

SURFACE COSTS: (CONT'D)

23. Hoisting Equipment:

Charges to this account approximately the same in 1950 as in 1949.

24. Shaft:

The increase in the cost per ton is due to the fact that there were more repairs during the year.

25. Top Tram Equipment:

The increase in the cost per ton is due to the fact that there were more repairs during the year.

26. Docks, Trestles and Pockets:

The increase in the cost per ton is due to the fact that pockets in shaft headframe were repaired.

27. Mine Buildings:

Charges to this account approximately the same in 1950 as in 1949.

GENERAL MINE EXPENSES:

28. Geological:

Charges to this account approximately the same in 1950 as in 1949.

29. Mining Engineering:

Charges to this account approximately the same in 1950 as in 1949.

30. Mechanical and Electrical Engineering:

Charges to this account approximately the same in 1950 as in 1949.

31. Analysis and Grading:

The cost to this account is made up as follows:

Year	Sampling at Mine	Central Laboratory	Shipping Dept. Expense	Trucking Samples,Etc.	Total
1950	1,435.18	9,555.27	2,506.95	1,192.91	14,690.31
1949	1,082.08	9,883.63	2,247.06	1,154.54	14,367.31
Increase	353.10	-	259.89	38.37	323.00
Decrease	-	328.36	-	-	-

35. Special Expenses, Pensions and Allowances:

The cost to this account is made up as follows:

Year	Retirements	Employment Office	Legal	Pensions	Examinations	Total
1950	4,482.31	837.46	407.33	203.75	335.12	6,265.97
1949	4,967.30	1,170.21	320.83	262.61	9.91	6,730.86
Increase	-	-	86.50	-	325.21	-
Decrease	484.99	332.75	-	58.86	-	464.89

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8. COST OF OPERATING: (CONT'D)

b. Detailed Cost Comparison: (Cont'd)

(7) Detail of Accounts: (Cont'd)

GENERAL MINE EXPENSES: (CONT'D)

36. Ishpeming Office:

Year	Amount	Cost per Ton
1950	19,830.19	.045
1949	14,863.07	.034

37. Mine Office:

The detail of charges to this account was as follows:

Year	Salaries Supt. & Clerks	Central Warehouse	Misc.	Total
1950	20,324.40	4,353.57	1,678.77	26,356.74
1949	17,492.68	4,648.55	1,754.62	23,895.85
Increase	2,831.72	-	-	2,460.89
Decrease	-	294.98	75.85	-

38. Insurance:

This account is made up as follows:

Year	Property Insurance	Group Health & Life	Group Annuity	Catastrophe Insurance	Total
1950	1,814.91	15,260.70	2,309.77	334.93	19,720.31
1949	1,317.61	9,395.45	6,039.36	401.61	17,154.03
Increase	497.30	5,865.25	-	-	2,566.28
Decrease	-	-	3,729.59	66.68	-

39. Personal Injury:

The detail of charges to this account was as follows:

Year	Compensation & Doctors	Compensation Department	Total
1950	21,038.90	1,010.91	22,049.81
1949	17,950.69	909.84	18,860.53
Increase	3,088.21	101.07	3,189.28

40. Social Security Taxes:

Year	Unemployment Tax	Old Age Benefit Tax	Total
1950	9,154.39	10,562.74	19,717.13
1949	9,039.34	7,088.53	16,127.87
Increase	115.05	3,474.21	3,589.26

41. Employees' Vacation Pay:

Year	Amount	Cost per Ton
1950	31,860.00	.072
1949	27,503.92	.063

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9. EXPLORATIONS AND FUTURE EXPLORATIONS:

There were no diamond drilling explorations during 1950. With reference however to the new 8th level, there will very likely be considerable drilling after main level drifting has been completed. This work will be carried on to explore areas where there are possible extensions along several dikes leading from ore areas in the Mather Mine, to the east and west.

10. TAXES:

	1950 Valuation	1950 Taxes	1949 Valuation	1949 Taxes
Cambria Realty:				
S½ of SE¼ of Sec. 35, 48-27) Lots 7 & 8 of Sec. 35, 48-27) Lots 5, 6 & 7 of Sec. 36, 48-27) - 222.09 Acres)	200,000	9,490.00	200,000	10,472.86
Jackson Strip:				
N660' of N½ of NW¼ of Sec. 1, 47-27 - 40 Acres)	1,200,000	56,940.00	1,035,000	54,197.05
Personal Property:				
Stockpile, Supplies & Equipment	355,000	16,844.75	570,000	29,847.65
Tot.by Mich.State Tax Com.	1,755,000	83,274.75	1,805,000	94,517.56
Collection Fees		832.75		945.18
Total Taxes, Negaunee		84,107.50		95,462.74
Division of Payments:				
Cambria-Jackson Taxes,Ishpeming*	100,000	3,783.24	100,000	3,730.14
Cambria-Jackson Taxes,Negaunee	1,755,000	84,107.50	1,805,000	95,462.74
TOTAL	1,855,000	87,890.74	1,905,000	99,192.88

*Cambria-Jackson Mine-Ishpeming:
N660' of NE¼ of NE¼ of Sec. 2, 47-27 - 20 Acres)

Tax Rate per $100 of Valuation:	1950	1949
City of Negaunee	4.74500	5.23643
City of Ishpeming	3.78324	3.73014
Total Taxes, City of Negaunee:	667,585.43	720,387.61
Cambria-Jackson Percent of Taxes:		
City of Negaunee	12.47	13.12