

NEGAUNEE MINE  
ANNUAL REPORT  
YEAR 1942

12. NEW CONSTRUCTION  
AND PROPOSED NEW  
CONSTRUCTION: (CONT.)

This E. & A. was completed in March 1942 and closed later in the year. The work on this E. & A. was fifty percent completed in December 1941. Due to advance in cost of materials and erection in the Winter months, the expenditures slightly exceeded the estimated cost. This E. & A. was tied in with E. & A. NM-17 - Air Heating Equipment - Maas and Negaunee Mines, especially as regards the building to house the fan, motor, and equipment which is an integral part of the building to house the boiler, stoker, and unit heaters and in reality the two E. & A.'s should have been combined into one E. & A.

E. & A. NM-17 - Air Heating Equipment - Negaunee and Maas Mines:

	Amount <u>Authorized</u>	Amount <u>Expended</u>	Unexpended <u>Balance</u>
100 H. P. Boiler	\$ 1000.00	\$ 1286.51	286.51
15 Unit Heaters	2812.50	2306.40	506.10
Stoker - 1200 lbs. Capacity	1200.00	1125.26	74.74
Installation Boiler & Heaters	600.00	1814.44	1214.44
Building for Boiler & Heaters	1500.00	4236.70	2736.70
Social Security Taxes		95.66	95.66
Total	7112.50	10864.97	3752.47
10 percent for Contingencies	711.25		711.25
Grand Total	7823.75	10864.97	3041.22

This E. & A. was completed in March and closed later in the year. Due to erection of the building in the Winter months and necessary changes in plans that developed as erection proceeded, the cost exceeded the estimated cost approximately 39 percent. The change in plans included the building of a 50-ton capacity coal bin as part of the main building, fire-proofing of the entire building, and grading of a road over the rock pile to reach the elevation of the coal bin which was built high enough for the coal to feed by gravity to the stoker. The entire cost of both these E. & A.'s was divided, one-half to the Negaunee Mine and one-half to the Maas Mine.

The cost of these two E. & A.'s is being depreciated at the rate of \$339.82 per month divided equally between the two mines.

13. EQUIPMENT AND  
PROPOSED EQUIPMENT:

a. Steam Shovels:

Number seven steam shovel, owned by the Negaunee Mine Company, was laid up for the Winter near the mine shops when loading was finished in November 1942 and necessary repairs are now being made. For several months in the Summer Number 43 shovel, owned by the Cleveland-Cliffs Iron Company, was rented to speed up loading from stockpile when an unusual number of ore boats were assigned to the Marquette and Escanaba docks.



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13. EQUIPMENT AND  
PROPOSED EQUIPMENT: (CONT.)

b. Stocking Trestles:

Wood Stocking Trestles:

The four bents at the East end of the East steel trestle were dismantled in the Summer of 1942 when the Negaunee-Maas ore stocked here was loaded by steam shovel. Due to the late closing of the shipping season and the prospect of an early opening of navigation on the lakes next Spring it was not considered necessary to erect this trestle again.

The wood trestle erected in January 1941 parallel with and North of the East steel stocking trestle constitutes a reserve stocking area in case the East steel stocking trestle is filled.

c. Scraper Hoists:

Following is a list of scraper hoist at the mine:

<u>Company</u>		<u>1942</u>		<u>1941</u>		
		<u>Total</u>	<u>Total</u>	<u>Total</u>	<u>Total</u>	
		<u>Machines</u>	<u>Machines</u>	<u>Machines</u>	<u>Machines</u>	
			<u>each</u>	<u>each</u>	<u>each</u>	
			<u>Cost of</u>	<u>Cost of</u>		
			<u>Repaired</u>	<u>Repaired</u>		
			<u>Repaired</u>	<u>Repaired</u>		
Ing-Rand	10 H.P. Elec.	2	2	\$342.08	1	\$149.62
"	15 H.P. Elec.	16	6	257.58	4	205.97
"	20 H.P. Elec.	12	2	264.70	3	186.21
"	25 H.P. Elec.	2				
Sullivan	15 H. P. "	15	9	206.86	10	346.98
"	20 H. P. "	2				
"	25 H. P. "	2				
Gard-Den	15 H. P. "	2				
<b>Total</b>		<b>53</b>	<b>19</b>		<b>18</b>	
Total cost repairs all Scraper Hoists			4620.77		4804.05	
Scrapped, Sold or Transferred - None						

Purchased in 1942, one Ingersoll-Rand 20 H. P. Elec. Scraper Hoist.

The total cost for repairing scraper hoists was slightly lower in 1942. After a hoist is repaired it is usually good for several years before overhauling and repairing is again necessary.

d. Underground Tram Cars:

No rocker dump cars were purchased during 1942. No cars were sent to the General Shop for repairs during the year 1942. The expense for maintenance of cars was higher in 1942 due to replacement of more wheels and springs.

e. Drill Equipment

During 1942 there were four Ingersoll-Rand R. B. 12 Jackhammer drill machines purchased at a cost of \$200.45 each, also one Ingersoll-Rand R-48 Stoper at a cost of \$365.00. The cost of all these machines were charged to operating the mine.

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13. EQUIPMENT AND  
PROPOSED EQUIPMENT: (CONT.)

f. Haulage Tracks:

The following is a detailed comparison of haulage track costs for the years 1942 and 1941:

	<u>1942</u>	<u>1941</u>
40-lb. Rail	574.39	1,501.33
Ties & Tie plates	718.73	923.86
Frogs	104.30	322.00
Total	<u>1,397.42</u>	<u>2,747.19</u>

The cost of new track equipment was lower in 1942 due to less extension of drifts on the 14th level. Expense, however, for maintenance of tracks was much higher due to large production in 1941 and 1942.

g. Timber Hoists:

During 1942 there were two H. W. Utility Hoist purchased at a cost of \$475.00 each. The raises from the 14th level vary from 165 feet to 180 feet in height and to hoist timber, lagging and poles a strong fast hoist is necessary. The H. W. Utility hoist is a four cylinder unit with plenty of power and speed and is admirably suited for this work.

14. MAINTENANCE  
AND REPAIRS:

Expenditures for maintenance and repairs in the accounts listed under "Underground Costs" were \$58,764.07 in 1942 compared with \$51,423.07 in 1941, and increase of \$7,341.00. The cost per ton was .052 in 1942 and .050 in 1941, and increase of .002.

The following is a list of purchases and repair costs for 1942:

	<u>1942</u>	<u>1941</u>
4 - R. B. 12 Jackhammer	801.80	
1 - R 48 Stoper	365.00	
1 - Ingersoll-Rand 20 H.P Elec. Scrap.	1469.00	
1 - 2 ton Gale Chain Hoist	120.40	
101,595 ft. Wire Ropes for Scrapers	11986.07	
Total Purchases	<u>14,742.27</u>	13,199.08
Repairs to Compressors & Air Lines	1,560.28	1,535.04
Repairs to Scraper Hoists, Scrapers	10,635.38	11,038.51
Repairs to Locomotives	7,164.00	12,298.25
Repairs to Trolley Wire	3,153.62	2,306.90
Repairs to Track	11,100.79	6,028.23
Repairs to Haulage Cars	4,635.05	3,841.71
Repairs to Pumping Machinery	4,431.88	1,175.35
Int. on Central Shop Investment	1,340.80	
Total Repairs	<u>44,021.80</u>	<u>38,223.99</u>
Grand Total purchases & Repairs	<u>58,764.07</u>	<u>51,423.07</u>

The increase in expenditures in 1942 was due to mine operating more shifts which increased maintenance expense, and to purchase of one Ingersoll-Rand 20 H. P. Scraper Hoist \$1,469.00 and more repairs to track and cars.

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14. MAINTENANCE  
AND REPAIRS: (CONT.)

Expenditures for maintenance and repairs in accounts listed under "Surface Costs" amounted to \$23,949.80 in 1942 as compared with \$30,611.84 in 1941, a decrease of \$6,662.04. The cost per ton was .021 in 1942 and .029 in 1941, a decrease of .008.

The following is a list of repair costs for 1942:

	<u>1942</u>	<u>1941</u>
New Drum skip Hoist		\$ 5,499.87
Four new Hoisting Ropes	\$ 3,177.24	2,643.89
Repairs to Electric Hoists	6,101.28	1,753.19
Repairs to skips & Cages, etc.	3,477.41	3,266.93
Interest on Central Shop Investment	210.34	
Repairs to shaft	6,059.92	4,210.91
Repairs to Top Tram Motors	370.46	1,735.11
Repairs to Top Tram Tracks & Cars	727.20	697.05
Repairs to pulley Stands		804.23
Wire Rope, Sheaves, Rollers, etc.	1,287.72	1,985.84
Repairs to Permanent Trestle	235.89	412.31
Repairs to Pockets, Chutes, etc.	1,090.79	430.07
Repairs to Mine Buildings	1,211.55	4,849.59
New Double Deck Cage		<u>2,322.85</u>
Total	<u>23,949.80</u>	<u>30,611.84</u>
Decrease	6,662.04	

The decrease in 1942 was due mainly to the purchase of a new drum for the skip hoist in 1941, to charging portion of the cost of modernizing the dry house to Repairs to Buildings in 1941 and to the cost of an aluminum double deck cage in 1941.

15. POWER:

Following is a detail of electric current purchased in 1942 and 1941, distribution of charges to various accounts, and other data:

	<u>1942 - 12 months Optg.</u>		<u>1941 - 12 months Optg.</u>	
	<u>Cost</u>	<u>Cost per Ton</u>	<u>Cost</u>	<u>Cost per Ton</u>
Stoping	2880.00	.0026	2760.00	.0027
Timbering	120.00	.0001	114.27	.0001
Compressors	43566.19	.0395	45629.87	.0442
Ventilation	6505.20	.0059	7637.84	.0074
Pumping	20,345.18	.0184	17889.52	.0173
Hoisting	31945.62	.0289	29800.06	.0288
Stocking Ore	230.84	.0002	276.78	.0003
Dry House Expense	1076.56	.0010	899.22	.0009
Telep. & Safety Devices	1380.00	.0012	1318.30	.0013
Mine Office	88.44		75.82	
Electric Haulage	9801.43	.0089	9514.83	.0092
Shops	469.14	.0004	415.65	.0004
District Carp. shop	15.34		14.53	
Loading at Pocket	45.56			
Surface Lighting	157.47	.0001		
Total	<u>118626.97</u>	<u>.1072</u>	<u>116346.69</u>	<u>.1126</u>



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15. POWER: (CONT.)

	<u>1942</u>	<u>1941</u>
Main Line Meter - K. W. (*)	8,959,865	8,902,091
Separate Meter Reading -K.W.	8,759,168	8,597,654
Line Loss - K.W.	200,697	304,437
Product - Tons	1,106,694	1,033,220
K.W. Per Ton (Inc. Line Loss)	8.09	8.62
Cost per K.W. (Avg. for Year)	.0132	.0131
15 Min. Demand - K.W. (Average)	1686	1659
Load Factor	" 63%	" 65%

(\*) Less Maas Charges.

More current was used in 1942, due to larger production and more shifts worked. The Kilowatts per ton of ore decreased slightly. The load factor was not quite as favorable as in 1941, resulting in a small increase in the cost per Kilowatt.

17. CONDITION OF  
GROUNDS:

a. Mine Grounds:

The premises around the mines were kept in good condition throughout the year. The parking lot for automobiles was enlarged in the fall to enable cars to be parked in a separate location on each of the three shifts. This was done to give room for scraping snow to clear the parking grounds and to make supervision easier to prevent theft of gasoline and tires.

b. Negaunee Mine Houses:

Only one house is now owned by the Negaunee Mine Company, all the other houses previously owned have been sold to employees.

The cost of repairs was \$325.09 and the revenue from rent was \$198.00. This house is not for sale due to its location on ground jointly owned by the Negaunee Company and the Cleveland-Cliffs Iron Co.

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18. NATIONALITY  
OF EMPLOYEES:

The nationality record of employees is submitted in two forms, one as to parentage, the other as to country of birth.

<u>As to Parentage</u>	<u>1942</u>	<u>Percent</u>	<u>1941</u>	<u>Percent</u>
Finnish	215	44.3	218	45.8
English	84	17.3	71	15.0
Italian	67	13.8	72	15.2
Swedish	42	8.7	40	8.4
French (Canadian)	38	7.8	39	8.2
French (Parisian)	1	.2	1	.2
Austrian	9	1.9	11	2.4
Norwegian	5	1.0	5	1.0
German	8	1.6	8	1.7
Danish	3	.6	3	.6
Belgian	3	.6	3	.6
Irish	5	1.0	1	.2
Polish	4	.8	1	.2
Dutch	1	.2	1	.2
Jugoslavia	1	.2	2	.4
Total	<u>486</u>	<u>100.0</u>	<u>476</u>	<u>100.0</u>

<u>As to Birth</u>	<u>American Born</u>		<u>Foreign Born</u>	
	<u>1942</u>	<u>1941</u>	<u>1942</u>	<u>1941</u>
Finnish	140	143	75	75
English	66	53	18	18
Italian	37	42	30	30
Swedish	35	29	7	11
French (Canadian)	37	38	1	1
French (Parisian)			1	1
Austrian	7	9	2	2
Norwegian	5	5		
German	8	8		
Danish	3	3		
Belgian	3	3		
Irish	3	1	2	
Polish	4	1		
Dutch	1	1		
Jugoslavia	1	2		
Total	<u>350</u>	<u>338</u>	<u>136</u>	<u>138</u>
	72.0%	71.0%	28.0%	29.0%



NORTH JACKSON MINE  
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1. GENERAL:

This property has been idle for thirty-four years.

6. SURFACE:

The fences around the caves were repaired during the summer.

10. TAXES:

	<u>1 9 4 2</u>		<u>1 9 4 1</u>	
	<u>Valuation</u>	<u>Taxes</u>	<u>Valuation</u>	<u>Taxes</u>
47% of realty as described				
Sec. 1-47-27	\$ 220,900	\$ 7218.39	\$ 220,900	\$ 7335.82
Collection Fees		72.18		73.36
Total	\$ 220,900	\$ 7290.57	\$ 220,900	\$ 7409.18
<u>Rented Buildings</u>				
Old Jackson Office	\$ 700	\$ 23.10	\$ 700	\$ 23.48
Grand Total	\$ 221,600	\$ 7313.67	\$ 221,600	\$ 7432.66
City of Negaunee Tax Rate				
Per \$100.00		\$ 3.267		\$ 3.321

Due to a decrease in the City of Negaunee tax rate, taxes on this property decreased for the fourth consecutive year. The tax rate has decreased 13% since 1938, resulting in a decrease of \$1083.40 in total taxes paid during the past four years or an average of approximately \$ 520.00 per year.

SOUTH JACKSON MINE  
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1. GENERAL:

There was no change in conditions at this idle property during 1942.

4. ESTIMATE  
OF ORE  
RESERVES

a. Available Ore:

Above present pit available by present system of mining:

On Southwest Side	35,000 tons
North of Lucy Pit	5,000 tons
South & Southwest of Lucy Pit	<u>3,000 tons</u>
Total	43,000 tons

Below present pit and above drainage tunnel available by milling:

West of Crusher	186,000 tons
Area below bottom of present pit shown by churn drilling	<u>105,226 "</u>
Total	<u>291,226 "</u>
Grand Total	334,226 "

c. Estimated Analysis:

	<u>Iron</u>	<u>Phos.</u>	<u>Silica</u>	<u>Alum.</u>	<u>Mang.</u>	<u>Line</u>	<u>Mag.</u>	<u>Sul.</u>	<u>Igni.</u>	<u>Moist.</u>
Natural	34.55	.066	36.00	1.42	2.00	.435	.175	.010	2.00	7.00

6. SURFACE:

The crusher building, the last remaining structure on the property was sold for scrap, but up to the end of the year, had not yet been dismantled by the purchaser. The fences around open pits and shaft house, etc., were inspected in the summer and the necessary repairs made.

10. TAXES:

	<u>1 9 4 2</u>		<u>1 9 4 1</u>	
	<u>Valuation</u>	<u>Taxes</u>	<u>Valuation</u>	<u>Taxes</u>
53% of realty as described				
Sec. 1-47-27	\$ 249,100	\$ 8139.89	\$ 249,100	\$ 8272.31
Collection Fees		81.40		82.72
Total	<u>\$ 249,100</u>	<u>\$ 8221.29</u>	<u>\$ 249,100</u>	<u>\$ 8355.03</u>
City of Negaunee Tax Rate				
Per \$100.00		\$ 3.267		\$ 3.321

Taxes decreased for the fourth consecutive year due to a decrease in the City of Negaunee tax rate, which has decreased 13% since 1938.



GWINN DISTRICT GENERAL  
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1. GENERAL

Princeton Mine

The Principal activity in the district in 1942 was the work in connection with getting the Princeton Mine on a production basis.

When the sixth and seventh Level - the operating levels - were unwatered it was found there was considerable more repair work than was expected in the shafts, drifts and on the the tracks. The mine was idle from 1921 to 1927, before it was permitted to fill with water. In this interval the stagnant air due to lack of proper circulation caused the timber to rot much more quickly than in an operating mine, with the result that more main level drifts had to be retimbered this year. The shafts were in better condition than the drifts but still required considerable repair work.

The mine started on an operating basis July 1st. The product increasing gradually each month to 700 tons per day in December. The expected daily product has been placed at 800 ton per day.

The mine opening was greatly handicapped by lack of experienced employees. Practically all of the trained men in the Gwinn District were employed at the mines in Ishpeming and Negaunee, as the year advanced some of these men were released and returned to the district, also the new men are gradually getting experience and by the end of the year are making a fairly satisfactory force.

A great deal of surface work was necessitated at the mine. Headframes had to be erected at both No. 2 and No. 3 shafts, new stocking grounds and trestles provided, hoists and compressor installed, etc. All of this is detailed in the Princeton Mine yearly report.

Francis Mine

The Francis Mine steel headframe was blasted down in November 1941. During 1942 the material was salvaged and used in the Ishpeming-Negaunee and the Gwinn districts.

Stephenson Mine

The Stephenson Mine lease was surrendered December 31, 1941. During the year a cave appeared at the Shaft site. At the request of the Stephenson Co. arrangements were made to have this fenced and the road approaches to the Shaft blocked. The expense was born by the I. Stephenson Co.

Gardner-Mackinaw

The Gardner Mining Lease - C. & N. W. Railway - was cancelled in 1941 as was the Mackinaw Mine Lease - the D. M. & N. Co. All stockpile ore was shipped in 1941.

During 1942 usable old equipment at the Mackinaw was removed from the premises except the headframe and taken to the district shops at Princeton. Tons of steel scrap than were salvaged from old car, pipes, etc.

The surface at the Mackinaw is the property of the The C. C. I. Co.

GWINN DISTRICT GENERAL  
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1. GENERAL (CONT.)

Archibald Mine

During the year the Company purchased from Clement K. Quinn a stockpile of Furnace Ore at this mine containing 29,009 tons. This was loaded by steam shovel intermittently throughout the season. On account of the lumps this was sent to the District crusher before shipping.

Schools

The enrollment of the Gwinn School for 1942 was as follows:-

Elementary Grades	249
Junior and High School	222
Total	471 or a decrease of 48 from 1941

As in the past few years, a large school bus transports pupils daily from Wells Township to Gwinn a distance of over twenty miles.

Houses and lots

The Company sold three houses during the year, one of its better houses in Gwinn and two cottages at the Mackinaw Location.

In addition, lots were sold by the Company.

Practically all of the houses in Gwinn and in the Princeton and Austin location are occupied.

Finnish Church

On Jan. 6th 1942 the Finnish Lutheran Church located on Pine St. Gwinn was totally destroyed by fire. A new church was erected during the summer.

a. Statement showing total Ore Produced in District by the C. C. I. Co. 1903 to 1942 inclusive

<u>Year</u>	<u>Austin</u>	<u>Princeton</u>	<u>Stephenson</u>	<u>Gwinn</u>	<u>Francis</u>	<u>Gard-Mack</u>	<u>Total</u>
Total to 1942	1,589,018	1,584,333	3,835,157	988,665	504,667	1,289,118	9,790,958
Year 1942		85,101					85,101
To date	1,589,018	1,669,434	3,835,157	988,665	504,667	1,289,118	9,876,059

b. Statement showing Ore shipments by C. C. I. Co. from 1905 to 1942

<u>Year</u>	<u>Austin</u>	<u>Princeton</u>	<u>Stephenson</u>	<u>Gwinn</u>	<u>Francis</u>	<u>Gard-Mack</u>	<u>Total</u>
Total to 1942	1,589,018	1,476,385	3,845,027	988,325	502,131	1,326,439	9,727,325
Year 1942		123,193		29,009*			152,202
To date	1,589,018	1,599,578	3,845,027	1,017,334	502,131	1,326,439	9,879,527

\* This "Foundry Ore" was produced ten or more years ago at the Archibald Mine (Gwinn Mine) of the Clement Quinn Co. and shipped by the C. C. I. Co.

c. Ore in Stock at Mines - December 31st 1942

Princeton Mine	69,856 tons
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GWINN DISTRICT GENERAL  
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10. Taxes

The following statement gives the taxes in detail for 1942 and 1941 for all company properties in the district. The mine taxes in the summary show totals only, as the detail for each mine is included in the mine report.

The summary also includes the taxes paid by the Cliffs Power and Light Company in order to show the total taxes paid in Forsyth Township by the Company, exclusive of those paid by the Land Department.

Forsyth Township Mineral Lands, Gwinn	1942		1941	
	Valuation	Taxes	Valuation	Taxes
SW $\frac{1}{4}$ of SW $\frac{1}{4}$ of Sec. 26, 45-25, 45 acres	100.	2.08	100.	2.11
NE $\frac{1}{4}$ of SW $\frac{1}{4}$ of Sec. 28, 45-25, 40 acres	100	2.08	100	2.11
N $\frac{1}{2}$ of NE $\frac{1}{4}$ of Sec. 34, 45-25, 80 acres	200	4.15	200	4.22
SE $\frac{1}{4}$ of NE $\frac{1}{4}$ of Sec. 34, 45-25, 40 acres	100	2.08	100	2.11
NE $\frac{1}{4}$ of NW $\frac{1}{4}$ of Sec. 34, 45-25, 38.05 acres	100	2.08	100	2.11
NE $\frac{1}{4}$ of SE $\frac{1}{4}$ of Sec. 34, 45-25, 36.3 acres	100	2.08	100	2.11
NW $\frac{1}{4}$ of Sec. 35, 45-25, 160 acres	400	8.31	400	8.44
Lots 1, 2 and 3 of Sec. 36, 45-25, 53 acres	125	2.60	125	2.63
Lots 7, 8 and 9 of Sec. 36, 45-25, 98.92 a.	260	5.41	260	5.48
Lot 11, of Sec. 36, 45-25, 13.3 acres	25	.52	25	.53
Und. $\frac{1}{2}$ of S $\frac{1}{2}$ of NE $\frac{1}{4}$ of Sec, 28, 45-25 80 a.	150	3.12		
Total	1,660	34.51	1,510	31.85
Collection fee		.35		.32
Total Taxes		34.86		32.17
<u>Gwinn Townsite - Surface Only</u>				
Lot 2, Sec, 21, 45-25 43.75 acres	100	2.08	100	2.11
NE $\frac{1}{4}$ of SW $\frac{1}{4}$ of Sec. 21, 45-25 included in plat, 6 acres	100	2.08	100	2.11
NE $\frac{1}{4}$ of NW $\frac{1}{4}$ of Sec. 21, 45-25 17.54 acres	150	3.12	150	3.16
That part of S $\frac{1}{2}$ of NE $\frac{1}{4}$ of Sec. 21, 45-25 not included in Plat of Gwinn, 25.01 a.	200	4.15	200	4.22
E $\frac{1}{2}$ of SE $\frac{1}{4}$ of Sec. 21, 45-25, 65.84 acres	150	3.12	150	3.16
That part of W $\frac{1}{2}$ of SE $\frac{1}{4}$ of Sec. 21, 45-25, not included in Plat of Gwinn, 38.80 a.	300	6.23	300	6.33
Gwinn Townsite Plat	82,079	1,705.14	83,100	1,778.68
Supt. Res. Part of W $\frac{1}{2}$ of SE $\frac{1}{4}$ of Sec. 21, 1.2 acres	1,500	31.16	1,500	31.65
NW $\frac{1}{4}$ of NE $\frac{1}{4}$ of Sec. 21, 45-25, except 5 a.	100	2.08	100	2.11
Part of S $\frac{1}{2}$ of NE $\frac{1}{4}$ of Sec. 21, 45-25, 50.88 A	300	6.23	300	6.33
Total	84,979	1,765.39	86,000	1,839.86
Collection fee		17.65		18.14
Total Taxes .		1,783.04		1,858.00

GWINN DISTRICT GENERAL  
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10. TAXES (CONT.)

Total Townsite Group Divided by Accounts

	1942		1941	
	Valuation	Taxes	Valuation	Taxes
From Tax Statement	84,979	1,783.04	86,000	1,858.00
Gwinn Club House, Lot 8 Bk 17	500	10.49	500	10.66
Hospital, Lot 9 Block 25	1,000	20.98	1,000	21.31
Rented Buildings,	66,500	1,395.38	68,330	1,481.38
Gwinn Townsite, Unsold Lots	16,979	356.19	16,170	344.65
Total Group as per Stmt	84,979	1,783.04	86,000	1,858.00

Gardner Mackinaw Dwellings

$\frac{1}{2}$  of NE $\frac{1}{4}$  of Sec. 35, 45-25, 87.35

	500	10.39	500	10.66
Collection fee		.10		.11
Total Taxes	500	10.49	500	10.77

Machinery in Warehouse

Central Water Plant NW $\frac{1}{4}$  of NE $\frac{1}{4}$

of Sec, 28, 45-25

Personal-District Office

District Crusher, N $\frac{1}{2}$  of NE $\frac{1}{4}$

of Sec. 27, 45-25

Total

	900	18.69	900	18.99
	100	2.10	100	2.13
	500	10.50	500	10.66
	1,000	20.98	1,000	21.31
Total	2,500	52.27	2,500	53.09

Austin Location

Part of Lot 5, SW $\frac{1}{2}$  of NE $\frac{1}{4}$  of

Sec. 20, 45-25

NW $\frac{1}{4}$  of SE $\frac{1}{4}$  of Sec. 20, 45-25

NE $\frac{1}{4}$  of SW $\frac{1}{4}$  of Sec. 20, 45-25

Total

Collection fee

Total Taxes

	3,500	72.69	3,500	73.84
	3,500	72.69	3,500	73.84
	260	5.40	260	5.48
Total	7,260	150.78	7,260	153.16
Collection fee		1.51		1.53
Total Taxes		152.29		154.69



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10. TAXES (CONT.)

<u>Summary</u>	<u>1942</u>		<u>1941</u>	
	<u>Valuation</u>	<u>Taxes</u>	<u>Valuation</u>	<u>Taxes</u>
Machinery in Warehouse	900	18.69	900	18.99
Stephenson Mine			27,100	576.98
Princeton Mine	361,260	7,578.59	241,260	5,141.04
Francis Mine		2.13		3.82
Gardner Mackinaw Mine	900	18.88	19,000	404.90
Austin Location	7,260	152.29	7,260	154.69
Mineral Lands	1,660	34.86	1,510	32.17
Gwinn Townsite	84,979	1,783.04	86,000	1,858.00
Gardner Mackinaw Location	500	10.49	500	10.66
Central Water Plant	100	2.10	100	2.13
Personal District Office	500	10.50	500	10.66
District Crusher	1,000	20.98	1,000	21.31
Total C. C. I. Co.	459,059	9,632.55	385,130	8,235.35
Cliffs Power and Light Co.	148,130	3,107.57	148,105	3,163.79
Total Taxes (Includes 1 %)	607,189	12,740.12	533,235*	11,399.14

\*Mine Personal Property included here

Gardner-Mackinaw			15,000	316.50
Princeton	130,000	2,700.17	115,000	2,426.50
Stephenson - C&NW Sec. 29			25,000	526.96
Total	130,000	2,700.17	155,000	3,269.96

Taxes Levied-Forsyth Township

	<u>1942</u>	<u>1941</u>	<u>1940</u>	<u>1939</u>
Forsyth Township Valuation	1,109,870	1,059,625	1,182,035	1,339,590
Rate per \$100.00 of Val.	2.077	2.110	2.068	1.883

Amount of Tax Roll

County Tax	6,215.27	5,298.12	7,092.21	7,974.55
County Road	2,219.74	2,543.14	2,600.48	2,742.10
Township Tax	2,219.74	2,119.25	2,718.68	4,018.30
Township Dept. Service	2,800.00	2,860.00	2,985.00	1,427.39
School	5,993.30	5,933.90	5,319.16	5,357.62
School Debt Service	3,604.48	3,600.00	3,704.48	3,705.10
Rejected Tax	14.50	26.36	27.65	0

Total 23,067.03 22,380.77 24,447.66 25,225.06

Amount paid by C. C. I. Co. 13,350.78 12,593.52 14,973.75 15,065.99  
 Percent Paid by C. C. I. Co. 57.9 % 56.3 % 61.2 % 59.7%  
 (Including C. P. & L. Co.)

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16. WATER SUPPLY GWINN DISTRICT

The main pumping plant at the Jopling Shaft (Kidder Shaft) and the auxiliary booster Plant on the East bank of the Escanaba River below the Austin Location operated throughout the year.

Samples of water were sent each month to the Michigan Department of Health Laboratory at Houghton. All samples were satisfactory and showed no contamination.

Following is comparative cost of operating the Pump Station for the Years 1942 and 1941

	<u>1 9 4 2</u>	<u>1 9 4 1</u>	<u>Increase</u>	<u>Decrease</u>
General Expense	69.20	101.65		32.45
Maintenance Labor	949.79	254.56	695.23	
Maintenance Material	1,650.63	1,281.06	369.57	
Operating Labor	477.29	598.42		121.13
Operating Supplies				
Oil, Waste & Packing	21.38	4.05	17.33	
Tools & Miscellaneous	27.87	46.83		18.96
Electric Power				
Kidder Pump Station	4,070.50	3,560.50	510.00	
Booster Pump Sta.	930.46	527.07	403.39	
Total	<u>8,197.12</u>	<u>6,374.14</u>	1,822.98	Net

The large increases in Cost for 1942 over 1941 were in Maintenance and Electric Power.

The maintenance increase was principally due to having to lay 700 feet of 4 inch iron pipe at the junction of Ash St, with the County road in the Northwest corner of Gwinn Townsite. The main 8 inch wood line springing a leak early in December under the creek bed at this location. It was impossible to make repairs on the main pipe, so a new line of 4 inch pipe was laid. The weather was extremely cold and the cost was higher than if the work were done in warm weather.

The extra current cost was due to operating the larger pump more days at the Kidder station and increased pumping at the booster station.

The Revenue credited the Pumping Plant:

	<u>1942</u>	<u>1941</u>
The C. C. U. Co. Mines	508.15	115.00
Water Charges Receivable		
Residents, business places etc.	2,287.73	2,374.77
Fire Hydrant Service, Township	1,400.00	1,400.00
	<u>4,195.88</u>	<u>3,889.77</u>



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17. CONDITION  
OF  
PREMISES

General upkeep repairs were made throughout the year.

The rents accrued, collected and repair expense for the company houses in Gwinn and in the Austin, Princeton and Gardner Mackinaw locations follows:

<u>Gwinn Townsite</u>	<u>1942</u>	<u>1941</u>	<u>1940</u>	<u>1939</u>
<u>Number of Houses-117</u>				
Rents accrued	11,576.54	11,417.03	11,306.26	9,454.31
Repair expense	8,032.71	5,320.12	7,256.55	5,562.68
Accrued rent over repair cost	3,543.83	6,096.91	4,049.71	3,891.63
Actual rent collected*	11,520.13	11,198.62	10,999.01	8,215.61
*Cash collected for regular running accounts, Year 1942			11,253.11	
Cash collected for old charged off accounts, Year 1942			267.02	
		Total	<u>11,520.13</u>	

During the year the following house was sold:

No. 112 Pine Street, located on Lot 16, Block 12 - to John Bond.

AUSTIN LOCATION

	<u>1942</u>	<u>1941</u>	<u>1940</u>	<u>1939</u>
<u>Number of Houses-41</u>				
Number occupied	40	40	39	38
Rents accrued	2,231.00	2,177.08	1,980.25	1,651.73
Repair Expense	417.52	856.35	1,902.69	1,065.51
Accrued rent over repair cost	1,813.48	1,320.73	77.56	586.22
Actual Rent Collection*	2,449.52	2,152.92	1,962.90	1,567.38
*Cash collected for regular running accounts, Year 1942			2,317.02	
Cash collected for old charged off accounts, Year 1942			132.50	
		Total	<u>2,449.52</u>	

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17. CONDITION  
OF  
PREMISES

<u>Princeton Location</u>	<u>1942</u>	<u>1941</u>	<u>1940</u>	<u>1939</u>
Number of Hoses-9	9	9	8	10
Number occupied				
Rents accrued	677.50	656.50	597.00	472.25
Repair Expense	307.01	393.04	580.40	588.77
Accrued rent over repair cost	<u>370.49</u>	<u>263.46</u>	<u>16.60</u>	<u>116.52</u>
Actual Rent Collection *	689.00	658.43	567.50	453.50
Cash Collected for Reg. running Accts	662.00			
Cash Collected for Chg. off Accts	27.00			
Total	<u>689.00</u>			

Gardner Mackinaw Location

Number of Houses - 2\*

Rents Accrued		43.87	
Repair Expense	9.14	88.10	
Rent Collection	10.00	33.87	19.02

Statistical Statement of Rented Buildings, 1942

<u>Location</u>	<u>Vacant</u>	<u>Occupied</u>	<u>Total</u>	<u>Cost of</u> <u>Repairs</u>	<u>Repair Cost</u> <u>per House</u>	<u>Rent</u> <u>Accrued</u>	<u>Rent</u> <u>Collected</u>
Princeton	0	9	9	393.04	43.67	656.50	658.43
Austin	1	40	41	856.35	20.89	2,177.08	2,152.92
Gardner*Mackinaw	1	1	2	9.14	4.57		
Gwinn	4	114	118	5,320.12	45.08	11,417.03	11,198.62
	<u>6</u>	<u>164</u>	<u>170</u>	<u>6,578.65</u>	<u>38.70</u>	<u>14,250.61</u>	<u>14,009.97</u>

Actual cash received \$14,668.65 includes \$426.52 which was credited to old charged off accounts.

Actual cash expended 8,757.24

Receipts over Expenditures 5,911.41



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18. GWINN HOTEL

The manager was unable to operate the hotel at a profit so it was decided to close it December 1st.

The Frank C. Shillings Company "CashWay" Store occupies one of the store rooms in the hotel block. When the hotel closed it was necessary to install an independent heating plant in this store as heat had previously been furnished by the hotel plant. The rent of the store was increased to write off the cost of the heating plant and chimney.

20. GWINN DISTRICT CRUSHER

The crusher operated in 29 days during 1942.  
The Ore crushed was as follows:-

"Foundry" Stockpile Ore - Archibald Mine	29,009 tons
Princeton Cambridge	1,378 tons
Total	30,387 tons

<u>Cost of crushing</u>	1 9 4 2		1 9 4 1	
	<u>Amount</u>	<u>Per Ton</u>	<u>Amount</u>	<u>Per Ton</u>
General Expense	47.80	- -	38.09	- -
Maintenance	260.10	.009	531.80	.010
Operating	2,249.82	.075	2,430.02	.048
Total Operating	2,557.72	.084	2,997.91	.058
Switching	325.60	.011	382.80	.008
Grand Total	2,883.32	.095	3,380.71	.066
 Tons Crushed	 30,387		 50,992	

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19. GWINN ASSOCIATION  
Clubhouse

The Association maintains its position as the center of civic and recreational activities in the Gwinn district. Its work is efficiently supervised by Mr. E. L. Miller who has acted as Superintendent for the past 24 years.

The following by Mr. Miller, is a brief synopsis of the annual report furnished to the Welfare Department of the activities carried on at the Gwinn Association Club house.

"The Club is maintained through the financial assistance of the Cleveland-Cliffs Iron company, The Cliffs Power and Light Company, rental received from the Local Board of Education, and membership fees from residents of the Community.

Average monthly membership was 284, of this number 253 were employees of the Cleveland-Cliffs Iron Co., and the remainder were employed elsewhere.

Indoor activities include, bowling leagues for men and women, card playing facilities for men and women, a library and reading room, (containing 500 volumes and receiving 25 weekly and monthly magazines and 3 daily and 2 weekly newspapers) a recreation room with pool and billiard tables, table tennis and other games. Rooms are provided for meetings or socials. The gymnasium is fully equipped for class or recreation work, basket ball or other games and is also used as a dancing floor. Shower baths are also provided for men and women.

Total number of meeting of a business, social or recreational nature for year was 427, of this number 7 were annual events, Church organizations used the building on 103 occasions, scout troops held 46 meetings, 16 dances were held, 20 committee meetings, 56 meetings by Red Cross workers, 15 classes for Home Nursing, 28 meetings by Federal Agencies, card playing leagues, women's organizations, town club, civilian defense groups and other organizations used the building for 136 scheduled meetings. Equipment in club kitchen used 106 times and equipment loaned for family parties 31 times.

The gymnasium was used 441 periods for supervised class work and recreational activities by high school students and club members, There were 115 scheduled basketball games, including high school, club team and junior league games for boys and girls. Activities include, basketball, volleyball, badminton, handball, boxing, wrestling and archery.

There was no organized leagues for softball or baseball the past year but Equipment was furnished to the different locations and playgrounds for softball, baseball and foot ball. There were 107 games of softball played under supervision and the estimated attendance for all outdoor activities, including playgrounds, tennis and horseshoe pitching courts and Bass Lake Camp ground was 9,200.

The school kindergarden was in session 168 days in rooms provided for that purpose and used club kitchen to cook noon lunches for bus pupils.

The building is used as a center for all civilian defense and red cross activities.

During the year equipment was purchased to keep all activities functioning properly and the usual attention given to the building to keep it in good repair. The Cleveland-Cliffs Iron Company had a stoker installed in connection with the heating facilities.



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The following is a statement of transfer of equipment in the Gwinn District.

FROM GARDNER MACKINAW MINE

To Princeton Mine

- #078-009 Station Stove.
- 187-089 Mine Telephone
- 090 " "
- 091 " "
- 092 " "
- 093 " "
- 020-155 Steel Head Frame
- 152-011 Air Receiver
- 094-417 Electric Scraper Hdst
- 138-192 Centrifugal Pump
- 117-334 Air Compressor
- 117-389 30 H. P. Motor
- 326 25 " "
- 094-420 Air Hoist
- 421 " "
- 117-323 7½ H. P. Motor
- 328 50 " "
- 118-230 10 " "
- 235 15 " "
- 138-140 Centrifugal Pump
- 194-265 10 KVA Transformer
- 057-053 Drill Press
- 090-006 Steam Hammer
- 132-013 Pipe Cutter
- 138-123 Aldrich Pump
- 134 Boiler Test Hand Pump
- 165-017 Power Hack Saw
- 170-018 Ingersoll Rand Drill Sharpener
- 057-035 Drill Press
- 097-065 Chain Hoist
- 138-141 Pump

To Mather Mine

- 171-055 4 ft. Bicycle Sheave

To Athens Mine

- 179-087 Switch Board
- 088 " "

To Hill Trumbull

- 043-014 No. 7 Pulverizer

To Inland Steel Co., Iron River

- 043-013 Style F. Gyratory Crusher

To Maas Mine

- 175-030 Skip

To Negaunee Mine

- 117-331 75 H. P. A C Motor
- 138-125 Vert. Triplex Pump

Equipment Sold

Two Gardner Mackinaw Mine Location Cottages.

Scrapped

- 030-032 Electric Cable
- 036 " "
- 037 " "
- 195-017 Wood Permanent Trestle
- 018 " " "

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FROM GARDNER MACKINAW MINE (CONT.)

Scrapped (Cont.)

- 171-056 C. I. Sheave
- 020-151 Timber Framers Shed
- 143 Captains Office
- 194-277 Transformer
- 058-435 Drill Machine-Pavement Breaker
- 436 " " " "
- 078-015 Forge
- 020-144 Dry House Building
- 140 Engine " " Gardner
- 139 " " " Mackinaw
- 171-057 4' Bicycle Sheave
- 058 4' " "
- 100-047 Idler Stand
- 048 " "
- 074-010 Hot Air Furnance
- 030-033 Cable
- 034 " "
- 035 " "
- 038 " "
- 071 " "
- 018-044 Junction Box
- 045 " "
- 048 " "
- 037-359 " "
- 360 " "
- 361 " "
- 362 " "
- 363 " "
- 364 " "
- 365 " "
- 366 " "
- 367 " "
- 187-080 Mine Telephone
- 082 " "
- Trolley Wire
- 032-415 UG S. B. Car
- 416 " "
- 417 " "
- 418 " "
- 419 " "
- 420 " "
- 421 " "
- 430 " "
- 431 " "
- 432 " "
- 433 " "
- 018-041 Junction Box
- 042 " "
- 043 " "
- 046 " "
- 047 " "
- 049 " "
- 050 " "
- 051 " "
- 037-357 Controller
- 368 Circuit Breaker
- 369 " "
- 370 " "



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FROM GARDNER MACKINAW MINE (CONT.)

Scrapped (cont.)

037-371	Circuit Breaker
372	" "
373	" "
374	" "
375	" "
376	" "
377	" "
187-079	Mine Telephone
081	" "
083	" "
084	" "
085	" "
086	" "
087	" "

FROM PRINCETON CENTRAL SHOPS

To Maas Mine

041-010 Counterweight

To Lloyd Mine

003-025 Anvil

FROM GWINN STORAGE SHED

To Cliffs Power and Light Co.,

037-523 Transformer

PRINCETON MINE  
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1. GENERAL

The reopening of the Princeton Mine went along as scheduled early in the year. The pumping progressed nicely the first four months. By April the 6th Level - the main working level - had been unwatered and a month later the 7th Level. At the latter elevation was located the main pump room. When this was reached, an inspection showed that the main pump, a vertical electrically driven Aldrich plunger with a 500 gal. per minute capacity, had been so attacked by the water during the flooded period that it was useless and would have to be dismantled. The water was found to contain enough sulphur to cause the damage. (Later it was found that all metal left in the mine was similarly affected, requiring a complete renewal of all pipe, rails, cars, etc.) Temporary pump stations were provided on the 7th Level plat and at the 5th Level in the shaft. The water from the 7th discharged at the 5th and thence relayed to surface. It was the end of September before another Aldrich, formerly at the Mackinaw Mine, was installed and put in operation on the 7th. From then until the end of the year the plunger pump worked daily and the centrifugal reserve pumps were installed to do away with the temporary pumps.

The drift timber in some places had stood up fairly well during the flooded period, however, most of it had to be replaced. During the year it was necessary also to renew practically all of the track. Both retimbering and relaying track were slow and expensive and the work was still in progress at the end of the year. No. 2 shaft also needed extensive repairs.

The surface plant was changed considerably. No. 3 shaft, formerly the timber shaft, was made the man way and a new cage for men and timber installed. A new hoist, compressor, electric generators and change house were set up in the old Central Power Plant Buildings and the District Office converted into the Mine Office. A steel headframe was erected at No. 2 shaft, which is used exclusively for hoisting ore.

A new wood headframe was erected at #3 shaft. By July 1st enough headway had been made underground to put the mine on an operating basis. By the end of the year, the product was approaching 700 tons per day on two eight hour shifts.

As soon as possible the shaft will be cleaned out to the 8th Level and forty additional feet sunk. A drift in rock will be driven to the southeast on the 7th towards #3 shaft and development of the level pushed as rapidly as possible.

But little development work was done at the property during the year except near #1 shaft. Enough was done there to prove that little ore is left in that area of merchantable grade.



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1. GENERAL (Cont.)

From the mining and development done so far, it is evident that most of the ore in the mine is of a plastic consistency, with high phosphorus, i.e. Cambridge grade, .800 phos. or higher.

The cost of reopening the mine, E&A #CC-91, has greatly overrun the estimate. The explanation of the costs against the items making up the estimate are detailed in this report.

2. PRODUCTION, SHIPMENTS  
AND INVENTORIES

<u>a. Production by grades</u>	<u>Princeton</u>	<u>Sec. 19 Lease</u>	<u>Total</u>
Cambridge	64,670	9,496	74,166
Princeport	9,578	175	9,753
Total	<u>74,248</u>	<u>9,670</u>	<u>83,919</u>

<u>b. Shipments</u>	<u>1942</u>	<u>1941</u>	<u>Increase</u>
Cambridge	119,171	12,476	106,695
Princeport	4,022	0	4,022
Total	<u>123,193</u>	<u>12,476</u>	<u>110,717</u>

c. Stockpile Inventories

	<u>1942</u>	<u>1941</u>
Cambridge	54,158	93,766
Princeport	8,790	1,750
Section 19 Cambridge	6,779	12,177
Section 19 Princeport	129	255
Total	<u>69,856</u>	<u>107,948</u>

d. Division of Product by Levels

6th Level	83,918	overrun 1,183	85,101
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The entire output came from the 6th Level.

<u>e. Production by months</u>	<u>Princeton</u>
June	187
July	6,120
August	13,703
September	15,772
October	15,926
November	15,612
December	<u>15,999</u>
	83,919

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2. PRODUCTION, SHIPMENTS  
AND INVENTORIES (Cont.)

f. Ore Statement

	Sec. 19		Sec. 19		<u>TOTAL</u>
	<u>Princeport</u>	<u>Princeport</u>	<u>Cambridge</u>	<u>Cambridge</u>	
On hand Jan.1,1942	255	1,750	12,177	93,766	107,948
Output for year	175	9,578	9,495	64,670	83,918
Transfers	<b>451</b>	451	<b>14,893</b>	14,893	
Overruns	150	1,033			1,183
Total	129	12,812	6,779	173,329	193,029
Shipments	0	4,022	0	119,171	123,193
Balance on hand Dec. 31st, 1942	129	8,790	6,779	54,158	69,856

1942 - 2-8 hr. shifts, 6 days per week from the time the mine started on an operating basis, i.e. July 1, 1942.

g. Delays

August 8	8 hrs.	No product, changing cage & repairing shaft.
Sept. 16	1 hr.	Break down on 6th Level
Oct. 26	1½ hr.	Cars off track underground
Oct. 30	1½ hr.	Broken sheave on top landing
Oct. 31	7½ hr.	Trouble on top landing
Nov. 13	3-¾ hr.	Freezing on landing-cars & motors off track Underground
Nov. 17	1½ hr.	Cars off track underground
Nov. 30	2 hrs.	Trouble on landing
Dec. 29	1 hr.	Break down of timber on level.
Dec. 30	1 hr.	Cars off track.

h. Electrical Delays

Oct. 9	1 hr.	Trouble with skip hoist
Nov. 9	3½ hr.	Coil on transfer burned out

3. ANALYSIS

A. Stockpile Analysis

<u>Grade</u>	<u>Tons</u>		<u>Iron</u>	<u>Phos.</u>	<u>Sil.</u>	<u>Mang.</u>	<u>Al.</u>	<u>Lime</u>	<u>Mag.</u>	<u>Sul.</u>	<u>Loss</u>	<u>Moist.</u>
Cambridge	60,937	Dry	59.61	.897	4.23	1.13	1.21	3.42	.89	.019	1.43	
		Natl.	50.996	.767	3.62	.966	1.03	2.92	.76	.016	1.22	14.50
Princeport	8,919	Dry	61.17	.324	5.51	.46	1.49	1.42	.72	.048	1.20	
		Natl.	52.64	.279	4.74	.396	1.28	1.22	.62	.041	1.03	13.95



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3. ANALYSIS (Cont.)

b. Average Analysis - 1942 Shipments

<u>Grade</u>	<u>Tons</u>	<u>Iron</u>	<u>Phos.</u>	<u>Sil.</u>	<u>Mn.</u>	<u>Al.</u>	<u>Lime</u>	<u>Mg.</u>	<u>Sul.</u>	<u>Loss</u>
Cambridge	119,171	60.10	.941	4.10	1.15	1.06	3.30	.71	.018	1.12
Princeport	4,022	59.90	.328	7.55	.61	1.35	1.56	.74	.025	1.29

4. ESTIMATE OF ORE RESERVES

a. Developed ore

Assumption: 12 cu. ft. equals one ton  
10% deducted for rock  
10% deducted for loss in mining

	<u>Princeport</u>	<u>Cambridge</u>	<u>Sec. 19 Princeport</u>	<u>Sec. 19 Cambridge</u>	<u>TOTAL</u>
Ore above 2nd Level	2,552				2,552
" " 4th "		78,325			78,325
" " 5th "	20,000	58,778			78,778
" " 6th "	43,118	367,948	8,825	47,633	467,424
	65,570	505,051	8,825	47,633	627,079

b. Prospective Ore

Ore Below 6th Level	20,000	418,815	5,000	46,921	490,736
Total Ore					1,117,815

c. Estimated Analyses

No separation of the rubbly ore from the plastic ore was made in 1942. The reserves are estimated at 15% rubbly and 85% plastic. The plastic is estimated at 90% Cambridge and 10% Princeport.

Using these percentages the estimated analyses are:

<u>Reserves</u>	<u>Grade</u>	<u>Iron</u>	<u>Phos.</u>	<u>Sil.</u>	<u>Mang.</u>	<u>Alum.</u>	<u>Lime</u>	<u>Mag.</u>	<u>Sul.</u>	<u>Ign.</u>	<u>Moist</u>
15%	Rubbly	59.62	.800	4.65	1.112	3.47	.965	.856	.023	1.526	15.00
85% ( 10%	Princeport *	59.50	.300	7.73	.505	1.60	1.214	1.037	.023	2.23	15.00
( 90%	Cambridge **	59.75	.853	4.42	1.19	3.68	.937	.840	.023	1.45	15.00

\* Plastic  
\*\* Plastic

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4. ESTIMATED ANALYSES (Cont.)

d. Estimated Tonnage as Required by State Tax Commission

Non-Bessemer Ore

Developed:	1. Princeport	74,395 Tons	
	2. Cambridge	<u>552,684</u> "	
Total Developed			627,079 tons
Prospective:	1. Princeport	25,000 "	
	2. Cambridge	<u>465,736</u> "	
Total Prospective			<u>490,736</u> "
Grand Total			1,117,815 tons

The above estimates are as of December 31, 1942.

e. Expected Average Natural Analyses of Ore Reserves

DEVELOPED:

<u>Grade</u>	<u>Trade Name</u>	<u>Total Tons</u>	<u>Iron.</u>	<u>Phos.</u>	<u>Sil.</u>	<u>Mn.</u>	<u>Al.</u>	<u>Lime</u>	<u>Mag.</u>	<u>Sul.</u>	<u>Loss</u>	<u>Moist</u>
Non-	Princeport	55,705	50.60	.256	6.57	1.032	.429	1.365	.882	.020	1.90	15.00
Bess.	Cambridge	571,374	50.76	.707	3.80	.787	1.005	3.095	.716	.020	1.24	15.00

PROSPECTIVE:

Princeport	49,074	50.81	.273	6.59	1.042	.437	1.369	.888	.020	1.91	15.00
Cambridge	441,662	50.80	.742	3.73	.807	1.023	3.145	.711	.020	1.22	15.00

5. LABOR & WAGES

a. Comments

(1) Labor -

While there was no real shortage of men, the mine was very much handicapped by a large percentage of inexperienced men. When the mine opened most of the trained men living in the district were employed in the Ishpeming and Negaunee Districts and the Company was reluctant to release them to the Princeton as it felt they were more essential at those mines than at the Princeton. As the year advanced, the younger men improved so that the force was fairly satisfactory at the end of the year. A large number of the younger men that were being broken in were called in the draft.



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5. LABOR & WAGES (Cont.)

b. Comparative Statement of Wages & Product

This is not a comparative statement as the mine operated only six months in 1942 and was idle in 1941.

	<u>1942</u>
PRODUCT	93,919
No. Shifts & Hours	6 - 2-8 hr.
 <u>AVG. NUMBER MEN WORKING</u>	
Surface	29
Underground	<u>95</u>
Total	124
 <u>AVG. WAGES PER DAY</u>	
Surface	6.49
Underground	<u>7.45</u>
Total	7.21
 <u>AVG. WAGES PER MONTH OF 25 DAYS</u>	
Surface	162.25
Underground....	<u>186.25</u>
Total	180.25
 <u>PRODUCT PER MAN PER DAY</u>	
Surface	17.68
Underground	<u>7.97</u>
Total	5.49
 <u>LABOR COST PER TON</u>	
Surface	3.91
Underground	<u>9.74</u>
Total	1.365
 <u>PRODUCT MINING</u>	
Stoping	82.729
Ore Development	<u>1.189</u>
Total	83.918
 AVG. WAGES CONTRACT LABOR	 8.28
 <u>TOTAL NUMBER OF DAYS</u>	
Surface	4,744 $\frac{1}{4}$
Underground	<u>10,528<math>\frac{1}{2}</math></u>
Total	15,272-3/4

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5. LABOR & WAGES (Cont.)

<u>AMOUNT FOR LABOR</u>	
Surface	\$ 32,829.82
Underground	81,748.64
Total	\$114,578.46

Proportion of Surface to Underground 1 to 3.29

6. SURFACE

Water Launder at #1

A wooden launder was erected to the north of #1 shaft to divert the small creek which flowed easterly at a point 100' north of the shaft. Water from this creek was finding its way into the mine workings.

a. Buildings, Repairs

Comments on various buildings, including costs, are included in Item 12. This is an analysis of the statement - Reopening Princeton Mine E&A CC-91. Buildings not commented on in Item 12 are as follows:

The frame building formerly used as the Princeton Office at #2 shaft was torn down, also an old boiler house.

The brick dry building at #2 was abandoned for that purpose. The south end now houses the heating plant and a small change room used by the top landers and pocket men. The north end is used to store building equipment, coal, etc.

The District Office at the Central Power Plant location, now is used as the office for the Princeton Mine. The room formerly used for the mining engineers is the mine storeroom. This same building is the headquarters and district office for the Cliffs Power & Light Company.

The old brick laboratory building and sample room are used as oil storage rooms.

The steel headframe from the Gardner Mine was reerected at #2 shaft.

b. Stockpiles

Early in the shipping season most of the ore in the Princeport-Cambridge pile north of #2 shaft was removed. Preparations were at once made to prepare this north area for two stockpiles. One paralleling the pocket track just north of No. 2 shaft; the other paralleling this new ground but to the west. It was necessary to level off the old coal dock fill which crossed this area.



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6. SURFACE (CONT.)

b. Stockpiles (Cont.)

As the Cambridge pile to the southeast of No. 2 shaft was only partially removed, a new area had to be prepared to the east. This was done early in the summer and Cambridge ore is now being stocked in the area.

c. Tracks

The pocket tracks southeast of No. 2 shaft had to be relocated on account of the new steel headframe. The tail tracks are now located on the west side of the old Cambridge stockpile.

d. Roads

The County Road Commission provided a road leading from M-35 (State Trunk Line) to Princeton No. 2 shaft in place of the road which was abandoned at the new stockpile site.

7. UNDERGROUND

General

Pumping operations at the Princeton Mine were continued during the first five months of the year. During this period most of the water was pumped through No. 3 shaft until the 6th Level elevation was unwatered. It was then necessary to continue pumping from the No. 2 shaft where several mechanical difficulties interrupted the operations. In May the water level was maintained practically at the 7th Level elevation and repairing operations in the mine were well on their way. The examination of the 6th Level indicated that with the exception of a few breakdowns, all openings were intact. These breakdowns, for the most part, were between the No. 2 and No. 3 shafts on the footwall drift near the contact of the ore and footwall arkose. Due to the water-soaked condition of all of the timber, it was anticipated that a large amount of replacement would be necessary, and this work was carried on throughout the entire year after operations were started in June.

It was found during pumping operations that there was a decided sulphur content in the water with the result that all iron and steel left in the mine was rendered useless. This included rail, air and water pipes, the 7th Level pump and air hoist and a locomotive frame. The replacing of these items required considerable time, resulting in somewhat of a delay in the general reopening.

During the first operation of the mine, the elevations of the various levels, as well as the sublevels, were taken by using No. 2 shaft collar as datum.

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7. UNDERGROUND (Cont.)

Inasmuch as this is not the present method of arriving at elevations, it was decided to refer all elevations to the Government points in the District based on sea level elevations. It was, therefore, necessary to give all levels and sub levels new elevations as well as change the name of the various sub levels to the actual elevation. A complete list of these changes with their present elevations is included in this report.

Relative Elevation of Main Levels  
Datum is collar of No. Shaft

No. 1 SHAFT

<u>Level</u>	<u>Mine Elevation</u>	<u>Sea Level Elevation</u>
Collar	-65.61	1165.75
4th	-250.1	981.3
5th	-323.5	907.9
6th	-341.9	889.5
7th	-368.2	862.6
8th	-390.2	841.2 connects with 6th Level No. 2 shaft.

No. 2 SHAFT

Collar	0	1231.36
1st	-71.32	1160.04
2nd	-131.12	1100.24
3rd	-191.10	1040.26
4th	-251.05	980.31
5th	-310.9	920.46 connects 5th Level No.3
6th	-383.41	847.95 " 6th " No.3
7th	-468.8	763.04
8th	-548.32	683.04

No. 3 SHAFT

Collar	-6.46	1224.90
5th	-290.53	940.83
6th	-392.4	839.0

a. Shaft Sinking

There was no shaft sinking at the Princeton Mine during the year. At the present time the No. 2 shaft is sunk and cut out on the 8th Level while the No. 3 shaft bottom is at the 6th Level elevation. The new

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7. UNDERGROUND (Cont.)

a. Shaft Sinking (Cont.)

south drift which will be driven to the No. 3 shaft location, was started late in the year and it is not likely there will be any shaft work during 1943.

Due to the design of the Gardner Mine headframe, which was erected at No. 2 shaft, it was necessary to turn the position of the skip to the north, or at right angles to the south skip. As a result, it was necessary to cut two new pockets on the 6th and 7th Levels before any hoisting could be done in this skip. This was another delaying factor in the reopening of the mine.

b. Development

Due to the fact that the Princeton ore body above the 6th Level has been fairly well defined, there was no development on this elevation or above during the year. The 7th Level No. 2 ore body has been developed to some degree in the north portion. However, several raises must be driven into the ore body on the 6th Level before mining can continue. During December a small amount of development was started by drifting to the Southwest as well as to the south. The southwest drift will be extended to locate a possible downward extension of the ore on the 7th Level elevation. It will also open the territory in the central part of the No. 2 ore body to mining by the extension of raises to the 6th Level. The No. 3 shaft ore body as yet is undeveloped, and with this work progressing at the present time. No definite outline is known of the ore on the 7th Level elevation with the exception of the knowledge gained from the numerous drill holes in this area. During the coming year, with the development of the No. 3 ore body, particularly in the north section, a fair estimate can be made as to the expected tonnage as well as the quality of the ore.

c. Stoping

No. 1 Shaft

During August and September, a considerable amount of work was done in the main 6th Level drift to the No. 1 shaft area. Due to the wide cars now in use, a considerable amount of blasting was necessary to open the drift to sufficient width to accommodate the tram cars. Due to the badly corroded condition of the rails, it was necessary to replace all the track in the drift, as well as the air and water line. It should be noted that the north portion of the 6th Level drift in the vicinity of No. 1 shaft, grades toward the shaft. It was, therefore, necessary to install a Cameron pump and later an automatic pump to take care of the surface water which drains through the old workings. This work was completed late in September, and mining operations were started in October.



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7. UNDERGROUND (Cont.)

c. Stoping (Cont.)

The Tax Commission estimate, which was made in 1921, showed reserve ore on two elevations, namely, the 875' and 885' sub levels. However, these sub levels, due to their close proximity to the flat dipping slate foot-wall, have overlapped one another in a number of places and for convenience in describing the mining, no division will be made as far as the sub level elevations are concerned.

Contract No. 1 made a cut out on what is known as the 885' sub level at raise #6103. This sub level is approximately 31' above the 6th Level and is really the bottom of most of the ore which remains in this territory. For the most part, the ore was mined from comparatively small pillars to the south and east of the shaft.

A second contract was also added in October to Raise #6107, which is located just southeast of the shaft, approximately 25'. This cut out was made at a point 41' above the level, and mining was started to the east and south. As in the case of No. 1 contract, the slicing of No. 15 was done entirely on the slate which forms the floor of the No. 1 shaft ore body. A major portion of two small pillars was mined, allowing a more or less circular pillar to remain around the main No. 1 shaft.

In December, Contract No. 15 completed two slices southeast of Raise #6107 and later in the month commenced drifting to the southwest and toward an old mining drift.

In November, a third contract was added after repairs were made to Raise #6111 which is located northeast of No. 1 shaft. A raise was cut out at an elevation known as the 885' sub level. Mining was started to the northeast toward Raise #6112. It might be added at this point that the entire area in the vicinity of No. 1 shaft was cut up by a number of drifts which divided the ore body into a number of small pillars. For the most part, these drifts were open, however, no definite mining plan could be established and mining was done only where these small pillars could be removed safely.

In December, Contract No. 8 stoped a small area Northwest of Raise #6111 and thereafter drove a connecting drift between Raise #6111 and an old drift to the north. This opening was used for traveling while a connection was made to the east, where it was hoped to draw a considerable amount of broken ore lying just southeast of Raise #6113. However, it was found that the caved stope had extended over the raise, and this work could not be carried on safely.

Late in November, after Contract No. 1 had completed the mining of a small pillar near Raise #6103, this contract moved to Raise #6114, approximately 100' north of No. 1 shaft.

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7. UNDERGROUND (Cont.)

c. Stoping (Cont.)

In December, Contract No. 1 completed two slices west of Raise #6114 and later commenced stoping along an old exploratory drift to the south-east. By the end of the month it was evident that only a small amount of available ore remained to be mined. For the most part, this ore was of Princeport grade, and was considerably harder in character than any ore in the Princeton Mine. It might be added also that despite the large number of openings and caved areas in and around No. 1 shaft, there has, to date, been no surface caving. Thus the mining that was done and described above, merely reduced the size of the pillars supporting this area and it is practically impossible to remove the remaining pillars without endangering the surface, as well as those carrying on the mining operations.

No. 2 Shaft

885' Sub Level

The first ore hoisted after the reopening of the Princeton Mine was on June 12th. This ore came from the No. 2 shaft ore body. After examining some of the raises and old stopes in this ore body just west of the shaft, it was found that a considerable amount of broken ore resulting from caved pillars, could be scraped without interrupting any mining plan which might be set up in the future. These pillars were originally left to support the jasper hanging wall between several major stopes to the southeast and northwest. However, during the closed period of twenty-one years, these pillars had caved. As a result, Contract No. 10 early in June started scraping this broken ore into the raise on the footwall drift of the No. 2 ore body. This raise is known as #6204. This work was continued during the next three months and supplied over half the production while work was being continued in preparing raises and other mining operations. Early in October, Contract No. 10 moved to Raise #6205 at the same elevation.

In August, a second contract was added to the mining operations of the No. 2 shaft ore body. Raise #6201 was repaired, preparatory to mining and Contract No. 9 started stoping operations in an old drift northeast of the Raise. This drift more or less developed the ore in this area and was driven on the arkose footwall inclined toward the east and the 5th Level. After completing this stope a second stope was started to the south and east which also had been developed by small drifts following the hanging wall and extending to the arkose footwall. The second stope was completed in October, after an area approximately 100' in length by 50' in width had been mined.

In November, two small stopes were completed under the jasper hanging wall West and southwest of the Raise (6201). These stopes were comparatively small and pinched out where the jasper hanging wall intercepted the floor of the sub level.

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7. UNDERGROUND (Cont.)

c. Stoping (Cont.)

In December, Contract No. 9 removed two pillars on either side of the southwest stope. Later in the month, this contract moved to a new location where repairs were being made to the cross cuts in the No. 3 shaft ore body.

In October Contracts Nos. 12 and 10 were moved to Raise #6205, which had previously been repaired and made ready for mining. Northeast of this raise, a long inclined drift extends from the jasper hanging through the ore and along the arkose footwall to the 5th Level. Contract #12 commenced stoping in the upper part of this drift immediately under the 5th Level in October. During this time Contract No. 10 started developing a second stope to the southeast by drifting along the hanging wall and to the northeast on the footwall. Several raises were extended to the 5th Level and after a close examination it was found that a considerable amount of the material previously classed as ore was too lean to be mined. This condition greatly reduced the amount of available ore for stoping in this area.

In December, Contract No. 12 continued stoping northeast of Raise #6205. A portion of the developing drift to the south was stoped and by the end of the month further advance was being made along the footwall to the northeast.

Contract No. 10 completed a short drift and raise to the 5th Level and later extended the third development drift to the northeast preparatory to stoping.

860' Sub Level

Late in July, it was decided to open several raises in Section 19 in the northeast end of the No. 2 shaft ore body. These raises were to be used only temporarily and would mine the ore on the sub-level above the 6th Level or a vertical distance of 12' from floor to floor. As a result, contracts No. 14 and No. 12 were moved to raises #6224 and #6218, respectively. Slicing was continued to the South and East where pillars were removed between the old workings to the hanging wall and the 6th Level drift to the north. During the course of this mining at several places the arkose footwall was found in the floor indicating that the ore body, which at this elevation was approximately 200' wide, would very likely be considerably narrower as mining continued below.

Contract No. 12 completed the mining in this area late in September.

In December, Contract No. 14 completed two slices to the southeast of Raise #6224. These slices ended in the caved material from an old drift which was extended south from the main drift on this elevation. Mining was later directed to the northwest where only a small ore pillar remains.



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7. UNDERGROUND (Cont.)

c. Stoping (Cont.)

6th Level

During the latter part of the year, a large amount of retimbering was necessary in the northwest portion of the 6th Level. In several places the old water soaked timber commenced breaking under the swelling weight and it was necessary to constantly repair this drift to maintain a connection with the No. 1 shaft territory.

Late in November, after completing most of the mining on the 860' sub level, and after the 7th Level was opened for tramping, it was decided to mine on the 6th Level elevation using the two available raises at the extreme northwest end of the 7th Level. As a result, Contract No. 12 moved to Raise #728 late in the month. This raise is located just southwest of the 6th Level, where mining operations were carried on by Contracts #12 and 14.

In December, Contract No. 12 commenced drifting to the southeast to make a connection with Raise #726. This drift was driven directly under the jasper hanging wall and will be used as a ventilation and traveling drift during further mining operations.

No. 3 Shaft - Section 20

910' Sub Level

Mining operations were opened up on this sub level in September. Raise #6312 was cut out at this elevation and mining was started to the north, parallel to and along the arkose footwall. The jasper hanging wall was encountered by all subsequent slices in a position which would indicate that there is an apparent pinching out on the north end of the No. 3 ore body. The ore was of the plastic nature, as is present in the No. 3 shaft ore body. The ore area on this sub level remaining to be mined is approximately 160' long and 70' in width. The new hanging wall drift and raise enters this territory and the latter will be used in the mining of the lower sub levels.

In December, Contract No. 6 completed one slice to the southwest of Raise #6312, and thereafter commenced drifting to the southeast along the arkose footwall where a second raise will be opened up for mining purposes.

900' Sub level

This sub level was the first mining sub level to be opened in the No. 3 ore body. Despite the long flooded period, a number of raises were still in usable condition. In August, Contract No. 5 was formed and commenced mining operations at Raise #6341. It might be added that this sub level is 44' above the 6th Level and allows only a limited amount of storage room in the mining raises. Contract No. 5 commenced drifting to the northwest, parallel

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7. UNDERGROUND (Cont.)

c. Stoping (Cont.)

to the arkose footwall with the subsequent mining to the south. The old floor covering which was used in 1921, before the mine closed, was rotted and water-soaked to such an extent that frequent breakdowns and runs hampered normal progress. As mining continued to the south, narrow seams of lean ore and jasper interbedded in the ore, somewhat reduced the size of the ore body and it was necessary to leave several pillars of this material as mining continued.

In December, Contract No. 5 completed the mining of a small pillar south of Raise #6341 and near the middle of the month this contract commenced cutting the Raise on the 885' sub level.

A second mining contract was added in August on this elevation at Raise #6331. Contract No. 2 started mining operations by drifting to a limit on the north side with further slicing taking place to the west, parallel to the jasper hanging wall. Mining was then continued on the east side of the original drift, swinging to the south where the arkose footwall was encountered. This contract is located approximately in the center of the No. 3 shaft ore body and the actual mining width between foot and hanging walls is approximately 150'. The ore in this area was also of the plastic slabby nature, and entirely different from that which most of the miners were accustomed to mine. Notwithstanding, general operations continued with comparatively few interruptions.

In December, Contract No. 2 completed a long slice northeast of Raise #6331. The south end of this slice was driven under a large ore pillar and a considerable amount of this was recovered on the completion of the slice.

Contract No. 3 commenced mining operations at Raise #6332, or directly under the jasper hanging wall. Mining was first directed to the south and the jasper was followed on the hanging wall side to the west and north. In October, mining operations were continued to the north and in each case left the covering poles above and continued under the new jasper hanging approximately 20'. Operations in this location were retarded by the wet conditions which were present in this particular area.

In December, Contract No. 3 completed one slice to the northeast of Raise #6332, and thereafter started a second to the East.

Previous to the first mining in the No. 3 area, it was decided to put a raise up from the footwall drift which could be used to open up by drifting several other raises. As a result, Raise #6305 was extended to the 900' sub level by Contract No. 1. The contact between the arkose and ore was located at the point where the raise was cut out and a connecting drift was

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7. UNDERGROUND (cont.)

6. Stoping (Cont.)

driven between Raises #6305 and #6331. In August, Contract No. 1 started mining operations by drifting to the southwest along the footwall. A decided flattening of the arkose footwall was found when several slices were stopped due to its intersection. A drift was then driven to the west and into the workings of Contract No. 3. This drift paralleled the arkose which had at this point come in approximately 50' from its position on the 910' sub. A small amount of mining then continued to the north, at which time the raise was temporarily abandoned.

885' Sub Level

Mining on this sub level was started in December, when Contract No. 5 completed the cutting of Raise #6341. The first drift was then directed to the northwest along the arkose footwall.

Contract No. 4 completed the cutting out of Raise #6305 in December. This cut out was entirely in the footwall and a short drift was extended approximately 25' west of the raise before the ore was located.

6th Level

No. 3 Shaft

Outside of a considerable amount of retimbering and clean up work on the main level, the only other new work was the driving of a crosscut to the east on the hanging wall drift near the north end of the No. 3 ore body. Contract No. 7 started this drift in October and it was completed to an old drift on the east side early in December. This drift and raise will be used in the mining of the area where Contract No. 6 is now located, and will allow operations to continue after the footwall raises which will be rendered useless as mining continues on the subsequent sub levels.

In December, Contract No. 7 started Raise #6351 on the south side of the new crosscut.

7th Level

The opening of the 7th Level to mining was delayed until late in 1942, as this level served as an emergency sump during the installation of the main 7th Level pump. General repairs and clean up work on the 7th Level were started in October, at which time numerous replacement sets were installed. The timber raise #721, which will be used for traveling and ventilation as well as the lowering of all timber and supplies, was repaired. Considerable work was required where this raise opens onto the 7th Level, the drift at this point being double width and timbered.



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7. UNDERGROUND (Cont.)

c. Stoping (Cont.)

In December, Contract No. 16 started a raise from the north cross cut, the raise being known as #7502 which will be extended into the Section 19 ore body or the north end of the No. 2 shaft ore body. Actual raising operations were started late in the month and by the end an advance had been made of 12' to an inclined height of 22' above the level.

According to information gained from the raises which were driven from the north drift, the ore body directly above extends below the 6th Level only 26' on Section 19. From here it apparently pitches to the south-east and thins out as the arkose footwall flattens. This condition will require considerable development in the near future to open much needed mining places. This development work will retard, somewhat, the progress of the main drift to No. 3 shaft. It will also mean a longer period in which all timber and materials must be lowered through the present traveling and ventilation raise.

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7. UNDERGROUND (CONT.)d. Timbering (Cont.)

Statement showing timber used for 1942

	<u>Lineal Feet</u>	<u>Avg. Price Per Foot</u>	<u>Amount 1942</u>	<u>Amount 1941</u>
6" to 8" Cribbing Timber	-	-		
8" to 10" Stull "	2,222	.1017	\$ 226.03	
10" to 12" " "	12,579	.1054	1,326.40	
12" to 14" " "	13,413	.1472	1,974.60	
Total Timber 1942	28,214	.1250	3,527.03	

Per 100 Feet

7' Lagging	209,905	.9085	1,907.19
9½' Poles	151,777	1.3708	2,080.69
Total 1942	361,682		3,987.88
Wire Fencing - Sq. Ft.	4,125	.0150	62.16
Grand Total - 1942			7,577.07

<u>Product - Tons</u>	83,918
Feet of Timber per Ton of Ore - Stull & Cribbing	.3362
Feet of Stull Timber only per ton of Ore	.3362
Feet of Lagging per ton of Ore	2.5013
Feet of Poles per ton of Ore	1.8086
Feet of Wire Fencing per ton of Ore	.0491
Feet of Lagging per Foot of Timber	7,4397
Feet of Poles per Foot of Timber	4.6706
Cost per ton for Timber	.0420
Cost per ton for Lagging	.0227
Cost per ton for Wire Fencing	.0074
Cost per ton for Poles	.0247
Cost per ton for All Timber	.0968
Equivalent of Stull Timber to Board Measure	80,139
Feet of Board Measure per Ton of Ore	.9549

	<u>Year 1942</u>	<u>Cost Per Ton</u>	<u>Amount</u>
Cost of Timber, Lagging, Poles, Fencing	1942	.0902	7,577.07

Mine did not operate in Year 1941

e. Drifting & Raising

There was only a small amount of drifting and raising during the latter months of 1942. The following table lists the development footage:

	<u>Drifting</u>		<u>Raising</u>		<u>Total</u>
	<u>Ore</u>	<u>Rock</u>	<u>Ore</u>	<u>Rock</u>	
1942	312	136	46	101	595

The major part of the development footage was done in the stoping area of No. 2 shaft.

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7. UNDERGROUND (CONT.)

f. Explosives, Drilling and Blasting (Cont.)

Explosive statement - Year 1942 - Stopping & Ore Development

<u>Kind</u>	<u>Quantity</u> <u>Lbs.</u>	<u>Average</u> <u>Price</u>	<u>Amount</u> <u>1942</u>	<u>Amount</u> <u>1941</u>
1 1/2" Gelex Powder #1	1,800	.1150	207.00	
1 1/8" Gelex Powder #2	30,247	.1183	3,578.86	
Total Lbs. 1942	32,047	.1181	3,785.86	
Fuse - M. Feet	80,036	5.316	425.54	
#6 Blasing Caps	16,428	12.20	200.42	
Powder Bags	27	2.56	69.30	
Tamping Bags	--	--	--	
Fuse Lighters	3,500	6.75	23.63	
Master Fuse Lighters	1,200	27.00	32.40	
Miscellaneous			54.58	
Total Fuse Caps, Etc.			805.87	
Total All Explosives			4,591.73	
Product, Tons			83,918	
Pounds Powder per ton of Ore			.3818	
Cost per ton for Powder			.0451	
Cost per ton for Fuse Caps, etc.			.0096	
Cost per ton for all Explosives			.0547	
<u>Rock Development &amp; Filling</u>				
1 1/4 " Gelex Powder #1	--	--	--	
1 1/8" Gelex Powder #2	203	.1147	23.29	
Total Powder 1942	203	.1147	23.29	
Fuse - Feet	2,520	5.151	12.98	
#6 Blasting Caps	360	12.19	4.39	
Total Fuse, Caps, etc.			17.37	
Total All Explosives			40.66	
Grand Total Explosives used at Mine			4,632.39	

Mine did not operate in Year 1941



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7. UNDERGROUND (Cont.)

i. Ventilation

During the year 1942, it was necessary to depend on the natural ventilation created by the difference in the elevations of No. 1, No. 2 and No. 3 shafts. For the most part, the general ventilation stream was from No. 3 shaft, which is 6' lower, as far as the collars are concerned. With the present steel casing, this actually amounts to 42'. During the winter months, it was necessary to close off a large part of the ventilation to prevent No. 3 shaft from freezing. The downcast air from No. 1 shaft, while not large, was sufficient to ventilate that portion of the mine during mining operations. However this source is only temporary due to the proximity of mining near the shaft. It is expected that in the early part of the coming year a ventilating fan will be installed.

k. Pumping

When the pumping stopped in 1927, and the underground workings were permitted to fill, the mine was making about 300 gallons per minute. During the time the mine was flooded, the area immediately around #1 shaft site settled slightly. When the mine was unwatered, it was found that a small drainage creek which passes 150' to the north of #1 shaft, lost most of its water at that point and it was evident it found its way into the mine. A drainage launder had to be provided to divert the creek. This required a considerable sand cut in which to construct the launder.

Practically the only pumping now is at No. 2 shaft, the water from No. 1 being impounded on a 40' sub level above the bottom level and piped to the 7th Level, No. 2 by gravity.

The 7th Level Aldrich pump is now operating about six hours and fifteen minutes per day, making the pump average 225 gallons per minute. This pump operated for years at the Mackinaw Mine, having there a capacity of 1000 gallons per minute against a 1000' head. Here at the Princeton, a smaller motor has been installed and the speed reduced. It is now geared to handle slightly over 800 gallons per minute.

The reserve pump will be a centrifugal with a 500 gallon per minute capacity. This is the original Princeton reserve pump but will require complete re-building before being permanently installed.

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8. COST OF OPERATING

a. Mining Costs

	<u>1942</u>
Product	83,919
Underground Costs	1.456
Surface Costs	.208
General Mine Accounts	.324
Cost of Production	1.988
Depletion	1.014
Depreciation (Plant & Equipt.)	.029
Movable Equipment	.001
Taxes	.051
Amortization of Defense Project	<u>.304</u>
Total Depln. Deprn. Taxes	1.399
Loading and shipping	.116
Total Cost at Mine	3.503
Supply Inventory Adjustment	<u>.001</u>
TOTAL COST	3.504

b. Detailed Cost

	<u>1942</u>
Days per week	6
Shifts and hours	2 - 8 hr.
Production, Tons	83,919
Average Daily Production	548
Number of Days Worked	153

<u>UNDERGROUND COSTS</u>	<u>Amount</u>	<u>Per Ton</u>
Exploring in Mine	1,603.54	.019
Development in Rock	1,280.94	.015
Development in Ore	696.61	.008
Stoping	53,575.31	.638
Timbering	13,705.54	.163
Tramming	27,182.89	.325
Ventilation	193.92	.002
Pumping	2,641.02	.031
Compressors & Air Pipes	6,841.28	.082
Underground Superintendence	3,069.30	.037
Maintenance - Comp. & Power drill	1,074.96	.015
" Scrapers & loaders	5,170.14	.062
" Elec. Tram equipment	3,325.19	.039
" Pumping machinery	<u>1,830.01</u>	<u>.022</u>
Total Underground Costs	122,190.85	1.456

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8. COST OF  
OPERATING (Cont.)

b. Detailed Cost (Cont.)

	<u>Amount</u>	<u>Per Ton</u>
<u>SURFACE COSTS</u>		
Hoisting	5,806.07	.069
Stocking ore	2,918.15	.035
Dry House	2,120.89	.025
General Surface Expense	4,406.36	.052
Maintenance:		
Hoisting Equipment	877.97	.011
Shaft	54.37	.001
Top Tram Equipment	460.29	.006
Mine Buildings	804.30	.009
Total Surface Costs	17,448.40	.208
<u>GENERAL MINE EXPENSE</u>		
Mining Engineering	1,516.67	.018
Mech. & Elec. Engineering	546.83	.006
Analysis & Grading	4,374.39	.052
Safety Department	363.96	.003
Telephones & Safety Devices	2,190.14	.026
Local & Gen'l Welfare	602.82	.007
Special Expense	1,290.11	.015
Shipping Office	2,760.72	.033
Mine Office	5,935.86	.071
Insurance	470.96	.006
Personal Injury	2,266.31	.027
Social Security Taxes	2,711.16	.032
Employees Vacation Pay	2,317.18	.028
Total Gen. Mine Expense	27,247.09	.324
Cost of Production	166,886.34	1.988
<u>DEPLETION, DEPRECIATION, TAXES</u>		
Depletion, Original Cost	85,101.00	1.014
Depreciation-Plant & Equipt.	2,382.83	.029
Movable "	107.73	.001
Taxes	4,308.59	.051
Amortization Defense Project	25,473.98	.304
Total Depln, Deprn. Taxes	117,374.13	1.399
<u>LOADING &amp; SHIPPING</u>		
Shovel 76,224 tons	4,955.25	
At Pocket 46,970 "	3,867.42	
Crusher 1,378 "	168.32	
Shipping Expense	699.41	
Total Loading & Shipping	9,690.40	.116
TOTAL COST AT MINE	293,950.87	3.503
Supply inventory Adjustment	79.71	.001
TOTAL COST	294,030.58	3.504



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8. COST OF OPERATING (Cont.)

b. Detailed Cost (Cont.)

	<u>Amount</u>	<u>1942</u>	<u>Per Ton</u>
Royalty			.031
Rail Freight			.890
Lake Freight			.740
Cargo Ins. & Analysis			.010
Shrinkage			.044
Total Cost Lower Lake Ports			5.219
 <u>Analysis of Supplies</u>			
General Supplies			.071
Iron and Steel			.013
Oil and Grease			.007
Machinery Supplies			.027
Explosives			.053
Lumber & Timber			.093
Fuel			.013
Electric Power			.140
Sundries			.064
Other Mine Accounts			.021
Total			.460
Miscellaneous			1.184
Total			1.644

There is no cost comparison as the mine was idle in 1941.

9. EXPLORATIONS AND  
FUTURE EXPLORATIONS

The only exploratory work during the year was to the north of No. 1 shaft on the 875' sub level. Most of the merchantable ore in the neighborhood of this shaft was mined before the mine closed down in 1921. There were a few pillars of merchantable ore mined during the year but little ore remains.

The pillars are spotty, i.e., contains some clean ore but mixed with cherty bunches.

A drill using Bort bits was installed in October and flat holes drilled in a promising location. No merchantable ore was found. The log of the drills follows:

Hole #1 in the northwest winze on 875' sub level (old 7th Level)  
Location of Hole - N. 1265, W. 665 in SE corner, Sec. 18  
Dip - -2°  
Direction of Hole - S. 13° W.



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9. EXPLORATIONS AND  
FUTURE EXPLORATIONS (Cont.)

Depth of Hole - 130'  
Material - 0 - 10' mixed ore  
          10' - 81' jasper and slate  
          81' - 130' mixed ore and jasper

Hole #2 from same location  
Dip - 0  
Direction of Hole - S. 35° W.  
Material - 0' - 7' lean ore  
          8' - 24' lean ore and jasper  
          hole stopped at depth of 24'.

Future exploratory work might be done by drilling in the area northwest of No. 3 shaft. From longitudinal sections there is a definite trend of the ore body to the northwest and it is only through diamond drilling at greater depth than has now been drilled that the extension may be found.

10. TAXES

	<u>1942</u>		<u>1941</u>	
	<u>Valuation</u>	<u>Taxes</u>	<u>Valuation</u>	<u>Taxes</u>
NE $\frac{1}{4}$ of NE $\frac{1}{4}$ , Sec. 19,45-25	10,000	207.71	10,000	210.96
158.27 A. in Sec. 18,45-25	15,000	311.56	15,000	316.45
160.00 A. NW $\frac{1}{4}$ of Sec. 20-45-25	205,000	4,257.95	100,000	2,109.65
NW $\frac{1}{4}$ of NE $\frac{1}{4}$ , Sec. 19,45-25	420	8.72	420	8.86
S $\frac{1}{2}$ of NE $\frac{1}{4}$ of Sec. 19,45-25	840	17.44	840	17.72
Personal Property	130,000	2,700.17	115,000	2,426.50
Total	361,260	7,503.55	241,260	5,090.14
Fees		75.04		50.90
TOTAL TAXES		7,578.59		5,141.04

12. REOPENING PRINCETON MINE - E&A NO. CC-91

The Estimate of Reopening was prepared in the fall of 1941. In arriving at the figures, the best available data was used. All mechanical and electrical items were referred to these departments of our Company and their recommendation as to cost was used. The large over-expenditure was largely due to conditions over which the Company had no control. A detailed comparison of the estimated and actual expenditure follows:

1. Unwatering - Estimate \$6,000, Total to Dec. 31, 1942, \$47,272.77, Over-expended \$41,272.77.

When the Princeton Mine closed down in 1926 the pumps were handling about 300 gallons per minute. All of the water was pumped directly to surface from the 7th Level #2 pump house. The pumping equipment was one 500 gallon electrically driven vertical Aldrich plunger pump; and a 500 gallon Allis-Chalmers centrifugal pump, both designed for a 500 ft. head. At the time of flooding the mine, the centrifugal was taken

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12. REOPENING PRINCETON MINE (Cont.)

to surface but the Aldrich, after removing the motor and other perishable attachments, was permitted to remain in the pump room.

The unwatering started October 18, 1941 at an open pit east of No. 1 shaft, and by December 24, the water was lowered 25'. At that time a 2,000 gallon centrifugal was installed at No. 3 shaft. Good progress was made and by April 1st, the 6th Level was reached, which is the bottom of No. 3 shaft. During April the pumping started at #2 shaft and by the end of the month the 7th Level was reached.

When the estimate was made, it was expected the old pumping plant could be put into commission within a month or so after the unwatering reached the 7th Level pump room. It was found, however, that the acid in the water had destroyed the frame of the Aldrich pump, making it necessary to tear it down and remove it from the mine. To replace it, a 1000 gallon Aldrich formerly used at the Mackinaw was commandeered. This is a larger pump and required a remodelling of the pump room and new foundations. The work of installation consumed practically four months, so that it was not until September that the Aldrich took on the regular pumping program. During this time one pump on the 7th, pumped to the 5th and the water was there relayed to the surface.

Since the Aldrich has been in commission, the former reserve pump, the 500 gallon 500' head Allis Chalmers, has been installed. All kinds of trouble has been had with this pump and by the end of the year, the trouble had not been found.

During the unwatering of the shafts, i.e., to May 1st, and particularly since then to the end of the year, a large force has been required that had to be charged to pumping. From the time the mine went on an operating basis, i.e., July, a monthly charge has been made against operating, equivalent to the monthly pumping cost at the time the mine was flooded. The tremendous over-expenditure is practically wholly chargeable to the discarding of old pump and pipes and the delay in getting on a regular schedule.

Charged against "unwatering" is the cost of diverting a small creek north of No. 1 shaft to prevent its water from seeping through the cracked ledge to the underground workings.

BUILDINGS

2. Shaft House from Gardner Mine - to move and set up. Estimate \$14,000  
Total Expenditure \$23,380.27, over-expended \$9,380.27.

The steel headframe at the Gardner was designed for a standard Cleveland-Cliffs shaft, i.e., 10'10" x 14'10" inside dimension. The shaft being divided into a pipe and ladder compartment, a cage way and two skip compartments. The Princeton #2 shaft has only three compartments, originally



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12. REOPENING PRINCETON MINE (Cont.)

they were one skip, one cage and the third for pipes and ladders. The cage compartment was very small, so it was decided to have two skips and one ladder compartment at #2. In order to use the Gardner headframe, the structure had to be revamped to meet the new layout.

The Mechanical Department estimated the Gardner headframe could be dismantled and erected at the Princeton No. 2 shaft site for \$14,000. The foundation piers were provided by the Company and a contract was let to dismantle and re-erect at Princeton. The work was started in November, 1941 and completed in March, 1942. This contract did not cover the remodeling. The latter was extremely slow and expensive and was not completed until summer. Since the mine started operating, the ferro-board covering was removed from the Mackinaw headframe and installed here. This item was not included in the original estimate.

The increased cost of remodeling and covering with ferro-board are the principal reasons for the over-expenditure.

3. Wooden Head Frame No. 3 Shaft. Estimated \$1,500, Total cost \$6,717.70, Over-expenditure \$5,217.00.

The original wooden headframe at No. 3 shaft was blasted down several years ago when the collar of the shaft caved during the period the mine was flooded. This shaft was used wholly for lowering timber, as the cage way at No. 2 was too small. The cage was operated by a small hoist and counterweight. A new headframe was built for this timber shaft. After the E&A had been prepared, it was decided that No. 3 shaft should be used for the men to enter and leave the mine. It was necessary, therefore, to provide a change house at this location and the old boiler house of the Central Power Plant was utilized for this purpose. It was then found the hoist was not large enough to handle the larger, heavier man cage. Rather than install a larger hoist in the small engine house 100' east of No. 3 shaft, it was decided to use the compressor and steam turbine room at the Central Power plant for the mine engine room. This meant adding to the height of the headframe, installing new braces to permit the pull from an entirely different direction than originally planned. The timber used was nearly double the amount in the original design. The whole structure was more heavily braced and the lower portion enclosed as a protection to the men. These additions and extra piers account for the increased cost.

4. Change House & Compressor House, Remodeling Central Plant, Estimate \$13,500, Expenditure \$22,782.13, Over-expended \$9,372.13.

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12. REOPENING PRINCETON MINE (Cont.)

The old boiler house of the central power plant was converted into a change house for the Princeton Mine. This is located about 100 yards from No. 3 shaft and is a brick building. Before the change could be made, the old boilers and the boiler settings had to be ripped out and the floor torn up. A contract was placed to remodel the building. Contracts were also given for piping and plumbing. The vertical height of the interior of the boiler house was much too high for a dry, so a false ceiling was put in about 18' from the floor. The installation was carried through and an up to date change house is the result. Adjoining the boiler house was a room which originally housed the steam driven air compressor and steam turbine of the Central Power plant. When it was decided to use the No. 3 shaft as the man-way for the men entering the mine, it was decided to install the electric compressor in this old compressor room, which had to be remodeled. Whatever equipment was in there had to be torn out and the floor rebuilt. The cost was much higher than the estimate and accounts for the large overrun in expenditure.

5. Shops - Reopening District Shop. Estimate \$3,500, Expenditure \$1,325.05, Unexpended \$2,174.95.

The shops were designed originally for the Gwinn District, when four or five mines were operating. They are centrally located near the engine house and dry. The machine shop proper of the old shops was not remodeled but is used for storing equipment. The carpenter shop has a bench, small drill press, and some mechanical equipment such as is used in a combination machine and carpenter shop. The blacksmith shop is the original lay-out for the Central shops. The installation was much less than anticipated and there is an unexpended balance of \$2,174.95.

6. Office - Reopening Mine Office. Estimate \$1,000, Expended \$960.79, Unexpended \$39.29.

Central Plant Buildings, No estimate. Expended \$9,453.40.

The book value of these buildings was transferred from The Cleveland-Cliffs Iron Company Central Power Plant buildings to the Princeton Mine.

7. Stocking Trestles and Grounds. 400' of permanent trestle. Estimate \$8,000, Expended \$15,219.58, Overexpended \$7,219.58.

When the Mine reopened, the stockpiles both to the north and southeast of No. 2 shaft were intact. It was expected that during the summer these would be completely shipped. However, as the season advanced, and they had not been removed, it was necessary to extend our permanent trestles considerably farther than originally estimated. As a result, the expenditure was almost doubled.

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12. REOPENING PRINCETON MINE (Cont.)

500' of Temporary Trestle. Estimate \$5,000, Expended \$7,726.65,  
Over-expended \$2,726.65.

The same comments made with reference to the permanent trestle would be applicable to the temporary trestle. From the fact that all of the ore was not shipped, it was necessary to prepare an entirely new stocking ground to the east of the old stocking ground and extend the temporary trestles into this area. This added 50' to the length of the temporary trestles and explains the over-expenditure.

Grading Surface with Rock, Estimate \$2,000, Expenditure \$6,091.80,  
Over-expended \$4,091.80.

The original estimate called for surfacing part of the old stocking grounds. When it was found these would not be available, a new area was prepared to the southeast of the shaft, and work done under a contract, which explains the large over-expenditure.

EQUIPMENT - SURFACE

8. Hoist - No. 3 Shaft. Estimate \$1,500, Expended \$5,314.27, Over-expended \$3,814.27.

The original estimate called for the revamping of the hoist at No. 3 shaft. However, when it was decided to use No. 3 shaft for the man cage hoist, it was found the small hoist at this shaft was not large enough to handle the cage. In the meantime, the electrical work, which had been robbed years ago, had been re-installed. To install a large hoist in the Central Power Plant engine room, the old Stephenson cage hoist, which had been out of commission for years, was reassembled and erected in this building at considerable expense, as shown by the large over-expenditure of \$3,814.27.

9. Compressor from Mackinaw. Estimate \$1,500, Expended \$4,127.76,  
Over-expended \$2,127.76.

At the time the Mackinaw closed down, the compressor was taken apart and sent to the Ishpeming Storehouse. It was brought back to the Central Power Plant for installation. There were no unusual expenditures in connection with this except to purchase a new main drive shaft and build new foundations.

10. Motor Generator Set from Cliffs Shaft. Estimate \$500.00, Expenditure \$1,143.46, Over-expended \$633.46.

When dewatering the mine was completed and mining actually started, a motor generator set purchased from the Mesaba Range, was installed. This



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12. REOPENING PRINCETON MINE (Cont.)

was a good set but of insufficient capacity. When this became evident, it was necessary to bring in the Cliffs Shaft set originally planned. The installation of the two is the reason for the over-expenditure.

11. Heating Plant

No estimate was made for a heating plant at No. 2 as it was expected the plant at the change house at No. 3 would fill all the requirements. However, when cold weather started, it was found it was necessary to have steam to use in the dumps at the shaft house. A heating plant operated by a stoker was installed at a cost of \$1,550.02.

12. Skips from Mackinaw. Estimate \$500, Expenditure \$2,460.11, Over-expended \$1,960.11.

The skips from the Mackinaw were standard skips such as are used at practically all of the Cleveland-Cliffs mines, they were rectangular in section and it was necessary to put in a hemispherical bottom and curved sides in order to make the ore run out properly. They were taken to the shops at Ishpeming and rebuilt, also a man cage for No. 3 shaft. This extra work made the over-expenditure.

13. Top Tram Plant from Mackinaw. Estimate \$600.00, Expenditure \$4,864.86, Over-Expended \$4,264.86.

There are two top tram plants installed at the Princeton. One was the original Princeton plant, which had to be overhauled and relocated. The other, the Gardner Mackinaw plant, which had to be assembled and erected at the Princeton. This latter plant had been robbed so that the cost to rebuild was out of line with the estimate. There was also charged here the new transfer room for the plants, the control room on the top landing, also the ropes, sheaves, spools and "take up" devices.

14. Top Tram Cars from Mackinaw. Estimate \$1,000, Expenditure \$2,426.27, Over-expended \$1,426.27.

When the Mackinaw cars were brought to the Princeton for use, it was found they were not in satisfactory shape for installation. They were sent to the Ishpeming shops for complete overhauling and partial remodeling, which accounts for the over-expenditure.

15.  $1\frac{1}{2}$  Ton Platform Truck. Estimate \$1,500, Unexpended balance \$1,500.

A new platform truck was not purchased, as the district was equipped with an old GMC three ton truck which was holding up and which was answering the purpose. However, the mine will need a small tractor, and when one is available, it should be purchased in place of the  $1\frac{1}{2}$  ton truck.

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12. REOPENING PRINCETON MINE (Cont.)

16. 4 U.G.Locomotives, Estimate \$10,000, Expenditure \$14,500.18,  
Over-Expended \$4,500.18.

The mine is now equipped with five underground locomotives, whereas it was originally estimated only four would be necessary. When the mine was unwatered, one of the locomotive frames which had been left underground was found to be absolutely wrecked on account of the sulphur in the water, which meant the purchase of an additional locomotive, which accounts in a large measure for the increased expenditure. It was further thought when the estimate was made, some of the equipment which had been at the Mackinaw, and which was in use in company mines in Ishpeming and Negaunee, would be returned to Princeton. However, no new equipment could be purchased for the Ishpeming and Negaunee district mines, and therefore it was necessary to buy and rebuild three locomotives, one Goodman and Two Jeffery were purchased.

17. 24 Rocker dump cars. Estimate \$15,000, Expenditure \$6,832.15.  
Unexpended \$8,167.85.

Shortly before the mine closed down, it was equipped with twenty-four two ton cars to be used in a rotary dump. These were left underground when the mine was flooded. When the mine was unwatered, it was found these cars and the rotary dumps were ruined. Cars of three ton capacity had to be installed. Old Gardner Mackinaw rocker dump cars and Mesaba Range cars were patched up and put into use. These were not particularly satisfactory but have been used on the 6th Level since the mine reopened. It was necessary to purchase 10 new, 53 cu. ft. capacity cars for the 7th Level at a price of \$700.00 each. They are the rocker dump design used by the company in the Negaunee District. The cost of these cars has not yet been charged against the E&A. However, the estimate will not be overrun.

18. Power & Signal Cables. Estimate \$3,000, Expenditure \$2,648.56.  
Unexpended \$353.44.

This needs no explanation.

19. 15 Timber Trucks. Estimate \$1,500, Expenditure \$1,205.29, Unexpended \$294.08.

This needs no explanation.

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12. REOPENING PRINCETON MINE (Cont.)

20. 24 Drill Machines. Estimate \$6,800, Expenditure \$5,579.00, Unexpended \$1,221.00.

All of the machines estimated have not been purchased.

21. Drill Steel and Tools. Estimate \$2,000, Expenditure \$492.49, Unexpended \$1,507.51.

Less drill steel and tools required than anticipated.

22. Trolley Lines. Estimate \$1,000, Expenditure \$2,632.68, Over-Expended \$1,632.68.

When the mine reopened, all of the trolley lines were down. They were an old type wire and did not have capacity enough for the pumps and scraper hoists we were using. The Electrical Department decided it was necessary to place new lines on the 6th and 7th Levels. This work has been completed at the above over-expenditure.

23. U. G. Tracks. Estimate \$500.00, Expenditure \$20,767.45. Over-Expended \$20,267.45.

At the time of the estimate, it was expected we would find the tracks in good shape, as they were apparently in first class condition at the time the mine was flooded. However, due to the sulphur in the water, the tracks were completely destroyed. The whole system, all of the tracks in the mine including frogs and switches, had to be replaced. The cost was considerably more than putting in new tracks from the fact the old ones first had to be removed, new ties installed, etc. This explains the increase.

24. 20 Scraper Hoists. Estimate \$30,000, Expenditure \$31,916.17. Over-Expended \$1,916.17.

This over-expenditure is due to supplies and installation of the scraper hoists, the original cost being slightly more than anticipated when the estimate was made.

25. Timber Hoists - 12, Estimate \$6,000, Expenditure \$5,836.19, Unexpended \$163.81.

The unexpended balance is due to the hoists not being as expensive as estimated.

26. Air Lines. Estimate \$500.00, Expenditure \$13,225.06, Over-expended \$12,725.06.

Here, as with the underground tracks, practically all piping in the mine had to be re-installed due to the action of the sulphur water, hence the very large expenditure which was not anticipated.



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12. REOPENING PRINCETON MINE (Cont.)

REOPENING

27. Shaft Repairs, No. 2 and No. 3. Estimate \$3,000, Expended \$23,536.80, Over-expended \$20,536.80.

When the estimate was made up, it was expected to find the shafts in good repair, as they were when flooded. However, there was some settling, requiring much retimbering, replanking, etc. This was slow, expensive work, and accounts for the very large over-expenditure.

28. Plats, chutes, sub-drifts. Estimate \$20,000, Expended \$24,360.63, Over-expended \$4,460.63.

The principal expenditure here was at the 6th and 7th Level plats, where new chutes had to be installed for the north skip. This was slow, expensive work and required much more time than anticipated. Both 5th and 6th Level plats required considerable retimbering.

29. Repairing Main Level Drifts. Estimate \$8,000, Expenditure \$43,815.60, Over-expended \$35,815.60.

Here, as in the shafts, it was expected when the mine was unwatered the drifts would be in good shape due to the fact they were flooded and there would be no rotting of the timber. However, this was not the case. We found practically all of the drifts required a great deal of retimbering, in places covering several hundred feet, all of the sets had to be reinstalled. The Arkose foot rock at the Princeton sloughs off like poor cement, leaving large boulders, which make up the body of the rock, without any support. This means all arkose drifts have to be timbered.

30. Sinking No. 2 shaft 70' and 30' Drifting. Estimate \$6,100. Unexpended balance \$6,100.

No work has been done covered by this estimate.

GENERAL EXPENSE

Nos. 31 to 37 inclusive. Nothing estimated. Expenditure \$23,691.23. Over-expended \$23,691.23.

When the E&A was made up, no estimate was made for the items of general expense.

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18. NATIONALITY REPORT

<u>As to Parentage</u>	<u>Number of Men</u>	<u>Percent of Total</u>
Finnish	72	37½
Italian	34	18
French	24	12
Swedish	24	12
American	14	7
English	9	5
Norwegian	6	3
German	4	2
Austrian	2	1
Belgian	2	1
Irish	2	1
Scotch	1	½
	<u>194</u>	<u>100%</u>
	<u>American Born</u>	<u>Foreign Born</u>
Finnish	49	23
Italian	20	14
French	23	1
Swedish	19	5
American	14	
English	8	1
Norwegian	3	3
German	4	0
Austrian	1	1
Belgian	2	0
Irish	2	0
Scotch	1	0
	<u>146</u>	<u>48</u>
% American born to total		75
% Foreign born to total		25

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1. GENERAL

For the first time in five years the production at this property was decreased as compared with the previous year. Production of the two grades totaled 171,514 tons as compared with 175,179 in 1941. The five day per week schedule with two crews was continued until October 16th after which operations were increased to six day shifts and five night shifts per week.

The cost of production was increased considerably due to increases in the cost of materials and to more over-time payments during 1942. The total cost at the mine reflects this increase and in addition the amount for depreciation was more than double that for the previous year. Expenditures for ventilation were almost three times that for the previous year caused by several flare-ups in the underground SO<sub>2</sub> fires.

With the exception of a short lived attempt to develop a stope sub-level on the 6th Level elevation, and considerable amounts of ore which were recovered on and above this elevation by caving in the stopes, operations were confined to a few remaining areas above the 8th Level. Appreciable amounts of Virgil grade ore were mined in the central and south areas while the north area was largely confined to mining Hi-Sulphur grade. As usual, a very large portion of the production was obtained from the old caved stopes, the production from which was mixed with the high grade, newly mined ore. It would have been impossible to maintain the production schedule without the addition of this material.

Ventilation was a major problem throughout the latter months of the year and occasioned the only delays of any importance. Two and one-half shifts were lost in the latter part of October and thirteen shifts during December while surface crews repaired ventilating equipment and underground helmet crews erected brattices. All of the ventilation trouble originated with the caving to the 6th Level drift of an old small stope above the 8th Level. This cave eventually made a connection with one of the old stopes above the 6th Level which immediately resumed burning and flooded the mine with SO<sub>2</sub> fumes. At the end of the year the continued operation of the property was still in doubt.

2. PRODUCTION, SHIPMENTS  
& INVENTORIES

a. Production by Grades

	<u>1942</u>	<u>1941</u>
Virgil	112,690	173,868
Virgil High Sulphur	<u>58,824</u>	<u>1,311</u>
Total	171,514	175,179

For the first time during the life of this property Hi-Sulphur ore was deliberately developed and mined. Without this grade, production would have fallen off sharply due to an insufficient number of mining areas.



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2. PRODUCTION, SHIPMENTS  
& INVENTORIES (Cont.)

B. Shipments

<u>Grade</u>	<u>Pocket</u>	<u>Stockpile</u>	<u>Total</u>	<u>Total Last Year</u>
Virgil	50,332	108,258	158,590	275,562
Virgil High Sulphur	11,140	23,740	34,880	0
Total	61,472	131,998	193,470	275,562
Total Last Year	106,667	168,895	275,562	
Decrease	45,195	36,897	82,092	

Shipments during 1942 were some 82,000 tons less than for the previous year. For the first time in the history of the property, shipments of the Hi-Sulphur grade were made in appreciable amounts.

c. Stockpile Inventories

<u>Grade</u>	<u>Tons</u>
Virgil	17,749
Virgil High Sulphur	30,153
Total	47,902

This figure compares with 42,090 tons at the end of 1941, the bulk of which was Virgil grade ore.

d. Division of Product by Levels

With the exception of an undetermined amount of lean caved material from the 6th Level elevation and above, there was no production above that level. All of the ore produced was trammed on the 8th Level and any estimate of the amount of caved ore from above the 6th would be a useless guess. Due to renewed ventilation difficulties there is little possibility of any future attempt being made to mine the very small amount of Virgil grade ore above that level.



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2. PRODUCTION  
SHIPMENTS &  
INVENTORIES (Cont.)

e. Production by Months

<u>Month</u>	<u>Shifts</u>	<u>Days</u>	<u>Virgil Ore</u>	<u>Hi-Sul. Ore</u>	<u>Total Ore</u>	<u>Tons Per Day Ore</u>	<u>Tons Per Man Per Day</u>	<u>Rock</u>
January	2-8 Hr.	22	14,136	593	14,729	669	8.20	-
February	2-8 Hr.	20	12,416	1,021	13,437	672	7.99	12
March	2-8 Hr.	22	7,650	6,127	13,777	626	7.68	128
April	2-8 Hr.	22	12,114	3,795	15,909	723	8.79	-
May	2-8 Hr.	21	11,245	2,816	14,061	669	8.22	16
June	2-8 Hr.	22	4,426	9,564	13,990	636	7.52	-
July	2-8 Hr.	23	7,118	7,778	14,896	648	8.02	28
August	2-8 Hr.	21	2,250	12,374	14,624	696	8.74	56
September	2-8 Hr.	22	4,486	8,335	12,821	583	7.00	304
October	2-8 Hr.	23	11,437	5,377	16,814	731	9.30	12
November	2-8 Hr.	22	14,859	819	15,678	713	8.50	-
December	2-8 Hr.	17½	10,553	225	10,778	616	5.68	-
Total	2-8 Hr.	257½	112,690	58,824	171,514	665	7.97	556
Prior Yr. Stockpile								
Overrun			27,768		27,768			
			140,458		199,282			

f. Ore Statement

	<u>Virgil</u>	<u>Virgil Hi-Sulphur</u>	<u>Total</u>	<u>Total Last Year</u>
On Hand Jan. 1, 1942	35,881	6,209	42,090	142,473
Output for Year	112,690	58,824	171,514	175,179
Overruns	27,768		27,768	
Total	176,339	65,033	241,372	317,652
Shipments	158,590	34,880	193,470	275,562
Balance on Hand	17,749	30,153	47,902	42,090

The operating schedule follows:

- 1938 - 2-8 Hr. Shifts 4 days per week Jan. 1 to April 16  
 2-8 Hr. Shifts 3 days per week Apr. 16 to June 1  
 1-8 Hr. Shifts (2 crews alternating) 4 days per week June 1 to Oct. 31  
 1-8 Hr. Shifts (2 crews alternating) 5½ days per week Oct. 31 to Dec. 31
- 1939 - 1-8 Hr. Shift (2 crews alternating) 5½ days per week Jan. 1 to Jan. 9  
 2-8 Hr. Shifts 4 days per week Jan. 9 to June 12  
 1-8 Hr. Shift (2 crews alternating) 5½ days per week June 12 to Nov. 1  
 2-8 Hr. Shifts 4 days per week Nov. 1 to Dec. 31
- 1940 - 2-8 Hr. Shifts 4 days per week Jan. 1 to Nov. 15 inclusive  
 2-8 Hr. Shifts 5 days per week Nov. 16 to Dec. 31 inclusive
- 1941 - 2-8 Hr. Shifts 5 days per week Jan. 1 to Dec. 31 inclusive
- 1942 - 2-8 Hr. Shifts 5 days per week Jan. 1 to Oct. 16 inclusive  
 2-8 Hr. Shifts 5½ days per week Oct. 17 to Dec. 31 inclusive

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2. PRODUCTION, SHIPMENTS  
& INVENTORIES (Cont.)

g. Delays

With the exception of two minor delays, neither of which caused any loss of production, all of the 1942 lost-time was chargeable to ventilation difficulties. One delay of 8 hours on April 7, was caused by a temporary breakdown of the main hoist. The time lost during the repairs was made up on the following Saturday. The second slight delay occurred on August 17th and lasted two hours while the bell signals were being repaired.

The delays due to ventilation difficulties were quite extensive and caused considerable loss of production. Two and one-half shifts were lost on October 26th and 27th and the mine was idle for thirteen shifts during the early part of December.

3. ANALYSIS

a. Average Mine Analysis on Output

The output analysis for the year 1942 was somewhat better than the previous year in the case of the Virgil grade, although along with an increase in the iron content, there was also an increase in the silica and sulphur. The Hi-Sulphur grade of 56.61 dried iron was only slightly better than the recommended guarantee of 56.50. The sulphur was slightly lower than the guarantee, being .224 as compared with .300.

<u>Grade</u>	<u>Tons</u>	<u>Iron</u>	<u>Phos.</u>	<u>Silica</u>	<u>Sulphur</u>
Virgil	112,690	57.80	.382	6.71	.078
Virgil Hi-Sulphur	58,824	56.61	.358	7.17	.224

b. Analysis of Ore in Stock Dec. 31, 1942

	<u>Iron</u>	<u>Phos.</u>	<u>Sil.</u>	<u>Mang.</u>	<u>Alum.</u>	<u>Lime</u>	<u>Mag.</u>	<u>Sul.</u>	<u>Loss</u>	<u>Moist.</u>
Virgil Dried	57.46	.418	6.44	.19	1.84	.58	.26	.076	6.86	
Virgil Nat.	52.018	.378	5.83	.172	1.666	.525	.235	.069	6.21	9.47
Hi-Sulphur Dried	56.35	.388	7.30	.19	1.84	.60	.21	.228	7.15	
Hi-Sulphur Nat.	50.636	.349	6.56	.171	1.653	.539	.189	.205	6.425	10.04



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3. ANALYSIS (Cont.)

c. Composite Analysis of Shipments

The average analyses of the 1942 shipments were somewhat different than those of the previous year. The iron content was somewhat lower and the phosphorous, silica, and sulphur were considerably higher. There were no shipments of Hi-Sulphur ore during 1941.

	<u>Iron</u>	<u>Phos.</u>	<u>Sil.</u>	<u>Mang.</u>	<u>Alum.</u>	<u>Lime</u>	<u>Mag.</u>	<u>Sul.</u>	<u>Loss</u>
Virgil	57.65	.406	6.45	.20	1.85	.56	.15	.082	7.18
Virgil Hi-Sulphur	57.40	.337	7.15	.17	1.94	.80	.20	.288	6.26

There were no straight cargo shipments of either grade during 1942.

d. High Sulphur Ore

Contrary to previous practice, a large amount of development work and mining was done in Hi-Sulphur ore. The decision to mine this grade was reached after carefully considering the future of the property. It was decided to mine such quantities of Hi-Sulphur ore as were readily available and easily mined rather than abandon the mine with this material in it. There was no immediate prospect of shipping this material and the decision was made in the hope that this ore could eventually be sold in mixed cargoes. The total production of this grade was 58,824 tons, without which the production for the year would have been much smaller and the mine practically depleted. As nearly as can be determined at the present time, the bulk of the 1943 operation will be in ore of that grade.

4. ESTIMATE OF ORE RESERVES

a. Developed Ore

Estimate made Nov. 30, 1942 using a factor of 12 cu. ft. per ton.

<u>Available Virgil Grade</u>	<u>Southwest Orebody</u>	<u>Middle Deposit</u>	<u>Northwest Orebody</u>	<u>Total Tons</u>
Between 6th & 8th Levels	16,065	30,583	2,017	48,665
Gross Estimate				48,665
Less 10% Loss in Mining				4,866
Sub Total				43,799
Less 10% for Rock				4,380
Net Total, Nov. 30, 1942				39,419
Less December Production				10,553
Total Developed Ore Dec. 31, 1942				28,866

The estimated reserves of Virgil grade as of Dec. 31, 1942 are 28,866 tons as compared with 119,641 tons the year previous. This is a decrease of 90,775 tons as compared with 112,690 tons produced. The difference of practically 22,000 tons represents a portion of the caved material recovered from old stopes. There was no estimate of available ore above the 6th Level this year as compared with 40,000 tons last year.

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4. ESTIMATE OF ORE RESERVES (Cont.)

a. Developed Ore (Cont.)

There was no estimate made of the Hi-Sulphur ore reserves since the production of this grade depends entirely on the prospect for shipping it and to our ability to mine successfully under old caved stopes.

b. Estimated Ore Reserve Analysis

<u>Virgil Grade</u>	<u>Iron</u>	<u>Phos.</u>	<u>Sil.</u>	<u>Mang.</u>	<u>Alum.</u>	<u>Lime</u>	<u>Mag.</u>	<u>Sul.</u>	<u>Loss</u>	<u>Moist</u>
Dried	56.50	.425	8.50	.17	1.83	.61	.17	.089	7.20	
Natural	50.85	.382	7.65	.15	1.65	.55	.15	.080	6.60	10.00

The following is the estimate of analysis of both grades to be produced during the coming year.

	<u>Iron</u>	<u>Sul.</u>	<u>Phos.</u>	<u>Sil.</u>	<u>Mang.</u>	<u>Loss</u>	<u>Moist</u>
Virgil Dried	56.50	.079	.380	8.50	.17	7.50	
Virgil Nat.	50.85	.071	.342	7.65	.15	6.75	10.00
Hi-Sulphur Dried	56.50	.300	.380	8.50	.17	7.50	
Hi-Sulphur Nat.	50.85	.270	.342	7.65	.15	6.75	10.00

In the tables the estimated analyses of reserves and production are based on mixing low grade caved material in the old stopes with higher grade newly mined ore obtained from the operating areas. The total recovery from the property over the course of the next year depends entirely on the success with which this mixing can be accomplished. If production were limited to actual mining the volume would decrease to approximately one-half and the total recovery, up to the end of the mine, would probably be less than half of what can ultimately be obtained by proper mixing.

5. LABOR & WAGES

a. General

The number of employees was gradually increased from 75 to 82 by the end of the year although the number varied constantly during the year. Working schedule was increased from five to five and one-half days per week with two crews.

A number of replacements were necessary due to employees being inducted and leaving for other jobs. By the end of the year the supply of both skilled and unskilled labor was practically exhausted due to increased activity throughout the district.

Organization of the employees by the C.I.O. was effected early in the year and formal recognition was granted. Contract negotiations were carried on intermittently throughout the year without an agreement being reached. In November the negotiations for the whole district were certified to the War Labor Board.

Settlement of the suit for alleged over-time under the "Collar to Collar" litigation was made for a nominal sum and the property continued to operate on the "Collar to Collar" basis.



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5. LABOR & WAGES (Cont.)

b. Statement of Wages and Product

	<u>1942</u>	<u>1941</u>
PRODUCT	171,514	175,179
NUMBER OF SHIFTS AND HOURS	2-8	2-8
 <u>Avg. No. of Men Working</u>		
Surface	25	24
Underground	<u>54</u>	<u>51</u>
Total	79	75
 <u>Avg. Wages Per Day</u>		
Surface	6.64	6.33
Underground	<u>7.68</u>	<u>7.33</u>
Total	7.34	7.02
 <u>Avg. Wages Per Month of 22 Days</u>		
Surface	146.08	139.26
Underground	<u>168.96</u>	<u>161.26</u>
Total	161.48	154.44
 <u>Product Per Man Per Day</u>		
Surface	24.90	27.58
Underground	<u>11.69</u>	<u>12.61</u>
Total	7.95	8.65
 <u>Labor Cost Per Ton</u>		
Surface	.2665	.2297
Underground	<u>.6571</u>	<u>.5816</u>
Total	.9236	.8113
 Avg. Product Breaking & Trimming	 38.59	 43.10
 Avg. Wage Contract Miners	 8.458	 8.164
 <u>Total No. of Days</u>		
Surface	6,886 $\frac{1}{4}$	6,352
Underground	<u>14,676<math>\frac{5}{4}</math></u>	<u>13,889<math>\frac{3}{4}</math></u>
Total	21,563	20,241 $\frac{1}{2}$
 <u>Amount for Labor</u>		
Surface	45,696.87	40,233.92
Underground	<u>112,710.47</u>	<u>101,880.27</u>
Total	158,407.34	142,114.19

Proportion Surface to Underground Men

1942	- 1 to 2.16
1941	- 1 to 2.12
1940	- 1 to 1.88
1939	- 1 to 1.88
1938	- 1 to 1.81
1937	- 1 to 1.92
1936	- 1 to .50
1935	- 1 to .88
1934	- 1 to .88
1933	- 1 to 2.15



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6. SURFACE

a. Buildings, Repairs

Due to the fact that the property is nearing depletion, only the most necessary repair work has been done on the mine buildings for the past several years. In compliance with requests by numerous governmental agencies, considerable work was done to guard the more important buildings from possible sabotage. All of the windows in the engine house were covered with heavy mesh screen and a screen door with a magnetic lock was installed. The shaft house and shop buildings were kept locked at all times when the mine was idle.

The air heater in the shaft was enlarged and operated with steam from the Marion shovel throughout the winter in an attempt to reduce the amount of ice. This attempt was only partly successful and it was necessary to do considerable chopping in the shaft.

The building which houses the ventilating equipment at the Virgil shaft was enlarged to accomodate the new fan which was installed late in the year.

b. Stockpiles

The ore in the old northwest stockpile was completely cleaned up by the end of the shipping season. Stocking of new ore was confined to the two main areas north of the shaft, with the Virgil grade west of the pocket tracks and the Hi-Sulphur ore to the east.

The continued use of the rock pocket and dump truck successfully eliminated any trouble with burning rock piles.

7. UNDERGROUND

a. Shaft Sinking

There were no shaft sinking operations during 1942 and no prospect of any for the future since the drilling below the 8th Level gave no encouragement below that elevation.

b. Development

With the exception of one ventilation raise which was put up a short distance above the 8th Level from the north end of the No. 840 cross-cut, all of the development work was confined to the sub-levels. A number of new transfer drifts were driven in advance of new stoping operations, most of which were in the Hi-Sulphur area along the north side of the deposit.

The proportion of development work necessary to maintain production was much greater than normal due to the fact that most of the work was done around and between the old stopes with a large amount of work necessary to develop comparatively small tonnages. Three contracts out of the

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7. UNDERGROUND (Cont.)

b. Development (Cont.)

total five were required to keep development ahead of mining operations. The total footage driven was 5,954 as compared with 4,632 in 1941 and 3,663 in 1940.

The combined rock footage was 195 feet, the bulk of which was ventilation work with a small amount in advance of diamond drilling operations. The detail of the development work will be found under heading 7-e.

c. Stoping

Stoping operations were confined entirely to the sub-levels between the 6th and 8th Main Levels with an undetermined amount of lean caved material obtained from above the 6th. The percentage of the total production which was obtained from old caved areas is impossible to estimate but without question exceeds a third of the total. The production of Hi-Sulphur grade was pushed rapidly throughout the early months of the year and was increased from less than 600 tons in January to a high of 12,374 tons in August. In the later months of the year when more Virgil grade was available, the production of Hi-Sulphur was greatly decreased. The amount of this grade produced was 58,824 tons or approximately 34 per cent of the total. During the remaining life of the property this grade will constitute by far the greater part of the production.

The detailed description of stoping operations follows:

Subs Above the 6th Level

There were no operations of any kind on subs above the 6th Level during 1942 due to extremely severe fire conditions. The last attempt to mine the very small amounts of ore above this elevation was given up in December of 1941 due to a recurrence of the old original S02 fire. No future attempt will be made in this area.

6th Level

Operations on the 6th Level elevation were confined to two ventilation raises and two small drifts which were holed to the No. 620 cross-cut above one of the new stopes. There were no actual mining operations on the level.



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7. UNDERGROUND (CONT.)

c. Stoping (Cont.)

Subs Above the 8th Level

+50' Sub-Level

There were no actual mining operations at this elevation although caving produced considerable quantities of lean ore.

+25' Sub-Level

The north-south supporting pillar between the two portions of No. 10 stope was completely mined out by Contract No. 6. The operation was completed in December.

A small amount of mining was done at this elevation along the north edge of the west portion of No. 10 stope.

A large new stope was developed in the central area by Contract No. 2 above the transfer drift on the -25' Sub-Level. Large quantities of ore were recovered at this elevation and mining was continued through December. This stope was 140 feet long by an average of 85 feet in width and for the most part produced Virgil grade ore. The operation was practically completed by the end of the year.

00' Sub-Level

The remainder of the ore lying to the south of the old northwest stope was recovered by means of a transfer drift on the -100' Sub-Level. In effect this mining was a continuation of the old stope.

Several small pillars in the south portion of the ore body were recovered during the year. The mining of the north-south supporting pillar was continued through December and practically completed. In the central portion of the ore body, the new stope was developed and practically mined out by the end of the year, although Contract No. 2 did a small amount of mining in December.

-25' Sub-Level

Mining operations in the northwest area had been completed by the end of the year south of the old northwest stope and west of old No. 7 stope. In the south portion of the ore body the mining of the remaining pillars was completed by the end of the year with the exception of a small amount in the old No. 10 supporting pillar. Contract No. 6 did a small amount of mining in this pillar in December.

In the central portion of the ore body, adjacent to the Sherwood boundary, a transfer drift was driven east of Raise No. 840. The stope above this drift was practically completed by the end of the year. During December, Contract No. 2 put up one new mill raise to the sub-level above and Contract No. 3 was driving an exploration drift to the north.



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7. UNDERGROUND (Cont.)

c. Stoping (Cont.)

Subs Above the 8th Level (Cont.)

-25' Sub-Level (Cont.)

Considerable caving occurred in the old Hi-Sulphur stope at the extreme east end of the ore body. This caving eventually reached the 6th Level and was responsible for the serious fire at the end of the year.

-50' Sub-Level

A small amount of mining was done in the northwest area south of the old stope and in the west portion of old No. 7 stope. In the south portion of the ore body, only small amounts of mining were done in the old pillars. This work was being continued by Contract No. 6 through December.

-75' Sub-Level

Mining operations south of the old northwest stope were completed as was the mining of a small pillar south of the old middle stope. The only other operation at this elevation was a new transfer drift and several raises in the south mining area.

-100' Sub-Level

The transfer drift from which the ore in the old northwest area was recovered was driven at this elevation north of Raise No. 842.

Several small stoping operations were carried on in the pillars between the old middle stope and east stopes and in the pillar south of these stopes. Small amounts of ore of both grades were recovered in addition to large amounts of lean caved material. The last of these small stopes was being continued through December.

A small amount of Hi-Sulphur ore was recovered from this elevation by caving in the new Hi-Sulphur stope at the east end of the ore body.

-115' Sub-Level

With the exception of two small Hi-Sulphur stopes at the east end of the ore body, there were no extensive mining operations at this elevation. One short transfer drift was driven west of Raise No. 814 and south of the old middle stope. A development raise was put up to this elevation in December by Contract No. 1.

A short test drift was driven in Hi-Sulphur ore northeast of Raise No. 808 to the north black slate footwall. Diamond drill hole No. 124 was drilled to the northeast in an attempt to find a continuation of the ore body. This attempt was not successful.

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7. UNDERGROUND (Cont.)

c. Stoping (Cont.)

Subs Above the 8th Level (Cont.)

-135' Sub-Level

Stoping operations at this elevation were largely confined to small "scrams" in the northwest area underneath the old stope. A considerable amount of this work was done in December by Contract No. 10 and was being continued at the end of the year. Large quantities of lean caved material were recovered as these openings were holed through to the old stopes above.

A considerable amount of mining was done at this elevation in the new Hi-Sulphur stope at the east end of the ore body.

Development operations in the central area beneath and to the south of the old middle stope were started late in the year and continued by Contracts Nos. 1 and 12 through December.

-150' Sub-Level

Mining beneath the old northwest stope was carried on through the later months of the year and was continued through December by Contract No. 10. Mining in the Hi-Sulphur stope to the east was completed earlier. A small amount of development work in the central area beneath and to the south of the old middle stope was done late in the year and continued through December.

-165' Sub-Level

There were no stoping operations at this elevation although a total of five new transfer drifts were driven in Hi-Sulphur ore. Three of these drifts were in the northwest portion connecting Raise No. 824 and 816 and two were in the east portion northwest and southwest of Raise No. 802.

A ventilation drift in rock was driven to the north of Raise No. 843 and connection made with the -150' Sub-Level above.

8th Level

Operations on the 8th Level were confined to one ventilation Raise, No. 843, a diamond drill cut out and a short raise above it. Two diamond drill holes Nos. 125 and 126 were drilled from this cut out below the level to the south and north respectively. No encouraging structure was encountered.

d. Timbering

Timber consumption was considerably less during 1942 due to the fact that a number of the new transfer drifts were in material which required no timber. A large portion of the timber used was in main level repairs.



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7. UNDERGROUND (Cont.)

d. Timbering (Cont.)

<u>Kind</u>	<u>Lineal Feet</u>	<u>Avg. Price Per Foot</u>	<u>Amount 1942</u>	<u>Amount 1941</u>
6" to 8" Cribbing	1,350 <sup>a</sup>	-	-	170.00
8" to 10" Stull Timber	702	.0700	49.14	71.80
8" to 10" Stull Timber	840 <sup>a</sup>	-	-	-
10" to 12" Stull Timber	540 <sup>a</sup>	-	-	32.76
12" to 14" Stull Timber	180 <sup>a</sup>	-	-	3.57
14" to 16" Stull Timber	20 <sup>a</sup>	-	-	5.85
Total Timber 1942	3,632	.0135	49.14	-
Total Timber 1941	8,646	.0328	-	283.98
5' Cedar Lagging	2,800	.0080	22.40	85.54
7' Cedar Lagging	21,215	.0094	200.30	-
	<u>24,015</u>	<u>.0093</u>	<u>222.70</u>	<u>85.54</u>
Poles (Sprags)	18,537	.0161	312.98	237.53
Poles (Sprags)	900 <sup>a</sup>	-	-	-
Total Lagging & Poles	-	-	535.68	323.07
Product	-	-	171,514	175,179
Feet of Timber per Ton of Ore	-	-	.0212	.0493
Feet of Lagging per Foot of Timber	-	-	6.6121	1.3035
Cost per Ton for Timber	-	-	.00028	.00162
Cost per Ton for Lagging	-	-	.00130	.00049
Cost per Ton for Poles	-	-	<u>.00183</u>	<u>.00135</u>
Cost per Ton for Timber, Lagging & Poles	-	-	.00341	.00346
Equivalent of Stull Timber to Board Measure	-	-	5,944	11,829
Feet of Board Measure per Ton of Ore	-	-	.0346	.0675
Cost of Timber, Lagging & Poles 1942	584.82	-	-	-
Cost of Timber, Lagging & Poles 1941	-	-	-	<u>607.05</u>

<sup>a</sup> The above Timber used this year was taken from company property.



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7. UNDERGROUND (Cont.)

8th Level (Cont.)

e. Drifting and Raising

The following table shows the 1942 development footage classified as to size and material:

	<u>Drifting</u>			<u>Raising</u>			<u>Combined</u>
	<u>Ore</u>	<u>Rock</u>	<u>Total</u>	<u>Ore</u>	<u>Rock</u>	<u>Total</u>	<u>Total</u>
Small Size	2845	145	2990	1803	32	1835	4825
Large Size	1111	-	1111	-	18	18	1129
Total	3956	145	4101	1803	50	1853	5954

The combined total of 5,954 feet is much higher than the last two years when 4,632 feet and 3,663 feet respectively were driven. As was previously explained, the only rock work during the year was in a ventilation raise and drift and a small raise which was put up for diamond drill purposes.

f. Explosives, Drilling and Blasting

The cost per ton for all explosives used during 1942 was considerably higher than for the past year due to the fact that a larger portion of the ore was broken during development work which necessitates larger charges of powder, although a contributing factor was the fact that all of the stopes were very small and several of them in very hard material. Both of these conditions require greater amounts of explosives.

There are no costs shown for rock development since this work was charged to Ventilation and Exploring in Mine.

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7. UNDERGROUND (Cont.)

f. Explosives, Drilling and Blasting (Cont.)

Statement of Explosives Used

<u>Ore Development &amp; Stopping</u>	<u>Quantity</u>	<u>Average Price</u>	<u>Amount 1942</u>	<u>Amount 1941</u>
Total No. 1 Gelamite 60%	73,512	.1150 Lb.	8,453.88	6,953.82
Fuse (Feet)	189,911	5.1643 M	980.75	724.70
No. 6 Blasting Caps	27,489	12.345 M	339.36	256.15
Hot Wire Fuse Lighters 7"	7,100	.6749 C	47.92	37.10
Master Fuse Lighters	1,700	2.0070 C	34.12	19.86
Powder Bags #1	25	1.522 Ea.	38.06	40.50
Tamping Bags	20,900	2.169 C	45.33	34.20
Connecting Wire				2.40
Cap Crimpers				49.33
Total Fuse, Caps, etc.			1,485.54	1,164.24
Total Explosives, Ore Devel. & Stopping			9939.42	8,118.06
Production, Tons			171,514	175,179
Lbs. Powder per Ton of Ore			.4286	.3452
Cost per Ton for Powder			.0493	.0397
Cost per Ton for All Explosives			.0580	.0463
<u>Rock Development</u>	<u>Quantity</u>	<u>Average Price</u>	<u>Amount 1942</u>	<u>Amount 1941</u>
No. 1 Gelamite Powder, lbs.	-	-	-	277.73
Fuse (Feet)	-	-	-	47.46
No. 6 Blasting Caps	-	-	-	16.78
Hot Wire Fuse Lighters	-	-	-	2.70
Powder Bags #1	-	-	-	2.70
Cap Crimper	-	-	-	1.56
Tamping Bags	-	-	-	1.80
Total All Explosives, Rock Devel.				350.73
Total All Explosives Used In Mine			9,939.42	8,468.79
Average Price per Pound for Powder			.1150	.1150
Total Cost per Ton, All Explosives			.0580	.0483



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7. UNDERGROUND (Cont.)

g. Ventilation

With the exception of the two shut down periods caused by renewed burning in the fire areas and the destruction by SO2 gas of the surface ventilating equipment, ventilation conditions in the actual working places were quite satisfactory.

In September a cave occurred in the old Hi-Sulphur stope at the extreme east end of the ore body. Mining in this stope had been completed some three years previously. This cave took down a portion of the main 6th Level drift and subsequently holed to one of the old bratticed off fire areas to the northwest.

Early in October small quantities of SO2 gas started to come out of the cave above the 6th Level. This is such a common occurrence that no particular importance was attached to it. Within a very few days this small amount of gas which had been barely discernible suddenly increased to tremendous proportions. All of this gas was exhausted through the main ventilation raise to the Virgil shaft and did not affect the underground operations. In the latter part of October, several operating shifts were lost while the damage to the old fans was repaired. Operations were then continued normally until the middle of December when the main ventilation door on the 4th Level collapsed as a result of acid action and increased pressure. For several days following the failure of the air door it was necessary to wear the mine rescue apparatus while operating the pumps during which time a temporary brattice was erected between the old door and the shaft. It was then possible to resume operations while picked crews were installing additional brattices on the 6th Level between the fire area and the main ventilation raise. This job was one of the most difficult and dangerous ever attempted in the district and was accomplished only by virtue of an extremely well trained and competent crew chosen from the mines in the Ishpeming and Negaunee districts. The heat of the fire was so intense that the water used in sprayers was immediately turned into live steam. Severe acid burns were commonplace and the clothes of the men disintegrated on their backs. While this work was being carried forward, surface crews, equipped with additional mine rescue apparatus and gas masks, installed a new ventilating fan which was protected against the ravages of the acid in the mine exhaust and repaired and reinstalled the original ventilating fans, the impellers of which had been completely eaten away. For example, a brand new fan, borrowed from the Negaunee district for the emergency was in use less than a week during which time the acid action damaged the impellers so severely that replacement was necessary. This occurred in spite of a protective coating of rubber paint.

The temporary brattice was completed just before Christmas and a permanent concrete brattice the following week, although it was apparent that a second concrete brattice would be necessary to completely seal up the drift. The expenditures during the month of December exceeded \$4,500.00 with considerable work left to be done. This cost was exclusive of the new ventilation fan which cost an additional \$2,219.00. Had there been no national emergency with its accompanying demand for iron ore, it is doubtful, that the gamble, although successful, would have been warranted.

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8. COST OF  
OPERATING

a. Comparative Mining Costs

	<u>1942</u>	<u>1941</u>	<u>Increase</u>	<u>Decrease</u>
Product, Tons	171,514	175,179	2,	3,665
Underground Costs	1.000	.866	.134	
Surface Costs	.211	.181	.030	
General Mine Expense	.189	.182	.007	
Cost of Production	1.400	1.229	.171	
Depreciation, Plant, & Equip.	.579	.261	.318	
Taxes	.040	.058		.018
Loading & Shipping	.096	.101		.005
Total Cost at Mine	2.115	1.649	.466	
Budget Est. Cost at Mine	1.680	1.746		.066
Number of Operating Days	257½	258½		1
Number of Shifts & Hours	2-8 Hr.	2-8 Hr.		
Average Daily Product	666	678		12



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YEAR 1942

8. COST OF OPERATING (Cont.)

b. Detailed Cost Comparison

	<u>1942</u>		<u>1941</u>	
	<u>Amount</u>	<u>Per Ton</u>	<u>Amount</u>	<u>Per Ton</u>
<u>Underground Costs</u>				
1. Exploring in Mine	4657.72	.027	4523.76	.026
3. Development in Rock			4140.02	.034
4. Development in Ore	23569.88	.137	18006.39	.103
5. Stopping	63558.62	.371	54504.06	.311
6. Timbering	8500.28	.049	7288.37	.041
7. Trammig	26092.40	.152	25181.97	.144
8. Ventilation	7739.74	.045	2932.90	.017
9. Pumping	11490.80	.067	11381.29	.065
10. Comp. and Air Pipes	10914.45	.064	10116.84	.058
12. Undg. Superintendence	8178.25	.048	8236.00	.047
14. Maint. Comp. and Power Drills	777.82	.004	387.18	.002
15. Scrapers & Mech. Loaders	1310.95	.007	666.92	.004
16. Electric Tram Equipment	3736.49	.022	3204.05	.018
17. Pumping Machinery	1220.69	.007	1128.19	.006
n Total Undg. Costs	171748.09	1.000	151697.94	.866
<u>Surface Costs</u>				
18. Hoisting	9476.25	.055	8961.63	.051
19. Stocking Ore	6400.80	.038	6182.77	.035
20. Crushing at Mine	4130.35	.024	4076.60	.023
21. Dry House	4805.57	.028	3818.51	.022
22. General Surface Expense	5071.69	.030	3596.88	.021
23. Maint. Hoist. Equipment	1624.77	.010	1633.87	.009
24. Shaft	2443.45	.014	706.24	.004
25. Top Tram Equipment	1040.64	.006	608.53	.004
26. Docks, Trestles & Pkts.	212.63	.001	438.46	.003
27. Mine Buildings	891.11	.005	1583.19	.009
Total Surface Costs	36097.26	.211	31606.68	.181
<u>General Expense</u>				
Vacation Expense	3657.42	.021	3600.81	.020
28. Insurance	679.49	.004	634.84	.004
29. Mining Engineering	1382.75	.008	924.16	.005
30. Mech. & Elect. Engineering	159.96	.001	71.46	.001
31. Analysis & Grading	4104.89	.024	2895.04	.017
32. Personal Injury	752.56	.004	943.81	.005
33. Safety Department	726.66	.004	676.18	.004
34. Telephone, Safety Devices	776.46	.005	911.72	.005
35. Local & Gen'l Welfare	1143.97	.007	1190.05	.006
36. Special Exp. Pension, etc.	2825.95	.017	2640.36	.015
37. Ishpeming Office	3867.87	.023	3657.60	.021
38. Social Security Taxes	4336.36	.025	6440.98	.037
39. Mine Office	7928.66	.046	7355.39	.042
Total Gen'l Mine Expense	32343.00	.189	31942.40	.182
<u>COST OF PRODUCTION</u>				
40. Taxes	240188.35	1.400	215247.02	1.229
Total Cost	6868.17	.040	10168.72	.058
Budget Estimated Cost	247056.52	1.440	225415.74	1.287
	155,000	1.359	156,000	1.330

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8. COST OF  
OPERATING (Cont.)

b. Detailed Cost Comparison (Cont.)

16. Electric Tram Equipment

This increase was due to several expensive new parts purchased for the top tram cars.

18. to 23. Inclusive

These increases were due to the decrease in production and the necessity of paying larger amounts of over-time.

24. Shaft

This increase was due to the replacement of a large number of the shaft runners and heavier maintenance work.

40. Taxes

This decrease was due to the decrease in valuation as the mine nears depletion.



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8. COST OF  
OPERATING (Cont.)

b. Detailed Cost Comparison (Cont.)

	<u>1942</u>		<u>1941</u>	
	<u>Amount</u>	<u>Per Ton</u>	<u>Amount</u>	<u>Per Ton</u>
41. General Supplies	3,983.07	.023	5,499.52	.031
42. Iron and Steel	892.67	.005	1,038.39	.006
43. Oil and Grease	587.96	.003	599.98	.003
44. Machinery Supplies	4,426.89	.026	3,842.48	.022
45. Explosives	10,003.89	.058	8,479.41	.048
46. Lumber and Timber	2,215.17	.013	2,549.18	.015
47. Fuel	2,876.16	.017	1,858.39	.011
48. Electric Power	23,803.62	.139	22,391.88	.128
49. Sundries	10,438.50	.061	5,251.67	.030
50. Other Mines & Accounts	244.11	.001	633.75	.004
Michigan State Tax	6.73	.000	3.08	.000
Total per Cost Sheet	58,990.55	.344	50,880.23	.290

In the following discussion of comparative costs no explanation is made unless the difference is large enough to be significant.

3. Development in Rock

There were no charges in this account since the little rock work which was done was charged to Ventilation and Exploring in Mine.

4. Development in Ore

This increase was due to the necessity of doing larger amounts of development per ton of ore developed.

5. Stoping

This increase was due to the fact that practically all of the stopes were very small and some of them in extremely hard material.

6,7. Timbering and Trimming

These small increases were due to the decrease in production.

8. Ventilation

This very large increase was due to the ventilation difficulties which were previously described.

10. Compressors and Air Pipes

This increase was due to the necessity for making major repairs to the compressor.

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9. EXPLORATIONS AND FUTURE EXPLORATIONS

a. Underground

As was previously mentioned, Diamond Drill Hole No. 124 was drilled on the -150' Sub-Level in an attempt to locate a suspected roll in the footwall which conceivably could contain additional ore. This hole was drilled horizontally N. 20° E. from S. 1910 and 414 E. The hole, which was put in a distance of 208 feet during June and July, encountered nothing but gray slate beyond a short run of mixed black slate and iron formation.

Later in July, Hole No. 125 was started on contract by the Longyear Company. This hole was drilled from the 8th Level from S. 2128 and 312 E. at a dip of -35° due south. The hole was completed at a depth of 210 feet by the middle of August. Early in September, Hole No. 126 was started from practically the same location, dip -60°, N. 12 W. This hole was completed late in November at a depth of 596 feet. The drilling of these two holes proves beyond any doubt that there is no enrichment or favorable structure beneath the 8th Level elevation.

b. Surface

Earlier in the year title was acquired to the minerals and surface of the bulk of Section 24. Surface drilling was started by the Longyear Company in April and continued throughout the year. The first two holes, Nos. 61 and 61A had to be abandoned before ledge was reached after which 61B was successfully put down to ledge at a depth of 179 feet and completed at a depth of 1,585 feet in September.

Hole No. 62 was started early in October and was continued to a depth of 1,109 feet by the end of the year. Neither of these holes, which were drilled to the north along the east line of the section, showed any encouragement. In spite of this it was planned to continue drilling in 1943 in the hope that a new ore body will be discovered. Opinions differ as to the possibility of discovering such an ore body.



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10. TAXES

The following tabulation is a complete statement of valuations, taxes and comparison for the years 1942 and 1941:

	1942		1941	
<u>Description</u>	<u>Valuation</u>	<u>Taxes</u>	<u>Valuation</u>	<u>Taxes</u>
<u>Iron River Township, Iron County</u>				
<u>Spies Lease</u>				
NE $\frac{1}{4}$ of NW $\frac{1}{4}$ of Sec. 24, 43-35)				
SE $\frac{1}{4}$ of NW $\frac{1}{4}$ of Sec. 24, 43-35)				
<u>Virgil Lease</u>				
SW $\frac{1}{4}$ of NW $\frac{1}{4}$ of Sec. 24, 43-35)	150,000	2,606.40	150,000	3,075.00
Stockpile, Supplies & Equip.	170,000	2,953.92	275,000	5,637.50
Total Spies-Virgil	320,000	5,560.32	425,000	8,712.50
Spies Dwellings			5,000	102.50
Total Iron River Township	320,000	5,560.32	430,000	8,815.00
Rate		1.7376		2.050
 <u>Village of Mineral Hills</u>				
<u>Spies Lease</u>				
NE $\frac{1}{4}$ of NW $\frac{1}{4}$ of Sec. 24, 43-35)				
SE $\frac{1}{4}$ of NW $\frac{1}{4}$ of Sec. 24, 43-35)				
<u>Virgil Lease</u>				
SW $\frac{1}{4}$ of NW $\frac{1}{4}$ of Sec. 24, 43-35)	150,000	613.05	150,000	513.96
Stockpile, Supplies & Equip.	170,000	694.80	275,000	942.26
Total Spies-Virgil	320,000	1,307.85	425,000	1,456.22
Spies Dwellings	7,500	30.65	5,000	17.13
Total Mineral Hills	327,500	1,338.50	430,000	1,473.35
Rate		.4087		.3426
 NOTE: Iron River Township and Village of Mineral Hills are the same valuations.				
 <u>Ravenna Prickett Houses</u>				
Total Rav. Prickett Houses#	700	20.65	700	22.75
Rate		2.95		3.25
 # These taxes were paid by the Inland Steel Co. and billed to the C.C.I. Co.				
 The recapitulation of the above taxes is shown below:				
<u>Operating Virgil Mine</u>				
Iron River Township	320,000	5,560.32	425,000	8,712.50
Village of Mineral Hills	"	1,307.85	"	1,456.22
Total		6,868.17		10,168.72
 <u>Operating Spies Dwellings</u>				
Iron River Township			5,000	102.50
Village of Mineral Hills	7,500	30.65	"	17.13
Total		30.65		119.63
Tax per Ton Produced		.040		.058
Tax per Ton Shipped		.035		.037

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YEAR 1942

11. ACCIDENTS AND PERSONAL INJURY

There were no lost time or compensable accidents at this property during 1942 as compared with two compensable accidents of a relatively minor nature which occurred in 1941. The property operated a total of 22,976 man days with a frequency and severity rate of 0. This compares with an average for the Company's mines and plants of .075 and 7.61 respectively.

12. NEW CONSTRUCTION AND PROPOSED NEW CONSTRUCTION

With the exception of routine trestle work there was very little new construction at this property. As was previously noted under heading 6-a., a small addition to the fan station at the Virgil shaft was erected to accomodate the new fan.

If the exploration work along the east line of the section in the newly acquired property is unsuccessful, there will probably be no new construction throughout the remaining life of the property. If the exploration is successful, and a new ore body of importance is discovered, it will be necessary to either rebuild or replace practically every structure on the property with the exception of the engine house and head frame.

13. EQUIPMENT AND PROPOSED EQUIPMENT

With the exception of the new Jeffrey fan, which was purchased by the Company at a cost of \$2,219.00 and is being used by this mine on a rental basis, there were no important pieces of equipment added to the inventory during 1941. Some of the minor items are listed below:

1 - Boiler Flue Blower	\$ 150.00
1 - Jackleg Mounting	65.00
2 - JB4 Jackhammers @ \$205.00	410.00
2 - Dugas Fire Extinguishers @ \$48.58	97.16
1 - Sullivan 15 H.P. Hoist	1,161.00
1 - 15 H.P. DC Motor (For Hoist)	322.00
1 - Steel Hoisting Rope	746.78



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14. MAINTENANCE & REPAIRS

a. Mine

Maintenance and repair work were held at an absolute minimum throughout the year due to the probability of early depletion.

b. Location

For the same reason, expenditures on the Location and dwellings were kept to a minimum. As can be seen in the following comparative table both of these items were much lower than the previous year.

			<u>1942</u>	<u>1941</u>
			<u>Total</u>	<u>Total</u>
<u>Spies Virgil Dwellings</u>	<u>Labor</u>	<u>Supplies</u>	<u>Amount</u>	<u>Amount</u>
Repairs to Houses	61.01	38.32	99.33	545.87
Interior Decorating	0	218.69	218.69	57.87
Shed Repairs	0	0	0	45.75
Total, Dwellings	61.01	257.01	318.02	649.49
 <u>Location Maintenance</u>				
Repairs to Sewers	12.97	30.22	43.19	432.72
Repairs to Street Lights	11.81	2.26	14.07	57.16
Fire Protection & Water	13.21	34.52	47.73	8.95
Mail Boxes	0	0	0	9.84
Fencing	91.89	22.84	114.73	504.80
Garage	0	0	0	10.21
Location Alleys	30.24	0	30.24	0
Total Location Maint.	160.12	89.84	249.96	1023.68
 Total Amount for				
Dwellings & Loc. Exp.	221.13	346.85	567.98	1673.17

15. ELECTRIC POWER

Electric power, which is purchased from the Wisconsin-Michigan Power Company was entirely satisfactory throughout the year with no interruption in service.

The use of the maximum demand warning signal for five-minute meter intervals was continued throughout the year with very satisfactory results. Pumping schedules were arranged to keep the maximum demand load at a practical minimum. The average maximum demand load increased only slightly from 379 to 384 K.W.H. The total consumption was 1,714,278 K.W.H. at a cost of \$ .0139 per K.W.H. The cost per ton increased from .128 to .139.

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16. WATER SUPPLY

This property continued to obtain its water supply from the Homer Mine of the M. A. Hanna Company. This service was satisfactory with the exception of several unavoidable interruptions when the water was shut off for a short time.

17. CONDITION OF PREMISES

Routine and seasonal clean-ups and repairs kept the premises in good condition throughout the year. The mine roads and Location streets and alleys, which are maintained by the Village of Mineral Hills were also well cared for.

18. NATIONALITY OF EMPLOYEES

<u>Parentage</u>	<u>American Born</u>		<u>Foreign Born</u>		<u>Total</u>	<u>Per Cent</u>
	<u>Number</u>	<u>%</u>	<u>Number</u>	<u>%</u>		
American	2	2			2	2
English	8	10	11	12	19	22
Finnish	7	9	9	11	16	20
Swedish	7	9	1	1	8	10
Danes	4	5			4	5
Italian	3	4	7	9	10	13
Austrian			1	1	1	1
German	2	2	2	3	4	5
Polish	2	2	4	6	6	8
French	8	10			8	10
Irish	2	2			2	2
Belgium			1	1	1	1
Welsh	1	1			1	1
Total	46	56%	36	44%	82	100%



ANNUAL REPORT  
CHAMPION MINE  
YEAR 1942

1. GENERAL

Operations at the Champion Mine in 1942 were resumed in April and all of the available tonnage was loaded out by July 21st.

After loading operations were finished, a small crew was employed for the balance of July salvaging and storing all usable equipment.

The timber in the bins and pockets was sold to Walter Lindberg for removal from the premises.

The stockpile areas were cleaned up and old plank and trestle legs, etc. were burned.

2. PRODUCTION,  
SHIPMENTS &  
INVENTORIES

a. Production

Production by Grades:

Champion Lump	34,787 tons
Champion Fines	<u>23,518 "</u>
Total	58,305 "

b. Shipments

The total tonnage produced and shipped in 1941-1942 was as follows:

Champion Lump	99,564 tons
Champion Fines	<u>65,669 "</u>
Total	165,233 tons

e. Production by Months

<u>Month</u>	<u>Lump</u>	<u>Fines</u>	<u>Total</u>
1941	64,777	42,151	106,928
April 1942	5,160	3,274	8,434
May	10,953	4,049	15,002
June	12,406	6,149	18,555
July	<u>6,268</u>	<u>10,046</u>	<u>16,314</u>
Total	99,564	65,669	165,233

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3. ANALYSIS

a. Average Analysis of Output

The average analysis of all shipments to date was as follows:

	<u>Iron</u>	<u>Phos.</u>	<u>Sil.</u>	<u>Mang.</u>	<u>Sul.</u>	<u>Moist</u>
Champion Lump	57.04	.084	12.51	-	.015	.17
Champion Fines	57.98	.070	11.64	.11	.023	2.35

8. COST OF OPERATING

Ore Produced - Tons	58,305
Rock handled - Cubic Yards	3,036

	<u>Amount</u>	<u>Per Ton</u>
<u>OPERATING</u>		
Contract Handling Ore	\$ 15,336.48	
Contract Handling Rock	607.20	
Sorting	7,528.43	
Sampling	513.35	
Plant Foreman	736.36	
Electric Power	452.83	
Laboratory	1,338.73	
<u>MAINTENANCE</u>		
Equipment	514.43	
	\$ 27,027.81	.463
<u>GENERAL EXPENSE</u>		
Property Insurance	22.15	
Mech. & Elec. Engrg.	51.77	
Warehouse Overhead Expense	38.73	
Propn. Supt.	706.50	
Social Security Taxes	226.01	
	\$ 1,045.16	.018
Total Cost at Plant	\$ 28,072.97	.481
Amorlization of Plant	4,957.86	.085
Administrative Expense	5,830.53	.10
Taxes	748.07	.013
	\$ 39,629.43	.679



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8. COST OF  
OPERATING (Cont.)

Total cost.....	\$ .679
Purchase price based on 165,233 tons.....	.6657
Rail Freight.....	<u>.710</u>
Total Cost at Marquette.....	2.0547
Lake Freight.....	.835
Cargo insurance.....	.002
Cargo Analysis.....	<u>.004</u>
Total cost of ore delivered....	\$ 2.8957

THE CLEVELAND-CLIFFS IRON COMPANY  
OPERATING AGENT FOR CANISTEO MINING COMPANY  
CANISTEO MINE  
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1. GENERAL:

With the exception of a few washing plant repairmen, who took their vacations during December, all operations at the Canisteo Mine were carried forward throughout the holidays.

The south side stripping program, which had been started after the ore season in 1941, was carried forward on a 20-shift per week basis, using two 85-B, three and a quarter-yard electric shovels and nine Euclid haulage units. This program, which entailed the removal of 300,644 cubic yards of surface and cretaceous material from the South Bovey lease, was completed in February. The shovel was then shifted to the east side of the North Bovey lease, near the approach in to the pit, where 10,850 cubic yards of surface material were excavated and taken to the washing plant settling basin to build up a baffle dyke.

Upon completion of these stripping programs, the electric shovels were moved to the shops, where they were given a complete overhauling. The trucks, tractors and other motorized equipment were also given the necessary repairs.

The new dyke, in the extension to the settling basin, which was started during the fall of 1941, under contract with Johnson Brothers, was completed early in February.

Ore operations were started on May 4th, and continued through September 14th, on a basis of three 8-hour shifts per day, five days per week, and satisfactory progress was made throughout the entire season.

The washing plant was operated 100 days on the above basis, treating 1,384,042 tons of crude ore from which 772,659 tons of concentrates were secured. The average daily output per shift amounted to 2,576 tons, as compared with 2,615 tons for the year 1941. There were but a few major delays at the washing plant during the entire season and operations, as a whole, were quite satisfactory.

Due to a shortage of railway ore cars it was necessary to stock 118,941 tons of concentrates during the season and practically the entire stockpile was loaded out and shipped later in the fall, as boats were available.

Following the ore operations, stripping was again resumed on a program which consisted of removing 175,000 cubic yards of paint-rock from the Mid-Snyder area and 725,000 cubic yards of surface and waste ore material from the South Bovey lease.



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1. GENERAL:  
(Continued)

The paint-rock stripping was completed during the early part of December and both shovels were then operated on the surface stripping program on the south side of the pit during the balance of the year.

The winter repair program at the washing plant was started immediately after the ore season and carried forward until December 19th, when the work was suspended during the holiday season.

2. PRODUCTION,  
SHIPMENTS &  
INVENTORIES:

a. Production By Grades:

Snyder Crude, -----	843,595 tons.
Bovey Crude, -----	427,905 "
Hemmens Crude, -----	<u>112,542 "</u>
 TOTAL CRUDE ORE, -----	 1,384,042 "
 Snyder Non-Bessemer Concentrates, -----	 250,311 "
Snyder Bessemer Concentrates, -----	218,029 "
Bovey Non-Bessemer Concentrates, -----	119,993 "
Bovey Bessemer Concentrates, -----	116,060 "
Hemmens Non-Bessemer Concentrates, -----	28,156 "
Hemmens Bessemer Concentrates, -----	<u>40,110 "</u>
 TOTAL PRODUCTION - 1942, -----	 772,659 "

b. Shipments:

Snyder Non-Bessemer Concentrates, -----	272,951 "
Snyder Bessemer Concentrates, -----	223,306 "
Bovey Non-Bessemer Concentrates, -----	119,993 "
Bovey Bessemer Concentrates, -----	116,060 "
Hemmens Non-Bessemer Concentrates, -----	28,156 "
Hemmens Bessemer Concentrates, -----	<u>40,110 "</u>
 TOTAL SHIPMENTS - 1942, -----	 800,576

c. Stockpile Inventories:

The 29,551 tons of Snyder Non-Bessemer Concentrates in stock January 1, 1942, were shipped during the year. From the 1942 production, there remains a balance of 1,634 tons of Snyder Concentrates.

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2. PRODUCTION,  
SHIPMENTS &  
INVENTORIES:  
(Continued)

e. Production By Months:  
(1) - Crude Ore:

<u>MONTH</u>	<u>SNYDER</u>	<u>BOVEY</u>	<u>HEMMENS</u>	<u>TOTAL</u>
May, -----	183,924	66,857	10,916	261,697
June, -----	247,903	54,813	26,371	329,087
July, -----	165,391	192,159	22,295	379,845
August, -----	173,541	75,120	36,295	284,956
September, -----	72,836	38,956	16,665	128,457
<b>TOTAL, -----</b>	<b>843,595</b>	<b>427,905</b>	<b>112,542</b>	<b>1,384,042</b>

(2) - Concentrates:

	<u>SNYDER</u>	<u>BOVEY</u>	<u>HEMMENS</u>	<u>TOTAL</u>
May, -----	96,298	37,390	6,387	140,075
June, -----	134,752	29,995	15,924	180,671
July, -----	98,014	106,221	12,848	217,083
August, -----	99,584	41,813	22,637	164,034
September, -----	39,692	20,634	10,470	70,796
<b>TOTAL, -----</b>	<b>468,340</b>	<b>236,053</b>	<b>68,266</b>	<b>772,659</b>

f. Ore Statement:

The 29,551 tons of Snyder Concentrates in stockpile January 1st, 1942, were shipped during the 1942 season. During operations, a total of 118,941 tons of Snyder Concentrates were placed in stock. Of this amount, 117,307 tons were shipped by the end of the season, leaving a balance of 1,634 tons of Snyder Concentrates, as of December 31, 1942.

g. Delays:

The following delays were reported during the 1942 shipping season:

<u>Date</u>	<u>Hours</u>	<u>Minutes</u>	<u>Cause:</u>
May 5th,	1	-	Trouble with 8' pan conveyor motor
7th,	13	-	Bearing on 8' pan conveyor tail pulley frozen.
12th,	-	40	Repairing tailings pump
June 15th,	-	30	8' Pan conveyor switch out of order
17th,	-	45	Electric power off
19th,	-	30	Replacing fine ore chute liner
24th,	-	40	Replacing fine ore chute liner
30th,	-	25	Repairing bearing on log washer



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2. PRODUCTION,  
SHIPMENTS &  
INVENTORIES:  
(Continued)

g. Delays: (Continued)

Date	Hours	Minutes	Cause:
July 2nd,	-	25	Electric power off
3rd,	--	30	Electric trouble on #2 shovel
6th,	14	-	Exciter armature on #2 shovel burned out.
9th.,	-	50	Fuse burned out on log washer
16th,	-	45	Changing liner in fine ore chute
17th,	2	05	Electric power off
18th,	1	20	Repairing hoist coupling on #2 shovel
	1	-	Electric power caused slow operations
22nd,	1	-	Electric coil on 8' pan conveyor burned out
29th,	-	30	Repairing chute under 5 x 12 screen
31st,	-	45	Changing tailings pump
Sept. 4th,	1	-	Symons crusher plugged
12th,	-	30	Great Northern track plugged with loads.
Total,	42		

This represents only 1.77 per cent of the total working time.

3. ANALYSIS:

a. Mine Analysis of Production:

	Tons	Iron	Phos.	Sil.	Mang.	Alu.	Moist.	Fe.Nat.
Snyder N. B. Concs.	250,311	57.71	.050	10.56	.21	.47	7.83	53.19
Snyder Bess. Concs.	218,029	57.89	.036	10.33	.28	.43	8.03	53.24
Bovey N.B. Concs.	119,993	57.51	.050	10.33	.23	.45	8.58	52.58
Bovey Bess. Concs.	116,060	57.61	.036	10.34	.29	.46	8.21	52.88
Hemmens N.B. Concs.	28,156	57.29	.058	11.16	.22	.45	7.76	52.84
Hemmens Bess. Concs.	40,110	57.34	.035	10.86	.24	.42	8.02	52.74
TOTAL,	772,659	57.67	.044	10.46	.25	.45	8.07	53.02

THE CLEVELAND-CLIFFS IRON COMPANY  
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3. ANALYSIS:  
(Continued)

b. Mine Analysis of Shipments:

	<u>Tons</u>	<u>Iron</u>	<u>Phos.</u>	<u>Sil.</u>	<u>Mang.</u>	<u>Alu.</u>	<u>Moist.</u>	<u>Fe.Nat.</u>
Snyder N.B. Concs.	272,951	57.76	.050	10.48	.22	.47	7.81	53.25
Snyder Bess. Concs.	223,306	57.91	.036	10.31	.28	.43	8.01	53.27
Bovey N.B. Concs.	119,993	57.51	.050	10.33	.23	.45	8.58	52.58
Bovey Bess. Concs.	116,060	57.61	.036	10.34	.29	.46	8.21	52.88
Hemmens N.B. Concs.	28,156	57.29	.058	11.16	.22	.45	7.76	52.84
Hemmens Bess. Concs.	40,110	57.34	.035	10.86	.24	.42	8.02	52.74
<b>TOTAL,</b>	<b>800,576</b>	<b>57.70</b>	<b>.044</b>	<b>10.43</b>	<b>.25</b>	<b>.45</b>	<b>8.05</b>	<b>53.06</b>

c. Mine Analysis of Ore in Stockpile:

	<u>Tons</u>	<u>Iron</u>	<u>Phos.</u>	<u>Sil.</u>	<u>Mang.</u>	<u>Alu.</u>	<u>Moist.</u>	<u>Fe.Nat.</u>
Snyder Concs.	1,634	57.92	.038	10.05	.31	.40	8.27	53.13

d. Average Analysis of Crude Ore Production:

<u>Lease</u>	<u>Tons</u>	<u>Iron</u>	<u>Phos.</u>	<u>Sil.</u>
Snyder,	843,595	44.56	.038	30.33
Bovey,	427,905	44.36	.039	30.04
Hemmens,	112,542	44.10	.038	31.21
<b>Total,</b>	<b>1,384,042</b>	<b>44.46</b>	<b>.038</b>	<b>30.31</b>

e. Complete Analysis of Season's Shipments:

	<u>Iron</u>	<u>Phos.</u>	<u>Sil.</u>	<u>Mang.</u>	<u>Alu.</u>	<u>Lime</u>	<u>Mag.</u>	<u>Sul.</u>	<u>Loss</u>
Snyder N.B. Concs.	57.70	.047	10.45	.22	.42	.16	.24	.012	5.80
Snyder Bess. Concs.	57.90	.037	10.35	.26	.40	.14	.20	.011	5.65
Bovey N.B. Concs.	57.50	.052	10.30	.21	.40	.16	.24	.013	6.25
Bovey Bess. Concs.	57.60	.037	10.30	.27	.40	.18	.24	.013	6.05
Hemmens N.B. Concs.	57.30	.056	11.10	.20	.40	.14	.22	.010	5.80
Hemmens Bess. Concs.	57.40	.036	10.80	.22	.38	.16	.24	.011	5.95



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4. ESTIMATE OF ORE RESERVES:

a. Developed Ore:  
Factors Used:  
All Leases:

	<u>Rock</u> <u>Deduction</u>	<u>Cu. Ft.</u> <u>Per Ton</u>	<u>%</u> <u>Recovery</u>
Wash Ore, -----	10%	14	60%
Lean Wash Ore, -----	10%	14	50%
Low Grade Wash Ore, -----	10%	15	60%
Lean Low Grade Wash Ore, -----	10%	15	50%
Rocky Wash Ore, -----	20%	14	60%

<u>LEASE:</u>	<u>RESERVE</u> <u>JAN. 1, 1942</u>	<u>MINED</u> <u>1 9 4 2</u>	<u>RESERVE</u> <u>JAN. 1, 1943</u>
<u>Bovey:</u>			
S $\frac{1}{2}$ -NE $\frac{1}{4}$ - Sec. 30,	106,307	-	116,744
NW $\frac{1}{4}$ -SE $\frac{1}{4}$ - Sec. 30,	240,403	4,418	235,100
NE $\frac{1}{4}$ -SE $\frac{1}{4}$ - Sec. 30,	313,039	38,641	447,898
NE $\frac{1}{4}$ -NE $\frac{1}{4}$ - Sec. 31,	799,642	192,994	1,150,893
Total Bovey,	1,459,391	236,053	1,950,635
<u>Hemmens:</u>			
SW $\frac{1}{4}$ -SW $\frac{1}{4}$ - Sec. 29,	1,276,294	68,266	1,569,535
<u>Snyder:</u>			
SE $\frac{1}{4}$ -SW $\frac{1}{4}$ - Sec. 30,	148,347	214,084	1,117,038
SW $\frac{1}{4}$ -SE $\frac{1}{4}$ - Sec. 30,	550,788	28,659	450,086
SE $\frac{1}{4}$ -SE $\frac{1}{4}$ - Sec. 30,	1,382,090	225,597	1,586,082
Total Snyder,	2,081,225	468,340	3,153,206
<u>GRAND TOTAL,</u>	4,816,910	772,659	6,673,376

The estimated tonnage of reserve ore in the Canisteco Mine, as of January 1, 1943, shows an increase of 2,629,125 tons over that reported for January 1, 1942, after deducting the tonnage produced during the past season. The above figures resulted from a new reserve estimate, based on an extensive drilling program which has been conducted during the past two years. This work was done in anticipation of a review of this property by the State Tax Commission.

The large increase in tonnage was made up mainly in a boost of 173,500 tons in the East Bovey; 351,251 tons in the South Bovey; 361,507 tons in the Hemmens; 429,589 tons in the East Snyder forty and 1,182,775 tons in the West Snyder. There was a decrease of 72,043 tons in the Mid-Snyder. The tonnage in the other forties was close to the 1942 estimate, after taking into account the 1942 production.