FRANCIS MINE
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1. GENERAL

This mine was abandoned in 1924. The steel headframe is the only structure remaining on the property. The ore remaining in stock is on an adjoining forty, the NE¼ of the SE¼ of Section 28,45-25.

2. PRODUCTION SHIPMENTS & INVENTORIES

	1936	1935	Increase
b. Shipments			
Franport	57,308	44,917	12,391
c. Stockpile Inventories			
Franport	52,371	109,679	

The difference in tonnage is due to seasons shipments.

3. ANALYSIS

b. Complete Analysis of Ore Shipped (Dried at 212° F.)

Franport Grade	Tons	Iron	Phos.	Sil.	Mn.	Al.	Lime	Mg.	Sul.	Loss	Moist
Mine Analysis	57,308	56.65	.233	7.42	.62	4.91	1.10	1.47	.057	2.45	14.18

4. COST OF OPERATING

	1936	1935	Incr.	Decr.
General Mine Expense	436.76	293.24	143.52	
Loading and Shipping	4,005.95	2,373.03	1,632.92	
Taxes	1,881.84	2,535.73		653.89
Total cost at mine	6,324.55	5,202.00	1,122.55	

The cost per ton for loading and shipping in 1936 was $ .069 as compared with $ .053 in 1935.

10. TAXES

	1936		1935	
	Valuation	Taxes	Valuation	Taxes
SW¼ of NW¼ of Sec.27,45-25		2.98		3.56
SW¼ of " 27 "	500	9.26	500	9.25
Personal property	100,000	1,851.00	135,000	2,497.85
Total	100,500	1,863.24	135,500	2,510.66
Collection Fees		18.60		25.07
Total Taxes		1,881.84		2,535.73
Tax rate per $100		1.861		1.861

GARDNER MACKINAW MINE
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1. GENERAL

Mine production increased for the third successive year, reaching the full capacity of the present plant on the five day per week schedule in June. The total production was 185,954 tons in comparison to 138,471 tons in 1935. Development and mining operations continued on all levels below the 5th, the former being especially active on the 8th and new 10th Levels. Preparations to open the 10th Level were begun in January when sinking of the incline shaft in the slate footwall was started below the 9th Level. This operation was completed in June and the new level development progressed rapidly during the remainder of the year.

The larger share of production resulted from mining operations above the 8th Level. Control of the phosphorus and sulphur content by mixing ore from different sections of the mine was continued throughout the year. Opening of the 10th Level, however, has shown that an upward revision of the guaranteed phosphorus content will be necessary in 1937, and this, together with the reduced ore thickness, disclosed on this level, were the disappointing features of 1936.

The dip of the formation carried the ore to the west of the former mine boundaries at the 9th and 10th Level elevations. Control of these lands were secured by new leases covering the N½ of the SW¼ of Sec. 35-45-25 from the Chicago & North Western Ry. Co., and the S½ of the SW¼ of Sec. 35 from the Detroit, Mackinaw & Marquette Land Co., owner of both the old and the new properties. Supplementary agreements provide that ore from either lease may be hoisted in the same shaft and stocked together, tally to be kept by tram car count, and overrun or underrun to be apportioned on that basis. This was vitally necessary, because of the double hoist and transfer from incline to vertical shaft.

The mine safety record was again extended through the year without a lost time accident.

2. PRODUCTION SHIPMENTS & INVENTORIES

a. Production by Grades

Grade	1936	1935	Increase
Gardner Ore	0	0	0
Mackinaw Ore	185,954	138,471	47,483
Total	185,954	138,471	47,483

The increased production resulted from the capacity mining schedule in effect during the last six months of the year.

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2. PRODUCTION
SHIPMENTS &
INVENTORIES

b. Shipments

Grade of Ore	Pocket Tons	Stockpile Tons	Total Tons	Total Last Year
Gardner	0	3,645	3,645	0
Mackinaw	109,880	38,492	148,372	144,467
Total	109,880	42,137	152,017	144,467
Increase 1936	39,948	0	7,550	34,203
Decrease 1936	0	32,398		

c. Stockpile Inventories

Grade of Ore	Dec.31,1936	Dec. 31,1935	Inc.	Dec.
Gardner	0	247	0	247
Mackinaw	70,485	32,903	37,582	0
Total	70,485	33,150	37,335	

d. Division of Product by Levels

	1936	%	1935	%
6th Level	15,432	8	15,737	11
7th Level	32,580	18	19,993	14
8th Level	60,093	32	51,611	38
9th Level	48,387	26	51,130	37
10th Level	29,462	16		
	185,954	100	138,471	100

e. Production by Months

	Mackinaw Ore Tons	Rock Tons
January	13,284	
February	12,820	
March	12,534	
April	12,815	
May	13,205	
June	14,168	357
July	17,878	
August	15,855	
September	21,534	
October	17,189	
November	17,445	
December	17,227	
Total	185,954	357

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2. PRODUCTION SHIPMENTS & INVENTORIES

f. Ore Statement

	Gardner	Mackinaw	Total	Total Last Year
On hand Jan.1,1936	247	32,903	33,150	39,146
Product for Year	3,398	185,954	189,352	138,471
Total	3,645	218,857	222,502	177,617
Shipments	3,645	148,372	152,017	144,467
Balance on hand	0	70,485	70,485	33,150
Increase in Output			47,483	60,118
Decrease in ore on hand				5,996
Increase in ore on hand			37,335	

1936 - Jan. 1st to June 15 - 4 days per week mining and 2 shaft sinking, each three shifts.
June 15 to Dec. 31 - 5 days per week, 2 mining shifts and 3 hoisting shifts per day.

1935 - Jan. 1st to Feb. 28 - 2 days per week.
Feb. 28 to Dec.31st - 3 days per week.

g. Delays

			Tonnage Lost
January 27	- 3 hour delay	- Ice in shaft	100
May 7	- 6½ " "	- Converter out of order	200
May 13	- 12 " "	- Fire on 9th Level	350
May 16	- 2½ " "	- No empty cars on hand	100
June 26	- 2 " "	- Skip off track	50
	- 2 " "	- Cleaning skip pit	50
July 13	- 4 " "	- Broken rail in shaft	100
July 15	- 4 " "	- Repairing skip	150
July 20	- 2 " "	- Hoist out of order	100
July 21	- 3 " "	- Repairing Skip	100
July 28	- 2 " "	- Signal system out of order	100
July 29	- 1 " "	- Hot bearing 5th Level hoist	100
July 30	- 4 " "	- Rep.motor bearing 5th Level hoist	200
August 3	- 24 " "	- Repairing incline shaft hoist motor	700
August 12	- 3 " "	- Grids burned out,5th Level Hoist	150
Sept. 17	- 2½ " "	- " " " " "	100
Sept. 18	- 2 " "	- Repair 5th Level Hoist	100
Oct. 12	- 12 " "	- 5th Level hoist motor burned out	300
October 28	- 16 " "	- Changing motor U.G.Hoist	500
December 11	- 16 " "	- Generator burned out elec. haulage converter	500
Dec. 15	- 3½ " "	- 5th Level Hoist repairs	100

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2. PRODUCTION
SHIPMENTS &
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h. Delays from Lack of Current

The single delay from this cause occurred August 12th and amounted to 2 hours. The loss in tonnage was negligible.

3. ANALYSIS

a. Average Mine Analysis on Output

Grade	Tons	Iron	Phos.	Sil.	Sul.
Mackinaw	185,954	59.84	.359	3.51	.910

These figures represent a decrease in the iron and an increase in the phosphorus and sulphur contents as compared to 1935. The 10th Level development is responsible for the first two changes, and the mixing of higher sulphur material from the 6th and 7th Level areas caused the third.

b. Average Analysis on Straight Cargoes

There were no straight cargoes forwarded from the mine, all shipments being graded with other ores.

c. High Sulphur Ore

The larger portion of the high sulphur ore mined in 1936 came from stopes at the northwest end of the 6th and 7th Levels. Most of this ore was low phosphorus and provided the desired mixture for the high phosphorus from the 9th and 10th Levels.

Development in 1936 disclosed small additional areas of higher sulphur ore at the northwest end of the ore body on Levels from the 6th to the 8th, and the 10th Level drift development added short lengths of 1% sulphur material at the northwest and southeast ends of the formation at the close of the year. The remainder of the 10th Level ore, however, was of lower average sulphur content than any level heretofore opened.

d. High Phosphorus Ore

The expected or feared increase in the average phosphorus content of the 10th Level ore materialized and proved to be about the most disappointing feature of the year. While some short lengths of lower phosphorus material were developed southeast of the incline shaft, all drifting to the northwest was in ore whose average phosphorus content is nearly 1%. Since this is the wider section of the ore body most of the 10th Level reserve must be classed as high phosphorus ore and the expected analysis for 1937 changed accordingly.

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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
Estimate is of available ore only.

Non-Bessemer	Tons
5th to 6th Level	15,928
6th to 7th Level	52,076
7th to 8th Level	31,396
8th to 9th Level	61,129
9th to 10th Level	125,499
Below 10th Level	23,055
Total available developed ore December 1936.	309,083

Statement Showing ore reserves and new ore developed for the following years:

	1932	1933	1934	1935	1936
Ore in Mine Jan.1	135,992	71,312	164,858	382,337	306,116
Production	24,769	3,405	78,353	138,471	185,954
Balance	111,223	67,907	86,505	243,866	120,162
Ore in Mine Dec.31	71,312	164,858	382,337	306,116	309,082
New ore developed	- 39,911A	96,951B	295,832C	62,250D	188,920E

A. Decrease due to elimination of high sulphur ore areas.
B. Increase due to sinking of incline shaft.
C. Large increase due to development of 8th and 9th Levels.
D. Increase due to northwest end development of 8th and 8th Levels
E. Increase due to development of 10th Level.

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4. ESTIMATE OF ORE RESERVES

c. Estimated Analysis
Ore Reserves: Approximate Expected Natural Analysis
Developed Ore

	Iron	Phos.	Sil.	Mang.	Alum.	Lime	Mag.V	Sul.	Ign.	Moist.
Mackinaw	52.50	.394	4.11	.22	1.64	1.88	1.20	.788	2.45	12.50

Ore in Stock: Average Natural Analysis

Mackinaw	53.61	.297	3.44	.22	1.67	1.92	1.10	.741	2.51	10.50

There are two changes in the expected analysis of ore reserves. The phosphorus was increased from .300 to .400 while the sulphur was reduced from .900 to .800 (the exact reverse of 1935). This is largely due to the generally poorer grade of ore encountered between the 9th and 10th Levels.

5. LABOR AND WAGES

a. Comments
1. Labor

There was a general oversupply of most classes of labor because of the continued general unemployment in the district. Approximately 30 men were added to the working force in January in making up the third or tramming shift. Many of these were former company employees still living in Gwinn.

2. New Construction
The Mackinaw shaft house received a covering of fireproof ferro-board during the latter part of the year, the work being done by steel workers brought from the Negaunee district for this purpose.

b. Comparative Statement of Wages & Product

	1936	1935	Incr.	Decr.
PRODUCT	185,954	138,471	47,483	
Number Shifts & Hours	3-8 hr.	1-8 hr.		
AVG. NUMBER MEN WORKING				
Surface	32	26	6	
Underground	122	97	25	
Total	154	123	31	

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5. LABOR AND WAGES

b. Comparative Statement of Wages & Product (Cont.)

	1936	1935	Incr.	Decr.
AVG. WAGES PER DAY				
Surface	4.45	4.31	.14	
Underground	4.90	4.70	.20	
Total	4.81	4.61	.20	

Wages were increased approximately 10% on November 16, 1936.

AVG. WAGES PER MONTH	(20 days)	(13 days)	(7 days)
Surface	89.00	56.03	32.97
Underground	98.00	61.10	36.90
Total	96.20	59.93	36.27

PRODUCT PER MAN PER DAY			
Surface	25.00	26.67	1.67
Underground	6.73	7.80	1.03
Total	5.30	6.04	.74

The reduced product per man was largely the result of shaft sinking operations and development of the 10th Level.

LABOR COST PER TON			
Surface	.178	.162	.016
Underground	.729	.603	.126
Total	.907	.765	.142

The increase here is also attributable to the above causes.

AVERAGE PRODUCT MINING			
Stoping	124,254	101,271	22,983
Ore Development	61,700	37,200	24,500
Total	185,954	138,471	47,483

AVERAGE WAGES CONTRACT LABOR	5.196	4.906	.290

TOTAL NUMBER OF DAYS			
Surface	7,439¾	5,191½	2,248¼
Underground	27,649¼	17,743¾	9,905½
Total	35,089	22,935¼	12,153¾

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5. LABOR AND WAGES

b. Comparative Statement of Wages & Product (Cont.)

	1936	1935	Incr.	Decr.
AMOUNT FOR LABOR				
Surface	33,090.37	22,365.72	10,724.64	
Underground	135,561.40	83,457.97	52,103.43	
Total	168,651.77	105,823.69	62,828.08	
AVG.WAGES PER MONTH BASED ON MEN CARRIED ON MINE PAYROLL				
Surface	89.00	56.03	32.97	
Underground	98.00	61.10	36.90	
Total	96.20	59.93	36.27	

Proportion of Surface to Underground Men
1936 - 1 to 3.81
1935 - 1 to 3.42
1934 - 1 to 3.48
1933 - 1 to .90
1932 - 1 to 2.00

6. SURFACE

a. Buildings,Repairs

Minor repairs were made to the mine buildings as needed.

A new main shaft was installed in the surface hoist in March. The key had become loose on the old shaft and the shaft itself was so badly worn from years of service that it was thought advisable to renew the whole assembly. The gears were fitted to the new shaft at the Ishpeming shops and the hoist placed in service after the loss of only one day.

b. Roads

A new road was made on the abandoned pocket track leading from the Mackinaw Shaft. This is now used by the general public instead of the road winding through the mine buildings.

c. Stockpiles & Trestles

Shipments from stockpile started in May. The Gardner stockpile ground was cleaned of ore in June leaving only the headframe and engine house as surface equipment on that property. The Mackinaw stocking trestle was dismantled early in the shipping season and all portions which could be salvaged were drawn out of the way and used again in the fall. Twenty three bents were erected to take care of the winter stocking program and because of the accelerated mining schedule, full use of the present stocking area will be made in the spring.

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7. UNDERGROUND

a. Shaft Sinking

Sinking of the incline shaft was started the first week in January and reached completion 50' below the new 10th Level on June 15th. The working schedule in effect during this time was three shifts, four days per week mining, which left available two days for shaft sinking.

The incline shaft had reached a depth of 48' on the incline below the 9th Level in January, 1934. It had entered the slate footwall at a depth of 11' below the 9th Level. Sinking was continued in this material for the full distance, the ore formation running parallel to and at a distance of a few feet above the back of the shaft. The total distance sunk was 178' and the cutting out of the 10th Level plat and pocket was underway within six months after sinking operations started.

The shaft was sunk without the use of a pentice, the regular hoisting skip was altered so that the back plate was easily removed for hand shoveling. There was practically no interference to mining operations, the only time lost was that necessary to remove and replace the north skip rope and to lengthen or shorten the south , or sinking, skip rope.

No E&A was prepared for this work, the cost being carried on the monthly cost sheet under the heading of "Sinking". The total cost, including cutting out the shaft plat and pocket, was approximately $14,000.00. This represented about 17½¢ per ton on the monthly product or approximately 8¢ per ton on the year's production.

b. Development

Additional development of all levels from the 6th to the 9th was carried on in 1936, plus the opening of the new 10th Level. Development on the upper levels was largely confined to the wider section at the northwest end of the ore body, with the exception of raises which were carried upward in advance of regular stoping operations.

At the 6th Level elevation, an additional drift to explore the formation near the footwall, was extended northwest of No. 20 raise. Most of the material encountered was high inphosphorus or sulphur but a second drift nearer the center of the ore body, disclosed some low phosphorus material. A short connection was then driven to the northwest end of the former hanging wall drift.

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7. UNDERGROUND (Cont.)

b. Development (Cont.)

Development at the 7th Level elevation consisted of two mining raises near the northwest end of the ore body, both of which disclosed ore suitable for stoping.

Development at the 8th Level elevation consisted of some stope raises in advance of stoping operations with the addition of exploratory work carried on at both the southeast and northwest ends of the ore body. A sub level drift was extended 130' southeast of No. 6 raise in search of an increased ore thickness. A small raise was extended an additional 70' toward the 7th Level but was finally abandoned in lean ore. A drift to develop the ore near the footwall at the northwest end of this level was started in August and completed on the footwall side of No. 23 stope in September. This drift was later utilized as a connection to No. 23 - 9th Level stope.

The footwall drift at the northwest end of the 9th Level, which had been started in December, 1935, was completed in extremely high phosphorus ore on the footwall in March. The total advance here was 280' and raising to the 8th Level was started immediately. The first of these raise connections improved the mine ventilation considerably and efforts were made thereafter to maintain at least one connection.

As noted above, development of the new 10th Level was started in June. Actual drifting operations were under way near the end of the month and at the end of the year had reached distances of 543' to the southeast and 575' to the northwest. The analysis of the material disclosed in these drifts is covered under other headings but a disturbing feature was the drifting in rock a distance of approximately 200' in search of a widening of the vein which occurred at the 9th Level elevation. At the end of the year this rock drift was approximately 60' short of the point at which the 9th Level drift was turned off along the footwall. It seems almost certain that the wider portion of the ore body will again be disclosed at this lower elevation. Raise development from the 10th to the 9th Levels was underway on both sides of the incline shaft and had progressed to such an extent that at the end of the year four stopes were underway.

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7. UNDERGROUND

c. Stoping

Stoping operations were confined to levels below the 5th, as in 1935. The proportion of the product resulting from actual stoping operations was reduced slightly in 1936, amounting to approximately 70% of the total. The product by levels showed the 8th in first place, closely followed by the 9th. The ore from various sections of the mine was mixed to provide a balanced analysis. In the early part of the year, some difficulty was experienced in keeping the sulphur content under control and as ore from the 10th Level was added later in the year, the same was true of the phosphorus.

A more detailed description of stoping operations follows:

6th Level

Northwest of Shaft

Mining operations were carried on in this section of the mine during the early part of the year to provide low phosphorus ore. At the start of the shipping season, however, the sulphur content increased to such an extent that all stopes abovethis level were discontinued for the remainder of the year.

A small amount of ore was drawn from Nos. 11 and 12 stopes at the beginning of the year.

Operations were started at No. 21 in May by driving a footwall raise to a height of 110' and providing a connection to the southeast side of No. 22 stope. Stoping operations were then discontinued here after reaching a height of 35' in June.

No. 22 stope provided low phosphorus ore in January and February but as the footwall was approached in March, this content increased. This stope was extended an additional 60' to the northeast under the hanging wall above the sub level elevation, the width being maintained at 25'.

7th Level

Southeast of Shaft

The only operation on this side of the shaft was the continuation of a small stope at the southeast end of the ore body. A small inclined stope was carried to a height of approximately 50' in ore 12' thick. At this height the ore pinched out and blasting of the wider section of the ore in the floor of the drift was then continued until June. The drift floor was mined to a depth of 6', the ore being scraped directly into cars.

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7. UNDERGROUND

c. Stoping (Cont.)

Northwest of Shaft

After a lapse of several years, mining operations were started in Nos. 13 and 14 stopes. New footwall raise connections were put through to the 6th Level and at the end of the year No. 13 stope had reached an inclined height of 142' in an average ore thickness of 30'. Stoping operations had been completed in No. 14 at a height of 140', leaving a supporting pillar in the back of the stope for the 6th Level drift. At the end of the year a small amount of broken ore remained in the footwall of this stope which will be scraped to the shaft early in 1937.

No. 22 raise was started in January and connected to the 6th Level hanging wall drift in April. Stoping operations started immediately and at the end of the year had reached an inclined height of 175' in ore approximately 40' thick. The back of the stope is being continued above the 6th Level, mining the 6th Level hanging wall drift in the process, and the stoping width is 30'.

No. 23 footwall raise was started in November and at the end of the year approached the 6th Level elevation at an inclined height of 160'.

The hanging wall portion of the ore body at the 7th Level elevation was mined in part by continuing the 8th Level stopes above the 7th level floor. Nos. 23 and 24 7th Level hanging wall stopes were joined to the 8th Level stopes in this operation, leaving a continuous pillar between the 6th and 8th Levels.

8th Level

Southeast of Shaft

The development to the southeast at the sub level elevation was continued until July. Stoping operations in No. 6 were then started and during September and October carried upward toward the 7th Level in a decreasing thickness of ore. The stope was abandoned finally at an inclined height of 90', the stoping width having averaged 35'.

No. 7 stope was completed early in the year at the 7th Level elevation, after an advance of 80' to a total inclined height of 150'. The stoping thickness averaged 12' and in this thinner material, the width was here also increased to 35'.

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7. UNDERGROUND

c. Stoping (Cont.)

Northwest of Shaft

Previously broken ore was scraped from the footwall of Nos. 11, 12 and 13 stopes during the period from August to November. In order to accomplish this work in safety a new sub level drift was driven to connect the lower portions of these stopes, the sub drift being vertically over the main level drift. A small cut out was blasted in the lower portion of the hanging wall of each stope. The ore scraped to the chute in Nos. 12 and 13 was of particularly good quality, the analysis averaging 64.00 Iron, .090 Phos. and .700 Sulphur. During the shipping season this ore was a welcome addition in the product forwarded from the pocket.

No. 14 stope, which had been started on the line of the old winze in 1935, was completed at the 7th Level elevation in March. The total inclined height was approximately 165' which included a portion of the floor of the old hoist room at the 7th Level elevation. The stoping thickness was exceptional, at times reaching a distance of 65'. Scraping of the broken ore from the curve in the footwall in this stope was continued as late as November. During that month a 55' sub level connection was extended to the northwest to the top of No. 15 raise. This raise had been halted at this level in 1935 because of the hardness of the ore and the difficult drilling. On completion of the sub level connection, stoping operations were started and at the end of the year had reached an inclined height of 75' in ore 20' thick. The stoping width was increased gradually to 30'.

For some distance northwest of No. 15 stope both the foot and hanging walls were contacted by the 8th Level drift and most of the material was high phosphorus. For this reason, there is a gap between No. 15 and the next raise, No. 20, which was started in November. This raise reached a total inclined height of 122' and was within a few feet of the 7th Level floor at the end of the year. Connection had also been provided at the sub level elevation to No. 21 stope. No. 21 stope, in the wider portion of the ore body, was started in January. It was carried to the 7th Level elevation in an increasing thickness of ore and operations were temporarily suspended from May to October. In November, the stope was completed at a total inclined height of 165', which is 10' above the 7th Level, and connects to the footwall side of No. 23 - 7th Level stope. At the end of the year, drawing and scraping of the large reserve of broken ore had been started. No. 22 stope was advanced from a height of 110' to a total inclined height of 200' above the 8th Level floor, or 30' above the 7th Level. This stope joined No. 24 - 7th Level stope, and probably provided the largest production resulting from any one stope in 1936. The average ore thickness was in excess of 50' and the

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7. UNDERGROUND

c. Stoping (Cont.)

stoping width 30'. Ore was drawn and scraped from the foot-wall until September. No. 23 stope was also extended from a height of 110' to a distance of 180' above the 8th Level floor. The fault contact which marks the northwest end of the ore body reduced the stoping width at this higher elevation but also allowed an extension of the stope to the north so that in its central portion from the 8th to 7th Levels, the stope reached a width of 60'.

The ore from these stopes, Nos. 21 and 23, provided a balanced analyses in the product during the early part of the year. Because of the great thickness, much of the product came from this section of the mine. As each stope approached the 7th Level, however, the sulphur content increased and at the start of the shipping season, this was the main reason for the difficulty in keeping the sulphur content under control.

9th Level

Southeast of Shaft
Mining operations were resumed on this side of the shaft in March when chutes were built and raises started at Nos. 6 and 7. No. 6 raise was advanced to the sub level elevation and a drift connected to No. 7. The raise was then completed at the 8th Level elevation at a total height of 170' in August. Stoping was started immediately and was completed in October at a total height of 170'. Since this was the last stope to the southeast, the width was increased to 35'. The average ore thickness approximated 11' but lean material was encountered on approaching the 8th Level elevation.

A combined stope and raise operation was carried on in No. 7 since the low sulphur product was needed during the summer months. The raise was finally connected to the 8th Level when the stope had been carried to a height of approximately 100'. Stoping operations were completed in September and the average ore thickness here was 14'.

Northwest of Shaft
No. 11 stope, which had been started in 1935, was completed at the 8th Level elevation in March, advancing from a height of 30' at the beginning of January. The analysis of ore in this stope was somewhat erratic, the lower portion being high phosphorus and the upper portion being low phosphorus. Ore

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7. UNDERGROUND

c. Stoping (Cont.)

was drawn from this opening as late as May.

Some small amounts of ore were drawn or scraped from Nos. 15 and 16 stopes which had been completed in 1935. On completion of the northwest footwall drift in March, Nos. 21, 22 and 23 footwall raises were started and advanced to heights of 15'.

No. 21 reached the 8th Level in August at a total inclined height of 170'. The stope was completed in October at a height of 160' and the average ore thickness was 30' in middle and high phosphorus material. No. 22 raise was completed at the 8th Level in December and stoping operations had just been started at the end of the year.

No. 23 stope was worked on a somewhat different plan. The raise was first carried to the sub level elevation and a traveling raise to the northwest extended to a height of 120'. Access was provided to the upper portion of the stope by this means until the 8th Level drift had been extended far enough to the northwest to provide a new connection to the stope raise. A third connection was made to No. 24 hanging wall raise from the hanging wall of the stope and ventilation was secured by this means during stoping operations. The stope was well under way at the end of the year, having reached a total inclined height of 160' above the 9th Level, which placed the back at an average elevation of approximately 10' above the 8th Level floor. In this advance, the 8th Level hanging wall drift was mined and the hanging wall portion of the 9th Level stope connected with No. 23 - 8th Level stope. The maximum ore thickness amounted to 70' and a large portion of the 8th Level floor resulted from this one operation.

The last operation to the northwest was No. 25 hanging wall stope which had been started in 1935. Mining operations were completed here in March at a total inclined height of 155'. The 8th Level hanging wall drift was also mined here and the fault contact formed the northwest side of the stope at its upper limits. Scraping of ore from the footwall was continued for several additional months.

10th Level

The shaft plat and pockets of this new level were cut out in June. The plat chutes are different from that of the upper levels since they are placed at a maximum distance from the hanging wall of the shaft and the tram cars dump toward the shaft from a track placed beyond the pocket. This allowed the drifts to be started

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7. UNDERGROUND

c. Stoping (Cont.)

in ore even though the shaft was in the slate footwall. The floor of the new level is 167' below that of the 9th Level on the inclination of the shaft and its depth below sea level elevation -456'.

Southeast of Shaft

Drifting operations on this side of the shaft were continuous from June to the end of the year. The advance here was in varying grades of ore but on the whole the phosphorus content was considerably lower than that of the drift to the northwest. The iron analysis was similar to that of the 9th Level as far as No. 6 raise but from that point to the southeast an increasingly lower iron content was noted. This apparently was caused by interbedded seams of graphitic slate in the soft ore formation which at the same time increased the phosphorus analysis. At the end of the year, the drift had reached a point approximately 100' beyond that of the 9th Level drift and was more in the nature of an exploratory drift than a development drift because the lean character of the material will prohibit stoping operations.

During the drift advance, raise Nos. 1 to 9 inclusive had been started preparatory to future stoping operations.

No. 8 raise was started in October and completed at the 9th Level elevation in November. Stoping operations started immediately and at the end of the year had reached an inclined height of 115' in ore approximately 30' thick. The stoping width was held to 25' because of the weak hanging wall composed of jasper and graphitic slate seams. All of the stopes so far opened at the 10th Level elevation have the same structural weakness and for future protection and safe working conditions, it will be necessary to leave a small thickness of ore in place. This, it is hoped, will prevent the slabbing off of the hanging wall material when the weak slate seams are exposed to the air.

No. 9 raise was started in July and reached the 9th Level elevation in September. The stope was carried to a height of 70' in ore approximately 25' thick. Operations were discontinued here in October due to the slabbing of the hanging wall but were being started again in December, leaving a protective pillar between.

Northwest of Shaft

The northwest drift was driven through consistently high phosphorus material to a point 350' northwest of the shaft. Here the ore pinched out in a highly folded structure, and although the advance was resumed and continued an additional 200' to the northwest, only a thin seam of ore was at times encountered. The same condition

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7. UNDERGROUND

c. Stoping

has been known to exist on the 8th and 9th Levels but at neither of these levels has the ore reduced to such a narrow seam as disclosed on the 10th Level. It seems almost certain that the wider formation at the northwest end will be reached early in 1937 and this is borne out by the ore encountered in a raise started toward the 9th Level from the northwest end of the drift. This raise was necessary to provide better ventilation during the rock drifting operation. It entered ore at a height of 10' and continued in an increasing thickness to a height of 41' at the end of the year. This work necessitates the reporting of a development footage in rock for the first time in several years.

No. 11 raise was started in July and reached the 9th Level elevation in September with a total advance of 175'. Stoping operations had reached a height of 130' in December and were stopped at this elevation due to the unsafe condition of the hanging wall. The ore thickness reached a maximum of 35' but in the upper part of the stope was composed of lean ore interbedded with slate seams.

No. 12 raise was started in September and reached the 9th Level in October at a total height of 170'. The stope was nearly completed at the end of the year, the back being only 10' below the 9th Level floor and the ore thickness averaged 30', and the stope width in both Nos. 11 and 12 was held to 25' to reduce the span of the hanging wall.

Nos. 13, 14 and 15 raises had been started during the course of drifting operations and this area will be developed for mining early in 1937. If the hanging wall condition in No. 12 is any indication, this area will furnish a large share of the 1937 production, even though most of the material will be medium to high phosphorus ore.

d. Timbering
Statement of Timber Used

	Lineal Feet	Amount 1936	Amount 1935
8" to 9" Timber	1,512	88.29	
9" to 10" "	1,413	105.79	31.28
10" to 11" "	2,007	176.04	95.34
11" to 12" "	3,310	350.44	210.76
Total Timber	8,242	720.56	337.38

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7. UNDERGROUND

d. Timbering (Cont.)

	Lineal Feetm	Amount 1936	Amount 1935
5 Ft. Lagging 64¾ Cds.	58,275	326.25	176.2 5
7 Ft. Lagging	6,790	46.40	
Total Lagging	65,065	372.65	176.25
9 Ft. 6" Poles	53,286	634.62	589.96
Total Lagging & Poles		1,007.27	766.21
Product		185,954	138,471
Feet of timber per ton of ore		.0044332	.0042745
Feet of lagging per ton of ore		.0349898	.0229111
Feet of lagging per foot of timber		7.8944321	5.4519670
Feet of poles per ton of ore		.2865547	.3482730
Cost per ton for timber		.0038749	.0024380
Cost per ton for Lagging		.0020040	.0012720
Cost per ton for Poles		.0034128	.0042600
Total cost per ton - All timber		.0092917	.0079700
Equivalent of stull timber to board measure		29.6653926	20,9443000
Feet of Board measure per ton of ore		.1595308	.1321070
Total cost for timber, lagging & poles		$1,727.83	$ 1,103.59

SUMMARY

Year	Amount	Cost per Ton
1936	1,727.83	.0092
1935	1,103.59	.0080
1934	1,184.87	.0212
1933	174.68	.0513
1932	238.81	.0097
1931	876.67	.0110
1930	2,300.66	.0184
1929	1,722.04	.0147

The consumption and cost of timber increased slightly in 1936 due to shaft sinking and the larger proportion of development.

e. Drifting and Raising

	Drifting			Raising			Combined
	Ore	Rock	Total	Ore	Rock	Total	Total
1935	1,730	25	1,755	2,660	0	2,660	4,415
1936	1,804	185	1,989	2,148	0	2,148	4,137

The larger share of development in 1936 was drifting. The opposite was true in 1935 and will again be the case in 1937, as raises are carried through in advance of the 10th Level stopes. In addition to the above is also the shaft sinking in the slate footwall from the 9th to the 10th levels.

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7. UNDERGROUND

f. Explosives, Drilling & Blasting

Statement of Explosives Used

	Quantity	Avg.Price	Amount 1936	Amount 1935
50% Gelatine Special	164,000	.1106	18,138.50	11,253.36
60% Gelex A				593.75
Total Powder	164,000	.1106	18,138.50	11,847.11
Fuse	291,000	.5657	1,646.41	1,116.30
Caps	53,000	1.1200	593.60	339.43
Connecting Wire	32	.4000	12.80	7.20
Tamping Bags	13,000	1.7500	22.76	7.63
Exploders	1,700	1.0601	180.22	
Fuse Lighters	5,500	.8836	48.60	23.40
Total Fuse, etc.			2,504.39	1,493.96
Total All Explosives			20,642.89	13,341.07
Avg. Price per hundred for powder			.1106	.1204
Product			184,954	138,471
Pounds of Powder per ton of ore			.8867	.7104
Tons of ore per pounds of powder			1.1338	1.4078
Cost per ton - Powder			.0976	.0855
Cost per ton - Fuse, caps, etc.			.0135	.0108
Cost per ton - All explosives			.1111	.0963

Summary showing percentages of different grades of powder used during the past five years:

100.0% of all powder used in 1936 was	50%
95.1% of all powder used in 1935 was	50%
4.9% of all powder used in 1935 was	60%
11.2% of all powder used in 1934 was	50%
88.8% of all powder used in 1934 was	60%
100.0% of all powder used in 1933 was	60%
26.5% of all powder used in 1932 was	40%
4.3% of all powder used in 1932 was	45%
56.5% of all powder used in 1932 was	50%
12.7% of all powder used in 1932 was	60%

The following summary shows the cost per ton for explosives for the past six years, exclusive of rock development:

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7. UNDERGROUND

YEAR	COST PER TON	PRODUCT
1936	.1111	185,954
1935	.0963	138,471
1934	.1188	78,353
1933	.1688	3,405
1932	.0841	24,769
1931	.1959	79,439

The powder consumption and cost also increased in 1936 due to the larger proportion of development and also because of the fact that more stopes were worked in the harder ore in the thinner part of the vein on the southeast side of the shaft.

i. Ventilation

With the increasing depth of the Mackinaw Mine, it became evident that during the year 1936, some means of forced ventilation should be installed. With the collars of both the Gardner and Mackinaw shafts at the same elevation, it was thought a reversal of natural ventilation by an electric fan would be comparatively easy. As a result, a 15 HP, 10,000 FPM fan was installed on the third level of the Gardner Mine approximately 700' from the shaft. The fan has been in operation several months and during that time the Gardner shaft has been free from ice.

With the lower workings at a depth of over 1500' below surface, the natural flow of air has been good and will shortly be aided by raises connecting the 9th Level with the 10th at the extremities of of the 10th Level.

j. Faults

The fault contact which forms the northwest end of the ore body was intersected by several stopes during the year. The fault zone was traced from the 6th to the 8th Levels by #22 stope above the 7th Level, #23 above the 8th and #25 above the 9th. In all cases a hard brecciated chert and sharply defined contact was disclosed.

k. Pumping

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

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7. UNDERGROUND

k. Pumping (Cont.)

Month	1936	1935	1934	1933	1932	1931	1930	1929
January	137	143	174	210	241	463	100	116
February	126	142	169	205	223	419	101	113
March	130	138	170	205	236	470	100	111
April	130	138	166	203	244	327	126	115
May	133	140	158	181	231	332	102	101
June	125	140	156	184	223	314	114	104
July	130	137	147	181	225	302	104	109
August	123	134	155	180	222	273	111	106
September	124	135	149	172	218	192	128	109
October	124	135	143	199	218	263	180	99
November	119	134	149	224	215	260	236	99
December	123	133	146	221	211	253	350	99
Total Average	127	138	157	196	225	327	142	107

In 1931 and 1932 many of the surface diamond drill holes were sealed. This has resulted in a steady decrease in the amount of water entering the mine.

8. COST OF OPERATING

a. Comparative Mining Costs

	1936	1935	Incr.	Decr.
Product - Tons	185,954	138,471	47,483	
Underground Costs	1.091	.951	.140	
Surface Costs	.241	.198	.043	
General Mine Accounts	.153	.163		.010
Cost of Production	1.485	1.312	.173	
Depreciation-Plant Acct.	.066	.065	.001	
" - Develop."	.066	.065	.001	
Taxes	.020	.024		.004
Cost on Stockpile	1.637	1.466	.171	
Loading and Shipping	.061	.078		.017
Adjustment Supply Inventories	.006		.006	
Total Cost on Cars	1.704	1.544	.160	
Number of days operating	287	293		6
Number shifts and hours	3-8 hr.	1-8 hr.	2	
Average daily product	648	473	175	
Cost of Production				
Labor	.954	.809	.145	
Supplies	.750	.735	.015	
Total	1.704	1.544	.160	

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8. COST OF OPERATING

b. Detailed Cost Comparison

	1936	1935	Increase	Decrease
Days per week	6	6		
Shifts and Hours	3-8 hr.	1-8 hr.	2-8 hr.	
Production, Tons	185,954	138,471	47,483	
Average Daily Production, Tons	648	473	175	
Number of days Worked	287	293		6

	Underground Costs	Amount	Per Ton	Amount	Per Ton	Amount	Per Ton	Amount	Per Ton
1.	Exploring in Mine	59.51	.000	72.93	.001			13.42	.001
2.	Sinking in Shaft	14,652.99	.079	834.63	.006	13,818.36	.073		
4.	Development in Ore	45,500.65	.245	22,604.78	.162	22,895.87	.083		
5.	Stoping	66,126.25	.356	57,168.15	.413	8,958.10			.057
6.	Timbering	9,912.28	.053	7,280.73	.053	2,631.55	.000		
7.	Tramming	39,101.57	.210	19,961.44	.144	19,140.13	.066		
8.	Ventilation	295.26	.002			295.26	.002		
9.	Pumping	9,341.93	.050	9,412.55	.068			70.62	.018
10.	Compressors & Air Pipes	2,629.53	.014	2,466.98	.018	162.55			.004
12.	Underground Supts.	6,914.25	.037	5,101.90	.037	1,812.35	.000		
13.	Safety Awards	190.00	.001			190.00	.001		
14.	Maint.Compr.& Power Drills			963.74	.007			963.74	.007
15.	" Hand Tram.Equipt	1,151.17	.006	1,593.93	.012			442.76	.006
16.	" Electric Tram Equipt.	6,082.74	.033	3,471.13	.025	2,611.61	.008		
17.	" Pumping Machinery	917.94	.005	714.52	.005	203.42	.000		
	Total Underground Costs	202,876.07	1.091	131,647.41	.951	71,228.66	.140		
	Surface Costs								
	Group Insurance	517.10	.003			517.10	.003		
18.	Hoisting	19,384.53	.103	14,579.18	.107	4,705.35			.004
19.	Stocking Ore	3,851.04	.021	3,033.91	.022	817.13			.001
20.	Employees Vacation Exp.	2,432.04	.013			2,432.04	.013		
21.	Dry House	3,989.45	.021	3,030.61	.022	958.84			.001
22.	General Surface Expense	1,273.72	.007	860.97	.006	412.75	.001		
23.	Maint: Hoisting Equipt.	8,334.83	.045	4,163.47	.030	4,171.36	.015		
24.	" Shaft	354.55	.002	342.52	.002	12.03	.000		
25.	" Top Tram Equipt.	1,096.48	.006	620.07	.004	476.41	.002		
26.	" Docks,Trestles,Pockets	573.93	.003	412.44	.003	161.49	.000		
27.	Mine Buildings	3,099.09	.017	235.87	.002	2,863.22	.015		
	Total Surface Costs	44,906.76	.241	27,379.04	.198	17,527.72	.043		
	General Mine Expenses								
	Accrual Unemploy.Exp.	1,763.88	.010			1,763.88	.010		
28.	Insurance	539.23	.003	483.03	.003	56.20	.000		
29.	Mining Engineering	1,197.15	.006	1,004.43	.008	192.72			.002
30.	Mech.& Elec. Engineering	235.49	.001	175.57	.001	59.92	.000		
31.	Analysis & Grading	3,811.17	.021	3,265.52	.024	545.65			.003
32.	Personal Injury	4,033.36	.022	2,651.28	.019	1,382.08	.003		
33.	Safety Department	436.22	.002	270.48	.002	165.74	.000		
34.	Telephones & Safety Devices	284.87	.002	326.00	.003			41.13	.001
35.	Local & Gen. Welfare	1,514.50	.008	1,553.59	.011			39.09	.003
36.	Special Exp.Pensions,etc.	2,906.14	.016	2,763.11	.019	143.03			.003
37.	Ishpeming Office	6,192.00	.034	5,702.75	.041	489.25			.007
38.	Saranac Invest. Expense	1,174.35	.006	818.15	.006	356.20	.000		
39.	Mine Office	4,171.80	.022	3,631.20	.026	540.60			.004
	Total General Mine Expenses	28,260.16	.153	22,645.11	.163	5,615.05			.010

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8. COST OF OPERATING

b. Detailed Cost Comparison

	1936		1935		Increase		Decrease	
	Amount	Per Ton	Amount	Per Ton	Amount	Per Ton	Amount	Per Ton
COST OF PRODUCTION	276,042.99	1.485	181,671.56	1.312	94,371.43	n.173		
40. Taxes	3,746.63	.020	3,271.88	.024	474.75			.004
Total Cost	279,789.62	1.505	184,943.44	1.336	94,846.18	.169		
Adjustment Supply Inven.	1,186.21	.006			1,186.21	.006		
Total	280,975.83	1.511	184,943.44	1.336	96,032.39	.175		

1. Exploring in Mine
Ishpeming Office Charge.

2. Sinking in Shaft
Incline shaft sunk 165 feet during 1936.

4. Development in Ore
Extensive development of raises, drifts, etc. in 1936.

5. Stoping
Decrease per ton due to more favorable stoping.

6. Timbering
More timber used in 1936 developing 10th Level.

7. Tramming
More expense account of 47,483 tons more ore handled than in 1935, extra trammers on 10th Level.

8. Ventilation
Installed new ventilating fan on 3rd Level Mackinaw Mine.

9. Pumping
Less expense for pumping.

10. Compressors & Air Pipes
More extensions to aid lines in 1936.

12. Underground Superintendence
Although there was an increase of $1812.35, the cost per ton remained the same due to the larger tonnage.

13. Safety Awards
Safety Awards given in 1936. No awards in 1935.

14. Maint: Compressors & Power Drills
Drill equipment purchased in 1935. Not any in 1936.

15. Maint: Hand Tramming Equipt.
Less repairs to scraper hoists during 1936.

16. Maint: Electric Tram Equipment
Heavy repairs to U.G. cars and locomotives in 1936.

17. Maint: Pumping Machinery
More repairs to Pumping machinery in 1936 than in 1935.

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8. COST OF OPERATING

b. Detailed Cost Comparison

17½. Group Insurance
Group insurance in 1936, no insurance in 1935.

18. Hoisting
Larger tonnages handled and increase in wages in 1936 as compared with 1935.

19. Stocking Ore
Erecting portable trestles and more ore stocked, 74,607 tons, in 1936 as compared with 57,380 for 1935.

20. Employees Vacation Expense
Employees vacation with pay expense in 1936. No vacation in 1935.

21. Dry House
More improvements in dry house and more fuel charged out in 1936.

22. General Surface Expense
More improvements in mine premises in 1936.

23. Maint: Hoisting Equipment
Hoisting equipment expense doubled in 1936 due to charging out new hoisting ropes, sheaves, skips and cages repairs, etc. and repairing 5th Level hoist etc.

24. Maint: Shaft
Charges for repairs to shaft about the same for 1936 and 1935.

25. Maint: Top Tram Equipment
Heavy repairs to top tram cars and new 5/8" Steel wire rope charged out in 1936.

26. Docks, Trestles & Pockets
Repairs to loading pockets and extensions and repairs to permanent trestles in 1936.

27. Mine Buildings
Ferro board shaft house main expense under this item in 1936 - fire prevention.

27½. Accrual of Unemployment Expense
Charges for accrual for unemployment expense in 1936. No unemployment insurance in 1935.

28. Insurance
Ishpeming Office charge.

29. Mining Engineering
More engineering work account shaft sinking and new 10th Level.

30. Mechanical & Electrical Engineering
Ishpeming Office charge.

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8. COST OF OPERATING

b. Detailed Cost Comparison

31. Analysis and Grading
More determinations made in 1936, due to more development work and checking on sulphur and phosphorus.

32. Personal Injury
Ishpeming office charge.

33. Safety Department
Increased due to more supplies used.

34. Telephones & Safety Devices.
Less extensions to telephones.

35. Local and General Welfare
Ishpeming office charge.

36. Special Expense, Pensions, Allowances.
Ishpeming office charge.

37. Ishpeming Office
Ishpeming office charge.

38. Saranac Investigation Expense
Ishpeming office charge.

39. Mine office
More overhead charges account general storehouse in 1936 but smaller cost per ton.

40. Taxes
Larger charge for taxes in 1936 but smaller cost per ton due to increased tonnage.

9. EXPLORATIONS AND FUTURE
EXPLORATIONS

The sinking of the incline shaft in the slate footwall was somewhat in the nature of an exploration since there was no definite proof of the downward continuation of the ore formation at that time. The rock drift at the northwest end of the 10th Level is likewise exploring for ore as the year ends, but also with the definite belief that at least a portion of the great ore thickness disclosed at the 9th Level will continue below.

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9. EXPLORATIONS AND FUTURE EXPLORATIONS

No additional work was done in 1936 toward penetrating the fault at the northwest end of the ore body. There is no doubt that the formation continues beyond this fault toward the Francis Mine and future exploration of this area by means of diamond drill may be advisable.

10. TAXES

	1936		1935	
GARDNER MINE - C&NW LEASE	Valuation	Taxes	Valuation	Taxes
SE¼ of SE¼ of Sec.35,45-25	5,000	92.55	5,000	92.57
NE¼ of SW¼ of Sec.35,45-25	80	1.48	-	-
NW¼ of NE¼ of Sec. 2,44-25	80	1.48	80	1.48
Personal Property	90,000	1,665.94	95,000	1,757.75
Total	95,160	1,761.45	100,080	1,851.80
Collection Fees		17.61		18.52
Total Taxes		1,779.06		1,870.32
MACKINAW MINE - DM&M LEASE				
N½ of SE¼ & SW¼ of SE¼ of Sec. 35,45-25	105,000	1,943.47	75,000	1,387.68
S½ of SW¼ of Sec.35,45-25	250	4.62		
Total	105,250	1,948.09	75,000	1,387.68
Collection Fees		19.48		13.88
Total Taxes		1,967.57		1,401.56
Total Gardner Mackinaw Mine	200,410	3,746.63	175,080	3,271.88

The property descriptions in 1936 include the additional lands secured by lease from the C.& N.W. Railway Co. (Gardner) and the D.M.& M. Land Co. (Mackinaw). The increased ore reserve reported at the end of 1935 is reflected in the higher tax paid in 1936. The tax payment on a production and shipment basis for the last two years may be shown as follows:

	1936		1935	
Production	195,954 tons, taxes per ton	.0201	138,471 tons taxes per ton	.0237
Shipments	152,017 tons taxes per ton	.0246	144,467 tons taxes per ton	.0227

11. ACCIDENTS AND PERSONAL INJURY

In 1936 the Gardner Mackinaw Mine once more stood at the head of the list of Company mines having no lost time accidents. The mine is now flying one of the Banner Safety Flags given out by the Company to represent its record.

With the exception of the two accidents reported last year, the mine has operated over 2000 days without a lost time accident.

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12. NEW CONSTRUCTION AND PROPOSED NEW CONSTRUCTION

The only new construction during the year was the enclosing of the Mackinaw head frame with fire proofing material as mentioned in 5. a. 2. of this report. This was to eliminate a fire hazard. The old shaft house covering of wood and gunite was removed, the permanent trestle repaired and the top tram engine house as well as the whole head frame above the landing platform fire proofed by the use of ferro board. This involved considerable expense.

There is no new construction contemplated for 1937 except regular maintenance at the mine buildings and crusher.

13. EQUIPMENT AND PROPOSED EQUIPMENT

a. Steam Shovels
Necessary repairs to steam shovels were made in the spring before the opening of shipping season. A second shovel was sent to the district to save time in moving from mine to mine.

b. Stockpile Trestles
Due to the limited shipments from the Mackinaw stockpile during the season, the stocking for 1936-1937 is to the south of last year's pile. Twenty three bents were erected in the fall.

c. Pumping Equipment
As mentioned in last year's report, the pumping from the lower levels has been by air pumps. It was expected to install an electric pump during the year but due to extensive repairs to underground hoist and shaft the electric pump installation was not made. The gallons per minute pumped has decreased gradually from year to year and it is possible the proposed new installation is not warranted.

d. Hoist at Incline Shaft
To increase the rope capacity of the drum it was necessary to install a dividing flange in the center, permitting a second layer on each side of the divided drum.

This hoist has required considerable repair work during the year and is evidently overloaded. A new hoist or larger motor will eventually be needed.

e. Compressor
The mine is equipped with but one compressor. This has capacity to supply all of the air needed but due to lightening burning out several of the coils four or five years ago, there is the constant fear that the motor may give us trouble. A supplementary compressor of smaller capacity should be provided for emergency service.

GARDNER MACKINAW MINE
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13. EQUIPMENT AND PROPOSED EQUIPMENT

f. Motor Generator Set

The mine is equipped with a single rotary convertor. During the year this went out of commission and a temporary installation made from one of the Negaunee Mines. A second set should be installed to prevent a possible shut down of the mine due to no tramming facilities.

15. POWER

Electric power was furnished by the Cliffs Power & Light Company at varying rates throughout the year.

The detail of power used in 1936 and 1935 follows:

	K.W.H. USED				
	1936	1935	Incr.	Decr.	Remarks
Gardner Hoist	-	-			Idle
Mack.Hoist & Lighting	412,484	303,429	109,055		Larger tonnage handled.
Compressors	1,552,290	1,002,137	550,153		"
Electric Haulage	155,710	101,200	54,510		"
Shops	3,100	2,752	348		
Top Tram-Mackinaw	11,571	1,248	10,323		
Underground Hoist	177,860	109,220	68,640		
Pumping & Lighting	274,121	329,496		55,375	
Analysis (Crusher)	120	129		9	
" " (Drier)	12,597	11,313	1,284		
Flood Lights-Mackinaw	1,595	2,175		580	
Heating Platn	1,585	1,932		347	
Dry House	3,736	4,508		772	
Office	566	644		78	
Timbering	2,490	1,942	548		
Total	2,609,825	1,872,125	737,700		
In Cash	$37,286.97	27,100.30	10,186.67		
Cost per KWH	.0142	.0145			

17. CONDITION OF PREMISES

The premises are kept neat and clean. During the year considerable planting of flowers, shrubs and trees was done about the mine buildings at no expense to the company, the men contributing seeds, plants, etc.

GARDNER MACKINAW MINE
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18. NATIONALITY OF EMPLOYEES

As to Parentage	1936	%	1935	%
English	12	7.5	11	8.2
Finnish	49	30.6	45	34.1
Italian	43	26.9	32	24.1
Swedish	19	11.9	20	15.1
French-Canadian	22	13.8	15	11.3
Germans	4	2.5	1	.8
Norwegian	7	4.4	5	4.0
Irish	1	.6	1	.8
Belgian	2	1.2	1	.8
Hungarian	1	.6	1	.8
Total	160	100.0%	132	100.0%

	Total		American Born		Foreign Born	
As to Birth	1936	1935	1936	1935	1936	1935
English	12	11	7	7	5	4
Finnish	49	45	18	16	31	29
Italian	43	32m	15	12	28	20
Swedish	19	20	11	7	8	13
French-Canadian	22	15	15	10	7	5
Germans	4	1	4	1	0	0
Norwegians	7	5	5	3	2	2
Irish	1	1	1	1	0	0
Belgian	2	1	1	0	1	1
Hungarian	1	1	0	0	1	1
Total	160	132	77	57	83	75
Percentages			48%	43%	52%	57%

GWINN DISTRICT GENERAL
ANNUAL REPORT
YEAR 1936

1. GENERAL

Conditions in the Gwinn District continued to improve during the year.

From January 1st to July 1st the Gardner Mackinaw Mine worked six days per week, with three shifts per day. The first four days were the regular mining schedule of two 8 hr. shifts mining and three 8 hr. shifts hoisting. The last two days were engaged in shaft sinking three 8 hr. shifts per day. During this period the shaft was sunk from the 9th to the 10th Levels.

From July 1st to December 31st the mine worked five days per week, three 8 hr. shifts per day, two of which were mining and three hoisting.

During the year, on account of the increased schedule, more men were employed at the Gardner Mackinaw and a number of men from the district found employment in Ishpeming and Negaunee mines.

As in the past few years, there were a number of small jobbers in the district getting out wood products such as pulpwood, mine timber, etc.

A firm by the name of Railo & Rytkonen built a camp a mile or so south of the Gardner Mackinaw Mine. They purchased a large stumpage from the Land Department which will require several years to cut. They are employing at present 125 men. The camp is modern with change house, electric lights, etc. and is very well run.

The CCC Camp #1620 located 18 miles west of Gwinn, is still in operation. This Camp was called on often during the past year to help fight forest fires. The families of some of the officers have made their headquarters at the Gwinn Hotel.

The Gwinn State Savings Bank showed an increase of $48,000 in deposits in 1936 and $24,000 in 1935. The deposits are nowabout the same as in December, 1931.

The Gwinn school continued its full time schedule throughout the year. The enrollment was slightly less than in 1935. The salary reductions of 30% put into effect in 1933-34 have been practically restored.

A new brick and cinder block garage was built on Pine Street just north of the bank. This is a good looking up-to-date building.

Improvements were made at the grounds of the County Road Commission storehouse and garage on Flint Street. It now presents a very neat appearance.

GWINN DISTRICT GENERAL
ANNUAL REPORT
YEAR 1936

1. GENERAL (Cont.)

The Michigan Department of Conservation erected a building on the County road just west of Gwinn. This is one of their typical neat structures, built of wood and painted green and white. It is used for storing their trucks and fire fighting apparatus.

During the year a moving picture theatre was started in Gwinn in one of the store buildings in the hotel block. Here pictures are shown three times a week. The proprietors, LeDuc and Aley of Escanaba, personally run the theatre. The films are up to date and on a par with those shown in Negaunee, Ishpeming and Marquette while the admission prices are considerably lower.

The theatre is well patronized and fulfilled a long felt want in the community.

Last spring the Company cancelled its contract with Dr. Burke for supplying the mine physician and on April 1st Dr. Serbst was hired by the Company to look after the district. He is capable and well liked and the present arrangement is much more satisfactory.

Forsyth Township placed new street lights in the business section of Gwinn and also installed lights along the main highway leading from Gwinn to New Swanzey.

a. Statement Showing Total Ore Produced in District by C.C.I.Co. 1903 to 1936 Inclusive.

Year	Austin	Princeton	Stephenson	Gwinn	Francis	Gardner Mackinaw	Total
Total to 1936	1,589,018	1,584,333	3,835,157	988,665	504,667	881,517	9,383,357
1936	0	0	0	0	0	185,954	185,954
	1,589,018	1,584,333	3,835,157	988,665	504,667	1,067,471	9,569,311

b. Statement showing Total Ore Shipments by C.C.I.Co. from 1905 to 1936 Inclusive.

Year	Austin	Princeton	Stephenson	Gwinn	Francis	Gardner Mackinaw	Total
Total to 1936	1,589,018	1,453,681	3,708,444	988,325	394,988	848,365	8,982,821
1936	0	883	9,645	0	57,308	152,017	219,853
	1,589,018	1,454,564	3,718,089	988,325	452,296	1,000,382	9,202,674

c. Ore in Stock at Mines Dec.31,1936

Princeton	Stephenson	Francis	Gardner Mackinaw	Total
129,769	111,078	52,371	70,485	363,703

GWINN DISTRICT GENERAL
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5. LABOR AND WAGES

The number of shifts worked by employeesin the district in 1936 was 35,809 as compared with 22,935¼ in 1935.

There was a general increase in wages effective November 16, 1936 which increased common labor 6¢ per hour, making the new surface labor rate 50¢ per hour. The average increase over all amounted to 9.679%.

10. TAXES

The following statement gives the taxes in detail for 1936 and 1935 from 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 & Light Company in order to show the total taxes paid in Forsyth Township by the Company, exclusive of that paid by the Land Department.

Forsyth Township	1936		1935	
Mineral Lands, Gwinn Fee	Valuation	Taxes	Valuation	Taxes
SW¼ of SW¼ of Sec.26,45-25, 45 acres	80	1.48	80	1.48
S½ of SE¼ of Sec.27,45-25, 80 acres	160	2.96	160	2.97
NW¼ of SE¼ of Sec.27, " 40 "	80	1.48	80	1.48
NE¼ of SE¼ of Sec.28, " 40 "	80	1.48	80	1.48
N½ of NE¼ of Sec.34, " 80 "	160	2.96	160	2.97
SE¼ of NE¼ of Sec.34, " 40 "	80	1.48	80	1.48
NE¼ of NW¼ of Sec.34, " 40 "	80	1.48	80	1.48
NE¼ of SE¼ of Sec.34, " 40 "	80	1.48	80	1.48
NW¼ of Sec.35, " 160 "	320	5.92	320	5.92
Lots 1,2,& 3, Sec.36, " 52 "	105	1.96	100	1.83
Lots 7,8," 9, Sec.36, " 98.92"	210	3.89	200	3.69
Lot 11 of Sec.36, " 13.3 "	20	.37	20	.37
S½ of N½ of Sec.22, " 160 "	500	9.26	500	9.24
S½ of NE¼ of Sec.28, " 80 "	130	2.41	130	2.40
N½ of NW¼ of Sec.22, " 87.08"	90	1.66	90	1.66
NE¼ of Sec. 2, " 165.61"	190	3.51	190	3.51
Total	2,365	43.78	2,350	43.44
Collection Fee		.44		.43
		44.22		43.87

GWINN DISTRICT GENERAL
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YEAR 1936

10. TAXES (Cont.)

	1936		1935	
Gwinn Townsite, Surface Only	Valuation	Taxes	Valuation	Taxes
NE¼ of SW¼, Sec.21,45-25, not included in Plat 6-Acres	100	1.86	100	1.86
NE¼ of SW¼, Sec.21,45-25, 27.4 acres	150	2.77	150	2.78
That partof S½ of NW¼,Sec.21,45-25 not included in Plat of Gwinn, 25.01 Acres	200	3.70	200	3.70
E½ of SE¼ of Sec.21,45-25, 65.84 acres	140	2.59	140	2.60
That part of W½ of SE¼, Sec.21,45-25 not included in Plat of Gwinn,38.80 A.	300	5.56	300	5.55
Gwinn Townsite Plat	89,345	1,654.20	89,255	1,650.76
Part of W½ of SE¼,Sec.21,45-25, Supts. residence, 1/2 acre	3,000	55.53	3,000	55.49
NW¼ of NE¼,Sec.21,45-25, except 5 acres in cemetery, 35 acres	100	1,86	100	1.86
Part of S½ of NE¼,Sec.21,45-25,50.99 A.	300	5.56	300	5.55
Lot 20,Block 7 (Previous years)		3.92		
Total	93,635	1,737.55	93,545	1,730.15
Collection Fees		17.34		17.30
Total		1,754.89		1,747.45
Gardner Mackinaw Dwellings				
N½ of NE¼ of Sec.35,45-25, 87.35 acres	5,000	92.55	5,000	92.57
Collection Fee		.93		.93
Total Taxes		93.48		93.50
Central Water Plant,NW¼ of NE¼ of Sec.28,45-25	400	7.47		
Personal District Office	500	9.34	500	9.34
District Crusher, N½ of NW¼ Sec.27,45-25	1,000	18.70	1,000	18.68
Total	1,900	35.51	1,500	28.02
Austin Location				
Part of Lot 5,SW of NE,Sec.20,45-25	3,500	64.77	3,500	64.75
NW¼ of SE¼ of Sec.2,45-25	5,000	92.55	5,000	92.57
NE¼ of SW¼ of Sec.20,45-25 BH	260	4.81	260	4.82
Total	8,760	162.13	8,760	162.14
Collection Fees		1.62		1.62
Total		163.75		163.76

GWINN DISTRICT GENERAL
ANNUAL REPORT
YEAR 1936

10. TAXES (Cont.)

Summary	1936 Valuation	1936 Taxes	1935 Valuation	1935 Taxes
Stephenson Mine	127,060	2,375.14	142,060	2,654.76
Princeton Mine	236,260	4,416.66	236,260	4,424.21
Francis Mine	100,500	1,881.84	135,500	2,535.74
Gardner Mackinaw Mine	200,410	3,746.63	175,080	3,271.88
Austin Location	8,760	163.75	8,760	163.76
Mineral Lands	2,365	44.22	2,350	43.87
Gwinn Townsite	93,635	1,754.89	93,545	1,747.45
Gardner Mackinaw Location	5,000	93.48	5,000	93.50
Central Water Plant	400	7.47	-	-
Personal District Office	500	9.34	500	9.34
District Crusher	1,000	18.70p	1,000	18.68
Total C.C.I. including 1% Fee	775,890	14,512.12	800,055	14,963.18
The Cliffs Power & Light Co	98,191	1,835.69	98,191	1,835.14
Total Mining Department	874,081	16,347.81	898,246	16,798.32
Rate per $100.00		1.851		1.851

Taxies Levied - Forsyth Township

	1936	1935	1934	1933
Forsyth Township Valuation	1,429,110	1,478,347	1,469,033	
Rate per $100.00	1.851	1.851	2.206	
Amount of Tax roll				
State Tax	-	7.61	852.48	853.97
County Tax	10,003.77	10,130.05	9,136.94	8,673.33
County Debt Service	494.36	548.03	800.00	1,965.39
County Road	928.92	1,114.30	734.52	735.85
Township Tax	4,215.87	4,368.58m	4,700.91	3,296.16
Township Debt Service	800.00	818.23	-	1,023.32
School	6,288.08	6,684.35	6,610.64	7,954.82
School Debt Service	3,704.48	3,742.34	9,000.00	-
Cemetery	-	-	-	n -
Road Repair Tax	-	3.81	-	-
Highway Improvement Tax	-	3.66	-	-
Rejected	187.92	-	175.76	156.57
Total	26,623.40	27,420.96	32,011.25	24,659.41
Amount paid by C.C.I.Co	16,347.81	16,798.32		
Percent paid by C.C.I.Co	60.08%	60.66%		

GWINN DISTRICT GENERAL
ANNUAL REPORT
YEAR 1936

16. WATER SUPPLY
GWINN DISTRICT

The cost of operating the pump station was somewhat more than last year due principally to more repairs to water mains. During the month of February it became necessary to install a boiler and steam some of the main lines in Gwinn. This was mostly due to the fact that on February 16 one of the high tension wires was found lying across the road near the District Laboratory at Princeton. This occurred about 4:30 A.M. with the temperature at 35 below zero. This necessitated shutting off of the current at this time, and also for one hour during the afternoon, when repairs were made which caused a lot of freezing of the water mains.

During the year considerable criticism was directed at the Gwinn Water Supply by the Michigan State Board of Health. Weekly samples sent to the State Laboratory at Houghton invariably were reported back as containing a very high bacterial count and occasionally as dangerous contamination. Thesource of the supply was the Escanaba River at a point about one half mile above Princeton. This supply had been used since 1908 and while not the best, was never considered dangerous. The complaints from the State became more frequent during the past few years and the greatest contributing cause was undoubtedly in the operation of the hydroelectric plant of the Cliffs Power & Light Company about five miles upstream. This plant operates intermittently. When the plant is shut down, there is little water in the river; on the other hand, when it operates there is a rush of water and a scouring of the river bed which evidently contaminated the supply for drinking purposes. The water was chlorinated to such an extent that it made it unpalatable. Three to four times as much chlorine was used as is considered normal treatment.

It was decided to look for a new source of supply.

The land lying due south of Gwinn is a flat, sand-covered plain with the water level in most places from ten to fifteen feet below surface and ledge 100' deep.

Early last spring a stand pipe was sunk along the old bed of the East Branch about 500' south of the Gwinn Railway Station. Quicksand was encountered so the work here was abandoned.

The next place selected to test was the abandoned concrete shaft at the Jopling Mine on property owned by the Alfred Kidder Estate. Diamond drill holes at the shaft location showed fine and coarse gravel for 10' to 50' below surface.

Negotiations were started with the owners of this land, who granted permission to unwater the shaft and make tests to determine whether

GWINN DISTRICT GENERAL
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YEAR 1936

16. WATER SUPPLY
GWINN DISTRICT (Cont.)

a potable and adequate supply could be secured. it was further understood that if a satisfactory supply was secured the surface rights would be purchased.

The shaft was unwatered in May and the walls of the shaft scrubbed down. A platform was placed in the shaft 50' below surface and the 30" concrete wall punctured by drilling holes around the perimeter of the shaft at 47 feet. Gravel was found at all holes. As soon as tapped, pipes were placed and caulked in each hole and shut-off valves attached. Seventeen 2" and eight 1½" holes were drilled. Water was run through the pipes until it became clear. It was clear as crystal and contained no contamination, although it showed a fairly high bacterial count. As soon as it was determined that the quantity was adequate, arrangements were made to install the pump station at the shaft site.

A concrete slab supported by I beams was placed in the shaft 10' below surface and a Layne-Western 1,000 gallon per minute pump installed. The suction was placed 37' below the concrete so as to bring it about the height of the inflow pipes. The pipes were then opened by valve rods extending through the concrete floor and the water permitted to rise in the shaft. It reached its level about two feet below the concrete floor. The flow into the shaft can be regulated by the valves.

The water main running south from Gwinn was extended to the Jopling or Kidder shaft.

The Layne-Western pump was designed to force water through Gwinn and up to the Austin and Princeton locations. In order to supply the latter, 90 pounds were required, which raised havoc with the wood lines in Gwinn, causing as many as six to eight leaks a day. These lines have been in use about 30 years and under ordinary pressure of fifty pounds have given us considerable trouble. It was decided to cut the pressure to fifty pounds or under and install a booster pump at the Austin Location to force the water over the hill. When this had been completed, the River Pump Station was abandoned December 2nd and the 500 gallon pump transferred to the new shaft station.

Considerable trouble has been had in the operation of the pumps to control the proper supply to the booster pump. These details will be worked out.

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YEAR 1936

16. WATER SUPPLY
GWINN DISTRICT (Cont.)

The site covering the new pump station has been purchased and an octagonal house built to cover the shaft. It presents a neat appearance.

The Marquette County Road Commission is relocating a road which ran by the shaft to prevent possible contamination from that source.

The following statement gives the cost of operating pump station for the years 1936 and 1935:

	1936	1935	Increase	Decrease
General Expense	59.15	61.52		2.37
Maintenance Labor	1,375.87	900.98	474.89	
Maintenance Material	554.02	604.06		50.04
Operating Labor	1,783.91	1,580.46	203.45	
Operating Supplies	4,951.91	4,651.65	300.26	
Total	8,724.86	7,798.67	926.19	
Cost per 1,000 gallons pumped	.033	.029		
Gallons pumped	262,800,000	262,800,000		

General Expense
The small decrease is accounted for in that there was a change in rate for telephone.

Maintenance-Labor
The increase in this account is due to more repairs to pipe lines in 1936.

Maintenance-Material
The decrease in this account is due to less supplies used in repairs to pipe lines in 1936.

Operating Labor
The increased cost is from the fact that there was more time for operators in 1936, also increase in wages on November 16th. This item should be reduced in 1937.

Operating Supplies
This increased cost is the power cost, due to power charges for the old and new pump stations during the latter portion of the year.

GWINN DISTRICT GENERAL
ANNUAL REPORT
YEAR 1936

16. WATER SUPPLY
GWINN DISTRICT (Cont.)

Operating costs were charged off as follows:

	1936	1935
1. C.C.I.Co. Mines	22.50	30.00
2. Water Charges Receivable	2,122.21	2,215.81
3. Gwinn Townsite Expense Gen.	6,580.15	5,552.86
Total	8,724.86	7,798.67

While the Maintenance Labor account increased $474.89, included in this increase is an item of $168.96 which is not a cash expenditure but shown as a cost item. This amount was for work performed by men owing rent, which they could not pay.

17. CONDITION OF PREMISES

The County under the McNitt Act is supposed to look after all roads and alleys taken over. The streets and alleys in Gwinn, Austin and Princeton are given one cleaning per year, in the spring, by the County. It refuses to do more. The Township is so limited for funds by the 15 mill tax that it can do very little. In order to keep the town clean, it is necessary for the Company to assist somewhat. Considerably more should be done to pres rve the name, "Model Town". On the whole, however, the condition of the streets and alleys compare favorably with those in the other cities of the county.

The premises for the most part are well kept.

The Company double houses are all badly in need of paint and this work should be started the coming summer. During the past season kalsomine and paint were given deserving tenants for redecorating the interior of their houses.

GWINN DISTRICT GENERAL
ANNUAL REPORT
YEAR 1936

17. CONDITION OF PREMISES (Cont.)

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

Gwinn Townsite	1936	1935	1934	1933
Number of Houses (123)				
Rents Accrued	10,391.71	7,604.74	7,708.63	7,249.51
Repair Expense (1)	5,945.19	2,558.91	1,508.26	597.32
Accrued rent over repair cost	4,446.52	5,045.83	6,200.37	6,652.19
Actual Rent Collection	9,095.45	6,162.81	5,636.79	
Amount credited by men owing back rent (2)	632.29	2,095.93		
Total Collection	9,727.72	8,258.74		

(1) In addition to this repair cost was an item of $231.00 for labor performed by men owing rent. This was not a cash expenditure.
(2) The credit shown $2,095.93 is the total amount credited to Gwinn rents by men owing for rent. This was not a cash outlay.

One large item in the increased cost was for repairs at the Doctor's house amounting to about $600.00.

New roofing was also put on the Gwinn Hotel Building, cost $342.00; also the bank building, cost $283.33. Also new window shades, 13 mattresses and 6 springs were purchased and installed in the Gwinn Hotel at a cost of $198.50.

The increase for "Rents Accrued" is on account of rentals having been increased during the year. The increased collection is on account of more men having secured employment and making payments on rent accounts.

Austin Location	1936	1935	1934	1933
Number of Houses (45)				
Number Occupied	32	32	30	32
Rents Accrued	1,463.97	1,168.25	1,114.00	1,452.50
Repair Expense (1)	436.30	1,328.68	92.63	47.36
Accrued rent over repair cost	1,027.67	160.43	1,021.47	1,405.14
Actual rent collection	1,596.49	1,022.13	909.00	543.00
Amount credited by men owing back rent (2)	7.04	294.28		
Total Collection	1,603.53	1,316.41	909.00	543.00

GWINN DISTRICT GENERAL
ANNUAL REPORT
YEAR 1936

17. CONDITION OF PREMISES (Cont.)

Austin Location (C ont.)

(1) In addition to repair expense was an item of $10.56 for labor performed by men owing rent. Not a cash expenditure.
(2) Credit of $7.04 is total amount credited to Austin rents by men owing rent. This was not a cash outlay.

The increase in the "Rents Accrued" column is from the fact that during the year the rentals were increased.

The rent collection also shows an increase which is accounted for in that more men have been given employment and more rentals collected.

The decrease in repair expense is from the fact that in 1935 several of the houses were repaired, including new roofs, etc.

Two double houses were sold in the Austin Location during the year, No. 30-31; 34-35 and one house, No.54-55 donated to a Negaunee Church.

Princeton Location	1936	1935	1934	1933
Number of Houses (13)				
Number occupied	9	11	10	10
Rents Accrued	581.90	437.50	495.00	499.00
Repair Expense (1)	165.99	436.66	80.11	26.37
Accrued rent over repair cost	415.91	.84	414.89	472.63
Actual rent collection	471.59	458.00	427.50	229.00
Amount credited by men owing back rent (2)	7.04	114.18		
Total Collection	578.63	572.18	427.50	229.00

(1) In addition to repair expense was an item of $8.80 for labor performed by men owing rent. Not a cash expenditure.
(2) Credit of $7.04 is total amount credited to Princeton rents by men owing rent. Not a cash outlay.

The decrease in repair cost is from the fact that in 1935 there were more general repairs, including roof on one house, etc.

The increase in the "Rents Accrued" column is from the fact that the rentals were increased during the year. The rent collection increase in that there were more men working in 1936 which increased the collections.

GWINN DISTRICT GENERAL
ANNUAL REPORT
YEAR 1936

17. CONDITION OF PREMISES (Cont.)

Gardner Mackinaw Location	1936	1935	1934	1933
Number of Houses (14)				
Number occupied	2	5	5	5
Rents accrued	279.90	245.50	257.50	240.00
Repair Expense	91.00	88.21	27.79	28.20
Accrued rents over repair cost	188.90	157.29	229.71	211.80
Actual Rent collections	237.90	262.00	277.00	273.50

During the year 13 double houses were sold, 3-5;10-12;11-13;14-16; 15-17;19-21;20-22;23-25;24-26;27-29;28-30;32-34;54-55.

Statistical Statement of Rented Buildings 1936

Location	Vacant	Occupied	Total	Cost of Repairs	Repair Cost per house	Rent Accrued	Rent Collected
Princeton	4	9	13	165.99	12.77	581.90	578.63
Austin	13	32	45	436.30	9.69	1,463.97	1,603.53
Gardner-Mackinaw	12	2	14	91.00	6.50	279.90	237.90
Gwinn Townsite	2	121	123	5,945.19	48.34	10,391.71	9,727.72
	31	164	195	6,638.48 (1)	34.04	12,717.48	12,147.78 (2)

(1) Actual cash expenditurefor repairs 6,388.12
for labor performed in house repairs not a cash expenditure 250.36
Total as above 6,638.48

(2) Actual cash received 11,501.41
Amount credited by journal voucher and credited to house rents 646.37
Total as above 12,147.78

In addition to the above, collections in the sum of $357.14 were applied to rent and water accounts which have previously been charged off the books.

19. GWINN ASSOCIATION
GWINN HOTEL

(1) Gwinn Association
The Association Clubhouse located at Gwinn continued to serve the people of the district as a community center. Practically all social and recreational activities carried on in the district by the different organizations, such as the school,

GWINN DISTRICT GENERAL
ANNUAL REPORT
YEAR 1936

19. GWINN ASSOCIATION
GWINN HOTEL (Cont.)

91) Gwinn Association (Cont.)
churches and the club are held in the Association building. The Association is under the supervision of Mr. E. L. Miller, who has most ably looked after its affairs for seventeen years.

During the summer months the building was again placed in good condition; floors revarnished and waxed, some rooms redecorated, club kitchen remodeled, new dishes, silver and stove purchased. All other departments were put in good condition and equipment replaced where necessary to have them operating to their best advantage.

The club continues to receive the same financial assistance from the local Board of Education, for the use of the building to carry on their Physical Education Program and for the supervision of their athletic program.

The membership roll showed a slight increase over the previous year; average monthly membership 249; of which 164 were employees of the Gardner Mackinaw Mine and the remainder being local townsmen. A detailed annual report of the Association is furnished the Welfare Department, so a brief synopsis of that report is hereby given.

A check of the attendance at the building shows a slight decrease over the previous year, due no doubt to the fact that many of the members are more steadily employed. Estimated attendance 67,015.

The Association sponsored and supervised indoor and outdoor activities and also furnished equipment for activities which were supervised by other agencies.

Indoor activities included a four team senior basketball league, a ten team junior basketball league, an eight team men's cribbage league, a women's bridge league, billiard instruction for high school girls, a twenty piece band, a library and reading room, two girl scout troops and one boy scout tropp, free dancing parties during summer vacation for high school students, bowling leagues for men and women, supervised social dancing and play periods in gymnasium for men and women. Besides the above, the building was used by church organizations, women's study club, town club for regular meetings and also by the Cleveland-Cliffs Company employees for instruction in first aid. Outdoor activities included supervision of an eight team inter-county amateur baseball league,

GWINN DISTRICT GENERAL
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19. GWINN ASSOCIATION
GWINN HOTEL (CONT)

(1) Gwinn Association (Cont.)
softball leagues for men and boys, tennis and horseshow pitching courts, construction and supervision of an ice skating rink and the care of Bass Lake Cottage and grounds.

Total number of meetings or social events held at the building during the year were 315. Of this number 12 are considered as special or annual affairs; church organizations used the building for 44 meetings or socials; three Scout troops held 97 meetings; events where dancing was permitted, 30; general committee meetings 15; and other organizations, such as the women's study club, town, club, musical organizations, supervised card leagues for men and women, band rehearsals and meetings by the Cleveland-Cliffs employees held 129 meetings.

The one section of the building used as a school kindergarten held 178 full day sessions, which are not included in the above.

It is estimated the 14,700 people, either as participants or spectators, enjoyed the Association's outdoor supervised programs.

Bass Lake Camp
The attendan ce at the camp grounds decreased somewhat during the season, due mostly to the fact that many of those that were regular visitors in other years are now employed and could only attend during Saturdays or Sundays.

There was an increase in the number of out of town residents that visited the camp on Sundays, bringing their own boats on trailers. Many of these visitors were Marquette and Escanaba residents. The men would fish while the mothers and children would ebjoy the bathing.

The Cleveland-Cliffs Iron Co. again arranged for a caretaker to look after the grounds under association direction.

(2) Gwinn Hotel
The Hotel was operated throughout the year under the same management as last year. Better conditions in the district made it possible for the proprietor to pay a small monthly rental.

It was necessary to put a new roof over the entire building and to add a dozen bed springs and mattresses to the equipment. Paint, varnish and kalsomine were furnished for redecorating. New window shades were also provided.

GWINN DISTRICT GENERAL
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20. GWINN DISTRICT CRUSHER

The crusher operated 98 days in 1936. The ore crushed was as follows:

	1936	1935
Gardner Mackinaw	152,018	144,467
Princeton	0	
Stephenson	400	
Francis	2,072	
	154,490	144,467

The cost for the year 1936 and 1935 were as follows:

	1936		1935	
	Amount	Per Ton	Amount	Per Ton
General Expense	26.50		32.20	
Maintenance	202.66	.002	900.69	.006
Operating	4,547.48	.029	3,585.68	.025
Total Optg.Expense	4,776.64	.031	4,518.57	.031
Switching	1,505.35	.010	1,458.40	.010
Grand Total	6,281.99	.041	5,976.97	.041
Tons crushed	154,490		144,467	
Increase in tonnage crushed	10,023			

PRINCETON MINE
ANNUAL REPORT
YEAR 1936

1. GENERAL

This mine has been idle since 1921. During the year, 883 tons of Cambridge Ore were loaded and shipped.

2. PRODUCTION SHIPMENTS & INVENTORIES

b. Shipments

	1936	1935	Incr.	Decr.
Cambridge	883	101	782	

c. Stockpile Inventories

Cambridge	105,583	106,364
Princeport	9,160	9,160
Section 19 Cambridge	13,713	13,815
" 19 Princeport	1,313	1,313
Total	129,769	130,652

4. ESTIMATE OF ORE RESERVES

a. Developed Ore

Assumption: 12 cu. ft. equals one ton
10% reduction for rock
10% reduction for loss in mining.
Percentage of Bessemer equals 0.

	Princeport	Cambridge	Sec.19 Princeport	Sec.19 Cambridge	Total
Ore above 2nd Level	2,552				2,552
Ore above 4th Level		78,325			78,325
Ore above 5th Level	20,000	58,778			78,778
Ore above 6th Level	60,318	445,694	9,000	57,128	572,140
Total	82,870	582,797	9,000	57,128	731,795

b. Prospective Ore

Ore below 6th Level	20,000	418,815	5,000	46,921	490,736
TOTAL ORE					1,222,531

c. Estimated Analysis

Grade-Princeport	Iron	Phos.	Sil.	Mang.	Alum;	Lime	Mag.	Sul.	Ign.	Moist
Dried 212°	59.50	.300	7.73	.505	1.214	1.605	1.037	.023	2.235	
Natural	50.60	.256	6.57	.429	1.032	1.365	.862	.020	1.900	15.00
Cambridge										
Dried 212°	59.75	.853	4.42	1.193	.937	3.676	.840	.023	1.447	
Natural	50.80	.725	3.76	1.014	.797	3.125	.714	.020	1.230	15.00

PRINCETON MINE
ANNUAL REPORT
YEAR 1936

4. ESTIMATE OF ORE RESERVES

d. Estimated Tonnage as required by State Tax Commission
Non-Bessemer Ore

Developed:	1. Princeport	91,870 tons	
	2. Cambridge	639,925 "	
Total Developed			731,795 tons
Prospective:	1. Princeport	25,000 tons	
	2. Cambridge	465,736 "	
Total Prospective			490,736 "
GRAND TOTAL			1,222,531 tons

The above estimates of ore in the mine were made in December, 1921.

8. COST OF OPERATING

2. Comparative Costs	1936	1935	Incr.	Decr.
Underground costs	-	-		
Surface Costs	1,124.28	1,542.61		418.33
General Mine Accounts	46.40	36.18	10.22	
Total	1,170.68	1,578.79		
Loading and Shipping	158.56	57.72	100.84	
Taxes	4,416.66	4,424.21		7.55
C&NW charge for tracks		11.30		11.30
Supply Inventory Adjustment	514.78		514.78	
TOTAL	6,260.68	6,072,02	188.66	

a. Comparative Costs
Surface Cost. The larte decrease in this account is that in 1935 the old wooden head frame was dismantled and the shaft covered.

Loading and shipping. The increase in this account is due to more ore loaded during 1936 than 1935.

10. TAXES

	1936		1935	
	Valuation	Taxes	Valuation	Taxes
NE¼ of NE¼ Sec.19,45-25 (C&NW)	10,000	185.10	10,000	185.01
158.27 acres in Sec. 18,45-25	10,000	185.10	10,000	185.01
160.00 acres in NW¼ Sec.20,45-25	100,000	1,850.92	100,000	1,850.24
NW¼ of NE¼ Sec.19,45-25 (Loc.)	420	7.77	420	7.69
S½ of NE¼ Sec.19,45-25 "	840	15.54	840	15.38
Personal Property	115,000	2,128.50	115,000	2,127.80
Total	236,260	4,372.93	236,260	4,371.13
Collection Fees		43.73		43.71
Total Taxes		4,416.66		4,414.84
Tax rate per $100		1.851		1.861

STEPHENSON MINE
ANNUAL REPORT
YEAR 1936

1. GENERAL

This mine was abandoned in 1927 but the Company is still paying the taxes on the original description, the S½ of the SW¼ of Section 20,45-25, as well as the adjoining 80 acres to the south, i.e., the N½ of the NW¼ of Section 29,45-25, on account of the ore in stock. The latter description is owned by the Chicago & North Western Railway Company.

2. PRODUCTION SHIPMENTS & INVENTORIES

b. Shipments

	1936	1935
Stephenson	-	-
Stephensonwood	8,995	14,458
Northdale	-	-
Northwood	-	-
Total	8,995	14,458

c. Stockpile Inventories

	1936	1935
Stephenson Lease		
S½ of SW¼ of Sec. 20,45-25	92,102	101,097
C.& N.W. Lease		
N½ of NW¼ of Sec.29,45-25	18,976	18,976
Grand Total	111,078	120,073 tons

Ore Statement

	Stephenson	Stephenwood	Northdale	Northwood	Total
On hand Dec.31,1935	3,647	97,450	227	18,749	120,073
" Dec.31,1936	3,647	88,455	227	18,749	111,078

3. ANALYSIS

b. Average Analysis on Shipments

Grade	Tons	Iron	Phos.	Sil.	Mang.	Al.	Lime	Mg.	Sul.	Loss	Moist
Stephenwood	8,995	60.00	.738	4.44	.86	1.16	2.82	.101	.019	2.00	14.00

STEPHENSON MINE
ANNUAL REPORT
YEAR 1936

8. COST OF OPERATING

a. Comparative Mining Costs

	1936	1935	Incr.	Decr.	Cost per ton 1936
Underground costs	-	-			
Surface Costs	1,124.28	1,096.88	27.40		
General Mine Expense	131.74	81.72	50.02		
Total	1,256.02	1,178.60	77.42		
Loading & Shipping	759.96	805.76		45.80	.079
Taxes	2,375.14	2,654.76		279.62	
Supply Invent.Adjsmt.	4,273.72	-	4,273.72		
TOTAL	8,664.84	4,639.12	4,351.14	325.42	

The principal reason for the increase is due to the supply inventory adjustment.

In 1935 there were	14,458	tons	loaded.		
In 1936 " "	9,133	"	"	by shovel, cost per ton	.058
" 1936 " "	512	"	"	by hand, cost per ton	.430

10. TAXES

	1936		1935	
	Valuation	Taxes	Valuation	Taxes
80 acres-S½ of SW¼,Sec.20,45-25	1,000	18.51	1,000	18.50
80 acres,N½ of NW¼,Sec.29,45-25	160	2.96	160	2.97
Personal property, ore in stock	125,000	2,313.50	140,000	2,590.36
" " in warehouse	900	16.66	900	16.65
Total	127,060	2,351.63	142,060	2,628.48
Collection Fees		23.51		26.28
Total Taxes		2,375.14		2,654.76

SPIES VIRGIL MINE
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YEAR 1936

1. GENERAL

The Spies Virgil Mine remained idle during all of 1936 with the exception of pumping.

Pumping was wholly on the day shift with the Mine Clerk acting as hoisting engineer and the former underground foreman and pumpman as operators. The mine worked on a staggered basis.

The idle expense for the year amounted to $25,317.81; Operating Expense $6,551.10; Taxes $8,976.50; Supply Inventory adjustment $6.84, making the total cost for the year $40,852.25 as compared with $31,841.34 for 1935. The difference in the idle expense was due to overhauling of hoist, compressor, motor generator sets, boiler repairs and replacement of pipe lines and general building repairs, etc. The operating expense was increased due to more shipments from stockpiles.

In 1935 the mine shipped 64,792 tons at a cost of .0372 per ton for analysis and shipping. In 1936, 121,255 tons were shipped at a cost of .053 per ton. The increased cost was due to small quantities of ore being loaded whenever called for and the necessity of shifting from pile to pile to try to meet the silica guarantee.

2. PRODUCTION SHIPMENTS & INVENTORIES

b. Shipments

Grade of Ore	Stockpile Tons
Virgil Crushed	121,255
Total 1935	64,792
Increase over 1935	56,463
Total shipments to Jan. 1, 1936	610,689
Shipments during 1936	121,255
Total shipments from mine to 1-1-37	731,944
Sherwood stockpile shipments,1936	1,292

Stockpile loading was from both the main pile and the east side of the north pile. There was no difficulty with the phosphorus guarantee as experienced in 1935 but there was continual trouble

SPIES VIRGIL MINE
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2. PRODUCTION SHIPMENTS & INVENTORIES (Cont.)

due to high silica. The average analysis of the pile when stocked showed 7.04 silica whereas the past season's loading averaged 8.33. Particular care was taken in sampling and it is evident that the stockpile analysis carried on the books is too low in silica and will be corrected to the figure obtained in last year's shipments, as it represents a good average sample of the two main piles.

c. Stockpile Inventories

Grade	Tons in Stock
Virgil Crushed	126,598
Virgil Crushed (Hi-Sulphur)	8,879
Total	135,477

f. Ore Statement

	Virgil Ore	Virgil Hi-Sulphur	Total	1935
On hand Jan.1,1936	247,853	8,879	256,732	321,524
Shipments	121,255	0	121,255	64,792
Balance 12-31-36	126,598	8,879	135,477	256,732

1935 - Idle except pumping throughout the year.
1936 - " " " " "

3. ANALYSIS

Grade	Tons	Iron	Phos.	Sil.	Mn.	Al.	Lime	Mag.	Sul.	Loss	Moist.
Virgil Crushed											
Dried 212° F.	126,598	56.30	.424	8.33	.19	1.84	.60	.21	.074	6.50	
Natural		52.35	.394	7.75	.18	1.70	.56	.19	.069	6.05	7.00
Virgil Hi-Sulphur Dried											
212° F.	8,879	57.41	.424	4.09					.369		
Natural		53.10	.392	3.78					.341		7.50

4. ESTIMATE OF ORE RESERVES

As there was no mining or development in 1936 the ore reserves remain the same as reported as of December 31, 1935.

a. Developed Ore

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

SPIES VIRGIL MINE
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4. ESTIMATE OF ORE RESERVES (Cont.)

a. Developed Ore (Cont.)

Virgil Ore	Available Tons	Unavailable Tons	Total Tons
Revised estimate developed ore above 6th Level, Dec.31,1936	41,008	507,718	548,726
Estimate of developed ore between 6th and 8th Levels,Dec.31,1936	167,318	95,712	263,080
Total Developed Ore, Dec. 31,1936	208,326	603,430	811,756

b. Prospective Ore

Between 6th and 8th Levels	409,151	278,755	687,906
Total all ore, Dec. 31, 1936	617,477	882,185	1,499,762

We estimate we will recover between 25% and 33%, in our last mining operations, of the ore above the 6th Level tied up in pillars and shown unavailable.

c. Estimated Reserve Analysis

	Iron	Phos.	Sil.	Mng.	Alum.	Lime	Mag.	Sul.	Loss	Moist
Dried	57.50	.425	7.00	.16	1.64	.60	.30	.119	7.35	
Natural	51.75	.382	6.30	.15	1.48	.55	.26	.107	6.60	10.00

5. LABOR AND WAGES

a. Comments

As the mine was idle during the entire year, the only regular crew was that employed in pumping which consisted of 12 men and the Mine Clerk.With the exception of the Clerk, they were for the most part on a staggered basis. The total time worked was 789 shifts more than in 1935, of which 725 were on surface and 54 underground.

The extra surface work was stockpile loading and general repairs, the underground,to pump, discharge column and shaft repairs. There was a change in wage schedule on November 15 which amounted to an increase of 6¢ per hour or slightly over 10%.

SPIES VIRGIL MINE
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5. LABOR AND WAGES (Cont.)

b. Comparative Statement of Wages and Product

	1936	1935	Increase	Decrease
PRODUCT	0	0		
NUMBER OF SHIFTS & HOURS	Idle 12 Mos.	Idle 12 Mos.		
AVG.NO.MEN WORKING				
Surface	8	7		
Underground	4	5		
Total	12	12		
AVG. WAGES PER DAY				
Surface	4.00	3.78	.22	
Underground	4.20	4.10	.10	
Total	4.06	3.91	.15	
WAGES PER MONTH				
Surface	48.00	45.36	2.64	
Underground	50.40	49.20	1.20	
Total	48.72	46.92	1.80	
PRODUCT PER MAN PER DAY	None	None		
LABOR COST PER TON	None	None		
AVG.PRODUCT BRK.& TRAM.	None	None		
TOTAL NUMBER OF DAYS				
Surface	2,021	1,296-9/16		
Underground	961-3/4	897-4/16		
Total	2,982-3/4	2,193-13/16		
AMOUNT FOR LABOR				
Surface	8,074.08	4,900.95	3,173.13	
Underground	4,040.07	3,675.45	364.62	
Total	12,114.15	8,576.40	3,537.75	

IDLE DURING 1935
IDLE DURING 1936

6. SURFACE

a. Building Repairs
1. Buildings - Mine

Repairs for the year were as follows: Applied roof dressing to power house roof; repaired mine office and shops and iron and steel shed; fixed doors and windows; general repairs to floors, windows and stairs in shaft house. Cost: Labor $148,60; Supplies $98.67, Total $247.27.

SPIES VIRGIL MINE
ANNUAL REPORT
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6. SURFACE (Cont)

a. Building Repairs (Cont.)
2. Buildings - Location

Repairs were for houses and sheds. The latter had been neglected for several years.

Labor	Supplies	Total
$ 164.98	135.22	298.20

7. UNDERGROUND

d. Timbering

No repairs were made to underground drifts during the year.

h. Ventilation

The main level drifts are bratticed near the shaft on all levels except the 6th and 8th to prevent the mine air, deficient in oxygen, from entering the Spies shaft. Air is blown down the 6" air line from surface to the 3rd and 8th Level pump stations and part of this, with a little natural ventilation, passes through the 6th and 8th Levels up through the old Virgil shaft. A recent inspection of the 6th level found the ventilation so bad that carbide lights would not burn in the main drift 1500' in from the shaft. Arrangements are being made to install a blower on the 8th Level which will probably improve conditions greatly.

i. Pumping

Both the 3rd and 8th Level pumps were operated throughout the year on one eight hour shift.

The water pumped for the year amounted to 89,770,200 gallons or 173.9 gallons per minute as compared with 86,439,900 gallons or 164 per minute in 1935, an increase of 9 gallons per minute

10. TAXES

Following is a comparative statement of taxes paid by the Company in Iron County for the years 1936 and 1935:

Description	1936		1935	
Iron River Township	Valuation	Taxes	Valuation	Taxes
NE¼ of NW¼ of Sec.24,43-35, 40 acres SE¼ of NW¼ of Sec.24,43-35, 40 acres Spies Dwellings.....	5,000	96.15	5,000	103.30

SPIES VIRGIL MINE
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10. TAXES (Cont.)

	1936 Valuation	1936 Taxes	1935 Valuation	1935 Taxes
SPIES VIRGIL (a)				
E½ of NW¼ of Sec.24,43-35 (Spies).....				
SW¼ of NW¼ of Sec.24,43-35 (Virgil)...	100,000	1,923.00	100,000	2,066.00
Stockpile,Supplies & Equipment.....	310,000	5,961.30	370,000	7,644.20
Total Spies Virgil.....	410,000	7,884.30	470,000	9,710.20
(a) Total Iron River Township.....	415,000	7,980.45	475,000	9,813.50
Rate.....		1.923		2.056
RAVENNA PRICKETT				
City of Crystal Falls				
W½ of SE¼ of Sec. 19,43-32.....	1,100	29.09	1,100	32.03
Rate.....		2.645		2.91
Crystal Falls Township				
Ravenna Prickett				
SW¼ of Sec.19,43-32 .....*	65,500	1,309.35	66,000	1,514.70
SW¼ of NE¼ of Sec.19,43-32.....	200	4.00	200	4.59
SE¼ of NE¼ of Sec.19,43-32.....	200	4.00	200	4.59
SW¼ of NW¼ of Sec.19,43-32.....	200	4.00	200	4.59
SE¼ of NW¼ of Sec. 19,43-32.....	200	4.00	200	4.59
Total.....	66,300	1,325.35	66,800	1,533.06
Rate.....		2.00		2.295
Total Ravenna Prickett.....	67,400	1,354.44	67,900	1,565.09

*Includes NE of SE of Sec.24,43-33 for 1935.

Distribution of Charges				
C.C.I.Co. Proportion.....	51,025	1,027.10	51,400	1,186.42
Michigan Mineral Lands,25% of SW of 19-43-32.....	16,375	327.34	16,500	378.67

(a) The mineral valuation is not divided between the Spies and Virgil, and the surface of the Spies is included in the mineral assessment of the Virgil.

Village of Mineral Hills				
Spies Lease				
SE¼ of NW¼ of Sec.24,43-35.....				
NE¼ of NW¼ of Sec.24,43-35.....				
Dwellings.....	5,000	13.32	5,000	8.22
Virgil Mine Lease				
(a) SW¼ of NW¼ of Sec.24,43-35.....	100,000	266.40	100,000	164.17
Stockpile,Supplies & Equipment.....	310,000	825.80	370,000	607.42
Total Opt. Spies Mirgil.....	410,000	1,092.20	470,000	771.59
Total Mineral Hills.....	415,000	1,105.52	475,000	779.81
Rate.....		.2665		.16417

The Village of Mineral Hills is in Iron River Township. The valuations as shown here are the valuations shown by Iron River Township and are omitted in the recapitulation and distribution.

(a) The valuation of 100,000 includes both Spies and Virgil descriptions noted above for the year 1936 and 1935. Not divided by tax appriaser and any division would be arbitrary.

SPIES VIRGIL MINE
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14. MAINTENANCE AND REPAIRS

When the mine shut down in 1933 no repairs were made to plant or equipment. To be ready to open the mine with the least possible delay, such maintenance repairs as were imperative were made throughout the past year.

Surface

a. Hoist
The gear and shaft were removed and sent to the Lake Shore Engine Works for repairs at a cost of $865.87. Repairs to switchboard and idler sheaves cost $33.89 or a total of $899.76.

b. Compressors
Repaired compressor and circulating pumps, cleaned out cylinders; cleaned motor and installed thermostat and safety plugs, total cost $277.32.

c. Heating Plant Boiler
New stack and breeching, repaired hot water tank, pipe line covered with asbestos, cost $468.32.

d. Top Tram Equipment
Repairing larry cars, total cost $230.82.

e. Docks, Trestles & Pockets
Repairing rock and ore trestle, cost $506.78.

f. Safety Devices
Fencing at old Virgil shaft, cost $52.37.

Underground

g. Pump Machinery
Repairing pump bearings, replacing pump poles, relining pump shaft, repairing pot heads for underground cable, repairing 8" water column, total cost $1,565.97.

h. Electric Tram Plant
Repairing Goodman Locomotive, cost $251.23, repairing underground cars, cost $1,506.05, total cost $1,757.28.

SPIES VIRGIL MINE
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14. MAINTENANCE AND REPAIRS (Cont.)

i. Shaft

Repairing skip roads and guides, cost $229.21

17. CONDITION OF PREMISES

Only absolutely necessary repairs were made during the year to the mine and location buildings. The latter need painting badly.

18. NATIONALITY OF EMPLOYEES

Americans	Percent	Parentage
2	.17	Americans
1	.08	English
2	.17	Irish
1	.08	Sweden
1	.08	Dane
1	.08	French
Foreign Born		
3	.26	English
1	.08	Croation
12	100.00%	

CANISTEO MINE
ANNUAL REPORT
YEAR 1936

1. GENERAL:

During the first three months of the year, a repair crew of 87 men were employed in addition to those engaged in policing the mine and washing plant, and in pit pumping. The repairing of the mine and washing plant equipment was conducted on a five-day basis, the men, with the exception of the office force and the foremen, being employed three days per week. The structural drilling program was resumed during the last week in March. Two drills were put into operation with a crew of 18 men. A track repair force was started on the first of April, in preparation for the spring clean-up and the stripping job, the latter work being started on April 14th and continued until the first of May.

The 1936 ore program was started on May 4th and conducted until October 8th. Two 4-yard electric and one 1-1/4-yard gasoline shovels were in service. The gasoline machine was engaged more in track grading and clean-up work than in actual ore loading.

At the washing plant, the new equipment arrangement, with two log washers, two classifiers, a new double-deck screen and picking belts, definitely proved the superiority over the former installation. A total of 1,009,880 tons of ore were produced in 129 working days, with a daily average of 7,829 tons.

The washing plant results were very satisfactory, both as to tonnage and grade of concentrates. There was an improvement in weight and iron units recoveries and a more thorough concentration was secured. Although the ratio of delays to total working time was slightly above last year, this would be expected with the operation being conducted 24 hours per day, six days per week, which only allowed Sundays for adjustments and repairs.

A structural drilling program got underway the latter part of March to outline the rock and ore areas in the North Bovey bay. This work was completed early in May. During May, June and the first part of July, one drill was used for sample holes in the North Bovey and West Snyder bottoms. The exploration information was used to facilitate the mining and grading of the 1936 ores. During the balance of the ore season, the drill was engaged along the approach and the upper stripping benches at the North end of the Bovey, to outline the Northerly extension of this ore body.

The 1936 stripping requirements called for a spring and fall program. During April, a rock capping was taken out of the West side of the North Bovey and a clean-up cut was made in the West Snyder bottom. This material was moved at a cost of $0.354 per yard, including all charges. In view of the heavy frost conditions and the fact that 60% of the material was solid rock, this cost was quite satisfactory. The fall program was conducted from October 13th to December 5th, operating three 8-hour shifts, five days per week. The stripping was

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1. GENERAL:
(Continued)

in small areas and about 40% of it was sloughed surface and mud. Handling the latter in cold weather made the cost higher than was anticipated. The fall stripping averaged 8,172 yards per day at a cost of $0.313 per yard, including all charges.

Due to the fact that all mining this season was about 15 feet above the mining depth for 1935, the bottom of the Snyder pit was used as a sump during 1936. In connection with the fall stripping program, a new sump was started in the vicinity of the shaft and this work will be completed with the spring clean-up operation. Ore cuts in the lower area during the mining operations of 1937 will afford adequate drainage to elevation 500 Lake Superior datum.

With an exceptionally dry summer and an increased tonnage, it was necessary to provide an additional supply of water for washing operations. A pipe line was laid and ditches dug to carry water from the pit to the tailings basin. The water from the pit was pumped North to the mill from the early part of July until the end of November. There is now ample water on hand for the 1937 ore season, unless another extremely dry summer develops.

2. PRODUCTION, SHIPMENTS & INVENTORIES:

a. Production by Grades:

Snyder Crude,	903,450	tons
Bovey Crude,	671,422	"
TOTAL CRUDE,	1,574,872	"
Snyder Non-Bessemer Concentrates,	259,288	"
Snyder Bessemer Concentrates,	300,987	"
Bovey Non-Bessemer Concentrates,	417,766	"
Bovey Bessemer Concentrates,	22,265	"
Bovey Non-Bessemer Direct Shipping Ore,	9,574	"
TOTAL CANISTEO MINE,	1,009,880	"

Actual ore operations started on May 4th and were completed on October 8th.

b. Shipments:

The shipments from the Canisteo Mine during 1936 were the same tonnages as shown under the production statement, as all ore mined was forwarded to Lower Lake ports.

c. Stockpile Inventories:

No merchantable ore, either concentrates or direct shipping was stocked at the Canisteo property during 1936.

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2. PRODUCTION, SHIPMENTS & INVENTORIES: (Continued)

e. Production by Months:

(1) Crude Ore:

MONTH	SNYDER	BOVEY	TOTAL
May, ----------	118,102	105,415	223,517
June, ----------	214,859	92,394	307,253
July, ----------	172,917	143,311	316,228
August, ----------	172,963	144,224	317,187
September, --------	177,239	145,843	323,082
October, ----------	47,370	40,235	87,605
TOTAL 1936, -------	903,450	671,422	1,574,872

(2) Concentrates & Direct Ore:

MONTH:	SNYDER	BOVEY	TOTAL
May, ----------	76,075	70,610	146,685
June, ----------	132,568	60,529	193,097
July, ----------	111,407	105,423	216,830
August, ----------	105,476	94,524	200,000
September, --------	105,890	91,507	197,397
October, ----------	28,859	27,012	55,871
TOTAL 1936, -------	560,275	449,605	1,009,880

f. Ore Statement:

All material considered as ore, that was mined during 1936, was shipped from the property.

g. Delays:

The following delays were reported during the year 1936:

Date:	Time Lost: Hours	Minutes	Cause:
May 8th,	4	30	Burned out oil switches on West Symons crusher.
12th,		45	Trouble with log switches.
12th,	1	30	Welding cloth on 5' x 14' screen.
13th,	2		Waiting for crude ore, due to a slide in Bovey bank.
20th,		45	Car overturned in crude ore bin.
20th,	1	40	Repairing 4' x 6' screen cloth.
20th,	1	20	Trouble in the power line to pumps
21st,	2	45	Changing 4' x 6' screen cloth.
22nd,	1		Patching 4' x 6' screen cloth.
22nd,	2		Plugged classifier
27th,	1	30	Waiting for Great Northern empties.
27th,	1		Classifiers plugged.
27th,		30	Crusher hopper plugged.
28th,		50	Repairing West log washer.

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2. PRODUCTION, SHIPMENTS & INVENTORIES: (Continued)

e. Delays: (Continued)

Date:	Time Lost: Hours	Minutes	Cause:
June 1st,		35	Repairing broken grizzly bar.
2nd,		40	Repairing spring on 4' x 6' screen.
3rd,	1	30	Repairing grizzly.
	1		Repairing log control switch.
		35	Repairing 4' x 6' screen.
4th,	1	30	Repairing side boards along 36" belt conveyor.
5th,		40	Log switch blew out.
	1	10	Patching 4' x 6' screen cloth.
	1	5	Repairing coupling on West cross conveyor pulley.
6th,	1	15	Repairing 5' x 14' and 4' x 6' screens.
	2		Repairing connecting rod on classifier rakes.
9th,	1		Repairing broken grizzly bar.
	1	20	Repairing brake on 36" conveyor.
	1		Overloaded with Bovey rock at crusher house.
11th,		20	Replacing springs on 5' x 14' screen.
	1		Symons crusher plugged.
13th,		40	Waiting for ore, due to derailment in pit.
15th,	1	30	Changing main oil circuit breaker.
		35	Trouble with pump.
		30	Picking belt rock car turned over.
16th,	1	30	Repairing 4' x 6' screen.
		30	Waiting for Great Northern to pull loads.
		30	Repairing 5' x 14' screen.
		30	Repairing rock finger on rock pocket.
18th,	2		Burned out fuse on pump.
23rd,		30	Picking belt rock pocket plugged.
24th,		40	Classifier plugged.
	1	30	Repairing broken grizzly bar.
25th,		45	Welding cross bars on 5' x 14' screen.
26th,	2		Welding cross bars on 5' x 14' screen.
29th,	1	15	Log washer plugged.
July 1st,	1	15	Log washer plugged.
	1		Motor on West log washer broken down.
2nd,	2	5	West classifier down.
7th,	2		East classifier plugged.
8th,		45	Repairing screens.
		25	Welding main clutch.
		30	Rock pocket plugged.
10th,		30	Repairing 5' pan conveyor.
		30	Repairing 5' x 14' screen.
11th,		25	Repairing rock gun.

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2. PRODUCTION, SHIPMENTS & INVENTORIES: (Continued)

e. Delays: (Continued)

Date	Time Lost: Hours	Minutes	Cause:
July 15th,		50	Changing cloth on 5' x 14' screen.
		45	Repairing cross conveyor belt.
		25	Repairing West 4' x 6' screen.
16th,	1	30	Pump fuse blown out.
17th,	1		Changing West vibrating screen motor.
		45	Repairing West vibrating screen.
18th,	2	15	Broken drive shaft on West vibrating screen.
		35	Changing screen cloth on 5' x 14' screen.
	1	30	Waiting for crude ore - derailment in pit, broken car journal.
23rd,		50	Patching 5' x 14' screen cloth.
		30	Repairing picking belt pulley.
24th,		30	Repairing grizzly.
25th,	1	30	Repairing West 4' x 6' screen.
	1	30	Repairing 4' x 6' East screen.
		20	Repairing rock gun.
27th,	1	15	Repairing East 4' x 6' screen.
28th,		40	Repairing 4' x 6' screens.
		20	Repairing cross conveyor.
29th,		55	Repairing 4' x 6' screens.
30th,	1		Burned out fuse on pump line.
Aug. 8th,		45	Repairing West 4' x 6' screen.
11th,	1	15	Repairing West 4' x 6' screen.
14th,	4		Waiting for ore - derailment 4 rails turned over at crossover.
19th,		30	Relining chutes to 36" conveyor.
27th,	4	35	Aggregate delays waiting for ore, burned out clutch on No.35 shovel.
Sept. 5th,	3		Rock haulage motor burned out.
10th,	8		No Great Northern empties - shut down one shift account car shortage.
11th,	6	20	No Great Northern empties.
15th,	2		Aggregate delays waiting for crude ore; both shovels in rock.
16th,	1		Waiting for crude ore - derailment in pit.
19th,	1		Waiting for Great Northern empties.
25th,	3		Waiting for Great Northern empties.
26th,	2		Waiting for Great Northern empties.
29th,	2		Waiting for Great Northern empties.
30th,	1	30	Waiting for Great Northern empties.
Oct. 1st,	1	30	Waiting for Great Northern empties.
1st,	1	20	Waiting for crude ore - derailment on main line.
3rd,	1		Motor burned out on log motor.
Total delays	126	45	

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2. PRODUCTION, SHIPMENTS & INVENTORIES: (Continued)

e. Delays: (Continued)

Of the 126 hours and 45 minutes total delays, 27 hours and 20 minutes were on account of Great Northern cars; 17 hours and 5 minutes due to delays in the pit and 82 hours and 15 minutes due to failure of mill machinery.

3. ANALYSIS:

a. Mine Analysis of Production & Shipments:

	Tons	Iron	Phos.	Sil.	Mang.	Alu.	Moist.	Iron Nat.
Snyder Non-Bess.Concts.	259,288	58.98	.065	9.54	.22	.45	7.86	54.34
Snyder Bess. Concts.	300,987	59.51	.040	9.30	.19	.45	8.28	54.58
Bovey Non-Bess.Concts.	417,766	57.75	.084	10.52	.18	.46	8.39	52.90
Bovey Bess.Concts.	22,265	57.86	.041	11.35	.19	.45	7.22	53.68
Bovey Non-Bess.Direct,	9,574	56.53	.088	11.30	.13	.79	13.60	48.84
TOTAL 1936,	1,009,880	58.58	.065	9.93	.19	.46	8.24	53.75

d. Average Analysis of Crude Ore Production:

	Tons	Iron	Phos.	Silica
Snyder Crude,	903,450	44.96	.048	30.67
Bovey Crude,	671,422	47.87	.090	24.99
Total Crude Ore,	1,574,872	46.20	.066	28.25

e. Composite Analysis of Season's Shipments:

	Iron	Phos.	Sil.	Mang.	Alu.	Lime	Mag.	Sul.	Loss
Snyder Non-Bess.Concts.	58.95	.063	9.48	.20	.42	.18	.14	.010	5.10
Snyder Bess-Concts.	59.50	.039	9.24	.18	.42	.16	.14	.012	4.70
Bovey Non-Bess.Concts.	57.80	.086	10.48	.18	.44	.20	.14	.012	5.65
Bovey Bess. Concts.	57.80	.040	11.40	.20	.46	.18	.16	.009	4.76
Bovey Non-Bess.Direct,	56.60	.090	11.30	.14	.80	.22	.16	.014	6.20

4. ESTIMATE OF ORE RESERVES:

a. Developed Ore:
Factors Used:

	Rock Deduction	Cu. Ft. Per Ton	% Recovery
N. Bovey:			
Wash, ----------	10%	14	60%
Low Grade Wash, ----------	10%	15	60%
Rocky Wash, ----------	20%	14	60%
S. Bovey:			
Wash, ----------	10%	14	60%
Lean Wash, ----------	10%	14	50%
Low Grade Wash, ----------	10%	15	60%
Lean Low Grade Wash, ------	10%	15	50%

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4. ESTIMATE OF ORE RESERVES: (Continued)

a. Developed Ore: (Continued)

Factors Used:

	Rock Deduction	Cu. Ft. Per Ton	% Recovery
Hemmens:			
Wash,	10%	14	60%
Low Grade Wash,	10%	15	60%
Lean Low Grade Wash,	10%	15	50%
Rocky Wash,	20%	14	60%
Snyder:			
Wash,	10%	14	60%
Lean Wash,	10%	14	50%
Low Grade Wash,	10%	15	60%
Lean Low Grade Wash,	10%	15	50%
Rocky Wash,	20%	14	60%

As a result of 1936 explorations and development in mining, some of the recovery factors were changed from the report of a year ago.

Snyder:		
SE¼-SE¼ - Sec. 30,	2,178,604	tons
SW¼-SE¼ - Sec. 30,	817,839	"
SE¼-SW¼ - Sec. 30,	184,587	"
Total,	3,181,030	"
Bovey:		
SW¼-NE¼ - Sec. 30,	144,485	"
SE¼-NE¼ - Sec. 30,	99,040	"
NW¼-SE¼ - Sec. 30,	348,171	"
NE¼-SE¼ - Sec. 30,	254,202	"
NE¼-NE¼ - Sec. 31,	781,110	"
Total,	1,627,008	"
Hemmens:		
SW¼-SE¼ - Sec. 29,	1,110,957	"
Grand Total,	5,918,995	"

The complete classification of the structure drilling campaign for the year 1935 and the results obtained in the 1936 program, resulted in our increasing the Snyder Reserve by approximately 84,000 tons; the Bovey 815,000 tons and decreasing the Hemmens by 48,000 tons, or a total increase of approximately 851,000 tons. This increase applies after deducting the shipments from the several descriptions. The large increase in the Bovey was largely the result of disclosing a good grade of wash ore at depth in one trough, and extending northward the limits of the Bovey pit.

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4. ESTIMATE OF ORE RESERVES: (Continued)

c. Estimated Analyses:

	Iron	Phos.	Silica	Moist.	Fe. Nat.
Bessemer,	58.61	.040	9.75	8.00	53.92
Non-Bessemer,	57.75	.090	10.16	8.00	53.13

As a result of explorations and concentrating during the past season, the expected analysis of the reserves have been changed somewhat from last year's report. The proportion of Bessemer ore, of the above Phosphorus content, is estimated to be 40 per cent.

5. LABOR & WAGES:

a. Comments:

(1) Labor:

With plenty of skilled and common labor in the district, there was no trouble experienced in maintaining a full crew. Labor union activities died out entirely. Operations were conducted in accordance with the proposed Mining Code and the Employees' Representative Plan continued to function very satisfactorily.

b. Comparative Statement of Wages & Product:

Production, Direct Shipping Ore,	9,574	tons.
Concentrates,	1,000,306	"
Total Production,	1,009,880	"
Number of days operated, 3, 8-hour shifts per day.	129	
Average Daily Product,	7,829	tons.
Average number of men working,	280	
Average Wages per day,	$ 4.70	
Amount paid for Labor,	$ 190,312.75	

6. SURFACE:

a. Buildings, Repairs:

No repairs were necessary to the buildings at the Canisteo Mine during the year 1936.

On account of crowded conditions at the mill, it was necessary to move the drill samples and the ore classification and test work from the washer building. A small corrugated sheet steel building was

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6. SURFACE:
(Continued)

a. Buildings, Repairs: (Continued)
erected immediately behind the laboratory to provide the required space.

c. Tracks, Roads, Transmission Lines, etc:

(1) Tracks:

A crew of 18 men were engaged on the first of April in changing the rail on the curves in the approach and putting in new rail on the passing track in the west Bovey. An additional crew was employed during the second week in April and tracks in the mine and on the dumps were prepared for the spring stripping operations. With but a few days elapsing between the spring stripping, the ore season and the fall stripping, all the maintenance work had to be undertaken during the operating period. The track work in connection with the stripping and mining kept the regular force busy and a section crew were engaged throughout the ore season on main line work. Their time was spent in replacing ties, and keeping up the main haulage lines. About 5,000 ties were replaced in the haulage lines; 1,500 on the dump and nearly 1,500 were used in keeping up the pit panels.

(2) Transmission Lines and Roads:

The transmission lines and roads were maintained as usual. In addition, new steel switch boxes were placed on each of the shovel feeder lines as an added safety measure.

7. OPEN PIT:

a. Stripping:

The spring clean-up and stripping operations were started on the 14th of April. The No. 35 electric shovel was moved into the north Bovey bay to remove the waste material, which had been cast aside from the Oliver Iron Mining Company's operations, and to load out a rock capping which was overlying the ore on the West side of the Bovey bay. The No. 32 electric shovel was taken into the west end of the Snyder to clean up some waste material which had been cast during the 1935 stripping operations and to remove the mud and silt which covered the ore in the west Snyder bottom.

The operation was carried forward three shifts per day, with one shovel, alternating between the No. 35 and the No. 32 as loading tracks were laid. Working continuously until the end of the month, the stripping progressed sufficiently to enable the mining operations to start on May 4th. During this period, 76,818 yards of waste material were removed, consisting of 47,600 yards of taconite and 210 yards of surface from the Bovey and 27,944 yards of paint rock, silt and mud and 1,064 yards of surface material from the Snyder.

Due to the fact that the Bovey stripping was mostly hard taconite and that there was considerable frost in the ground, the cost of the spring stripping was higher than had been anticipated.

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7. OPEN PIT:
(Continued)

a. Stripping: (Continued)

The fall stripping program was started on October 13th and carried forward three 8-hour shifts per day, five days per week. In order to minimize the cost and at the same time to employ the maximum number of men on the mine roll, one shovel was operated during the day shift and two machines during the afternoon and night shifts. This arrangement not only balanced the power load, but it afforded an opportunity to shift the loading tracks in the pit and to plow and line the dump tracks during the day shift. This method of procedure was continued until the last week in November, when the stripping area narrowed down to such an extent that there was too much congestion for a two-shovel operation. The stripping work was carried forward until December 5th, when the extremely cold weather made it too impractical to handle wet material to advantage.

Two stripping areas were operated. In the west end of the pit, the paint rock layer covering the main ore body was pushed southward across the mid-Snyder forty. This area was long and narrow, varying from one cut, 65 feet, in width, at the east end to two full cuts at the west end. The stripping varied in depth from fifteen to twenty feet. In the east end of the pit along the Snyder-Hemmens line, the stripping consisted in cleaning sloughed surface and mud from an upper wash ore area and removing paint rock from the main ore body in the vicinity of the drainage shaft. In addition to the stripping, drainage cuts were made which permits mining to an elevation of 500 feet, (Lake Superior datum).

The No. 32 shovel was moved to the west end and the stripping was taken in two lifts. The material was hauled out the west end of the pit and a special run-down was provided for the lower part of the stripping. The paint rock in this area was hard and blocky, necessitating thorough drilling and blasting. The work here was completed on November 19th.

The No. 35 shovel was moved to the east end of the pit. A drainage cut was made through the pit bottom from the present sump 900 feet west, to drain this entire area. This permitted the clean-up of the mixed surface and lean ore, which had washed down from the south stripping banks and covered the upper wash area. In addition to cleaning this ore, the machine completed stripping the Hemmens area east of the sump. The No. 32 was operated in the same area the last week in November, pushing the paint rock stripping limits to the south. The work was all completed, with the exception of the drainage cuts on the west side of the sump and adjoining the upper wash area. There was considerable congestion in attempting to operate at two elevations in one small area, as the top of the main ore body was from eight to twelve feet below the top of the upper wash ore and the two areas overlapped. The surface and lean ore overlying the lower cut was extremely wet. Several water pockets were encountered and numerous slides occurred, washing out loading tracks and filling the previous cuts. This waste

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7. OPEN PIT:
(Continued)

a. Stripping: (Continued)
was not only difficult to load on account of the shallow depth, but it gave considerable trouble in handling on the dump. The material stuck to the cars, in spite of the use of salt brine, and it was necessary to chain each car to the track before dumping, to prevent overturning.

In the fall program - 302,394 yards were removed, 293,686 yards of waste material and 8,708 yards of lean ore. The latter was stocked on the Snyder lean ore dump near the washing plant.

The following tabulation shows the classification of the material stripped during the year 1936:

Lease	Waste Material Cu. Yds.	Lean Ore Cu. Yds.	Surface Cu. Yds.	Total Cu. Yds.
Snyder,	266,450	8,708	1,064	276,222
Bovey,	47,600	-	210	47,810
Hemmens,	55,180	-	-	55,180
Total,	369,230	8,708	1,274	379,212

Of this material, 76,818 yards were removed in April and 302,394 yards during October, November and December.

A total of 13,245 thirty-yard cars were taken from the pit. The average quantity per car being 28.63 cubic yards.

The estimated cost was $0.311 and the actual cost realized was $0.322.

During the month of April, the following stripping operation was in progress:

Bovey Clean-up,	210	cu. yards.
Snyder Clean-up,	1,064	"
Snyder Waste Material,	27,944	"
Bovey Waste Material,	47,600	"

The fall stripping operations were started October 12th and continued until December 4th, with the following results:

Lease	Waste Material	Lean Ore	Total
Snyder,	238,506 cu.yds.	8,708 cu.yds.	247,214 cu.yds.
Hemmens,	55,180 cu.yds.	-	55,180 cu.yds.
Total,	293,686 cu.yds.	8,708 cu.yds.	302,394 cu.yds.

d. Timbering:
The following statement shows the number of ties used at the Canisteo Mine during the year 1936:

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7. OPEN PIT:
(Continued)

d. Timbering: (Continued)

Amount	Kind:	Price	Cost
5,933	Standard 8" x 8" - Tamarack,	.76	$ 4,509.08
232	" " "	.85	197.20
169	#2 " "	.55	92.95
290	Standard 8" x 8" - Tamarack,	.90	261.00
693	#2 " "	.52½	363.83
80	Standard 8" x 8" - Oak,	1.15	92.00
112	Standard 8" x 8" - Oak,	1.00	112.00
554	#2 8" x 8" - Tamarack,	.40	221.60
8,063	Total and Average,	.725	$ 5,849.66
2	Standard Oak Switch Sets,	110.00	220.00
1	" " " "	125.00	125.00
2	" Elm " "	100.00	200.00
1	" Oak " "	125.00	125.00
1	" Elm " "	100.00	100.00
1	" Oak " "	120.00	120.00
8	Total and Average,	111.25	$ 890.00
40	Standard Oak Bridge Ties,	.90	36.00
40	" " " "	.90	36.00
80	Total and Average,	.90	$ 72.00
	TOTAL ALL TIES, ----------		$ 6,811.66

f. Explosives, Drilling & Blasting:

Statement of Explosives Used:

KIND:		QUANTITY	PRICE	AMOUNT
60% DuPont Special Gel.	7/8 x 8	400 Lbs.	11.50	$ 46.00
60% DuPont Special Gel.	5 x 16	22,600 lbs.	11.50	2,599.00
40% DuPont Special Gel.	1-1/8 x 8	1,600 lbs.	10.69	171.00
40% R.C. Extra	7/8 x 8	300 lbs.	10.50	31.50
25% DuPont Quarry Gel.	3 x 10	157,750 lbs.	9.13	14,410.00
Gelex "A"	5 x 16	74,600 lbs.	11.77	8,779.00
R.C.Blasting #4	Bags	100,000	9.60	9,600.00
TOTAL AND AVERAGE, -		357,250 lbs.	9.97	$35,636.50
Crescent Fuse,		6,000 Ft.	.595	$ 35.70
8' No. 6 E.W. Caps,		1,000	.615	61.50
30' No. 6 E.W. Caps,		4,350	.116	506.80
40' No. 6 E.W. Caps,		1,100	.154	169.40
DuPont #6 E.B. Caps,		2,000	.112	22.40
TOTAL AND AVERAGE, -		8,450	.899	$ 760.10

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7. OPEN PIT:
(Continued)

f. Explosives, Drilling & Blasting: (Continued)

Statement of Explosives Used: (Continued)

KIND:		QUANTITY	PRICE	AMOUNT
Connecting Wire No. 20,		200 Lbs.	.40	$ 80.00
DuPlex Lead Wire,		750 Ft.	1.40	10.50
TOTAL COST ALL EXPLOSIVES, ----------				$ 36,522.80
CHARGED TO DRILLING & BLASTING - ORE OPERATIONS:				
60% DuPont Special Gel.	7/8 x 8	400 Lbs.		$ 46.00
60% " " "	5 x 16	17,600 "		2,024.00
40% " " "	1-1/8 x 8	None		
40% R. C. Extra	7/8 x 8	500 "		50.00
25% DuPont Quarry Gel.	3 x 10	140,250 "		12,710.00
Gelex "A"	5 x 16	62,100 "		7,216.50
R.C. Blasting No. 4	Bags	100,000 "		9,600.00
30' No. 6 E.W. Caps,		3,600		419.42
40' No. 6 E.W. Caps,		900		138.60
DuPont No. 6 E.B. Caps,		2,000		22.40
Connecting Wire No. 20,		150 Lbs.		60.00
DuPlex Lead Wire,		500 Ft.		7.00
TOTAL CHARGES TO ORE OPERATIONS, ----------				$ 32,293.92
CHARGED TO DRILLING & BLASTING - STRIPPING:				
60% DuPont Special Gel.	7/8 x 8	(None)		-
60% " " "	5 x 16	5,000 Lbs.		$ 575.00
40% " " "	1-1/8 x 8	1,100 "		121.00
40% R.C. Extra	7/8 x 8	(None)		-
25% Quarry Gel.	3 x 10	17,500 Lbs.		1,700.00
Gelex "A",	5 x 16	12,500 "		1,562.50
Crescent Fuse,		6,000 Ft.		35.70
30' No. 6 E.W. Caps,		750		87.38
40' No. 6 E.W. Caps,		200		30.80
Connecting Wire No. 20,		50 Lbs.		20.00
DuPlex Lead Wire,		250 Ft.		3.50
TOTAL CHARGES TO STRIPPING, ----------				$ 4,135.88

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7. OPEN PIT:
(Continued)

f. Explosives, Drilling & Blasting: (Continued)

Statement of Explosives Used: (Continued)

KIND:	QUANTITY	PRICE	AMOUNT
CHARGED TO STRUCTURE DRILLING:			
40% R. C. Extra, 7/8 x 8	300 Lbs.		$ 31.50
8' No. 6 E.W. Caps,	1,000		61.50
TOTAL CHARGED TO STRUCTURE DRILLING, ----------			$ 93.00

RECAPITULATION

Ore Operation,	$ 32,293.92
Stripping Operation,	4,135.88
Structure Drilling,	93.00
Total,	$ 36,522.80

g. Open Pit Mining & Loading:

Commencing ore operations on the 4th of May, the No. 35 shovel was operated along the west bank of the north Bovey bay, loading the ore which was uncovered during the 1935 stripping program. This ore was loaded on a track, resulting from work done in connection with April clean-up and rock stripping. During the first two months the machine was shifted about considerably, loading along the high bank on the west side, sorting and removing the ore and rock from the taconite island on the east side, and on week ends attacking the clean-up work on the north Bovey bottom. When the mining in the west bank had been pushed to the limits along the approach, a run-down into the Bovey bottom was accomplished by the No. 35 shovel. The main haulage lines on the west side of the pit were shifted 25 feet to the eastward and a run-down cut from the load line, at a point about 700 feet south of the mining area, provided. Running on a three per cent grade, this new track arrangement permitted mining to elevation 584' Lake Superior datum. The area was mined from elevation 640 down to 684 in a series of 18-foot lifts, or two shovel cuts in depth, the three per cent run-down being extended with each successive lift in the mining operation.

The ore in the entire area was a good grade non-Bessemer wash. The ore body was very irregular, with horses and layers of rock, and small deposits of waste material, all of which had to be sorted. The rock and waste was either loadd out or cast aside and removed during the week ends. The wash ore remaining after the rock and waste removal showed good recovery. The limonitic ores from these areas, that could not be improved through concentrating, were shipped direct.

The No. 32 shovel, operating in the Snyder area, mined that part of the island on the mid-Snyder forty which had been stripped during the fall of 1935. This area was mined south, leaving only a small bench to be utilized in connection with the 1936 stripping. The ore

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7. OPEN PIT:
(Continued)

g. Open Pit Mining & Loading:

bank averaged about 35 feet in height and was mined to an elevation of 536 feet at the east end to 543 feet at the west end, Lake Superior datum. The ore in the entire area was high grade, with a low phosphorus content and was ideal for both mining and grading. The operation was rather intermittent, however, as it was necessary to mine as much of the Snyder rock area as the grading would permit. This ore remained from the previous year's operations in the Snyder, due to the fact that there were no picking belts at the mill to sort out the small rock in the product. In the east Snyder forty, just north of the 1935 ore area, the rocky material was mined to an elevation of 532. The crude ore secured was a fair grade of wash, containing several layers of rock. This was sorted in the pit and the resultant product was nearly all a mediocre non-Bessemer wash, with a high silica content. It was necessary to sweeten this ore with a high grade low silica ore from the pit bottom at the west end of the Snyder. The small tonnage of ore that had been uncovered there was mined for grading purposes during the year. In addition to the areas worked by the No. 32 shovel, an upper wash deposit on the south side of the pit, near the old Oliver Iron Mining Company's sump, was mined by the gasoline shovel. This area contained over 40,000 tons of high silica, low-phosphorus ore overlying the paint rock and had to be mined previous to the 1936 fall stripping. A track was graded and laid along the south side of the pit and during August and September, most of this ore was removed. The small tonnage remaining will be taken out during the next ore season.

During the ore operation - 234,037 tons of pit rock and waste material were removed, of which 187,874 tons were taken from the Bovey. In addition to the pit rock, there were 97,232 tons of mill rock rejects from the Bovey and 39,912 tons from the Snyder. In the Bovey - this meant the removal of 285,106 tons of rock and waste in securing 449,605 tons of concentrates, or one ton of rock for each 1.6 tons of concentrates. The rock factor from the Snyder was about normal.

k. Pit Drainage:

The deeper ore cuts in the 1935 ore operation in the Snyder and Hemmens pits was used as a sump for the 1936 pumping. The pump-house on the raft near the shaft handled all the water the first four months, but from the middle of July until the last of November, water was pumped to the mill from a pump-house erected on the north edge of the Snyder area. During the next season, a new and deeper sump will be provided by drainage cuts in the vicinity of the Snyder-Hemmens boundary.

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8. COST OF OPERATING:

a. Comparative Mining Costs:

	1936	1935
PRODUCT:	1,009,880 tons	605,095 tons
Average Daily Production,	7,829 tons	6,955 tons
Tons Per Man Per Day,	24.98 tons	22.85 tons
Days Operated,	129	87
COST:		
Total Cost at Mine:		
Open Pit Wash Ore,	$ .216	$ .221
General Pit Expense,	.055	.077
Concentrating,	.141	.175
General Mine Expense,	.075	.097
Cost of Production,	.487	.570
Depreciation, Plant & Equipment,	.344	.250
Amortization Stripping,	.250	.315
Taxes - Ad Valorem,	.084	.133
" - Occupational,	.070	.063
" - Royalty,	.021	.024
Total Cost at Mine,	$ 1.256	$ 1.355
Administrative & Miscellaneous Expense,	.109	.105
GRAND TOTAL,	$ 1.365	$ 1.460

The final figures have not been furnished by the Cleveland office and there may be some small adjustments to the above tabulation, but the cost would only be effected to a slight extent.

d. Detailed Cost Comparison:

(1) Product:

The character of the ore mined and treated during 1936 was in general harder and contained more rock than the output handled in 1935. This condition was offset, so far as costs were concerned, by the higher weight recovery, amounting to over 4 per cent, secured in 1936.

The total cost at the mine, including Administrative and Miscellaneous Expense was $.108 under that for the previous year and exclusive of extraordinary charges, within $.0071 per ton of our budget estimate.

The following tabulation shows the extraordinary charges and changes in the rates of depreciation and amortization, made subsequent to preparing the budget estimate:

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8. COST OF OPERATING: (Continued)

d. Detailed Cost Comparison: (Continued)

(1) Product: (Continued)

Vacation Pay amounts to	.0045	per ton	and not figured in	budget	costs
Federal Unemployment Ins. Tax,	.0024	"	"	"	"
Plant & Equipment Depreciation,	.0940	"	" over cost		"
Stripping Amortization,	.0650	"	" under "		"
Net increase beyond mine control (per ton)	.0359				
Total Mine Cost,	1.365				
Budget Estimated Cost	1.322				
Increase,	.043				
Less,	.0359				
Actually over budget estimate,	.0071	per ton.			

(2) Open Pit Mining:

There was a decrease of $.005 per ton in the 1936 costs under this caption.

"Drilling and Blasting" was $.014 higher in 1936, due to the excessive rock and hard ground encountered; "Shovels Maintenance" was $.003 higher and there was an increase of $.002 for "Locomotives and Cars" operating, on account of the larger quantity of rock handled, but these unfavorable factors were partly offset by decreases in "Track Expense" of $.003 and "Locomotives and Cars Maintenance" of $.002 per ton. The "Winter Expense" chargeable to this account more than offset the balance of increase, and amounted to $.073 per ton in 1936, against $.121 in 1935.

During 1936 it was necessary to handle excessive rock and undertake repair work each Sunday, as the property operated six days per week of three eight-hour shifts per day, during the greater part of the ore season. There was also considerable shifting of equipment during 1936, not alone in the handling of waste material, but for grading and operating purposes.

(3) General Pit Expense:

For the year 1936 there was a decrease of $.022 per ton under this caption, as compared with 1935, - the decidedly larger tonnage absorbing the charges and showing a lower cost per ton.

For "Pumping and Drainage", the larger output in 1936 was entirely responsible for lowering the cost per ton by $.011.

The "Water Supply Expense" was higher in 1936, as the mine supply well dried up and it was necessary to test for a new source of water and make arrangements for a supply in the pit during most of the ore operating season.

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8. COST OF OPERATING: (Continued)

d. Detailed Cost Comparison: (Continued)

(3) General Pit Expense: (Continued)

"General Open Pit Expense" and "Superintendence" were nominal and the increased output resulted in a lower cost per ton for 1936.

With the decided increase in the amount of waste material handled in 1936, the item "Waste Pile Expense" showed a higher cost of $.001 for the year.

The extensive structure drilling program undertaken in 1936, and the fact that there was a considerable deferred charge accumulated in 1935 and spread against the 1936 production, resulted in increasing the 1936 cost per ton for this account by $.014.

(4) Concentrating:

The decrease of $.032 per ton for 1936 under this caption was due to the larger tonnage handled and effecting favorably especially "Transportation to Mill"; "Power" and "Winter Expense". All maintenance items were lower per ton for 1936, on account of the larger tonnage handled in spite of the fact that numerous changes and adjustments were made and absorbed under 1936 costs.

"Washing Expense" was increased somewhat in 1936, due to the fact that a pipe line was installed and some ditching done in connection with the plant water supply and to the installation and operation of picking belts.

The improvements in the general flow sheet of the mill were entirely justified by the results as to improved grade of concentrates and costs realized.

(5) General Mine Expense:

While the total charges to the several items under this caption were larger than during the previous year, the considerable increase in tonnage handled in 1936 resulted in showing a decreased cost per ton of $.022.

There was less pit sampling undertaken during 1936 and a larger proportion of the Shipping Department expense was charged to outside ores.

The only item showing an increase was "Special Expense" - and this was due to the charges "Vacation with Pay" and "Federal Unemployment Insurance Tax", which were not included in the 1935 accounts.

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9. EXPLORATIONS AND FUTURE EXPLORATIONS:

The greater part of the structural drilling campaign undertaken during 1936 was in connection with the year's ore operation. The north Bovey bottom was drilled to outline the ore and rock areas and to guide the mining and grading. Several additional holes were put down on the west bank of the Bovey for the same purpose. In the west Snyder bottom, several shallow sample holes were drilled for grading purposes. With the completion of this work a number of drill holes were put down to attempt to outline the possible extension of the Bovey ore body to the west and north. The work was started with two drills on the Bovey bottom on March 26th, working each drill three shifts. During the last week in April, one machine was moved to the shop to be rigged for blast hole work, while the other continued the drilling in connection with the ore operations until the 15th of July. It was then moved up to the approach for the exploratory drilling and this work was completed on October 9th. In all, 41 sample holes and 12 exploratory holes were drilled, totaling 4,105 feet. The 12 holes on the outer Bovey totaled 1,413.5 feet in depth. The cost of the season's drilling, including all charges and all repairs, was $2.43 per foot.

In drilling the Bovey bottom, it was necessary to outline the rock area for the spring stripping. As this work progressed and the irregularity of the ore body was developed, it was decided that more information would be needed in connection with the mining operations. Twenty-eight holes, totaling 2,053 feet, were drilled in the Bovey bottom and five holes, totaling 524 feet, were put down in the west bank. This exploration developed more ore than had been estimated in this area and aided materially in laying out mining operations.

With the completion of this work, the drill was moved to the west Snyder bottom. This area was partly uncovered during the spring clean-up and contained some high grade low Silica ore. Eight shallow holes were put down here for grading purposes.

The drill was then moved to the north Bovey approach and a series of 12 holes were drilled around the north and west sides of the Bovey. One row along the approach and the other on the upper stripping bench. The twelve holes, totaling 1,413 feet, definitely outlined the extension of the ore body northward. This work was completed early in October and the repair work on the drills was started at that time.

With the exception of some sample hole drilling, this work should complete the structural drilling at the Canisteo Mine.

10. TAXES:

The following statement shows the Canisteo Mine taxes and average rates for the years 1935 and 1936:

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10. TAXES:
(Continued)

Statement of Taxes:	1936	1935	Increase	Decrease
Canisteo Mine,	$ 79,227.21	$75,371.63	$3,855.58	
Washing Plant Lands,	2,792.70	2,730.62	62.08	
Personal Property,	2,044.41	2,200.95	-	$ 156.54
Total,	$ 84,064.32	$80,303.20	$3,761.12	-
Village Lots,	199.95	199.29	.66	-
GRAND TOTAL,	$ 84,264.27	$80,502.49	$3,761,78	-
Average Tax Rate,	.846	.804	.042	

The increase in the 1936 taxes are entirely due to the larger levies made by the Village of Coleraine and the County of Itasca.

11. ACCIDENTS AND PERSONAL INJURY:

There were seven lost-time and one fatal accident at the Canisteo Mine during the year 1936, descriptions of which are as follows:

NAME: Charles Hecomovich DATE: April 15th.
CAUSE: A gasoline portable air compressor is used in the car yard to furnish repairers with compressed air. A 15-gallon barrel of gasoline is used to furnish this machine with fuel. While handling this gasoline barrel with wet mittens on, the barrel slipped through his hands and fell on injured man's foot. (Note) Hecomovich was unloading barrel from flat car.
NATURE: Fracture of proximal 1/3 of first metatarsal left foot.
TIME LOST: Six weeks.
COMPENSATION: $100.32.

NAME: James Jones DATE: May 29th.
CAUSE: Jones is employed as a laborer and devotes his entire time in cleaning up along the mine tracks. He was in the act of piling up old railroad ties, when he stepped into a mud hole about knee deep, throwing him off balance. In doing this, he threw the tie off his sholuder and landed on his left side against a pile of ties.
NATURE: Dislocation of left shoulder. Tenderness over ribs - left. Shoulder reduced and placed in sling.
TIME LOST: 3-2/3 weeks.
COMPENSATION: $ 51.11.

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11. ACCIDENTS AND PERSONAL INJURY: (Continued)

NAME: Raymond Dirkes DATE: June 3rd.
CAUSE: Dirkes was carrying ties to use under caterpillars of the gas shovel, for crossing railroad track. He slipped and wrenched his back in so doing.
NATURE: Left Sacro Iliac sprain.
TIME LOST: One week.
COMPENSATION: None:

NAME: Lloyd Flatley DATE: July 28th.
CAUSE: Tightening casing with wrench at structure drill. Felt pain in back.
NATURE: Left Sacro Iliac sprain.
TIME LOST: 3 Days.
COMPENSATION: None:

NAME: William Ronkinen DATE: July 30th.
CAUSE: Ronkainen was tightening up around his machine while in the clear, having a few minutes time on his hands. He was standing on the running board of the Locomotive Crane, tightening a packing nut on the right piston. The wrench slipped and Ronkainen lost his balance, falling to the ground, a distance of approximately six feet.
NATURE: Calles fracture of left arm. Contusion left chest and sixth rib.
TIME LOST: Six weeks.
COMPENSATION: $120.00.

NAME: Harry Edner DATE: August 6th.
CAUSE: Edner was dropping two 75-ton cars loaded with concentrates. He had set the brake on the head car and it is assumed that in coming down off the car, he missed his footing and fell to the ground, - the first wheel of the front truck running over his body, just below the heart, severing the body and cutting off his right arm.
NATURE: FATAL.
COMPENSATION: $2,700.00.

NAME: Vernon Cyrus DATE: September 17th.
CAUSE: Cyrus, together with five other workmen, was engaged in driving a rail in place with a "bumper rail". The injured party was standing with his left foot between the ties of the track. The men driving the "bumper rail" missed the steel and struck the railroad tie, catching injured man's left ankle between the two ties.
NATURE: Contusion and severe sprain.
TIME LOST: 4-1/3 weeks.
COMPENSATION: $60.41.

NAME: Kenneth Adams DATE: September 21st.
CAUSE: Adams was pounding the grizzly bars with a sledge hammer, in an endeavor to loosen the sticky ore. A chip broke off the hammer, flew upwards and struck Adams under his right eye.
NATURE: Laceration of cornea and sub-corneal hemorrhage. Laceration of lower lid - right eye.
TIME LOST: 4 Days.
COMPENSATION: None:

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12. NEW CONSTRUCTION AND PROPOSED NEW CONSTRUCTION:

There was no new construction undertaken at the Canisteo Mine during the year 1936 and none is contemplated for 1937.

13. EQUIPMENT AND PROPOSED EQUIPMENT:

A new double-deck 5' x 14' vibrating screen was installed at the head of the washing plant to replace the two 4' x 10' vibrating screens and to provide for a picking belt installation. A new 4' x 6' desliming screen was placed at the head of the second log washer. Picking belts were taken from the Holman mill and installed at the Canisteo and the proper chutes and rock disposal arrangement provided.

14. MAINTENANCE AND REPAIRS:

Locomotives Nos. 101, 103, 104, 105 and 106 were checked over; worn side rod bushings replaced; worn tires removed and turned down, and the valve motion and the air equipment repaired. A new door sheet was installed on the No. 103 boiler and all the boilers were checked over and given the necessary repairs. This work was completed during the first three months of the year.

During the spring stripping and the first part of the ore season - locomotives Nos. 103, 146 and 153 were overhauled in addition to the regular maintenance work. The No. 146 was sold after the ore season and the No. 156 was put in operating condition to replace it.

The thirty-two cars on hand were all run through the shops. All badly worn wheels were replaced; the air equipment checked over and the dumping equipment cleaned and repaired. New center plate castings were installed on several of the cars.

The track shifter and the locomotive crane were checked over and given the necessary light repairs.

On the No. 32 and No. 35 electric shovels, the motor generator sets and motors were taken into the shop for cleaning and repairing. The crawling mechanism was completely overhauled, building up the driving lugs on the pads and the sprockets by electric welding. All the idlers were rebushed and built up, where necessary. The booms were dropped, checked over, and given the necessary repairs.

The gasoline shovel was given some light repairs and the drums were taken out and rebushed.

The two structural and two blast hole drills were cleaned and overhauled. The crawling mechanism rebushed; worn bearings replaced and the hinge pins straightened.

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14. MAINTENANCE AND REPAIRS: (Continued)

Early in December, the Locomotives Nos. 101, 102, 103 and No. 2 and eleven dump cars were sent to the Hill-Trumbull Mine. In addition to preparing this equipment for shipment, the flues were removed from the No. 104 and the No. 105 locomotives.

Washing Plant Repairs:

The installation of the east log washer and the 8-foot classifier rakes were completed. The classifiers were reinforced and the rakes on the west classifier repaired. The necessary chutes and conveyor connections on the new log washer and classifier were installed.

The McClure grizzly was dismantled and rebuilt, strengthening points of weakness which had developed during the ore season.

The conveyors, crushers and screens were taken down, cleaned, inspected and given the necessary repairs.

With the installation of the 5' x 14' double-deck vibrating screen, picking belts were brought over from the Holman plant and put in place at the Canisteo mill. Rock chutes and a rock pocket were built and dump cars and a haulage motor were installed for rock disposal.

The crude ore pocket was replated and the track on the pocket raised so that the ore could be dumped against the feeder side. This decreased the wear on the 8-foot pans and maintained a much better ribbon of crude ore on the conveyor.

After the 1936 ore season, a crew of 15 men were employed until the latter part of December on washing plant repairs. The classifiers were overhauled and repaired. The vibrating screens taken down and inspected for the necessary repairs. The crushers were dismantled, cleaned and repaired, - and the log washers were taken apart to build up the log paddles and paddle shafts.

Electrical Equipment:

The electrical force at the mine cleaned and repaired all the motors at the mill and provided the necessary hook-ups for the new equipment.

The motors and generator sets from the shovels were overhauled.

The electrical equipment on the drills were cleaned, checked over and repaired.

The pump and shop motors were overhauled.

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14. MAINTENANCE AND REPAIRS: Continued:

Electrical Equipment: (Continued)

The cables were all taken into the shop and bad spots were vulcanized.

The rock haulage motors were taken to the electric shop and given a thorough overhauling.

18. NATIONALITY OF EMPLOYEES:

NATIONALITY:	NO. MEN 1936	NO. MEN 1935
American,	245	199
Jugo-Slav,	28	31
Finnish,	22	13
Italian,	9	9
Swedish,	6	8
Bulgarian,	6	6
Austrian,	4	6
Canadian,	4	5
Norwegian,	4	4
French-Canadian,	4	4
Irish,	2	3
Danish,	2	1
Montenegrin,	2	1
English,	1	1
Macedonian,	1	1
Belgian,	1	1
German,	1	1
Russian,	1	-
TOTAL,	343	294

19. WASHING PLANT OPERATIONS:

A crew of twenty men were employed from January 6th until May 2nd on the repairs and changes at the mill. As in the case of the other repair work, the men were employed three days per week, with a daily force of 12 men, aside from the foremen. The repair work was completed on the 2nd of May and the plant turned over and tested.

The Canisteo washing plant was operated from May 4th until October 8th, working three 8-hour shifts. During May, the concentrator worked five days per week, but with an increase in tonnage - it was necessary to step this up to 6 days per week from the first of June. The operation as a whole was very satisfactory and no serious difficulties were presented. With very little time for maintenance on week-ends and a heavy production, the delays at the mill were less than might have been expected.

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19. WASHING PLANT OPERATIONS: (Continued)

The changes made in installing the second log washer and picking belts were well warranted. The average daily production was much better than in previous years and satisfactory concentrates were secured from some very lean and rocky ores. While there were no exceptionally high runs, the output for a number of days was well over 9,000 tons of concentrates. The average daily production of 7,829 tons was about 800 tons per day better than that for the year 1935.

No particularly weak spots were developed in the mechanical equipment. The frames of the vibrating screens did not stand up during the first part of the operation, but these were improved and strengthened so that during the last half of the season there were but few delays from this source. In fact, during the entire month of September the only delay on account of mill equipment failure was a burned-out rock haulage motor armature, resulting in a 3-hour delay in the production of 197,397 tons of concentrates.

With an acute car shortage, at times, the Canisteo Mine was very fortunate in the car service from the Great Northern, for we fared much better than neighboring properties.

The very dry season and no run-off from rains, caused a very serious water situation early in July. To insure an adequate supply for washing, 5,700 feet of 10" pipe line was laid and a half mile of ditching was put in to carry water from the pit. Approximately 1,200 gallons of water per minute were delivered from the mine and the water level in the storage basin rose gradually during the season. Pumping from the pit continued from the middle of July until the end of November and there is a very good reserve on hand at the present time, with the water level up to elevation 777.2 (Lake Superior datum).

The amount and analysis of the plant rejects for 1936 were as follows:

5-FT. PAN REJECTS

Lease	Tons	Iron	Phos.	Silica
Snyder,	36,987	30.49	.053	51.82
Bovey,	90,368	31.29	.110	50.45
Total,	127,355	31.06	.093	50.85

36" BELT REJECTS

Snyder,	2,931	26.34	.051	57.56
Bovey,	6,864	27.57	.090	55.09
Total,	9,795	27.20	.078	55.83

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19. WASHING PLANT OPERATIONS: (Continued)

The rock removed from the pit and placed on the waste dump was as follows:

Lease:	Cu. Yds.	Tons	Iron
Snyder,	30,775	46,163	33.78
Bovey,	125,249	187,874	35.08
Total,	156,024	234,037	34.82

During mining operations, 1,440 cubic yards of Snyder and 3,450 cubic yards of Bovey surface cleanup were handled and placed on the waste dumps.

The tonnage and Iron Unit recovery realized in the treatment of Canisteo ore during 1936, was as follows:

Lease:	Tonnage	Iron Unit
Snyder,	62.02%	81.74%
Bovey,	65.58%	79.08%
Total,	63.52%	80.56%

The analyses of the product from the several machines for the year 1936 was:

SNYDER MILL MACHINES:

	Iron	Phos.	Silica
Log Washers, ----------	59.50	.057	8.73
Classifiers, ----------	57.98	.047	12.14
Tailings, ----------	22.67		

BOVEY MILL MACHINES:

Log Washers, ----------	57.89	.087	10.26
Classifiers, ----------	56.83	.077	12.33
Tailings, ----------	23.58		

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19. WASHING PLANT OPERATIONS: (Continued)

The following is the concentrating data for the Canisteo Mine during the year 1936:

	Cu.Yds.	Tons	Percentage of Total Mined	Analysis Iron Dried	Concentrate Recoveries Made From Tons	Concentrate Recoveries Made % Iron
Material removed in mining operations, (exclusive of surface)	1,054,509	1,936,264	100.00	43.83		
Less lean ore stocked, (in mining)	-	-				
	1,054,509	1,936,264	100.00	43.83		
Less pit rock wasted, -	156,024	234,037	12.09	34.82		
Total transported to mill,	898,485	1,702,227	87.91	45.07		
Less rock rejects (crusher house) -	84,903	127,355	6.58	31.06		
Total Crude Ore to washing plant, -	813,582	1,574,872	81.33	46.20		
Concentrates,		1,000,306	51.66	58.60		
Mill rejects on mill picking belts, -		9,795	.51	27.20	63.52	80.56%
Tailings (By deduction) -		564,771	29.17	24.57		
Total rock and Lean Ore from above, -		361,392	18.66	33.49		

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19. WASHING PLANT OPERATIONS: (Continued)

Sieve Tests of Canisteo Ores for 1936

	Snyder Concts.	Bovey Concts.	Bovey Direct
Plus 3-Mesh,	54.46	59.21	52.65
Plus 10-Mesh,	14.60	11.79	7.68
Plus 20-Mesh,	6.40	5.12	5.94
Plus 40-Mesh,	9.77	8.95	8.16
Plus 60-Mesh,	5.97	7.18	6.29
Plus 80-Mesh,	2.56	2.34	2.52
Plus 100-Mesh,	3.40	2.34	3.22
Minus 100-Mesh,	2.84	3.07	13.54
	100.00%	100.00%	100.00%

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1. GENERAL:

The patrolling of the mine and washing plant premises was accomplished by the employment of four full-time watchmen.

The A. Guthrie & Company loaded out two railway cars of scrap material during August.

Four carloads of scrap iron were shipped from the Holman shops and washing plant during July, by The Mesaba-Cliffs Mining Company.

In order to provide a means of subduing fires during the dry spell, the surge tank at the washing plant was filled with water in August. No difficulty was experienced with brush fires.

Two houses, No. 66 and No. 77, were sold by the Oliver Iron Mining Company during the year and removed from Taconite. There are now fifty-seven houses in the town, belonging to the Oliver Company.

The water in the pit is standing at about its maximum level. There is practically no change from the elevation of a year ago.

4. ESTIMATE OF ORE RESERVES:

a. Developed Ore:

Assumption: 16 Cubic Feet per ton for Wash Ore.

A rock deduction of 10% was made generally and in estimating a part of the deposit the deduction was increased to 20%, due to the exceptionally rocky condition of this ore.

No exploratory work was undertaken at the Holman-Cliffs group of properties during the past year and there was, therefore, no occasion for making any re-estimates.

The tonnage listed below is on a concentrated basis and is figured on a 60% gross recovery:

Brown No. 1:		
Non-Bessemer Concentrates, ----------	1,126,196	tons.
Holman:		
Non-Bessemer Concentrates, ----------	2,798,873	"
Brown No. 2:		
Non-Bessemer Concentrates, ----------	1,891,533	"
TOTAL HOLMAN-BROWN, ----------	5,816,602	"
North Star:		
Non-Bessemer Direct, ----------	80,103	"
Bessemer Concentrates, ----------	538,083	"
Non-Bessemer Concentrates, ----------	101,891	"
TOTAL NORTH STAR, ----------	720,077	"

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4. ESTIMATE OF ORE RESERVES: (Continued)

a. Developed Ore: (Continued)

Bingham:		
Bessemer Direct,	269,664	tons.
Non-Bessemer Direct,	329,590	"
Bessemer Concentrates,	1,198,361	"
Non-Bessemer Concentrates,	590,238	"
TOTAL BINGHAM,	2,387,853	"
TOTAL BINGHAM-NORTH STAR,	3,107,930	"
GRAND TOTAL HOLMAN-CLIFFS MINE,	8,924,532	"

b. Prospective Ore:

Additional drilling in the Southerly and Southeasterly portions of the Holman forty is quite likely to result in proving up additional deep ore of treatable character. The possibilities of additional ore in the Brown-North Star or Bingham lands is rather remote, as the ore bodies in these properties have been pretty well outlined.

6. SURFACE:

a. Buildings, Repairs:

The carpenter crew of from three to four men started house repair work on July 1st, and continued, somewhat intermittently, until the first week in December. Part of their time was spent on the houses at Marble, and on work at the Hill-Trumbull Mine.

The painting crew, which varied from one to four men, started work on the 14th of July and continued until the end of November. This crew worked on both interior and exterior jobs.

There are two houses remaining to receive exterior paint, and two that have been given but one coat. In addition to these, the camp buildings have received only minor repairs, and there are a number of interiors that need attention. These jobs will be part of the 1937 program.

The following tabulation shows the houses by number; their occupants and the nature and cost of repairs in each case, and also the cost of reconditioning the mine buildings:

Ho.No.	Name of Occupant:	Repair work done	Cost
11	Peter Baril,	Repairs to foundation; porches; steps; floors; siding; windows and door. New toilet provided. Exterior painted. Interior painted; electric wiring repaired,	$ 865.13