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7. UNDERGROUND: (CONT.)

c. Stoping: (Cont.)

6½ Level: (Cont.)

and on the West by old workings. One contract mined from No. 918 Raise for the entire year completing the 6½ Level, the 690' and 673' Sub-levels. At the latter elevation the mining area was approximately 50 feet in width and 120 feet in length having been reduced due to the advance of the footwall from the East. So much old timber from the original square set stopes was encountered on the floor as mining operations progressed that it was decided that the ore recovered from the next lower sub-level would not justify any further mining in this area.

No. 1 Shaft Pillar North of the Dike

This ore area might be described as the downward descent of the area above that lies North of the main dike. During 1943 one contract mined three subs, the 653', 640', and 630' Sub-levels. Mining operations on the 653' Sub were completed in February with mining being carried on adjacent to the mined out area to the South. Shortly thereafter mining was started on the 640' Sub which is bounded on the East and North by the lean ore footwall and on the West by caved workings from the old original stopes. Later in the year as mining was continued on the 630' Sub it was apparent that the footwall was rapidly reducing the size of this area.

In November, No. 37 Contract working on the 630' Sub-level completed two slices to the Southwest of No. 920A Raise to the old workings. Mining operations were then directed to the Northeast where two slices were also completed to the footwall. It might be added that this sub-level is 23 feet above the 9th Level drift which is directly below the area mined in December. Approximately two months work should complete the mining on this sub-level.

A small area further to the Southwest was mined on the 9th Level elevation late in 1943 from the 10th Level No. 1004 and 1005 Raises. This pillar is bounded on the South by the main level dike and on the North and West by old workings of the Negaunee Main Ore Body. Due to the ore pillar described in the above paragraph there is only a limited amount of mineable ore available from No. 1005 Raise.

No. 1 Shaft Pillar South of the Dike

Mining operations were continued in this area by two contracts most of the year, a single contract worked here in the latter part of the year. Early in the year the last remaining pillar on the 630' Sub South of #923 Raise was mined and operations were started on the 620' Sub-level. This area is approximately 250 feet in length and 80 feet in width, bounded on the North by the main dike and on the South by lean ore footwall and old workings. Later in the year mining was commenced on the 9th Level elevation from 10th Level raises where an area somewhat smaller in size was mined. This reduction in size was due to the encroachment of the lean ore footwall which is rapidly approaching the dike in its regular downward trend. This ore area will be mined out in 1944 as the footwall intersects the dike 40 feet below the 9th Level.

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7. UNDERGROUND: (CONT.)

c. Stoping: (Cont.)

9th Level

In 1943 one raise was put up from the 9th Level in the No. 2 Shaft Pillar. The raise, No. 909, was extended up to the 675' Sub to eliminate the short transfer, this has been discussed under the No. 2 Shaft Pillar heading. There was a considerable amount of retimbering and maintenance work done in the No. 920 Cross-cut during the year with two mining contracts at the Southwest end, it has been necessary to maintain this drift for timber, traveling and ventilation, despite the mining which is being carried on two subs above the level. There was no new drifting on the 9th Level during 1943.

Subs Above the 10th Level

No. 1 Shaft Pillar South of the Dike

In October the 595' Sub which is approximately 13 feet below the 9th Level was opened for mining after driving a ventilation and traveling connection to the 9th Level haulage drift. It was found that no merchantable ore remained in the vicinity of No. 1003 Raise and as a result the East portion was abandoned and mining was continued from the 10th Level No. 1002 Raise. Mining operations progressed on either side and to the Southeast along the main footwall. In December No. 4 Contract completed the mining of all available ore on this sub-level after finishing three slices East of the raises to lean ore. The contract moved to the 580' Sub late in the month.

No. 1 Shaft Pillar North of the Dike:

Mining operations were carried on North of the dike from No. 1005 Raise which was cut out on the 595' Sub-level. In December No. 38 Contract completed five slices along the dike and to the old workings on the North and West side of the area. It was apparent from the grade of ore as well as the analysis made when No. 1004 Raise was put up that mining would be completed in this small area when all the ore was removed on this sub-level.

10th Level

With the exception of the usual cleaning and track maintenance, there was no work done on the 10th Level during 1943.

11th Level

There was no mining carried on above this level during 1943 as the ore body has been entirely depleted in this territory.

Subs Above the 12th Level

Small Ore Bodies South of Main Dike

The mining of the pillars in the vicinity of the main branch of the 12th Level shaft drift was completed on the 325' Sub in March. The two ore bodies lie between the branches of the main dike on the South footwall. Mining was continued below the 12th Level in April 1943 from No. 1363 Raise put up

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7. UNDERGROUND: (CONT.)

c. Stoping: (Cont.)

Small Ore Bodies South of Main Dike: (Cont.)

from the 13th Level. The ore in the small North ore body was approximately 240 feet in length and 40 feet in width. It might be added that this ore was originally shown in the development of the 12th Level but mining was delayed until another drift had been completed to by-pass the ore body. The second small ore body South of the dike and along the footwall was greatly reduced in size due to the flattening of the footwall which reduced the overall length by approximately 70 feet on each sub-level.

12th Level

The mining of the two small ore areas near the South footwall completed the removal of all of the ore above the 12th Level.

Subs Above the 13th Level - Negaunee Lease

Small South Ore Bodies

In July the 295' Sub was opened in the small ore bodies near the footwall South of the main Negaunee dike. After a small amount of exploratory drifting in the vicinity of No. 1369 Raise it was decided further mining would be impractical in as much as the footwall had cut off the small ore body at this point between the dikes which lie to the North and South. A small amount of ore was mined East of No. 1369 Transfer Raise in an area 60 feet by 60 feet. In as much as the footwall above had reduced the size by approximately 60 feet it was evident that no further available ore could be found at lower elevations. The entire floor of this sub-level was underlaid by the jasper footwall.

During the development of the 13th Level by raises a small narrow ore body was found on the 250' Sub-level elevation Southeast of No. 1320 Raise. During August and September of 1943 it was decided to stope out the comparatively hard ore in this small area. A transfer drift was then driven Southwest of No. 1321 Raise and the ore body which was only 20 feet in width was milled out to a height of approximately 50 feet above the transfer floor. Information gained from the driving of the transfer drift indicated that no further downward extension of this small ore body could be expected as it was cut off by jasper on all sides as also in the floor of the drift.

Main Ore Body North Footwall Pillar

The mining of the North end of the Negaunee ore body adjacent to the Negaunee Mine boundary has lagged behind adjacent areas mined to the South and Northwest due to the converging of the footwall from a once large area to an increasingly smaller one. Early in 1943 mining operations were being carried on by two contracts on the 260' Sub-level, for the most part Northwest of No. 1359 and 1357A Raises. This sub-level was completed in the middle of the year after which time the 250' Sub was opened for mining. Two raises were available for mining here, both located near the footwall. Long slices were necessary to reach the Northwest end of this pillar. In December No. 10 Contract

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7. UNDERGROUND: (CONT.)

c. Stoping: (Cont.)

Main Ore Body North Footwall Pillar: (Cont.)

completed mining the last pillar Southwest of No. 1359 Raise as well as a small pillar on the South and East side of the raise to the jasper footwall. Late in December the contract moved down to open the 235' Sub-level.

The major portion of the product in 1943 was mined on four sub-levels, the 235', 220', 210' Subs, and the 13th Level. This area lies on the Northeast footwall dipping to the West or toward the Maas Mine and constitutes what has been termed the Main Ore Body. As the footwall advanced approximately 45 feet on each sub-level new locations for contracts crowded out by the advancing footwall were found in other small ore bodies to the Southwest or in the Maas Strip ore area. The ore in this territory and particularly along the footwall is relatively hard and due to the rapid mining as well as the concentration of contracts, ventilation was somewhat of a problem. After the middle of the year mining had progressed to a point where all ore with the exception of two places was being diverted to the 14th Level. During the last half of 1943 there were as many as 14 mining contracts located on a single sub-level due to the limited territory which now and in the future is available.

A considerable portion of the mining in the Maas Strip to the North of this area was carried on under old timber and jasper pillars left from the original mining at the Maas Mine prior to the lease of this area to the Negaunee Mine. This condition as well as the heavy pressure in this area has materially affected the speed with which mining here has progressed. It might be added that adjacent to the Northwest boundary of the Maas Strip area, mining has been completed at the Maas Mine on a number of sub-levels below the elevation of the area being mined at the Negaunee Mine.

Three mining contracts throughout the year continued operations in the central portion of the main ore body just South of the Maas area boundary and North of the main dike. In one instance a considerable amount of water had been encountered along the boundary. This area is also cut up by jasper horses and a cross dike which is now being used as a mining limit.

In a small ore body South of the dike which is approximately the upper portion of an ore concentration which follows a narrow trough to the Southwest, an exploratory drift was driven from a transfer which connects with No. 1401 Raise. This ore body had been intersected by two 13th Level cross-cuts and its development was necessary due to lack of mining places. A drift was driven in the area between the two cross-cuts which indicated that the South footwall as well as rolls in the jasper hanging had cut the area and divided the ore body. Toward the end of the year a diamond drill hole was extended into this area which also showed two bodies separated by jasper. From a drift at an elevation of about 23 feet below the 13th Level it is probable that these two small ore bodies can be mined by the stoping method when the 13th Level cross-cuts which intersected this ore area are no longer needed.

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7. UNDERGROUND: (CONT.)

c. Stoping: (Cont.)

Main Ore Body North Footwall Pillar: (Cont.)

In December, eleven contracts were engaged in mining on and above the 13th Level elevation. The ore from only one of these contracts, mining on the 235' Sub-level, about 40 feet above the 13th Level was trammed on the 13th Level. Ten contracts were mining from 14th Level raises and their ore was trammed on the 14th Level.

One contract was mining on the 13th Level elevation in a small ore trough between two dikes, the North dike or boundary of this deposit being the Main East and West dike that has been found on all the levels in the mine. The other ten contracts were all mining in the main deposit which lies between the main dike and the North boundary of the Negaunee Mine property. They were divided as follows: one on the 235' Sub-level, one on the 220' Sub-level, five on the 210' Sub-level, and three on the 13th Level.

The footwall advancing from the East to the West at an approximate pitch of 17 degrees is reducing the ore area in the main deposit quite rapidly and cuts off this deposit entirely at a point some distance above the 14th Level.

Negaunee Lease - Southwest Ore Body Above the 14th Level

During 1943 there was a considerable amount of exploratory drilling and drifting in the Southwest stoping territory. Four diamond drill holes were drilled on the 160' Sub-level in a drift which connects by a raise to the 13th Level, and also extends in a Northwesterly direction to the Maas boundary. After mining was completed in the large stope opened here near the South footwall, it was decided to further explore the area to the East. Diamond drill hole No. 42 was drilled in March a distance of 145 feet in ore with the exception of two cross dikes which had also been located by the original exploration drift. In June No. 1474 and 1475 Raises were opened by a connecting drift on the 140' Sub-level (20 feet below) and transfer drifts were driven to the Southeast from each of these raises. The drifts were driven in footwall slate and jasper and showed some ore in the back in several instances. The drift from No. 1475 Raise was driven to a point 118 feet from the raise and at the elevation of the upper subs, viz: 160', 185', 195' (13th Level) and 210' Sub-levels, exploration of the ore body to the Southwest was made by small drifts and raises. On finding that the ore extended further to the Southeast than the diamond drilling indicated it was necessary to advance the transfer drift to a point 195 feet from the raise. Similar explorations were likewise carried on in the ore body to the North which is separated from the ore area described above by a dike varying from 2 feet to 8 feet in thickness.

In December, the work of connecting the small drifts on the various sub-levels with the stoping raise was continued. Development will be completed when the vertical and lateral extent of the ore body is definitely known.

Early in the year a second small stope was opened Southeast of No. 1461 Raise above the transfer drift located on the 160' Sub-level. An ore body approximately 70 feet in length and 40 feet in width was mined to a height of 60 feet above the transfer drift. Stoping operations were completed in August.

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7. UNDERGROUND: (CONT.)

c. Stoping: (Cont.)

Southwest Ore Body Above the 14th Level - Negaunee Lease (Cont.)

A second small ore body was developed for stoping in September Southwest of No. 1461 Raise. The stoping width was approximately 25 feet with a length of 45 feet. The Main Negaunee dike served as the North mining limit with jasper hanging encountered on the other three sides. Late in 1943 further development indicated that the ore continued to make to the Southeast on the upper sub-levels. A long inclined raise outlined the ore to elevation of the 235' Sub-level. In December No. 17 Contract continued to develop the upper part of the ore body South of No. 1461 Raise. By the end of the month actual stoping operations had been completed to the 220' Sub-level elevation and it became necessary to do more development work to mine the remaining ore which apparently connects over a jasper horse with the stope in which mining had been completed in August. It is not anticipated that much ore remains to be mined in this small stope.

Mining operations were continued in the Southwest end of the Main Negaunee Ore Body adjacent to the boundary during 1943. One contract carried on mining operations here in a small area and during the year completed the 185', 160' Sub-levels and were nearing the end of mining on the 150' Sub-level. This area is bounded on the South by the Main Negaunee dike and at the present time includes an ore area approximately 110 feet in length by 55 feet in width. From all indications resulting from mining in the Maas Mine adjacent to this area, the ore outline should increase considerably in size as mining continues downward.

14th Level:

The work on the 14th Level consisted largely of putting up new raises where needed to efficiently carry on mining operations. The actual development which includes four raises as well as the present extension of the No. 1430 Cross-cut has been previously discussed under the heading "Development in Rock". The usual maintenance and repair work was continued during 1943 and comprised largely the replacing of crushed timber as well as regular cleaning of the various cross-cuts. It might be added that at the end of the year, 27 mining contracts were using raises originating on the 14th Level. This condition naturally has increased the tramming activity on the 14th Level with the result that any major repairs must be done during off shift periods.

Subs Above the 13th Level

Maas Strip Area

The Maas Strip comprises an area approximately 1,000 feet in length by 250 feet in width immediately Northwest of the Main Ore Body on the Negaunee Property and is a continuation of this ore body across the ore trough. Mining was started on this leased parcel in 1941 on the 260' Sub-level elevation at the top of the ore under an area already mined at the Maas Mine. In 1941 and 1942 an area approximately 225 feet by 250 feet was mined on the 250' and 235' Sub-levels. Two small pillars on the 235' Sub-level were mined early in 1943, which completed mining at this elevation.

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7. UNDERGROUND: (CONT.)

C. Stoping: (Cont.)

Maas Strip Area: (Cont.)

The 220' Sub-level was mined in this area in 1943, but due to advance of the footwall the area had decreased to approximately 160 feet by 250 feet in size. The 210' Sub-level was then developed and by the end of the year was over 50% mined. The area had however decreased to 120 feet by 250 feet in size. Due to shrinkage in size only two contracts were mining here at the end of the year as compared with four at the start of the year.

The second block 280 feet by 250 feet immediately Southwest of the above area was opened for mining in 1942 at the elevation of the 220' Sub-level and all but one small pillar mined by the end of 1942. The ore above the second block in the Maas Strip had been mined several years ago on the 235' Sub-level, Maas Mine. It was reached by four raises from the 14th Level. In 1943, the 210' Sub-level was mined in this block and at the end of the year development of the 195' Sub-level at the elevation of the 13th Level, Negaunee Mine, was well advanced and six gangs were mining here as compared with four at the start of the year. Three additional raises were put up in this block in 1944 from No. 1420 Cross-cut. The ore is dry and mining conditions except for the heavy pressure is good. Due to pressure and crushing, ventilation late in the life of the sub-levels is difficult to maintain and output from the mining contracts is less due to decrease in supply of fresh air and difficulty of handling supplies through the crushed drifts.

The extension of No. 1430 Cross-cut on the 14th Level across the Maas Strip was completed in 1942. Heavy pressure in this area made it necessary to install lining sets and start retimbering before the cross-cut was completed. Constant retimbering failed to keep the cross-cut open and in the fall of 1943 it was decided to drive a branch drift to the Northeast from a point near the South boundary of the Strip. This new drift will be driven in lean ore and jasper some 75 feet back of the ore contact. At the end of the year the drift had advanced 110 feet with 130 feet to drive to completion. One raise out of the four planned for this area has been cut out, five feet of cribbing installed and a chute built. Three of the four raises here will extend from the 14th Level to the 200' Sub-level, a vertical height of 125 feet, and one to the 220' Sub-level, or to a vertical height of approximately 150 feet. This area, the third block in the Maas Strip, approximately 250 feet by 210 feet in size will be developed as rapidly as possibly as additional working places will soon be needed for contracts forced out of their present working places in the Negaunee-Maas Lease by the flat pitching footwall.

Plans for development of Block four in the Maas Strip have been made and this area will be developed as soon as work is completed in Block 3. Block 4 has been mined down to the 150' Sub-level elevation, Maas Mine, leaving only 57 feet of ore above the Negaunee Mine 14th Level drift. This block can only be mined on three sub-levels, or for a distance of 37½ feet as the pressure will be so great that the 14th Level drift can probably not be kept open for haulage when mining reaches a point within 20 feet of the back of the level. It is also true that the storage capacity of the raises will be reduced by this time to one or two tram cars beyond which point it is uneconomical to continue mining.

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7. UNDERGROUND: (CONT.)

c. Stoping: (Cont.)

Maas Strip Area: (Cont.)

Block 4 comprises an area approximately 250 feet by 250 feet in size at the Southwest end of the Maas Strip. It is directly under the large cave to surface and for this reason will be very wet. It is anticipated that great difficulty will be experienced in mining here. It is cut up by 4th Level drifts, Maas Mine, and by mining on the 150', and 135' Sub-levels, Maas Mine. Directly Northwest of the Maas Strip mining has progressed to much greater depth in the Maas Mine which throws more weight on this pillar.

At the end of the year, eight contracts were mining in the Maas Strip. In the coming year at least four more contracts will be transferred to this area and by the end of 1944 probably two or more additional gangs will be working here. The rapidity of transfer of contracts to the Maas Strip depends on the number of shifts per week that the mine will operate during the coming year.

d. Timbering:

The total cost for timbering increased 8.7% in 1943, and in cost per ton nine cents or 25%. The large increase was due to increase of 21.6% in cost of stull timber, cribbing, lagging and poles, and to increase of 5½ cents per hour in wages. During the year, more raises were repaired while repairs of timber sets in main level drifts slightly decreased. There was an actual decrease of 12.4% in the amount of stull timber and 16% in amount of lagging and poles used in 1943, while the product decreased 13.7%. The war demand for pulpwood for manufacture of paper, etc., and for lumber together with the increased wages paid men working in the woods has forced the price of timber products used at the mine to the highest level on record. A number of cords of slabs obtained from timber sawed at the District Sawmill, located at the Negaunee Mine, were used during 1943 in covering down the floors of sub-levels.

There was a shortage of stull timber early in the year which was relieved by diversion to the mine of sawmill timber cut by the Land Department. Late in the year a shortage of seven foot lagging developed due to the open winter which prevented cutting of this material in the swamps. Freezing temperatures in December indicate quick relief and it is hoped ample supplies for 1944.

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7. UNDERGROUND: (CONT.)

d. Timbering: (Cont.)

Statement of Timber Used:

	Lineal Feet		Average Price, Feet		Amount	Amount
	1942	1943	1942	1943	1943	1942
6" to 8" Cribbing	221,253	177,332	.0400	.0506	8,974.58	8,853.28
8" Stulls	143,699	128,099	.0718	.0978	12,531.52	10,312.75
10" Stulls	217,752	170,473	.0967	.1259	21,469.45	21,058.16
12" Stulls	111,122	131,258	.1421	.1606	21,083.79	15,788.22
Total	693,826	607,162	.0807	.1055	64,059.34	56,012.41
Lagging - 7 ft.	3,146,026	2,419,420	.0094	.0111	26,800.93	29,699.82
Poles - 9½ ft.	2,163,043	2,135,107	.0172	.0181	38,682.28	37,275.28
Total	5,309,069	4,554,527	.0172	.0144	65,483.21	66,975.10
Wire Fencing, Ft.	9,570	2,805	.0628	.0628	176.31	601.31
Grand Total					129,718.86	123,588.82

	1943	1942
Product	954,990	1,106,694
Feet timber per ton of ore	.636	.627
Feet of Lagging per ton of ore	2.533	2.843
Feet of Lagging per foot of timber	3.985	4.534
Feet of Wire Fencing per ton of ore	.0029	.0086
Cost per ton for timber	.0671	.0506
Cost per ton for lagging	.0380	.0269
Cost per ton for poles	.0405	.0337
Cost per ton for wire fencing	.0002	.0005
Total Cost Per Ton	.1358	.1117
Equivalent of stull timber to board measure	1,438,058	1,494,308
Feet of board measure per ton of ore	1.506	1.350

Total Cost For Timber, Lagging, Poles, Etc.

Year	Product	Amount	Cost Per Ton
1943	954,990	129,718.86	.1358
1942	1,106,694	123,588.82	.1117
1941	1,033,220	96,802.32	.0937
1940	865,689	79,331.40	.0916
1939	551,362	57,608.66	.1045
1938	412,000	43,788.52	.1061
1937	820,915	76,759.61	.0935

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7. UNDERGROUND: (CONT.)

e. Drifting and Raising:

The following table gives a comparison of total feet of drifting and raising in ore and rock in 1943 and 1942.

	Drifting		Raising		Grand Total
Year	Ore	Rock	Ore	Rock	
1943	1567'	903'	2015'	758'	5,243'
1942	1244'	1639'	2152'	1332'	6,367'
Increase	323'				
Decrease		736	137	574	1,124

Ore drifting increased 26% in 1943, while rock drifting decreased 45%. There was a decrease also in raising in ore and rock. A major portion of the footage in drifting and raising was incurred in development of the sub-level stopes between the 13th and 14th Levels.

f. Explosives, Drilling and Blasting:

The total cost for all explosives decreased 11.4% in 1943, while the product decreased 13.7%. As the cost for powder was the same as in 1942, the difference in the above percentages indicates the use of more explosives per ton of ore mined in 1943. Reference to the following statement discloses an increase of 2.7% in pounds of powder per ton of ore and a like percentage of increase in cost per ton of ore for powder. There was a slight decrease in cost per hundred feet of fuse while the cost for blasting caps, tamping bags, and fuse lighters increased. The net effect of change in prices reduced the 2.7% increase in cost per ton for powder to a 1.9% in cost for all explosives. The cost of .0681 for all explosives per ton of ore is the highest on record for the Negaunee Mine.

The use of more powder per ton of ore was due to harder ground encountered in several mining areas above the 14th Level. Sub-level stoping here in two areas in extremely hard ore involved driving of several thousand feet of small drifts and raises to develop the stopes for mining. More powder was required per ton of ore in these small drifts and raises than in ordinary drifting and slicing operations.

Supervision of blasting practices was continued during the year by the shift bosses at regular intervals. Following the fatal blasting accident at the Negaunee Mine due to violation of the rule that miners must leave when one hot wire fuse lighter burns out, the time interval between inspections at all of the mines was reduced to two months. The inspections are made to prevent the miners from becoming reckless and taking chances particularly in the lighting of fuses where the time element is all important.

The auger drill steel manufactured in the United States was of poorer quality than in the previous year and far inferior to the steel imported from Sweden prior to the war. As a result breakage of auger drills increased and more drill steel was used in 1943. Welding of the broken drills has not proven very satisfactory as they break again in a new place soon after going back into service.

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7. UNDERGROUND: (CONT.)

f. Explosives, Drilling and Blasting: (Cont.)

The following statement gives a comparison of powder costs, etc., for the past ten years:

Year	Cost Per Lb. For Powder	Lbs. Powder Per Ton of Ore	Cost Per Ton For Powder	Cost Per Ton Fuse & Caps	Total Cost
1943	.1150	.4918	.0566	.0115	.0681
1942	.1150	.4788	.0551	.0117	.0668
1941	.1150	.4792	.0551	.0118	.0669
1940	.1151	.4485	.0516	.0111	.0627
1939	.1176	.4584	.0539	.0113	.0652
1938	.1225	.4320	.0530	.0102	.0632
1937	.1195	.4270	.0510	.0110	.0620
1936	.1104	.4320	.0475	.0105	.0580
1935	.1168	.4270	.0498	.0102	.0600
1934	.1140	.4350	.0507	.0106	.0613

Statement of Explosives Used: (Ore Development and Stoping)

	Quantity	Average Price	Amount 1943	Amount 1942
Gelamite #1	441,600	11.50	50,823.74	58,146.88
60% Gelatin	28,050	11.40	3,194.45	2,817.50
Total Powder 1943	469,650	11.50	54,018.19	60,964.38
Fuse - feet	1,826,977	5.17	9,439.97	8,864.24
#6 Blasting Caps	216,665	12.19	2,643.07	3,044.74
Tamping Bags	31,000	5.61	174.08	168.84
Fuse Lighters	40,300	6.92	279.05	330.11
Total Fuse, Etc. 1943			11,032.39	12,983.66
Total Cost all Explosives			65,050.58	73,948.04
Product - tons			954,990	1,106,694
Pounds powder per ton of ore			.4918	.4788
Cost per ton for powder			.0566	.0551
Cost per ton for fuse, caps, etc.			.0115	.0117
Cost per ton for all explosives			.0681	.0668
(Sinking, Rock Development, etc.)				
Gelamite #1	4,600	11.05	508.30	644.00
60% Gelatin	13,650	11.50	1,569.75	2,892.50
Total Powder 1943	18,250	11.50	2,078.05	3,536.50
Fuse - feet	43,890	5.17	226.78	382.77
Tamptite Paper Shells	200	12.42	1.20	
No. 6 Blasting Caps	5,350	12.42	66.46	179.25
Total Fuse, etc., 1943			294.44	562.02
Total Cost All Explosives 1943 Rock Development			2,372.49	4,098.52
Grand Total All Explosives Used 1943			67,423.07,	78,046.56
Average Price per Pound for Powder 1943			.115	.115
Explosives used for Stoping and Development			67,423.07	
Explosives used for Backfilling			24.27	
Total as Per Cost Sheet			67,447.34	

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UNDERGROUND: (CONT.)

g. Mining & Loading:

There were no changes in 1943 in the top slicing mining system that has been followed at the Negaunee Mine for many years. Mention was made in last years Annual Report of mining a small hard ore body between the 14th and 13th Levels by the sub-level stoping system. This stope proved to be larger than had been anticipated. All the available ore was mined without a single fall of ground from the hanging wall jasper which proved to be very hard and compact. Farther to the North a small ore body was also mined by stoping and work was still underway here at the end of the year. Diamond drilling has located two other similar hard ore bodies lying between small dikes with a general North-South strike which at the end of the year were being developed for mining. There is also a third ore body in this area near the South footwall which it is planned to mine by the sub-level stoping system. These stoping areas will provide work for two contracts for a year or more and prove of great value in maintaining the product during 1944.

There were no changes in scraping practices in 1943. In some areas where pressure is heavy additional raises are being put up to enable mining to proceed more rapidly by decreasing the area to be mined from each raise. Output from a contract is from 10 to 20% greater when mining on a newly opened sub-level where all drifts are full size. When the timber in air ways and around the top of the raise crush, the miners are handicapped by reduction in volume of fresh air and increased difficulty in handling timber, operating scraper hoists, etc. Additional raises reduce the time required to mine the sub-level with a corresponding decrease in the handicaps resulting from crushing timber.

A few years ago when the manufacturers increased the speed of the scraper hoists from 220 and 240 feet per minute to 300 feet per minute for loaded scraper and to 350 feet per minute for the empty scraper, the miners complained that the speed was too great. Now all the miners want the speedier hoists as the increased speed means larger pay checks. It is to be regretted that there are only a comparatively few of these hoists at the mine, most of the hoists are ten years or older and operate at slower speeds.

h. Ventilation:

The new aerodyne fan which was put into operation at No. 2 Shaft in February 1942 was operated continuously during the past year. Minor mechanical repairs have been made since its installation to improve the heating plant which is in operation during the four cold winter months. The general ventilation system has for the most part remained unchanged as far as the Negaunee and Maas Mines are concerned. Biannual inspections by the Safety and Engineering departments continue to show good results in the ventilation of these two mines. These inspections showed that the total intake averaged 98,000 cubic feet per minute which was distributed between the various levels, of which the 9th, 13th and 14th Levels, Negaunee Mine, are the only ones where active mining is underway. The connection between the Negaunee 12th and the Maas Mine 3rd Levels allows approximately 20,000 cubic feet to pass into the Maas Mine at this elevation. On the 13th Level, approximately 47,000 cubic feet are distributed between the four cross-cuts leading to the large mining area. The exhaust air is then diverted by raises to the 14th Level where at the present time four connections have been made to the 4th and 5th Levels of the Maas Mine. It should be noted that there is

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UNDERGROUND: (CONT.)

h. Ventilation: (Cont.)

a partial leakage on each of the Negaunee Levels which allows these levels to be free of accumulate blasting smoke, thus the total exhaust to the Maas Mine is approximately 66,000 cubic feet per minute. During the year an average of six small auxiliary fans were used in various segregated mining locations where added ventilation was necessary. An increase in the number of auxiliary units will likely be necessary during the coming year as mining operations become more concentrated in the ore area between the 14th and 13th Levels.

i. Pumping:

The average number of gallons of water pumped per minute in 1943 was 770 gallons, an increase of 114 gallons per minute over the previous years average. This was the largest amount pumped since 1939, when the average was 1,015 gallons. The lowest average was in 1941 when 645 gallons were pumped per minute. It is difficult to account for the increase as there was no excessive rainfall in 1943. However, there was rainfall in all the summer months and boundaries of the caved area also extended so that a larger caved area was exposed to direct rainfall.

The deep well pump on Section 32, located a few hundred feet from the cave to surface North of No. 2 Shaft, operated throughout the year, except for a short shutdown in the summer for repair of the motor bearing. Prior to the shutdown the pump handled about 225 gallons per minute, after the shutdown for several weeks 275 gallons per minute were pumped. The water then slacked off and late in December had decreased to less than 200 gallons per minute. In October a rectangular weir was installed to permit of more accurate measurements of the water.

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

Month	1943	1942	1941	1940	1939	1938
January	668	671	612	892	947	1038
February	660	636	591	768	738	906
March	713	635	584	768	944	951
April	671	627	582	700	963	988
May	726	641	824*	747	995	1029
June	794	659	838	678	1085	1052
July	843	666	602	679	1177	1055
August	858	662	613	685	1112	1085
September	849	662	612	657	1067	1070
October	833	667	605	644	1033	1044
November	860	671	629	640	979	994
December	761	675	646	618	947	973
Total Average	770	656	645	714	1015	1015

(*) Athens Mine water diverted to Negaunee Mine for months of May and June.

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7. UNDERGROUND: (CONT.)

i. Pumping: (Cont.)

The following statement shows the average number of gallons pumped per minute for the past ten years:

Year	Gallons Per Minute
1943	770
1942	656
1941	645
1940	714
1939	1015
1938	1015
1937	1069
1936	914
1935	918
1934	831

j. Underground in General:

The product in 1943 was 954,990 tons of ore which was produced by an average of 35 contracts working 16 shifts per week except in January. The product shows a decrease of 150,000 tons from the product in 1942, but is not far from the maximum possible output. This is due largely to the fact that an increased proportion of the product is and will continue to be mined from the 14th or the deepest level in the Mine.

The total gross estimate of 2,303,012 tons would at the present rate of production indicate that the life of the Negaunee Mine is about three years, however, some prospective ore will doubtless be developed which will extend the life possibly another year or more depending on the operating schedule in effect during the next several years. If the present plan of transferring men to the Mather Mine is carried out in the coming year, the life of the Negaunee Mine will be extended a longer period.

8. Cost of OPERATING:

a. Comparative Mining Costs:

	1943	1942	Increase	Decrease
Product - tons	954,990	1,106,694		151,704
Underground Costs	1.357	1.184	.173	
Surface Costs	.115	.098	.017	
General Mine Expenses	.224	.194	.030	
Cost of Production	1.696	1.476	.220	
Taxes	.139	.110	.029	
Depletion & Deprec.	.148	.262		.114
Loading & Shipping	.036	.035	.001	
Adm. & Gen. Expense	.055	.060		.005
Misc. Income	.007	.007		
Total Cost	2.067	1.931	.136	

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8. COST OF OPERATING:

a. Comparative Mining Costs: (Cont.)

	1943	1942	Increase	Decrease
No. of Days Operated	308	308		
Total No. Shifts Operated	823	868		45
No. of Shifts & Hours	1, 2 & 3-8 Hr.	1,2 & 3-8 Hr.		
Average Daily Product	3101 tons	3593 tons		492 tons

Cost of Production:

	1943	Percent	1942	Percent	Increase	Decrease
Labor	1.153	68.0	.956	65.0	.197	
Supplies	.543	32.0	.515	35.0	.028	
Total	1.696	100.0	1.471	100.0	.225	

b. Detailed Cost Comparison:

(1) Days and Shifts:

Year	Days Mine Worked	Shifts & Hours	Men Employed	Total Shifts Worked
1943	308	1,2 & 3-8 hr.	498	130,861
1942	308	1,2 & 3-8 hr.	487	136,567
Increase			11	
Decrease				5,706

(2) Wages:

There was an increase in wages of 5½ cents per hour effective April 1, 1943.

(3) Comparison of Production:

Production - 1943	954,990 Tons
Production - 1942	1,106,694 Tons
Decrease	151,704 Tons

(4) Comparison of Number of Men and Wages:

Year	No. of Men	No. of Days	Amount	Rate Per Day
1943	498	130,861	1,054,565.80	8.06
1942	487	136,567	1,046,988.98	7.67
Increase	11		7,576.82	.39
Decrease		5,706		

(5) Tons Per Man Per Day:

	1943	1942	Increase	Decrease
Surface	41.98	49.83		7.85
Underground	8.83	9.68		.85
Total	7.30	8.10		.80

(6) Cost of Production:

1943	$ 1,619,850.23	Cost Per Ton	$1.696
1942	1,633,650.25	Cost Per Ton	1.476
Decrease	13,800.02		
Increase			.220

	Labor	Percent	Supplies	Percent
1943	1,110,074.05	68.0	519,103.18	32.0
1942	1,057,944.00	65.0	570,392.42	35.0
Increase	52,130.05			
Decrease			51,289.24	

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

	1943		1942		Increase or Decrease	
Days Per Week	6		6			
Shifts and Hours	1-8 -48 2-8 - 5 3-8 -255		1-8 -3 2-8 -50 3-8 -255		1-8 - 45 2-8 - 45 3-8 - 0	
Production, Tons	954,990		1,106,694		151,704	
Average Daily Production, Tons	3,101		3,593		492	
Number of Days Worked	308		308			
UNDERGROUND COSTS:	Amount	Per Ton	Amount	Per Ton	Amount	Per Ton
1. Exploring in Mine	2183.49	.003	4211.71	.004	2028.22	.001
2. Sinking in Shaft						
3. Development in Rock	15479.13	.016	25333.67	.023	9854.54	.007
4. Development in Ore	25790.02	.027	23716.02	.022	2074.00	.005
5. Stoping	498749.46	.522	526328.35	.475	27578.89	.047
6. Timbering	427179.10	.446	393582.25	.356	33596.85	.090
7. Tramming	130149.49	.136	142823.00	.129	12673.51	.007
8. Ventilation	17780.14	.019	12811.10	.012	4969.04	.007
9. Pumping	37226.64	.039	31812.47	.029	5414.17	.010
10. Compressors and Air Pipes	49581.75	.052	56416.56	.051	6834.81	.001
11. Back Filling	332.90		805.81	.001	472.91	.001
12. Underground Supt.	36390.03	.038	33627.70	.030	2762.33	.008
13. Cave-in						
14. Maint: Comp. & Power Drill	1781.85	.002	2727.08	.002	945.23	
15. Scraper Equipt.	22381.71	.024	24760.85	.022	2379.14	.002
16. Electric Tram Equipt.	27751.51	.029	26723.86	.024	1027.65	.005
17. Pumping Machinery	3647.05	.004	4552.28	.004	905.23	
Total Underground Costs	1296404.27	1.357	1310232.71	1.184	13828.44	.173
SURFACE COSTS:						
18. Hoisting	47375.56	.050	48376.56	.044	1001.00	.006
19. Stocking Ore	12259.00	.013	9674.91	.009	2584.09	.004
20. Screening-Crushing at Mine						
21. Dry House	12003.64	.013	12554.20	.011	550.56	.002
22. General Surface Expense	14775.05	.015	14424.69	.013	350.36	.002
23. Maint: Hoisting Equipt.	10393.23	.011	12966.27	.012	2573.04	.001
24. Shaft	4977.29	.005	6059.92	.005	1082.63	
25. Top Tram Equipt.	3448.86	.004	2385.38	.002	1062.78	.002
26. Docks Tresttle&Pkt.	2848.66	.003	1326.68	.001	1521.98	.002
27. Mine Buildings	1344.02	.001	1211.55	.001	132.47	
Total Surface Costs	109424.61	.115	108980.16	.098	444.45	.017
GENERAL MINE EXPENSES:						
Employees Vacation Pay	22183.98	.023	23887.01	.022	1703.03	.001
Sump & Pump-E.&A.-NM-11			8911.30	.008	8911.30	.008
28. Insurance	6425.19	.007	6306.62	.006	118.57	.001
29. Mining Engineering	3215.49	.003	3161.85	.003	53.64	
30. Mechanical & Elec. Eng.	2867.98	.003	2598.13	.002	269.85	.001
31. Analysis & Grading	24479.37	.026	24562.60	.022	83.23	.004
32. Personal Inury	24203.95	.025	30142.22	.027	5938.27	.002
33. Safety Department	2263.93	.002	2304.41	.002	40.48	
34. Tele. & Safety Devices	5016.65	.005	4547.67	.004	468.98	.001
35. Local & General Welfare	6094.90	.006	6733.02	.006	638.12	
36. Special Expense, Pensions	46135.04	.049	31733.05	.029	14401.99	.020
37. Ishpeming Office	22375.20	.024	23314.27	.021	939.07	.003
38. Soc. Sec. Taxes	24979.95	.026	24240.07	.022	,739.88	.004
39. Mine Office	23779.78	.025	21995.16	.020	1784.56	.005
Total General Mine Expense	214021.35	.224	214437.38	.194	416.03	.030
COST OF PRODUCTION	1619850.23	1.696	1633650.25	1.476	13800.02	.220
40. Taxes	132710.85	.139	121784.67	.110	10926.18	.029
TOTAL COST	1752561.08	1.835	1755434992	1.586	2873.84	.249
Budget-Tons & Cost	928464	2.142	1020950	1.640	92,486	,502

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8. COST OF OPERATING: (CONT.)

b. Detailed Cost Comparison: (Cont.)

(7) Detail of Accounts: (Cont.)

UNDERGROUND COSTS:

1. Exploring in Mine:
Decrease due to proportion of cost of E. & A. NM-15 Exploration of $2,058.60, and proportion of E. A. CC-82 Gopher Hi-Speed drill $393.00. Charged to this account in 1942. Increase in drilling underground with High Speed Drill account for main portion of expense in 1943.

3. Development in Rock:
Decrease due to less development work in rock. In 1943 there were 1627 feet of rock drifting and raising compared with 2784 feet in 1942. Also proportion of cost of E. & A. NM-15 Exploration of $2,058.60 charged in 1942.

4. Development in Ore:
Increase due to more development work in ore.

5. Stoping:
Expenditures decreased $27,578.89. In 1943 there were 45,515¼ shifts worked compared with 49,059 shifts in 1942. Labor cost decreased $18,109.72 and supply cost decreased $9,469.17. The cost per ton increased .047. Average tons stoping in 1943 was 20.70 compared with 22.17 tons in 1942.

6. Timbering:
Expenditures increased $33,596.85. Labor cost increased $29,492.34. Four utility hoists, $1,900.00, charged out, also increase in cost of stull timber and poles used.

7. Tramming:
Expenditures decreased $12,673.51. Decrease due to less tonnage trammed. Electric current increased $138.39.

8. Ventilation:
Expenditures increased $4,969.04. Five Coppus Fans costing $2,126.63 and proportion of "V" Belt for No. 2 Ventilation Fan, $199.04, charged out. Labor repairing Fans and Air Doors in the mine increased. Heating cost increased on account of burning more coal in heating plant at No. 2 Shaft to keep air warm to prevent ice forming in the down cast shaft.

9. Pumping:
Expenditures increased $ 5,414.17 Electric current increased $3,479.31.

Number of gallons pumped year 1943	401,074,555
Number of gallons pumped year 1942	368,234,666
Increase	32,839,889

Average number of gallons per minute for year 1943 - 770
Average number of gallons per minute for year 1942 - 656
Increase 114

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8. COST OF OPERATING: (CONT.)

b. Detailed Cost Comparison: (Cont.)

(7) Detail of Accounts: (Cont.)

10. Compressors and Air Pipes:
Expenditures decreased $6,834.81. Electric current decreased $8,003.70. Less air used in development work. Increase in labor and supplies, and air piping on account of higher wages and supply cost. Less shifts worked per week in 1943 for eleven months of the year.

Cubic feet of air compressed 1943	1,137,375,000
Cubic feet of air compressed 1942	1,432,260,000
Decrease	294,885,000

11. Back Filling:
Expenditures decreased $472.91. Less blasting of filling in working areas in 1943.

12. Underground Superintendence:
Expenditures increased $2,762.33. Wage adjustment of $705.43 also increase in wages effective 7/1/43 of 5%. One extra shift boss put on because of bosses taking vacations, home sick, and injured.

14. Compressors, and Power Drills:
Expenditures decreased $945.23. Six RB-12 Jackhammers, $1202.49 and repairs to Intercooler $305.67 charged out in 1943. In 1942 four RB-12 Jackhammers $800.83 and one R-48 Stoper $365.00, Intake and discharge valves $895.00, and repairs to compressor charged in 1942.

15. Scrapers and Mechanical Loaders:
Expenditures decreased $2,379.14. One 20 H.P. Ingersoll Rand scraper hoist $1,469.00 charged out in 1942. Repairs to scrapers and scraper hoists decreased in 1943 due to mine operating less shifts.

16. Electric Tram Equipment:
Expenditures increased $1,027.65.

	1943	1942	Increase	Decrease
Locomotives	10,194.31	7,349.39	2,844.92	
Wiring	2,42k,95	3,153.62		731.67
Tracks	8,751.02	11,100.79		2,349.77
Cars	5,973.36	4,903.05	1,070.31	
Generators	410.87	217.01	193.86	
Total	27,751.51	26,723.86	1,027.65	

17. Pumping Machinery:
Expenditures decreased $905.23. Repairs to pumping machinery increased in 1943. Labor and supplies completing excavation of 14th Level pump house and installation of pump on 14th Level charged out in 1942.

SURFACE COSTS:

18. Hoisting:
Expenditures decreased $1,001.00. Cost of electric current decreased $1,999.32. Labor increased $631.60 and carbon brusher $366.72.

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8. COST OF OPERATING: (CONT.)

b. Detailed Cost Comparison: (Cont.)

(7) Detail of Accounts: (Cont.)

19. Stocking Ore:
Expenditures increased $2,584.09. Cost of operating tram system increased $1,954.39. Cost of erecting and repairing rock trestle and scraping rock increased $629.70.

21. Dry House Expense:
Expenditures decreased $550.56. One Hot Water Tank $120.00 charged out. In 1942 one Maytag Washer - $134.95 and one Gould booster pump - $280.00 charged out, also more fuel consumed in 1942.

22. General Surface Expense:
Expenditures increased $350.36. Two extra policemen hired 3/20/43 and one extra policeman hired 9/16/43. This was done in connection with the war effort as added protection against sabotage. In 1942 cost of erection of fence at East end of property enclosing No. 2 Shaft and Fan, also 500 feet at West end of property and installation of 500 watt floodlights at strategic points on surface charged out.

23. Hoisting Equipment:
Expenditures decreased $2,573.04. In 1943, three hoisting ropes amounting to $1,970.46 and cost of rewinding skip motor $1,501.77 charged out. In 1942, three hoisting ropes were charged out, also more expanse for repairs to hoisting machinery to skips, cages and skip roads.

24. Shaft:
Expenditures decreased $1,082.63. Less repairs required in shaft and shaft pockets in 1943.

25. Top Tram Equipment:
Expenditures increased $1,062.78. Cost of repairing top tram cars increased in 1943, also rollers, sheaves, and Herringbone Pinions for top tram motor - $152.85.

26. Docks, Trestles and Pockets:
Expenditures increased $1,521.98 due to repairing steel stocking trestles.

27. Mine Buildings:
Expenditures increased $132.47 due to building storm shed for engine house and building storage shed for shop supplies and tools.

	1943	1942	Increase	Decrease
Office	106.94	140.87		33.93
Warehouse	11.69	.23	11.46	
Shops	107.89	12.89	95.00	
No. 2 Shaft House		35.23		35.23
Shaft House	232.74	150.57	82.17	
Engine House	254.59	241.57	13.02	
Boiler House	25.71		25.71	
Dry House	17.39	244.65		227.26
Coal Dock and Trestle	135.59	115.91	19.68	
Miscellaneous	417.53	104.71	312.82	
Fire Protection	5.13	112.06		106.93
Timber Tunnel	25.80	2.58	23.22	
Mine Rescue Room	3.02	50.28		47.26
Total	1,344.02	1,211.55	583.08	450.61

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8. COST OF OPERATING: (CONT.)

B. Detailed Cost Comparison: (Cont.)

(7) Detail of Accounts: (Cont.)

GENERAL MINE EXPENSE:

Employees Vacation Pay:
Expenditures decreased $1,703.03. In 1943, 327 employees were elegible for vacation with pay, compared with 332 in 1942; 158 employees with a record of 10 years or more of continuous service were eligible for two weeks vacation pay and 167 employees with a record of three years or more of continuous service were eligible for one week vacation pay. Also two employees inducted into the armed forces received vacation pay checks. In 1943 employees were paid for 43 hours per week compared with 46 hours in 1942. In both years all employees worked during the vacation period receiving their vacation checks with their regular pay checks.

28. Insurance:
Expenditures increased $118.57.

	1943	1942	Increase	Decrease
Property	3,486.62	3,371.41	115.21	
Group	2,191.05	2,198.55		7.50
Catastrophe	747.52	736.66	10.86	
Total	6,425.19	6,306.62	118.57	

29. Mining Engineering:
Expenditures increased $53.64 on account of increase in wages.

30. Mechanical and Electrical Engineering:
Expenditures increased $269.85

31. Analysis and Grading:
Expenditures decreased $83.23 on account of less ore produced and shipped.

	1943	1942	Increase	Decrease
Ishpeming Laboratory charge	17,274.39	18,345.56		1,071.17
Shipping Dept. Expense	4,098.62	3,812.35	286.27	
Mine Sampling	3,106.36	2,404.69	701.67	
Total	24,479.37	24,562.60		83.23

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8. COST OF OPERATING: (CONT.)

b. Detailed Cost Comparison: (Cont.)

(7) Detail of Accounts: (Cont.)

32. Personal Injury:

Expenditures decreased $5,938.27.

	1943	1942	Increase	Decrease
Compensation and Doctors	17,703.36	23,819.91		6,116.55
Compensation Department	868.40	849.74	18.66	
Hospital Loss	5,627.09	5,472.57	154.52	
Mine Expense	5.10		5.10	
Total	24,203.95	30,142.22		5,938.27

33. Safety Department:
Expenditures decreased $40.48.

34. Telephone and Safety Devices:
Expenditures increased $468.98. Cost per ton increased .001. Increase due to proportion of Cardoxide Breathing appratus and safety supplies charged out.

35. Local and General Welfare:
Expenditures decreased $638.12.

	1943	1942	Decrease
General Welfare	5,024.69	5,576.66	551.97
District Welfare	1,070.21	1,156.36	86.15
Total	6,094.90	6,733.02	638.12

36. Special Expense, Pensions, and Allowances:
Expenditures increased $14,401.99. Cost per ton increased .020.

	1943	1942	Increase	Decrease
Pensions	1,985.48	2,499.96		514.48
Legal	895.46	506.92	388.54	
Saranac Investigation	3,027.28	2,681.14	346.14	
Central Emp. Office	1,342.78	1,154.83	187.95	
Retirement Expense	3,521.53	3,802.70		281.17
Other	2,867.47	21,087.50		18,220.03
Wage Adjustment	32,495.04		32,495.04	
Total	46,135.04	31,733.05	14,401.99	

37. Ishpeming Office:
Expenditures decreased $939.07. Cost per ton decreased .003. Expense is based on total labor cost at mine.

38. Social Security Taxes:
Expenditures increased $739.88. Cost per ton increased .004.

	1943	1942	Increase
Unemployment Insurance Tax	14,128.07	13,739.28	388.79
Old Age Benefit Tax	10,851.88	10,500.79	351.09
Total	24,979.95	24,240.07	739.88

Adjustment of $719.98 for 1942 charged out in 1943.

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8. COST OF OPERATING: (CONT.)

b. Detailed Cost Comparison: (Cont.)

(7) Detail of Accounts: (Cont.)

39. Mine Office:

Expenditures increased $1,784.56. Cost per ton increased .005.

	1943	1942	Increase	Decrease
Mine Office Expense	12,674.00	10,303.73	2,370.27	
Supt. & Asst. Supt.	5,693.17	6,363.53		670.36
Central Warehouse	5,412.55	5,327.90	84.65	
Total	23,779.72	21,995.16	1,784.56	

Increase due to donation to Red Cross of $500.00, Stationery and increase in wages effective 4/1/43.

40. Taxes:

Expenditures increased $10,926.18 on account of higher tax rate of City of Negaunee.

9. EXPLORATIONS AND FUTURE EXPLORATIONS:

The ore reserves of the Negaunee Mine for the most part are definitely known, with the exception of the Southwest stoping area, where development work was underway at the end of 1943. It is evident that this territory is the only one where explorations may develop additional ore. During the past year as indicated by the log of diamond drill holes listed below, a considerable amount of exploratory work was carried on. The use of a small air operated diamond drill has been of great value in determining the locations of the cross dikes as well as defining the areas where drifting would be uneconomical. The diamond drill was used to determine the extent of the ore in locations undetermined by drifts and raises, in some instances the results of these holes somewhat altered the plan of development work.

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9. EXPLORATIONS AND FUTURE EXPLORATIONS: (CONT.)

The following drill holes were drilled during 1943:

D.D. Hole No.	Location	Dip	Direction	MATERIAL	Date Started	Date Stopped
38	160' Sub	0°	N78-29E	0- 60 - Dike & Lean Ore 60- 75 - Ore 75-160 - Lean Ore & Dike	2/1/43	2/16/43
39	160' Sub	0°	N46W	0-120 - Seams of Ore and Jasper and Dike	2/19/43	3/1/43
40	160' Sub	0°	N24W	0- 30 - Lean Ore 30- 50 - Ore 50- 77½ - Jasper	3/3/43	3/10/43
41	160' Sub	0°	S21E	0- 6½ - Ore	3/11/43	3/11/43
42	160' Sub	0°	S13E	0- 65 - Ore 65-75 - Dike 75-105 - Ore 105-110 - Dike 110-145 - Ore	3/11/43	3/27/43
43	13th Level	-37°		0- 25 - Ore 25- 60 - Jasper	4/6/43	4/9/43
44	150' Sub	+20°	S35W	0- 25 - Ore 25-105 - Lean Ore & Jasper	10/7/43	10/20/43
45	150' Sub	+30°	N68W	0- 35 - Lean Ore & Jasper 35- 45 - Ore 45-110 - Lean Ore & Jasper	10/25/43	11/9/43
46	150' Sub	+2°	N79-57E	0-10 - Ore 10- 22 - Lean Ore 22- 45 - Ore 45- 70 - Lean Ore 70-105 - Slate	11/12/43	12/13/43
47	170' Sub	+-2°	S78W	0- 30 - Lean ore	12/21/43	

Diamond Drill Hole No. 41 was stopped after one days drilling due to a decision to drill in another direction.

Diamond Drill Hole No. 42 and 45 were drilled a distance of 145 and 110 feet respectively at which point they were stopped due to caving ground in the holes.

Diamond Drill Hole No. 47 is not complete in the above table due to its continued operation in January 1944.

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10. TAXES:

A comparison of taxes paid by the Negaunee Mine Company in 1943 and 1942 follows:

	1943		1942	
	Valuation	Taxes	Valuation	Taxes
Realty - 218.07 acres	1,140,000	43,455.89	1,350,000	44,114.22
Pers. Stockpile, Equipt. Supplies	760,000	28,970.59	680,000	22,220.50
Total by Tax Commission	1,900,000	72,426.48	2,030,000	66,334.72
Collection Fees		724.26		663.35
Total Optg. Negaunee Mine	1,900,000	73,150.74	2,030,000	66,998.07
Adams Strip	165,000	6,352.57	75,000	2,475.30
Maas Lease Area	1,382,000	53,207.54	1,585,000	52,311.30
Grand Total Optg. Negaunee Mine	3,447,000	132,710.85	3,690,000	121,784.67
MATHER MINE				
Realty - Sec. 1, 47-27	470,000	18,095.18	470,000	15,511.86
Realty - Sec. 2, 47-27	1,400,000	47,589.64	1,125,000	38,974.84
Personal Property	100,000	3,399.26	175,000	6,062.75
Collection Fees		509.89		450.38
Total Mather Mine	1,970,000	69,593.97	1,770,000	60,999.83
Cloverdale Tract	600	20.60	600	20.98
Grand Total Mather Mine	1,970,600	69,614.57	1,770,600	61,020.81
Total Optg. Neg. and Mather Mines	5,417,600	202,325.42	5,460,600	182,805.48
Negaunee Rented Buildings	1,200	45.75	1,200	39.21
Collection Fees		.46		.39
Grand Total Negaunee Mine Co.	5,418,800	202,371.63	5,461,800	182,845.08
Tax Rate Per $100 of Valuation:				
City of Negaunee		3.81192		3.267
City of Ishpeming		3.39926		3.464
Negaunee Mine Co. Percent of Taxes:				
City of Negaunee		27.95		25.33
City of Ishpeming		12.88		11.42
Division of Payments:				
City of Negaunee	3,918,200	150,852.24	4,161,200	137,336.13
City of Ishpeming	1,500,600	51,519.39	1,300,600	45,508.95
Total	5,418,800	202,371.63	5,461,800	182,845.08
Distribution by Accounts:				
Operating Negaunee Mine Only	3,447,000	132,710.85	3,690,000	121,784.67
Mather Mine & New Acquisitions	1,970,600	69,614.57	1,770,600	61,020.81
Grand Total Optg. Neg. Mine	5,417,600	202,325.42	5,460,600	182,805.48
Opt. Negaunee Rented Bldgs.	1,200	46.21	1,200	39.60
Grand Total Neg. Mine Co.	5,418,800	202,371.63	5,461,800	182,845.08

The valuation of realty and personal property set by the State Tax Commission on the Negaunee Mine Lease, the Adams Strip and the Maas Lease Area decreased $243,000 in 1943; but due to the tax rate in the City of Negaunee increasing 16.67% total taxes operating the Negaunee Mine increased $15,706.60, or 8.3%.

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11. ACCIDENTS AND PERSONAL INJURY:

The accident record in 1943 was the worst in number of compensable accidents in the past six years. There was one fatal accident in 1943, one in 1942 and one in 1941. However, the severity rate showed an improvement over the previous year as there were only three accidents aside from the fatality that caused a loss of time of over four months as compared with five in 1942. Reduced to percentages, 47% of the accidents caused loss of time of less than one month, 41.6% loss of time from one to four months, and 8.3% loss of time of over four months. Approximately 88.6% of the accidents were comparatively slight.

The heavy operating schedule has now been continued for three years and is having its effect on the men. Supervision has not relaxed, in fact, is more thorough than in prior years. The quality of employees hired in the past two years is lower than heretofore and the labor turn over has been greater, which has increased the hazard. Rapid mining due to concentration of contracts in the ore areas does not give time for the mat to settle which increases the hazard from falls of ground due to movement of the mat when mining the next lower sub-level.

Following is a statement listing the accidents in the past five years:

	1943	1942	1941	1940	1939
Fatal	1	1	1	2	0
Time lost - Over four months	3	5	3	4	3
" " - One to four months	15	5	4	8	2
" " - Less than one month	17	16	8	9	4
Total Compensable Accidents	36	27	16	23	9
Number of cases paid compensation for accidents prior to Jan. 1, 1943 -	8	6	4	2	10
Number of cases being paid difference in wages (Included in above total) - - -	1	1	0	0	3

Fatal Accident:

On July 26th, John Solka, a contract miner, received injuries in a blasting accident that caused his death 36 hours later.

Solka and his partner, Joseph Paris worked in a three shift contract in the 9th Level territory. A few days ago, mining was completed at the 9th Level elevation and the first sub-level below the 9th Level was then cut out. The raise had been timbered over, room blasted out for the scraper hoist and two cuts blasted in the first drift which was started from the ladder road end of the raise. On Monday morning, Solka, and Paris drilled 26 holes for the next cut, charged the holes and were ready to light the fuses about 11:30 A.M. The ground was tight and rather hard, previous cuts had not broken

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11. ACCIDENTS AND PERSONAL INJURY: (CONT.)

cleanly with 21 holes, so they drilled five more holes, making 26 holes in all. Solka stayed too long after the holes were lighted and was fatally injured from flying chunks from one hole that went off in advance of the other 21 holes.

Paris was questioned and promised to tell the whole truth. The accident was due to lighting one hole on which the fuse was six and one-half feet in length, (six inches having been cut off for timing) after which the hot wire lighter went out and two lighters held together were then lighted with a match. This made a delay of at least one minute in the time interval allowed for lighting the fuse in the balance of the holes. Both men were lighting the fuse and Paris does not know whether Solka's hot wire lighter went out the same as his did after burning one and one-half inches, or approximately one-half of the total length. Paris was lighting the knee holes and others lower down, while Solka was lighting the upper rows. When the two lighters being used by Paris burned out, he realized it was time to get out. He distanctly remembers that Solka was lighting the last top hole when he (Paris) called out, "Come on." They only had to travel about 15 feet to reach the hole to the 9th Level and then by climbing on two sprags nailed to the legs of the raise set, they were out of danger. On reaching the 9th Level traveling road, Paris turned and looked back and not seeing Solka, called again to him. Before Solka had time to answer or join Paris, the first hole went off. Paris realized his partner was probably injured and perhaps buried and ran for help. He stated he heard several of the first holes lighted go off as he ran about 800 feet out to the lunch room for help. As he and another man came back, the other holes were still going off, even when they were back within a couple of hundred feet of the raise. There was very good ventilation in this area, the smoke from the blast going down to the 10th Level through the empty dirt compartment of the raise. They waited a few minutes to be sure all of the holes had gone off, then went down and found Solka lying unconscious on the ladder road side of the raise, with his head toward the dirt pile broken by the blast. He was not buried by the broken ore, a cut was visible on his left cheek, and also on the back of his neck, otherwise no injuries were observed. The basket for handling injured men was sent to the 9th Level and Solka was brought to surface and taken directly to the Ishpeming Hospital. He did not regain consciousness, and x-ray photographs showed a foreign body in his brain, evidently a piece of ore from the first hole blasted. Death occurred at 1:00 A.M. Wednesday morning approximately 36 hours after the accident.

Paris admitted that they violated the rules governing charging and blasting of drill holes. The rules allow three inches of fuse to be cut off from the first holes blasted, they cut off six inches. The rule for lighting the fuse states that the miner must leave when the hot wire lighter burns out. The lighters burn approximately one minute and ten seconds, which leaves over two minutes for the men to get to a safe place. The violation of this rule was directly responsible for Solka's fatal injury.

11. ACCIDENTS AND PERSONAL INJURY: (CONT.)

Solka had worked at the Negaunee mine since October 1936, and had been mining for three years. He had been working with Joseph Paris for nearly eighteen months. He was 29 years of age and was married. He was above the average in intelligence and was regarded as a sober, industrious man and a good miner. Paris took the lead in the contract due to his longer experience and stated that Solka always did as he was told. Evidently Solka was intent on lighting the last hole in the back before leaving, which he may have succeeded in doing and had turned to follow Paris to safety when the first hole went off.

Probably only two or three seconds would have been needed for him to reach a safe place and if the rule regarding cutting off the fuse for timing the holes had been observed, the three inches of extra fuse would have given him an additional seven seconds to escape.

The shift boss in this terrotory, William Treloar, made a check on blasting procedure in this contract on March 23rd, approximately four months ago. At that time, only eleven holes were blasted and the rules and regulations were followed out in every particular. It was therefore not a case where the men did not know the rules and proper procedure for blasting.

An accident of this character is deplorable from every angle. Men in the mines undoubtedly take risks due to long familiarity with the work and the supervisory force knows nothing about these violations. Strict discipline is necessary but even this seems inadequate to prevent the men from occasionally taking long chances. Solka's death will make all of the men more careful for months but eventually this accident will be forgotten and chances again will be taken. More frequent inspections must be made of blasting procedure in the contracts with the hope that with the lesson taught by this accident and with rigorous discipline for infraction of the blasting rules a repetition of an accident of this character will not occur.

12. NEW CONSTRUCTION AND PROPOSED NEW CONSTRUCTION:

There was no new construction in 1943, and no proposed new construction.

13. EQUIPMENT AND PROPOSED EQUIPMENT:

a. Steam Shovels:

The Negaunee Mine steam shovel was moved to the General Shops at Ishpeming for a general overhaul when loading was completed. For the past several years repairs have been made at the mine where facilities are lacking for handling heavy pieces.

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13. EQUIPMENT AND PROPOSED EQUIPMENT: (CONT.)

b. Stocking Trestles:

Wood Stocking Trestles:

The wood trestle erected in the fall of 1941, North of and parallel with the East Steel stocking trestle, was overhauled in the fall to get it in condition for stocking ore in case the steel trestles were filled before navigation opens on the Lakes. At the end of 1943, there were 151,382 tons of ore in stock and if there is a late opening of navigation ore will have to be stocked from the wood trestle.

c. Scraper Hoists:

Following is a list of scraper hoists at the mine:

		1943			1942	
Company		Total Machines	Total Cost of Machines Repaired	each Mach. Repaired	Total Cost of Machines Repaired	each mach. Repaired
Ing.-Rand	10 H.P. Elec.	2	1	$ 419.94	2	$ 342.08
"	15 H.P. "	16	3	348.65	6	257.58
"	20 H.P. "	12	1	299.68	2	264.70
"	25 H.P. "	2				
Sullivan	15 H.P. "	15	10	282.47	9	206.86
"	20 H.P. "	2				
"	25 H.P. "	2				
Gard-Den.	15 H.P. "	2				
Total		53	15		19	
Total cost repairs all scraper hoists				4,590.27		4,620.77

Scrapped, Sold or Transferred - None.

No hoists were purchased in 1943. As in the previous year, repair costs are almost entirely confined to the low horsepower older hoists. The 20 and 25 horsepower hoists purchased in recent years operated throughout the year with no repairs.

d. Underground Tram Cars:

During the year 22 of the haulage cars were repaired at the mine. Due to age of many of the cars and to the heavy operating schedule constant repairs are necessary with a general overhauling once every two years, which includes replacement of wearing plates, re-riveting and other repairs.

e. Drill Equipment:

During 1943, six Ingersoll-Rand RB-12 Jackhammer drills were purchased as compared with two in 1942, also one Ingersoll-Rand R-48 stoper drill. The cost of the drill machines purchased were charged directly to operating costs.

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13. EQUIPMENT AND PROPOSED EQUIPMENT: (CONT.)

f. Haulage Tracks:

Following is a detailed cost of haulage tracks for years 1943 and 1942:

	1943	1942
40-lb. Rail	None	574.39
Ties & Tie Plates	224.29	718.73
Frogs	26.07	104.30
Total	250.36	1397.42

The large decrease was due to less drifting on the 14th Level in 1943. In the latter months of the year a limited amount of drifting was underway on this level which will be completed early in 1944.

g. Timber Hoists:

During the year, a number of timber hoists (single drum hoists converted from double drum 6½ H.P. scraper hoists) wore out and had to be replaced. Six new 6-HU Utility Hoists were purchased to replace these old hoists. In 1942 two 6-HU hoists were purchased.

h. Mine Truck:

The Chevrolet hydraulic dump body truck purchased in 1936 was worn out and a new Chevrolet hydraulic dump platform truck was purchased in the summer of 1943. The old truck was turned in at price of $ 150.00 to apply on the purchase price of the new truck.

14. MAINTENANCE AND REPAIRS:

Expenditures for maintenance and repairs in the accounts listed under "Underground Costs" were $55,562.12 in 1943 compared with $58,764.07 in 1942, a decrease of $3,201.95. The cost per ton was .058 in 1943 compared with .052 in 1942, an increase of .006 due to less product.

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14. MAINTENANCE AND REPAIRS: (CONT.)

The following is a list of purchases and repair costs for 1943:

	1943	1942	Increase	Decrease
6 RB-12 Jackhammers	$ 1,202.49	$ 801.80	$ 400.69	$
1-36 Cu. ft. Rocker Dump Car	50.00		50.00	
1-15 H.P. - AC Motor	50.00		50.00	
1-3 ton Chain Hoist	53.55	120.40		66.85
100,535 ft. wire rope for scrapers	10,367.15	11,986.07		1,618.92
1-R-48 Stoper		365.00		365.00
1-20 H.P.-I-R Scraper Hoist		1,469.00		1,469.00
Total Purchases	11,723.19	14,742.27		3,019.08
Repairs to Comp. & air lines	579.36	1,560.28		980.92
" Scraper hoists, and scrapers	11,911.01	10,635.38	1,275.63	
" to generator	410.87		410.87	
" to Locomotives	10,194.31	7,164.00	3,030.31	
" " Trolley Wire	2,421.95	3,153.62		731.67
" " Track	8,751.02	11,100.79		2,349.77
" " Haulage Cars	5,923.36	4,635.05	1,288.31	
" " Pumping Machinery	3,647.05	4,431.88		784.83
*Interest, Central Shop Inv.		1,340.80		1,340.80
Total Repairs	43,838.93	44,021.80		182.87
Grand Total Pur. & Repairs	55,562.12	58,764.07		3,201.95

Decrease in 1943 due to less wire rope used for scraper hoists on account of less tonnage mined, also one 20 H.P. Scraper Hoist charged out in 1942, but six R.B.-12 Jackhammers charged out in 1943, and only two in 1942.

*Interest charge on Central Shop Investment distributed to the various repair accounts in 1943. It is based on cost of repairs and was almost the same in both years.

Expenditures for maintenance and repairs in accounts listed under "Surface Costs" amounted to $23,011.36 in 1943 compared with $23,949.80 in 1942, a decrease of $938.44. The cost per ton was .024 as compared with .021 in 1942, a increase of .003

The following is a list of repair costs for 1943:

	1943	1942	Increase	Decrease
3 New Hoisting Ropes	$ 2,460.50	$3,177.24	$	$ 716.74
Rewinding Skip Motor	1,501.77		1,501.77	
Repairs to Electric hoists	3,066.44	6,101.28		3,034.84
" " Skips & Cages	3,364.52	3,477.41		112.89
" "Shaft	4,977.29	6,059.92		1,082.63
" " Top Tram Motors	113.51	370.46		256.95
" " Tracks and Cars	1,588.45	727.20	861.25	
Wire Rope & Sheaves, Rollers	1,746.20	1,287.72	458.48	
Repairs to Permanent Trestle	,1,743.19	235.89	1,507.30	
" " Pockets & Chutes	1,105.47	1,090.79	14.68	
" " Mine Buildings	1,344.02	1,211.55	132.47	
Int. Central Shop Investment		210.34		210.34
Total	23,011.36	23,949.80		938.44

One less hoisting rope charged out in 1943, also decrease in repairs to hoisting machinery, repairs to shaft and top tram motors, but increase in cost of repairing top tram cars, replacing sheaves and rollers and repairing permanent trestles.

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15. POWER:

Following is a detail of electric current purchased in 1943 and 1942, and distribution of charges to various accounts, and other data:

	1943 - 12 Months Optg. Cost	1943 - 12 Months Optg. Cost Per Ton	1942 - 12 Months Optg. Cost	1942 - 12 Months Optg. Cost Per Ton
Stoping	2880.00	.0030	2880.00	.0026
Timbering	120.00	.0001	120.00	.0001
Compressors	35562.49	.0362	43566.19	.0395
Ventilation	5140.41	.0053	6505.20	.0059
Pumping	23824.49	.0250	20345.18	.0184
Hoisting	29946.30	.0313	31945.62	.0289
Stocking Ore	281.93	.0003	230.84	.0002
Dry House Expense	1070.30	.0010	1076.56	.0010
Telep. & Safety Devices	1380.00	.0015	1380.00	.0012
Mine Office	116.55		88.44	
Electric Haulage	9939.82	.0104	9801.43	.0089
Shops	502.70	.0005	469.14	.0004
Dist. Carp. Shop	17.48		15.34	
Loading at Pocket			45.56	
Surface Lighting	418.34	.0004	157.47	.0001
Total	111200.81	.1160	118626.97	.1072

Main Line Meter *K.W.	8603,200	8,959,865
Separate Meter Reading	8334,284	8,759,168
Line Loss - K.W.	268,916	200,697
Product - Tons	954,990	1,106,694
K.W. Per Ton (Inc. L. Loss)	9.01	8.09
Cost Per KW (Avg. for Year)	.01345	.0132
15 Min. Demand KW (Avg. Year)	1645	1686
Load Factor " " " "	59%	63%

(*) Less charge to Maas Mine of one-half of the current used to operate the main ventilation fan at No. 2 Shaft.

Line loss was greater in 1943 and kilowatt hours per ton of ore increased 11%. The load factor was not as favorable as in 1942, and the cost per kilowatt hour increased.

Cost for current increased due to more water pumped in 1943. Less current was used in 1943 due to decrease in production.

17. CONDITION OF GROUNDS:

a. Mine Grounds:

The grounds around the mine were kept in good condition throughout the year. Some grading was done to permit water to drain from the automobile parking lot.

b. Negaunee Mine Houses:

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

The cost of repairs was $157.08 and the revenue from rents was $198.00.

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18. NATIONALITY OF EMPLOYEES:

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

As to Parentage	1943	Percent	1942	Percent
Finnish	207	45.9	215	44.3
English	86	19.1	84	17.3
Italian	59	13.1	67	13.8
Swedish	36	8.0	42	8.7
French (Canadian)	40	8.9	38	7.8
" (Parisian)			1	.2
Austrian	9	2.0	9	1.9
Norwegian	2	.4	5	1.0
German	1	.2	8	1.6
Danish	3	.7	3	.6
Belgian	2	.4	3	.6
Irish	0		5	1.0
Polish	4	.9	4	.8
Dutch	1	.2	1	.2
Yugoslavia	1	.2	1	.2
Total	451	100.0	486	100.0

As to Birth	American Born		Foreign Born	
	1943	1942	1943	1942
Finnish	139	140	68	75
English	70	66	16	18
Italian	34	37	25	30
Swedish	29	35	7	7
French (Canadian)	36	37	3	1
" (Parisian)				1
Austrian	7	7	2	2
Norwegian	2	5		
German	1	8		
Danish	3	3		
Belgian	2	3		
Irish	0	3		
Polish	3	4	1	
Dutch	1	1		
Yugoslavia	1	1		
Austrian	1			
Total	329	350	122	136
	72.9%	72.0%	27.1%	28.0%

NORTH JACKSON MINE
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YEAR 1943

1. GENERAL:

There were notchanges at this idle property in 1943. No work has been done at the open pits in the past thirty-five years.

6. SURFACE:

The fences around the open pits were inspected early in the summer and necessary repairs made.

a. Buildings:

The four apartments in the Jackson Mine Office building were occupied all the year.

The expense for interior decorating, repair plaster, cleaning chimneys, etc., amounted to $217.99. Taxes were $26.94 making total expenses $244.93. The rental income was $379.20, and the net profit for the year was $134.27.

10. TAXES:

	1943		1942	
	Valuation	Taxes	Valuation	Taxes
47% of realty as described Sec. 1-47-27	$220,900.00	$8,420.53	$220,900.00	$7,218.39
Collection Fees		84.21		72.18
Total	220,900.00	8,504.74	220,900.00	7,290.57
Rented Buildings:				
Old Jackson Office	$700.00	$26.94	$700.00	$23.10
Grand Total	221,600.00	8,531.68	221,600.00	7,313.67
City of Negaunee Tax Rate Per $100.00		3.81192		3.267

SOUTH JACKSON MINE
ANNUAL REPORT
YEAR 1943

1. GENERAL:

There was no change in conditions at this idle property during 1943.

4. ESTIMATE OF ORE RESERVES:

a. Available Ore:

Above present pit available by present system of mining:

On Southwest Side	35,000 tons
North of Lucy Pit	5,000 tons
South and Southwest of Lucy Pit	3,000 tons
Total	43,000 tons

Below present pit and above drainage tunnel available by milling:

West of Crusher	186,000 tons
Area below bottom of present pit shown by churn drilling	105,226 tons
Total	291,226 tons
Grand Total	354,226 tons

c. Estimated Analysis:

	Iron	Phos.	Silica	Alum.	Mang.	Lime	Mag.	Sul.	Igni.	Moist.
Natural	34.55	.066	36.00	1.42	2.00	.435	.175	.010	2.00	7.00

6. SURFACE:

The crusher building was dismantled late in the year and removed by the purchaser. Part of the structure was destroyed by fire in the summer, that was started by boys playing near the building. Some work remains to be done in covering over the shaft and moving and rebuilding a permanent fence around the shaft. The fences around the open pits were inspected and necessary repairs made.

10. TAXES:

	1943		1942	
	Valuation	Taxes	Valuation	Taxes
53% of realty as described Sec. 1-47-27	$249,100	$9,495.49	$249,100	$8,139.89
Collection Fees		94.95		81.40
Total		9,590.44		8,221.29
City of Negaunee Tax Rate Per $100.00 Valuation		3.81192		3.267

Taxes increased due to the higher tax rate in the City of Negaunee. From 1939 to 1942---taxes decreased each year.

WWG/jl
3/20/44

ANNUAL REPORT
GWINN DISTRICT GENERAL
YEAR 1943

1. GENERAL

Princeton Mine

The principal activity in the district in 1943 was at the Princeton, the only operating mine. This mine went on an operating basis July 1st, 1942 and by the end of that year a product of 700 tons per day was reached. During 1943 operations continued without interruption with a product of 227,185 tons for the year, or an average of 18,932 tons per month. During the shipping season it was found the skips were under weight and their recorded weights were reduced 10% in November. This change is reflected by a 10% reduction in monthly product if the same number of skips are hoisted.

Although the mine production was 227,185 tons, the shipments were only 165,733 tons. The difference increased the ore in stock 61,452 tons.

The present operating schedule is two eight hour shifts, five days per week, one eight hour shift on Saturday. Repairs are made Saturday afternoon and night and when absolutely necessary, on Sunday.

A detail of the Princeton operations is shown in the Princeton Mine annual report for 1943.

Other Mines

Francis Mine

The only work here was salvaging a few truck loads of scrap iron remaining on the ground from the blasted heaframes.

Mackinaw Mine

Salvaging operations of old equipment was continued. All of the buildings except the headframe and brick oil house have been sold or removed.

Stephenson Mine

The cave at the shaft site has enlarged slightly but has not extended beyond the fenced in area.

Schools

The enrollment of the Gwinn school for 1943 was as follows:

Elementary Grades	238
Junior & High School	207
Total	445

a decrease of 26 for 1943. A large school bus transports pupils daily from Wells Township to Gwinn, a distance of over twenty miles.

ANNUAL REPORT
GWINN DISTRICT GENERAL
YEAR 1943

1. GENERAL (CONT.)

Townsite

During the year the Township pruned and removed old dead trees on Pine Street.

The steel bridge over East Branch, near the L.S.& I. station, which was abandoned over a year ago was dismantled. The County Road Commission closed the road running east from the junction of Oak and Spruce Streets on the north side of the High School, as a safety measure for the protection of the school children.

The Civilian Defense Observation post which was erected a year ago in the Austin Location, was discontinued during the year.

Gwinn Bank

The Gwinn State Savings Bank was organized in 1908 and reorganized in 1940, at which time the Capital Stock was $25,000, Common; $20,000 Preferred, $9,000 Surplus and $5,000 Undivided Profits. During the past three years this bank has done very well, due to the fact that practically all of the men in the District are working at high wages. The statement of December 31, 1943 shows Capital $25,000, Common stock; Surplus $25,000; Undivided Profits $11,103. During the three year period all of the Preferred Stock has been written off. I think the above is quite a wonderful record.

Armed Forces

On December 31st, 1943, there were 185 men from the Gwinn District in the armed forces of the United States.

House & Lot Sales

About October 1st, the Company decided to offer for sale its 55 double (110 single) houses in Gwinn. The price to prospective purchasers was made as attractive as possible on a time payment plan, not exceeding five years, or on a 20% reduction for cash. By the end of the year sixty-eight single houses were sold, in every instance for cash, most of which were partially financed by the Gwinn Bank.

The following is a record of houses sold in Gwinn during the year:

Street	House No.	Lot	Block	Name	Amount
Pine	187	14	27	Clarence Garrett	$ 800.00
Pine	183	15	27	Edelore Lafave	800.00
Maple	205	13	26	Godfrey Anderson	548.00
Pine	196	12	28	Arthur J. Nylander	800.00
Pine	195	12	27	Herbert Robare	760.00
Pine	203	10	27	Edwin Sather	720.00

ANNUAL REPORT
GWINN DISTRICT GENERAL
YEAR 1943

1. GENERAL (Cont.)

Street	House No.	Lot	Block	Name	Amount
Maple	197	15	26	Edward Summerville	$ 548.00
Maple	195	16	26	Arthur Burkman	548.00
Pine	207	9	27	Carl Prudom	760.00
Maple	143	6	17	George Flack	568.00
Ash	241	3	30	Archie Vecellio	480.00
Elm	151	7	23	Clyde Bath	540.00
Elm	199	2	28	Wilfred Tousignant, Sr.	560.00
"	195	3	28	" "	560.00
Maple	208	23	27	John W. Koski	548.00
Oak	147	8	23	Burton J. Pariseau	508.00
Maple	166	18	25	Charles Racine	568.00
Pine	191	13	27	Geno Valenti	760.00
Pine	184	9	28	William Lund	800.00
Pine	199	11	27	Peter Robare	720.00
Maple	200	21	27	Joseph H. Prisk	548.00
Elm	183	6	28	Louis J. Senical	548.00
"	179	7	28	" "	560.00
Elm	155	6	24	Benjamin E. Gauthier	548.00
Elm	163	4	23	Sigmond E. Mohn	548.00
"	167	3	23	" "	548.00
Elm	164	18	23	Edward Nordeen	548.00
Maple	245	3	26	John Vercoe, Sr.	548.00
Ash	224	24	26	Bernard DelBello	500.00
Pine	192	11	28	Herbert Blomquist	800.00
Tamarack	108	19	15	Lowell Ross Roberts	540.00
Elm	172	20	23	Louis Tousignant	508.00
Elm	167	3	24	Frank Ayotte	548.00
"	163	4	24	" "	548.00
Maple	168	19	25	Otis Horrocks	568.00
Ash	210	21	26	Louis N. Vallier	500.00
"	202	19	26	Emil W. Walimaki	540.00
"	226	25	26	Norman A. Powers	500.00
Maple	155	3	17	Elmer Voegtline	568.00
Elm	182	3	29	John Stein	540.00
"	159	5	24	William Voegtline	548.00
Maple	153	4	17	Eino J. Hytinen	568.00
"	210	24	27	Henry Niemi	548.00
Elm	160	17	23	Arthur W. Maunula	548.00
Maple	202	22	27	Robert Wills	548.00
Elm	175	1	24	Bruno L. Zanetti	548.00
Maple	158	16	25	Hjalmer Wallenstein	568.00
Maple	152	25	25	" "	568.00
Elm	191	4	28	Nils Mohn	548.00
Elm	152	15	23	Peter Storti	548.00
Pine	211	8	27	Corell Pepin, Sr.	720.00
Maple	232	29	27	John Niemisto	508.00
"	234	30	27	" "	508.00

ANNUAL REPORT
GWINN DISTRICT GENERAL
YEAR 1943

1. GENERAL (COnt.)

Street	House No.	Lot	Block	Name	Amount
Tamarack	120	22	15	Elmer Kangas	$ 500.00
Tamarack	115	21	15	" "	520.00
Ash	248	30	26	Charles Aho	560.00
Oak	159	5	23	Mrs. Marie Oien	508.00
Maple	216	25	27	Aaron Pelkie	548.00
Maple	227	8	26	Melchoire Cazanigga	508.00
Maple	229	7	26	" "	508.00
Maple	211	12	26	Aaron Eklund	548.00
Pine	219	6	27	Mrs. Anna C. Nordeen	720.00
Pine	215	7	27	Floyd Erickson	720.00
Maple	237	5	26	John R.Vercoe,Jr.	508.00
Maple	224	27	27	A. J. Haydon	548.00
Elm	187	5	28	Kenneth Boogren	548.00
Maple	203	14	26	Donald O. Nyquist	548.00
Elm	151	7	24	Wilfred Tousignant,Jr.	548.00
	Total				$39,568.00

Total number of double houses, Gwinn Townsite	110
Total number of sides sold during 1943	68
Total unsold as of December 31st, 1943	43

All of the above purchases have been for cash, indicating that all purchasers took advantage of the Company offer of the 20% discount.

During the year Lot 13, Block 9 was sold to Dr. Metzner.

a. Statement Showing Total Ore Produced in District by C.C.I.Co. 1903 to 1943 inclusive

YEAR	AUSTIN	PRINCETON	STEPHENSON	GWINN	FRANCIS	GARDNER MACKINAW	TOTAL
Total to 1943	1,589,018	1,669,434	3,835,157	988,665	504,667	1,289,118	9,876,059
1943 product		227,185			Y		227,185
To date	1,589,018	1,896,619	3,835,157	988,665	504,667	1,289,118	10,103,244

b. Statement Showing Ore Shipments by C.C.I.Co. from 1905 to 1943

YEAR	AUSTIN	PRINCETON	STEPHENSON	GWINN	FRANCIS	GARDNER MACKINAW	TOTAL
Total to 1943	1,589,018	1,599,578	3,845,027	1,017,334	502,131	1,326,439	9,879,527
1943		165,773					165,773
To date	1,589,018	1,765,351	3,845,027	1,017,334*	502,131	1,326,439	10,045,300

* included in the shipments from Gwinn Mine is 29,009 tons of Foundry Stockpile ore purchased from the Clement Quinn Company and shipped by the C.C.I.Co. in 1942.

c. Ore in Stock at Mines, December 31, 1943

Princeton 131,308 tons

ANNUAL REPORT
GWINN DISTRICT GENERAL
YEAR 1943

10. TAXES

The following statement gives the taxes in detail for 1943 and 1942 for all company properties in the district. The mine taxes in the summary show totals only, as the detail for each mine is included in the mine report.

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

Forsyth Township Mineral Lands, Gwinn		1943 Valuation	1943 Taxes	1942 Valuation	1942 Taxes
SW¼ of SW¼ of Sec.26,45-25	40 A.	$ 100	$ 2.07	$ 100	$ 2.08
NE¼ of SE¼ of Sec.28,45-25	40 A.	100	2.07	100	2.08
N½ of NE¼ of Sec. 34,45-25	80 A.	200	4.14	200	4.15
SE¼ of NE¼ of Sec.34-45-25	40 A.	100	2.07	100	2.08
NE¼ of NW¼ of Sec.34-45-25	38.05 A.	100	2.07	100	2.08
NE¼ of SE¼ of Sec.34-45-25	36.3 A.	100	2.07	100	2.08
NW¼ of Sec. 35-45-25	160 A.	400	8.27	400	8.31
Lots 1,2, and 3 of Sec. 36,45-25	53 A.	125	2.60	125	2.60
Lots 7, 8 and 9 of Sec. 36-45-25	98.92 A.	260	5.38	260	5.41
Lot 11 of Sec.36-45-25	13.3 A.	25	.52	25	.52
Und.½ of S½ of NE¼ of Sec. 28-45-25	80 A.	150	3.10	150	3.12
Total		$ 1,660	34.36	1,660	34.51
Collection Fee			.34		.35
Total Taxes			34.70		34.86
Gwinn Townsite - Surface Only					
Lot 2, Sec. 21,45-25	43.75 A.	100	2.07	100	2.08
NE¼ of SW¼ of Sec.21,45-25 included in plat	6 A	100	2.07	100	2.08
NE¼ of NW¼ of Sec.21,45-25	17.54 A.	150	3.10	150	3.12
That part of S½ of NE¼ of Sec.21,45-25 not included in plat of Gwinn	25.01 A.	200	4.14	200	4.15
E½ of SE¼ of Sec.21,45-25	65.84 A.	150	3.10	150	3.12
That part of W½ of SE¼ of Sec.21,45-25 not included in Plat of Gwinn	38.80 A.	300	6.20	300	6.23
Gwinn Townsite Plat		81,550	1,685.97	82,079	1,705.14
Supt.Res.Part of W½ of SE¼ of Sec. 21	1.2 A.	1,500	31.02	1,500	31.16
NW¼ of NE¼ of Sec.21,45-25 except five acres		100	2.09	100	2.08
Part of S½ of NE¼ of Sec.21 45-25	50.88 A.	300	6.20	300	6.23
Total		84,450	1,745.94	84,979	1,765.39
Collection Fee			17.46		17.65
TOTAL TAXES			1,763.40		1,783.04

ANNUAL REPORT
GWINN DISTRICT GENERAL
YEAR 1943

10. TAXES (Cont.)

Total Townsite Group Divided by Accounts

	1943		1942	
	Valuation	Taxes	Valuation	Taxes
From Tax Statement	$ 84,450	1,763.40	$ 84,979	1,783.04
Gwinn Club House, Lot 8, Blk.17	500	10.44	500	10.49
Hospital, Lot 9, Block 25	1,000	20.89	1,000	20.98
Rented Buildings	66,690	1,392.46	66,500	1,395.38
Gwinn Townsite, Unsold Lots	16,260	339.61	16,979	356.19
Total Group as per statement	84,450	1,763.40	84,979	1,783.04
Gardner Mackinaw Dwellings				
$N\frac{1}{2}$ of $NE\frac{1}{4}$ of Sec.35,45-25 87.35 A.	500	10.34	500	10.39
Collection Fee		.10		.10
Total Taxes	500	10.44	500	10.49
Machinery in Warehouse	900	18.88	900	18.69
Central Water Plant $NW\frac{1}{4}$ of $NE\frac{1}{4}$ of Sec. 28-45-25	100	2.09	100	2.10
Personal - District Office	500	10.44	500	10.50
District Crusher, $N\frac{1}{2}$ of $NE\frac{1}{4}$ of Sec. 27,45-25	1,000	20.88	1,000	20.98
Total	2,500	52.29	2,500	52.27
Austin Location				
Part of Lot 5, $SW\frac{1}{4}$ of $NE\frac{1}{4}$ of Sec. 20,45-25	3,500	72.37	3,500	72.69
$NW\frac{1}{4}$ of $SE\frac{1}{4}$ of Sec.20,45-25	3,500	72.37	3,500	72.69
$NE\frac{1}{4}$ of $SW\frac{1}{4}$ of Sec.20,45-25	260	5.38	260	5.40
Total	7,260	150.12	7,260	150.78
Collection Fee		1.50		1.51
Total Taxes		151.62		152.29
Summary				
Machinery in Warehouse	900	18.80	900	18.88
Stephenson Mine				
Princeton Mine	411,260	8,588.91	361,260	7,578.59
Francis Mine		2.10		2.13
Gardner Mackinaw Mine	30,000	626.53	30,000	629.35
Austin Location	7,260	151.62	7,260	152.29
Mineral Lands	1,660	34.71	1,660	34.86
Gwinn Townsite	84,450	1,763.40	84,979	1,783.04
Gardner Mackinaw Location	500	10.44	500	10.49
Central Water Plant	100	2.09	100	2.10
Personal District Office	500	10.44	500	10.50
DistrictCrusher	1,000	20.88	1,000	20.98
Total C.C.I.Co.	537,630	11,229.92	488,159	10,243.21
Cliffs Power & Light Co.	148,130	3,093.68	148,130	3,107.57
Total Taxes (Includes 1%)	685,760	14,323.60	636,289	13,350.78
Princeton - Personal Property	150,000	3,101.64	130,000	2,700.17

ANNUAL REPORT
GWINN DISTRICT GENERAL
YEAR 1943

10. TAXES (Cont.)

	1943 Valuation	1943 Taxes	1942 Valuation	1942 Taxes
Taxes Levied - Forsyth Township				
Forsyth Township Valuation	$ 1,128,030	1,109,870	$1,059,625	1,182,035
Rate per $100 of Valuation	2.068	2.077	2.110	2.068

Amount of Tax Roll	1943	1942	1941	1940
County Tax	6,317.65	6,215.27	5,298.12	7,092.21
County Road	2,256.30	2,219.74	2,543.14	2,600.48
Township Tax	2,256.30	2,219.74	2,119.25	2,718.68
Township Debt Service	2,800.30	2,800.00	2,860.00	2,985.00
School	6,092.02	5,993.30	5,933.90	5,319.16
School Debt Service	3,604.87	3,604.48	3,600.00	3,704.48
Rejected Tax		14.50	26.36	27.65
Total	23,327.44	23,067.03	22,380.77	24,447.66
Amount paid by C.C.I.Co.		13,350.78	12,593.52	14,973.75
Percent paid by C.C.I.Co. (Including C.P.& L.Co)		57.9%	56.3%	61.2%

16. WATER SUPPLY - GWINN DISTRICT

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

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

Following is a comparative cost statement for operating the Pump Station for the years 1943 and 1942:

	1943	1942	Increase	Decrease
General Expense	$ 50.49	$ 50.32	$ .17	
Maintenance	1,091.07	1,431.81		340.74
Operating	605.79	526.44	79.35	
Electric Power-KidderStation	4,600.10	4,091.23	508.87	
Booster "	974.96	928.71	46.25	
E&A Depreciation	1,046.74	1,168.61		121.87
Total Cost	$ 8,369.15	8,197.12	172.03	
" Revenue Credit	4,600.76	4,195.88	405.08	
Deficit	$ 3,768.39	4,001.24		

ANNUAL REPORT
GWINN DISTRICT GENERAL
YEAR 1943

16. WATER SUPPLY (Cont.)

The large increase in power for 1943 over the previous year was due to running the 1,000 gallon pump for a period of nine months, whereas the 500 gallon pump was used almost wholly in 1942. Leaky wooden mains in Gwinn Townsite were responsible principally for the use of the larger pumps. While repairs are constantly being made, it is impossible to prevent a tremendous loss of water due to the leaks. The wood lines have been in commission thirty-six years and should be replaced by cast iron when obtainable.

The Company operates the water system and the loss the past year was $3,768.39. It was suggested a few years back that the plant be turned over to Forsyth Township without cost. If the Township could arrange to take it over, it would mean a Board of Public Works, or some other agency, to run it and the cost would be considerably more than it is to the Company. As the Company pays 57% of the Forsyth Township taxes, our share would likely be in excess of what we are now losing in operating the plant.

Something will have to be done regarding the replacement of the wood mains in Gwinn.

16.A. SEWER SYSTEM

Ever since the Townsite was platted, The Cleveland-Cliffs Iron Company has taken on the maintenance of the sewer system. During the past five years the yearly expenditure for this work was as follows:

1939	$ 722.37
1940	710.69
1941	598.10
1942	336.40
1943	581.06

When the Town was first platted, naturally the Company had a very large interest. This is getting smaller and during the past few months we have sold a number of houses and lots and from now on our interest will be considerably less than it has been.

Whether there is any way the Company can divorce itself from the upkeep is questionable. It is a large yearly expenditure which might be met at least in part by the Township.

ANNUAL REPORT
GWINN DISTRICT GENERAL
YEAR 1943

17. CONDITION OF PREMISES

General up-keep repairs were made throughout the year.

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

Gwinn Townsite Number of Houses -49	1943	1942	1941	1940
Rents Accrued	10,489.92	11,576.54	11,417.03	11,306.26
Repair Expense	2,308.51	8,032.71	5,320.12	7,256.55
Accrued Rent over repair cost	8,181.41	3,543.83	6,096.91	4,049.71
Actual rent collected*	10,942.36	11,520.13	11,198.62	10,999.01

* Cash collected for regular running accounts, Year 1943 10,518.36
Cash collected for old charged off accounts, Year 1943 424.00
Total 10,942.36

During the year 68 houses (sides) were sold as per detail on other sheet. Repairs were comparatively small on account of the anticipated sales.

Austin Location Number of Houses 41	1943	1942	1941	1940
Number occupied	40	40	40	39
Rents accrued	2,275.83	2,231.00	2,177.08	1,980.25
Repair Expense	514.11	417.52	856.35	1,902.69
Accrued rent over repair cost	1,761.72	1,813.48	1,320.73	77.56
Actual rent collection*	2,316.42	2,449.52	2,152.92	1,962.90

* Cash collected for regular running accounts, Year 1943 2,232.42
Cash collected for old charged off accounts, Year 1943 84.00
2,316.42

The houses in this location need extensive repairs including painting, plastering, new floors, storm sheds, etc. The rental here is $5.00 per month per side. The houses are on land leased from the Escanaba River Land & Iron Company, which lease expires in 1950. These houses should be sold at once if possible at a nominal price, if satisfactory arrangements can be made with the Escanaba Company for a fair lot rental to the purchasers when the lease is abandoned by the Company.

ANNUAL REPORT
GWINN DISTRICT GENERAL
YEAR 1943

17. CONDITION OF PREMISES (Cont.)

Princeton Location	1943	1942	1941	1940
Number of Houses - 9				
Number occupied	9	9	9	8
Rents accrued	666.00	677.50	656.50	597.00
Repair expense	134.09	307.01	393.04	580.40
Accrued rent over repair cost	531.91	370.49	263.46	16.60
Actual rent collection*	636.00	689.00	658.43	567.50

*Cash collected for regular running accounts, year 1943	614.00
Cash collected for old charged off accounts, Year 1943	22.00
	636.00

The houses in this location are in bad condition and should be sold.

Statistical Statement of Rented Buildings, 1943

Location	Vacant	Occupied	Total	Cost of Repairs	Repair Cost per house	Rent Accrued	Rent Collected
Princeton	0	9	9	134.09	14.90	666.00	636.00
Austin	1	40	41	514.11	12.54	2,275.83	2,316.42
Gwinn	2	47	49	2,308.51	47.11	10,489.92	10,492.36
Total	3	96	99	2,956.71	29.86	13,631.75	13,444.78

Actual cash received $13,444.78 - Includes $530.00 which was credited to old charged off accounts.

Actual expended for repairs 2,956.71

Difference $ 10,488.07

19. GWINN ASSOCIATION

Following is a synopsis of the activities of the Association by E. A. Miller, Superintendent:

The Club is maintained through the financial assistance of The Cleveland-Cliffs Iron Company, Cliffs Power & Light Company, rental received from the local Board of Education and membership fees from residents of the community.

Average monthly membership was 283; of this number 241 were employees of The Cleveland-Cliffs Iron Company and the remainder were persons employed elsewhere.

ANNUAL REPORT
GWINN DISTRICT GENERAL
year 1943

19. GWINN
ASSOCIATION (Cont.)

Activities for the year in the building were about normal, except for those that covered special dinners, banquets or dancing, these activities were off about 30%. Indoor activities include: Bowling leagues for men and women, card playing facilities for men and women, a library and reading room, a recreation room with pool, billiard and table tennis tables, carrom, dart, checkers, chess and other games. Rooms are provided for meetings and socials with equipment for serving of lunches or dinners. The gymnasium is fully equipped for class or recreation work, basketball and other games and is also used for dancing. Separate shower and locker rooms are provided for men and women.

Total number of meetings of a business, social or recreational nature for year was 401, of this number 5 were annual events. Church organizations used the building on 99 occasions, scout troops held 44 meetings, 10 dances were held, 19 committee meetings, 61 meetings by Red Cross workers, federal agencies, card playing groups, women's organizations, Town club, civilian defense groups, rehearsals for plays and other scheduled meetings numbered 163. Equipment for club kitchen used 91 times and equipment loaned for outside events 35 times.

The gymnasium was used 423 periods for supervised class work and for recreational activities by the high school students and club members. There were 139 scheduled basketball games, including high school, club team and junior leagues for boys and girls. Other gymnasium activities are volleyball, badminton, handball, archery, boxing and some wrestling.

Outdoor activities were limited to miscellaneous games of softball, hardball, volleyball, touch football and horseshoe pitching, Equipment was furnished to the boys and girls in the different locations to cover the above. The estimated attendance including participants for all outdoor activities and Baas Lake Camp was 5,600.

The rooms formerly occupied by the Kindergarten are now used by the local Chapter of the Red Cross as a meeting place and as work rooms. The building is still the center of all Civilian Defense Activities and information center.

During the year equipment and supplies were purchased to keep all activities functioning properly and the usual attention given to the building to keep it in good repair. The floor of the gymnasium was given a special coat of seal-o-san to preserve and recondition the surface. The bowling alleys were also given extra attention and are now in first class shape but are lacking the automatic pin-setting devices necessary to give first class service.

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GWINN DISTRICT GENERAL
YEAR 1943

19. GWINN
ASSOCIATION (Cont.)

GWINN HOTEL

The hotel was closed during the entire year.

STORE BUILDING

Occupied during 1943 by the Frank C. Schilling "Cash Way" Company. Rental $42.00 per month.

20. GWINN DISTRICT CRUSHER

This plant was not operated in 1943. During the year new links were installed in the pan conveyor.

If there is no future use for this crusher plant in the Gwinn District it should be dismantled.

PRINCETON MINE
ANNUAL REPORT
YEAR 1943

1. GENERAL

The production for 1943 was 227,185 tons or an increase of 144,266 tons over 1942. During the year the mine operated on a schedule of two eight hour shifts per day, five days per week and one shift on Saturday. In 1942 the mine was on an operating basis only the last six months of the year. In the first part of 1943, the mining operations were spread out over the entire length of the ore body, from No. 1 shaft on the northwest end to No. 3 to the southeast, the greater part of the ore being mined above the 6th Level and trammed to No. 2 shaft. Early in the year, mining ceased in the No. 1 shaft area, and was concentrated from that time in the No. 2 and No. 3 shaft ore bodies. The production from the 6th Level gradually decreased as the ore body between the 6th and 7th Levels was being developed. During the last few months of the year, production was on the upgrade due to the fact that the No. 2 ore body below the 6th Level had been developed to the stage where mining could be started.

The development and maintenance requirements of the mine are exceptionally high due to the thin flat ore body. Much rock raising is done in order to provide top slicing contracts with ore pillars two or three sub-levels in height. Long drifts and crosscuts must be maintained for mining operations of contracts located far apart along the flat dipping ore body.

Late in the year the skip weight was changed 10% from 3 tons to 2.7 tons to insure a consistent small overrun. An underrun of approximately 5% was shown on the railroad car weights at the pocket during the past shipping season. The decrease of .30 tons per skip should correct the 1943 underrun.

During the coming year the development of the 7th Level will be pushed.

As the mine produced 61,452 tons more than it shipped, that amount was added to the ore in stock at the end of the year.

2. PRODUCTION, SHIPMENTS AND INVENTORIES

a. Production by grades

	PRINCETON		SEC. 19 LEASE		TOTAL	
	1943	1942	1943	1942	1943	1942
Princeport	3,323	9,578	381	175	3,704	9,753
Cambridge	196,077	64,670	27,404	9,496	223,481	74,166
Total	199,400	74,248	27,785	9,670	227,185	83,919

b. Shipments

	1943	1942	Increase
Princeport	9,799	4,022	5,777
Cambridge	155,934	119,171	36,763
Total	165,733	123,193	42,540

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2. PRODUCTION, SHIPMENTS AND INVENTORIES (Cont.)

c. Stockpile Inventories

	1943	1942
Princeport Sec. 19	--	129
Cambridge Sec. 19	18,441	6,779
Princeport	--	8,790
Cambridge	112,867	54,158
Total	131,308	69,856

e. Production by months

	Sec. 19		Sec. 20		
	Princeport	Cambridge	Princeport	Cambridge	Total
January	-	2,448	1,743	14,229	18,420
February	6	1,170	321	14,664	16,161
March	-	2,250	-	17,595	19,845
April	-	1,611	153	19,239	21,003
May	-	1,823	246	16,471	18,540
June	321	2,114	-	19,204	21,639
July	30	3,149	124	16,120	19,423
August	30	3,254	730	14,207	18,221
September	-	3,113	-	14,715	17,828
October	-	3,160	-	16,099	19,259
November	-	1,903	-	17,086	18,989
December	-	1,181	-	16,676	17,857
Total	387	27,176	3,317	196,305	227,185

f. Ore Statement

	Sec. 19 Princeport	Princeport	Sec. 19 Cambridge	Cambridge	Total
On hand Jan. 1, 1943	129	8,790	6,779	54,158	69,856
Output for year	381	3,323	27,404	196,077	227,185
Transfers	510	2,314	15,742	18,566	-
Overruns	-	-	-	-	-
Total	-	9,799	18,441	268,801	297,041
Shipments	-	9,799	-	155,934	165,733
Balance on hand Dec. 31, 1943	-	-	18,441	112,867	131,308

1943 - 2-8 hr. shifts, 6 days per wk. throughout the entire year

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2. PRODUCTION, SHIPMENTS AND INVENTORIES (Cont.)

g. Delays

January 27	½ hr.	Trouble on landing
February 1	1 hr.	Motor off track 6th Level.
February 5	1½ hr.	Repair trap door for bucket dump.
April 12	1 hr.	Trouble with trip lever - South Skip.
May 5	4 hrs.	Repairing loose plate 6th Level Pocket.
May 31	½ hr.	Cutting North Skip rope.
June 3	1½ hrs.	Top Tram car off track.
June 22	1½ hr.	Timber breakdown Main Drift 6th Level.
July 8	1½ hr.	Motor off track - 6th Level
July 8	½ hr.	Trouble on landing.
July 12	½ hr.	Trouble on landing.
July 15	¾ hr.	Motor off track - 6th Level.
August 9	1 hr.	Repairing No. 2 Shaft.
August 13	1 hr.	Trouble on landing.
August 17	1½ hr.	Skip caught bottom of Shaft.
August 17	1½ hr.	Cutting North Skip rope.
September 7	1 hr.	Repairing locomotove.
September 8	1 hr.	Repairing No. 2 Shaft.
September 28	½ hr.	Replacing sheave on stocking trestle.
October 6	1 hr.	Track repair 6th Level.
October 8	½ hr.	Trouble on landing.
October 26	1 hr.	Trouble on landing.
November 4	5 hrs.	Timber breakdown 6th Level Main Drift.
December 1	½ hr.	Trouble on landing.
December 3	1½ hr.	Repairing top tram car.
December 7	½ hr.	Repairing top tram car.
December 17	2 hrs.	Repairing top tram car.
December 29	1 hr.	Repairing top tram car.

h. Electrical Delays

February 1	½ hr.	Repair signal system.
April 9	½ hr.	No Current.
June 3	1 hr.	No Current.
August 13	½ hr.	No Current.
October 22	½ hr.	Trouble with grids on hoist.

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3. ANALYSIS

a. Stockpile analysis

Grade	Tons		Iron	Phos.	Sil.	Mang.	Al.	Lime	Mag.	Sul.	Loss.	Moist.
Cambridge	112,867	Dry	59.43	.918	4.37	1.05	1.10	3.26	.61	.019	1.08	
		Natl.	50.75	.784	3.73	.90	.94	2.78	.52	.016	.92	14.60
Cambridge Sec. 19	18,441	Dry	59.43	.918	4.37	1.05	1.10	3.26	.61	.019	1.08	
		Natl.	50.75	.784	3.73	.90	.94	2.78	.52	.016	.92	14.60

b. Average Analysis - 1943 Shipments

Grade	Tons	Iron	Phos.	Sil.	Mang.	Al.	Lime	Mag.	Sul.	Loss
Princeport	9,799	61.10	.500	5.44	.52	1.14	2.21	.70	.037	1.13
Cambridge	155,934	60.05	.940	4.11	1.05	11.10	3.26	.61	.017	1.08

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

	Princeport		Cambridge		
	Sec. 19	Sec. 20	Sec. 19	Sec. 20	Total
Ore above 5th Level	-	22,552	-	119,835	142,387
" " 6th "	5,396	22,598	38,420	203,380	269,794
	5,396	45,150	38,420	323,215	412,181

b. Prospective Ore

Ore below 6th Level	4,694	42,492	42,244	382,428	471,858
Total Ore					884,039

c. Estimated Analysis

The reserves are estimated at 10% Princeport and 90% Cambridge.
The following are the estimated analyses of the ore reserves:

Reserve	Grade	Iron	Phos.	Sil	Mang.	Alum	Lime	Mag.	Sul.	Ign.
10%	Princeport	59.50	.300	7.73	.505	1.60	1.214	1.037	.023	2.23
90%	Cambridge	59.75	.853	4.42	1.19	3.68	.937	.849	.023	1.45

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4. ESTIMATED ANALYSIS (Cont.)

d. Estimated Tonnage as Required by State Tax Commission

Non-Bessemer Ore

Developed:	1. Princeport Sec. 20	22,552 Tons	
	2. Cambridge Sec. 19	43,816 "	
	3. Cambridge Sec. 20	345,813 "	
Total Developed			412,181 tons
Prospective:	1. Cambridge Sec. 19	46,938 Tons	
	2. Cambridge Sec. 20	424,920 "	
Total Prospective			471,858 tons
Grand Total			884,039 Tons

The above estimates are as of December 31, 1943.

e. Expected Average Natural Analysis of Ore Reserves

DEVELOPED:

Grade	Trade Name	Total Tons	Iron	Phos.	Sil.	Mn.	Al.	Lime	Mag.	Sul.	Loss	Moist.
Non-	Princeport	22,552	50.60	.256	6.57	1.032	.429	1.365	.882	.020	1.90	15.00
Bess.	Cambridge	389,629	50.76	.707	3.80	.787	1.005	3.095	.716	.020	1.24	15.00
PROSPECTIVE:												
Non-Bess.	Cambridge	471,858	50.80	.742	3.73	.807	1.023	3.145	.711	.020	1.22	15.00

5. LABOR & WAGES

b. Comparative Statement of Wages and Product

This is not a comparative statement as the mine operated twelve months in 1943 but operated only six months in 1942.

	1943	1942	Incr.	Decr.
PRODUCT	227,185	83,918	143,267	
Number of Shifts and Hours	5-2-8 hr. 1-1-8 "	6-2-8 hr.		
AVG. NUMBER OF MEN WORKING				
Surface	43	30	13	
Underground	129½	67	62½	
Total	172½	97	75½	

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5. LABOR & WAGES (Cont.)

	1943	1942	Incr.	Decr.
AVG. WAGES PER DAY				
Surface	7.16	6.91	.25	
Underground	8.15	7.76	.39	
Total	7.89	7.50	.39	
AVG. WAGES PER MONTH OF 24 DAYS				
Surface	171.84	165.84	6.00	
Underground	195.60	186.24	9.36	
Total	189.36	180.00	9.36	
PRODUCT PER MAN PER DAY				
Surface	17.69	17.68	.01	
Underground	6.20	7.97		1.77
Total	4.59	5.49		.90
LABOR COST PER TON				
Surface	.405	.391	.014	
Underground	1.315	.974	.341	
Total	1.720	1.365	.355	
AVG. PRODUCT MINING				
Stoping	202,526	82,763	119,763	
Ore Development	24,659	1,155	23,504	
Total	227,185	83,918	143,267	
AVG. WAGES CONTRACT LABOR	8.56	8.36	.20	
TOTAL NUMBER OF DAYS				
Surface	12,837-3/4	4,744-1/4	8,093-1/2	
Underground	36,641	10,528-1/2	26,112-1/2	
Total	49,478-3/4	15,272-3/4	34,206	
AMOUNT FOR LABOR				
Surface	92,045.16	32,829.82	59,215.34	
Underground	298,707.27	81,748.64	216,958.63	
Total	390,752,43	114,578.46	276,173.97	

PROPORTION OF SURFACE TO UNDERGROUND MEN
1943 - 1 to 3.01 - 2-8 hr. shifts
1942 - 1 to 2.23 - 2-8 hr. shifts

AVG. WAGES PER MO. BASED ON MEN CARRIED ON MINE PAYROLL			
Surface	171.84	165.84	6.00
Underground	195.60	186.24	9.36
Total	189.36	180.00	9.36

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5. LABOR & WAGES (Cont.)

LABOR

There was a shortage of skilled miners at the Princeton during 1943 but this was being overcome by hiring younger men and putting them to work with the older or more experienced men. This program of training the younger men was proving very satisfactory until the draft called many of these men into service. Unskilled men and younger men are continually replacing those who are called and this training is in practice all of the time.

A general wage increase of 5½ cents per hour was granted the underground and surface labor at the Princeton Mine. The increase was retroactive to July 13, 1942 and a special adjustment was made and paid to April 1, 1943. Since April, 1943, the increase was incorporated into the regular pay schedule.

C. I. O.

An election was held on March 17, 1943 to determine labors bargaining agent at the Princeton Mine. Of the 139 votes cast, 131 voted for the C. I. O. and 8 against. This majority gave the C. I. O. the right to be the sole bargaining agent for the workers at the mine.

6. SURFACE

a. Buildings, Repairs

A few minor changes were made to the surface buildings during the year.

A storm shanty was placed outside the south doorway of the miners dry, to prevent the outside cold air coming in to the clean clothes dressing room, while the miners are washing or dressing.

A new steam line was installed from the Boiler House at the dry to the shop building. A new unit heater was placed in the carpenter shop to replace the coal stove formerly used.

A fence was placed around the caving area between No. 2 and No. 3 Shaft to prohibit any trespassers from getting near the settling surface.

A number of "Defense Area -- No Trespassing" signs were placed at various boundaries of the property to prevent outsiders from wandering through the surface plants and buildings. These signs were placed under the supervision of the "Emergency Protective Defense Board" and the Michigan State Police Department.

New bushes were planted alongside the roadway and walkways were made around the office buildings. A general clean-up was made around both of the shaft houses and the office and shop buildings.

During the winter months, a considerable amount of ice forms in the No. 3 Shaft. This shaft is a natural downcast of air for mine ventilation. The small amount of water that continually drips in this shaft near the 5th Level elevation freezes and builds up on the runners until the cage can no longer be raised or lowered safely. The loading shovel is kept at No. 3 Shaft so that the boiler may be used to supply steam for thawing ice in shaft. To limit the volume of cold air down No. 3 Shaft, every possible opening in the headframe was enclosed and a door was installed in the 6th Level Main Drift.

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6. SURFACE (Cont.)

b. Stockpiles

Approximately 1500' of ore stocking trestle was erected at the No. 2 Shaft. At present there are 2 trestles to the southeast of the shaft and two to the northwest of the shaft. It can be seen from paragraph two "Production and Shipments", that the output is much greater than the shipments. Due to this fact, the ore stocking capacity must be gradually increased each year.

Two additional bents were added to the waste rock trestle. In order to gain additional capacity of the trestle, the top portion of the pile is bulldozed to each side, thus widening the bottom of the pile.

c. Tracks

The L. S. & I. Rr. laid a new track from their main line east of the No. 2 Shaft to the southeast stockpile. A small tonnage was loaded out from this pile by the end of shipping season.

d. Roads

A new road was constructed from the No. 2 Shaft alongside the east side of the waste rock pile connecting with the county road near No. 3 Shaft. The old road crosses the mined area and may cave at any time. This new road serves as a connection from the Main Office Building to the No. 2 Shaft area.

7. UNDERGROUND

Mining operations at the Princeton Mine have developed from the scattered contracts spread over entire ore body, to a more concentrated area of mining operations. The first part of the year, stoping contracts were operated at No. 1, No. 2 and No. 3 Shafts. The slicing contracts were operating at No. 2 and No. 3 Shafts. Early in the year, the minable ore was exhausted at No. 1 Shaft and these stoping contracts were moved to No. 2 Shaft to mine this ore body intensively. The open stope system of mining is used in the No. 2 Shaft ore body. The character of ore found in the No. 2 Shaft is suitable for this type of mining.

The character of the ore of No. 3 Shaft ore body makes it suitable for the top slicing method of mining. This area has been mined down to within one sub-level or 15' of the 6th Level elevation. In order to mine this remaining ore above the 6th Level, new raises must be put up from the 7th Level. The few remaining contracts now mining above the 6th Level and scraping into chutes loading on the 6th Level, do not have the storage capacity necessary for a full five foot cut. The train of cars must wait at the chute until the cut is cleaned out. Raises from the 7th Level will permit enough storage capacity so that trains will not be held up for the ore of just one contract.

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7. UNDERGROUND (Cont.)

As the development of the 7th Level has been increased, it was necessary to provide storage space for the storing of rock at the No. 2 Shaft plat. During the past, a train of ore or rock had to be kept at the shaft until the skip was released by the 6th Level hoisting crew or until all the cars of a five car train were dumped directly into the skip. The storage capacity was provided by excavating a trench alongside the main track thus enabling the train crews to dump the loaded cars into the trench and proceed back to the mining area for another train load.

A pocket of capacity equalled to that of the skip was installed at the shaft end of the trench. This pocket is filled with the material dumped in the trench by means of a scraper. When this measuring pocket is filled, a chute door is opened andthe rock or ore will fall into the skip. The trench will hold approximately fifteen to twenty cars which can be hoisted on the night shift when the ore output of the mining contracts is low.

a. Shaft Sinking

There was no shaft sinking during the year and it is not likely there will be any during 1944. The new 7th Level Main Drift which will connect No. 2 and No. 3 Shafts was advanced approximately 1/3 of the distance between the two shafts.

b. Developments

The Princeton ore body above the 6th Level has been fairly well defined so little development was necessary on this elevation. A drift was advanced to the west from the crosscut connecting the foot and hangingwall drifts opposite No. 3 Shaft. This drift was driven to locate the contacts of the ore body that had been partially outlined by the workings prior to the reopening of the mine. A diamond drill hole was completed from the hangingwall drift and proved the ore body to be of small dimensions in the north-south direction. The new 7th Level Main Drift which was driven southeast toward No. 3 Shaft was advanced approximately 700' during the year. From thisdrift three crosscuts were started and advanced around the curve.

On the 7th Level in the No. 2 Shaft area, diamond drill rigs were set up and two horizontal holes were drilled to the southwest in order to determine the ore contacts at this elevation. The first hole (#3) was drilled 298' in arkose the second hole (#5) encountered the ore at 150' west of #7100 Raise. The log of the above holes are found in paragraph nine "Explorations". Two raises were advanced from the 7th Level - #700 Raise from the main drift and #7100 Raise from the first crosscut south of the No. 2 main drift. #700 Raise encountered the ore 42' above the level and #7100 Raise was in ore 30' above the level.

During the coming year additional crosscuts will be turned off of the No. 3 Shaft main drift to locate the downward extension of the No. 3 ore body.

A number of raises must be brought up from these crosscuts to continue the top slicing operations that are now being carried on from the 6th Level raises.

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7. UNDERGROUND (Cont.)

c. Stoping

No. 1 Shaft - Section 18
885' & 875' Sub-levels

Mining operations in the No. 1 Shaft were at their peak during January, 1943. Contract #1 stoped a small area southeast of Raise #6114. This stope was extended 100' south and intersected a number of old drifts which were used for traveling when this area was being worked in 1921. This Contract also advanced a small drift to the northwest of Raise #6103. The drift was driven through the arkose footwall and intersected the ore near the winze drift to which it was connected. Considerable exploratory work was done on either side of the drift and the ore proved to be contaminated by seams of jasper with an average iron content of 56%. This material was too lean to be mined at this time and it was decided to abandon the operations for the time being.

In January, Contract #15 completed the mining of all available ore south and west of Raise #6107 by taking three slices into the ore pillar south of the Raise.

Contract #8 completed a drift to the east of Raise #6311 into an area which had been developed a number of years ago. The pillars that were left before the mine was closed down in 1921 had caved or been crushed. As much of this ore as could safely be scraped from the old opening was taken and this operation was abandoned late in January. The Contract was moved to the top of Raise #6101 in February. According to previous reports there were several pillars of ore remaining in the stope just east of the No. 1 ore body. A drift was advanced from this Raise northeast into the pillar immediately under the jasper hanging-wall. After several cuts were taken it was found that this material was somewhat lean with bands or seams of jasper running through the ore. Several test holes were put in and after a small amount was mined it was found that the analyses were too low to warrant further work. Several small pillars with a tonnage totalling approximately 10,000 tons remain in the No. 1 Shaft area. These pillars are unavailable as they are supporting the No. 1 Shaft which is the air intake of the Princeton Mine. Any mining done here might cause the Shaft to collapse, thus cutting off the mine ventilation. This tonnage was reported to the State Tax Commission as unavailable ore.

No. 2 Shaft - Section 20
925', 910', 900', 885' & 860' Sub-levels

Early in the year, Contracts #7, #8, #9 and #10 had developed a stoping area from the tops of #6201, #6205, #6314 and #6316 Raises. Drifts were advanced to the northeast from these Raises up along the arkose footwall. Stoping operations were started at the eastern end of these drifts on the 825' Sub-level elevation. Lean ore and jasper seams were encountered just above the arkose footwall thus determining the eastern limit of the stope. During the development of this area traveling and ventilation connections were driven between the tops of these Raises just under the jasper hanging. Mining was started in the eastern ends of the drifts and retreated to the west toward the tops of the Raises. Small lean ore or jasper pillars were left for support,

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7. UNDERGROUND (Cont.)

c. Stoping (Cont.)

thus making it possible to mine all the merchantable ore. Exceptionally large tonnages were produced from this stope during the year. Its length was a little over 600', average width approximately 100'and thickness of 25' from foot to hanging. Four contracts were employed here from the first of the year through October.

In December, Contract #9 cut out on the 860' Sub-level and drifted north just under the jasper hangingwall, for 80' to previous workings located east of #6206 Raise. A small stope was started at the end of this drift and retreated toward the top of their raise. A small tonnage was mined from the stope but operations were stopped in the latter part of December because the limits of mining had approached the 6th Level main drift.

6th Level

In February, Contract #4 stoped an area in the center of the ore body at a point where the main shaft drift encountered the ore. This stope is immediately under the jasper hangingwall and was stoped to a width of 90', which were the limits of such an operation.

In the middle of the year, Contract #10 retimbered the first crosscut south of No. 2 Shaft main drift and drove a transfer drift to the northwest into the #4 stope. Stoping operations were started at the end of this drift and retreated toward the crosscut. This stope was extended to the south, to the first crosscut to the east, until lean ore was encountered and to the west to the jasper hanging. A small stope was then started on the south side of the first crosscut and advanced to the second crosscut. Due to the fact that the stope was so near to the 6th Level main drift only a relatively small tonnage was obtained without interfering with the main drift pillar.

In September, Contract #5 moved to the No. 2 Shaft main drift and advanced a transfer drift to the northwest into #10 stope. Contract #5 began their stoping operations and lengthened the stope northwest to the mining limit just 20' south of the timber and ventilation raise that connects the 6th and 7th Levels. Lean ore was encountered on the east side of the stope and the jasper hanging on the west side.

In August, Contract #10 set up a scraper slide and other facilities necessary for stoping operations in the first crosscut north of No. 2 Shaft main drift just opposite the top of the timber raise to the 7th Level. A drift was driven to the northwest for approximately 100'. A stope was started at the end of this drift and enlarged to the northwest until it broke into #14 stope to the north and encountered the jasper hangingwall on the west. The ore was mined as the stope retreated to the crosscut. A small pillar was left between this stope and the 6th Level main drift.

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7. UNDERGROUND (Cont.)

c. Stoping (Cont.)

During May, Contract #14 retimbered the third crosscut north of No. 2 Shaft main drift, installed a scraper slide just off the main drift. A new drift was driven northwest from the slide until the fourth crosscut was encountered in the drift. A breakdown occurred at the junction of these two drifts and stoping operations were started. From this drift, the mining of several small pillars which were left was impossible. This stope was extended to the north and west until the jasper hanging was encountered. A short drift was driven to the southwest and a Raise put up from the end of this drift to the jasper hangingwall. The ore at this locality is approximately 35' from foot to hanging. A local rise in the hangingwall accounts for this unusual thickness. A bench was made along the open stope in order to safely mine this thick ore body. As the stope was extended to the southwest, it broke through into #10 stope. A few small pillars were left but will be mined during the coming year when #14 Contract will move their scraper slide to the crosscut just north of the stope.

835' Sub-level

Late in the year, Contract #11 cut out at the top of #7101 Raise at this elevation and drifted toward the northwest. This drift will be used as a transfer drift to scrape the ore from the cross drifts that will be extended to the east from this drift into the stopes on the 6th Level elevation.

In December, Contract #14 continued the advancement of this transfer drift to the northwest to connect to a drift being driven south by Contract #8 from the top of #7301 Raise.

Also in December, Contract #11 started the first cross drift to the northeast toward the 6th Level stopes.

825' Sub-level

In December, #5 and #10 Contracts cut out #700 Raise at this elevation and drifted northeast to come under old #10 stope on the 6th Level. #5 Drift encountered and followed jasper hangingwall until the connection was made to the stope. #10 Contract also completed the traveling connection between the top of #700 and #7101 Raises.

800' Sub-level

Contract #4 cut out #700 Raise at 800' Sub-level elevation and drifted to the southwest for 55'. The Raise was started from this drift and advanced up to the 825' Sub-level. This was an attempt to repair the #700 Raise which had caved in the process during its advancement. The character of the Princeton ore is such that the loss of raises during advancement is inevitable if the cribbing is not kept close to the breast. This raise was finally cribbed and repaired up to the 825' Sub-level.

7th Level

During the entire year, Contract #16 advanced the main drift 700' which will eventually connect to No. 3 Shaft. This drift was driven in the arkose footwall.

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7. UNDERGROUND (Cont.)

c. Stoping (Cont.)

Three crosscuts were started and turned to the southwest. During the first part of the year, this Contract worked in two headings; the first crosscut to the south and also the main drift. A greater portion of this main drift was driven to No. 3 Shaft is untimbered. In the latter part of the year, the arkose that was encountered was fractured and broken up and required timbering. The use of forepoles and lagging along the sides of the drift was necessary in order to stop the running of this fractured ground.

#700 Raise was started in May and was advanced to the ore contact 47' above the level by Contract #11. In October, Contract #11 advanced the first crosscut to the southwest so that #7101 Raise could be started. This Contract then advanced the #7101 Raise 30' in arkose and 45' in ore up to the 835' Sub-level where it was cut out.

In December, Contract #16 advanced No. 3 Shaft main drift 45' in arkose and the third crosscut 25' around the curve up to the point of tangent.

No. 2 Shaft - Section 19

6th Level

Contract #12 completed a connecting drift between Raises #728 & #726. This drift was driven directly under the jasper hangingwall and all available ore to the North and east of the top of these raises was mined. This Contract mining from #726 Raise, faned slices southeast from the jasper hangingwall. A drift was driven from #726 Raise to the top of #7502 Raise. The Contract then moved to #7502 Raise and drifted to #7401 Raise. The latter raise was then timbered and the Contract continued driving the drift toward the 6th Level in a northeasterly direction. This drift was used as a traveling and ventilation connection to the 6th Level main drift. Contract #12 moved to the top of #7401 Raise and mined the pillar southeast of this raise by fanning slices southeast toward the traveling connection to the 6th Level. Toward the end of the year, the drift that connects #7401 Raise to the 6th Level was crushed beyond repair. In December, a new traveling road had been started along the south side of this drift.

Late in February, Contract #1 moved to Raise #728 to commence slicing operations. Seven slices were mined to the northeast of the Raise. The arkose footwall was encountered in the floor and breasts of the slices. A small pillar remains to the west of this Raise, but could not be mined because its support was necessary to keep the drift open for timber tramming purposes to #726 Raise. #1 Contract then moved to #726 Raise and started slicing operations by advancing a slice south of the Raise along the jasper hangingwall. Slices were to the south and fanned east from the Raise until the arkose footwall was encountered 50' to the east of the Raise. This Contract then moved to the next lower sub-level.

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7. UNDERGROUND (Cont.)

c. Stoping (Cont.)

Contract #4 was moved to #7502 Raise in July to mine the ore northwest along the traveling connection for 30' until a breakdown occurred. A second and third slice were started to the west of the Raise but these also broke down. Mining from this Raise at this elevation was temporarily abandoned due to the excessive amount of water found in this area which makes progress difficult.

Contract #7 put up a single compartment raise on the 6th Level main line between #6216 and #6214 Raises. According to old maps there was a sizable ore pillar left just above the 6th Level elevation. A small exploratory drift was advanced from the top of this single compartment raise to the north. Old wood was encountered when the breast was only 30' from the raise. Another small drift was driven to the east; old workings were again encountered a short distance to the east. A drift and a slice were mined to the west of the raise and the jasper hanging was encountered. This territory was then abandoned because of extreme pressures causing the drift to crush.

835' Sub-level

Late in November, #1 Contract moved down to this sub-level and cut out #726 Raise prior to slicing operations. In December, a short drift had started to the southwest toward the jasper hanging.

825' Sub-level

Contract #8 cut out #7301 Raise at this elevation and advanced a drift to the southeast of this raise. This Raise was cut out in the arkose footwall. The drift was advanced in ore which was encountered approximately 5' southwest of the Raise. The jasper hangingwall was encountered 120' southwest of the Raise. A small drift was then driven at right angles toward the initial drift, following the jasper hanging. When the breast of the small drift was 100' to the northwest, it was stopped due to the excessive amount of water encountered in the breast. The Contract then cut out room for the scraper hoist on the north side of #7301 Raise and drifted southeast parallel to the main drift pillar. The jasper hanging appeared in the breast 100' south of this raise. This drift when connected to #7101 Raise will act as a transfer drift for mining ore in the stoping area just under the 6th Level.

No. 3 Shaft - Section 20
910' Sub-level

Contract #6 completed mining a small pillar just above the arkose footwall around #6311 Raise. This contract was then moved to #6351 Raise and resumed mining operations on the same elevation. These workings were driven parallel to and near the jasper hangingwall where lean ore was present before the actual jasper was reached. Late in May, Contract #6 cut out #6351 Raise on the 900' Sub-level.

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7. UNDERGROUND (Cont.)

c. Stoping (Cont.)

Contract #3 was moved to Raise #6341 late in April, to commence mining operations in the south and on the ore boundary which has been more or less segregated due to the dike seam located to the north on 885' Sub-level. A drift was started on the west side of the Raise and was driven along the arkose footwall southeast of the original workings. This drift was connected to #6318 Raise at a point approximately 10' north of #6318 Raise the arkose footwall cut across the drift. This Raise will be usable for at least one sub in mining the south limb of the No. 3 Shaft ore body.

Contract #5 was moved to Raise #6318 late in June and advanced a drift to the north along the western side of the connecting drift to #6323 Raise. This drift broke down approximately 20' north of the Raise and a slice was advanced along the west side of the drift in order to mine the ore north of the breakdown. An excessive amount of water was encountered in this breast, prohibiting the advancement of this drift. A drift and a slice were taken along the arkose footwall to complete the mining of #5 Contract on the 910' Sub-level.

900' Sub-level

A drift was driven by #6 Contract to the southwest of #6351 Raise to the old drainage drift on the hangingwall side of the ore body. A large amount of water was encountered and operations were temporarily stopped. The Contract then commenced driving a small drift from the old water raise in the hangingwall drift to the hangingwall drift just southwest of the mining area. A short raise was extended from the small drift which opened into the end of the mining drift, but due to the broken jasper, the opening could not be maintained. Pipes were installed to take this water from the small drift to the raise and from there to the 6th Level main drift. Slicing was then continued to the northwest, stopping at the jasper hangingwall.

In December, Contract #6 completed a connection between #6351 Raise and #6313 Raise. This Contract then moved their mining equipment to the latter Raise and slicing operations to the southeast of #6313 Raise. Late in December, this Raise was crushed and mining operations were temporarily abandoned until the Raise could be repaired.

During April, Contract #15 cut out on this sub-level and drifted south along the arkose footwall. After completion of this drift, slices were fanned to the southwest to the old workings from the south and to the jasper hangingwall on the west. A small pillar remains west of the raise because of the breakdown and the excessive amount of water occuring during the mining.

Contract #2 completed the mining of pillars both east and west of Raise #6331 that was started last year. The slices to the east were advanced to the arkose footwall, while the slices to the west encountered old workings. This contract then moved to the 885' Sub-level and slicing operations were continued.

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7. UNDERGROUND (Cont.)

c. Stoping (Cont.)

Contract #3 mined the ore on the 900' Sub-level which lies west of #6323 Raise. This raise was cut out in the arkose footwall and drifts had to go through approximately 10' of arkose before the ore was encountered.

During September, Contract #4 had completed the advancement of #6324 Raise to the jasper hanging. This raise was cut out on the 900' Sub-level and a drift was driven to the southeast toward the end of Contract #3's slices. Arkose was encountered at the breast of this drift at a point approximately 70' southeast of #6324 Raise. A second drift was started to the southwest and advanced 20' in jasper before the ore was encountered. A breakdown occurred and mining was abandoned in this area.

885' Sub-level - No. 3 Shaft

Contract #15 cut out at the sub-level elevation late in October. A drift was driven to the southwest approximately 30' in arkose before the ore was encountered. Old workings were encountered to the south and the jasper hangingwall to the west. In December, a slice that was started the month before and another slice were completed to the jasper hangingwall. This raise will not be cut out at the next lower sub-level because the arkose footwall dips to the west and makes too much rock work to drive west to encounter the ore.

Contract #5 cut out #6341 Raise late in 1942. The first drift was continued to the northwest adjacent and parallel to the arkose footwall. Slices were fanned to the southwest, encountering lean ore to the west and a dike seam on the south. This dike which forms a mining limit between #6341 Raise and #6331 Raise lies in the east-west direction 30' south of #6341 Raise. After completing the mining of ore on this sub #5 Contract moved to the 875' Sub-level in April.

Contract #2 started mining operations on this sub-level in April; the first workings were along the arkose footwall to the northeast. After completing the original drift a considerable amount of ore was mined on the footwall east of the drift. The arkose footwall was very flat in this area so short slices were fanned from the original drift up the footwall to the east. After removing all the ore that could be obtained up along the footwall, slicing operations were started to the west of this drift. The north limit of this area has been the ferruginous dike which is 130' north of the #6331 Raise. The south limit of this territory is the arkose footwall. There is an unusual roll of the arkose footwall just south of this Raise that almost cuts the ore body in two. Late in the year, this Contract completed mining on this elevation and moved to the next lower sub-level.

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7. UNDERGROUND (Cont.)

c. Stoping (Cont.)

875' Sub-level

Late in April, Contract #5 completed the cutting out of Raise #6341. This cut out was made entirely in the arkose footwall and a drift was started to the west which intersects the ore approximately 20' from the raise. This initial drift was continued to the west to the intersection of jasper hangingwall and the dike seam which was found just south of this raise. Three slices were taken; one on the northside of the drift and two on the southside immediately to the south. The lean ore and dike was encountered and greatly reduced the size of this mining area. As this sub-level is only 12' above the main level drift no storage capacity is available in chutes dumping on the 6th Level. In order to continue mining operations from this territory new raises must be put up from the new 7th Level main drift which is being driven toward No. 3 Shaft.

Contract #2 moved to this sub-level in October and advanced a drift along the arkose footwall to the dike 130' north of the raise. Slicing operations were started and continued along the west side of this drift. In December, a slice started the previous month and another slice were advanced 60' to the north of the raise.

6th Level

Contract #7 completed the advancement of #6351 Raise to the 910' Sub-level.

Contract #15 started a small stope just above the 6th Level elevation under the jasper hangingwall. This stope was enlarged to the north and east. This contract advanced a small drift into the jasper hangingwall just south of the original drift. A stope was started from the eastern end of this drift and enlarged to the north. Irregularity in the jasper hanging made stoping operations impossible. This Contract was moved back to their slicing territory late in December.

Contract #9 started a new crosscut opposite #6325 Raise and advanced it to the jasper hangingwall approximately 30' west of this Raise. A raise was started in the ore which intersected this drift and was advanced to the 910' Sub-level where slicing operations were started.

d. Timbering

Statement showing Timber Used for 1943

KIND	LINEAL FT.	AVG. PRICE PER FT.	AMOUNT 1943	AMOUNT 1942
6" x 8" Cribbing Timber	48,204	.0421	$2,032.40	--
8" x 10" Stull "	21,337	.0831	1,774.95	$ 226.03
10" x 12" " "	37,922	.1150	4,363.79	1326.40
12" x 14" " "	22,420	.1589	3,562.97	1974.60
14" & Up " "	1,161	.1969	228.66	--
Total Timber 1943	131,044	.0913	$11,962.77	
Total Timber 1942	28,214	.1250		$3,527.03

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7. UNDERGROUND (Cont.)

d. Timbering (Cont.)

	LINEAL FT.	AVG. PRICE PER FT. Per 100 Ft.	AMOUNT 1943	AMOUNT 1942
7' Lagging	611,948	1.0233	$6,262.59	$1,907.19
9½' Poles	481,173	1.6835	8,100.55	2,080.69
Total 1943	1,093,121		$14,363.14	
Total 1942	361,682			$3,987.88
Wire Fencing - Sq. Ft. 1943	742	.0112	82.82	
1942	4,125	.0150		62.16
Grand Total 1943			$26,408.73	
Grand Total 1942				$7,577.07

Product - Tons	227,185	83,918
Feet of timber per ton of ore - Stull & Cribbing	.5768	.3362
" of stull timber only per ton of ore	.3646	.3362
" of lagging per ton of ore	2.6936	2.5013
" of poles " " " "	2.1179	1.8086
" of wire fencing per ton of ore	.0036	.0491
" of lagging per foot of timber	4.6697	7.4397
" of poles " " " "	3.6718	4.6706
Cost per ton for timber	.0526	.0420
" " " " lagging	.0275	.0227
" " " " wire fencing	.0004	.0074
" " " " poles	.0356	.0247
" " " " all timber	.1158	.0968
Equivalent of stull timber to board measure	292,792	80,139
Feet of board measure per ton of ore	1.2887	.9549

Total Cost for Timber, Lagging, Poles, Fencing:

Year	Amount	Cost per Ton
1943	26,408.73	.1162
1942	7,577.07	.0902

This is not a comparative statement as the mine operated twelve months in 1943 but only six months in 1942.

e. Drifting & Raising

The following table lists the development footages:

	Drifting		Raising		
	Ore	Rock	Ore	Rock	Total
1943	2287'	1683'	563'	460'	4993'
1942	312'	136'	46'	101'	595'

The major part of the development footages was done in stoping area of No. 2 Shaft ore body.

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7. UNDERGROUND (Cont.)

f. Explosives, Drilling and Blasting

Explosive Statement - Year 1943 - Stoping, Slicing & Ore Development

Kind	Quantity Pounds	Average Price	Amount 1943	Amount 1942
1 1/8" 45% Gelax #2	84,424	.1150	$9,713.35	$3,578.86
1 1/4" 60% Special Gelex	3,180	.1150	365.70	207.00
Total Powder - 1943	87,604	.1150	$10,079.05	
Total Powder - 1942	32,047	.1181		$3,785.86
Fuse - M. Feet	393,574	5.15	2,026.91	425.54
No. 6 Blasting Caps - M. Feet	52,822	12.20	644.50	200.42
Electric Blasting Caps - C	144	11.12	16.02	--
Powder Bags - large	14	3.59	50.26	--
" " - small	15	2.39	35.91	69.30
Tamping Bags - M.	8,333	1.65	13.75	--
Fuse Lighters - M.	4,667	6.68	31.17	23.63
#14 Duplex Blasting Wire - M. ft.	450	18.00	8.10	--
Master Fuse Lighters - M.	16	7.50	.12	32.40
Miscellaneous			36.39	54.58
Total Fuse, Caps, etc.			2,863.13	805.87
Total All Explosives			$12,942.18	$4,591.73
Product - Tons			227,185	83,918
Pounds powder per ton of ore			.2856	.3818
Cost per ton for powder			.0443	.0451
Cost per ton for fuse, caps, etc.			.0126	.0096
Cost per ton for all explosives			.0569	.0547
Rock Development & Filling				
1 1/8" - 45% Gelex #2	3,639	.1150	418.49	23.29
1 1/4" - 60% Special Gelex	7,887	.1150	907.00	--
1 1/4" - 80% " "	2,000	.1400	280.00	--
Total Powder - 1943	13,526	.11869	1,605.49	
Total Powder - 1942	203	.1147		23.29
Fuse - M. feet	78,974	5.15	406.72	12.98
No. 6 Blasting Caps - M.	10,409	12.20	127.00	4.39
Electric Blasting Caps - C.	624	9.59	59.85	--
Powder Bags - large	4	3.45	13.80	--
" " - small	3	1.39	4.17	--
Tamping Bags - M.	1,667	1.35	2.75	--
Fuse Lighters - M.	3,558	6.75	24.03	--
Miscellaneous			10.43	
Total Fuse, Caps, etc.			648.75	17.37
Total All Explosives			2,254.24	40.66
Grand Total Explosives used at Mine			15,196.42	4,632.39

This is not a comparative statement as the mine operated twelve months in 1943 but only six months in 1942.

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7. UNDERGROUND (Cont.)

i. Ventilation

During the year 1943 it was necessary to depend on the natural ventilation created by the difference in elevation of No. 1, No. 2 and No. 3 Shafts. Both No. 1 and No. 3 Shafts are downcast. The air stream then flows through the 6th Level main drifts and was upcast in the No. 2 Shaft. During the winter months, ice formed in the No. 3 Shaft and several times it was necessary to use steam from the loading shovel boiler to remove the ice in order to use the cage for lowering supplies and men. At the end of the year, a fan was obtained and the work of installing it on the 7th Level was started. The fan will draw air from the No. 1 Shaft and exhaust it up both the No. 2 and No. 3 Shafts. This should eliminate any possibility of ice forming in either of these shafts.

k. Pumping

Pumping during the year was done from the No. 2 Shaft 7th Level.

The main pump is an Aldrich which was obtained from the Mackinaw Mine. This pump has a capacity of a little over 800 gallons per minute.

The reserve pump is a centrifugal of 500 gallons per minute capacity.

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

March	187
April	249
May	298
June	296
July	311
August	277
September	256
October	224
November	203
December	207

In August the main sump southeast of No. 2 Shaft on the 7th Level was cleaned. A new intermediate dam was built in the main sump between the main dam and the level where the mine water enters the sump. This dam will tend to settle the mud, before it reaches the main sump. A regular cleaning of this smaller portion of the sump will lengthen the time between the cleaning of the main sump.

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8. COST OF OPERATING

a. Mining Costs

	1943	1942	Increase	Decrease
Product	227,185	83,918	143,267	
Underground Costs	1.851	1.456	.395	
Surface Costs	.343	.208	.135	
General Mine Accounts	.327	.324	.062	
Cost of Production	2.521	1.988	.592	
Depreciation - Plant Account	.028	.029		.001
Depreciation - Development				
Taxes	.038	.051		.013
Cost on Stockpile	.066	.080		.014
Loading and Shipping	.089	.116		.027
TOTAL COST ON CARS	2.735	2.184	.551	
Number of Days Operating	308	153	155	
Number of Shifts and Hours	2-8 hr.	2-8 hr.		
Avg. Daily Product	738	640	98	
Cost of Production				
Labor	1.765	1.370	.395	
Supplies	.756	.618	.138	
Total	2.521	1.988	.533	

b. Detailed Cost

Days per week	5 & 6	5 & 6	
Shifts and Hours	2-8 hr.	2-8 hr.	
Production	227,185	83,918	143,276
Avg. Daily Product	738	640	98
Number of days	308	156	155

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YEAR 1943

8. COST OF OPERATING (Cont.)

b. Detailed Cost (Cont.)

UNDERGROUND COSTS	1943 Amount	1943 Per Ton	1942 Amount	1942 Per Ton	Increase Amount	Increase Per Ton	Decrease Amount	Decrease Per Ton
Exploring in Mine	1649.32	.007	1603.54	.019	45.78			.012
Development in Rock	33186.64	.146	1280.94	.015	31905.70	.131		
Development in Ore	27830.20	.122	696.61	.008	27133.59	.114		
Stoping	121915.84	.537	53575.31	.638	68340.53			.101
Timbering	86795.32	.382	13705.74	.163	73089.58	.219		
Tramming	77690.50	.343	2718.89	.325	50507.61	.018		
Ventilation	1011.00	.004	193.92	.002	817.08	.002		
Pumping	13258.14	.058	2641.02	.031	10617.12	.027		
Compressors & Air Pipes	10322.18	.045	6841.28	.082	3480.90			.037
Underground Superintendence	12064.05	.053	3069.30	.037	8994.75	.016		
Maintenance-Compressors & Power Drills	843.90	.004	1074.96	.013			231.06	.009
" -Hand Scrapers	16080.70	.072	5170.14	.062	10910.56	.010		
" -Elec. Tram equip.	14814.88	.065	3325.19	.039	11489.69	.026		
" -Pumping Mach.	3040.64	.013	1830.01	.022	1210.63			.009
Total Underground Costs	420503.31	1.851	122190.85	1.456	298312.46	.395		
SURFACE COSTS								
Hoisting	20049.21	.088	5806.07	.069	14243.14	.019		
Stocking Ore	27437.98	.121	2918.15	.035	24519.83	.086		
Dry House	7327.61	.032	2120.89	.025	5206.72	.007		
General Surface Expense	11203.93	.049	4406.36	.052	6797.57			.003
Maintenance-Hoisting Equip.	3932.49	.017	877.97	.011	3054.52	.006		
" -Shaft	1976.89	.009	54.37	.001	1922.52	.008		
" -Top Tram Equip.	3040.70	.013	460.29	.006	2580.41	.007		
" -Docks, Tres., etc.	1094.34	.005			1094.34	.005		
Mine Buildings	2075.11	.009	804.30	.009	1270.81	.000		
Total Surface Costs	78138.26	.343	17448.40	.208	60689.86	.135		
GENERAL MINE EXPENSE								
Vacation Expense	5595.71	.025	2317.18	.028	3278.53			.003
Insurance	1513.02	.007	470.96	.006	1042.06	.001		
Mining Engineering	2876.72	.013	1516.67	.018	1360.05		.005	.005
Mech. & Elec. Engineering	884.11	.004	546.83	.006	337.28			.002
Analysis & Grading	12710.58	.056	4374.37	.052	8336.21	.004		
Personal Injury	10897.15	.048	2266.31	.027	8630.84	.021		
Safety Department	1513.35	.007	263.96	.003	1249.39	.004		
Telephones & Safety Devices	3121.60	.014	2190.14	.026	931.46			.012
Local and Gen'l. Welfare	1848.93	.008	602.82	.007	1246.11	.001		
Sped. Exp. Pensions, Allow.	4164.82	.018	1290.11	.015	2874.71	.003		
Ishpeming Office	8346.85	.041	2760.72	.033	6586.13	.008		
Social Security Taxes	8942.39	.039	2711.16	.032	6231.23	.007		
Mine Office	10735.57	.047	5935.86	.071	4799.71			.024
Total General Mine Exp.	74150.80	.327	27247.09	.324	46903.71	.003		

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8. COST OF OPERATING (Cont.)

b. Detailed Cost (Cont.)

	1943		1942		Increase		Decrease	
	Amount	Per Ton	Amount	Per Ton	Amount	Per Ton	Amount	Per Ton
COST OF PRODUCTION	572792.37	2.521	166886.34	1.988	405906.03	.533		
Taxes	8588.91	.038	4308.59	.051	4280.32			.013
TOTAL COST	581381.28	2.559	171194.93	2.039	410186.35	.520		
General Supplies	15397.04	.067	5933.37	.071	9463.67			.004
Iron and Steel	5313.67	.023	1131.51	.013	4182.16	.010		
Oil and Grease	1707.73	.007	651.54	.007	1056.19			
Machinery Supplies	6233.23	.027	2233.72	.027	3999.51			
Explosives	15901.09	.070	4436.32	.053	11464.77	.017		
Lumber and Timber	33076.27	.146	7806.45	.093	25269.82	.053		
Fuel	3334.72	.015	1099.00	.013	2235.72	.002		
Electric Power	34442.64	.152	1170.61	.140	22672.03	.012		
Sundries	15877.97	.070	5348.92	.064	10529.05	.006		
Other Mines and Accounts	540.34	.002	1758.54	.021	1218.20	.019		
Supply Inventory Adjustment	34.82		79.71	.001			44.89	.001
TOTAL COST PER COST SHEET	130778.84	.575	38732.61	.461	92046.23	.114		

Comparative Supply Balance	1943	1942	Increase	Decrease
General Supplies	3129.87	3024.35	105.52	
Iron and Steel	2527.67	989.02	1538.65	
Oil and Grease	326.32	324.47	1.85	
Machinery Supplies	734.09	1501.45		767.36
Explosives	227.98	338.14		110.16
Lumber and Timber	14448.15	12641.76	1806.39	
Fuel	885.68	3009.63		2123.95
Total	22279.76	21828.82	450.94	

Exploring in Mine
More diamond drilling and rock development.

Development in Ore
Increase due to mine producing only six months in 1942.

Stoping
Increase due to mine producing only six months in 1942.

Timbering
Increase due to mine producing only six months in 1942.

Tramming
Increase due to mine producing only six months in 1942.

Ventilation
Increase due to mine producing only six months in 1942.

Pumping
Increase due to mine producing only six months in 1942.

Compressors & Air Pipes
Increase due to mine producing only six months in 1942.

Underground Superintendence
Increase due to mine producing only six months in 1942.

Maintenance-Compressors & Power Drills
Decrease due to charge in 1942 for connecting rod for compressor.

Maintenance-Hand Scrapers
Increase due to mine producing only six months in 1942.

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8. COST OF OPERATING (Cont.)

b. Detailed Cost (Cont.)

Maintenance-Electric Tram Equipment
Increase due to mine producing only six months in 1942.
Maintenance-Pumping Machinery
Increase due to mine producing only six months in 1942.
Hoisting
Increase due to mine producing only six months in 1942.
Stocking Ore
Increase due to mine producing only six months in 1942 also more ore stocked.
Dry House
Increase due to mine producing only six months in 1942.
General Surface Expense
Increase due to mine producing only six months in 1942.
Maintenance-Hoisting Equipment
Increase due to mine producing only six months in 1942.
Maintenance-Shaft
Increase due to mine producing only six months in 1942.
Maintenance-Top Tram Equipment
Increase due to mine producing only six months in 1942.
Maintenance-Docks, Trestles, Pockets
In 1942 expenditures under this caption were charged to CC 91.
Mine Buildings
Increase due to more general repairs to all buildings and expenditures to this type of maintenance charged to CC 91 in 1942.
Vacation Expense
More men entitled to vacation pay and proportion of expense for 1942 borne by other mines in the ratio of the time they were transferred to Princeton.
Insurance
Ishpeming Office Charge
Mining Engineering
Ishpeming Office Charge. More engineering work on account of mine operating full year compared to six months in 1942.
Mechanical & Electrical Engineering
Ishpeming Office Charge. Twelve months operating in 1943 compared with six months in 1942.
Analysis and Grading
Increase due to mine operating full year in 1943 and only six months in 1942 with less sampling.
Personal Injury
Ishpeming Office charge and larger payrolls.
Safety Department
Ishpeming Office Charge.
Telephones and safety devices
Twelve months operating compared with six months in 1942. Also some of this type of installation and repairs charged to CC 91 in 1942.

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8. COST OF OPERATING (Cont.)

b. Detailed Cost (Cont.)

Local & General Welfare

Ishpeming Office Charge. Increase due to higher proportion of this expense due to larger product.

Special Expense, Pension, Allowances

Ishpeming Office Charge.

Ishpeming Office

Ishpeming Office Charge. Higher proportion on account of larger product.

Social Security Taxes

Larger payrolls

Mine Office

Twelve months operating in 1943 - six months in 1942.

Taxes

Twelve months operating in 1943 compared with six months in 1942.

General Supplies

Twelve months operating in 1943 compared with six months in 1942.

Iron & Steel

Twelve months operating in 1943 compared with six months in 1942.

Oil & Grease

Twelve months operating in 1943 compared with six months in 1942.

Machinery Supplies

Twelve months operating in 1943 compared with six months in 1942.

Explosives

Twelve months operating in 1943 compared with six months in 1942.

Lumber & Timber

Twelve months operating in 1943 compared with six months in 1942.

Fuel

Operating two heatings plants in 1943 as compared with one for a portion of 1942.

Electric Power

Twelve months operating in 1943 compared with six months in 1942.

Idle Expense Account

The following table shows the cost under four main headings:

1.	Underground Costs	No idle expense in 1943.
2.	Surface Costs	No idle expense in 1943.
3.	General Mine Expense	No idle expense in 1943.
4.	Taxes	No idle expense in 1943.

9. EXPLORATION AND FUTURE EXPLANATION

The exploratory work during the year consisted of three diamond drill holes. No development or exploratory work had been done on the 7th Level prior to reopening the mine and in order to outline the ore body at this elevation. Horizontal holes were drilled to the southwest from the end of the first two crosscuts south of the No. 2 Shaft main drift. No.3 diamond drill hole was drilled in the 2nd crosscut and No.5 diamond drill hole in the 1st crosscut.

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9. EXPLORATION AND FUTURE EXPLANATION

The Log of these holes in as follows:

No.3 diamond drill hole in the 2nd crosscut south of the No. 2 Shaft Main Drift - - 7th Level.
Location of hole: - - S1018 E535 Section 20.
Dip -10°
Direction of Hole: S 45° W
Depth of Hole: 298½'
Material: Arkose

No. 5 diamond drill hole in the 1st crosscut south of the No. 2 Shaft Main Drift - - 7th Level.
Location of Hole: S807 E308 Section 20
Dip 0°
Direction of Hole: S 45° W
Depth of Hole: 192'
Material: 0' - 120' Arkose
120' - 140' 1st Class Soft Ore
140' - 150' 2nd " " "
150' - 160' 1st " " "
160' - 170' Jasper
170' - 185' 1st Class " "
185' - 192' Jasper

In order to obtain additional information concerning the No. 3 Shaft ore body, No.4 diamond drill hole was drilled from the 6th Level hangingwall drift. A drift had been advanced into the probable ore body but no ore was found. Instead of drifting, the No.4 hole was drilled to prove the location of the estimated outline. No ore was found in the diamond drill hole so the drift was not advanced any farther to the west.

No.4 diamond drill hole in the hangingwall drift of No. 3 Shaft ore body - - 6th Level.
Location of Hole: S1805 E865 Section 20.
Dip 0°
Direction of Hole: S 20° W
Depth of Hole: 124'
Material: 0' - 74' Soft Ore Jasper
74' - 75' Ore
75' -124' Arkose

There are no plans for future exploratory work done by drilling due to the character of the ore. The soft plastic ore does not form a core and the only means of sampling is to analyize the sludge which can easily be contaminated by material from the sides of the hole. Much more reliable results can be obtained at the Princeton Mine by driving small or dog drifts as a means of exploratory work, rather than diamond drilling.

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10. TAXES

	1943		1942	
	Valuation	Taxes	Valuation	Taxes
NE¼ of NE¼ of Sec. 19, 45-25, C & NW Lease #29	10,000	206.78	10,000	207.71
158.27 acres in Sec. 18, 45-25	15,000	310.16	15,000	311.56
160 acres NW¼ of Sec. 20, 45-25	235,000	4,859.24	205,000	4,257.95
NW¼ of NE¼ of Sec. 19, 45-25, Loc. 40 acres	420	8.68	420	8.72
S½ of NE¼ of Sec. 19, 45-25, Loc. 80 acres	840	17.36	840	17.44
Personal Property	150,000	3,101.64	130,000	2,700.17
Total	411,260	8,503.86	361,260	7,503.55
Fees		85.05		75.04
TOTAL TAXES		8,588.91		7,578.59

12. NEW CONSTRUCTION AND PROPOSED NEW CONSTRUCTION

There was no new construction during 1943, but new stocking trestles are contemplated for the coming year. The production of the Princeton Mine exceeded the shipments approximately 60,000 tons and if this situation continues, additional stocking capacity will be needed to handle the ore hoisted to surface. A new permanent trestle may have to be built to the east of No. 2 Shaft across the Lake Superior & Ishpeming Railroad tracks and additional stocking ground graded.

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

In 1942 Annual Report some items of E & A NO. CC-91 were not expended. The following is the amount spent during the year 1943:

#7 Stocking Trestles and Grounds	
Trestle Timber	$ 1,375.00
Grading & Track Changes L.S.& I.	3,300.00
#10 Motor-Generator Set from Cliffs-Shaft	625.00
#11 Heating Plant #2 Dry Building	430.00
#17 Ten Rocker Dump Cars - Lake Shore Engineering Works	7,000.00
#23 Underground Tracks	1,700.00
Arc Welder for Mechanical Shop	425.00
Tractor & Bulldozer	2,535.00

15. POWER

Electric Power was furnished by the Cliffs-Power & Light Company at varying rates during the year.

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15. POWER (Cont.)

The detail of Power used in 1943 and 1942 follows:

Kilowatt Hours Used

	1943	1942
Hoist No. 2 Shaft	187,760	86,420
Hoist No. 3 Shaft	46,130	25,080
Compressors	1,272,400	378,779
Haulage Set #1	218,300	72,200
Haulage Set #2	208,340	77,400
Pump No. 2 Shaft	195,200	96,644
Shops - Power	1,830	2,430
Shops - Light	6,408	2,797
Lights & Signal System	28,711	18,127
Top Tram	90,800	17,700
Total	2,255,879	777,577
In Cash	$34,442.64	$12,040.28
Cost per KWH	.0152	.0154

In 1942 the mine operated six months.
In 1943 the mine operated twelve months.

18. NATIONALITY REPORT

As to Parentage	1943	%	1942	%
Finnish	75	41.7	77	37.5
Italian	36	19.8	34	18
American	23	12.6	14	7
French	16	8.8	24	12
Swedish	13	7.1	24	12
English	6	3.3	9	5
Norwegian	6	3.3	6	3
German	2	1.1	4	2
Belgian	2	1.1	2	1
Irish	1	.6	2	1
Austrian	1	.6	2	1
Scotch			1	.5
Total	182	100.0	194	100.0

	Total		American Born		Foreign Born	
As to Birth	1943	1942	1943	1942	1943	1942
Finnish	76	72	55	49	21	23
Italian	36	34	23	20	13	14
American	23	14	23	14		
French	16	24	15	23	1	1
Swedish	13	24	10	19	3	5
English	6	9	5	8	1	1
Norwegian	6	6	3	3	3	3
German	2	4	2	4		
Belgian	2	2	2	2		
Irish	1	2	1	2		
Austrian	1	2		1	1	1
Scotch		1		1		
Total	182	194	139	146	43	48
Percentages			76.3	75	23.7	25

SPIES-VIRGIL MINE
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1. GENERAL

The product in 1943 was 124,107 tons as compared with 171,514 tons in 1942. For the first time during the life of the property production of high-Sulphur grade ore constituted the major portion of the total product. During the remainder of the active life of the Virgil property a continued decline in production will result due to depletion of reserves, which consist mostly of High-Sulphur ore. Operation of the mine was continued on a schedule of two shifts per day with six day shifts and five night shifts per week.

Early in the year an important ore discovery was made by the surface exploration drilling on Section 24 to the East of the Spies Shaft. A run of approximately 478' of ore was first encountered in Hole No. 63 in March and subsequent drilling in the area has disclosed a favorable extension of the orebody along the strike. The surface drilling program is being continued in 1944 to more completely outline the orebody for the underground development program and also to provide a basis for an estimate of the reserves in the new deposit.

Upon discovery of the new orebody in Section 24 and also in the adjoining Section 19 plans were formulated to make changes from the single skip to a two skip hoisting system to increase the hoisting capacity of the shaft preliminary to development of the new orebody for production. Work on this project was delayed until July, pending additional information from the exploration drifting and completion of some of the detail work. Underground operations were suspended on July 19 and work was started on the remodeling program under E. & A.CC116A. Changes and installation of runners in the shaft compartments to provide a second or North skip road and also a ladder compartment in a portion of the cage road constituted the major part of the program and work was concentrated on this project on a 3-8 hr. shift schedule. Changes also were made in the steel headframe to provide a two skip dump arrangement and the former Gardner-Mackinaw mine cage hoist was installed in the engine house, and will continue to serve as the cage hoist and the original hoist will be used for hoisting ore. Work was concentrated on this program for approximately three months and on October 14th operation of the mine was resumed using only the original hoist with the South skip and cage operating in balance.

To complete the change over to the two skip hoisting system it was necessary to suspend operation of the mine again for a period of about three weeks in December after the second hoist was made ready for operation. On December 10th work was started installing the counter weight pipe in the new ladder road compartment of the shaft. Upon completion of this work a permanent ladder road was constructed and a casing placed between the new skip and cage roads. This work was completed late in December and operation of the mine rusumed on January 3, 1944.

Development of the new orebody for mining will be first undertaken from the 4th Level and work in rehabilitation of a part of the level near the shaft was started late in the year. New loading pockets and a trench storage pocket will be constructed preliminary to the start of drifting operations. Approximately 3700' of rock drifting will be required on this level to reach the new orebody encountered in Diamond Drill Hole No. 63. This development including the purchases of new equipment and changes in the surface plant and shaft is being done under E. & A. CC116A.

Mining operations have been confined to recovering remaining pillars adjacent to old stope above the 8th Level. During the early part of the year Virgil grade was mined from pillars in the central and South part of the orebody but after completing the mining here production was entirely dependent upon a High-Sulphur area along the North footwall side and in an area adjacent to the Sherwood boundary. Due to the extremely spotty nature of the Sulphur content in the remaining reserves is is very likely that only a small amount of Virgil grade will be produced in 1944. Similarily as in the previous year a large amount of ore was obtained from old caved

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1. GENERAL, CONTINUED

stopes and mixed with the higher grade that was mined in recovering pillars. The development work was confined entirely to sub-level stope development to keep abreast of the mining operations.

The cost per ton increased considerably as compared with the previous year due to the general wage increase of five and one-half cents per hour that went into effect April 1st and the retroactive feature of the raise to July 13th, 1942 necessitated payment of back pay commencing from the latter date. Also there were more wages paid for overtime work due to the working schedule of six day shifts and five night shifts per week maintained throughout the year.

Ventilation conditions have beenquite satisfactory throughout the year. On several occasions foul air and SO_2 gas has backed up into one of the active working areas and caused slight interruptions to mining here. However by means of an auxiliary fan it has been possible to clear up the air in a relatively short time in each instance so mining operations could continue. Operation of the main fan on surface at the Virgil Shaft has been continued upcasting the air through the latter shaft. By following this plan throughout the year the SO_2 gas and foul air from the fire area is being exhausted from above the working areas and with few exceptions this has eliminated the presence of foul air from the mining areas and made it possible to maintain satisfactory ventilation.

2. PRODUCTION, SHIPMENTS & INVENTORIES

a. Production by Grades

	1943	1942
Virgil	25,453	112,690
Virgil High-Sulphur	98,654	58,824
Total	124,107	171,514

Production decreased by 47,407 tons as compared to the previous year due to operation of the mine being suspended during the year for a period of approximately three and one-half months during the reconstruction program. Production of Virgil grade decreased considerably due to depletion of this grade of ore in those areas where mining was underway. High-Sulphur ore areas were developed for mining and this grade of ore will most likely constitute the major proportion of the product in 1944 also.

b. Shipments

Grade	Pocket	Stockpile	Total	Total Last Year
Virgil	281	36,904	37,185	158,590
Virgil High-Sulphur	36,116	41,723	77,839	34,880
Total	36,397	78,627	115,024	193,470
Total Last Year	61,472	131,998	193,470	
Decrease	25,075	53,371	78,446	

Total shipments from the mine decreased 78,446 tons as compared with 1942. Shipments of Virgil grade from both stockpile and pocket were decreased considerably, whereas shipments of High-Sulphur ore was more than doubled as compared with the previous year.

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2. PRODUCTION, SHIPMENTS & INVENTORIES, CONTINUED

c. Stockpile Inventories

Grade	Tons
Virgil	6,017
Virgil High-Sulphur	50,968
Total	56,985

The above stockpile inventory at the end of the year compares with 47,902 tons at the end of 1942. The bulk of the ore remaining in stock was High-Sulphur grade.

d. Division of Product by Levels

With the exception of a small amount of Virgil grade ore mined in the central part of the orebody at the Sixth Level elevation and slightly above, the balance of the entire product was mined above the eight level. Similarly as in 1942, all of the ore produced was trammed on the eight level. Due to continuation of burning in the fire area on the sixth level with the resultant SO_2 gas and heat generated there is very little possibility of any future attempt to mine the Virgil grade ore above this level that has been made unavailable on this account.

e. Production by Months

Month	Shifts	Days	Virgil Ore	Hi-Sul. Ore	Total Ore	Tons per Day	Tons per Man Per Day	Rock
Jan.	2-8	22½	8,432	4,627	13,059	580	6.77	
Feb.	2-8	22	8,013	7,282	15,295	695	8.31	
Mar.	2-8	24½	5,263	10,350	15,613	637	7.91	
April	2-8	24	552	14,720	15,272	636	8.04	
May	2-8	22½	1,348	12,979	14,327	636	7.71	
June	2-8	24	-	16,221	16,221	676	8.30	
July	2-8	12½	-	8,766	8,766	701	7.00	
Aug.	-	-	-	-	-	-	-	
Sept.	-	-	-	-	-	-	-	
Oct.	2-8	12½	-	6,828	6,828	546	5.38	134
Nov.	2-8	23	625	14,452	15,077	655	9.83	128
Dec.	2-8	6½	1,220	2,429	3,649	561	5.75	108
Total		194	25,453	98,654	124,107	640	6.91	370

The small amount of rock that was hoisted during the year was obtained from the new Fourth Level development.

f. Ore Statement

	Virgil	Virgil High-Sulphur	Total	Total Last Year
On Hand Jan. 31,	17,749	30,153	47,902	42,090
Output for Year	25,453	98,654	124,107	171,514
Overruns				27,768
Total	43,202	128,807	172,009	241,372
Shipments	37,185	77,839	115,024	193,470
Balance	6,017	50,968	56,985	47,902

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2. PRODUCTION, SHIPMENTS & INVENTORIES, CONTINUED

f-1. Operating Schedule

1939-1-8 Hr. Shift (2 crews alternating) 5½ days per week Jan. 1 to Jan. 9
2-8 Hr. Shifts 4 days per week Jan. 9 to June 12
1-8 Hr. Shift (2 crews alternating) 5½ days per week June 12 to Nov. 1
2-8 Hr. Shifts 4 days per week No. 1 to Dec. 31

1940-2-8 Hr. Shifts 4 days per week Jan. 1 to Nov. 15 inclusive
2-8 Hr. Shifts 5 days per week Nov. 16 to Dec. 31 inclusive

1941 2-8 Hr. Shifts 5 days per week Jan. 1 to Dec. 31 inclusive

1942 2-8 Hr. Shifts 5 days per week Jan. 1 to Oct. 16 inclusive
2-8 Hr. Shifts 5½ days per week Oct. 17 to Dec. 31 inclusive

1943 2-8 Hr. Shifts 5½ days per week Jan. 1 to Dec. 31 inclusive

g. Delays

During the night shift operation on January 5th a four hour delay occured to hoisting due to a top tram car going off the track. The loss in product which resulted on this account was largely made up on the following operating shifts.

On Saturday March 13th the day shift operation was suspended to enable repair work in the Fourth Level exhaust airway to be completed. A breakdown occured in the airway and it was necessary to re-open the drift and install timber to maintain the ventilation system for the mine.

On April 7th a two hour delay to hoisting occured due to lack of electric power, caused by a short circuit in the main pump and crusher cable. A loss in product on this account was largely made up on the following shift.

During the night shift operation on June 29th a five hour delay to hoisting occured due to skip hoist motor going out of order. The loss in product on account of this delay was estimated as 200 tons.

3. ANALYSIS

a. Average Mine Analysis on Output.

The average analysis on the output for 1943 indicates a material decrease in the iron content in the case of the Virgil grade and a very slight decrease in the iron content in the High-Sulphur grade as compared to the previous year. However, in both grades the iron content was slightly better than the recommended gaurantee of 56.50 dried iron.

The Silica and Sulphur contents in the Virgil grade increased as compared to the previous year. In the High-Sulphur grade there was an increase in the Silica content, while the Sulphur content of .168 was considerably lower than the gaurantee of .300.

Grade	Tons	Iron	Phos.	Sil.	Sulphur
Virgil	25,453	56.87	.354	7.32	.090
High-Sulphur	98,654	56.59	.356	8.15	.168

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3. ANALYSIS, CONTINUED

b. Analysis of Ore in Stock Dec. 31, 1943

Grade	Iron	Phos	Sil.	Mang	Alum	Lime	Mag.	Sul.	Loss	Moist.
Virgil Dried	56.76	.353	7.55	.19	1.84	.58	.26	.090	6.86	
Virgil Nat'l	52.17	.324	6.94	.17	1.69	.53	.24	.083	6.30	8.08
Hi-Sulp Dried	56.58	.356	8.26	.19	1.84	.60	.21	.165	7.15	
Hi-Sulp Nat'l	52.13	.328	7.61	.18	1.70	.55	.19	.152	6.59	7.86

c. Composite Analysis of Shipments

The average analysis of the 1943 shipments indicates a lower iron content in the case of both grades, also a higher Silica and lower Sulphur content as compared to the previous year.

Grade	Iron	Phos	Sil.	Mang	Alum	Lime	Mag.	Sul.	Loss
Virgil	57.30	.379	6.75	.21	1.60	.75	.18	.080	7.23
Hi-Sul	56.35	.363	8.68	.18	1.50	.85	.20	.191	6.55

There were no straight cargo shipments of either grade in 1943.

d. High-Sulphur Ore

As mentioned previously production and shipments of High-Sulphur ore were increased considerably over production and shipments of this grade in the previous year. During the year the major portion of the development work and mining was done in High-Sulphur ore and in the latter half of the year production was confined entirely to this grade. The production of 98,654 tons of High-Sulphur ore in 1943 represents 79.4 percent of the total product and is an increase of slightly more than 49,000 tons more of this grade produced than in 1942. A large percentage of the reserves in the pillars adjacent to old stopes is ore of High-Sulphur grade and consequently during the remaining life of the Virgil property mining operations will be confined to a large extent in ore of this grade.

4. ESTIMATE OF ORE RESERVES

a. Developed Ore

Estimate made Nov. 30, 1943 using a factor of 12 cu. ft. per ton.

Available Virgil High-Sulphur Grade

	S.West Orebody	Middle Orebody	Total Tons
Between 6th and 8th Levels	44,600	38,658	83,258
Gross Estimate			83,258
Less 10% Loss in Mining			8,326
Sub Total			74,932
Less 10% for Rock			7,493
Net Total November 30, 1943			67,439
Less December Production			3,649
Total Developed Ore Dec. 31, 1943			63,790

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4. ESTIMATE OF ORE RESERVES, CONTINUED

a. Developed Ore, Continued

In contrast to previous estimates the estimate of reserves as of Dec. 31, 1943 is entirely of High-Sulphur grade instead of Virgil grade. The available Virgil grade ore has been practically exhausted, however it is possible that in the process of recovering some of the remaining supporting pillars along the South side of the orebody some Virgil grade may be obtained. An estimate of the reserves of this grade that may be recovered is practically impossible due to the spotty nature of the sulphur content in the remaining reserves. The extent to which recovery of the remaining pillars can be made will be determined largely by the amount of caving and dilution that will result from the old adjacent stopes. In addition to the estimate of 63,790 tons of High-Sulphur ore remaining, it is very likely that a substantial amount of this grade will continue to be recovered from caved stopes, andmixed with the higher grade ore that is mined.

Information was still insufficient at the end of the year to provide a basis for an estimate of the reserves in the new Spies orebody discovered in Section 24 and Section 19 by the surface exploration diamond Drilling. A preliminary estimate of 348,100 tons was made at the close of the year based on the ore encountered in three intersecting inclined drill holes. This estimate is premature as no extension of the orebody along the strike was known at that time. Subsequent drilling early in 1944 has disclosed the approximate strike of the orebody and also very favorable extensions of the orebody in width as well as along the strike. Available geological information indicates that an orebody of important size has been discovered and drilling is being continued to outline the new orebody more completely.

b. Estimated Ore Reserve Analysis

High-Sulphur

Grade	Iron	Phos	Sil.	Mang	Alum	Lime	Mag.	Sul.	Loss	Moist
Dried	56.50	.380	8.50	.17	2.14	.88	.22	.300	7.46	
Natural	51.13	.344	7.69	.15	1.94	.80	.20	.271	6.75	9.50

The estimated analysis of reserves is based on mining entirely High-Sulphur grade and this permits mixing some low grade caved material from old stopes with the higher grade ore that is mined. When mining some of the remaining pillars in the South part of the deposit it may also be possible to produce some Virgil grade. This, however, will depend upon the Sulphur content in the ore and whether it can be maintained within the established limits for this grade.

5. LABOR AND WAGES

a. General

In 1942 the majority of the employees chose by election the C. I. O. as their labor organization and a contract agreement between the Union and Company was put into effect April 17, 1943. A decided change in relations has resulted since organization of the employees, however, it is quite apparent that harmonious relations with the employees as a whole is hindered and dissension incited by a relatively small group. Hope for improvement in relations for the future depends largely upon the calibre of men selected by the employees as officers of the Union and its representation.

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5. LABOR AND WAGES, CONTINUED

a. General, Continued

The number of employees on the payroll at the end of the year was 82, the same as at the end of the previous year. There were variations from the above number during the year particularly during the reconstruction program in the summer months when ten men were laid off and four were temporarily transferred to the Marquette Range and later all those who had not obtained work elsewhere were rehired when operation of the mine was resumed.

Loss of employees into the armed services was less than in the previous year as occupational deferments have been granted in nearly all cases when requested. On the basis of the present age limits set by the Selective Service on non-deferable employees, no appreciable loss of employees by drafting is anticipated. However, if the age limits are raised, more employees will naturally be affected.

During the year there were eight men who quit to seek work elsewhere. Ten men were laid off temporarily during the reconstruction program, and one enlisted and one was drafted into the armed services. During the year a total of 21 men were hired as replacements when needed.

Late in the year due to closing down operations in two properties owned by other Companys in the district some experineced men were available for employment. In a very short time these men were reemployed by various operators and the available supply of labor at the close of the year was again practically exhausted.

b. Statement of Wages and Product

	1943	1942
PRODUCT	124,107	171,514
Number of Shifts and Hours	2-8	2-8
Avg. No. of Men Working		
Surface	22	25
Underground	39	54
Total	61	79
Avg. Wages per Day		
Surface	7.11	6.54
Underground	8.35	7.68
Total	7.91	7.54
Avg. Wages Per Month of 22 Days		
Surface	156.56	146.08
Underground	183.74	168.96
Total	173.96	161.48
Product Per Man Per Day		
Surface	19.21	24.90
Underground	10.80	11.69
Total	6.91	7.95

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5. LABOR AND WAGES, CONTINUED

b. Statement of Wages and Product, Continued

Labor Cost Per Ton	1943	1942
Surface	.3703	.2665
Underground	.7735	.6571
Total	1.1438	.9236
Avg. Product Breaking & Tramming	37.64	38.59
Avg. Wages Contract Miners	8.904	8.458
Total Number of Days		
Surface	6459	6887¼
Underground	11494¼	14676¾
Total	17953½	21564
Amount for Labor		
Surface	45963.29	45704.04
Underground	95999.10	112710.47
Total	141962.39	158414.51

Proportion Surface to Underground Men

1943	1 to 1.78
1942	1 to 2.16
1941	1 to 2.12
1940	1 to 1.88
1939	1 to 1.88
1938	1 to 1.81
1937	1 to 1.92
1936	1 to .50
1935	1 to .88
1934	1 to .88
1933	1 to 2.15

6. SURFACE

a. Buildings, Repairs

In addition to the large reconstruction program carried out to convert from the single skip to a two skip hoisting system necessitating major changes in head-frame and engine house some surface building construction and repairs were made.

A new and larger doorway was constructed in the center of the North end of the engine house and the old doorway was bricked in and an additional window installed.

The new arrangement will facilitate the moving of equipment into and out of the engine house.

An addition to the garage for the mine truck was constructed to house the new International T-D 14 tractor bulldozer. An extension of sixteen feet by twenty-two was constructed to the South end of the original garage

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6. SURFACE, CONTINUED

a. Buildings, Repairs, Continued

building and a doorway built into the South end. The extension is a frame structure covered with corrugated metal sheeting and lined on the inside with celotex similarly as the truck garage.

A temporary storage shed was constructed at the start of the reconstruction program in July to the South of the shop building. The structure is a frame building covered with hemlock sheeting and is used for storage of various supplies that over-crowded the warehouse space.

An addition to house the air heating units was constructed on the cage road side of the shaft. By means of the Marion shovel, steam is generated during the winter months and piped to the radiators and a small Sirocco fan used in conjuction with the heaters to force heated air into the down cast shaft. This practice reduces the formation of ice in the shaft during the freezing weather.

Major changes were made in the headframe and this work is described later in the report under New Construction.

A fence type enclosure about fifteen feet in height and thirty-five feet in length was constructed of one inch hemlock boards supported by posts of two inch pipe near the exhaust opening of the fan at the Virgil shaft. The purpose of this is to deflect and reduce the noise made by continuous operation of the fan which is located near some dwellings.

b. Stockpiles

The product during the year was stocked in the two areas tothe North of the shaft, the Virgil grade to the West of the pocket tracks and the High-Sulphur ore to the East. During the latter months of the year High-Sulphur ore was also stocked in a pile to the Northwest of the shaft in an area between the Virgil pile and the railroad fill to the coal trestle. A large increase in shipments of High-Sulphur ore were made as compared with the previous year but the stockpile of this grade to the North of the shaft was not cleaned up. It is hoped however, that shipments in 1944 will enable loading out this entire pile so stocking space will be made available for the development ore obtained from the new Spies orebody.

A new rock trestle was erected tothe South of the shaft late in the year to provide dumping capacity for the rock hoisted from the Fourth Level development program. The new trestle extends for a distance of approximately 400 feet to the South adjacent to the old rock piles.

The new International T-D 14 Tractor Bulldozer has been employed to a large extent to widen the High-Sulphur pile Northwest of the shaft. By means of this unit this pile is being widened to the full extent of the stocking space here and has eliminated placing additional ore on the High-Sulphur pile to the North of the shaft. As mentioned previously it is planned to clean up the latter High-Sulphur pile first so stocking space will be made available for development ore from the new Spies orebody.

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7. UNDERGROUND

a. Shaft Sinking

There was no shaft sinking in 1943.

b. Development

Preliminary to starting drifting operations on the Fourth Level, new loading pockets and a trench storage pocket were being constructed during December. Construction of the loading pockets was nearing completion and the work in excavating the trench was under way. A trench storage system will be employed in conjunction with Granby type self-dumping tram cars. The capacity of the trench will be approximately 300 tons and loading of the measuring pocket will be done by means of a scraper hoist unit.

All of the development work in the Virgil property during the year was confined to sub-levels between the 6th and 8th levels. Development was also confined entirely in ore, and was carried in advance of stoping operations. During the early part of the year a small proportion of the development work was in Virgil grade to develop several small areas for mining in the central and South part of the ore body. During the remainder of the year the development was entirely in High-Sulphur areas which were developed for mining along the North footwall and also in another area adjacent to the Sherwood boundary. A number of transfer drifts were driven in the High-Sulphue ore areas and mill raises and sub-level connections advanced above the transfers to comprise the development for stoping. In recovering the remaining reserves which are confined to supporting pillars adjacent to old stopes the amount of development work is larger than normal to develop comparatively small areas for mining. However, it has been possible during the year to confine the development entirely in ore. During the early months of the year an average of two contracts were on development work, but upon completion of mining in several areas the number of contracts were reduced and development work during the balance of the year was done mostly by regular mining contracts in conjunction with their stope operations. The decrease in available mining areas is reflected in the total development footage in 1943 which was less than one-half of the footage during the previous year.

c. Stoping

Mining operations were confined to various sub-levels above the 8th level. Early in the year an average of five contracts were mining and developing and by the end of the year the total number of the contracts was reduced to three. The production of High-Sulphur grade was increased considerably over previous years and the bulk of this grade was obtained from stoping areas along the North footwall side of the deposit. Several High-Sulphur ore stopes were developed for mining in the latter area directly under and adjacent to old stopes and work was still in progress here at the end of the year. In the South and Central parts of the deposit two relatively small stope operations in Virgil grade ore were completed early in the year and the mining here also consisted of recovering supporting pillars between old stopes. In the central part of the deposit adjacent to the Sherwood boundary an area of High-Sulphur ore adjacent to old stopes was developed for mining and operations were still underway here at the end of the year.

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7. UNDERGROUND, CONTINUED

c. Stoping, Continued

Similarly as in previous years a substantial amount of ore was recovered from old caved stopes near active workings. The ore obtained from this source was mostly lean and it is mixed with the higher grade that is mined. The amount of ore that can be recovered during the remaining life of the Virgil property will be determined largely by the extent to which caving and dilution occurs from old stopes as the supporting pillars are being removed.

There were no mining operations carried on at the 6th level elevation and above. Mining was completed above this elevation in 1941 in an area that was made unavailable for mining due to the old fire that contines to burn and generates SO_2 gas.

The following is a detail description of stoping operations.

Subs above the 8th Level

/ 50' Sub Level

There was no actual mining at this elevation but the operations in No. 2 stope in an East-West pillar in the central part of the orebody produced a cave to this elevation. A small area of Virgil grade ore near the East limits of the pillar comprised the extent of the caving at this elevation.

/ 25' Sub Level

A small amount of mining was done near the West limits in the East-West pillar by the operation of No. 2 stope in the central part of the ore deposit. Mining was completed here early in the year and the contract transferred to work in developing an adjacent area for stoping along the Sherwood boundary. In addition to the large amount of ore recovered in mining this pillar substantial amounts of Virgil grade ore was recovered after caving from the back occurred during the last stages of the stope operations.

No. 2 North-South stope was developed during the year adjacent to the Sherwood boundary above the transfer drift on the -50' Sub-Level. An area approximately 80' by 70' was mined at this elevation and stoping was underway at this elevation at the end of the year, retreating the stope to the south. In contrast to the adjacent No. 2 stope to the East, as mentioned above, the product from the latter stope has been mostly High-Sulphur grade. A large amount of the development for this stope was in Virgil grade ore, but in the stoping operations, ore with considerably higher sulphur content was encountered and only a small amount of Virgil grade was produced.

Along the South side of the orebody, narrow supporting pillars between four old stopes were mined by the operations in No. 6 stope. A small amount of mining was done at this elevation above the transfer on the -75' sub-level, but the major portion of the pillars were recovered after caving of adjacent stopes began. Mining was completed here early in the year and the contracttransferred to develop and mine a High-Sulphur area near the North footwall.

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7. UNDERGROUND, CONTINUED

c. Stoping, Continued

00' Sub Level

An area approximately 100' by 50' was mined adjacent to the Sherwood boundary by the operations in No. 2 stope. As mentioned previously, practically the entire product from this area has been High-Sulphur grade. Mining was underway here at the end of the year retreating the stope to the South.

- 25' Sub Level

Operations in No. 2 stope adjacent to the Sherwood boundary were also carried on at this elevation. An area approximately 90' by 45' was mined at this elevation and mining was underway late in December retreating the stope to the South. The black slate footwall defines the limits of the stope at this elevation along the East side and to the West, stoping extends to the Sherwood boundary. During December, a development contract was temporarily organized and advanced of small ore drift from an old transfer drift North to the stope opening for traveling purposes.

-50' Sub Level

A relatively small amount of mining was done by No. 6 stope operation in the South part of the ore deposit directly above the transfer drifts on the -75' sub-level. Work was temporarily completed here early in the year and the contract transferred to a North footwall area leaving several small supporting pillars along the South footwall to be recovered later.

As part of the development for No. 2 stope, adjacent to the Sherwood boundary, a transfer drift 135 ft. in length was advanced to the North of No. 840 raise. Part of the transfer drift followed along an old ventilation connection in ore which was stripped to full size and timbered, the remainder of the drift was advanced in mixed High-Sulphur ore and slate. A total of seven mill riases were put up along the east and west sides of the transfer to the ∠ 25' sub-level. Intermediate sub-level connections were then advanced between the mills to comprise the development preliminary to starting stoping operations.

-75' sub Level

Two mill raises were put up from a transfer drift along the South side of the ore deposit to the -50' sub-level as part of the development for No. 6 stope operation early in the year. As mentioned previously several small supporting pillars between old stopes in this area remained to be recovered and mining of these will be undertaken in 1944.

-100' Sub Level

A small amount of mining in the Northwest area was done at this elevation in No. 6 stope above the transfer drift on the -150' sub level. A stope was developed here in High-Sulphur ore early in the year adjacent to old stopes near the North footwall.

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7. UNDERGROUND, CONTINUED

c. Stoping, Continued

-115' Sub Level

No. 6 contract carried on stope operations in a High-Sulphur area adjacent to the North footwall during the major part of the year. Along the North side of this area mining was done in two separate stopes above transfer drifts on the -165' sub-level. Both of these areas were relatively small and mining in the most Easterly stope was underway in December retreating the stope to the East. Both of the latter areas were developed to recover High-Sulphur ore that remains under old stopes and overlies the footwall.

Along the South side of the above High-Sulphur area operations were also carried on by No. 6 contract above a transfer drift on the -150' sub-level. A narrow supporting pillar was left remaining in the center of the latter stope and also between the adjacent stopes to the North to prevent caving to occur through to old stopes above.

-135' Sub Level

Operations in No. 6 stopes as mentioned above were also carried on at this elevation. Narrow supporting pillars were left remaining between the stopes similarly as on the sub-level above. Late in the year, mining in the most Easterly area was underway, retreating the stope East toward the traveling connection.

-150' Sub Level

Two separate No. 6 stope operations in High-Sulphur ore were completed directly adjacent to the North footwall early in the year. By means of a scram stope operation, a small supporting pillar between the completed stopes was later recovered by No. 10 contract. After caving started in adjacent stopes a large amount of lean ore was recovered and mixed with the higher grade ore that was mined.

As part of the development for the most easterly No. 6 stope in the High-Sulphur area, a transfer drift 135' in length was advanced to the Northwest of No. 806 raise. A total of thirteen mill raises were put up along the Northeast and Southwest sides of the transfer to the -115' and -135' sub-levels, and intermediate connections driven on the latter subs between the mills. Directly North of No. 806 raise, a small drift was advanced for a short distance in High-Sulphur ore and a raise put up for traveling purposes to connect with the stope development above.

A ventilation connection Northwest of No. 809 raise was stripped to larger size to serve as a transfer drift for No. 6 stope operations along the South side of the High-Sulphur ore area. A total of nine mill raises were put up to the -115' and -135' sub-levels and intermediate connections advanced to connect the mills. In December work was underway extending the transfer further to the Northwest to enable mills to be put up into a small pillar that will be recovered. To the Southeast of No. 809 raise, a small drift connection was advanced to No. 807 raise and continued from the latter raise to No. 806 raise for traveling and ventilation purposes. The development drifting and raising on this elevation and above for the stopes was entirely in High-Sulphur ore.

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7. UNDERGROUND, CONTINUED

c. Stoping, Continued

-165' Sub Level

A transfer drift approximately 90' in length was advanced to the Northeast of No. 816 raise. Six mill raises were put up from this transfer tothe -150' sub-level to comprise the development for No. 10 scram stope operation when recovering a supporting pillar between two old stopes. All of this development was in High-Sulphur ore and numerous seams of black slate were also encountered in the ore.

One mill raise was put up from the old transfer drift tothe Northwest of No. 816 raise to the -150' sub-level. This raise was put up early in the year as part of the development for No. 6 stope when mining was underway in the most Westerly area.

The old transfer drift to the East of No. 816 raise was stripped to large size early in the year for a short distance near the East end. Three additional mill raises were put up as part of the development for the most Westerly part of No. 6 stope.

8th Level

There was no development work or mining done on the 8th Level during the year

d. Timbering

Consumption of timber and also the price of timber was increased as compared with last year and accounts for the increase in the cost for this material over last year. Most of the transfer drifts for stope development required timbering and on the 8th level extensive repairs were made in the main level drift.

The following is comparative timber statement for the years 1943 and 1942.

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7. UNDERGROUND, CONTINUED

d. Timbering, Continued

	Lineal Feet	Avg. Price Per Foot	Amount 1943	Amount 1942
6" to 8" Cribbing	755*			
	1394	.0714	99.49	
8" to 10" Stull Timber	855*			
	1004	.1017	102.16	49.14
10" to 12" Stull Timber	408*			
	168	.0943	15.84	
Total Timber	4584	.0474	217.49	49.14
5' Cedar Lagging	9933	.0170	168.74	22.40
7' Cedar Lagging	5413	.0086	46.63	200.30
Total Lagging	15346	.0140	215.37	222.70
Poles	15600	.0160	249.54	312.98
Total Lagging & Poles			682.40	535.68
Product			124,107	171,514
Feet of Timber per Ton of Ore			.0369	.0212
Feet of Lagging per Foot of Timber			3.3473	6.6121
Cost per Ton for Timber			.00175	.00028
Cost per Ton for Lagging			.00174	.00130
Cost per Ton for Poles			.00201	.00183
Cost per Ton for Timber, Lagging & Poles			.00550	.00341
Equivalent of Stull Timber to Board Measure			6,380	5,944
Feet of Board Measure per Ton of Ore			.0514	.0346
Cost of Timber, Lagging and Poles			682.40	584.82

* The above Timber used this year was taken from Company property.

e. Drifting and Raising

The following table shows the 1943 development footage classified as to size and material:

	Drifting			Raising			Combined
	Ore	Rock	Total	Ore	Rock	Total	Total
Small Size	1319		1319	768		768	2087
Large Size	556		556				556
Total	1875		1875	768		768	2643

The total development footage was less than one half of the total footage in 1942. This is due to a decrease in areas that can be developed for mining as depletion of Virgil reserves progresses. A significant difference in the development as compared with the previous year is the total absence of rock development in 1943. A small amount of rock was hoisted from the 4th Level and this was obtained from the new loading pocket excavation.

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7. UNDERGROUND, CONTINUED

f. Explosives, Drilling and Blasting

There was a slight decrease in the cost per ton for all explosives used in 1943 as compared with the previous year. Due to a decline in operations and in production as ore areas are being depleted less explosives were used and the total cost decreased in approximate proportion.

The explosives costs for development in rock was confined to work in excavating the new loading pocket and a part of the storage trench on the 4th Level. This work under E. & A. CC116A is preliminary to the drifting program that will be started early in 1944 East towards the new orebody.

Statement of Explosives Used

Ore Development & Stoping	Quantity	Average Price		Amount 1943	Amount 1942
Total No. 1 Gelamite 60%	53,069	.1150	Lb	6102.93	8453.88
Fuse (Feet)	123,242	5.1528	M Ft.	635.05	980.75
No. 6 Blasting Caps	18,017	12.2000	M	219.81	339.36
Hot Wire Lighters 7"	5,350	.6750	C	36.11	47.92
Master Lighters	1,050	2.0676	C	21.71	34.12
Powder Bags No. 1	17	1.4000	Ea	23.80	38.06
Tamping Bags	13,750	2.150	C	29.56	45.33
Total Fuse, Caps, etc.				966.04	1,485.54
Total All Explosives				7,068.97	9,939.42
Production, Tons				124,107	171,514
Lbs. Powder per Ton of Ore				.4276	.4286
Cost per Ton For Powder				.0492	.0493
Cost per Ton for all Explosives				.0570	.0580
Development in Rock				None	None
E. & A. CC116A (4th Level Development)					
Total No. 1 Gelamite 60%	1,047 Lbs	.1150		120.41	
Fuse (Feet)	4,610 Ft.	5.1475	M	23.73	
No. 6 Blasting Caps	686	12.186	M	8.36	
Hot Wire Lighters 7"	150	.680	C	1.02	
Tamping Bags	250	2.150	Ea	.54	
Total Explosives				154.06	
Total Explosives used in Mine				7,223.03	9,939.42
Average Price per Pound for Powder				.1150	.1150
Total Cost per Ton, All Explosives				.0582	.0580

g. Ventilation

The ventilation conditions in the actual working places has been quite satisfactory. The main fan on surface at the Virgil shaft has continued in operation upcasting the air through the Virgil shaft and downcast through the Spies shaft. The volume of air exhausted by the fan has ranged during the year from about 7000 c.f.m. to approximately 9500 c.f.m.

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7. UNDERGROUND, CONTINUED

g. Ventilation, Continued

The fire area on the Sixth Level and above has continued burning with the resultant generation of SO_2 gas and heat. Upcasting the air through the Virgil shaft exhausts the gas and heated air from above the active mining areas so no interference to ventilation from this source has occured in the working places. However, on several occassions foul air with very low oxygen content has backed up into one of the working places and caused slight interruption to work, but it has been possible in each instance to clean up this condition by means of auxiliary fans installed in the working places. In January a second concrete brattice was constructed on the Sixth Level between the fire area and the ventilation raise to the Fourth Level. This brattice seals off the area that started to burn late in 1942 after a cave above an old High-Sulphur stope extended to the Sixth Level elevation. Work in constructing the brattice was done under extremely bad conditions, caused by high concentration of SO_2 gas and excessive heat. The first concrete brattice constructed here in December 1942 to seal off this fire area developed several leaks and necessitated construction of a second one nearby.

Extensive repairs were required during the year in the Fourth Level exhaust airway drift. In March one Saturday operating shift was suspended to enable repair work to be concentrated in a portion of the timbered airway that was crushing badly. A large amount of repair work was also done in this drift on weekends when the mine was idle.

No new rock connections for ventilation purposes were driven during the year. Numerous repairs were made in existing connections that are accessible and this work consisted mainly of installing lining sets and props where additional support was required. The major portion of the ventilation connection on the Sixth Level and above are inaccessible due to caving and SO_2 gas and continued operation of the present ventilation system is dependent upon them. This is an important factor as recovery of the remaining Virgil reserves is dependent upon continued satisfactory operation of the present system of ventilation.

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8. COST OF OPERATING

a. Compartive Mining Costs

	1 9 4 3	1 9 4 2	Increase	Decrease
Product, Tons	124,107	171,514		47,407
Underground Costs	1.135	1.000	.135	
Surface Cost	.326	.211	.115	
General Mine Accounts	.389	.189	.200	
Cost of Production	1.850	1.400	.450	
Depreciation, Plant & Equip.	.253	.579		.326
Taxes	.033	.040		.007
Loading & Shiping	.076	.096		.020
Total Cost at Mine	2.212	2.115	.097	
Budget Est. Cost at Mine	2.001	1.680	.321	
Number of Days Operating	194	257½		63½
Number of Shifts & Hours	2-8 hr.	2-8 hr.		
Average Daily Product	640	666		20

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8. COST OF OPERATING, CONTINUED

b. Detailed Cost Comparison

		1943		1942	
		Amount	Per Ton	Amount	Per Ton
1.	Exploring in Mine	1,286.49	.010	4,657.72	.027
4.	Development in Ore	13,214.87	.107	23,569.88	.137
5.	Stoping	52,676.49	.425	63,558.62	.371
6.	Timbering	8,765.84	.071	8,500.28	.049
7.	Tramming	20,674.98	.167	26,092.40	.152
8.	Ventilation	7,108.78	.058	7,739.74	.045
9.	Pumping	11,966.65	.095	11,490.80	.067
10.	Comp. and Air Pipes	9,072.00	.073	10,914.45	.064
12.	Undg. Superintendence	9,319.35	.075	8,178.25	.048
14.	Maint. Comp. & Power Drills	307.79	.003	777.82	.004
15.	Scrapers & Mech. Loaders	1,165.81	.009	1,310.95	.007
16.	Electric Tram Equipment	3,018.08	.024	3,736.49	.022
17.	Pumping Machinery	2,282.82	.018	1,220.69	.007
	Total Undg. Costs	140,859.95	1.135	171,748.09	1.000
18.	Hoisting	8,366.25	.058	9,476.25	.055
19.	Stocking Ore	6,319.12	.051	6,400.80	.038
20.	Crushing at Mine	3,493.79	.028	4,130.35	.024
21.	Dry House	5,690.13	.046	4,805.57	.028
22.	Gen. Surface Exp.	9,306.21	.075	5,071.69	.030
23.	Maint. Hoist Equipment	1,868.40	.015	1,624.77	.010
24.	Shaft	3,259.01	.026	2,443.45	.014
25.	Top Tram Equipment	963.25	.008	1,040.64	.006
26.	Dock trestles & Pockets	259.73	.002	212.63	.001
27.	Mine Buildings	861.16	.007	891.11	.005
	Total Surface Costs	40,417.05	.326	36,097.26	.211
	Vacation	3,998.20	.032	3,657.42	.021
28.	Insurance	709.15	.006	679.49	.004
29.	Mining Engineering	1,751.16	.014	1,382.75	.008
30.	Mech. & Elec. Engr.	518.91	.004	159.96	.001
31.	Analysis and Grading	3,883.46	.031	4,104.89	.024
32.	Personal Injury	10,080.02	.081	752.56	.004
33.	Safety Department	1,231.23	.010	726.66	.004
34.	Telephone Safety Devices	658.73	.007	776.46	.005
35.	Local & General Welfare	963.58	.008	1,143.97	.007
36.	Special Exp. Pension, etc.	8,077.85	.065	2,825.95	.017
37.	Ishpeming Office	3,642.30	.029	3,867.87	.023
38.	Social Sec. Taxes	3,349.59	.027	4,336.36	.025
39.	Mine Office	9,258.59	.075	7,928.66	.046
	Total Gen. Mine Expenae	48,322.77	.389	32,343.00	.189
	Cost of Production	229,599.77	1.850	240,188.35	1.400
40.	Taxes	4,068.67	.033	6,868.17	.040
	Total Cost	233,668.44	1.883	247,056.52	1.440
	Budget Estimated Cost		1.648		1.359

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8. COST OF OPERATING, CONTINUED

b. Detailed Cost Comparison, Continued

		1943		1942	
		Amount	Per Ton	Amount	Per Ton
41.	General Supplies	4,672.36	.038	3,983.07	.023
42.	Iron and Steel	1,117.60	.009	892.67	.005
43.	Oil And Grease	689.89	.005	587.96	.003
44.	Machinery Supplies	3,352.81	.027	4,426.89	.026
45.	Explosives	7,081.02	.057	10,003.89	.058
46.	Lumber and Timber	1,887.81	.015	2,215.17	.013
47.	Fuel	3,741.38	.030	2,876.16	.017
48.	Electric Power	21,775.39	.176	23,803.62	.139
49.	Sundries	10,440.32	.084	10,438.50	.061
50.	Other Mines and Accounts	1,997.63	.016	244.11	.001
	Michigan State Tax	5.70	.000	6.73	.000
	Total as Per Cost Sheet	52,766.65	.425	58,990.55	.344

The following is an explanation of the comparative costs for accounts that show significant variation. The increase in costs over last year in many accounts is due to the general wage increase of five and one-half cents per hour put into effect April 1st, 1943 and retroactive to July 13th, 1942.

1. Exploring in Mine

Decrease due to no underground drilling done during the year.

4. Development in Ore

Decrease due to smaller ore development program for stope operations.

5. Stoping

The decrease in total expenditures for this account was less, due to decline in mining operation, but increase in cost per ton due to general wage increase and smaller product.

7. Tramming

Decrease in expenditures due to less repairs and maintenance, and increase in cost per ton due to general wage increase and smaller product.

17. Pumping

Increase due to repairs to pump motor and more repairs to pumping equipment.

18. Hoisting
19. Stocking Ore
20. Crushing at Mine

Decrease in total expenditures in these accounts due to operations of mine being suspended during reconstruction program. Increase in cost per ton due to general wage increase and smaller product.

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8. COST OF OPERATING, CONTINUED

b. Detailed Cost Comparison, Continued

22. General Surface Expense

Increase due to laying 1300 feet of new four inch water mains, also erecting 1900 feet of barbed wire fencing around undermined area on Virgil property. In addition numerous miscellaneous jobs were done during reconstruction program.

24. Shaft

Increase due to more repair work done to maintain shaft.

40. Taxes

Decrease due to reduced valuation based on smaller ore reserves.

Work on the reconstruction program including installation of second hoist in engine house, changes in shaft compartments and in headframe charged to E. & A. CC116A.

9. EXPLORATIONS AND FUTURE EXPLORATION

a. Underground.

There was no exploration work either in Diamond Drilling or Drifting done underground during the year. Late in 1942 an exploration drilling program from the Eight Level was completed after encountering no enrichment or favorable structure below the Eight Level.

Future exploration will be confined to the new Spies orebody discovered by the surface drilling in Section 24 and Section 19 to the East of the shaft. The orebody was first encountered in Hole No. 63 at an elevation of approximately 200 feet above the Fourth Level elevation in Section 24 and in a subsequent hole at a height of approximately 300 feet above this level in the adjoining Section 19. The drilling has also proven ore extending down to an elevation of about 80 feet above the Sixth Level elevation. Development of the new orebody for mining will be first undertaken from the Fourth Level where approximately 3700 feet of rock drifting will be done to reach the ore encountered in Diamond Drill Hole No. 63. Preliminary to starting drifting operations work was underway late in the year constructing new loading pockets and excavating a trench storage pocket at the shaft plat on the Fourth level. Work on this level is being rushed to enable production from the new orebody to be started at the earliest possible date.

b. Surface

Surface exploration Diamond Drilling has been continued throughout the year in Sections 24 and in the adjoining Section 19, to the East of the shaft. As previously mentioned this drilling disclosed an important ore discovery and drilling is being continued to determine the strike and ore outline of the deposit. Drill hole analysis indicates ore averaging from 58.00 percent to

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9. EXPLORATIONS AND FUTURE EXPLORATION, CONTINUED

b. Surface, Continued

to 60.00 percent in Iron content and about .100 percent in Sulphur. Five additional holes were drilled in Section 24 in 1943 and one hole started in the previous year was completed. A mining lease dated May 1, 1943 was acquired on the SW¼ of Section 19 which adjoins Section 24. One angle hole to the west was completed on the latter property and at the end of the year drilling was underway in one additional angle hole on this property to the West. Upon agreement with the M. A. Hanna Iron Ore Co. a union hole which is being drilled at an angle to the West is located on Bates Mine property in Section 19. The surface drilling program is being done on contract with the Longyear Company similarily as in the previous year.

The following is a log of the Surface Diamond Drilling in 1943.

	D.D.H.No. 62 Sec. 24 Dip Approx. 70°		D.D.H.No. 63 Sec. 24 Dip Approx. 70°	
	Depth	Material	Depth	Material
	0' - 8'	Clay & Boulders	0' - 14'	Hard pan & Gravel
	8' - 122'	Gravel & Boulders	14' - 114'	Gravel & Boulders
	122' - 142'	Cherty Bl. Sl. & Siderite	114'-140'	Iron Formation & B. Sl.
	142' - 680'	B. Sl. & C.Iron Carb.	140' - 155'	Ferruginous Slate
	680' - 691'	Black Slate	155' - 170'	Black Slate
	691' - 732'	B. Sl. & Ch. Iron Carb.	170' - 175'	Iron Formation
	732' - 1109'	" " "	175' - 200'	Ferruginous B. Slate
	(1109' - 1390'	" " "	200' - 220'	Iron Formation
Drilled	(1390' - 1459'	Ch. Iron Carb.	220' - 240'	Ferr. Bl. Slate
in	(1459' - 1473'	B. Sl. & Ch. Iron Carb.	240' - 330'	Iron Formation
1943	(1473' - 1492'	Ch Iron Carb.	330' - 335'	Sec. Class S. O.
	(1492' - 1518'	B. Sl & Ch Iron Carb.	335' - 365'	Iron Formation
			365' - 397'	1st C. Hi-Sul S. O.
			397' - 875'	1st Class S. O.
			875' - 885'	Black Slate
			885' - 890'	Sec. Class S. O.
			890' - 910'	Black Slate

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9. EXPLORATIONS AND FUTURE EXPLORATION, CONTINUED

b. Surface, Continued

D.D.H.No. 64
Sec. 24 Dip Approx. 63°

Depth	Material
0' - 10'	Gravel & Sand
10' - 42'	Gravel & Boulders
42' - 140'	Broken Ledge
140' - 148'	" "
148' - 153'	Ferr. Slate
153' - 160'	Jasper Iron Formation
160' - 170'	Black Slate
170' - 173'	Jasper Iron Formation
173' - 174'	1st Class S. O.
174' - 215'	Jasper Iron Formation
215' - 220'	2nd Class S. O.
220' - 223'	1st Class S. O.
223' - 240'	Jasper Iron Formation
240' - 245'	Slaty Iron Formation
245' - 250'	1st Class S. O.
250' - 260'	Slaty Iron Formation
260' - 275'	1st Class S. O.
275' - 350'	Slaty Iron Formation
350' - 355'	Gray Slate
355' - 575'	Jasper Iron Formation
575' - 580'	Lean S. O.
580' - 600'	Jasper Iron Formation
600' - 610'	2nd Class S. O.
610' - 615'	1st Class S. O.
615' - 620'	Lean S. O.
620' - 625'	First Class S. O.
625' - 630'	Sec. Class S. O.
630' - 635'	First Class S. O.
635' - 640'	Sec. Class S. O.
640' - 655'	First Class S. O.
655' - 660'	Jasper Iron Formation
660' - 655'	First Class S. O.
665' - 676'	Sec. Class S. O.
676' - 680'	Jasper Iron Formation
680' - 681'	Sec. Class S.O.
681' - 685'	Lean S. O.
685' - 730'	Jasper Iron Formation
730' - 745'	Sec. Class S. O.
745' - 835'	First Class S. O.
835' - 845'	Sec. Class S. O.
845' - 848'	Quartx Vein
848' - 865'	Lean S. O. & Jasper
865' - 870'	Sec. Class S. O.
870' - 1010'	First Class S. O.
1010' - 1040'	Jasper & Lean S. O.
1040' - 1060'	1st & 2nd Class H-Sul S. O.
1060' - 1065	Jasper Iron Formation

Lost bit at 1061' and Hole abendoned

D.D.H.No. 65
Sec. 24 Dip Approx. 65°

Depth	Material
0'- 8'	Clay & Gravel
8' - 108'	Gravel & Boulders
108' - 130'	Sand, Gravel & Clay
130' - 138'	Sand, Gravel & Chert
138' - 299'	Bl & Gray Slate & Chert.
299' - 385'	Black Slate
385' - 395'	Cherty Iron Carb.
393' - 396'	Black Slate
396' - 403'	Cherty Iron Carb.
403' - 423'	Black Slate
423' - 465'	Cherty Iron Carb.
465' - 475'	Gray Slate
475' - 503'	Cherty Iron Carb.
503' - 515'	Black Slate
515' - 570'	C. Iron Carb. & Bl. Slate
570' - 607'	Black Slate
607' - 619'	Bl. Slate & Cher. Iron C.
619' - 630'	Black Slate
630' - 637'	B. Sl. & Cher. Iron Carb.
638' 645'	Bl. Slate
645' - 674'	Bl. Sl. & C. Iron Carb.
674' - 693'	Black Slate
693' - 748'	Bl. Sl. & C. Iron Carb.

D.D.H.No. 66
Section 24 Dip 90°

Depth	Material
0' - 32'	Clay Sand, Gravel & Boulders
32' - 105'	Sand, Gravel & Boulders
105' - 110'	Broken Chert
110' - 138'	Gr. Sl. & Cherty Iron Carb.
138' - 150'	Gray & Black Slate
150' - 175'	Cherty Iron Carb & Gray Slate
175' - 188'	Black Slate
188' - 202'	Cherty Iron Carb. & B
202' - 235'	Black Slate
235' - 260'	G. Sl.,Bl. Sl. & C. Iron Carb.
260' - 402'	" " " "

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9. EXPLORATIONS AND FUTURE EXPLORATION, CONTINUED

b. Surface, Continued

D.D.H.No. 67
Section 24 Dip - 90°

Depth	Material
0' - 82'	Clay, Gravel & Boulders
82' - 96'	Gravel, Hardpan & Boul.
96' - 107'	Black Slate
107' - 121'	Gray Sl. & Cher. Iron Car.
121' - 137'	Black Slate
137' - 145'	G. Sl. & Cher. Iron Carb.
145'- 180'	B. Sl. & Cher. Iron Carb.
180' - 235'	G. Sl. & Cher. Iron Carb.

D.D.H.No. 1
Sec. 19 Dip Approx. 65°

Depth	Material
0' - 132'	Clay, Gr., Sand & Boul.
132' - 265'	Jasper Iron Formation
265' - 345'	First Class S. O.
345' - 698'	Black Slate
698' - 715'	First Class S. O.
715' - 720'	Lean Hi-Sul S. O.
720' - 835'	1st. Cl. Hi-Sul S. O.
835' - 845'	Slaty Iron Formation
845' - 910'	Cherty Ferr. Bl. Slate
910' - 975'	Dark Gray Ferr. Slate
975' - 1029'	Cherty Gray Slate

Union Hole
D.D.H.No. 2
Sec. 19 Approx. Dip 65°

Depth	Material
0' - 114'	Gravel & Boulders

D.D.H.No. 3
Sec. 19 Dip Approx. 65°

Depth	Material
0' - 10'	Clay & Gravel
10' - 20'	Boulders & Gravel
20' - 68'	Coarse Gravel & Sand
68' - 95'	Boulders & Gravel
95' - 129'	Coarse Gravel & Boulders
129' - 140'	Gravel & Sand
140' - 151'	Sand, Gravel & Bl. Slate
151' - 415'	Dark Gray Slate.

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10. TAXES

The following tabulation is a complete statement of valuations, taxes and comparison for the years 1943 and 1942:

Description	1943 Valuation	1943 Taxes	1942 Valuation	1942 Taxes
Iron County				
Iron River Township				
NE¼ of NW¼ of Sec. a4, 43-35)				
SE¼ of NW¼ of Sec. 24, 43-35)				
Virgil Lease				
SW¼ of NW¼ of Sec. 24, 43-35	50,000.	857.00	150,000.	2,606.40
Stockpile, Supplies & Equip.	140,000.	2,399.60	170,000.	2,953.92
Total Spies-Virgil	190,000.	3,256.60	230,000.	5,560.32
Spies Dwellings	7,500.	128.55		
Total Iron River Twp.	197,500.	3,385.15	320,000.	5,560.32
Rate		1.714		1.7376
Village of Mineral Hills				
Spies Lease				
NE¼ of NE¼ of Sec. 24, 43-35)				
SE¼ of NW¼ of Sec. 24, 43-35)				
Virgil Lease				
SW¼ of NW¼ of Sec. 24, 43-35	50,000.	213.70	150,000.	613.05
Stockpile, Supplies & Equip.	140,000.	598.37	170,000.	694.80
Total Spies-Virgil	190,000.	812.07	320,000.	1,307.85
Spies Dwellings	7,500	32.06	7,500	30.65
Total Village of Mineral H.	197,500.	844.13	327,500.	1,338.50
Rate		.4274		.4087

Note - Iron River Township and Village of Mineral Hills are the same Valuations.

RAVENNA PRICKETT HOUSES*				
Inland Steel Company pays the taxes and bills us	700	24.20	700	20.65
Rate		3.457		2.95
City of Iron River				
N½ of NE¼ of Sec. 24, 43-35	3,600	128.52	3,600	129.24
SE¼ of NE¼ of Sec. 24, 43-35	2,000	71.40	2,000	71.80
NW¼ of NW¼ of Sec. a4, 43-35	2,000	71.40	2,000	71.80
N½ of SE¼ of Sec. 24, 43-35	3,200	114.24	3,200	114.88
Total	10,800	385.56	10,800	387.72
Collection fees .		8.18		8.20
Total Iron RiverCity		393.74		395.92
Rate		2.570		3.590
Tax per Ton Produced		.033		.040
Tax per Ton Shipped		.035		.035

* Ravenna Prickett houses sold in 1943 (7 houses)