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4. ESTIMATE OF ORE RESERVES:

a. Developed Ore:

Assumption: 7 cu. ft. equals one ton.
10% deduction for rock.
10% deduction for loss in mining.

Estimate of ore in Sight, December 31st, 1927.

No. 9 Shaft.

Developed Ore

Level	Available Ore	Shaft Pillars	Total Ore
911'		2,520	2,520
1000'		3,000	3,000
1050'		6,000	6,000
1153'		3,200	3,200
Total,		14,720	14,720

Pascoe Shaft.

Developed Ore

Level	Available Ore	Shaft Pillars	Total Ore
1500'	1,273		1,273
1570'	18,514		18,514
1640'		2,700	2,700
1710'	8,609	31,700	40,309
1780'		42,940	42,940
1850'		13,200	13,200
1950'		58,570	58,570
2050'		18,960	18,960
2570'		9,750	9,750
2670'		47,250	47,250
2770'		51,250	51,250
Total,	28,396	276,320	304,716
Grand Total,	28,396	291,040	319,436

b. Prospective Ore:

None.

c. Estimated Analysis:

Grade	Iron	Phos.	Silica	Alum.	Mang.	Lime	Mag.	Sul.	Igni.	Moist.
Bess.Nat'l	64.50	.040	6.50	1.15	.065	.249	.333	.010	.10	1.00
Non-Bess."	62.85	.060	8.19	.79	.050	.140	.090	.008	.10	1.50

d. Ore Reserves divided into Grades:

Grade	Available	Non-Available	Total
Bessemer		122,970	122,970
Non-Bessemer	28,396	168,070	196,466
Total,	28,396	291,040	319,436

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4. ESTIMATE OF ORE RESERVES:

e. Comparison of Developed Ore:

The following table shows the ore in sight, product and ore developed during the past four years:-

	1924	1925	1926	1927
Ore in Sight January 1st,	485,650	395,380	390,852	358,216
Prospective Ore,	67,800	77,700		
Total,	553,450	473,080	390,852	358,216
Product,	75,511	72,314	55,017	64,978
Balance,	477,939	400,766	335,835	293,238
Ore in Sight December 31st	395,380	390,852	358,216	319,436
Prospective Ore,	77,700			
Total,	473,080	390,852	358,216	319,436
Developed during Year,	4,859	9,914	22,381	26,198

The table above shows we developed a small tonnage in excess of our production. From the outlook at the end of the year, there is only one chance of developing additional ore and that is above the Southeast end of the 1500' Level.

f. Estimate of Production 1928:

It is impossible to estimate what we will be able to produce during 1928 on account of the small available tonnage, namely: 28,396 tons. Our present operation, however, is based on a monthly production of 5,000 tons. Just how many months we can operate, will depend on costs realized.

Although we show 291,000 tons of ore tied up in Shaft pillars, we explained fully in the 1926 report the impossibility of mining any part of this tonnage.

5. LABOR AND WAGES:

a. Comments:

(1) Labor:

The labor situation at the Mine throughout the year was most satisfactory, as we had more men looking for work than we could use. During January, some of the surplus labor was able to secure employment in the woods. In February, conditions were such that we had to divide the fillers, blockholers and laborers into two crews of 20 men each and work them every other week. The same condition existed again in November.

During March ten of the younger men left by auto to seek employment in the West and later in the Spring more left Republic for other places. We were able to place six men at some of the Company's mines in April and in June eight more were transferred to the Negaunee Mine. By the middle of the summer, we were able to givr continuous employment to all of the older men.

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5. LABOR AND WAGES:

b. Comparative Statement of Wages & Product:

	1927	1926	INCREASE	DECREASE
PRODUCT	63,850	54,719	9,131	
No. of Shifts & Hours	2 - 8	2 - 8		
AVG.NO.MEN WORKING:				
Surface	30	48		18
Underground	85	112		27
Total	115	160		45
AVG. WAGES PER DAY:				
Surface	4.58	4.59		.01
Underground	4.73	4.74		.01
Total	4.69	4.70		.01
WAGES PER MO. OF 25 DAYS:				
Surface	114.50	114.75		.25
Underground	118.25	118.50		.25
Total	117.25	117.50		.25
PRODUCT PER MAN PER DAY:				
Surface	6.45	3.64	2.81	
Underground	2.55	1.75	.80	
Total	1.89	1.18	.71	
LABOR COST PER TON:				
Surface	.710	1.261		.551
Underground	1.779	2.714		.935
Total	2.489	3.975		1.486
AVG. PRODUCT BR'K & TRM'G	6.94	4.24	2.70	
" WAGES CONTRACT MINERS	4.61	4.90		.29
" " " TRAMMERS	6.66	6.09	.47	
" " " LABOR	5.07	5.14		.07
TOTAL NO. OF DAYS:				
Surface	9,900	15,015		5,115
Underground	24,005¼	31,272		7,266¾
Total	33,905¼	46,287		12,381¾
AMOUNT FOR LABOR:				
Surface	45,356.10	69,023.88		23,667.78
Underground	113,575.90	148,535.26		34,959.36
Total	158,932.00	217,559.14		58,627.14

Proportion Surface to Underground:

1927 - 1 to 2.83
1926 - 1 to 2.34
1925 - 1 to 2.47
1924 - 1 to 2.80
1923 - 1 to 2.48

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6. SURFACE.

a. Buildings, Repairs:

(1) Mine Buildings:

The Smoke Stack on the Central Plant Boiler House had been in very bad condition for some months but we thought it would hold out for the life of the mine. When we found we were going to continue to operate through the winter, we built a stack out of one on hand from old No. 5 Plant. This new stack was erected on Saturday and Sunday, October 29th and 30th.

(2) Location Houses:

Practically no repairs were made to the houses during the past year and on account of the uncertainty of conditions, there was very little Spring painting and Kalsomining done by the tenants.

A chimney fire occurred at House No. 31, the Superintendent's residence, at 7:00 A.M., April 4th. The fire was discovered by a passer-by. The roof around the chimney was already in flames. Although an alarm was turned in, the flames were put out by using a small Pyrene Fire-extinguisher and buckets of water carried to the attic. Besides the roof, there was damage by water to the walls of two rooms on the second floor. We estimate the cost of the repairs to the roof and damage to the walls at $24.67.

b. Stockpiles:

The rock dump leading from No. 9 Shaft to the West out over the Bay in the River has given us very little trouble during the past year. We have not hoisted a large tonnage of rock and it has only been necessary to swing the track about once a week. We are side-dumping from the Southeast side of the pile.

Two more bents were added to the Basic Crushed trestle in January and a timber crib built along the railroad track to prevent the ore from running onto it. This trestle was dismantled the first part of May to permit loading out the stockpile, which was cleaned up on September 27th. Arrangements were immediately made for erecting a new trestle for the winter's stocking. Eight bents were erected.

As we did not take one complete cut in the Lump ore stockpile, the trestle was not wrecked and it was only necessary to add two more bents for the winter's stocking.

The bottom of the old Crushed ore stocking ground along the River was very rough and when the stockpile was cleaned up in 1926, there was from one to two feet of ore left in places. During the past Summer, two men were employed to scrape this ore up and dump it in a pile along the loading track to be loaded with the Steam Shovel. An Engineer's estimate shows 1600 tons cleaned up from this bottom.

d. Farm:

The Company's Farm near the Water Power Plant was not worked by the Company but rented out for a yearly rental of $100.00. The farm has been offered for sale.

e. Scrap:

During June and July, we loaded one car of old machine shafting which was sold to the Lake Shore Engine Works at Marquette, and two cars of miscellaneous steel scrap sold to the Lake Superior Iron & Metal Company at Houghton.

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7. UNDERGROUND:

a. Shaft Sinking:

As the Diamond Drill holes put down from the 2840' Level, Pascoe Shaft, proved that the foot and hanging walls were coming together and the ore pinching out, further sinking of the shaft was abandoned. No work of Shaft Sinking was done in 1927.

b. Development:

The development drifting and raising done during the past year was limited to the opening and mining of known ore bodies. An extensive programme of development drifting for exploration purposes was carried on in 1926 but no new ore was developed. The total rock drifting done in 1927 amounted to 145 feet compared with 1320 feet for 1926.

1500' Level:

The foot wall stope on this level was breasted in mixed material which averaged about 58% Iron. When mining below this stope from the 1570' Level, we discovered that there was more ore to the South of this seam. On October 24th, a gang was started to advance the breast of this foot wall stope. They drifted Southeast 21 feet following a narrow seam of ore, at this point it opened up and a stope 30 feet by 14 feet was developed. We have started to work up on this ore but find it badly mixed with Jasper and it is questionable what tonnage we can mine.

1570' Level:

The drift started the end of last year to the South following close to drill hole No. 611 to strike the ore above the 1710' Level stope, went through 125 feet of hard Jasper before reaching the ore. The ore was only 5 to 6 feet wide at the start but gradually opened up to the Southeast. This stope furnished 26% of the year's production.

1710' Level:

Toward the end of the year when taking inventory of the available ore in the mine, it appeared that unless we made a second filling place for loading the broken ore in this stope, we would not be able to clean it all out, at least at a profit. In November, a gang started to drift Southeast from the South end of the old stope East of the one we have been working the past year. We drifted through 10 feet of rock when we struck a small seam of ore which opened up an area 20 feet by 25 feet. We believe this will connect in with the stope to the West at a higher elevation.

Exploration Near Surface
East of Pascoe Shaft:

The winze at the Pascoe Scram was sunk 45 feet on the incline to the bottom of the lowest developed ore. A new level was cut out at a vertical distance of 25 feet, and a stope opened up under the ore above.

c. Stoping:

(1) General:

The ore hoisted the past year was secured from nine different levels. The 1500' and the 1570' Levels produced 53.8%, and the 1710', 2050' Levels and Pascoe Scram 34.5% of the total. At the end of the year the production was limited to the 1500', 1570' and 1710' Levels, the only working places.

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7. UNDERGROUND:

c. Stoping:

(1) General:

During the past year we were able at times to secure a few hundred tons from many of the old abandoned places. At no time during the year were we filling from more than four stopes at a time and there were periods when we were restricted to two. On account of the limited number of places to fill from, there was a tendency to pull too much from the larger stopes and then we had to stop and allow them to pile up again.

The main stope above the 1500' Level which furnished more than one-quarter of our product the past year, was exhausted in August. While we are opening another stope to the Southeast on this level, it is small compared with the old one. Of the levels from which we secured ore during 1927, the following were exhausted: Pascoe Scram near surface, 1335', 1950', 2050', 2840' and 2910' Levels, Pascoe Shaft.

(2) Detail of Stoping Operations:

Pascoe Scram:

This is the operation East of the Pascoe Shaft near surface. During January all the ore above the first level was mined and then the incline winze was sunk 45 feet. A new level was cut out 25 feet vertical distance below the first level. This permitted the mining of all the ore proved up in this pocket by the drill holes. We cut out from both sides of the winze, but the West side only went in about 18 feet as the ore was mixed with Jasper. The East side opened up into a fair size stope. It too was mixed with rock in places, which was picked out and loaded separately. This ore was stocked as Run-of-Mine. When it is loaded into railroad cars for shipment, it will have to be put through the Screening Plant and the Lump and fine ore separated. One gang of miners and a crew of fillers worked here continuously until October 22nd, when all the available ore was mined. The broken ore was cleaned up early in November.

A total of 7,540 tons was produced from here in 1927, making a grand total of 10,643 tons mined from this pocket.

1335' Level:

The end of the ore to the South was reached early in January by Contract No. 11. This lens was 70 feet long and varied in width from 6 feet at the North end to 10 feet at the South. A stull was built during January and mining carried on, on top of the stull until May 13th, when the ore seam became too small to follow higher. The foot wall was steep while the hanging flattened considerable about 35 feet above the level. All the broken ore was cleaned out of this level by the first of July.

1500' Level:

When this stope was opened up in 1926, we felt it was going to be very strong and be the main stay of the mine for sometime to come. There seemed to be two separate lenses with a Jasper horse between. The hanging stope was 80 feet long by 30 feet wide on the sill floor and the foot wall stope 110 feet long by 16 feet wide. After starting to mine over the stull, the hanging flattened out and there was only a small seam about 10 feet wide.

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7. UNDERGROUND:

c. Stoping: (Continued)

1500' Level:

Contracts Nos.: 2, 3 and 12 were engaged in this stope during January and in February No. 5 was added to break the ore faster as this place was furnishing a large portion of our output. As the hanging flattened out and the minable area became smaller, the gangs had to be reduced. Contract No. 2 was laid off the end of March and No. 3 the 8th of April. Nos. 5 and 12 continued here until May 6th when at a height of 85 feet above the level, the ore vein became too narrow to follow higher. Contract No. 12 was laid off and No. 5 transferred to the 1570' Level. This stope furnished a large portion of the year's hoist which was cleaned out in August.

No. 1 Stope on the 1710' Level had been very strong and had extended through to the 1570' Level and above. This lens was worked up to the 1500' elevation several years back, but was abandoned on account of the lean character. There had been no workings on the 1500' Level in this area until the above stope was opened up. In August in an effort to develop more ore, Contract No. 4 drifted Southerly from the Southwest end of the hanging wall stope. They cut through 40 feet of banded or lean ore averaging 58% Iron and holed into the old stope from the 1710' Level. This contract worked here most of September following several small seams in the back, but on account of the banded character of the ore, it was finally abandoned and the miners transferred to the stull above the 1570' Level.

Contract No. 7, the crew that was employed at the Pascoe Scram, was transferred to this level on October 24th. They pushed ahead the foot-wall stope to the Southeast which was stopped in lean material. When raising in the stope from the 1570' Level, we found the ore extending further South than on the 1500' Level, which indicated better ore ahead at this elevation. They followed a leader of ore for 20 feet, when it began to open up as they advanced. They also cut into the left through about 10 feet of Jasper and struck the ore over the stope below at this point. The ore ahead of the foot-wall stope is mixed with Jasper while the ore to the East is clean. This place is being pushed with as many gangs as can work as it is very important to know the size of the stope about the 1500'in this area. If it is only a small body, we may have to leave it in order to mine the floor pillar and keep up our production.

1570' Level:

As the stope above the 1710' Level continued to be pushed up close to this elevation,there was every reason to believe this ore existed here but that Diamond Drill Hole No. 611 was deflected from its course and missed it. Contract No. 10 started, on December 24th, to drift South following the course of Hole No. 611. This drift was advanced 125 feet in rock to the ore which was struck early in April. The raise from the 1710'Level stope was holed into in May. As they drifted ahead to the Southeast, the ore widened out from 16 feet to 65 feet.

Contract No. 1 started here in July to work to the East and take down the back in order to secure additional ore. A stull was built in August and another gang added to the working crew in the stope. By the end of September, they had reached a height 22 feet below the 1500' Level.

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7. UNDERGROUND:

c. Stoping: (Continued)

(2) Detail of Stoping Operations:

1570' Level: (Continued)

Contract No. 10 began raising from the Southwest corner of the stope and holed into No. 7's drift on the 1500' Level in November. They then moved down in the stope and took part of the over-hanging bench from below.

Contract No. 1 continued to mine the ore on the East side of the stope until within 25 feet of the 1500' Level and then put up a raise from the Southeast corner to this elevation. When high enough, they moved to No. 7's drift on the 1500' Level and drifted in to their raise and are now stoping in this area.

Contract No. 5 was transferred from the 1500' Level stope early in May and started a raise from the North end of the stope under the hanging. In order to secure a production in the process of raising, it was carried the width of the stope and as far as they could reach from foot to hanging. They holed to the 1500' Level in August and then came down in the raise leaving a 22 foot floor pillar. Contract No. 5 breasted ahead on the foot side and No. 6 on the hanging side. In order to reach the ore on the hanging, it was necessary to cut a bench in the Jasper.

A scraper was installed to pull the ore from these benches into the raise. These gangs mined on their respective sides until they reached the rock on the hanging and holed into the stope on the foot side. Both gangs then raised to the level above. Near the end of the bench to the North, No. 5 Contract cut into the Southwest for the ore under the hanging wall stope. The hanging had flattened out and there was only lean material in this area.

Contracts Nos.: 5 and 6 then started to underhand stope these benches and by the end of the year, this place was all mined out except the floor pillar below the 1500' Level.

1710' Level:

As contract No. 7 continued to work up in the stope above this level, it became evident that this vein reached the 1570' Level. They raised as rapidly as possible and had reached the 1570' elevation by the middle of March. They then were transferred to the main level and started to mine an eight-foot seam of ore at the West end of No..1 Stope. They worked here until the 15th of April when the ore lens became too narrow to pay and this gang was laid off.

Contract No. 2 started stoping 30 feet below the 1570' Level early in July. They cut a bench in Jasper around the East side of the stope to reach the ore on the hanging. At the same time Contract No. 3 began breasting ahead on the foot side. A scraper was installed to pull the broken dirt into the stope. By working in this way all the ore broken could be filled. However, in October it was seen that in order to recover all the ore on the hanging, we would have to allow the stope to fill and back stope the ore. No dirt was filled from this place during November and December.

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7. UNDERGROUND:

c. Stoping: (Continued)

(2) Detail of Stoping Operations:

1710' Level: (Continued)

Contract No. 3 struck the foot rock the end of October and then put up a raise along the rock to the level above. This gave a new entrance into the stope and allowed the starting of a new bench lower down.

Filling from this stope was resumed the first part of January, 1928. This stope will furnish a large portion of our next few month's production.

There is a small stope to the Northeast of this one that extends through to the 1570' Level. In order to get another filling hole to this main stope, Contract No. 2 started drifting Southeast from the breast. There was a small leader which we followed and finally opened up an area 20' x 30'. This ore no doubt connects with that to the West at a higher elevation. A stull will be built and the stope carried up and, at the same time a drift will be pushed South under the other stope.

1950' Level:-

Contract No. 1 was transferred from the 2910' Level, April 1st, and started to test the back of the old stope over where Holes Nos.: 584 and 585 were drilled. They worked here until the 21st when they broke through to workings to the East. They had to be taken out immediately on account of the unsafe condition of the back.

2070' Level:

Contract No. 4 continued stoping above this level, 360 feet Southwest of the Pascoe Shaft. At an elevation of 40 feet above the level the ore had opened up from 2 feet on the level, to 15 feet wide by 40 feet long. They continued mining here until the 20th of April when the back of their place was within 8 feet of the 1950' Level. This floor was blasted down after all the broken ore was cleaned out. Some ore was filled from this place as late as September.

2840' Level:

All the broken ore from this stope was filled during January. The last week a scraper was operated to pull the ore down from the foot wall which was exceedingly flat.

2910' Level:

Contract No. 1 holed their raise to the 2840' Level the end of January and stoping started again. The hanging flattened as it approached the 2840' Level and the ore area was very small. This stope was carried to within 16 feet of the level above and then stopped, as the floor pillar was taking weight. This gang was transferred to the 1950' Level in April. The broken ore was all cleaned out by May.

d. Timbering:

During the past year we have made extensive repairs to both No. 9 and the Pascoe Shafts. Usually there are crews working every Sunday of each week. The wide portion of No. 9 Shaft keeps settling and must be reinforced and braced continually with heavy timbers. The Pascoe Shaft since abandoning the lower portion, has not required so much work.

Besides the usual repair work, which has been cut to a minimum, stulls were built on the 1335' and 1570' Levels.

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7. UNDERGROUND:

e. Drifting and Raising:-

We did more rock drifting and raising in 1926 than for many years. A large part was in connection with the exploration programme to locate new ore bodies. The drifting and raising done during 1927 was in connection with development of the stopes.

YEAR	DRIFTING		RAISING	
	ORE	ROCK	ORE	ROCK
1926	510	1320	416	64
1927	332	145	334	

f. Explosives, Drilling and Blasting:

The cost of explosives per ton of ore in 1927 was $0.2101 compared with $0.3435 for 1926, a decrease of $0.1334. The costs were exceptionally high in 1926 due to the large amount of rock drifting and shaft sinking. Our 1927 powder costs are rather high due to the small veins mined which take a large amount of powder for the tonnage broken.

Statement of Explosives Used:

	Quantity	Average Price	Amount 1927	Amount 1926
50% L.F. Gelatin	86,661	.1414	12254.42	17116.27
Total Powder	86,661	.1414	12254.42	17116.27
Fuse	165,640	5.8542	969.69	1104.53
Caps,	19,645	.9305	182.80	405.85
Tamping Bags,	3,370	.0013	4.71	37.96
Cap Crimpers,	6	.6700	4.02	12.00
Ignitors				100.35
Electric Exploders				2.78
Connecting Wire				9.97
Leading Wire				6.41
Total Fuse, etc.,			1161.22	1679.85
TOTAL ALL EXPLOSIVES			13415.64	18796.12
Product			63,850	54,719
Pounds Powder per ton of ore,			1.357	2.130
Cost per ton for powder,			.1919	.3128
" " " " Fuse, Caps, etc.,			.0182	.0307
" " " " All Explosives,			.2101	.3435
Average price per pound for powder			.1414	.1465

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8. COST OF OPERATING:

a. Comparative Mining Costs:

	1927	1926	INCREASE	DECREASE
Production:				
Ore Produced	64,978	26,629	38,349	
Average Daily Product	229	102	127	
Tons per Man per day	1.92	0.57	1.35	
No. Days Operating	284	260	24	
No. Shifts & Hours	2 - 8	2 - 8		
Cost:				
Underground Costs	2.270	8.109		5.839
Surface Costs	.804	2.721		1.917
General Mine Accounts	.281	.920		.639
COST OF PRODUCTION	3.355	11.750		8.395
Cost of Loading & Shipping	.040	.269		.229
Cost at Mine per Cost Sheet	3.396	12.019		8.624
Taxes	.162	.904		.742
Central Office	.184	.644		.460
Welfare, Safety, Hospital, etc.	.184	.439		.255
Cost Adjustment	.029	.048		.019
Total Cost at Mine	3.955	14.054		10.099
Expenses Beyond Mine:				
Rail Freight	.700	.700		
Lake Freight	.760	.760		
Cargo Insurance & Analysis	.010	.010		
Shrinkage	.047	.148		.101
Total Cost Lower Lake Ports	5.472	15.672		10.200

b. Detailed Cost Comparison:

(1) Days and Shifts:

The Mine operated two eight-hour shifts per day schedule five days per week, from January 1st, 1927, to June 16th, and six days per week from June 16th to December 31st, 1927, while in 1926, we worked five days per week the entire year, which expalins the twenty-four additional days operated in 1927.

(2) Production:

The increase in production as shown on the Cost Sheet is 38,249 tons. This large increase is due to our cleaning up all of our stockpiles in 1926 except for a few thousand tons of Pascoe Run-of-Mine ore and finding a shortage of 28,389 tons. Although this shortage was an accumulation of several years prior to 1923, the piles had never been cleaned up until 1926 and that year's production was charged with the entire amount. The actual production for 1926 was 55,018 tons showing an increase of 9,960 tons for 1927.

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8. COST OF OPERATING:

b. Detailed Cost Comparison: (Continued)

(2) Production: (Continued)

The increase in production is explained by the stopping of mining in the 1500' Level Stope and pulling this ore as rapidly as possible. Further, we show a decided improvement in tons per man per day during 1927. This is explained by our laying off every possible man on surface and underground. The average number of men employed in 1927 was 115 compared with 160 for 1926.

(3) Cost of Production:

The large decrease in the Cost of Production and Total Cost at the Mine for 1927 is explained by the stockpile shortage in 1926 which was taken up in that year's costs. Even using the actual hoist for 1926, we show a decided decrease in the Costs for 1927. During 1926 we carried on an extensive exploration programme of rock drifting, Diamond Drilling and shaft sinking, which was all stopped in 1927. Further, we cut down our crews to a minimum and reduced all repair work to only the most necessary, which cut down on the supplies used.

(4) Underground Costs:

Exploring in Mine:

Year 1926	$20,360.79
" 1927	
Decrease for 1927	20,360.79

There was no Diamond Drilling or other exploratory work undertaken during 1927.

Sinking in Shaft:

Year 1926	$13,798.58
" 1927	
Decrease for 1927	13,798.58

There was no shaft sinking done in the year 1927.

Development in Rock:

Year 1926	$27,092.99
" 1927	3,426.25
Decrease for 1927	23,666.74

We only did 145 feet of rock drifting in 1927 compared with 1320 feet in 1926. In 1926 we drove a number of drifts in connection with our extensive exploratory programme, while in 1927, only drifts in connection with the development of known ore was undertaken. The cost per foot was somewhat higher in 1927, being $23.23 against $20.53 for 1926.

Development in Ore:

Year 1926	$22,902.25
" 1927	16,867.14
Decrease for 1927	6,035.11

This account shows a decrease for the past year due to the fact that fewer new stopes were developed compared with 1926. The only new stope developed during the past year was that on the 1570' Level, while in 1926, we opened up the 1335', 1500', 1710', 2840' and 2910' Level Stopes.

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8. COST OF OPERATING:

b. Detailed Cost Comparison: (Continued)

(4) Underground Costs:

Stoping:

Year	1926	$56,119.88
"	1927	63,436.21
Increase for 1927		7,316.33

The average number of miners employed stoping during 1927 was considerably more than in 1926, increasing both labor and supplies. Our explosive costs were high per ton of ore due to the fact that we were working smaller lenses, which required more powder to break a less tonnage. The cost per ton, however, was slightly less, being .978 compared with $1.02 for 1926.

Timbering:

Year	1926	$9,792.05
"	1927	6,442.69
Decrease for 1927		3,349.36

Due to the fact that mining for the most part of 1927 was limited to the three upper levels of the Pascoe Shaft, there was very little repair work and our timber crew was cut in half, employing three instead of six timbermen, explaining the decrease charged against this account.

Tramming:

Year	1926	$37,021.33
"	1927	32,616.26
Decrease for 1927		4,405.07

Although we show an increase in tonnage handled, the total cost and cost per ton,was less in 1927 than the previous year. This is due to the fact that early in January, 1927, we discontinued hoisting on the night shift which cut down the number of laborers employed on tramming and also increased our efficiency.

Pumping:

Year	1926	$6,336.18
"	1927	6,886.99
Increase for 1927		550.81

The increase is entirely in supplies and for current charged against pumping. There are no meters on our pumps and the current is charged on a percentage basis. During 1927, we purchased more current from the Cliffs Power & Light Company than in 1926 when we were able to generate current at our own Power Plant on Saturdays and Sundays, explaining this increase.

Compressors & Air Pipes:

Year	1926	$8,592.06
"	1927	7,876.05
Decrease for 1927		716.01

This decrease is entirely in fuel consumed for operating the Steam Compressor. We were compelled to run the Steam Compressor for the first two and a half months of 1926 until the spring break-up. We had sufficient water to operate our Water Driven Compressors during the entire year of 1927.

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8. COST OF OPERATING:

b. Detailed Cost Comparison: (Continued)

(4) Underground Costs:

Underground Superintendence:

Year	1926	$5,916.05
"	1927	6,216.94
Increase for 1927		300.89

Increase due to more shifts operated in 1927 than in 1926. The Mine was operated only five days per week in 1926 while in 1927, we operated five days per week to June 15th and then six days per week for the balance of the year.

Maintenance Accounts:

Compressors & Power Drills:

Year	1926	$596.14
"	1927	149.21
Decrease for 1927		446.93

Due to better operating conditions at the Mine, no repairs were made in the year 1927 in the way of up-keep. In 1926, repairs were made to the air line from the Water Power Plant and also to the Compressors, explaining this decrease.

Hand Tramming Equipment:

Year	1926	$4,987.08
"	1927	3,333.63
Decrease for 1927		1,653.45

Very little new track was laid in 1927 while during the previous year, due to our extensive development programme, we re-laid track on several of the old levels and along new drifts. Further, we kept down repairs on cars to a minimum during the past year, showing a decrease against this account.

Electric Tram Equipment:

Year	1926	$946.50
"	1927	742.96
Decrease for 1927		203.54

During 1927, we were only tramming to the shaft on the day shift compared with both shifts in 1926, and as a result, the underground locomotives required less repairs.

Pumping Machinery:

Year	1926	$1,441.75
"	1927	535.06
Decrease for 1927		906.69

This large decrease is explained by the fact that the portion of the Pascoe Shaft below the 2050' Level was abandoned in July and no further pumping done. The pumping in this portion of the shaft was done largely with small air pumps which required a large amount of repairs.

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8. COST OF OPERATING:

b. Detailed Cost Comparison: (Continued)

(5) Surface Costs:

Hoisting:

Year	1926	$32,712.38
"	1927	27,443.70
Decrease for 1927		5,268.68

This large decrease is explained by the fact that we were hoisting ore on both shifts during 1926, while in 1927, we discontinued hoisting ore on the night shift after January 15th, and also to the fact that the underground hoisting plant at the Pascoe Shaft was shut down in August, after the lower portion was abandoned.

Stocking Ore:

Year	1926	$10,618.75
"	1927	6,892.41
Decrease for 1927		3,726.34

This large decrease is explained by our stockpiles not being cleaned up during 1927 and it was only necessary to repair and make additions, while in 1926, when all of the piles were cleaned up, entire new trestles were erected. Further, on account of hoisting on one shift, less labor required on surface in connection with stocking ore.

Crushing & Screening:

Year	1926	$1,613.66
"	1927	929.61
Decrease for 1927		684.05

The labor cost on the screening plant located in the No. 9 Shaft House was approximately the same for 1927 and 1926. The large decrease for 1927 is due to operating the Screening Plant when the Run-of-Mine pile was loaded out, in 1926.

Dry House:

Year	1926	$1,769.96
"	1927	1,807.46
Increase for 1927		37.50

Very little difference between the two years.

General Surface Expense:

Year	1926	$5,549.68
"	1927	4,059.96
Decrease for 1927		1,489.72

This large decrease is explained by our general curtailing and laying off of surface men including the mine policeman.

Maintenance Accounts:

Hoisting Equipment:

Year	1926	$7,111.26
"	1927	4,536.85
Decrease for 1927		2,574.41

This large decrease is explained by our making less repairs to all equipment incident to hoisting on account of hoisting ore on one shift only during 1927. Further, it was necessary to make continual repairs to a portion of the lower part of the Pascoe Shaft as it was taking weight. This expense was eliminated when it was abandoned.

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8. COST OF OPERATING:

b. Detailed Cost Comparison:

(5) Surface Costs:

Shaft:

Year	1926	$9,703.94
"	1927	5,371.45
Decrease for 1927		4,332.49

The charges against this account were extraordinary in 1926, due to extensive repairs in the wide portion of the No. 9 Shaft and to the lower part of the Pascoe Shaft in the vicinity of the 2770' Level. The repairs made during this past year has not been as frequent nor as extensive, explaining this decrease.

Top Tram Equipment:

Year	1926	$1,394.49
"	1927	540.02
Decrease for 1927		854.47

This decrease is explained by less rope being charged out to Top Tram in 1927 and also to less repairs to cars. In 1926, extensive repairs were made to one of the top tram cars which went over the rock dump into the River.

Docks, Trestles & Pockets:

Year	1926	$765.42
"	1927	357.32
Decrease for 1927		408.10

This decrease is due to less extensions made to the rock dump on account of less tonnage handled: 8997 tons in 1927 compared with 23,286 tons in 1926.

Mine Buildings:

Year	1926	$1,210.58
"	1927	316.55
Decrease for 1927		894.03

Only minor repairs were made to Mine Buildings during 1927 while in 1926, the roofs on a number of the Mine Buildings were given a coat of roofing tar, and the Picking Belt in the No. 9 Shaft House was rebuilt.

(6) General Mine Accounts:

Insurance:

Year	1926	$1,031.76
"	1927	2,323.30
Increase for 1927		1,291.54

An adjustment in insurance charges was made in July, 1927. The other monthly charges were the same for 1927 and 1926.

Engineering:

Year	1926	$1,821.13
"	1927	1,107.93
Decrease for 1927		713.20

As there was less development drifting and Diamond Drilling, less time was spent at the Republic Mine by the Engineers in 1927 than the previous year.

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8. COST OF OPERATING:

b. Detailed Cost Comparison:

(6) General Mine Accounts:

Analysis:

Year	1926	$2,470.53
"	1927	1,986.50
Decrease for 1927		484.03

This decrease is explained by the closing of the Republic Mine Laboratory on October 1st and having our analytical work done at the Cliffs Shaft Mine Laboratory.

Personal Injury Expense:

Year	1926	$7,433.83
"	1927	2,620.86
Decrease for 1927		4,812.97

This large decrease is due to a fatal accident to John Eckstrom in 1926, and less compensation paid for other injuries. There were only twelve loss time accidents in 1927 compared with thirty-three in 1926.

Safety Department Expense:

Year	1926	$212.21
"	1927	107.56
Decrease for 1927		104.65

The fire helmets were transferred to the Spies-Virgil Mine in the Spring of 1927 and less training periods were held than in 1926, explaining this decrease.

Telephones & Safety Devices:

Year	1926	$752.94
"	1927	621.50
Decrease for 1927		131.44

Due to fewer operating levels in 1927, the repair charges to telephones were less by the above amount.

Mine Office:

Year	1926	$10,769.02
"	1927	9,492.05
Decrease for 1927		1,276.97

This large decrease is explained by employing of two men during the entire year of 1927, while in 1926, three men were employed up to May 1st, and less supplies were charged to Office Account during the current year.

9. EXPLORATIONS AND FUTURE EXPLORATIONS:

No exploratory work was undertaken during 1927, and at the present time, we do not anticipate carrying on any work of this nature during 1928.

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10. TAXES:

DESCRIPTION	1927 VALUATION	1927 TAXES	1926 VALUATION	1926 TAXES
Realty as described on Tax Receipt	100,000	$5274.20	100,000	$5225.74
Personal Property----------	99,500	5248.25	360,500	18836.50
Lots: 71, 72, 86, 108 & 126-------	95	5.06	190	9.94
Total Opt. Republic Mine----	199,595	10527.51	460,690	24072.18
Republic Mine Dwellings	20,750	1095.00	41,500	2168.47
Dr. H..H. Loveland, - Hospital ----	2,500	132.00	3,500	182.87
Total Republic Mine----------	222,845	11754.51	505,690	26423.52
Power Lines----------	1,500	78.35	1,500	
Lots 4 & 6, Sec.9-47-30, Michigamme Dam Site----	100	5.22	100	
Total,----------	1,600	83.57	1,600	82.79
Collection Fees----------		.84		.82
Total----------		84.41		83.61
Total Taxes Republic Township (Inc. Fees)-------	224,445	11838.92	507,290	26507.13
Rate ----------		5.22		5.174

In view of the fact that the Republic Mine, the only industry of the Community, was in such condition that it might be closed, and its affect on all property and business in the Township, the valuation on all Real Estate in the Town of Republic was reduced 50% and that on farms 30%. Even with this drastic cut in valuation, the rate was only increased $0.046 per $100.00 valuation.

11. ACCIDENTS AND PERSONAL INJURY:

a. Accidents:

We had a total of twelve accidents during 1927 compared with thirty-three in 1926 and thirty-one in 1925. All of the twelve accidents were of a minor nature and eight can be classified as trade risks. Of the twelve accidents, ten occurred to men employed filling the underground cars, one on the timber crew and one miner.

b. Safety Work:

A sixty-foot flag pole, made of pipe was erected in the grass plot between the Drill Sharpening Shop and the No. 9 Shaft House. Mr. Elliott dedicated the flag pole and held the flag raising ceremony on October 31st. The American Flag with the National Safety Flag flying underneath it, will be a daily reminder to the men of our accident prevention campaign. All the day shift men were present and pledged themselves to the futherance of Safety Work and prevention of Accidents.

On January 1st, 1928, the Republic Mine is proudly flying a Banner Safety Flag, a blue field with one large white star in the center. The Republic Mine shares equally with the Athens Mine in having only one accident during the last five months of the year causing a loss of time of 3½ days.

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15. POWER:

We operated the Water driven Compressors continuously until the Spring break-up, by running at low pressure and then raising the pressure by operating the Booster Compressor at the Central Plant. We were able to go from the Spring break-up in 1925 until the Spring break-up in 1926 without operating the Steam Compressor. During 1927, we only had to work the Steam Compressor about six days in September on account of low water. We thought some of opening the gate at the Lake Michigamme Dam in order to bring up the water, but rains the latter part of September made this unnecessary.

On account of our operation at the Pascoe Shaft near surface and running at low pressure at the Water Power Plant, we had to lay a 2½" line from the Central Plant to supply air at 90 pounds. The pipe used on this line was taken from the abandoned levels underground.

During the early Spring while the gates were open, the carpenters made some repairs, replacing several rotted timbers.

Whenever there is so much water that it over-flows the dam, we can keep up the air pressure with one wheel and then the other is connected to the generator for making electricity. This current can be used for the operation of all electrical equipment about the mine, except the No. 9 Hoist which requires full 2200 volts.

We have never been able to synchronize this generator with the main transmission line. In April equipment was received from the General Electric Company for changing over this plant, so after the Mine is closed down, it can be used for generating current entirely, and connected into the Ishpeming circuit. This change was made during the week of May 19th. It took several days to tune up the machine and on the morning of May 21st, lightning struck the generator and burnt out several coils. The repairs were not made until sometime in August.

17. CONDITION OF PREMISES:

We cleaned up around the surface and mine buildings and repaired fences about the pits and old shafts during April and May. On account of the condition of the Mine, we did not employ any surface men and therefore the property was not kept as neat and clean as we had been doing in past years. During the latter part of July and first of August, two men were employed cutting thistles from the Republic Mine property, which covers an area about one mile square.

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18. NATIONALITY OF EMPLOYES:

	1927		1926	
	NO. MEN	%	NO. MEN	%
Finnish	53	46.2	76	47.8
Scandinavians	21	18.3	26	16.9
English	12	10.5	18	11.4
French	12	10.5	19	11.9
Irish	11	9.5	12	7.6
Belgian	3	2.6	4	2.6
German	1	.8	1	.6
Italian	1	.8	1	.6
Welsh	1	.8	1	.6
Total	115	100.0%	159	100.0%

SPIES-VIRGIL MINE

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1. GENERAL:

We reached a normal basis of production at the Spies-Virgil Mine early in 1927. At the close of the 1926 shipping season, we started to develop the Northwest portion of the Sixth Level and Subs above and were in shape to break ore in this stope (Northwest) in April. This immediately increased our production. In June, the hanging rock, Black Slate, in the Southwest Stope began to cave and continued to break away until the stope was almost filled to the 230' Sub-Level. Fortunately, the Northwest Stope was developed so the loss in production from the Southwest Stope could be made up.

It has been the experience at the mines in the Iron River District when the hanging, Black Slate, begins to cave, the stope must be abandoned and sealed off to prevent it from catching fire and making it impossible to work the rest of the mine. The Slate contains a high percentage of carbon and Sulphur. The carbon content starts the rock burning and then the Sulphur goes off in a gas which is suffocating. The Southwest stope was sealed off and the entire production after the early part of June came from the Northwest Stope and its development.

As the workings of this stope were extended, it developed that the ore body was not one large one but cut into several fingers with rock in between. This is a fortunate development and eliminated the necessity of tieing up ore pillars to support the hanging, which would have to be done.

There was no work done on the Spies Property during 1927. The only known ore in the Spies Mine, that below the Third Level, is high in Sulphur and not merchantable. The Mining Lease on the Spies, dated: July 1st, 1914, was surrendered October 1st, 1927. This lease carried a $6,000.00 yearly minimum. We still hold the agreement giving us the right to hoist the Virgil ore through the shaft on the Spies land in consideration of a payment of $0.05 per ton. This $0.05 royalty payment on Virgil ore was in addition to the $6,000.00 minimum on the Mining Lease. so there was no reason to hold this lease any longer.

Up until January 1st, 1927, we had been calling our underground cars 2.2 tons, but due to the fact that toward the end of the 1926 shipping season, we developed no over-run, the car weights were reduced to 2 tons. This reduction made a big difference in our monthly product and costs. Although we only shipped a small tonnage from pocket the past season, our over-run was about 12½%.

2. PRODUCTION SHIPMENTS & INVENTORIES:

a. Production by Grades:

Spies Crushed	None	tons
Virgil Crushed	150,156	"
Virgil High Sulphur	2,923	"
Total Ore	153,079	"
Rock	11,090	"

The product for the year 1927 was all from the Virgil property and was 76,404 tons more than the year 1926, or about double. This was due to the development on the Virgil being far enough advanced to permit stoping operations throughout the entire year, and only doing a limited amount of development. In 1926, we did not start stoping operations until during July and then the development work was not enough in advance of actual mining to keep up a steady production.

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2. PRODUCTION SHIPMENTS & INVENTORIES:

a. Production by Grades:

The high Sulphur ore was secured in the course of development of the Fourth Level and Sub-Levels above. This tonnage is ore averaging higher than .150 Sulphur, as anything lower than this Sulphur content was mixed with the Virgil grade.

b. Shipments:

Grade of Ore	Pocket Tons	Stockpile Tons	Total Tons	Total Last year Tons
Spies Crushed		3,264	3,264	8,445
Virgil Crushed	8,663	4,242	12,905	55,195
Total	8,663	7,506	16,169	63,640
Total Last Year	42,457	21,183	63,640	
Decrease	33,794	13,677	47,471	654

The total shipments were only 10½% of our year's production. In fact, we stocked ore almost continuously throughout the year. The small tonnage shipped was mixed with Stephenson ore and forwarded as Cambridge grade.

The first shipments were made in June when we loaded from pocket for 3½ days and one day from the stockpile. In August, we again shipped our hoist for three days and on the 30th started to load out the small tonnage of Spies ore in stock. This pile was cleaned up on September 3rd and showed an over-run of 2925 tons. We loaded from pocket from August 30th until September 6th.

The next shipments were not made until November when we dumped into railroad cars from the 4th to 10th and operated the Shovel in the Virgil pile the 7th, 8th and 9th. We kept accurate account of the number of underground cars dumped into the Railroad cars and the small tonnage shipped during the year showed an over-run of about 12%.

On December 24th, we shipped one ton of Virgil ore to the American Pigment Corporation at Bedford, Virginia. The ore was put into cement bags and shipped by local freight.

c. Stockpile Inventories:

Grade	Tons in Stock
Spies Crushed	None
Virgil Crushed (Low Sulphur)	158,380
Virgil Crushed (High Sulphur)	2,923
Total	161,303

On December 31st, 1927, the ore in stock amounted to 161,303 tons, an increase of 139,835 tons over the same date 1926. All the Spies stockpile ore was shipped the past season. We do not consider the High Sulphur grade as merchantable ore.

d. Division of Product by Levels:

The ore hoisted from the various Levels was as follows:-

Level	Property	Tons	Percent of Product
Fourth Level	Virgil	3,608	2.3%
Sixth Level	Virgil	149,471	97.7%
Total		153,079	100.0%

The product from the Fourth Level was that secured in development drifting and raising.

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2. PRODUCTION SHIPMENTS & INVENTORIES:

e. Production by Months:

The product by months, days operated, average daily product and tons per man per day, are shown in the table below:-

Month	Rock	Spies	Virgil	Total	No. days Operated	Ave. Daily Product	Tons Per Man per Day
Jan.	2092		8,596	8,596	25	344	2.80
Feb.	1958		8,580	8,580	24	357	2.94
Mar.	2112		10,672	10,672	27	395	3.19
Apr.	1434		11,060	11,060	25	442	3.62
May,	1138		12,492	12,492	25	500	4.28
Jun.	656		14,615	14,615	26	562	5.05
Jul.	230		14,780	14,780	25	591	5.52
Aug.	160		17,556	17,556	27	651	6.09
Sep.	836		12,974	12,974	25	519	5.21
Oct.	304		14,068	14,068	26	541	5.72
Nov.	10		13,411	13,411	25	536	5.88
Dec.	160		14,275	14,275	26	549	5.48
Total	11090		153,079	153,079	306	500	4.60
Over-run		2,925		2,925			
Grand Total	11090	2,925	153,079	156,004	306	510	4.68

The production from the Virgil Mine exceeded our estimate which was placed at 120,000 tons for the year. The Northwest stope was developed more rapidly than we had anticipated and we started breaking ore in April. Had the Fourth Level developed a low Sulphur, merchantable grade, we could have done even better as at times we were handicapped with chutes in the one stope being blocked.

f. Ore Statement:

	Spies	Virgil Low.Sul.	Virgil Hi.Sul.	Total	Total Last Year
On hand January 1, 1927,	339	21,129		21,468	8,433
Output for Year		150,156	2,923	153,079	75,045
Stockpile Over-run	2,925			2,925	1,630
Total	3,264	171,285	2,923	177,472	85,108
Shipments	3,264	12,905		16,169	63,640
Balance on Hand	None	158,380	2,923	161,303	21,468
Increase in Output	7,007	82,118	2,923	78,034	14,577
Increase in Ore on hand	339	137,251	2,923	139,835	13,035

1926 - 2 - 8 Hour Shifts, 6 days per week , Jan. 1st to Dec. 31, 1926.
1927 - 2 - 8 Hour Shafts, 6 days per week , Jan. 1st to Dec. 31, 1927.

g. Delays:-

Production was interrupted several times during the year, but none of the delays were of a serious nature and the loss in product was small. In all but two instances, we were able to make up the delay, both occurring in June.

DELAYS:

Date	Duration	Cause	Tonnage Lost
Jun. 13th	5 hours	Sledge hammer head stuck in Crusher	150
Jun. 22nd	2 hours	Pull-Bell Cable broke	50

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2. PRODUCTION SHIPMENTS & INVENTORIES:

g. Delays: (Continued)

The first accident of the year occurred on the night shift of June 13th, a sledge hammer head was hoisted in a skip of ore and dumped into the Crusher. It was necessary to call out the Blacksmith and burn the hammer out with the Acetylene outfit. This caused a delay of five hours and a loss in product of 150 tons.

The second delay happened on the night shift of June 22nd when the pull-bell cable broke. The pull-bell cable, although copper, was eaten through by the acid water. When it broke, it coiled in the Shaft and had to be removed before hoisting could be resumed. The pull-bell hangs in the Cage-compartment but as the skip and cage are in balance, there was a delay of several hours, causing a loss in product of 50 tons.

h. Delays from lack of Current:

There were no serious electrical delays during the past year.

3. ANALYSIS:

a. Average Mine Analysis on Output:

Grade	Iron	Phos.	Silica	Sulphur
Virgil-Low Sul.	56.95	.429	7.57	.111
Virgil-Hi. Sul.	58.32	.426	4.26	.338

b. Average Analysis on Straight Cargoes:

		Mine			Lake Erie	
Grade	Tons	Iron	Phos.	Sulph.	Iron	Moist.

Spies-Virgil (No Straight Cargoes Shipped)

c. High Sulphur Ore:

The 165', 185' and 210' Sub-Levels in the Northwest stope developed some high Sulphur ore as we mined East. This ore was drawn off with low-Sulphur ore in the same stope to the South and the average grade ran only .111 Sulphur.

The development on the Fourth Level and Subs above has been most discouraging in that we are finding a very limited amount of low Sulphur ore. We had hoped to be able to develop a low Sulphur stope at this elevation, which would help out our production and not concentrate the tramming from one level, as it has been the past year. We are continuing to raise toward the Third Level elevation and hope that we may strike a low Sulphur area.

d. Average Analysis on Total Shipments:

Grade	Tons	Iron	Phos.	Silica	Mn.	Alum.	Lime	Mag.	Sulph.	Igni.	Moist.
Spies	3264	55.20	.445	7.44	.18	3.35	.09	.37	.118	8.40	4.44
Virgil	12905	56.40	.425	7.76	.30	1.46	.34	.61	.112	7.60	7.80

e. Average Analysis of Ore in Stockpile:

Grade	Tons	Iron,	Phos.	Silica	Mn.	Alum	Lime	Mag.	Sulph.	Igni.
Virgil	158379	57.13	.424	7.43	.20	.171	.47	.21	.119	8.15
Virgil Hi-Sul	2923	58.32	.334	5.00	.20	.171	.47	.21	.342	8.45

4. ESTIMATE OF ORE RESERVES:

a. Developed Ore:

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4. ESTIMATE OF ORE RESERVES:

a. Developed Ore: (Continued)

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

Percentage of Bessemer equals 0.

Sixth Level and above .....1,019,172 tons

b. Prospective Ore:

Fourth Level and above	27,219	"
Below Sixth Level	777,876	"
Total	805,095	"
Total all ore 1,824,267		"

The above reserve ore estimate covers the Virgil property only. The total ore in the Virgil Mine as of December 31st, 1927, is 1,824,267 tons, as compared with 2,173,803 tons on December 31st, 1926, or a decrease of 349,536 tons. This decrease is the 1927 production and estimate of prospective ore.

Developed ore 6th Level & above,	December 31, 1926,	1,164,670	tons
Ore Mined from 6th " " "	during 1927,	149,471	"
Balance	December 31, 1927,	1,015,199	"
Developed ore 6th Level & above,	December 31, 1927,	1,019,172	"
Ore developed during 1927 in excess of Production		3,973	"

The estimate of prospective ore above the Fourth Level was reduced from 88,265 tons to 27,219 tons, on account of the Sulphur content of the ore in this area shown by the development drifting and raising.

The prospective ore below the Sixth Level also shows a decrease of 142,992 tons and due to the different method used in making the estimates. The estimate of December 31st, 1926, was made from the plan area of the Sixth Level, while that for December 31st, 1927, is made from sections and is more conservative.

c. Estimated Analysis:

	Iron	Phos.	Silica	Alum	Mang.	Lime	Mag.	Sul.	Igni.	Moist.
Dried 212°	57.50	.425	7.00	1.64	.16	.60	.30	.119	7.35	
Natural	51.75	.382	6.30	1.48	.15	.55	.26	.107	6.60	10.00

d. Estimate of Production:

The following is the estimated tonnage and expected analysis of the 1928 production from the Spies-Virgil Mine:-

Grade	Tons	Iron	Phos.	Silica	Sulph.	Moist.	Iron Nat'l
Virgil	180,000	57.50	.425	7.00	.090	8.00	52.90

5. LABOR AND WAGES:

a. Comments:

(1) Labor:

The labor conditions at the mine throughout the year were satisfactory. At no time was there a shortage of men. During the winter and early spring when in need of additional men, they were transferred from the Republic Mine. We have built up a very steady crew of underground and surface men and have a very small turn-over. The labor situation has improved greatly over what it was in 1926.

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5. LABOR AND WAGES:

a. Comments:

(2) New Construction:

There was no new construction work undertaken during 1927.

b. Comparative Statement of Wages & Product:

	1927	1926	Increase	Decrease
PRODUCT	153,079	76,675	76,404	
No. Shifts & Hours,	2 - 8	2 - 8		
AVG. NO. MEN WORKING:				
Surface	27	28		1
Underground	83	84		1
Total	110	112		2
AVG. WAGES PER DAY:				
Surface	4.20	4.18	.02	
Underground	5.11	4.91	.20	
Total	4.88	4.72	.16	
WAGES PER MO. OF 25 DAYS:				
Surface	105.00	104.50	.50	
Underground	127.75	122.75	5.00	
Total	122.00	118.00	4.00	
Product PER MAN PER DAY:				
Surface	17.76	8.48	9.28	
Underground	6.03	2.98	3.05	
Total	4.50	2.20	2.30	
LABOR COST PER TON:				
Surface	.2362	.493		.2567
Underground	.8483	1.653		.8047
Total	1.0845	2.146		1.0615
AVG. PRODUCT BR'K & TRM'G	17.08	13.69	3.39	
" WAGES CONTRACT MINERS	5.64	5.54	.10	
" " " TRAMMERS		4.91		
TOTAL NO. OF DAYS:				
Surface	8,619	9,040¾		421¾
Underground	25,406½	25,738		331½
Total	34,025½	34,778¾		753¼
AMOUNT FOR LABOR:				
Surface	36,163.97	37,790.76		1,626.79
Underground	129,863.53	126,479.57	1,383.96	
Total	166,027.50	164,270.33	1,757.17	

Proportion Surface to Underground Men:

1927 - 1 to 3.08
1926 - 1 to 3
1925 - 1 to 2.3
1924 - 1 to 1.82
1923 - 1 to 3
1922 - 1 to 2.8

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6. SURFACE:

a. Buildings, Repairs:

(1) Buildings Mine:

The plates in the chute under the dump and Crusher were renewed early in the year. A half moon chute stopper, operated with an air cylinder, was installed at the mouth of the chute from which the top tram car is loaded, in February. This was done in order that we could increase our hoist. We were handicapped on account of our method of stocking which was slow and caused many delays in hoisting. With this chute stopper we were able to dump from one to two skip loads even if the car was not under the chute. We also cut off part of the hoisting time by building on to the skip and dumping two cars per skip instead of one.

A new smoke stack was put on the Dry heating plant in July and the boiler was completely over-hauled. The tubes were all cut out and new ones put in. The mine water which we have been using in the boiler is very hard, also dirty at times and a heavy scale formed on the tubes. We have always had a great deal of trouble even with the use of boiler compound.

(2) Buildings Location:

The roofs of the location houses were reshingled during the summer. A car load of Asbestos Shingles were purchased from the Johns-Mansville Company and Contractor A. H. Proksch of Iron River did the work for us. The Boarding House roof was not in as bad a condition and was only repaired with cedar shingles. The Captain's residence and ten cottages were covered with Asbestos Shingles, which were put on top of the old ones. On account of this additional weight of the Asbestos Shingles, the roofs of the cottages were strengthened with braces put in to form a truss.

b. Stockpiles:

We shipped from pocket only 16 days the entire year and have had considerable difficulty to make stocking room and to handle the ore on the stockpile with a minimum delay to the hoisting.

A double trestle of 300 feet long was built in the fall of 1926. This trestle was filled some time in March when we had to change to a side dump car and swing the track. In order to make additional room, five bents were added to the East side of the double trestle. As the ground rises toward this end of the stocking ground and the trestle has a down grade, the pile will only average 18 feet at the North end. This trestle was all filled again early in April and we started to dump from the trestle on the East side of the pocket tracks. This stocking ground had been reserved for Spies ore but as we were not getting any production from this property and were not developing any ore, it was used to stock Virgil ore. When this trestle was completely filled, we had to continue to side dump on the West side. When side dumping, additional men must be employed to shift tracks.

In August we reached a point of congestion in our stocking, that made it necessary to load out a small tonnage of Spies ore stocked close to the Coal Dock approach and timber yard. This space was filled and we had to arrange to move the mine timber to make additional stockpile room.

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6. SURFACE:

b. Stockpiles: (Continued)

In December, a Larry Car System of stocking was authorized and a trestle was built on top of the ore pile on the East side of the track. This trestle was built with ½% up-grade, making the last bent at the end of the pile about 18 feet high. As soon as we discontinue stocking on the West side by the old system, we will build a trestle on top of the pile while the one to the East is being filled. In this way we will have room to last until about June 1st at our present rate of production.

An effort should be made to dispose of a sufficient tonnage of the stockpile ore during the coming season to give enough stockpile room for the winter of 1928 - 1929.

d. Drainage Ditches:

A drainage ditch was dug around the Old Virgil Shaft about 200 feet long to prevent water from the West running down the Shaft. The mine water drainage ditch which flows through a location, called the Virgil Location, but not on our property, was cleaned out during the summer.

A new launder or culvert for the drainage of surface water coming from the North of the Mine was built across the road leading to the dry and Engine House.

e. Timber Yard:

We have used the ground along the Coal Dock approach as a timber yard. On account of being cramped for stocking room, we had to start moving the timber to a new location in November. As we had an excess amount of stull timber on hand, it was decided to dispose of what we would not use during the coming year.

This timber was cut in the winter of 1925 - 1926 and delivered at the Mine in the spring of 1926. At the time this timber was purchased, we were not able to tell whether we would have to use timber and cave the ore or could mine by the sub-level stoping method. A large portion of the timber was for cribbing as we were putting up a great number of raises in the course of development. As our development progressed we found we could mine the ore body without timber, except on the main levels.

Arrangements were made with Sawyer-Stoll Lumber Company, the concern from whom we purchased it, to take it off our hands. They sent one man to act as foreman and load out the timber. This was done during December. Fourteen cars were loaded as follows:-

5	Cars	4½" - 7"	X	7½'	long.
3	"	6" - 7"	X	8'	"
3	"	7"and larger	X	8'	"
3	"	7" " "	X	16'	"

While we have had to dispose of this timber at a loss, if we had held it, it would have deteriorated to such an extent to be worthless and been a total loss.

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7. UNDERGROUND:

a. Shaft Sinking:

There has been no Shaft Sinking during the past year.

b. Development:

Third Level:

A raise was started in December, 1926, by Contract No. 1, from the extreme West end of the Third Level drift and was pushed up a vertical distance of 218 feet to the elevation of First Level from the Virgil Shaft. They reached the top in April, when the raise was cleaned down and new ladders and sollars were put in before starting to drift. The raise was in the black slate and some Iron Formation. From the top of the raise, they drifted 30 feet East and holed into an old drift at the exact elevation. The level and stope were entirely free of water and the air was fresh, eliminating any danger from these sources. This level (First Level from Virgil Shaft) is 218 feet above the Third Level from the Spies Shaft and the point of holing approximately half way between the two shafts.

As the floor of the old stope had been mined, it was impossible to reach the shaft through the old drifts. Our original intention was to drift South along the 200' East Co-ordinate a distance of 135 feet to the Shaft. An inspection of the stope showed the hanging firm and standing well, therefore we cut a bench around the edge of the stope for a travelling way. This cut down the cost materially as the dirt was blasted into the stope and took much less time. After the bench was cut, a fence was built along the edge of the stope for safety.

The Virgil Shaft was repaired from surface to the First Level and the second outlet ready for use early in August.

Fourth Level:

The Fourth Level drift was advanced from a point 225 feet across the Spies line Westerly a distance of 670 feet, to within 180 feet of the Sherwood line. This drift cut some very soft treacherous ground that required careful timbering and lagging of the sides. About the middle of March, the drift passed into a harder Iron Formation and we had a seam of hard blue ore in the breast for 50 feet. The analysis of this ore ran 55% Iron and .400 Sulphur, and was dumped on the High-Sulphur stockpile. As it was pushed ahead, several lean ore areas were cut.

At a point 175 feet East of the breast of the main drift, a 20 foot seam of hard high grade ore low in Sulphur was drifted through. After reaching the slate in the breast of the West drift, a stub drift was cut on each side in this hard ore seam and the Deep Hole Machine drilled several holes here. On the main level it showed a lens 20 feet by 39 feet.

Contract No. 14 also drove a cross-cut South following the course of Hole No. 66. In this way we could watch the position of the breast and check up on the Sulphur content. This drift cut only 60 feet of low Sulphur ore and again passed into high Sulphur ore but was extended to the balck slate.

Drill Hole No. 90 drilled East from a point 30 feet North of the South breast, after 15 feet of High Sulphur ore passed through 65 feet of low Sulphur material. Then No. 91 was drilled from the same set-up to the Northeast and cut the 15 feet of high Sulphur ore and then only had 10 feet of low Sulphur ore and then rock.

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7. UNDERGROUND:

b. Development:

450' - 475' and 500' Sub-Levels:

The development of these Sub-Levels by Contracts Nos.: 10 and 14 shows very little low Sulphur ore. The raises that were started in the low Sulphur area on the main level showed higher content as they were pushed upward.

Contract No. 10 put up a raise on either side of the drift, 175 feet East of the breast of the main drift in the high grade ore cut in May. They found the ground on the 450' Sub-Level very hard and mixed with chert and as they drifted West, it gradually pinched down to only a drift wide. It appears that this ore is the top of a lens.

Contract Nos.: 10 and 14 put up several raises from the South Cross-cut to develop the territory above. The North raise on the East side of the drift was up 80 feet to the rock and the South raise on the West side had rock at 93' above the level.

Sixth Level:

The major portion of the Virgil development was concentrated on the Sixth Level and Sub-levels above, Northwest side.

Two to three gangs were engaged in drifting and raising from this section of the mine during the entire year. Contract No. 8 together with No. 6, did all the development drifting on the main level. No. 8 drove five cross-cuts to the Southwest under the area to be stoped. No. 6 drove the drift Northwest from No. 1 Cross-cut to the Sherwood line and thence followed it North to the rock. No. 6 Contract started the stoping from raises put up from the end of their drift.

Contract No. 7 put up raises in the drift driven by Nos. 6 and 8 at 25 foot intervals and staggered them on both sides of the drift, making a raise every twelve and a-half feet.

During December Contract No. 12 started a raise in rock from the East side of the drift opposite No. 52 Diamond Drill Hole. This raise is being put up so the ore on the 145' and 165' Sub-Levels can be mined through it. The Sub-level development is well in advance of mining operations.

Southwest Side:

90' Sub-Level:

The only development done on this Sub-level was during January when Contract No. 18 drove a rock drift back in the foot rock for a travelling way into the stope.

120' Sub-Level:

Contract No. 12 drifted in to the foot rock South of No. 606 Raise and then drifted Southerly to the stope, keeping about 10 feet from the rock. On account of the slabby nature of the foot rock, it was decided to leave 10 to 15 feet of ore to prevent it from caving.

165' Sub-Level:

Contract No. 15, from the top of the North raise put up from No. 1 Cross-cut, drifted Northeast to connect with a drift off No. 604 Raise for a new travelling road to this Sub-level. They had not holed their drift when they were taken out when the stope was abandoned.

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7. UNDERGROUND:

b. Development:

185' Sub-Level:

Contract No. 12 put up several raises from the 165' Sub-level and they blocked out the ore at this elevation into pillars. They are driving a drift to the Northeast to hole to No. 604 Raise at the time this stope began caving and then was abandoned.

210' Sub-Level:

This Sub-Level was developed from raises put up from the 185' Sub-Level by Contracts Nos.: 10 and 12. Development of this Sub-Level was just well under way when on account of the hanging caving this section of the mine had to be abandoned.

230' Sub-Level:

This Sub-level was developed during May by Contract No. 12 who had driven a drift close to the hanging and then cross-cut to the foot at 25 foot intervals. Only a small area had been opened up. A raise put up from the 185' Sub-Level connected this place with the 245' Sub-Level, the elevation of the Fifth Level, which had been developed in 1926 from No. 604 Raise.

Northwest Side:

The development of this side of the Sixth Level was started in the Fall of 1926 and rushed as hard as possible during the winter of 1927. As this area was larger than the Southwest side, more gangs could be employed outlining and blocking out the ore into pillars.

90' Sub-Level:

This Sub-Level was developed by a drift from No.638 driven Northeast parallel to Cross-cut No. 2 on the Sixth Level and then drifts at right angles at 25 foot intervals. The two drifts to the East of No. 638 Raise were cut off on the North by rock. Deep Hole No. 73 drilled from a drift along the Sherwood line to the East and North of the breast of these drifts showed ore on the other side of this rock. It looked at first as if there was a sharp fold in the rock but it developed as mining progressed that there were two horses of rock in the ore. This Sub-Level has been completely developed North of No. 2 Cross-cut and East to the rock in the vicinity of Diamond Drill Hole No. 52.

120' Sub-Level:

Contract Nos. 11 and 15 were employed on this elevation from January until May outlining and blocking out the ore. The development of this Sub-level showed the hanging coming down and dividing the ore body into separate fingers. While this rock reduces the ore tonnage somewhat, if it did not exist, it would be necessary to leave ore pillars to prevent too great a swing to the hanging and have it cave. This rock does not reach the 90' Sub-Level and an ore pillar will be left temporarily under it.

145' Sub-Level:

The Northwest part of this Sub-Level was developed from a raise put up from the 90' Sub-Level in the drift along the Sherwood line. Raise No.638 was in rock at this elevation but after development showed up ore to the East, No. 638 was pushed up to this Sub and a drift driven Northwest through the rock to the ore. The ore in the North finger is only 45 to 50 feet wide and pinches out 180 feet East of the Sherwood line.

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7. UNDERGROUND:

b. Development:

145' Sub-Level: (Continued)

The ore to the South of the rock has been developed from Raises Nos.: 622 and 624. The ore in this finger is about 100 feet between the rock at the widest point. During the latter part of the year, Contract No. 15 was developing the territory West of Diamond Drill Hole No. 52. The rock had been well outlined on the East, but from its location on the 165' Sub-Level, it looked as if it might be only a seam and more ore on the other side of the rock.

The Deep Hole Machine was set up in the North end of the most Easterly drift and a hole drilled Southeast. This hole cut 40 feet of ore showing a sharp turn in the rock at this point.

165' Sub-Level:

Contract No. 16 developed this Sub-level from a riae put up from the 90' Sub-Level at the North end of the drift along the Sherwood line. The ore was only 35 feet wide along the boundary but widened out a short distance to the East and then came together. It pinched out entirely about two hundred feet East and then there is a barren area for 75 feet and ore again.

The ore in the vicinity of No. 52 Diamond Drill Hole has been developed from Raise Nos. 622 and 620. Ore has been developed to a point 75 feet East of No. 52 Hole, while on the Sub. below the rock is 50 feet further to the West.

The development of the ore above the 165' Sub-Level will be difficult on account of no raises being put up in this area and the dirt will have to be transferred. A raise has been started from the main level but will not reach this elevation until the middle of February.

As soon as sufficient raises are up from the main level, this ore could be stoped, as it is separate from any other that is being mined at the present time. The ore in this territory is all low in Sulphur.

185' Sub-Level:

Contract No. 16 started development of this Sub. in May. It was first opened from a raise put up from the 90' Sub-Level and then from a raise at the East end of the Sub-Level. The ore was very narrow along the hanging, only averaging about 15 feet. It gradually opened up until 200 feet East of the boundary it was 60 feet.

Contract No. 12 has been developing the area above Nos. 622 and 620 raises during September and October. The ore body at this point is small but will probably open up as we work East.

210' and 230' Sub-Levels:

Contract No..12 has raised from the 185' Sub. and developed a small amount of ore on these Sub-levels. It is only 15 feet wide by 60 feet long. Just how much of this we will be able to mine is a question.

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7. UNDERGROUND:

c. Stoping:

The ore hoisted the past year has practically all been secured from the Virgil Sixth Level. The Fourth Level only produced 3609 tons. The Northwest area has furnished most of that hoisted from the Sixth Level. The Southwest Stope up until it was abandoned in June, was furnishing 50% of our output.

Southwest Stope:

When driving No. 4 Cross-cut on the Southwest side, it developed some ore to the West and South and the Cross-cut No. 5 was driven which was mostly in rock. However, at the South end of this drift, a number of raises were put up and Contract No. 13 opened up a small stope which was an extension of the main one under a flattened hanging. This ore was high grade and furnished a nice product during March and April at which time, stoping was started on the Northwest side.

Contract No. 17 continued to stope in the Southwest area, working from the South to the North. They had just holed through to the 185' and 210' Sub-Levels in May. This stope had been worked so that the upper Sub-Levels over hang the stope underneath.

In May several ore pillars on the 120' and 145' Sub-Levels, caved into the stope and then the hanging kept dropping away from time to time. In order to prevent further caving, we at once decided to work the face of the stope, inclining it so that the top Subs would be mined back before the bottom ones. Unfortunately, the hanging continued to cave and the ore on the foot rock slid off and the entire stope was filled up to the 230' Sub-Level within a few days.

It had been the experience of most of the other operators in this district that when the stopes cave and fill with black slate, that after a time they begin to burn and cause more or less trouble. In anticipation of a similar condition, we have blocked off every opening leading into the stope.

Three concrete dams were built on the Sixth Level and twelve brattices in the Sub-levels drifts. The brattices were built of one inch boards, tar paper and one inch boards on top of the paper. The outside edges were plastered with wood fiber so as to make them perfectly air tight. By cutting off all circulation, we have eliminated the danger of catching fire. Before building the dams and brattices all pipes, rail, ties, chute irons and electrical equipment were taken out and salvaged. A pipe with a valve on it was set in the concrete dams on the level for draining off the water. No ore was drawn from this stope after June 3rd.

Northwest Stope:

This stope was started by No..6 contract on April 25th, and since June has furnished our entire hoist. After the stope was fairly well started three gangs of miners were employed breaking ore in this stope. As the stope was worked East, we found a small leader reaching to the 210' and 230' Sub-Levels.

The rock hanging has come down and cut the ore body into several separate fingers. The rock does not reach the 90' elevation so an ore pillar will have to be left to support this rock. Since November, one gang of No. 6 Contract has been connecting the raises on the South side of this pillar and coneing them and another has started stoping at the West end. Only one crew is left in the North finger as it is too narrow to work more men.

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7. UNDERGROUND:

d. Timbering:

We are only using timber in the main level drifts and for building chutes. We used a little less timber in 1927 than 1926. This is due to our not putting up any more cribbed raises, while in 1926, when we first started to develop the Virgil ore body, we cribbed all the raises. We built more chutes and drifted through more ground on the main levels that required timbering during the past year than in 1926. The increase of the stull timber off-set part of the cribbing timber used the previous year.

We used considerable more lagging in 1927 on account of the repairs made to the Old Virgil Shaft. The old timber had rotted away and the ground had caved back some distance, requiring a large amount of blocking.

On account of the increased production the cost per ton for all timber is just about half what it was the year before.

Statement of Timber Used:

	Lineal Feet	Avg. Price per Foot.	Amount 1927	Amount 1926
6" to 8" Timber	17,620	.045	792.90	1,761.28
8" to 10" "	5,722	.095	491.38	445.04
10" to 12" "	7,848	.101	792.65	435.93
12" to 14" "	2,896	.149	431.49	217.63
14" to 16" "	208	.149	30.99	
Total Timber - 1927	34,294	.0737	2,539.41	
" " - 1926	55,186	.0518		2,859.88
		Per 100'		
6' Lagging	173,500	.73	1,265.20	952.93
7' "	53,293	.655	349.07	113.40
Total Lagging	226,793	.712	1,614.27	
Poles	20,420	1.270	259.34	581.97
Total Lagging & Poles - 1927	247,213	.758	1,873.61	
" " " " - 1926	172,483	.956		1,648.30

Product	153,079	76,675
Feet of timber Per Ton of Ore	.446	.719
" " Lagging " " " "	.675	1.550
" " " per foot of timber	1.512	2.156
Cost per ton for timber	.0166	.0372
" " " " Lagging	.0105	.0139
" " " " Poles	.0017	.0076
" " " " all timber, etc.,	.0288	.0587
Equivalent of stull timber to board measure	62.9160	80.9830
Feet of board measure per ton of ore	.4110	1.0550
Cost for timber, lagging, poles, etc., - 1927	$4413.02	
" " " " " " - 1926		$4508.18

e. Drifting and Raising:

Very little rock drifting was done except in the development of the Fourth Level. The Sub-Level drifting was with a few exceptions all in ore.

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7. UNDERGROUND:

e. Drifting and Raising: (Continued)

The following is a comparison of drifting and raising done in the years 1926 and 1927:-

Year	Drifting Ore	Drifting Rock	Raising Ore	Raising Rock
1926	7696	2150	2892	219
1927	8213	1397	2849	562

The increase in ore drifting for 1927 is due to the extensive sub-level development in blocking out the ore with the small dog drifts. There was a decrease in rock drifting compared to 1926, as the only main drift in rock was the Fourth Level.

The amount of ore raising is about the same for each year as we have been developing continuously requiring a great deal of raising from Sub-Level to Sub-Level. The increase in rock raising in 1927 is due to the one raise in rock from the Third Level to the old First Level Virgil, amounting to 240 feet, and also raises put in rock for travelling roads into the stope and also for testing out the back in places.

f. Explosives, Drilling and Blasting:

On account of our high powder costs at the Virgil Mine, we have had the Powder experts study the conditions with us but we have found nothing better than the grade of powder we are using.

When working in the Southwest stope the ore broke in very large chunks and we tried different grades of powder and methods of placing the holes, but we got no relief. The ground in the Northwest area is harder and is more friable and breakes better. We are not entirely free of chunks, however. The increase cost per ton for powder in 1927 is due to the Northwest stope getting very narrow in the upper sub-levels and requiring a larger amount of Explosives for the tonnage broken. Then too the ground is tight and takes more powder to break it.

Statement of Explosives Used:

	Quantity	Average Price	Amount 1927	Amount 1926
40% Powder	77,725	.1325	10,298.61	2,975.83
60% "	9,200	.1380	1,271.00	
50% "	1,450	.1384	200.68	
Total Powder	88,375	.1332	11,770.29	2,975.83
Fuse	191,850	5.7400	1,101.23	295.30
Caps	24,700	9.5560	263.05	78.72
Cap Crimpers	27	.4500	12.23	2.50
Powder Bags,	9	1.2500	11.25	
Tamping "	8,150	.2520	20.56	2.08
Total Fuse, etc.,			1,408.32	378.60
Total Explosives			13,178.61	3,354.43
Product			117,769	31,962
Pounds Powder per ton of ore			.7504	.6950
Cost per ton for powder			.0999	.0931
" " " " Fuse, etc.,			.0119	.0118
" " " " All Explosives			.1118	.1049
Avg. Price per pound for powder			.1332	.1340

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8. COST OF OPERATING:

a. Comparative Mining Costs:

	1927	1926	INCREASE	DECREASE
Production:				
Ore Produced	153,079	76,675	76,404	
Average Daily Product	500	251	249	
Tons per man per day	4.50	2.20	2.30	
No. Days Operating	306	306		
No. Shifts & Hours	2 - 8	2 - 8		
Costs:				
Underground Costs	1.431	2.891		1.460
Surface Costs	.241	.416		.175
General Mine Accounts	.141	.242		.101
COST OF PRODUCTION	1.813	3.549		1.736
Cost of Loading & Shipping	.007	.038		.031
Cost at Mine per Cost Sheet	1.820	3.587		1.767
Depreciation:				
Plant & Equipment	.200	.153	.047	
Development		.227		.227
Taxes	.121	.252		.131
Central Office	.103	.194		.091
Welfare, Safety, Hospital, etc.	.024	.031		.007
Cost Adjustment	.029	.033		.004
Total Cost at Mine	2.298	4.477		2.179
Expenses Beyond Mine:				
Royalty	.407	.407		
Rail Freight	.820	.820		
Lake Freight	.655	.655		
Cargo Insurance & Analysis	.010	.010		
Shrinkage	.035	.057		.022
Total Cost Lower Lake Ports	4.225	6.426		2.201

b. Detailed Cost Comparison:

(1) Days and Shifts:

The Mine operated on the same schedule; two eight-hour shifts, six days per week, both in 1927 and 1926 and the days worked were the same each year.

(2) Production:

We about doubled our 1926 production in 1927. In 1926, we were still in the development stage at the Virgil property and did not start actual mining until July 19th of that year, and were handicapped even after that date, as our mining was very close onto the development drifting and raising. We reached a normal production basis by April, 1927, and continued through the balance of the year. We exceeded our estimate of production which was placed at 120,000 tons.

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8. COST OF OPERATING;

d. Detailed Cost Comparison: (Continued)

(3) Cost of Production:

The large decrease in Cost of Production and Total Cost at the Mine is due to the increased output and the fact that we were mining the entire year of 1927, compared with mostly development work during 1926.

We had a stockpile over-run of 2,925 tons which when taken into account, reduces the total cost at the Mine from $2.298 to $2.225 per ton. The sale price of Virgil ore at the Mine is $2.258 per ton which shows a profit of $0.033 per ton.

(4) Underground Costs:

Exploring in Mine:

Year	1926	$7,146.36
"	1927	3,264.67
Decrease for 1927		3,881.69

During 1926, we drilled an underground hole which was done by Diamond Drill Contractor, Ira Odgers, and amounted to $2197.50. The Deep Hole Machine was operated the entire year of 1926, while in 1927, it was idle from March 1st until July 11th. The drill cost per foot of ground with the Deep Hole Machine shows an increase, however, for 1927, due to the hard ground drilled. The cost per foot in 1927 was $2.399 compared with $1.83 in 1926.

Development in Rock:

Year	1926	$39,588.07
"	1927	18,705.55
Decrease for 1927		20,882.52

This large decrease in cost of rock drifting for 1927 is explained by the difference in footage, namely, 1709 feet of rock drifting in 1927 compared with 2569 feet in 1926. The cost per foot was considerably less in 1927, being $10.95 per foot for drifting compared with $15.41 for 1926. This difference is due to the softer ground encountered. The greatest footage done in 1927 was in the course of the development of the 4th Level, which was for a large portion of the distance in very soft material.

Development in Ore:

Year	1926	$61,300.21
"	1927	46,851.49
Decrease for 1927		14,448.72

There was considerably more development work in 1926 than 1927. We were confined to development entirely until July 19th, 1926, when we first started stoping on the Virgil property. Our 1927 operations were merely stoping with a limited amount of development work, explaining this large decrease for 1927.

Stoping:

Year	1926	$16,314.14
"	1927	56,344.46
Increase for 1927		40,030.32

In 1926, the Virgil property was under development to a point where stoping could be begun until the middle of July; therefore, the 1926 amount is for less than a half year compared with the entire year of 1927 and more extensive operations.

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8. COST OF OPERATING:

b. Detailed Cost Comparison:

(4) Underground Costs: (Continued)

Timbering:

Year	1926	$19,990.33
"	1927	18,837.14
Decrease for 1927		1,153.19

This decrease is entirely in labor and due to a less cost on surface for framing cribbing for raises. During 1926 when the Virgil Mine was in the development stage, a great number of cribbed raises were put up, while during the past year, our raises have been put up without timber.

Tramming:

Year	1926	$18,651.99
"	1927	21,435.19
Increase for 1927		2,783.20

We hoisted almost double the product in 1927 compared with that for 1926. We were able to do this with very little additional labor, the cost per ton being $0.14 for 1927 compared with $0.243 for 1926.

Pumping:

Year	1926	$11,461.65
"	1927	10,536.42
Decrease for 1927		925.23

We have employed less labor on our pumps in 1927 than we did in 1926. After June, when we connected into the Location Water Supply of the Village system, we were able to discontinue the 3rd Level Pump-House, laying off two pumpmen, which explains this decrease for 1927.

Compressors & Air Pipes:

Year	1926	$22,911.42
"	1927	22,770.00
Decrease for 1927		141.42

Conditions affecting the cost relative to this account were about the same each year and the decrease is very small compared with the total operating cost.

Underground Superintendence:

Year	1926	$6,532.63
"	1927	6,310.78
Decrease for 1927		221.85

This decrease is due to the bosses putting in more over-time in 1926 when cutting out from the sahft for the 4th and 5th Level plats, which was done over the week end.

Cave-in:

Year	1926	$365.44
"	1927	
Decrease for 1927		365.44

The drainage ditch carrying the surface and mine water across the mine area above the North stope of the First level, Spies, was changed onto solid ground, as the hanging in this stope started to drop away and we were apprehensive that it might reach through to surface.

SPIES-VIRGIL MINE
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8. COST OF OPERATING:

b. Detailed Cost Comparison: (Continued)

(4) Underground Costs:

Maintenance Accounts:

Compressors & Power Drills:

Year	1926	$467.61
"	1927	546.97
Increase for 1927		79.36

The charges against this account are small for each year. The increase is due to the installation of a set of new valves in the compressor during the latter part of 1927.

Hand Tramming Equipment:

Year	1926	$66.14
"	1927	
Decrease for 1927		66.14

The 1926 charges represent repairs made to the cars used in tramming the Spies ore on the 3rd Level. There is no need of this Equipment in connection with the mining of the Virgil ore.

Electric Tram Equipment:

Year	1926	$12,702.06
"	1927	11,638.53
Decrease for 1927		1,063.53

There was less main drifting done in 1927 than the previous year, requiring less extensions to tracks and trolley lines, explaining the decrease for 1927.

Pumping Machinery:

Year	1926	$4,215.13
"	1927	1,815.73
Decrease for 1927		2,399.40

We had continual trouble with the Prescott Pumps located in the 8th Level Pump House during 1926, and while the Prescott Company replaced the defective parts, we had to stand the expense of dismantling and replacing same. While we have broken two crank shafts on these same pumps during 1927, and had to stand the expense of one new one amounting to $850.00 in addition to the repair labor, our 1927 trouble has not been as great as it was in 1926.

(5) Surface Costs:

Hoisting:

Year	1926	$6,586.69
"	1927	8,673.90
Increase for 1927		2,087.21

This large increase is entirely due to the increased production in 1927, which was approximately double that of 1926.

Stocking Ore:

Year	1926	$4,903.12
"	1927	9,187.32
Increase for 1927		4,284.20

The large increase is due to the increased tonnage stocked during 1927. The cost per ton of $0.061 is very high due to our stocking method which requires considerable labor to handle our present production.

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8. COST OF OPERATING:

b. Detailed Cost Comparison: (Continued)

(5) Surface Costs:

Crushing & Screening at Mine:

Year	1926	$3,086.84
"	1927	3,127.08
Increase for 1927		40.24

While double the tonnage was handled in 1927, still there is only one man's time to charge to Crushing & Screening and the other expense being principally electric current. The cost of operating the Crushing & Screening is about the same regardless of the tonnage handled.

Dry House:

Year	1926	$3,611.29
"	1927	3,137.96
Decrease for 1927		473.33

This decrease is explained by the installation of a new hot water tank, feed water pump and shower heads made in 1926.

General Surface:

Year	1926	$4,765.36
"	1927	2,546.34
Decrease for 1927		2,219.02

During 1926 we were put to considerable expense spreading a burning rock pile, which explains the decrease for 1927.

Maintenance Accounts:

Hoisting Equipment:

Year	1926	$2,623.58
"	1927	2,367.85
Decrease for 1927		255.73

The general repairs to hoisting equipment were about the same each year. A new eight-foot head sheave was installed in the Shaft House in 1926, explaining this decrease.

Shaft:

Year	1926	$474.51
"	1927	6,624.37
Increase for 1927		6,149.86

In 1927 we opened the old Virgil Shaft from surface to the First Level above the old workings, a distance of 173 feet. In addition to this work, we re-timbered the Spies Shaft surface to ledge, a distance of 67 feet, explaining the large increase against this caption.

Top Tram Equipment:

Year	1926	$335.30
"	1927	260.97
Decrease for 1927		74.33

Less repairs made to top tram cars during 1927 than 1926.

Docks, Trestles & Pockets:

Year	1926	$3,422.26
"	1927	829.72
Decrease for 1927		2,592.54

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8. COST OF OPERATING:

b. Detailed Cost Comparison: (Continued)

(5) Surface Costs:

Docks, Trestles & Pockets: (Continued)

During the fall of 1926, we erected portable trestles for stocking Spies and Virgil ore for the first time. Previous to this date, we had been end dumping and building out from track as we filled the stockpile ground. The original cost of a trestle is charged to this caption, explaining the decrease for 1927.

Mine Buildings:

Year	1926	$2,073.80
"	1927	149.36
Decrease for 1927		1,924.44

Only minor repairs were made to mine buildings in 1927, while the heavy charges for 1926 covered a part of the expense of enclosing the Shaft House with corrugated sheet iron, a new concrete floor in the Shop Building and 250 feet of new fire hose.

(6) General Mine Accounts:

Insurance:

Year	1926	$152.04
"	1927	1,019.07
Increase for 1927		867.03

This large increase is due to an adjustment in July 1927, account of Fire and Boiler Insurance policies which should have been charged previous to January 1st, 1927.

Engineering:

Year	1926	$2,117.94
"	1927	2,488.86
Increase for 1927		370.92

More Engineering work required during 1927 than the previous year.

Analysis:

Year	1926	$2,324.51
"	1927	2,030.09
Decrease for 1927		294.42

On account of less drifting, we took fewer samples for Analysis Maps, explaining the decrease for 1927.

Personal Injury Expense:

Year	1926	$6,680.22
"	1927	7,472.13
Increase for		791.91

While we had fewer accidents at the Spies Mine in 1927 that received compensation than in 1926, a large portion of the 1927 is due to a settlement with Renaldo Feroni in June, 1927, on account of a permanent injury. The large expense for 1926 was due to a fatal accident.

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8. COST OF OPERATING:

b. Detailed Cost Comparison: (Continued)

(6) General Mine Accounts:

Safety Department Expense:

Year 1926	$ 18.54
" 1927	156.48
Increase for 1927	137.94

The Fire Helmets were transferred from the Republic Mine to the Spies-Virgil Mine during the summer of 1927, and a team of six men were trained several times a month for the balance of the year, explaining the increase for 1927.

Telephones & Safety Devices:

Year 1926	$804.36
" 1927	1,109.01
Increase for 1927	304.65

More safety devices were installed during 1927 than in 1926.

Local General Welfare:

Year 1926	$291.91
" 1927	221.57
Decrease for 1927	70.34

This expense is for a visiting Nurse which is proportioned on a Pay-Roll basis for the mines which she serves. The Spies- Virgil Mine employed less men during 1927 than 1926, explaining this decrease.

Special Expense:

Year 1926	
" 1927	$378.39
Increase for 1927	378.39

The charges for 1927 against this account represent the Cleveland-Cliffs Iron Company's proportion of the Iron County Taxpayers Association's expense.

Mine Office:

Year 1926	$6,136.86
" 1927	6,852.62
Increase for 1927	715.76

This increase for 1927 is in both labor and supplies. An extra man was employed in the office during the entire year of 1927, compared with only part time for 1926.

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9. EXPLORATIONS AND FUTURE EXPLORATIONS:

b. Underground Explorations:

The Deep Hole Drill was operated during January and February and then was idle until July 11th, after which date it worked the balance of the year. By the end of February we had secured all the information desired, to be able to proceed intelligently with our development and mining. After the Fourth Level drift reached the ore and cut such a large amount of high Sulphur material, the drill was started to outline the ore area and determine the Sulphur content.

The following table shows the location, depth and footage of ore of the holes drilled in 1927:-

Hole No.	Location	Depth of Hole	Footage of Ore	Remarks:
71	Fourth Level	19	15	Deepened from 181'-200'
72	" "	23	None	" " 143'-166'
73	90' Sub-Level	92	45	20' of ore ran .462 Sul.not considered.
74	" "	112	15	
75	" "	36	15	
76	" "	6	1	Only started when drilling suspended.
77	Fourth Level	27	5	
78	" "	32	10	
79	" "	43	35	
80	" "	39	30	
81	" "	27	10	
82	" "	76	None	35' of ore High Sulphur.
83	" "	37	"	5' " " " "
84	" "	62	"	15' " " " "
85	" "	25	"	10' " " " "
86	" "	36	"	
87	" "	17	"	
88	" "	22	"	
89	" "	130	"	85' of ore High Sulphur.
90	" "	115	65	25' " " " "
91	" "	75	10	
92	" "	103	20	
93	Sixth Level	136	10	
94	Fourth Level	1	None	Drill set up and then moved to 145' Sub.
95	145' Sub-Level	70	40	
Total	25 Holes	1361'	326'	

There were twenty-five holes drilled having a total depth of 1,361 feet. The ore footage exclusive of the high Sulphur ore amounted to 326 feet or 24% of the footage drilled.

The total cost of drilling these twenty-five holes was $3264.67, or a cost per foot of $2.399. This compares with a cost of $1.83 per foot for the 2663 feet drilled last year. The harder ground drilled and heavier repair charge on the drill explains the large increase in cost per foot of ground drilled in 1927.

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9. EXPLORATIONS AND FUTURE EXPLORATIONS:

b. Underground Explorations: (Continued)

Holes Nos.: 71 and 72, drilled in 1926, were deepened a short distance and had to be stopped on account of the slow progress. These two holes, along with Nos.: 66, 67, 68, 69 and 70, developed the discouraging situation of the ore on the Fourth Level and above being contaminated with Sulphur. The Cross-cut to the South checked the results of these holes.

When driving the Fourth Level drift we cut a 20' seam of hard, low Sulphur, high grade ore, 175' East of the breast of the main drift. This ore seemed to be isolated and it looked like a wonderful opportunity to develop a new stope. The Deep Hole Machine was started to work and Nos.: 77, 78 were drilled from the North side of the drift and Nos. 79, 80 and 81 from the South side.

The ore shown in holes Nos. 79 and 80 was developed from the 450' Sub-Level but found too small and mixed to warrant opening up.

Holes Nos. 82, 83, 84 and 85 were drilled around the breast of the main drift and what ore was cut was all High Sulphur.

Holes Nos. 86, 87 and 88 were in the nature of test holes in the Black Slate.

Holes Nos. 89, 90, 91 and 92 were drilled to outline the low Sulphur area so that further development could be carried on. The results of these holes were not encouraging.

Holes Nos. 73, 74 and 75 drilled from the Northwest corner of the 90' Sub-Level gave us information that ore existed further to the North than indicated by the rock struck in several development drifts. At first we thought there was a fold in the rock but it finally worked out as mining progressed to be a rock pillar in the ore.

Hole No. 93 was drilled from the Sixth Level, East from a point opposite No. 52 Diamond Drill Hole. We thought these was a possibility of ore back of this rock as Hole No. 52 passed through alternate layers of lean ore and Black Slate. This Hole cut 10 feet of ore from 25' to 35' and was bottomed in Iron Formation. The ground drilled was cherty and very hard and we were only able to reach a depth of 136 feet.

Hole No. 95 was drilled from the 145' Sub-Level from a point Northwest of No. 52 Drill Hole. The horizontal distance between the Black Slate foot on this Sub. and the 165' Sub-Level showed it to be very flat and we thought that there might be ore behind it but this did not prove to be the case.

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10. TAXES:

The following tabulation is a comparative statement of taxes paid in Iron County for the years 1927 and 1926:-

Description	1927 Valuation	1927 Taxes	1926 Valuation	1926 Taxes
Iron County				
Iron River Township				
NE¼ of NW¼ Sec. 24-43-35 40 Acres - -)				
SE¼ of NW¼ " " " " 40 " - -)			83,200	2,070.25
Personal - Stock Pile - - - - - - - - - -			42,000	1,045.20
Supplies & Equipment - - - -			23,000	572.30
Total - - - -			148,200	3,687.75
Collection Fees - - -				36.87
Total Spies Mine - -				3,724.63
Spies Dwellings - - - - - - - - - - - -	5,000	135.72	5,000	124.50
Collection Fees - - -		1.36		1.24
Total Dwellings - - -		137.08		125.74
Spies-Virgil (a)				
E½ of NW¼ Sec. 24-43-35 Spies - -)				
SW¼ of NW¼ " " " " Virgil - -)	455,000	12,350.75	570,000	14,184.03
Stockpile, Supplies & Equipment - - -	145,000	3,935.95		
Total - - - - - - - -	600,000	16,286.70	570,000	14,184.03
Collection Fees - - -		162.86		141.84
Total Spies-Virgil Mine		16,449.56		14,325.87
(a) Total Iron River Township - - - - -	605,000	16,586.64	723,200	18,176.24
Rate		2.7144		2.488
Village of Mineral Hills				
Spies Mine				
a. SE¼ of NW¼ Sec. 24-43-35 - - - - - -)				
a. NE¼ of NW¼ " " " " - - - - - -)			83,200	147.42
Personal - Stockpile - - - - - -			42,000	74.40
Supplies & Equipment - - - -			23,000	40.76
Operating Spies Mine - - - -			148,200	262.58
Dwellings,	5,000	17.14	5,000	8.86
Virgil Mine				
a. SW¼ of NW¼ Sec. 24-43-35 - - - - - -	455,000	1,559.37	570,000	1,009.94
Stockpile, Supplies & Equipment - -	145,000	496.95		
Operating Spies-Virgil - - -	600,000	2,056.32	570,000	1,009.94
Total Mineral Hills - - - -	605,000	2,073.46	723,000	1,281.38
Rate		.3427		.1772
Total Spies-Virgil Mine Township and Village - - - - - - - - - - - - - -	605,000	18,660.10	723,000	19,457.62

a. The mineral valuation of $455,000.00 includes both the Spies and Virgil descriptions noted above for the year 1927. Not divided by Tax Appraiser and any division would be arbitrary. In 1926, a separate valuation was placed on each property.

SPIES-VIRGIL MINE
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10. TAXES:

	1927 Valuation	1927 Taxes	1926 Valuation	1926 Taxes
Bates Township				
Erickson Lease				
SW¼ of Sec. 21-43-34	226,000	7,399.24	225,000	7,650.00
Collection Fee		73.99		76.50
Total Bates Township		7,473.23		7,726.50
Rate		3.288		3.40
Mastodon Township				
Neely Lease				
NW¼ of NE¼ Sec. 12-42-33)				
NE¼ of NE¼ " " " ")	137,000	4,469.21	137,000	4,599.91
NE¼ of NW¼ " " " "	1,400	52.64	1,400	50.26
Total	138,400	4,521.85	138,400	4,630.17
Collection Fee		45.22		46.30
Total Mastodon Township		4,567.07		4,676.47
Rate		3.262		3.345
Village of Alpha				
Neely Lease				
NE¼ of NE¼ Sec. 12-42-33	137,000	2,870.01	137,000	2,829.74
Collection Fee		28.70		28.30
Total Village of Alpha		2,898.71		2,858.04
Rate		2.845		2.086
Total Township & Village		7,465.78		7,534.51

NOTES:-

The Village of Alpha is situated in Mastodon Township, and Mineral Hills in Iron River Township. The valuations as shown here are the same valuations, (either all or in part) as the valuations of the respective Townships.

Although the total ore in the Virgil Mine as of December 31st, 1926, was 2,173,803 compared with 1,512,186 tons for December 31st, 1927, the valuation is less. We appeared before the Tax Commission and asked for relief on account of the high Sulphur content and difficulty of mining a merchantable grade, which explains the difference in valuation for the years 1926 and 1927.

Up until the year 1926, the Tax Commission reported the valuation on the Erickson Lease as $223,000.00 to cover the entire SW¼ of Secton 21-43-34. In 1926, they reported it to the Supervisor as $223,000.00 to cover the S½ of SW¼ of Section 21-43-34 and the Supervisor as Township Assessor added $2,000.00 to the valuation to cover the N½ of SW¼ where the farm is located, but showed it on the Tax Roll as one description, namely, the SW¼. In 1927, the Tax Commission reported the valuation the same as in 1926, but the Supervisor listed the Erickson Lease as two separate descriptions on his Tax Roll and in error added $1,000.00 to the S½ of SW¼ and $2,000.00 for the N½ of SW¼, making the valuation $1,000.00 more for 1927 than 1926.

11. ACCIDENTS AND PERSONAL INJURY:

a. Accidents:

There were twelve accidents at the Spies-Virgil Mine during the past year compared with sixteen in 1926. All but one, in which Andrew Isaacson had three fingers on his left hand blasted, were of a minor nature.

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11. ACCIDENTS AND PERSONAL INJURY:

This accident to Andrew Isaacson occurred at 10:00 A.M. on October 11th, 1927. He had put in pipe for No. 15 Contract who were working on the 145' Sub-Level. He went back to a stub drift near the No. 620 Raise which he was going to climb down and was kneeling on the bottom of the drift taking apart some pipe fittings, using two Stillson wrenches, one of the wrenches slipped and struck a detonator, that must have been either lying on the bottom of the drift or buried in the dirt unnoticed by Isaacson. The blow caused the detonator to explode and severely lacerate the tip of the thumb, index and middle finger of his left hand, break the tips of the finger bones and cuts on face and right leg.

An investigation of the accident brought out that the night shift miners of October 10th found a missed hole in which the fuse and cap was loose. Victor Lindstrom claims he took the fuse and cap from the hole and put it in a stub drift just back of the breast he was working in and blasted it on leaving shift the morning of October 11th. We tried to put the blame of carelessness on Lindstrom and discharge him. He was so insistant that he had blasted the cap from the missed hole and the cap which caused the accident came from some other source, that he was given a five-day lay-off and the other three men working in this place, two days each. We felt that one of the four men were responsible for this detonator lying around on the ground.

b. Safety Work:

A sixty foot flag pole, made of iron pipe, was erected in the grass plot just in front of the Engine House. Mr. Elliott dedicated the flag pole and held the flag raising ceremony at noon on November 1st. The American flag with the National Safety flag flying underneath it will be a daily reminder to the men of our accident prevention campaign. All the day shift men were present and pledged themselves to the furtherance of Safety Work and prevention of accidents.

The five fire helmets from the Republic Mine were transferred to the Spies-Virgil and a rescue crew of six men, were trained during the summer in this work, besides First Aid.

A motor block signal system was installed on the Sixth Level. A switch is thrown by the motor trolley pole when the train reaches the main track to the shaft, and an orange light is turned on at several points in the drift and at the shaft. This is not only a signal to a motor at the shaft that the line is blocked, but also to any one walking through the drift to seek a place of safety. When the train reaches the shaft, another switch is automatically thrown and puts out the lights showing the line is clear. It works the same way on the return trip.

12. EQUIPMENT AND PROPOSED EQUIPMENT:

e. Larry Stocking Cars:

We are stocking ore at the Spies-Virgil Mine by means of a tail rope gravity system. The car runs out by gravity and is then pulled back by an electrically driven puffer. This system is very slow and causing considerable delay in our hoisting. Further, on account of the heavy grade necessary for a gravity tram, we are losing in the height of the trestle and capacity of our stocking ground.

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12. EQUIPMENT AND PROPOSED EQUIPMENT:

e. Larry Stocking Cars: (Continued)

On December 31st, our stocking space, with 161,303 tons on hand, was almost entirely filled. We estimated at the present rate of production there is only sufficient room until February 1st.

Our stocking car only holds 52 cu.ft., while we are hoisting two underground cars per skip or about 90 cu.ft. This means that we must make two trips for every skip hoisted. A new car, large enough to handle a skip of ore, would cost approximately $1,000.00 to build and would not eliminate the disadvantage of stocking ground capacity.

The Larry Car with a remote control system method of stocking ore, permits running on a level track or slightly up-grade and will be quite an advantage at the Spies-Virgil, due to having to stock our ore, high Sulphur ore and rock with the same car. Our stocking cost for the year 1927 was $0.061 per ton and we feel we can cut this to $0.04, showing a saving of $0.02 per ton with the Larry Car System. We can lay off an average of 1½ men per shift, amounting to approximately $300.00 per month in labor cost. On the basis of a 15,000 tons monthly production, a cost of $300.00 is $0.02 per ton.

Figuring for an average year of seven months stocking and five months shipping, the yearly saving would be as follows:-

7 Months	@	15,000 tons	105,000 tons
105,000 tons	@	$0.02	$2,100.00

At this rate, the cost of installation of $5,940.00 would be paid for in less than three stocking seasons.

E. & A. No. 511, for this installation has been approved by the President.

1. Description of Work to be done:
   Purchase and installing of Larry Car System for stocking ore.
2. Expected Results:
   To reduce the cost for stocking ore, 1st, by cutting down the number of men; 2nd, by using larger car and reducing number of trips. This will greatly decrease delays in hoisting which are now occurring.
3. Estimated Time Required to Complete Work:
   Three weeks from date of Authorization.
4. Estimated Cost:

2 Cars complete @ $2,000.00 (R. I. & S. Co.)	$4,000.00
Control Equipment	200.00
Trolley Wire Installation,	300.00
Moving D.C. Rotary Convertor from 8th Level Pump Room to Surface Engine House, (Labor & Supplies)	900.00
Total,	$5,400.00
Contingencies, 10%,	540.00
Total,	$5,940.00

12. DEPRECIATION:

Carried as uncompleted construction until completed. Transfer to Plant Account and participate in the regular depreciation for this Mine.

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14. MAINTENANCE & REPAIRS:

a. Shafts:

(1) Spies Shaft:

During July there was a settlement of the shaft timber just above the ledge. The set just above the ledge bearers was changed and it was found that the timber and lath from surface to ledge was in very bad condition, due to dry rot. Work of retimbering this portion of the shaft was started immediately, being done over the week ends, working Saturday night, Sunday and Sunday night. On account of having pipes in the original pipe compartment and also in part of the cageway, which was divided when the shaft was sunk for development of the Virgil ore body, it was a tedious job and slow.

In August when starting the retimbering, new surface bearers were installed and at the same time, concrete pillars were put under the legs of the Shaft House by the cage road.

Repairs from surface to ledge were completed in October. A total of seventeen sets and surface bearers were renewed. The ladder road in this part of the shaft was replaced and the entire shaft was cleaned from the collar to the bottom.

The skip-road from the collar of the shaft to the dump was enclosed with casing plank. It will probably be necessary to retimber another portion of this shaft next summer.

On account of the acidity of the water, frequent inspections are made of the pipes and cables in the shaft. In June, we had a delay caused by the copper pull-bell wire being eaten through and coining itself on top of the cage. On an inspection early in the year, we found a number of the iron rounds in the ladders above the Third Level eaten away and also many of the pipe hangers. These ladders were replaced with ones with wooden rounds and the pipe hangers were renewed where necessary.

The eight-inch discharge column and six-inch air pipe are being eaten by the water dropping on them in different places. We are preparing to cover these pipes with rubberoid roofing paper.

(2) Virgil Shaft:

In order to have a second outlet for the Spies-Virgil Mine, a raise was put up from the Third Level to the First Level of the Old Virgil Shaft workings, and a travelling way cut around the edge of the stope. This was completed in May. The bottom of the shaft at the First Level was found in fair condition, but was blocked with timber, pipes and dirt 20 feet above.

Preparations for opening the Old Virgil Shaft was started in March. A 2" air line was laid from the Spies Power House to the Virgil Shaft. The railroad track which formerly served the Virgil Mine was in very bad condition, the ties being all rotted and several lengths of rail had been taken out by the Railroad Company to prevent its use. We repaired the track so that the timber, lagging and hoist could be unloaded at the site. Only sufficient repairs were made to allow the cars to run down by gravity and when unloaded, we pulled them back with the mine team so the engine could get them.

Work of retimbering the Shaft was started early in May. A fence was built around the shaft enclosing an area 100' square. The air hoist secured from the Cliffs Shaft Mine was set up and a temporary structure of old lumber and sheet iron built arout it. We erected a derrick made of 4" pipe for lowering timber and handling the bucket with the dirt.

SPIES-VIRGIL MINE
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14. MAINTENANCE & REPAIRS:

a. Shafts:

(2) Virgil Shaft: (Continued)

Two long bearers were set over the Old Shaft and one set placed on top. Then the five old sets at the top of the Shaft were left in place, being reinforced with 2" plank and hung with hanging bolts from the bearers. We did not want to disturb the ground around these sets, as the timber below had dropped away and the sides caved, making an opening about 20' x 24' in daimeter, with the outside dimensions of the Shaft 7' by 9'. Four sets with 4' studdles had to be hung to reach the top of the caved dirt. On account of the large opening behind these sets, it was necessary to use considerable blocking and after reaching the dirt, spiling had to be driven to make room for each new set of timber.

Twelve sets were installed when at a depth of 67 feet, ledge was reached and most of the timber found in place. It was only necessary to change an occasional set from here down to the First Level.

The ladder compartment was almost filled with pipes of all sizes which had to be taken out. Upon completing the work to the First Level, we then went back to surface and changed the top five sets that were left in place until the lower portion was caught up.

The Shaft was cased with one inch plank between the skip-road and ladder-way and new ladders and sollars were put in from surface to the First Level. Before leaving this job, the dirt that had been hoisted from the shaft and dumped near the collar, was graded and a guard constructed so as to keep children away from the opening. A fence enclosing an area 100' square was built at the start of operations here.

The men have been taken into the mine through this opening and arrows are placed along all the drifts leading to the Virgil Shaft.

b. Hoisting Equipment:

On account of the acidity of the water in the Spies Shaft, close watch is given the hoisting ropes. We are fortunate that the cage compartment is not as wet as the skip-road, therefore the effect on the cage ropes is not so great. A new skip rope was installed on August 29th, 1926. It was changed, end for end, on March 20th, after less than seven months' wear and a new rope was put on June 25th, 1927, after being in service only ten months. This latter rope will be turned, end for end, early in January, 1928.

The skips were changed and repaired at frequent intervals through the year. Changes were made in January, March, June, July, October and December. At the time of changing the skip on June 25th, a new clevis and pin was put on.

On January 23rd, 30 feet was cut off the end of the cage rope. It was found well lubricated and the wires in first class condition. This rope was put on new in March, 1925, turned end for end January, 1926, and finally taken off and replaced with a new one on May 25th, 1927, giving two years and two months of service.

Repairs were made to the cage in October when new shoes and wearing plates were put on.

c. Pumps:

The Prescott Pumps located in the Eighth Level Pump room continued to be a source of trouble and expense.

SPIES-VIRGIL MINE
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14. MAINTENANCE & REPAIRS:

c. Pumps: (Continued)

From the time they were installed in the latter part of 1924 until June, 1926, we had no end of breakages, which were always replaced without charge. However, we were put to considerable expense and suffered delays in our development work.

There is an over-hanging bracket carrying one of the bearings of the crank shaft of the pump. There was a considerable vibration in the pump which was practically eliminated by building a concrete pillar under it. This was done in May and June, 1926. Since that time, we have broken a crank shaft in each of the pumps. On May 1st, 1927, the crank shaft on pump No. 209 broke and on December 18th, 1927, the one on Pump No. 208 broke. The latter pump has not been repaired as the new crank shaft has not been received. We were charged $850.00 for the crank shaft furnished in May, and in addition, we had the expense of dismantling and setting up again.

Fortunately, we are pumping less than 300 gallons of water per minute at the present time and have had no delay due to these last accidents to the pumps.

16. WATER SUPPLY:

The installation of the Village of Mineral Hills water system was completed in January. The source of the water supply is the Homer Mine of the M. A. Hanna Company. Water is pumped through a six-inch main to a 50,000 gallon steel tank located on the Spies Location Hill. When pumping was started, it was found to be of too low a head for the water to reach our elevation. A new pump was purchased by the Village and a temporary connection was made from a fire hydrant to our location supply pipe in May. On account of a number of leaks in the main and the heavy spring rains, a permanent connection was not made until some time in June.

The Village charges each of the Companies a flat rate of $31.25 per month for fire protection and the balance of the operating cost is charged on a percentage of the total water used as shown by the meter at each property.

17. CONDITION OF PREMISES:

The Mine and Location premises were cleaned up of the winter's accumulation of dirt and rubbish in April and kept in a neat condition the balance of the summer. We had our mine team clean up the alley behind the location houses several times during the summer.

The team hauled several loads of earth to improve the planting spaces, which helped the general appearance of the Mine grounds. During the fall, the surface about the mine was again given a general cleaning and material about the shops and yards piled beatly.

18. NATIONALITY OF EMPLOYES:

	1927 No. Men	%	1926 No. Men	%
Americans	6	5.5	6	5.2
English	27	24.5	26	22.4
Croation	1	.9	1	.9
Dane	1	.9	1	.9
Franch	12	10.9	9	7.8
Swede	12	10.9	9	7.8
German	2	1.8	3	2.6
Finn	25	22.7	32	27.5
Polish	16	14.6	19	16.3
Italian	6	5.5	7	6.0
Irish	2	1.8	3	2.6
Total	110	100.0	116	100.0

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1. GENERAL:

No underground operations were conducted at the Wade Mine during the past year, in fact, other than repair work, no underground activities have been attempted since the property was closed on May 28th, 1921.

Regular trips of inspection were made through the underground workings during the fore part of the year. Several caves occurred on the sub-levels, which made it impossible to go through these workings and the air finally became so bad that all trips into the subs were suspended. During the summer months, mud and sand, which had accumulated on the main level behind the dams, was cleaned up and hoisted. It was necessary to make some repairs to the lathing in the shaft, which had become badly weakened from dry rot. A new ladder road and sollars were placed in the shaft.

The A. Guthrie Company started erecting their 300-ton shovel the middle of April. Weather conditions were quite unfavorable and stripping operations were not started until May 23rd. The contractor continued stripping until August 18th, when ore loading was started. Between September 28th and October 14th the contractor's operations were transferred to stripping. Between October 14th and November 5th the 300-ton shovel was engaged intermittently in loading ore, as our boat service warranted. The contractor closed down all operations for the year on November 5th.

Pumping conditions were normal throughout the past year and only the usual shut-downs occurred to the pumps for cleaning and minor repairs.

2. PRODUCTION, SHIPMENTS & INVENTORIES:

a. Production by Grades:

Wade Pocket, ----------		
Wade Open Pit, Cleveland-Cliffs Iron Co. Ore----------	140,155	tons.
Wade Open Pit, Oliver Iron Mining Co., Ore----------	10,458	"
Wade Open Pit, to satisfy Helmer trespass----------	1,403	"
Total, ----------	152,016	"

b. Shipments:

All ore produced was shipped.

c. Stockpile inventories:

Wade Ore in Shaft Stockpile, ---------- 219 tons.

This small tonnage of ore in stock is scattered over the old bottom and it will be necessary to scrape into wind rows with a small shovel and later load into cars. It is the intention to load out this small tonnage in stockpile during 1928, as we may not retain our lease on the Wade Mine after next season.

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2. PRODUCTION, SHIPMENTS & INVENTORIES: (Continued)

d. Division of Product by Levels:
Open Pit Ore above 1st Level, ---------- 152,016 tons.

e. Production by Months:

MONTH:	CLEVELAND-CLIFFS IRON COMPANY.	OLIVER IRON MINING CO.	HELMER TRESPASS	TOTAL
August----------	29,293	7,748		37,041
September----------	63,183	2,710		65,893
October----------	33,233	---	1,272	34,505
November----------	14,446	---	131	14,577
Total----------	140,155	10,458	1,403	152,016

f. Ore Statement:

	1927	1926
On Hand Jan. 1st, 1927----------	219	25,205
Output for Year----------	152,016	---
Total----------	152,235	25,205
Shipments----------	152,016	24,986
Balance on Hand----------	219	219
Increase in Output----------	152,016	

g. Delays:
The A. Guthrie Company have a record of sixty hours delay during the season, waiting for Great Northern ore cars. Most of this delay occurred at the end of the season, when our boat service was slow and we had accumulated considerable Wade ore in docks and cars.

3. ANALYSIS:

a. Average Mine Analysis on Output:

	Tons	Iron	Phos.	Sil.	Mn.	Alu.	Mois.	Fe.Nat.
Pit (C.C.I.Co)------	140,155	59.90	.059	6.26	.81	2.07	12.10	52.65
Pit (O.I.M.Co)------	10,458							
Pit (Helmer trespass)	1,403	58.51	.061	5.81	1.20	-	11.63	51.70

The Oliver Iron Mining Company did not care to give us a record of the analysis of their ore, which was loaded out by the A. Guthrie Company during the past season.

b. Average Analysis on Straight Cargoes:

	Mine Analysis			Lower Lake		
Grade:	Iron	Moist.	Fe.Nat.	Iron	Moist.	Fe.Nat.
Wade----------	59.67	12.12	52.44	59.58	12.43	52.17
Wade Special----------	56.28	11.64	49.73	55.43	11.53	49.04
Boeing Special--------	55.14	13.64	47.62	55.33	12.75	48.28

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3. ANALYSIS:
(Continued)

b. Average Analysis on Straight Cargoes - Continued:
The following table shows the tonnages of Wade and other ores going into mixed cargoes during the past season:

	WADE SPECIAL Tons	BOEING SPECIAL Tons.
Wade Pit	66,623	40,695
Helmer	782	1,927
Boeing Pit	0	59,768
Boeing Stockpile	0	28,408
Boeing Lean Ore Stockpile	34,740	8,313
Hill Direct	0	13,028
Total	102,145	152,139

d. Composite Analysis by Lerch Bros. of Season's Shipments:

	Iron	Phos.	Mn.	Sil.	Alu.	Lime	Mag.	Sul.	Loss.
Wade	60.01	.058	.80	6.25	2.03	.55	.32	.014	4.02

e. Analysis of Ore in Stockpile January 1st, 1928:

Tons	Iron	Phos.	Sil.	Mn.	Moist.
219	57.22	.064	7.50	1.27	-

4. ESTIMATE OF ORE RESERVES:

a. Developed Ore:
Assumption: 13 cu. ft. equals one ton
10% deduction for rock
10% deduction for loss in underground mining

Open Pit Ore	419,000	tons.
Underground Ore - West Deposit	804,000	"
Total Developed Ore	1,223,000	"

b. Undeveloped Ore:

East Deposit - Underground Ore	1,515,000	tons.
Deacon Bessemer - Underground Ore	80,000	"
Deacon Non-Bess.- Underground Ore	95,000	"
Total Undeveloped Ore	1,690,000	"
GRAND TOTAL ALL ORE	2,913,000	"

No exploratory or development work has been undertaken at the Wade Mine since the property was closed in 1921. The present estimate is arrived at by making deduction of shipments since the last estimate.

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4. ESTIMATE OF ORE RESERVES: (Continued)

c. Estimated Analysis:

Dried 212°:	Tons	Iron	Phos.	Mn.	Sil.	Moist.
Open Pit Ore	419,000	58.50	.063	.70	7.90	12.35
Underground - West Deposit	804,000	57.50	.074	1.45	7.49	12.50
" - East Deposit	1,515,000	56.91	.075	1.83	7.44	13.50
" - Deacon Bessemer	80,000	56.65	.045	1.16	8.04	12.50
" - Deacon Non-Bess.	95,000	55.77	.053	.42	8.43	12.50
Total	2,913,000	57.25	.072	1.49	7.56	13.00
Natural	2,913,000	49.81	.063	1.30	6.58	--

5. LABOR & WAGES:

a. Comments:

The A. Guthrie Company had no difficulty in securing labor during their 1927 operations. The contractor's scale of wages was pased on 35¢ per hour for common labor. This compares with a scale of 42¢ per hour for common labor in vogue among the mining companies operating on the Mesaba Range.

b. Comparative Statement of Wages & Product:

	1927	1926	Increase	Decrease
PRODUCT	140,155 (Loaded by Cont.)	0	140,155	
No. of Shifts & Hours	0	0		
AVG. NO. MEN WORKING:				
Surface		4		4
Underground		5		5
Total		9		9
AVG. WAGES PER DAY:				
Surface		$ 5.64		$ 5.64
Underground		5.14		5.14
Total		5.37		5.37
WAGES PER MO. OF 25 DAYS:				
Surface		141.00		141.00
Underground		128.50		128.50
Total		134.25		134.25
TOTAL NO. OF DAYS:				
Surface		1428¾		1428¾
Underground		1780½		1780½
Total		3209¼		3209¼
AMOUNT FOR LABOR:				
Surface		8,054.91		8,054.91
Underground		9,150.11		9,150.11
Total		17,205.02		17,205.02

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6. SURFACE:

a. Buildings, Repairs:

The location houses were gone over and such clapboarding as had become loose was nailed down. The location houses are badly in need of paint and bids were secured for doing the work, but on account of the uncertainty of our future operations at the mine, the painting job was not approved. Some of the chimneys in the occupied houses were repaired. One of the boarding houses and two dwellings were occupied by employes of A.Guthrie Company.

b. Stockpiles:

No ore was stocked and no work done on the stockpile grounds during 1927.

c. Tracks, Roads, Transmission Lines, etc:

As a safety precaution a new section of fence was placed around the North side of the pit.

7. UNDERGROUND (OR OPEN PIT:)

a. Stripping:

The A. Guthrie Company commenced stripping operations on May 23rd. The unfavorable weather handicapped the erection of the shovel and track work on the dumps. The first few days work consisted in casting ahead while the shovel was cutting down for its first bench. By the 28th of May the dumps were ready and the movement of waste material was started. At the start of the stripping operations, the ground encountered was hard-pan and clay and progress was somewhat slow.

Stripping operations were conducted until August 18th, when ore loading was commenced. The stripping job had not been completed but our customers were anxious to secure ore and the operation was switched to ore loading accordingly.

By September 28th it was deemed advisable to resume stripping in order to facilitate future operations in the pit. One more cut around the East side of the pit remained to be taken. The cut encountered underground caves and the stripping bank started to slide. The angle of repose was much flatter than we had anticipated and the increased yardage handled was due to this fact. It was quite hazardous to cut under a moving bank and as it looked as though we would not be able to complete the stripping program and move our ore during 1927, the shovel was moved back onto ore October 14th and spent the remainder of the season operating in this material.

A small revolving shovel was used to clean up the old approach tracks, preparatory to ore loading.

b. Development:

No development operations were undertaken at the Wade Mine during the past year.

c. Stoping:

No stoping was attempted.

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7. UNDERGROUND (OR OPEN PIT) (Continued)

d. Timbering:

The only timbering work undertaken at the Wade Mine during 1927 was some proping of the main level and the renewal of some of the lathing in the shaft.

e. Drifting and Raising:

No work of this nature during 1927.

f. Explosives:

No explosives were used at the Wade Mine, other than by the contractor, during 1927.

g. Open Pit Mining and Loading:

All open pit ore loading during 1927 was done under our contract with the A. Guthrie Company. Shipments were started August 18th and were completed November 5th. Due to the fact that the contractor was very late in getting started on ore loading it was necessary to reduce our schedule of shipments from the Wade property for 1927. Our customers' demands for ore made it necessary to begin loading before the stripping was completed and it was also necessary to so conduct the shovel cuts in ore that the machine could be moved back into stripping after the close of the shipping season.

A churn drill was used for blasting holes to shake the ore banks. A large amount of hard ore chunks were encountered during the season and it was necessary for the most part to reduce them by hand. This was a very slow process and at times as many as twenty-five men were engaged on this work in front of the shovel. So far as possible, large chunks were cast behind the shovel to be broken down and not interfere with loading operations. Although precaution was taken to reduce the ore to a desirable size, many chunks were loaded that could not be detected. It is extremely difficult in loading with an 8-ft. dipper to detect all chunks of a foot, or even larger, in diameter.

An agreement was made with the Oliver Iron Mining Company, who own the property to the South of the Wade, to load out some of their ore in order to affect proper grades for work in the Wade pit. Under this agreement 10,458 tons of ore were loaded into D.M.& N.Ry. cars by the contractor and paid for by the Oliver Company at the rate of 75¢ per ton. We anticipate that it will be necessary to load out some 15,000 tons additional of Oliver ore during the season of 1928 in order to affect proper haulage grades to get out all of the Wade ore.

We had agreed to settle the old Helmer trespass with the Oliver Company. In affecting this trespass settlement, which amounted to 1,393 tons, the A. Guthrie Company loaded 1,403 tons into D.M.& N. cars which were delivered to the Oliver Iron Mining Company. The small over-shipment in this trespass will be adjusted in next season's operations.

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9. EXPLORATIONS AND FUTURE EXPLORATIONS:

No explorations were undertaken during 1927.

10. TAXES:

Tax Statement:	1927	1926	INCREASE	DECREASE
Wade Stripping Lands---	$ 0	83.23		83.23
Wade Mine----------	40,805.91	51,077.78		10,271.87
Total Wade Mine-------	40,805.91	51,161.01		10,355.10

Personal property reduced from $4,305.22 for 1926 to $1,049.95 for 1927 - difference $3,255.27. (Stockpile) N½ of NW¼ reduced from $42,003.91 for 1926 to $36,214.64 for 1927 - difference $5,789.27. SE¼ of SW¼ reduced from $4,550.08 for 1926 to $3,330.11 for 1927 - difference $1,219.97.

16. WATER SUPPLY:

The clean water supply for the location is secured from an underground crosscut and is quite limited. In order to take care of the additional requirements on account of the A. Guthrie Company's operations at the Wade Mine, it was necessary to install a new 2" line underground between the crosscut and the clean water pump. The water lines on surface are in very poor condition and it was necessary to dig up the line and make repairs to leaks upon several occasions. Only such work was done as was absolutely necessary.

17. CONDITION OF PREMISES:

Due to the fact that the mine has been idle for such a long period, the premises have not been kept up as would have been the case at an active property, but some clean-up work was done during 1927 and everything considered, the location and mine premises are in fair condition.

18. NATIONALITY OF EMPLOYES:

NATIONALITY:	NO.OF MEN 1927.	NO.OF MEN 1926.
Americans----------	3	3
Austrians,----------	3	3
TOTAL----------	6	6

HILL-TRUMBULL MINE
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1. GENERAL:

Ore operations in the Hill-Trumbull pit and the washing plant were started April 25th and the season's work was completed on October 12th.

Direct Ore loading was carried on from October 14th to October 20th to supply an additional tonnage to make up a shortage from expectations at the Wade Mine.

On the whole the season's operations were satisfactory. It was necessary to curtail at times due to the large balance in the Great Northern dock and in cars. The large quantity of rock encountered in the open pit slowed up wash ore production at times.

2. PRODUCTION: SHIPMENTS & INVENTORIES:

a. Production by Grades:

Hill Crude Ore----------	165,100	Tons.
Trumbull Crude Ore----------	549,290	"
Total Crude Ore----------	714,390	"

Hill Bessemer Direct Shipping Ore----------	6,146	"
Hill Non-Bessemer Direct Shipping Ore-------	51,815	"
Hill Bessemer Concentrates----------	4,850	"
Hill Non-Bessemer Concentrates----------	102,059	"
Trumbull Non-Bessemer Direct Shipping Ore---	15,424	"
Trumbull Bessemer Concentrates----------	1,256	"
Trumbull Non-Bessemer Concentrates----------	334,835	"
TOTAL SHIPPING GRADE----------	516,385	"

The total output for the year was 14,021 tons greater than in 1926, due to an increased demand for a sweetening product for the Boeing special grade and also to supply the proper tonnage for delivery to the Otis Steel Company. The amount of Direct Ore shipped in 1927 was 50,574 tons less than in 1926, with the result that there was an increase of 136,563 tons of crude ore treated.

b. Shipments:

The shipments were the same as the production figures, as all ore mined during the year was forwarded to Lake Erie ports.

c. Stockpile Inventories:

No merchantable ore, either Concentrates or Direct, has ever been stocked at the Hill-Trumbull property, but the following lean material is in stock:

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2. PRODUCTION, SHIPMENTS & INVENTORIES:

c. Stockpile Inventories: (Continued)

Concentrating Material Above 25%:

	Tons	Fe.	Phos.	Sil.
Trumbull--------	82,285	27.42	.036	54.11
Hill----------	10,088	27.18	.035	50.48

Non-Concentrating Material Between 30% and 40%:

	Tons	Fe.	Phos.	Sil.
Hill----------	282	41.81	.033	35.63
Hill----------	7,245	32.90	.028	42.65

The lean ore has been stockpiled in accordance with the terms of the lease, but it is very questionable whether any of the material can be treated to advantage during the life of our operations.

e. Production by Months:

(1) Crude Ore:

MONTH	HILL	TRUMBULL	TOTAL
April----------	-	24,570	24,570
May----------	700	131,810	132,510
June----------	500	131,620	132,120
July----------	14,820	102,290	117,110
August----------	46,550	86,930	133,480
September----------	61,730	61,000	122,730
October----------	40,800	11,070	51,870
TOTAL - 1927----------	165,100	549,290	714,390
TOTAL - 1926----------	57,585	520,242	577,827

(2) Concentrates & Direct Ore:

MONTH:	HILL DIRECT	TRUMBULL DIRECT	HILL CONCTS.	TRUMBULL CONCTS.	GRAND TOTAL
April----------	1,324	-	-	15,696	17,020
May----------	--	6,751	417	75,103	82,271
June----------	2,801	7,513	302	81,921	92,537
July----------	11,507	1,160	9,937	61,238	83,842
August----------	1,885	--	28,616	53,518	84,019
September-------	19,207	--	40,520	40,803	100,530
October---------	21,237	--	27,117	7,812	56,166
TOTAL - 1927----	57,961	15,424	106,909	336,091	516,385
TOTAL - 1926----	108,861	15,098	38,670	339,735	502,364

f. Ore Statement:

All mined ore was shipped during 1927.

g. Delays:

There were no serious delays that affected the operations to any extent during the season of 1927. The following delays were reported:

HILL-TRUMBULL MINE
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2. PRODUCTION, SHIPMENTS & INVENTORIES:

g. Delays: (Continued)

Pit Delays:

DATE	HOURS LOST	CAUSE:
June 1st,	1.00	Broken "A" Frame on Number 27 Shovel.
September 14th,	3.40	Repairs to Number 26 Shovel.
Washing Plant Delays:		
April 30th,	8.30	Pan Conveyor broken down.
May 24th,	.30	Great Northern car off track.
June 1st,	.30	Repairs to Pan Conveyor.
June 2nd,	.30	Picking belt broken.
August 9th,	1.00	Pan Conveyor broken down.
September 25th,	2.45	Pan Conveyor broken down.

Delays Account no Cars:
Direct Pit Shipping Ore ---------- A total of 5.30 hours for season.
Concentrates (Washing Plant)--------- A total of 18.40 hours for season.

h. Delays from Lack of Current:
A total of 1.49 hours during the season on this account.

3. ANALYSIS:

a. Mine Analysis of Production & Shipments:

Grade:	Tons	Iron	Phos.	Sil.	Moist.	Fe.Nat.
Hill Bessemer Direct-----	6,146	60.03	.044	9.97	6.72	55.99
Hill Non-Bess. Direct----	51,815	60.22	.047	9.86	7.64	55.62
Hill Bess. Concentrates--	4,850	61.33	.045	8.05	8.66	56.02
Hill Non-Bess. Concts.---	102,059	59.28	.052	8.90	7.74	54.69
Trumbull Non-Bess. Direct	15,424	56.09	.062	14.32	6.98	52.17
Trumbull Bess.Concts.----	1,256	59.13	.055	6.64	10.29	53.04
Trumbull Non-Bess. Concts.	334,835	59.17	.053	7.57	8.22	54.31
TOTAL - 1927----------	516,385	59.23	.052	8.29	8.02	54.48
TOTAL - 1926----------	502,364	59.32	.067	8.87	8.12	54.50

b. Average Analysis on Straight Cargoes:

	---Mine Analysis----				-Lake Erie Analysis-		
Grade:	Iron	Mois.	Fe.Nat.	Grade:	Iron	Moist.	Fe.Nat.
McCook------	59.19	8.02	54.44	McCook---------	58.79	7.29	54.50
Hill Bess.--	60.45	7.85	55.70	Hill Bess.-----	61.15	6.69	57.06

d. Average Analysis of Crude Ore Production:

	Tons	Iron	Phos.	Sil.
Hill Crude----------	165,100	43.10	.040	33.05
Trumbull Crude---------	549,290	38.20	.039	39.51
TOTAL - 1927----------	714,390	39.33	.039	38.02
YEAR - 1926----------	577,827	43.46	.061	32.25

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3. ANALYSIS:
(Continued)

e. Composite Analysis by Lerch Bros. of Season's Shipments:

GRADE:	Iron	Phos.	Sil.	Mn.	Alu.	Lime	Mag.	Sul.	Loss.
Hill Direct,	60.29	.046	9.26	.13	1.11	.18	.23	.014	3.04
Hill N.B.Concts.	59.29	.051	8.88	.11	.54	.16	.18	.009	5.24
Trumbull Direct,	56.17	.062	14.25	.10	1.10	.19	.20	.006	4.02
Trumbull NB Cts.	59.17	.053	7.53	.12	.46	.24	.17	.016	6.94
Bess. Grade,	60.35	.046	8.71	.13	.71	.14	.25	.014	3.85

4. ESTIMATE OF ORE RESERVES:

a. Developed Ore:

Assumption: 14 cu. ft. per ton for Direct Ore.
18 cu. ft. per ton for Wash Ore.
On account of the very conservative factors used, no rock deductions are made at these properties.

Hill Bessemer Direct Shipping Ore	636,000	Tons.
Hill Non-Bessemer Direct Shipping Ore	1,160,000	"
Hill Bessemer Concentrates	1,403,000	"
Hill Non-Bessemer Concentrates	524,000	"
TOTAL HILL ORE	3,723,000	"
Trumbull Bessemer Direct Shipping Ore	85,000	"
Trumbull Non-Bessemer Direct Shipping Ore	280,000	"
Trumbull Bessemer Concentrates	2,395,000	"
Trumbull Non-Bessemer Concentrates	345,000	"
TOTAL TRUMBULL ORE	3,105,000	"
GRAND TOTAL HILL AND TRUMBULL ORE	6,828,000	"

No exploratory work was undertaken at the Hill and Trumbull Mines during the past year, with the exception of a test drift driven in 244 feet from the West end of the Trumbull pit and shallow test-pits to determine the grade of ore to be mined during 1928. Not sufficient work has been done in the drift to warrant making any ore estimate. It is contemplated that several drifts will be pushed in from the open pit banks during the coming year and no doubt some increase in the estimated ore will result from this exploratory work.

b. Prospective Ore:

There is a possibility of developing additional Hill and Trumbull ore along the North side of the pits and a narrow extension of the ore body to the West of the Trumbull pit. Test-pits put down during 1925 indicate that the ore makes back under the stripping banks and a few scattered drill holes tend to confirm this. It is not advisable to do any exploratory work with drills for the present. If we were to prove up any substantial tonnage, the taxes would be a considerable item of expense, as it would be a number of years before stripping and mining operations would be conducted.

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4. ESTIMATE OF ORE RESERVES: (Continued)

c. Estimated Analysis:

Hill Mine:	Tons	Iron	Phos.	Sil.	Fe.Nat.
Bessemer Direct Shipping,--------	636,000	58.00	.045	13.00	53.36
Non-Bessemer Direct Shipping----	1,160,000	58.00	.055	13.00	55.36
Bessemer Concentrates----------	1,403,000	59.50	.045	8.50	55.04
Non-Bessemer Concentrates-------	524,000	60.00	.059	7.50	55.50
TOTAL HILL ORE----------	3,723,000	58.86	.050	10.48	54.31
Trumbull Mine:					
Bessemer Direct Shipping--------	85,000	56.40	.040	12.79	51.32
Non-Bessemer Direct Shipping----	280,000	58.04	.060	9.85	52.82
Bessemer Concentrates----------	2,395,000	59.00	.043	9.00	54.57
Non-Bessemer Concentrates-------	345,000	59.00	.080	9.00	54.57
TOTAL TRUMBULL ORE----------	3,105,000	58.85	.052	9.16	54.34
GRAND TOTAL HILL TRUMBULL-------	6,828,000	58.86	.051	9.86	54.32

5. LABOR & WAGES:

a. Comments:

(1) Labor:

Labor conditions were quite satisfactory during 1927. No changes in the wage schedule were made for the year.

(2) New Construction:

No new construction work was undertaken at the Hill-Trumbull properties in 1927.

b. Comparative Statement of Wages & Product:

	1927	1926	Increase	Decrease
PRODUCT----------	516,385	502,364	14,021	
No. Shifts & Hours--------	1,10	1,10	-	-
Avg. No. of Men Working---	107	107	-	-
Avg. Wages Per Day--------	5.31	5.25	.06	
Product Per Man Per Day---	26.11	29.78		3.67
Labor Cost Per Ton--------	.2033	.176	.0273	
Total No. of Days---------	19780¾	16872	2908¾	
Amount Paid for Labor-----	104986.78	88601.46	16385.32	

In 1923 - Production from May 5th to October 3rd.
1924 - " " Apr. 26th to Sept. 13th.
1925 - " " Apr. 25th to Oct. 6th.
1926 - " " May 7th to Oct. 9th.
1927 - " " Apr. 25th to Oct. 12th.

In order to furnish cargoes for boats, the Hill-Trumbull Mine was operated 274 hours overtime and the Washing Plant 258 hours. This compares with 137 hours overtime in the pit during 1926 and 182 hours at the Washing Plant.

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6. SURFACE:

a. Buildings, Repairs:

Only incidental repairs were made to the buildings during 1927. In 1928 it will be necessary to paint the company houses and two new roofs will be required.

c. Tracks, Roads, Transmission Lines:

A track crew of twenty men were employed March 31st and this force was employed until ore operations were started. They repaired and extended the track on the North bench in the Hill Mine to the East end of the property and laid a loading track for the thorough cut across the center of the Trumbull pit. The A. Guthrie Company stripping track, which we purchased, was removed from the North berm of the Trumbull pit.

During the month of April some repair work was done on the approach tracks and on the main line leading to the washing plant. This repair work consisted in putting in new ties, changing worn out rails and re-lining.

At the end of the ore season, the track crew was engaged in re-tieing, raising and ballasting the approach tracks and badly worn-out rails were replaced. The service on the approach tracks is quite severe and to avoid any possibility of derailments where the trains are operating at considerable speed, it is advisable to keep the tracks in very good condition and rails that show any appreciable wear are replaced.

Some of the rails on the East main line yard track were changed.

In order to facilitate moving in and out of the shops, a new cross-over was put in from the main line track.

The track crew spent some time the latter part of the year in building a grade into the bottom of the old Hill pit for 1928 ore operations.

On account of the severe weather all track work was discontinued on November 17th.

A pumping station was installed on the North side of the Hill pit to handle the water, which collects during the spring and at times of heavy rains, between the drainage ditch and the crest of the pit. We have had a bad wash here every year and it was thought advisable to install a pump and take the water to the drainage ditch, rather than have it washed down the banks and be obliged to clean up the surface of the ore, from time to time.

The drilling power line was extended to the East end of the Hill pit in connection with drilling operations in the Direct Ore area. A power line was also extended to the top of the North bank of the Hill pit to serve the drainage pump.

The gasoline dragline was moved from the washing plant storage basin to the drainage ditch North of the property the latter part of August and this machine was utilized in widening, deepening and cleaning out the

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6. SURFACE:
(Continued)

c. Tracks, Roads, Transmission Lines: (Continued)
old ditch, the work being finished early in November.

7. OPEN PIT:

a. Stripping:

Aside from some clean-up work at the Northeast corner of the Hill pit and at several other points where material had been washed down the banks, no stripping operations were conducted during 1927.

It was not necessary to move any lean ore material other than that encountered in wash ore operations. During 1926 we handled quite a block of lean ore and it will be necessary to handle quite a quantity of this material during the fall of 1928 along the Southeast corner of the Trumbull pit.

d. Timbering:

Statement of Railroad Ties Used:

1927	1926	Increase	Decrease
6,993	5,736	1,257	-

The operations were more scattered in 1927 than was the case in 1926 and we also did some work in the bottom of the old Hill pit which necessitated extending our tracks. The tie replacements, especially in the approach tracks, were exceptionally heavy during 1927.

Nine hundred and seventy-eight lineal feet of mining timber and over five cords of lagging were used in the drift pushed out from the Trumbull pit.

f. Explosives, Drilling & Blasting:

The one Keystone and one Cyclone drill were operated more or less continuously throughout the past season.

Statement of Explosives Used:

	QUANTITY	AVERAGE PRICE	AMOUNT 1927	AMOUNT 1926
60% Hercules----------	4,700	.1500	705.00	456.00
40% Hercules----------	4,965	.1303	646.96	418.60
Hercules Special #1---------	12,750	.1400	1,785.00	728.00
Hercules Special #2---------				6.75
DuPont Blasting Powder #2---				169.50
DuPont 40%----------				26.00
Trojan CC----------				66.90
Trojan 40%----------				370.50
Trojan 40C----------	3,000	.1300	390.00	6,090.50
Trojan 50%----------	5,000	.1400	700.00	
Hercules Pluto----------	45,550	.1130	5,147.15	1,796.70
Total Powder----------	75,965	.1234	9,374.11	10,129.45

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7. OPEN PIT:
(Continued)

f. Explosives, Drilling & Blasting: (Continued)

Statement of Explosives Used: (Continued)

	QUANTITY	AVERAGE PRICE	AMOUNT 1927	AMOUNT 1926
Fuse, ----------	1,100	.0061	6.78	4.96
Caps, ----------	850	.0106	9.01	8.79
Electric Exploders,---------	2,100	.0845	177.55	165.84
Connecting Wire----------	16	.3945	6.31	5.60
Crimpers----------				.50
Total Caps, etc----------			199.65	185.69
TOTAL EXPLOSIVES----------			9,573.76	10,315.14

	1927 CRUDE & DIRECT	1927 CONCTS & DIRECT	1926 CRUDE & DIRECT	1926 CONCTS & DIRECT
Product----------	787,775	516,385	701,786	502,364
Lbs.Powder per ton of Ore---	.0964	.1471	.1131	.1580
Cost per ton for Powder-----	.0119	.0182	.0144	.0201
" " " " Caps,etc---	.0002	.0003	.0002	.0003
" " " all Explosives-	.0121	.0185	.0146	.0205
Avg. Cost per Lb. for Powder	.1234	.1234	.1275	.1275

Commenced operations April 25th, 1927: suspended operations October 20th, 1927.

g. Open Pit Mining & Loading:

Wash Ore:

Wash ore operations were begun April 25th. Shovels Nos. 26 and 27 were taken into the Trumbull pit on the 22nd of April and cut into the ore banks; the No. 26 machine in the upper bench on the North side and the No.27 in the bottom.

The No.27 shovel took three thorough cuts across the center of the Trumbull pit from East to West, before the loading track was placed on the bottom of the second bench, which was the season's working level, the elevation being approximately 1,290 feet. The ore encountered by the No.27 shovel was of quite a satisfactory grade, except near the center of the cuts where a very lean whitish cemented material was encountered. All of the ore was wash and even the lean material was absorbed and did not cause any of the cargoes to go below grade. There was some lean wash ore at the West end of the Trumbull pit, but it was possible to absorb this, as we had sufficient high grade concentrates to carry it. As the cuts were extended to the South side of the Trumbull pit, the waste lean ore area was reached. No attempt was made to treat this material, as past experience and hand-wash tests from test-pit samples showed that it was impossible to benefit it sufficiently. This lean waste ore area will be removed during the fall of 1928, when it has been entirely outlined by ore operations during the coming season.

The No.27 shovel was laid up from July 13th to July 25th on account of a broken hoisting drum shaft.

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7. OPEN PIT:
(Continued)

g. Open Pit Mining & Loading:(Continued)
Wash Ore: (Continued)

The No. 27 machine operated in the Trumbull pit until September 16th when the season's operations in the area to the West of the approach had been completed. The shovel was then taken to the rocky area East of the taconite island and operated here until September 27th. The amount of rock encountered on this job finally became so excessive that the work had to be abandoned and the No. 27 shovel was moved to the Northeast corner of the Hill pit where it operated during the balance of the season.

The No. 26 shovel operated on the upper bench of the Trumbull pit until July 19th, having taken four cuts, which completed the area which we had figured on mining during 1927.

Shovel No.26 was used in the Trumbull bottom while the No.27 machine was laid up for repairs. When the No.27 machine was put in commission on July 25th the No. 26 shovel was moved to the rocky area West of the taconite island where one cut was taken. A second cut was started but the material was so rocky that it was impossible to make any progress and the work was discontinued on August 17th. This shovel was then turned around and moved to the bottom of old area "A", where it operated until the close of the season, October 12th.

The No. 19 shovel handled some wash ore in connection with the Direct Ore operations in the East end of the Hill pit and a 60-ton Marion was used for a short time in the Trumbull pit.

Direct Ore:

A small tonnage of Hill Direct Ore was loaded during the latter part of April in connection with the clean-up job at the Northeast corner of the pit. No further Direct Ore was loaded until the second week in June, when the shovel operated three days. Operations were resumed here on July 15th. There was considerable rock and wash ore mixed with the direct and production of the Direct Ore was very intermittent. On July 27th shovel No. 19 was moved to this area from the taconite island and was occupied in cleaning up surface wash on top of the ore and also loaded a small tonnage of Direct Shipping Ore.

Shovel No.19 was moved back into the East end of the Hill pit on August 31st and started loading Direct Ore on September 1st. The cut taken by this shovel was very narrow and operations were slow, as only one car could be spotted for loading and had to be switched out. Loading operations in this area were completed on September 21st and the machine was moved to the bottom of the Direct Ore area where a mixture of wash and direct material was handled.

Shovel No. 27 was moved to the Northeast corner of the Hill pit on September 27th to load out the remaining tonnage of Hill Direct Ore. Considerable rock and wash ore was handled in this operation, which was completed on October 20th. Approximately 14,000 tons of ore in excess of our season's requirements were handled here to make up for a shortage in the Wade Mine production.

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7. OPEN PIT:
(Continued)

g. Open Pit Mining & Loading: (Continued)

Lean and Waste Ore:

Only such very lean and waste material, as was encountered during wash ore operations was handled during the season. No lean material was handled upon the completion of the ore season.

k. Water Level in Pit:

The water level in the Hill pit raised 1.2 ft. during 1927, the elevation on January 1st, 1927 was 1247.2 ft., and on January 1st, 1928 had reached 1248.4 ft. The elevation of the water fluctuated during the first half of the year, and has risen slowly but steadily during the past several months.

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8. COST OF OPERATION:

a. Comparative Mining Costs:

	1927	1926	INCREASE	DECREASE
PRODUCT:				
Direct Shipping, ----------	73,385	123,959		50,574
Concentrates, ----------	443,000	378,405	64,595	
Total Production, --------	516,385	502,364	14,021	
Avg. Daily Product, --------	2,413	2,076	337	
Tons Per Man Per Day, ------	26.38	29.77		3.39
Days Operated, ----------	67-147	108-134		
Budget, Estimated Production	500,000	---		
" " Cost at Mine,	1.545	---		
COST:				
Total Cost at Mine:				
Open Pit Direct Shipping Ore	.177	.151	.026	
Open Pit Wash Ore, --------	.258	.204	.054	
Concentrates, ----------	.154	.150	.004	
Total, ----------	.379	.324	.055	
Depreciation - Plant & Equipment---	.200	.200		
Taxes----------	.234	.241		.007
Occupational Taxes---------	.035	.019	.016	
Central Office, ----------	.011	.010	.001	
Welfare,Safety,Hospital,etc.	.000	.000		
Cost Adjustment,----------	.002	.001	.001	
Stripping, ----------	.519	.560		.041
Winter Expense----------	.189	.155	.034	
Misc. Credits & Debits-----	.009	.000	.009	
Administrative Expense-----	.100	.100		
Cleveland Office Items-----	.016	.005	.011	
Total Cost at Mine-------	1.694	1.615	.079	

d. Detailed Cost Comparison:

(1) Product:

There was a decrease in the 1927 production of direct shipping ore of 50,574 tons as compared with the previous year. The minimum tonnage requirements from the Hill Mine amounts to 150,000 tons and on account of the available ore in this property being so scattered and difficult to get out without considerable expense, only the minimum tonnage was extracted during 1927. It was convenient to secure a larger tonnage of Hill concentrates, as was the case the year before, explaining the decrease in the tonnage of direct shipping ore for the year.

The tonnage of concentrates turned out from the Hill-Trumbull Mine in 1927 was 64,595 tons greater than in 1926. Only a small tonnage of direct shipping ore was encountered in the Trumbull operations and as there was considerable ore available in this property, the bulk of the shipments came from here. This condition, combined with the situation in regard to the wash ore from the Hill Mine, was responsible for the increase in concentrates.

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8. COST OF OPERATING: (Continued)

d. Detailed Cost Comparison - Continued:

(2) Direct Ore Costs:

The cost per ton for producing the direct shipping ore during 1927 was $.026 higher than for the previous year. The item "operating steam shovels" was $.012 higher and locomotives $.021 higher. On account of the scattered condition of the 1927 operations it was necessary to maintain more equipment in service. The higher cost for steam shovels and locomotives in 1927 was partly off-set by there being less track expense.

In the operations at the East end of the Hill pit, where most of the direct ore was secured, horses of taconite and bunches of wash ore were encountered between pockets of direct shipping material. This fact contributed quite largely to the increased cost of ore extraction.

(3) Wash Ore Costs: (Concentrated Basis)

The wash ore costs (concentrated basis) were $.054 per ton higher for 1927 than they were for 1926. The items under this caption which were higher in 1927 were - first, track expense - second, pumping - third, insurance and - fourth - District Office expense.

It was necessary to do considerable track work at the East end of the Hill pit and to lay a track from the East end of the pit down into the bottom in order to attack the Hill ore in old Area "A". The track expense in the Trumbull pit was also slightly higher than for the previous year.

On account of conducting mining operations down to the water level in the Trumbull pit, it was necessary at times of heavy rain-falls to operate a steam pump to keep the water below the shovel cuts. It is not advisable to put wet ore through the washing plant, as it is very sticky to handle on the conveyors and over the grizzly.

In the 1926 costs, Insurance and District Office expense were carried under the "Miscellaneous Group" and were not charged against the cost of production. On our 1927 cost sheet they are charged in proportion to the various items making up the cost of production.

(4) Concentrating:

There was an increase of $.004 per ton for concentrating during 1927 as compared with the previous year. The actual operating cost for concentrating was in reality $.003 less in 1927, but the charging of Insurance and District Office expense to the cost of production on the 1927 cost sheet resulted in the increase shown above.

(5) Miscellaneous Group:

The 1927 Ad Valorem taxes were $.007 per ton lower than for 1926. This was due to the deduction of ore shipped from the Hill pit. The Tax Commission reduced the tonnage estimate at the Trumbull and also deducted shipments from this property, but this was off-set by the Tax Commission placing a Trumbull forty in the active list for valuation, whereas previously the ore had been considered and valued in an inactive class.

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8. COST OF OPERATING: (Continued)

d. Detailed Cost Comparison - Continued:

(5) Miscellaneous Group - Continued:

The Occupational tax item was $.016 higher for 1927. This was the result of an adjustment made in the 1926 taxes, where a substantial credit was applied.

The stripping depreciation per ton was $.041 lower in 1927 than it was in 1926. This was the result of a credit allowance of $21,042.59 made by the Cleveland office in the December face cost sheet.

The 1927 "Winter Expense" was $.034 higher than in 1926. The general repairs to the washing plant and equipment was about in line with an average each year, but the test-pitting and track work was considerably greater in 1927 and caused the above increase in that year's cost per ton.

The Cleveland office expense was $.011 per ton higher in 1927 than for the previous year. This charge is made in Cleveland, but no doubt the increase was due to the accounting being largely transferred from Ishpeming to the Cleveland office.

9. EXPLORATIONS AND FUTURE EXPLORATIONS:

A test drift at the West end of the Trumbull pit was started in August and was pushed in 244 feet. It is the intention to ascertain the Westerly extension of the Trumbull ore and also the width and thickness by crosscuts, raises and winzes. Operations in this drift will be discontinued for the winter, to be resumed next spring. There are several test drifts to be put in along the North side of the Trumbull and Hill pits and it was thought advisable to have several gangs working at the same time so that we could afford to have a boss supervise the work to insure the best results. The material encountered in the West test drift has been a fair grade of wash ore, with comparatively little rock.

Four crews started test-pitting in the bottom of the Hill pit early in September. A total of 137 pits were put down in this area to an average depth of 18 feet. Besides this work, 20 pits were put down in the Northeast corner of the Hill pit for an average depth of 21 feet and 24 pits were sunk in the Trumbull pit to the West of the approach, attaining an average depth of 24 feet.

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10. TAXES:

The following statement shows the taxes and average rate for 1927 and 1926, covering the Hill-Trumbull, Bingham and North Star Mines, the Hill-Trumbull washing plant, the Bingham-North Star washing plant site and the Hill-Trumbull shops. The reason for including the Bingham and North Star Mines and washing plant site is that the Hill-Trumbull operations carry the taxes on these properties and as the Bingham and North Star are not operating, the taxes on these mines would not be shown otherwise in the annual report of the Mesaba District.

	1927	1926	Increase	Decrease
Hill Mine	$ 53,007.11	55,045.37		2,038.26
Trumbull Mine	48,342.34	48,574.69		232.35
Hill-Trumbull Shops	1,250.58	693.52	557.06	
Bingham	8,034.03	7,476.86	557.17	
North Star	6,114.34	5,690.31	424.03	
Washing Plant	3,527.58	3,687.16		159.58
Bingham-N.Star W.P.Site	75.31	72.71	2.60	
TOTAL	120,351.29	121,240.62		889.33
Village lots	649.18	643.28	5.90	
GRAND TOTAL	121,000.47	121,883.90		883.43
Holman-Brown	18,137.93	--		
Average Rate	8.92	8.75	.17	

11. ACCIDENTS AND PERSONAL INJURY:

There were four accidents at the Hill-Trumbull Mine during 1927, as compared with three for the previous year. The total number of days lost in 1927 were 93 against 55 for 1926.

Two of the accidents were of a very minor nature and practically all of the time lost was the result of the other two accidents. A brief description of the two more serious accidents follows:

NAME: Wm. F. LeClair DATE: March 17, 1927.
CAUSE: Was drilling a piece of iron in drill press; the piece slipped on the table and crushed his left hand against the stop iron.
NATURE: "Fracture of the second metacarpal bone of the left hand at the middle- badly displaced- fracture of the third metacarpal near proximal end".
TIME LOST: March 17, 1927 to April 11, 1927.

NAME: Pete Hecemovich DATE: July 30, 1927.
CAUSE: Was standing on wagon unloading when mules jerked and caused him to fall to ground, striking on his right shoulder and breaking shoulder blade.
NATURE: "Multiple fracture of right scapula".
TIME LOST: July 30, 1927 to Sept. 20, 1927.

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12. NEW CONSTRUCTION AND PROPOSED NEW CONSTRUCTION:

While no new construction work was undertaken in 1927, plans were worked up for several changes in the washing plant, the most important of which was the installing of a secondary crusher to reduce all the oversize material to 3/4". As we do not expect to handle any large amount of frozen material in our 1928 operation, it was not deemed necessary to make the changes in the plant this winter, but it is quite likely that the installation of a secondary crushing plant will be advisable previous to our 1929 ore season.

In this connection hand wash tests are being made on Hill-Trumbull and Holman-Brown ores to determine what benefit may be expected in the finer crushing.

13. EQUIPMENT AND PROPOSED EQUIPMENT:

a. Steam Shovels:

The 350-ton Marion shovel was shipped to the Hill-Trumbull from the Boeing Mine and erection work started on December 3rd. It is proposed to use this machine for stripping operations at the East end of the Trumbull pit during 1928.

A small compressor was installed at the Hill-Trumbull washing plant to operate an air cylinder for handling very large chunks of rock from the 5-ft. pan conveyor. The compressor is also used to operate the chute gates.

A second-hand lathe was purchased and installed in the shops.

It will be necessary to arrange for a dump plow in connection with our stripping operations next spring, when it will be necessary to either purchase or rent a plow for this purpose. Inasmuch as we are not to open the Taconite properties this year, it probably would be advisable to rent a plow for 1928 and purchase one for the operations at both properties in 1929.

14. MAINTENANCE & REPAIRS:

Following the two weeks lay-off during the holidays, repair work in the shops was resumed on January 3rd, 1927.

The repairs to Locomotives Nos. 101, 102 and 103 were comparatively light. The driving boxes were cleaned and repaired, the wedges were taken up and the air pumps were overhauled. New spark screens were put in the front end of the boilers of these locomotives in order to comply with the State requirements. All repair work on these three machines was completed before the middle of November.

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14. MAINTENANCE & REPAIRS: (Continued)

Locomotive No.2 was taken into the shop during the first week in February. New spark screens were put in the front end and a new air line and valves were installed so that the engine could be used to handle dump cars. The tires of this locomotive were turned down as the flanges had become very sharp. The machine was turned out of the shops early in March.

There were eight 20-yard cars remaining to be repaired. They were given a thorough overhauling, the work being completed early in March. All worn and broken parts were repaired or replaced, and the journal brasses on all the gears were re-babbitted and the boxes cleaned and greased.

Work was started on the 12-yard cars during the fore part of March and the job was completed before the end of the month. Only such work was done as was absolutely necessary, as these cars are at about the end of their service.

During January, the drive roller of the 8-ft. pan conveyor was taken to the shop and repaired. The sprockets on this part had become rounded and it was necessary for the welder to build them up.

The 2-ton White truck was overhauled during January.

The dragline was taken into the shop during the first week in February. This machine was taken apart and thoroughly overhauled. It was necessary to replace some of the gears and pinions and extensive repairs were made on the propelling mechanism. This machine was turned out the first week in April.

The Keystone drill was overhauled during February.

During January, February and March the pans of the 8-ft. conveyor were taken to the shop and repaired, including the riveting on to the pans of wearing plates. The wearing plates were removed after they had been in use for a time, as the ore packed under them and caused them to buckle. Work on the 8-ft. pan conveyor was completed in April.

Locomotive No.17 was taken into the shop during the latter part of March. This machine was given a thorough overhauling and a new spark screen installed.

The 60-ton Marion shovel was taken into the shop early in April and all necessary repairs were completed by the end of the month.

The No. 27 shovel was taken to the shop the last week in October. The machine, which had been given pretty heavy service during 1927, was thoroughly gone over, the job being completed on November 19th.

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14. MAINTENANCE & REPAIRS: (Continued)

Shovel No. 26 was given an overhauling by the same crew that worked on the No.27 machine, the job being finished December 14th.

Six of the 20-yard cars had been put through the shop by December 17th.

The No.19 shovel and Locomotive No.101 were undergoing repairs at the end of the year.

It has been decided to weld wearing plates on the pans of the 8-ft. conveyor and this work has been started.

The big lathe was thoroughly cleaned, repaired and installed.

Washing Plant Repairs:

During the months of January, February and March the repairs on the washing plant machinery consisted of the following:

Raising and repairing the 20" water supply pipe line.
Removing and taking the 8-ft. pans of that conveyor to the shops.
Overhauling air compressor.
Relining receiving bin.
Cleaning and repairing the conveyor rollers.

The washing plant crew was used to install the pumping plant to the North of the Hill pit.

During the last two weeks in March and the fore part of April, the washing plant repair force was engaged in repairing and installing the 8-ft. pans and a new perforated plate on the trommel screen.

During the month of April the crew at the washing plant re-assembled all the machinery and put it in shape for service.

After the close of the 1927 ore season on October 12th, the force at the mill was engaged in cleaning the machinery and draining all pipe lines. The pumps were disconnected and drained.

The interior of the water tank was found to be badly rusted and it was necessary to give it a thorough scraping and to re-paint it. Some rust spots were detected on the outside of the tank and these spots were scraped and painted.

The 8-ft. pan conveyor was taken apart and the sprockets on the head drive pulley were built up. The pans will be taken off during the winter and new wearing plates welded on. By welding we hope to eliminate the trouble with the ore crowding under the plates and causing them to buckle. The paddle shafts on the logs and turbos were taken apart to be reinforced and repaired.

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14. MAINTENANCE & REPAIRS: (Continued)

The various pockets and chutes were overhauled.

The 5-ft. pan conveyor and the rock cars have been given the necessary repairs for 1928 operations.

A new track was laid to the waste rock dump.

18. NATIONALITY OF EMPLOYES:

NATIONALITY:	NO.OF MEN 1927	NO.OF MEN 1926
Jugo-Slav	20	15
Swedish	13	13
Finnish	9	5
German	5	4
French	3	3
Serbian	3	-
English	12	12
Italian	2	2
Croatian	3	4
Irish	13	7
Bulgarian	1	1
Norwegian	2	3
Scotch	3	2
Welch	1	1
Polish	1	2
Dutch	-	3
TOTAL	91	77

19. WASHING PLANT OPERATIONS:

Washing Plant operations were begun April 25th and were carried on until October 12th.

Operating conditions were quite satisfactory during the season and no serious trouble was experienced with the frost at the beginning of the season, as has been the case in past years.

On April 30th it was necessary to close down the mill to remove the wearing plates which had buckled.

Throughout the season considerable lean material was handled with the better grade wash and at times the quantity of rock was so great that the speed of the mill had to be slowed down.

Practically no trouble was experienced with the dyke during 1927. The dragline was put in operation the latter part of April and was operated until August, in building a wide substantial dyke around the

HILL-TRUMBULL MINE
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19. WASHING PLANT OPERATIONS: (Continued)

East and North sides of the tailings basin. The new dyke is over 20 feet in width on top and we do not anticipate having any more difficulty with wash-outs, as was the case when we had a narrow dyke of only a few feet of width on top. The dragline more than paid for itself the first season of its operation and the work on the dyke from this time forward will be comparatively light per season.

In 1927, 714,390 tons of wash ore were treated and in 1926 - 577,827 tons were put through the mill. The production of concentrates in 1927 amounted to 443,000 tons, which compares with 378,405 tons for the previous year.

The rejects from the mill during 1927 amounted to 22,093 tons as against 14,841 tons in 1926.

The gross recovery for 1927 amounted to 62.01 as against 65.49 for the year 1926.

The iron unit recovery for 1927 was 91.80 and compares with 89.14 for the previous year.

The analyses of the product from the several machines for the years 1927 and 1926 were as follows:

	1927				1926		
	Iron	Phos.	Sil.		Iron	Phos.	Sil.
Screen-----	58.38	.055	8.90	Screen-----	58.09	.082	9.54
Logs-------	59.71	.053	7.16	Logs-------	59.73	.070	7.53
Turbos-----	55.85	.047	14.05	Turbos-----	54.68	.064	15.34
Tailings---	14.54			Tailings---	19.59		

Analysis of Rejects for the year were as follows:

	Tons	Iron	Phos.	Silica.
Hill----------	9,711	29.35	.023	55.63
Trumbull------	5,130	18.68	.037	69.29
Total 1927----	14,841	25.66	.028	60.34
Total 1926----	22,093	27.91	.080	53.33

The pit rock for the year was as follows:

	Tons	Iron	Phos.	Silica.
Hill----------	24,075	32.20	.030	50.22
Trumbull------	927	22.54	.022	63.71
Total 1927----	25,022	31.84	.030	50.72
Total 1926----	8,336	30.97	.029	52.34

This material was placed on the waste dump as untreatable.

BOEING MINE

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1. GENERAL:

Underground operations were conducted at the Boeing Mine from January 1st until May 4th, when orders were received to suspend this work.

The second level development work was continued until August 22nd, at which time it was decided not to attempt to do any further underground ore extraction during the life of the Boeing lease and the second level work was discontinued.

No shipments from pocket were undertaken during the season of 1927, as underground ore operations had been discontinued before the opening of navigation.

Loading from open pit was started on the 2nd of May and continued, except for moving of the shovel and clean-up operations, until October 15th. For the three weeks preceding May 2nd, shovel and track repair work was undertaken. Subsequent to October 15th the large shovel was dismantled and a crew was kept busy on this work and taking up tracks until December 10th.

It was necessary to do a considerable amount of clean-up work in the pit between May 11th and June 2nd and ore loading was suspended during this period. The North stripping bank slid into the pit and ore loading was interrupted and interferred with to quite an extent during the month of August. These bank slides changed the plans for future operations of the mine, both open pit milling and underground.

The reason for closing down the underground operations in May was the result of having exhausted the West underground deposit and the very restricted workable area in the East deposit where the costs were quite high.

The lease on the Boeing Mine and auxiliary lands was surrendered during the last of the year.

2. PRODUCTION, SHIPMENTS & INVENTORIES:

a. Production by Grades:

Boeing Underground Ore----------	56,330 tons
Boeing Open Pit Ore----------	306,856 tons
TOTAL BOEING ORE----------	363,186 tons.

The monthly rate of production decreased between the first of the year and May on account of fewer working places being available.

The estimated output of open pit ore was placed at 413,000 tons for the season, but due to the bank slides and the necessity of leaving some of the open pit ore in the deep channel, our estimated figures were reduced by approximately 110,000 tons.

On account of the unsafe condition prevailing after the bank slides it was considered too hazardous to attempt any milling operations in the open pit or underground work adjacent to the open pit along the North bank.

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2. PRODUCTION, SHIPMENTS & INVENTORIES: (Continued)

b. Shipments:

Grade of Ore:	Open Pit Tons	Stockpile Shaft Tons	Stockpile Pit (Lean Sandy) Tons	Total Tons.
Boeing,	247,088	51,234	80	298,402
Boeing Special	59,768	28,407	8,313	96,488
Wade Special			34,740	34,740
TOTAL,	306,856	79,641	43,133	429,630

As compared with the shipments of 1926, there was a decrease of 192,288 tons, which was the result of reduced open pit operations and to the suspension of underground activities in May.

c. Stockpile Inventories:

Both the underground and open pit stockpiles were cleaned up during 1927 to the satisfaction of the fee owners' representative. No ore remains in stockpile at the Boeing Mine.

All of the underground production for 1927, amounting to 56,330 tons, was stocked before the opening of the shipping season.

d. Division of Product by Levels:

The ore hoisted from the two levels was as follows:

Underground - First Level	51,706	tons
Open Pit - First Level	306,856	tons
Underground - Second Level	4,624	tons
TOTAL,	363,186	tons.

e. Production by Months:

MONTH:	UNDERGROUND	OPEN PIT	TOTAL
January,	12,284	----	12,284
February,	11,819	----	11,819
March,	13,396	----	13,396
April,	8,677	----	8,677
May,	301	24,884	25,185
June,	---	73,373	73,373
July,	---	76,798	76,798
August,	---	62,551	62,551
September,	---	48,311	48,311
October,	---	20,939	20,939
November,	---	---	---
December,	---	---	---
Stockpile overrun,	9,853	---	9,853
TOTAL,	56,330	306,856	363,186

Not considering the small tonnage secured the first few days of May the average production for the first four months of 1927 amounted to 11,544 tons as compared with an average monthly production of 18,223 tons for the entire year of 1926.

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2. PRODUCTION, SHIPMENTS & INVENTORIES: (Continued)

e. Production by Months: (Continued)

The open pit production was dependent almost entirely on operating conditions during 1927, as the car supply was quite satisfactory. A large amount of rock and off-grade ore had to be removed during the season of 1927 in connection with the ore loading and the average ore bank attacked was lower than for the previous year.

f. Ore Statement:

	UNDERGROUND	OPEN PIT	OPEN PIT LEAN ORE	TOTAL	TOTAL LAST YEAR
On Hand Jan.1,1927,	23,311	-	33,417	56,728	65,030
Output for Year,	56,330	306,856	9,716	372,902	513,616
TOTAL, ----------	79,641	306,856	43,133	429,630	578,646
Shipments,	79,641	306,856	43,133	429,630	521,918
Balance on Hand,	---	---	---	---	56,728
Decrease in Output,				140,714	
Decrease in Ore on Hand,				56,728	

The above table includes an underground stockpile overrun of 9,853 tons and shows a lean sandy open pit stockpile overrun of 9,716 tons.

Underground operations were conducted on two 8-hour shifts while work was in progress and open pit activities were confined to one 10-hour shift.

g. Delays:

Underground:

There were no serious delays to underground operations during the four months that this operation was conducted. There were several instances of sand-runs which required some time to clean up and the following list shows a number of minor delays to hoisting and stocking operations:

January 3rd	-	2-1/2 Hrs.	Broken eye-bolt on top tram.
" 5th	-	1 "	Car off track at rotary dump.
" 12th	-	1 "	Broken axle on top tram car.
" 13th	-	1-1/2 "	Rotary dump out of service.
" 20th	-	3-1/2 "	Cave-in blocked 1st Level.tramway in East Deposit.
" 25th	-	2 "	Top tram car spilled
February 3rd	-	3 "	Top tram motor out of order.
" 25th	-	5 "	Rotary dump out of service.
April 7th	-	2-1/2 "	Broken axle on top tram car.

Open Pit:

There were two serious delays to open pit operations due to extensive bank slides, the first on August 3rd and the second on August 11th. In each instance the 350-ton shovel was pushed off its tracks and one side buried with ore and surface material. The shovel cut was so narrow when these slides occurred that it was impossible to swing the machine and a large part of the clearing of the shovel had to be done by hand. A small amount of loading was done while the shovel was being taken out but this production was quite small.

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2. PRODUCTION, SHIPMENTS & INVENTORIES: (Continued)

g. Delays: (Continued)

Open Pit: (Continued)

Between May 11th and June 2nd the large shovel was engaged in clean-up work along the deep channel. Owing to the wet character of the material handled this job took somewhat longer than was anticipated.

Following is a list of minor delays, which did not, however, effect the output:-

June 29th	- 3 Hrs.	-	Car off track
" 30th	- 5 "	-	Locomotive off track
July 8th	- 3/4 "	-	Minor shovel repairs
" 27th	- 1/2 "	-	Broken dipper door latch
Total	25½ "	-	No Great Northern cars.

The car service and the boat dispatch for Boeing ore was given preference during the past season, and the delay on account of waiting for Great Northern cars only amounted to 25-1/2 hours during 1927, as compared with 208¾ hours during 1926.

h. Delays from Lack of Current:

There were no delays on account of lack of current during 1927.

3. ANALYSIS:

a. Average Mine Analysis on Output:

	Tons	Iron	Phos.	Sil.	Mn.	Alu.	Moist.	Fe.Nat.
Underground--	56,330	55.04	.072	9.54	.81	6.29	12.81	47.99
Open Pit-----	306,856	54.59	.073	12.94	1.12	2.89	14.74	46.54
TOTAL 1927---	363,186	54.66	.073	12.41	1.07	3.42	14.44	46.77
TOTAL 1926---	513,616	54.83	.083	11.89	.83	3.90	13.60	47.37

Average Mine Analysis of Shipments:

	Tons	Iron	Phos.	Sil.	Mn.	Alu.	Moist.	Fe.Nat.
Shaft Stock-pile,---	79,641	54.87	.075	9.73	.77	6.28	12.81	
Open Pit-----	306,856	54.59	.073	12.94	1.12	2.89	14.74	
Open Pit Stockpile--	43,133	49.35	.118	19.79	.18	5.61	10.60	
TOTAL 1927--	429,630	54.11	.078	13.03	.96	3.79	13.97	
TOTAL 1926--	521,918	54.82	.083	11.96	.85	3.80	13.59	47.37

b. Average Analysis on Straight Cargoes:

	Mine Analysis			Lower Lake		
Grade of Ore:	Iron	Moist	Fe.Nat.	Iron	Moist.	Fe.Nat.
Boeing, ----------	55.27	14.04	47.51	55.11	13.46	47.69
Boeing Special, --------	55.14	13.64	47.62	55.33	12.75	48.28
Wade Special, ----------	56.28	11.64	49.73	55.43	11.53	49.04

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3. ANALYSIS:
(Continued)

b. Average Analysis on Straight Cargoes: (Continued)

The following table shows tonnages used in mixed cargoes of Boeing Ore:

BOEING SPECIAL

Boeing Pit,	59,768	tons.
" Stockpile,	28,408	"
" Lean Pit Stockpile,	8,313	"
Wade Pit,	40,695	"
Helmer,	1,927	"
Hill Direct,	13,028	"
TOTAL,	152,139	"

WADE SPECIAL

Boeing Lean Pit Stockpile,	34,740	"
Wade Pit,	66,623	"
Helmer,	782	"
TOTAL,	102,145	"

d. Composite Analysis by Lerch Bros. of the Season's Shipments:

	Iron	Phos.	Mn.	Sil.	Alum.	Lime	Mag.	Sul.	Loss.
Pit & Shaft Stockpile, ----	54.52	.074	1.02	12.31	3.40	.21	.17	.012	4.66
Lean Sandy Pit Stockpile, ----	49.52	.122	.17	19.47	5.52	.18	.16	.015	3.94

e. Analysis of Ore in Stockpile January 1st, 1928:

There was no ore in stockpile at the Boeing Mine on January 1st, 1928.

4. ESTIMATE OF ORE RESERVES:

a. Ore Developed for Mining:

Assumption: 14 cu. ft. equals one ton.
10% deduction for rock.
10% deduction for loss in underground mining.
Percentage of Bessemer equals 0.

Developed Ore:
Above First Level:
Underground Ore:

East Deposit,	64,000	tons.
Total Underground Ore,	64,000	tons.
Total Developed Ore,	64,000	tons.

Partially Developed Ore:
Between First & Second Levels:
Underground Ore:

Deep Channel,	500,000	tons.
North Bank,	34,000	tons.
Total Underground Ore,	534,000	tons.
Total Partially Developed Ore,	534,000	tons.

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4. ESTIMATE OF ORE RESERVES: (Continued)

b. Ore Proven but not Developed for Mining:

Underground Ore:

Above First Level:

South Bank, ----------	252,000	tons.

Between First & Second Levels:

West Channel, ----------	200,000	"
Total Underground Ore, ----------	452,000	"
Total Undeveloped Ore, ----------	452,000	"
GRAND TOTAL ALL ORE, ----------	1,050,000	tons.

A comparison between estimates of January 1st, 1927 and January 1st, 1928, after deducting production:

	ESTIMATE OF JAN.1,1927:	1927 PRODUCTION	BALANCE	ESTIMATE OF JAN. 1,1928.
Underground, --------	975,500	56,330	919,170	1,050,000
Milling, ----------	169,000	---	169,000	---
Open Pit, ----------	413,000	306,856	106,144	---
TOTAL, ----------	1,557,500	363,186	1,194,314	1,050,000

The above statement shows that there was a decrease in the ore estimate on January 1st, 1928, as compared with that of the previous year, after deducting the ore produced, of 144,314 tons.

Open Pit Ore:

The open pit steam shovel operations during 1927 exhausted all of the open pit ore which can ever be secured by this method of mining. There was a decrease of 106,144 tons in the open pit estimate, the slides making it impossible to secure this tonnage by open pit methods.

Milling Ore:

The development work on the second level was for the purpose of handling the open pit milling ore in the deep channel, but the bank slides made it unsafe to consider mining this ore by the milling method and the tonnage is now considered as "underground".

Underground Ore:

With the exception of the East Deposit all developed ore has been exhausted on and above the first level.

The second level development demonstrated that the width of the deep ore channel at that elevation was narrower than had been anticipated and the estimate of the reserve ore was reduced in consequence. A substantial tonnage of ore, previously estimated along the North bank as subject to underground extraction, was disturbed by the slides and only a part of this ore can ever be recovered. This fact further reduced the ore estimate of underground material.

No changes were made in the estimate of ore in the South bank and West channel as between January 1st, 1927 and January 1st, 1928.

We have never considered any of the second-class ore indicated by diamond drill holes below the second level. This ore channel is very narrow and the iron content of the ore is so low that it has never been considered in any of our estimates.

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4. ESTIMATE OF ORE RESERVES: (Continued)

c. Estimated Analysis:

DRIED 212°	Tons	Fe.	Phos.	Sil.	Mn.	Alu.	Moist.
Underground, ----	1,050,000	56.84	.079	9.08	1.00	3.06	14.00
NATURAL:							
Underground, ----	1,050,000	48.88	.068	7.81	.86	2.63	- --

5. LABOR & WAGES:

a. Comments:

(1) Labor:

Underground labor conditions during the four months that operations were conducted were quite unsatisfactory. The majority of the working places were quite wet and there were frequent sand runs. Only skilled miners could be employed and as they were unable to make as good wages under existing conditions at the Boeing, we had considerable difficulty in keeping our crews filled.

There was sufficient open pit labor at all times during the past season and it was of a satisfactory character.

b. Comparative Statement of Wages & Product:

For the purpose of general information, two tables are shown, covering labor and wages, first - not including the cost of closing down the property and - second - including such cost:

Following statement does not include cost of closing down the mine:

	1927	1926	Increase	Decrease
PRODUCT, ----------	56,330	218,678		162,348
No. Shifts and Hours, ----	2, 8	2, 8		
AVG. NO. MEN WORKING:				
Surface, ----------	27	26	1	
Underground, ----------	88	102		14
Total, ----------	115	128		13
AVG. WAGES PER DAY:				
Surface, ----------	4.98	4.97	.01	
Underground, ----------	4.83	5.19		.36
Total, ----------	4.85	5.14		.29
WAGES PER MO. OF 25 DAYS:				
Surface, ----------	124.50	124.25		.25
Underground, ----------	120.75	129.75		9.00
Total, ----------	121.25	218.50		7.25
PRODUCT PER MAN PER DAY:				
Surface, ----------	19.69	26.83		7.14
Underground, ----------	6.16	6.90		.74
Total, ----------	4.68	5.48		.80

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5. LABOR & WAGES:
(Continued)

b. Comparative Statement of Wages & Product: (Continued)

Statement not including cost of closing down the mine, (continued)

	1927	1926	Increase	Decrease
LABOR COST PER TON:				
Surface, ----------	.253	.185	.068	
Underground, --------	.782	.752	.030	
Total, ----------	1.035	.937	.098	
AVG.PRODUCT BREAK.ORE:				
Tons per Miner per day,	9.810	9.830		.020
AVG.WAGES PER CONT.MINER:	4.885	5.540		.655
TOTAL NUMBER OF DAYS:				
Surface, ----------	2860½	8150⅛		5290
Underground, --------	9145¼	31689¾		22544½
Total, ----------	12005¾	39840¼		27834½
AMOUNT FOR LABOR:				
Surface, ----------	14,259.46	40,546.86		26,287.40
Underground,--------	44,047.15	164,551.99		120,504.84
Total,----------	58,306.61	205,098.85		146,792.24

Following statement includes cost of closing down the mine:

	1927	1926	Increase	Decrease
PRODUCT, ----------	56,330	218,678		162,348
No. Shifts and Hours-	2, 8	2, 8		
AVG. NO. MEN WORKING:				
Surface, ----------	29	26	3	
Underground, --------	88	102		14
Total, ----------	117	128		11
AVG. WAGES PER DAY:				
Surface, ----------	4.96	4.97		.01
Underground, --------	4.83	5.19		.36
Total, ----------	4.85	5.14		.29
WAGES PER MO.OF 25 DAYS:				
Surface, ----------	124.00	124.25		.25
Underground, --------	120.75	129.75		9.00
Total, ----------	121.25	128.50b		7.25
PRODUCT PER MAN PER DAY:				
Surface, ----------	18.20	26.83		8.63
Underground, --------	6.16	6.90		.74
Total, ----------	4.60	5.48		.88

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5. LABOR & WAGES:
(Continued)

b. Comparative Statement of Wages & Product: (Continued)

Statement including cost of closing down the mine, (continued)

	1927	1926	Increase	Decrease
LABOR COST PER TON:				
Surface, ----------	.272	.185	.087	
Underground, --------	.782	.752	.030	
Total, ----------	1.054	.937	.117	
AVG.PRODUCT BREAK. ORE:				
Tons per Miner per day,	9.810	9.830		.020
AVG. WAGE CONT. MINER:	4.885	5.540		.655
TOTAL NO. OF DAYS:				
Surface, ----------	3094½	8150½		5056
Underground, --------	9145¼	31689¾		22544½
Total, ----------	12239¾	39840¼		27600½
AMOUNT FOR LABOR:				
Surface,----------	15,373.30	40,546.86		25,173.56
Underground, --------	44,047.15	164,551.99		120,504.84
Total, ----------	59,420.45	205,098.85		145,678.40

PROPORTION SURFACE TO UNDERGROUND MEN

	Including Cost of Closing Down Mine.	Not including Cost of Closing Down Mine.
1923, ----------	1 to 4.43	1 to 4.43
1924, ----------	1 to 3.68	1 to 3.68
1925, ----------	1 to 3.42	1 to 3.42
1926, ----------	1 to 3.92	1 to 3.92
1927, ----------	2 to 2.95	1 to 3.19

6. SURFACE:

a. Buildings, Repairs:

Only such minor repairs as were absolutely necessary were made during 1927, and when work was discontinued in the fall all of the windows of the buildings were boarded up. All of the location houses were occupied at the end of the year with the exception of one of the cottages.

b. Stockpiles:

The underground and open pit lean ore stockpiles were loaded out by November 8th. In order to clean up the bottom of the underground stockpile to the satisfaction of the fee owners, a small revolving shovel was rented from the Oliver Iron Mining Company and all of the ore was loaded out to the satisfaction of the fee owners' representative.