

Although this ore is lowered down, it takes some fuel nevertheless to keep the hoist going. The labor cost for the two years shows but a slight decrease for 1924, being \$12,107.65 for 1924 compared with \$12,441.80 for 1923. The proportion of boiler house expense charged to hoisting increased from \$9945.09 to \$11,324.07. Electric power consumed shows a decrease for 1924 from \$9349.50 to \$8321.40. We used less oil and grease also during the past year, but the unit cost is increased due to the over-head charged against a smaller daily average hoist and increased fuel consumption for the Pascoe Shaft hoist.

STOCKING ORE.

| | | |
|--------------------------|------|---------------|
| Year | 1923 | \$9,247.15 |
| " | 1924 | 9,369.79 |
| <u>Increase for 1924</u> | | <u>122.64</u> |

Small increase due to stocking Crushed ore entire season whereas, during the previous year, both Lump and fine ore was shipped to the dock during the shipping season.

SCREENING - CRUSHING AT MINE.

| | | |
|--------------------------|------|-----------------|
| Year | 1923 | \$5,836.06 |
| " | 1924 | 2,448.72 |
| <u>Decrease for 1924</u> | | <u>3,387.34</u> |

Decreased because very little Crushed ore was shipped from the mine during the past year. In the previous year the old Crushing & Screening Plant was operated during the summer months to separate the fines from the lumps. In 1924, this plant was idle and will be from now on, as we have arranged to haul the fine ore direct from the screen in No. 9 Shaft House to a large pocket from which it will be loaded into railway cars the same as the Lump ore.

DRY HOUSE.

| | | |
|--------------------------|------|---------------|
| Year | 1923 | \$2135.48 |
| " | 1924 | 1935.05 |
| <u>Decrease for 1924</u> | | <u>200.43</u> |

This decrease is due to less coal burned to keep the Dry warm. The Dry was gunited the latter part of the previous year and we find it much easier to keep this building warm since this work was finished.

GENERAL SURFACE EXPENSE.

| | | |
|--------------------------|------|---------------|
| Year | 1923 | \$5,416.27 |
| " | 1924 | 5,218.55 |
| <u>Decrease for 1924</u> | | <u>197.72</u> |

The bulk of the general surface expense consists of the wages of surface foreman, mine police man and watchman, and the reason for the decrease for the year 1924 was that in the previous year, considerable labor was put on the drainage ditches and culverts around the mine surface, as they were becoming filled up and blocked with dirt.

MAINTENANCE ACCOUNTS.

HOISTING EQUIPMENT.

| | | |
|--------------------------|------|-----------------|
| Year | 1923 | \$8,877.29 |
| " | 1924 | 9,896.24 |
| <u>Increase for 1924</u> | | <u>1,018.95</u> |

The increase for 1924 is due to a number of causes. The Pascoe Shaft skip-road required considerable repair work. The storage pockets on the motor haulage level were rebuilt. Two new 10 foot head sheaves for No. 9 Shaft House were installed. New wires for bell signal system put in Pascoe Shaft from surface to the motor haulage level. We also built a new skip for the Pascoe Shaft.

SHAFT.

| | | |
|--------------------------|------|-----------------|
| Year | 1923 | \$3,939.61 |
| " | 1924 | 8,515.03 |
| <u>Increase for 1924</u> | | <u>4,575.42</u> |

We were put to a heavy expense repairing and retimbering No. 9 Shaft in the so-called wide shaft, as mentioned previously in this report.

TOP TRAM EQUIPMENT.

| | | |
|--------------------------|------|--------------|
| Year | 1923 | \$2,217.92 |
| " | 1924 | 2,257.83 |
| <u>Increase for 1924</u> | | <u>39.91</u> |

This account shows but little change for the two years.

DOCKS, TRESTLES & POCKETS.

| | | |
|--------------------------|------|---------------|
| Year | 1923 | \$1,387.99 |
| " | 1924 | 1,135.66 |
| <u>Decrease for 1924</u> | | <u>252.33</u> |

Decrease due to much less work required on the trestles leading to the rock dumps.

MINE BUILDINGS.

| | | |
|--------------------------|------|-----------------|
| Year | 1923 | \$7,189.92 |
| " | 1924 | 2,879.97 |
| <u>Decrease for 1924</u> | | <u>4,309.95</u> |

The year 1923 showed the heaviest expenditures due to rebuilding No. 9 Dry.

GENERAL MINE ACCOUNTS.

INSURANCE.

| | | |
|--------------------------|------|---------------|
| Year | 1923 | \$1,260.79 |
| " | 1924 | 1,156.59 |
| <u>Decrease for 1924</u> | | <u>104.20</u> |

Decreased due to smaller premiums charged against the Republic Mine for insurance.

ENGINEERING.

| | | |
|--------------------------|------|--------------|
| Year | 1923 | \$1,629.03 |
| " | 1924 | 1,570.67 |
| <u>Decrease for 1924</u> | | <u>58.36</u> |

Small decrease for the year 1924.

ANALYSIS.

| | | |
|--------------------------|------|---------------|
| Year | 1923 | \$2,924.70 |
| " | 1924 | 2,606.88 |
| <u>Decrease for 1924</u> | | <u>317.82</u> |

In charging out the Republic Mine Chemist's labor, a division is made, part of it going to Laboratory expense and part to shipping expense, as he takes care of the grading of the cargoes and computes the average analysis. In 1923 more ore was shipped out than in 1924, and consequently, less of Mr. Linn's time was charged to Laboratory expense than in the following year, but the expense of sampling the cars in 1923 more than off-set this.

PERSONAL INJURY EXPENSE.

| | | |
|------|--------------------------|---------------|
| Year | 1923 | \$2,173.67 |
| " | 1924 | 2,899.18 |
| | <u>Increase for 1924</u> | <u>725.51</u> |

Although we had practically the same number of accidents in the two years, there being fifty in one and forty-nine in the other, the cost for the past year shows an increase because of the greater severity of them.

SAFETY DEPARTMENT EXPENSE.

| | | |
|------|--------------------------|--------------|
| Year | 1923 | \$209.51 |
| " | 1924 | 193.60 |
| | <u>Decrease for 1924</u> | <u>15.91</u> |

There was a small decrease for 1924 due to the Republic Mine being charged with a smaller proportion of First Aid supplies.

TELEPHONE & SAFETY DEVICES.

| | | |
|------|--------------------------|---------------|
| Year | 1923 | \$1,291.59 |
| " | 1924 | 891.45 |
| | <u>Decrease for 1924</u> | <u>400.16</u> |

The expense in 1923 was above the average due to purchasing new fire fighting helmets.

MINE OFFICE.

| | | |
|------|--------------------------|---------------|
| Year | 1923 | \$14,133.86 |
| " | 1924 | 13,703.72 |
| | <u>Decrease for 1924</u> | <u>430.14</u> |

Decrease due to less expense in connection with taking the annual inventory. Also, we have been charged with less expense accounts distributed from the Central Office in 1924 than for the year previous.

SPIES-VIRGIL MINE.

The following report covers the operation of the Spies Mine and gives an account of the development work done on the Virgil property during the year 1924.

SURFACE.

We started on the work of improving the appearance of the area surrounding the Mine Buildings. It was first necessary to provide proper drainage by digging a ditch running North and South about midway between the old Engine House and the new one. This ditch joins one running East and West between the stockpile area and the Mine Buildings, and continuing East along the North-East side of the main road near the old oil house. These ditches are lined with cobble stones to prevent the sides caving in, and the stones add greatly to the appearance of the drainage ditches.

A fence was built along the South boundary of the stockpile area on the North side and close to the rock pile on the South side and running far enough to the East and West to include all the Mine Buildings and the area close to the shaft.

Trees were planted along the West side of the road East of the shaft and the old oil house and a number were also planted between the office and the dry. It looked for a time as though the sulphur fumes from the burning rock pile would kill these trees, but fortunately, we succeeded in getting the rock spread before vegetation was far advanced in the Spring.

ENGINE HOUSE:-

A concrete floor was laid in the new Engine House during the year. Last year after the building was completed and the foundations for the compressor and hoist poured, the excavated area inside the Engine House was filled with gray slate.

We were careful not to use any black slate for filling as this variety of slate will swell under pressure and would cause any floor laid on top of it to heave. This filling was tamped and permitted to settle for six months or more before we attempted to lay any concrete floor. A thin layer of ashes was tamped on top of the rock and a concrete floor 5" thick laid on top the ashes. A gutter about 6" deep and 8" wide was left in the floor on three sides of the building, in which to lay the pipe lines.

BLACKSMITH & MACHINE SHOP:-

The exterior of this building which formerly was the Engine House, was gunited and a concrete foundation laid underneath the old sills which were in bad shape. The interior of the shop was also improved by taking out the old wiring and putting it in conduit. The shop equipment was added to by installing a drill press and a pipe threading machine, both of which came from the Lake Mine. A coke furnace for heating and tempering drill steel, which was idle at the Republic Mine, was moved and installed in the shop. The shop lacks a lathe but we hope to secure one from the General or Hard Ore Shops at Ishpeming.

DRY:-

The exterior of the Dry was gunited and the doors and window frames painted, adding much to the appearance of the building. About twenty additional lockers were installed, these lockers being secured from surplus stock at the Cliffs Shaft Mine.

OFFICE & WAREHOUSE:-

This building was gunited on the outside and by using a little richer mixture on the second coat, the color of the finished surface was much whiter. In guniting all of the Spies Mine buildings, the outside walls were first covered with building paper. Expanded metal lath was then nailed onto the walls and after thoroughly wetting the surface, a thin coat of gunite was sprayed onto the walls.

After the first coat was dry, a second was added making the coating about $\frac{1}{2}$ " thick. A 4 to 1 mixture was usually used, being four parts of screened sand to one part cement. For the second coat on the office building, a 3 to 1 mixture was used.

Some necessary repairs were also made to the interior of the building. A new floor was laid in the Warehouse and the walls and bins and shelving painted. The interior of the office itself was covered with beaver board and painted, and a larger radiator installed. The double doors in the Warehouse were poor and replaced with new ones.

OIL HOUSE:-

The old oil house was converted into a work shop for the electrician, the plan being to move the present transformer house to a site near the North end of the rock pile and use it for housing the oil and grease. The oil house must be heated in the winter to keep the oils fluid, and the old oil house was so far away from the heating plant that it took considerable steam to keep it warm, due to condensation in the steam line. At the present time, the building is heated with a stove. The new oil house will be but a short distance from the heating boiler in the Dry.

TRANSFORMERS:-

The Peninsula Power Company installed a bank of six new transformers on a concrete block or base, about 25 feet West of the Engine House. This doubles the transformer capacity which was needed, as the additional load of the new 2400 ft. Compressor and the two new pumps and motor haulage set on the Fifth Level could not be handled by the three old transformers, and we had trouble keeping the circuit breaker in. The switching apparatus itself is housed in a steel box, but the other equipment is similar to the regular out-door type used on the Marquette Range. Two new circuits consisting of six stranded aluminum wire suspended from steel towers now run from the new transformer station to the main line, one-

half mile to the North.

COOLING POND:-

The new compressor installed during the year requires considerably more cooling water for the jackets and intercooler than the old compressor, and in order to meet these conditions a new concrete cooling pond was built just East of the Engine House. It is hexagonal in shape, about 16 feet wide and 4 feet deep, and the incoming water travels through a pipe placed vertically in the centre of the pond. The water is discharged over a horizontal perforated plate in the form of a spray, and as a result, the temperature is lowered enough so that the water can again be pumped from the pond for cooling purposes.

SHAFT HOUSE:-

The building housing the Crusher and the grizzly was gunited both inside and out to lessen the fire hazard.

The head sheaves in the shaft house were also relined to conform with the centre lines of the drum on the new hoist.

TIMBER YARD:-

Up to this time but little timber had ever been used in the Spies Mine, but in driving the main level drifts on the Virgil property, we found it necessary to timber, and so a timber yard was laid out South of the shaft on both sides of the stub pocket track. A road was also constructed around the East side of the yard.

ROCK PILE:-

During the winter of 1923-1924, the rock pile took fire which is not unusual in the Iron River District. The gray and black foot-wall slates both carry considerable Iron Pyrites and the weight of the pile and lack of ventilation, starts the Sulphur in the Pyrites to burning. The only cure is to spread the pile out so that it will not average over 10 feet in depth.

We first tried to spread the rock by using a 6 H A double drum tugger hoist and a small scraper, like those used in the soft ore mines. We found out, however, that this process was slow and expensive and then decided to use the old electric skip hoist for that purpose. A temporary Engine House was built 500 feet South of the end of the rock pile, so situated as to enable us to spread all the rock hoisted from the shaft sinking operation, also making allowances for the rock from the Fourth and Fifth Level drifts and Pump-house and sump. A temporary pole line carried the power from the sub-station. We then built a large scraper, four feet wide, and by using $\frac{3}{4}$ " rope, discarded from the top tram system, we were able to spread the rock rapidly.

As the fire was only confined to the East half of the rock pile, we first cut a trench through the centre to prevent the fire from spreading. We then cut several troughs through the heart of the burning mass and in a few hours the fire would die down. After cutting four or five of these trenches cross-wise through the pile, we quenched most of the fire in the pile, and the burning material that was scraped to the South went out in a few hours.

We had a lot of trouble with the wire ropes breaking, because the heat from the burning mass would burn out the hemp centre in the rope and in a short time, the rope would lose its shape and the strands start to break. By splicing with rope clamps, we managed to keep things going until the worst of the pile was spread. If we had continued to have trouble, we planned on using chain or rods fastened to the scraper.

AIR COMPRESSOR:-

The development work was proceeding very slowly at the beginning of the year because the rock encountered on both the Fourth and Fifth Levels was cherty gray slate, the same material that we had in the shaft, 500 feet below the collar.

We attempted also to use a Hoar Loader and could not because of the low air pressure. About May 1st, a P.R.E.#2 Ingersoll-Band Compressor was available from the Francis Mine and arrangements were made to move and install this in the new Engine House. Fortunately, we found we just had room enough in the North-West corner of the building to house the Compressor. Outside of a little trouble with the main right hand bearing, the compressor was installed and operated smoothly. The trouble with the bearing was easily remedied, however, and improved results were obtained underground immediately, as the P.R.E. Compressor had thrice the capacity of the old Imperial Type 10.

PRODUCTION.

The production from the Spies Mine proper was as follows:-

| | | | | |
|-------|------------|---------|--------|----------------|
| Mar., | Spies Mine | Crushed | Ore, | 1,894 tons, |
| Apr., | " | " | " | 3,757 " |
| May, | " | " | " | 1,039 " |
| Jun., | " | " | " | " |
| Jul., | " | " | " | 2,915 " |
| Aug., | " | " | " | 5,582 " |
| Sep., | " | " | " | 2,262 " |
| Oct., | " | " | " | 3,392 " |
| Nov., | " | " | " | 3,317 " |
| Dec., | " | " | " | <u>3,001</u> " |
| | | | Total, | 27,159 |

No ore was hoisted in June as the samples during the latter part of May ran off grade, and it was first necessary to open up new territory underground before hoisting could be resumed.

SHIPMENTS.

We shipped a total of 19,667 tons to the Escanaba Docks. Shipments were started about the middle of July on a special 8,000 ton cargo for the American Radiator Company, and although we had but a limited territory underground from which to draw the ore, we tried our best to hoist material running in excess of our guaranteed analysis of 56.00 Iron. The ore shipped was split into five cargoes, but only two of them went out as straight Spies ore, the balance being mixed with Cambridge or Homer ore.

The two straight Spies cargoes were the:-

| | MINE ANALYSIS | | | LOWER LAKE | | |
|------------------------|---------------|-------|--------|------------|--------|---------|
| | TONS | IRON | SILICA | IRON | MOIST. | SULPHUR |
| Steamer, Central West, | 4689 | 57.03 | 4.61 | 57.10 | 4.37 | |
| " Wolf, | 8026 | 55.88 | 5.16 | 56.50 | 5.58 | .108 |

You will note that in each case the lower lake chemists report higher Irons than the published analysis.

UNDERGROUND.

ORE ESTIMATE.

The ore in sight in the Spies Mine proper on December 31, 1924, is as follows:-

| | AVAILABLE | UNAVAILABLE | TOTAL |
|---|--------------|--------------|--------|
| Non-Bessemer ore developed, Prospective, | 24,748 tons, | 42,360 tons, | 67,108 |
| | | 28,130 " | 28,130 |
| Total, | 24,748 " | 70,490 " | 95,238 |

This ore is distributed throughout the Mine as follows:-

| | TONS DEVELOPED | TONS PROSPEU- TIVE | TONS AVAILABLE | TONS UNAVAIL- ABLE |
|--|-------------------|--------------------------|-------------------|--------------------------|
| 910' Sub-level Main Stope Back Pillar, | 19,900 | | | 19,900 |
| 910' Sub-level North Lens Back Pillar, | 8,700 | | | 8,700 |
| 875' Sub-level, | 7,420 | | 7,420 | |
| First Level North Lens, Back Pillar, | 4,558 | | 4,558 | |
| First Level North Lens, Floor Pillar, | 3,840 | | 3,840 | |
| Second Level North Lens, Back Pillar, | 2,480 | | 2,480 | |
| Second Level North Lens, Floor Pillar, | 3,200 | | 3,200 | |
| 642' Sub-level, | 3,250 | | 3,250 | |
| Third Level, North Lens, Back Pillar, | 2,150 | | | 2,150 |
| Third Level, Main Stope, Back Pillar, | 11,610 | | | 11,610 |
| Third Level, North Lens, Ore below Level, | | 5,530 | | 5,530 |
| Third Level, Ore below Level, | | | | |
| Diamond Drill Holes #1 & #6, | | 22,600 | | 22,600 |
| Totals, | 67,108 | 28,130 | 24,748 | 70,490 |
| GRAND TOTAL, | | 95,238 | | 95,238 |

EXPLORING.

No Diamond Drilling was done underground and the only new ore developed in the Spies Mine proper, was a new stope being opened up above the main West Third Level drift, going over towards the Virgil property. This ore was just being explored by raising and drifting at the end of the year, and at this writing it is impossible to forecast its extent but we are much encouraged by the possibilities.

STOPING.

The main stope in the Spies property from which the bulk of the product was secured since the mine was opened up, was practically worked out when the mine was shut down in May, 1921. We had then mined up to within 30 feet of the sand, and it was not thought safe to go any higher. The bulk of the ore broken in 1924 came from the North lens shrinkage stope and from a pillar of ore developed between the South end of the Shrinkage stope and the North end of the main stope. It is impossible to break ore as cheaply in the shrinkage stope system as it was when the ore was won from the main stope, but at that the unit cost for stoping was only a shade higher than the unit cost in 1921, when the mine was last operated.

TRAMMING.

The ore is trammed to the shaft by contract trammers. These men work on a bonus schedule. They are paid Company account wages for the first twenty cars; then 5¢ per day extra for the next five cars and then 10¢ per day extra for each succeeding car. In other words, the men receive \$4.35 per day for trampling twenty cars, \$4.85 for thirty cars and \$5.85 for forty cars. The unit cost for trampling in 1924 shows but a slight change from 1921, but as the wage schedule is a little lower for the 1924 period, the unit cost should show a corresponding decrease. The reason for not showing a decrease is that the average monthly product for 1924 is only about one-third that of 1921, and the over-head expense chargeable to

trammings, such as skip-tender and cage rider who acts as a skip-tender, is the same for the two periods.

PUMPING.

Since the Virgil drifts have been opened up and particularly since the Spies started operating again in March, 1924, the pumping charges have been less. During the period the mine was idle, practically all of the current metered each month was charged to pumping, because the only reason the hoist was kept in commission was to enable the pumpman to get to and from the pump-house. What little Dry House expense there was, was also charged to the pumping expense. Just as soon as miners were put to work in the Spies and hoisting resumed, the cost of electric current was proportioned between puming, hoisting, top tram, Crushing Ore, etc. For that reason, the supply cost under this account shows a considerable decrease from last year.

COMPRESSORS & AIR PIPES.

We have mentioned previously in this report about the installation of the P.R.E. #2 Compressor that was shipped from the Francis Mine. We also found it necessary to put in both new air and water pipes on all three levels in the Spies Mine before mining could be resumed.

UNDERGROUND SUPERINTENDENCE.

The underground work is looked after by the Captain and two shift bosses, both of the latter being new men put on during the year. Richard Roberts, formerly boss for the Jones-Laughlin Ore Company, and Ed. Dawe, who was employed as shift boss at the Salisbury Mine until it closed down, are the new bosses.

HOISTING.

The unit cost for hoisting shows an increase compared with that for the 1921 period when we last operated the Spies property.

That is due to the installation of the new hoist which is considerably larger than the old electric hoist, now being used to spread rock on the rock pile. Also the hoisting expense has been subdivided between Spies Operating and Virgil development in the same ratio as to the amount of ore and rock hoisted, whereas, to be absolutely correct, it should be subdivided not only on the basis of ore and rock, but also the depth from which these materials are hoisted, should be considered, as the rock comes from a 950' and 1200' depth compared with only 200' and 400' for the ore. To simplify the work in the office, however, only the amount of ore and rock was considered, and as a result, the Spies operating cost sheet shows an increase per ton of ore compared with 1921. The monthly tonnage hoisted was also considerably less than during the 1921 period, which also tends to increase the unit cost.

STOCKPILE.

There was but a small tonnage in stock at the close of the year and stocking space was ample for both the ore from the Spies and Virgil properties.

DRY.

Since guniting the Dry we have noted a perceptable decrease in the amount of coal necessary to keep the building warm.

The average monthly expense runs about \$130.00 compared with \$180.00 before. A part of this decrease is probably also due to the fact that the heating boiler is now located in the Dry building, whereas, formerly one of the large 125 H.P. boilers was used for heating purposes.

The number of lockers in the Dry has hardly ever been adequate to properly care for the men, and so about twenty additional ones were added.

E. & A. #429.

The work done on the Fourth and Fifth levels, in the sump and Pump-House and in the new Engine House, was carried on under E. & A. #429. The estimate on the E. & A. has over-run not only in the Superintendent's division, but also the Master Carpenter's and Chief Mechanical Engineer's estimates were too small in nearly every instance.

When the E. & A. was prepared in 1922, all of the Company's mines were operating under reduced wage schedules compared with previous years, and before shaft sinking actually started in October, 1922, there was an increase in wages followed shortly by another, so that naturally all of our figures were thrown out of line. The labor charges on the E. & A. were based on existing wage schedules, but the majority of the work was done after wages were advanced from \$3.70 for Company account miners to \$4.60, or an increase of 24.4%.

Furthermore, as explained last year, the only guide we had to help us in estimating the cost of sinking and rock drifting, was the work done under E. & A. #274, covering the cost of sinking the shaft from surface to the Third Level and the driving of the First, Second and Third Level rock drifts from the shaft to the ore body. Allowances were made for the difference in wages prevailing in 1916 and 1917 and the wage schedule in 1922. Having nothing to guide us as to the nature of the rock that would be encountered, we assumed that the shaft and drifts would be in black slate or gray slate foot-wall. There were no deep Diamond Drill holes within 1500 feet of the shaft, so that we had absolutely no reliable information to base the speed of the sinking and drifting on. A short distance below the Third Level, the shaft ran into hard cherty gray slate, and this hard material was sunk through for over 700 feet. All of the plats, the Pump-house and sump and tail tracks were cut out in the same hard material, the Fifth Level Plat particularly, being hard.

No softer material was reached until the drifts had advanced about 300 feet from the shaft.

Furthermore, the Fourth Level drift was planned to encounter the ore about October 1st, 1924, and the expenditures on the E. & A. were based on the assumption that the Virgil Mine would become an operating property on that date, but due to delays because of the labor shortage in 1923, and the slow progress in the shaft and drifts, there is no prospect of cutting the main ore body until February 1st, 1925, which means that the general expense: maintenance and other items, will over-run the estimated time schedule from four to five months.

The various accounts will now be taken up in detail:-

GENERAL EXPENSE:-

Upon analyzing the various items that make up General Expense, we find that only two items show a large increase over the figures made up for the E. & A., namely: Taxes and Central Office Expense. The amount of taxes that would be levied against the Virgil property was entirely guess-work, because the E. & A. was made out six months before the valuation figures from the State Tax Commission were available. Furthermore, the monthly expense for taxes was only estimated to run until October 1st, 1924, because we assumed that after that date, the Virgil property would be producing ore.

The Central Office Expense charged against the E. & A. is also more than double the estimate, but that is another item that is always guess-work, and we used the figures given us by the Central Office and to show how difficult it is to estimate that amount, I can only point out how that particular item varies on the E. & A. In October, 1922, the monthly Central Office expense charged to the E. & A. was \$145.07. In December, it had increased to \$447.37. By July, 1923, it had dropped to \$280.40, increasing in December, 1923, to \$527.50. In 1924, it has varied from \$343.53 to nearly \$800.00 a month. We assumed a monthly charge of \$275.00 per month.

I can't understand how the Central Office expense charged against the Virgil Development is so heavy, as for instance, at the Republic Mine where days worked for the month of November is three times as many as the days worked opening and equipping the Virgil Mine for the same month, yet the central Office expense for the Republic Mine was only approximately one-half again as large as that of the Virgil. It strikes me that too much Central Office expense is being charged against the Virgil Mine.

Even when the Spies Mine was operating full-time in 1920, when it employed the largest number of men and was producing at its maximum, our Central Office expense averaged only about \$500.00 a month.

MAINTENANCE:-

This account shows no change for the past year, all of the charges against it having been made in 1922 and 1923.

SINKING:-

The sinking of the shaft was finished in 1923, but there has been some little expense charged to this account incurred in putting in dividing plank and dividers for the skip-road.

DRIFTING:-

Drifting has been carried on on two levels, the Fourth and Fifth. We had numerous difficulties driving these drifts. In the first place, the ground near the shaft was exceedingly hard. It was not until nearly June 1st that the material became softer and better progress was made after that date. The following table shows the footage driven each month on the Fourth Level:-

| | | | |
|-------|--------------|--------|-----------|
| Jan., | Cutting Plat | July, | 207 feet, |
| Feb., | " " | Aug., | 181 " |
| Mar., | " " | Sept., | 219 " |
| Apr., | 91 feet *1, | Oct., | 153 " *2, |
| May, | 100 " *1, | Nov., | 129 " *3, |
| Jun., | 143 " *1, | Dec., | 120 " |

*1, Same miners working on both Fourth and Fifth Levels.

Rock drilled and blasted on one shift mucked out by trammers on next shift.

*2, Encountered water and due to soft nature of ground, drift had to be timbered.

*3, Short of miners due to re-opening of Rogers Mine.

In April, May and June, progress was slow partially to hard nature of rock which changed and became softer latter part of May. Then we found we could speed up our drifting if we could operate the Hoar Loader. Because of the low air pressure, however, we could not make the Loader operate satisfactorily. The shortage of air was due to trying to operate the Spies Mine and do the development work at the same time. When the opening up of the Virgil Mine was contemplated, we had no thought of operating the Spies property at the same time. The Spies Mine was only equipped with a small Imperial Type 10 Compressor, good for only 800 cu.ft. per minute, or only capable of taking care of about six #248 drills. Because of the soft nature of the black slate, all the drilling in the Spies Mine was done with small Jackhammers, but the rock drifting in the Virgil property required the heaviest type of machines with consequently larger air consumption. As we had six to eight Jack hammer machines on ore in the Stopes, we could only use two #248's in the drifts, and so the drilling had to be done alternately on the Fourth and Fifth Levels, and the Hoar Loader could not be used at all.

Just about this time, it was decided to close down the Francis Mine and so arrangements were made to move the 2450 cu.ft. air compressor from the Francis to the Spies Mine. After this compressor was installed, we made better progress until October when a heavy flow of water was encountered and drifting ahead was done slowly and carefully, until we were sure that the pumps could handle the water. The wet and sloppy nature of the material blasted, made it impossible to use the loading and mucking machines, as the dirt would run and bury the machines. Furthermore, the drift had to be timbered and forepoled, so that the miners that did the drilling also had to timber up the drift.

It was not possible to keep the miners drilling and blasting and have another gang come in behind and do the timbering, as the ground in the back was not secure enough for that procedure. To make matters worse, on November 1st, the Rogers Mine re-opened, and as all of our miners working on both the Fourth and Fifth Levels were formerly employed in the Rogers and lived in that mine location, we lost fourteen good miners. The Captain had difficulty in filling their places, as experienced miners are always scarce in the Iron River District, due to the intermittent employment offered them. Even the best miners, however, in this district know but little about timbering, and as a result, even with careful supervision on the part of the Captain and bosses, a great many sets put up were blasted down again. However, as the men became more proficient, better progress was made in the drift.

This drift is being driven on a .5% grade and is plenty wide enough for motor haulage, allowing plenty of room also for ditches, air and water pipes and sufficient space for one to stand to allow the motor-train to pass. In order to provide plenty of air with only a small loss in pressure, a 4" air line is run from the shaft to the breast, the pipe being suspended from iron supports about three feet above the floor of the drift.

While driving the drift we had considerable difficulty with gas until vent tube was installed. We ran a 12" vent Tube from the skip compartment in the shaft to within a short distance of the breast and both at the shaft and about 1,000 feet in from the shaft, we inserted a short section of 12" pipe, made of galvanized iron. Inside this iron section, we fastened a $\frac{1}{2}$ " pipe bent in the form of a ring, perforated with a number of small holes. This ring was connected with the main air line and after blasting, the air would only have to be turned on a short time to clear the breast of smoke.

The compressed air blowing through the perforations created a suction and this added to the suction induced at the end of the Vent Tube by another ring and the fact that the Tube projected out into the upcast shaft compartment made a satisfactory method of ventilation. Just as soon however as the drift encountered the water, we had but little trouble with gases after a blast.

As mentioned before, progress was slow until the new air compressor was installed, after which we were able for a short time to operate shovel loaders borrowed from the North Lake District. About this same time the electric haulage system was put in commission, motors operating on both the Fourth and Fifth Levels.

In order to try to speed up the rock work, Capt. Wm. Nault of the North Lake District spent a week at the Virgil property making some changes which were of great help in speeding up the work. He first tried working but one gang of miners on both the Fourth and Fifth Levels, the idea being to drill and blast a round on the Fourth in the forenoon, duplicating the same on the Fifth in the last half of the shift. In the mean time, the dirt would be mucked out with the loading machines. We tried this scheme for a while, later changing to a full gang of miners each shift on each level, and trying for two cuts a shift in each breast. For a short time we did average from 14' to 18' per day, until we encountered the water and found it necessary to timber the drift when progress was slowed down a great deal. In order to make the two cuts a shift, we cut down on the number of holes drilled each round, and the holes were drilled shallower. The number of holes were cut from twenty and twenty-two to only twelve or fourteen, depending on the ground and the depths were reduced from six to four feet. We had more favorable ground on the Fifth Level where we did actually blast three 7 foot cuts in succession in one and one-half shifts.

As to the Geology of the drift for the most part, the material has been gray slate near the shaft, and mixed gray and black slate as the drift progressed to the South-West. The slate is badly folded but for the most part, the strike is nearly East and West with a dip to the South. In other words, the drift seems to be headed into a syncline formed by the main foot dipping to the North and the South side of an anticline dipping to the South. Along about the middle of October, shortly after encountering the water, the drift ran into ore coming in at the bottom and on the South side of the drift. This lasted only a short time, however, the drift going back into slate again. At the point where the drift ran into the ore, a small sub-level was opened up just over the back of the drift and exploring done both to the South and North. Outside of a small seam of ore in the South cross-cut, nothing of interest was encountered.

FIFTH LEVEL:-

The work on the Fifth Level was pretty much a duplicate of what was done on the Fourth, except that better progress was made. The monthly footages follow:-

| | | | |
|-------|---------------|--------|-----------|
| Jan., | Cutting Plat. | June, | 128 feet, |
| Feb., | " " | July, | 208 " |
| Mar., | " " | Aug., | 247 " |
| Apr., | 91 feet, *1, | Sept., | 360 " |
| May, | 88 " *1, | Oct., | 229 " *2. |

*1, Same miners driving both Fourth and Fifth level drifts.

*2, Drift stopped during month on account of water.

We made the best footage on the Fifth Level in October. Although we drifted 360 feet in September, the first seven days in October, the advance totalled 115 feet or $16\frac{1}{2}$ feet per day. On the last three cuts just before striking the water we made three 7 foot cuts, or at the rate of 28 feet per day. At that point, however, the drift ran into soft faulted material which made it necessary to start timbering immediately.

We found the back would sluff off eight or ten feet above the top of the sets and it required a great deal of packing to make the drift secure. Just about the same time the breast began to make water and we had to stop drifting as the Fourth Level was making as much water as the Fourth Level pump would handle, and the main pumps on the Fifth Level were giving us trouble, due to defective valves and valve seats.

The drift was breasted 1400 feet from the shaft on October 15th and no further drifting was done the balance of the year. It is not advisable to drive this drift much further without more definite knowledge of the shape and position of the ore bodies on the Fourth Level and above.

The entire drift is in mixed gray and black slate, mostly the former.

The cost of both the Fourth and Fifth Level drifts was estimated at \$13.50 per foot. During the month of September when we made our maximum footage of 579 feet on the Fourth and Fifth levels combined, the actual cost per foot was \$18.50. Taking into account the increase in wages since the E. & A. figures were made up the estimated cost would be approximately \$17.00 per foot. As mentioned before, the estimated figures were based on both drifts being driven through soft black slate, and no allowance was made for timbering, as none had ever been done in the three levels in the Spies Mine in the black slate.

PLATS:--

Both the Fourth and Fifth Level plats were cut during the first three months of the year. We encountered extremely hard ground on both levels, the Fifth being particularly hard. Whereas we anticipated being able to drill a round of holes in three or four hours, it actually took us two and one-half shifts, so that we could not blast over four rounds or cuts a week. In the black slate, a cut per shift could easily have been secured.

When the plats were planned we also assumed that the standard motor car would be of the four-ton saddle back type, commonly used in the Company's mines. It was later decided to use the new round bottom two-ton cars, manufactured by the Lake Shore Engine Works. That meant doubling the length of the side and tail tracks as the new cars were only half the capacity of the former standard motor car, used by our Company, and due to the length of the haul on each level, we decided to run eight-car trains. As a result, it took us much longer to cut the plats than we planned on in the start.

PUMP-HOUSE & SUMP:-

On the Fifth Level just East of the shaft, we located the main pump-house. This is patterned after the pump-houses made recently in other of the Company's mines, where provision is made to isolate the pump-house in case of a heavy flow of water, by having a dam constructed across the entrance to the pump room, exit being provided by means of a raise from the back of the room to the shaft or the level above. In order to keep the water entering through the sump, the suction is concreted in and large valves provided with which to shut off the incoming water.

The pumping equipment consists of two 350 gallon Prescott Vertical Triplex Pumps, designed for 1200 foot head. The suction runs down into a small sump underneath the floor that is connected with the main sump by means of a drift. Two 12" pipes placed in a dam built in this drift are used to let the water through from the large to the small sump. An incline drift that starts at the end of the tangent South of the shaft, leads to the end of the main sump, the floor of which is 10 feet below the level. This main sump has a 100,000 gallon capacity, or ample for six hours based on the flow handled by the Wickwire Interests when they operated the Virgil property.

At the end of the main sump near the concrete dam dividing the main and small sumps, we have provided a settling basin, which is merely the upper end of a raise, made water tight by having a concrete dam or plug in the raise about 10 feet below the floor of the sump. This raise leads to a small drift driven 50 feet below the Fifth Level, which provides a place from which to clean out the skip-pit as well as the bottom of the sump. A large 10" clean out pipe runs through the concrete dam or plug and the mud or silt from the sump will be drawn off into a car that can be run onto the cage and hoisted to the Fifth Level. We are also going to put a small air pipe through the dam, so that we can agitate the mud in case it becomes too hard and blocks the end of the clean-out pipe.

The drift at the bottom of the shaft was completed at the close of the year, but we had not quite finished the raise leading to the bottom of the sump.

MOTOR HAULAGE.

Both the Fourth and Fifth Levels were equipped for motor haulage. Two old motors were secured from the Crosby Mine, as was also the motor-generator set which was placed underground and put in operation in the pump-house. This was done to save the cost of running a D.C. cable from surface to the Fourth Level.

MINING & STOPING SPIES ORE BODY.

Stoping was resumed in the Spies Mine proper in March, 1924. The work in detail was as follows:-

910' SUB-LEVEL:-

A pillar about 50 feet long and 41 feet wide was mined at the North end of the main stope, leaving probably a small lens about 100 feet long farther North still to be mined.

As the ore is mined out to about the 917' elevation, that leaves only approximately 30 feet of ore in the back to act as a capping to prevent the sand from coming in and mixing with the ore.

900' SUB-LEVEL:-

This sub is really at the 887' elevation and the ore mined during the year was directly underneath that taken out on the 910' sub.

We also finished mining all the ore that it is possible to take at the extreme North end of the North lens. The ore here is narrow, averaging only about 15 feet in width. The hanging is also very flat making it necessary to leave numerous cross pillars to prevent the lean material in the hanging getting mixed with the broken ore in the stope.

There remains about 7500 tons that can be taken safely between Diamond Drill holes Nos. 36 and 40.

875' SUB-LEVEL:-

A small bunch of ore about 70 feet long was sliced off of the foot near Diamond Drill hole No. 40. As both the foot and hanging were flat, it was necessary to leave four or five pillars of ore on the foot to prevent the hanging from coming in.

A small drift was driven in ore near the main foot joining the North lens with the main stope. There is a small pillar of ore left here about 40 feet long and from 20 to 25 feet wide. Below this elevation there is no ore to speak of in the area between Diamond Drill holes, Nos.: 13, 36 and 39.

662' SUB-LEVEL:-

This sub-level is approximately 55 feet above the Third Level and in the area over the main level West drift, we have been endeavoring to develop some new ore. Back in 1921, several raises were put up about 50 feet above the level from the main level drift, and samples from these raises showed nothing but lean ore.

Recently, we discovered that the samples from raises did not always check the broken dirt samples; in fact, the sampling of ore in place always showed lower Irons than the samples of the same ore from the cars. This is probably due to the fact that the Spies Mine ore bodies are not of uniform quality. The ore lies in seams that vary in color, hardness and quality. The ore bands run from a light yellow to reds and browns and the best ore is hard and blue-black in color.

When sampling a breast or wall of any opening, the samples are taken across the bands and more of the lower grade or softer material gets into the sample, and the good ore, which is hard, is not properly represented in the sample. After a blast, it is quite easy to take a fair sample from the broken dirt pile.

Acting on the supposition that the sampling in the Third Level West drift raises was not representative of the real quality of the material encountered, we did further exploring and found the ore to extend nearly 100 feet West of the hanging of the main stope at the 662' elevation and directly over the main level drift. So far, the ore does not run over 20 feet in width. There are possibilities here of finding the ore running clear over and beyond the Virgil West boundary.

GRADE OF ORE:-

We found it very difficult to keep the quality of the ore hoisted up to the guaranteed analysis, during the past year. When the average daily product is small, it is more difficult to grade the ore, as a few cars of lean material from one chute only will have such a large bearing on the days analysis.

Then again all the Spies ore is broken either by the sub-level stoping method or in shrinkage stopes. By neither method can we immediately change the grade of the ore hoisted by shifting the contracts into new working places.

The ore hoisted to-day from the shrinkage stope chutes may have been mined and broken days or months previously and if any lean material from the hanging or foot gets mixed with the ore, as it settles down in the stope, the samples will go off-grade. It is practically impossible in the Spies property to detect by eye the difference between broken ores that will run 53% or 57% Iron. In the stopes, it is comparatively easy to spot the leaner seams, but after the ore is broken and drawn from the chutes, it is very difficult to tell where the lean ore is coming from. In the case of the main stope, we may break a quantity of good ore at the 875' elevation but by the time this ore is drawn from the Third Level chutes, 300 feet below, some material from the hanging may become mixed with it. The bulk of the ore, however, from the main stope was drawn off pretty clean, and in cases where the hanging is fairly firm, I believe the sub-level stoping system is a good one to adopt, as all the advantages more than counter-balance a few disadvantages.

LABOR SITUATION.

The labor situation which is never none too good in the Iron River District, was bad during the Spring and again in the early Winter months. We have a large labor turn-over as for instance, more men will be hired in one month at the Spies-Virgil property than we would hire at the Republic Mine in two or three years. During the month of April, as an example, we employed an average of sixty men daily, surface and underground, and the Captain hired ninety new men during the month. Along about July, when the Rogers-Brown Company closed down their properties, we secured plenty of good miners who worked for four months and then went back to their old jobs on November 1st, when the Rogers & Hiawatha were reopened. Obviously having such a large labor turn-over is reflected in the results secured.

The trouble with the entire district is the intermittent employment offered the men and the housing conditions, which are none too good. At the Spies-Virgil property, particularly, we need new dwellings, a better water supply and some form of a sewerage system for the location. To show the need of the new houses, we could have kept all of the miners that were employed by us in the Summer months, as they all put in applications for dwellings but had to go back to work in the Rogers Mine, as they were living in that mine location. There were fourteen of those men whom the Captain contended were the best miners he ever had. Furthermore, we had two shovel runners from the North Lake District that would not remain at the Spies Mine, because they were unable to find homes near the mine.

We should build at least twenty new single dwellings similar to those already in the location with the exception that they should have concrete foundations and a cellar.

The present water supply is inadequate and the water is not always clean, being pumped from drill holes on the Third Level. The location should be provided with city water which can be done by extending the pipe lines less than one-half of a mile and by installing a booster pump.

A sewerage system can easily be built discharging the wastes into the same creek that carries away the mine water.

By building a location having a few of the necessary conveniencies, will enable us to hold the neuclus for a good crew. When times are dull, if these men could be retained and put on development work to keep them steadily employed, they would be satisfied and we would secure much better operating results.

The men in the Iron River District have always liked to work for the Cleveland-Cliffs Iron Company but have invariably complained about the houses or rather lack of houses. The ore reserves in the Spies Mine never justified building additional

dwellings, but the Virgil forty is probably underlain by a considerable tonnage, and although we will not know definitely how large the ore bodies are until we have done considerable development work, still I believe we are justified in building at least twenty dwellings, the more so because with the prospects of good times ahead for three or four years, good men are going to scarce in the Iron River District.

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SPIES-VIRGIL MINE

AVERAGE MINE ANALYSIS ON OUTPUT FOR YEAR 1924

| GRADE | IRON | PHOS. | SILICA |
|---------|-----------------|-------|--------|
| Spies, | 55.78 | .512 | 6.45 |
| Virgil, | (No Production) | | |

AVERAGE ANALYSIS ON STRAIGHT CARGOES FOR YEAR 1924.

| GRADE | IRON | Mine | SILICA | Lake Erie | |
|---------|----------------|-------|--------|-----------|--------|
| | | PHOS. | | IRON | MOIST. |
| Spies, | 56.30 | .563 | 4.96 | 56.72 | 5.13 |
| Virgil, | (No Shipments) | | | | |

ORE STATEMENT - DECEMBER 31ST, 1924.

| | SPIES | VIRGIL | TOTAL | TOTAL LAST YEAR |
|--------------------------|--------|--------|--------|-----------------------|
| On hand January 1, 1924, | 2,302 | 835 | 3,137 | 3,137 |
| Output for Year, | 27,159 | - | 27,159 | - |
| Total, | 29,461 | 835 | 30,296 | 3,137 |
| Shipments, | 19,667 | - | 19,667 | - |
| Balance on Hand, | 9,794 | 835 | 10,629 | 3,137 |
| Increase in Output, | | | 27,159 | |
| Increase in Ore on Hand, | | | 7,492 | |

1924 -- 2-8 Hour Shifts, Jan. 1st to Dec. 31st, 1924.

1923 -- 3-8 Hour Shifts, Jan. 1st to Dec. 31st, 1923.

SPIES-VIRGIL MINE

SHIPMENTS FOR YEAR-1924.

| GRADE | POCKET | STOCKPILE | TOTAL | TOTAL LAST YEAR |
|------------------|--------|-----------|--------|-----------------------|
| Spies, | 11,534 | 8,133 | 19,667 | - |
| Virgil, | - | - | - | - |
| Total, | 11,534 | 8,133 | 19,667 | - |
| Total Last Year, | | | | - |
| Increase, | | | 19,667 | |

SPIES MINE

COMPARATIVE WAGES AND PRODUCT

| | 1 9 2 4 | 1 9 2 3 | INCREASE | DECREASE |
|---------------------------|--------------------|--------------------|-----------|----------|
| PRODUCT | | | | |
| No.Shifts & Hours | 27,159 1-8;2-8 | - | | |
| AVG.NO.MEN WORKING | | | | |
| Surface | 11 | 3 | 8 | |
| Underground | 20 | 2 | 18 | |
| Total | 31 | 5 | 26 | |
| AVG.WAGES PER DAY | | | | |
| Surface | 4.07 | 3.98 | .09-2.26% | |
| Underground | 4.75 | 4.32 | .43-9.95% | |
| Total | 4.50 | 4.12 | .38-9.24% | |
| WAGES PER MO. OF 25 DAYS | | | | |
| Surface | 101.75 | 99.50 | 2.25 | |
| Underground | 118.75 | 108.00 | 10.75 | |
| Total | 112.50 | 103.00 | 9.50 | |
| PRODUCT PER MAN PER DAY | | | | |
| Surface | 7.67 | | | |
| Underground | 4.63 | | | |
| Total | 2.88 | | | |
| LABOR COST PER TON | | | | |
| Surface | 1.530 | | | |
| Underground | 1.028 | | | |
| Total | 1.558 | | | |
| AVG.PRODUCT BRK'G & TRM'G | 6.38 | | | |
| " WAGES CONTRACT MINERS | | | | |
| " " " TRAMMERS | | | | |
| TOTAL NO.OF DAYS | | | | |
| Surface | 3539 $\frac{1}{2}$ | 1048 $\frac{1}{4}$ | 2491-1/4 | |
| Underground | 5873 | 738 $\frac{1}{4}$ | 5134-3/4 | |
| Total | 9412 $\frac{1}{2}$ | 1786 $\frac{1}{2}$ | 7625 | |
| AMOUNT FOR LABOR | | | | |
| Surface | 14411.19 | 4169.38 | 10241.81 | |
| Underground | 27912.16 | 3188.60 | 24723.56 | |
| Total | 42323.35 | 7357.98 | 34965.37 | |

Proportion Surface to Underground Men:

- 1924 - 1 to 1.82
- 1923 - 1 to 3.
- 1921 - 1 to 2.8
- 1920-- 1 to 3.1
- 1919 - 1 to 2.91
- 1918 - 1 to 2.86

1924 - operating from March 17th;
1-8hr to March 24th; then 2-8hr shifts.

SPIES MINE

STATEMENT OF EXPLOSIVES USED FOR BREAKING ORE

| <u>KIND</u> | <u>QUANTITY</u> | <u>AVERAGE PRICE</u> | <u>AMOUNT 1924</u> |
|------------------------------------|-----------------|----------------------|--------------------|
| 40% Powder | 32,800 | .135 | 4,428.00 |
| Total Powder | 32,800 | .135 | 4,428.00 |
| Fuse | 61,100 | .6556 | 400.57 |
| Caps | 9,150 | 1.065 | 97.45 |
| Cap Crimpers | 8 | .50 | 4.00 |
| Total Fuse, etc. | | | 502.02 |
| Total Explosives | | | 4,930.02 |
| Product | | | 27,159 |
| Pounds powder per ton of ore | | | 1.204 |
| Cost per ton for powder | | | .163 |
| " fuse, etc. | | | .018 |
| " all explosives | | | .181 |
| Average price per pound for powder | | | .135 |

Spies idle 1923.
 " " Jan. 1924 to Feb. 5, 1924.
 Started breaking ore Feb. 6, 1924.
 " hoisting ore Mar. 17, 1924.

HILL-TRUMBULL MINE
ANNUAL REPORT FOR 1924

Ore operations at the Hill-Trumbull Mine for the year 1924 were begun on April 24th and shipments were concluded on September 13th. The property produced 451,724 tons of wash ore, yielding 287,146 tons of concentrates, and 15,849 tons of Hill Direct ore, making a total shipment for the season of 302,995 tons. During 1923 the mine produced 406,915 tons of wash ore, yielding 255,636 tons of concentrates and 44,723 tons of direct ore were forwarded, making a total for the season of 300,459 tons.

Operations during 1924 were conducted entirely on day shift.

The analysis of the crude ore mined from the Hill and Trumbull properties during 1924 was as follows:

| | <u>Tons.</u> | <u>Fe.</u> | <u>Phos</u> | <u>Sil.</u> |
|-----------------------|----------------|--------------|-------------|--------------|
| Hill Crude----- | 209,994 | 42.64 | .051 | 32.96 |
| Trumbull Crude----- | <u>241,730</u> | <u>44.41</u> | <u>.050</u> | <u>28.68</u> |
| TOTAL & AVERAGES----- | 451,724 | 43.59 | .050 | 30.67 |

The average iron content of the crude ore was over a point higher than for the 1923 season.

Following is the analysis of the concentrates secured from the Hill and Trumbull ores treated during the past season:

| | <u>Tons.</u> | <u>Fe.</u> | <u>Phos</u> | <u>Sil.</u> | <u>Mois.</u> |
|---------------------------|----------------|--------------|-------------|-------------|--------------|
| Hill Concentrates----- | 134,269 | 60.13 | .065 | 8.23 | 7.86 |
| Trumbull Concentrates---- | <u>152,877</u> | <u>59.43</u> | <u>.062</u> | <u>6.67</u> | <u>7.90</u> |
| TOTAL & AVERAGES----- | 287,146 | 59.75 | .063 | 7.40 | 7.88 |

The average iron content of the 1924 concentrates was one-half point higher in iron and the silica was approximately one-half point lower.

The analysis of the direct ore produced from the Hill property during the past season follows:

| | <u>Tons</u> | <u>Fe.</u> | <u>Phos</u> | <u>Sil.</u> | <u>Mois.</u> |
|----------------------|-------------|------------|-------------|-------------|--------------|
| Hill Direct Ore----- | 15,849 | 59.08 | .057 | 8.98 | 8.86 |

At the Annual Meeting of the Mesaba-Cliffs Iron Mining Company's Directors in the early summer of 1924, it was understood that the Boeing Mine would be operated to capacity and that we would forward but 300,000 tons per annum from the Hill-Trumbull Mine. This schedule calls for a maximum operation

on single shift, during the favorable weather operating period. By double shifting the Hill-Trumbull, we could produce 550,000 tons, made up of 500,000 tons of concentrates and 50,000 tons of direct ore.

The following table shows our estimated production for 1925, as divided between the Hill and Trumbull properties, and the analysis of same:

| | <u>Tons.</u> | <u>Fe.</u> | <u>Phos</u> | <u>Sil.</u> | <u>Mois.</u> | <u>Fe.Nat.</u> |
|--------------------------|---------------|--------------|-------------|-------------|--------------|----------------|
| Trumbull Concentrates--- | 200,000 | 59.00 | .062 | 7.25 | ---- | --- |
| Hill Concentrates----- | 50,000 | 59.50 | .065 | 8.50 | ---- | --- |
| Hill Direct----- | <u>50,000</u> | <u>58.50</u> | <u>.060</u> | <u>9.50</u> | ---- | --- |
| TOTAL AND AVERAGES----- | 300,000 | 59.00 | .062 | 7.83 | 6.81 | 54.98 |

We expect to mine some rather low grade ore from the south end of the Trumbull cuts next season. We stripped a large tonnage of this lean material during the fall of 1924, but on account of excessive curves and unfavorable loading conditions, it was decided to work in as much of the low grade ore as possible next year and send the balance to the lean ore, or waste dumps.

We also will secure about 13,000 tons of concentrates from the rocky area in the bottom of the Hill pit to the east of the approach track. This ore is apt to be somewhat low in iron and high in silica, but the fee owners are insistent that we take some of the leaner ores each year and in this case it is to our advantage to mine down in the rocky area, on account of future track grades at depth in old Area "A". The balance of the Hill concentrates will be derived from a good grade Hill ore to the north and west of the approach track and the direct shipping ore will come from the east end of the Hill pit.

HILL-TRUMBULL ORE ESTIMATE OF JANUARY 1st. 1925

Following are the estimates of ore in sight at the Hill-Trumbull properties on January 1st., 1924, the tonnage mined during that year and the estimate of January 1st., 1925.

A factor of 14 cubic feet per ton was used in the case of the direct shipping ore and 18 cubic feet per ton for the wash material. The tonnages are figured on a shipping basis, a gross recovery of 60% being anticipated in the case of the wash ore.

ORE ESTIMATE OF JANUARY 1ST. 1924

| | TONS |
|---|------------------|
| Hill Bessemer Direct Shipping Ore----- | 642,000 |
| Hill Non-Bessemer Direct Shipping Ore----- | 1,436,000 |
| Hill Bessemer Concentrates----- | 1,408,000 |
| Hill Non-Bessemer Concentrates----- | <u>877,000</u> |
| TOTAL HILL ORE IN SIGHT JANUARY 1ST., 1924----- | 4,363,000 |
| Trumbull Bessemer Direct Shipping Ore----- | 85,000 |
| Trumbull Non-Bessemer Direct Shipping Ore----- | 310,000 |
| Trumbull Bessemer Concentrates----- | 2,396,000 |
| Trumbull Non-Bessemer Concentrates----- | <u>1,500,000</u> |
| TOTAL TRUMBULL ORE IN SIGHT JANUARY 1ST., 1924----- | 4,291,000 |
| GRAND TOTAL HILL AND TRUMBULL ORE IN SIGHT JANUARY 1ST., 1924---- | 8,654,000 |

ORE MINED DURING 1924

| | |
|--|----------------|
| Hill Non-Bessemer Direct Shipping Ore----- | 15,849 |
| Hill Non-Bessemer Concentrates----- | <u>134,269</u> |
| TOTAL HILL ORE MINED DURING 1924----- | 150,118 |
| Trumbull Non-Bessemer Concentrates----- | <u>152,877</u> |
| GRAND TOTAL HILL AND TRUMBULL ORE MINED DURING 1924----- | 302,995 |

ORE ESTIMATE OF JANUARY 1ST., 1925

| | |
|---|------------------|
| Hill Bessemer Direct Shipping Ore----- | . 642,000 |
| Hill Non-Bessemer Direct Shipping Ore----- | 1,420,000 |
| Hill Bessemer Concentrates----- | 1,408,000 |
| Hill Non-Bessemer Concentrates----- | <u>743,000</u> |
| TOTAL HILL ORE IN SIGHT JANUARY 1ST., 1925----- | 4,213,000 |
| Trumbull Bessemer Direct Shipping Ore----- | 85,000 |
| Trumbull Non-Bessemer Direct Shipping Ore----- | 310,000 |
| Trumbull Bessemer Concentrates----- | 2,396,000 |
| Trumbull Non-Bessemer Concentrates----- | <u>1,347,000</u> |
| TOTAL TRUMBULL ORE IN SIGHT JANUARY 1ST., 1925----- | 4,138,000 |
| GRAND TOTAL HILL AND TRUMBULL ORE IN SIGHT JANUARY 1ST., 1925---- | 8,351,000 |

HILL-TRUMBULL MINE.

Our ore operations during the past season have shown conditions to be approximately as expected. We did anticipate encountering questionable wash material in the bottom of the Hill cuts to the west of the taconite island. While we struck some low grade ore, we were able to wash it and test pits put down from the bottom of this cut indicated that there will be more washable ore in this particular territory than we have previously estimated. We have always considered the ore to the north of our present outside Hill stripping cut as being questionable and have had in mind doing some additional diamond drilling before attempting any further stripping. We put down a row of test pits in the bottom of our Hill and Trumbull cuts and we are at present putting down a row of pits along the toe of the stripping cut. These latter test pits extend along the north stripping bank of the Trumbull for a distance of approximately 100' and over 500' on the Hill side. The pits have been sampled and hand washing tests are to be made, to determine the washable character of the ore. The material appears to be of washable grade and if this is the case, it looks as though a full, or at least a partial stripping cut will have to be taken along this bank in order to make available additional ore.

We do not feel that the work has progressed far enough at this time to make any change in our tonnage estimates, but we feel that there will be some increase shown in this area before our next Annual Report.

A special report will be made on the results of the test pits and the drilling that will be necessary to determine the additional amount of stripping that should be done. Further than this, we do not contemplate any exploratory work at the Hill-Trumbull property during 1925.

The average analysis of the ore in the Hill and Trumbull properties on January 1st., 1925, is as follows:

| | <u>HILL MINE</u> | | | | |
|-----------------------------------|------------------|--------------|-------------|-------------|----------------|
| | <u>Tons.</u> | <u>Fe.</u> | <u>Phos</u> | <u>Sil.</u> | <u>Fe.Nat.</u> |
| Bessemer Direct Shipping----- | 642,000 | 58.00 | .045 | 13.00 | 53.36 |
| Non-Bessemer Direct Shipping----- | 1,420,000 | 58.00 | .055 | 13.00 | 53.36 |
| Bessemer Concentrates----- | 1,408,000 | 60.50 | .045 | 7.50 | 56.00 |
| Non-Bessemer Concentrates----- | <u>743,000</u> | <u>61.00</u> | <u>.059</u> | <u>6.50</u> | <u>56.43</u> |
| TOTAL AND AVERAGES----- | 4,213,000 | 59.40 | .051 | 10.01 | 54.78 |

HILL-TRUMBULL MINE.

TRUMBULL MINE

| | <u>Tons</u> | <u>Fe.</u> | <u>Phos</u> | <u>Sil.</u> | <u>Fe.Nat.</u> |
|----------------------------------|------------------|--------------|-------------|-------------|----------------|
| Bessemer Direct Shipping----- | 85,000 | 56.40 | .040 | 12.79 | 51.32 |
| Non-Bessemer Direct Shipping---- | 310,000 | 58.04 | .060 | 9.85 | 52.82 |
| Bessemer Concentrates----- | 2,396,000 | 60.00 | .043 | 8.00 | 55.50 |
| Non-Bessemer Concentrates----- | <u>1,347,000</u> | <u>60.00</u> | <u>.080</u> | <u>8.00</u> | <u>55.50</u> |
| TOTAL AND AVERAGES----- | 4,138,000 | 59.78 | .056 | 8.24 | 55.21 |

STRIPPING

The A. Guthrie Company handled 1,041,433 cubic yards of overburden on the Trumbull property during the past year. The original 3,000,000 yard contract was extended to include 2,000,000 additional yards, making a grand total of 5,000,000. The quantity of stripping handled by the contractor to January 1st., 1925, amounts to 3,956,310 cubic yards and this leaves approximately 1,044,000 yards to complete the contract. It is possible that it will be advisable to extend the stripping contract somewhat, if the drilling program is attempted and shows the ore conditions warrant another cut.

The contractor did not close the 1923 stripping program until January 9th, 1924.

The old Model 300 shovel, which was used on Hill-Trumbull stripping by the contractor during 1921, 1922 and 1923, was dismantled and shipped to the Calumet shops for repairs during January and February. The contractor purchased a new 350-ton machine for the Hill-Trumbull job. The shipment of the new shovel reached the Hill-Trumbull property on February 9th and the work of erection started on February 12th, the job being completed March 26th. The 1924 stripping operations were begun on March 26th. The work was conducted on single shift until the end of the month and from then until the close of the season, the job was worked on double shift.

The contractor purchased twelve new 30-yard air dump cars. Two trains, six cars each, of the 30-yard cars, were in service and one train of old 16-yard cars, during the season.

The 350-ton shovel made four complete cuts across the south end of the Trumbull property and had started on a fifth when work was suspended for the season.

The stripping bank varied from 60' to 80' and it was coyote-holed and blasted ahead of the cuts. With the exception of replacing a few small broken parts, no trouble was experienced with the 350-ton shovel.

The contractor started clean-up work with the 60-ton shovel on May 5th

and this machine was engaged in loading out the material under the old tracks until July.

The contractor started erecting a new dump trestle, which extends southeast from the old dump, during the month of February and the job was completed late in March. This dump was filled and fanning operations started on either side. The contractor now has several dumps and no difficulty is experienced in dumping and disposing of the stripping.

A clean-up cut was taken along the east side of the approach with our shovel No. 27. This work was started on November 9th and completed on the 13th, 6,264 cubic yards being handled.

The following table shows the monthly yardage handled by the A. Guthrie Company and the cost to us of doing the work:

| <u>MONTH:</u> | <u>CUBIC YARDS</u> | <u>COST PER YARD</u> | <u>TOTAL COST</u> |
|---------------|--------------------|----------------------|-------------------|
| January---- | 28,707 | \$.3364 | \$ 9,657.68 |
| February---- | ---- | -- | ---- |
| March----- | 6,089 | .3668 | 2,233.74 |
| April----- | 164,006 | .3137 | 51,448.39 |
| May----- | 195,548 | .3295 | 64,427.54 |
| June----- | 197,480 | .3273 | 64,644.46 |
| July----- | 221,413 | .3193 | 70,703.68 |
| August----- | 170,386 | .3083 | 52,532.42 |
| September-- | <u>57,804</u> | <u>.3142</u> | <u>18,162.73</u> |
| TOTAL----- | 1,041,433 | \$.3205 | \$333,810.64 |
| 1923----- | 1,066,474 | \$.3585 | \$382,334.25 |

The decrease of \$.0380 per yard as compared with the previous year was due to the lower rate of wages paid by the contractor and the reduction in the cost of coal.

On the same basis of labor and coal as in 1924, the 1925 profits to the A. Guthrie Company should be higher, as there will be less expense on the dumps and the actual digging conditions should be at least as favorable.

TRACKS

During the month of April the main line between the pit and dump was repaired and the yard tracks were given some attention. It was necessary to replace a number of ties as well as straighten and reline the rail. The first wash ore cut was taken along the edge of the taconite island, in order to make room for the new track system. Upon the completion of the cut, the track was thrown in as close to the rock as possible and new switches, one leading into the Trumbull approach and the second for the contractor's stripping operations, were placed. Previous to this a new grade had been dug for the Guthrie track by our 60-ton shovel.

After placing these two switches a complete double track system was installed for both the Hill and Trumbull properties. The new layout of tracks required considerable work, but the saving in time and doing away with congestion have more than justified it. The present track system will be in service for the next two years with comparatively little new work necessary.

The pit and approach tracks were repaired from time to time during the season and a number of tie replacements made.

A new switch track was put in at our coal dock, enabling the locomotives to take water and coal without interference on the main line. Previously the spur to the coal dock dead ended and it was necessary for the trains to switch back to the mouth of the approach. The trains now pass on down the approach and switch into the main line below the coal dock.

It will be necessary during the coming summer to place a new waste dump track along the south side of our original dump.

REPAIR WORK

Following the two weeks lay-off during the holiday period, winter repair work was resumed on January 7th.

The overhauling of the 88-C Bucyrus and the "36" revolving Marion shovels, which had been started in December, 1923, were completed on the 26th of January, with the exception of some small jobs on the booms.

Shovel No. 26 was taken into the shops for a thorough overhauling in January and was turned out the latter part of February. We had some difficulty in securing flues for the machine and they had to be put in later. The rather extensive repairs on this shovel should not be necessary again this winter.

The 60-ton Marion shovel was taken into the shops on March 1st. and the repair work was completed by the end of that month.

The three Boeing locomotives were taken into the shop on January 17th. The principal repair work undertaken on these machines was the retipping of the flues. Locomotive No. 106 was turned out on January 26th and sent back to the Boeing Mine. Work on Locomotives Nos. 104 and 105 was finished February 9th and the machines were stored at Marble until spring.

The repair work on Hill-Trumbull locomotives Nos. 102 and 103 was made in April and on No. 101 during the early part of May. The repairs on these three locomotives were comparatively light.

The overhauling of locomotive No. 17 was started, but as it was necessary to send the No. 19 locomotive to the Boeing Mine, this machine had to be put into service at the Hill-Trumbull without all of the repairs. The No. 17 locomotive will be thoroughly overhauled this winter, and the No. 19, which has been in rather severe service at the Boeing, will probably require rather heavy repairs.

The sixteen 20-yard cars were overhauled, thoroughly cleaned and repainted during the winter.

Repairs at the washing plant were in the nature of a general overhauling, taking the machines apart for inspection and replacement of worn parts. The chutes and launders were relined and the machinery was given a general cleaning and greasing. No work was done at the washing plant from January 1st. to the 10th of March on account of the severe weather.

The excavation for the tailings pump installation was begun on March 27th, the foundation was poured and the building erected before May. The pumps were not received and installed until after the plant was running.

Several low places in the tailings dyke were raised during March to take care of the material to be deposited in our 1924 operations.

Starting early in October, a crew of men were employed in raising the dyke throughout its length and placing three overflow pipes, which will do away with spillways and keep the water from following along the face of the dyke. These pipes will take the water approximately 80' back from the dyke, thus doing away with any eddys in the proximity of the dyke. The dyke was built up with tailings and several heavy rains that we had the latter part of the year indicate that the new dyke will stand the weathering. The work on the dyke was completed November 22nd.

The cleaning out of a channel in connection with the suction of our washing plant supply pumps was begun early in December, but on account of the severe weather, this work was discontinued. We intend to put a concrete dam to hold back the mud from the pump sump. While very little washing plant tailings material has flown into the lake, the pressure has been sufficient to shove the soft mud into the pump sump and channel leading from this sump to Little Pinacie Lake.

In order to minimize the wash across our tailings basin, we contemplate taking the flood waters, which now flow into the basin from the north during heavy rain storms and the spring break-up, into the creek which carries the Hill-Annex water. Our ditch around the east side of Little Pinacie Lake now takes the water from the Hill-Annex Mine. We will have to secure permission from the Oliver Iron Mining Company and the Sargent Land Company, as it will be necessary to ditch across their lands to take the flood water mentioned above into the Hill-Annex creek. We contemplate doing this work in the spring, providing the necessary permission is secured from the Oliver and Sargent Companies.

The 1924 pit operations were completed on November 13th and the equipment was moved into the shops for winter repairs.

ORE OPERATIONS

Ore operations for the 1924 season were started on April 24th and completed September 13th.

The estimated production of direct ore was 16,000 tons, as compared with shipments of 15,849 tons. The direct ore was loaded from time to time during the season as the grade and car service warranted.

The analysis of the direct ore produced during 1924 follows:

| | <u>Tons-</u> | <u>Fe.</u> | <u>Phos</u> | <u>Sil.</u> | <u>Mois.</u> |
|-----------------|--------------|------------|-------------|-------------|--------------|
| Direct Ore----- | 15,849 | 59.08 | .057 | 8.98 | 8.86 |

We contemplate mining 50,000 tons of direct ore during 1925 and in order to determine the grade more accurately, and also the detail of our proposed operations, we are putting down a number of test pits in the direct ore area at the east end of the Hill pit.

Wash ore operations were started April 24th, shovel No. 27 cutting in at the taconite island to dig out for a track grade and also reduce the curvature of the tracks leading to the east end of the Hill pit. While there was considerable rock in this cut, we did secure a small tonnage of concentrates. The first cut with the No. 27 shovel followed the grade of the approach and it was for the purpose of making room for the double track system. The second cut with this shovel was taken on a $2\frac{1}{2}\%$ grade and was for the purpose of a permanent approach into the Trumbull pit.

The 60-ton shovel was taken into the pit on May 18th and dug an approach grade for A. Guthrie Company's stripping track. The ore removed was taken to the washing plant. This job was completed early in June.

The 60-ton shovel was taken into the south end of the Trumbull and operated here in lean ore, which was worked in with the better material, as the grade warranted. The No. 27 shovel operated in high grade material most of the season.

Shovel No. 26 was cut into the rocky berm some distance to the east of the taconite island and worked here intermittently for some time. The material was very rocky and the concentrates secured from the treatment of the ore was a comparatively small tonnage.

There was quite an improvement in the ore operations of 1924 as compared with those of the previous year. Now that we have our permanent track arrangement worked out to such good advantage, the 1925 operations should be still more favorable.

The tonnage and analysis of the wash ore produced during 1924 follows:

| | <u>Tons.</u> | <u>Fe.</u> | <u>Phos</u> | <u>Sil.</u> |
|-------------------------|----------------|--------------|-------------|--------------|
| Hill Wash Ore----- | 209,994 | 42.64 | .051 | 32.96 |
| Trumbull Wash Ore----- | <u>241,730</u> | <u>44.41</u> | <u>.050</u> | <u>28.68</u> |
| TOTAL AND AVERAGES----- | 451,724 | 43.59 | .050 | 30.67 |

LEAN AND WASTE ORES

Upon the conclusion of the shipping season the No. 27 shovel was taken to the south end of the Trumbull pit and was engaged from September 15th until November 8th in loading out the lean and waste ores, which had previously been determined by test pitting. While we did not take all the ore that the test pits showed as non-washable, due to the excessive track curves, most of it was handled and we feel that the small tonnage remaining can be worked in with our higher grade ores without injuring the grade to any noticeable extent.

The tonnage of lean and waste ores handled by years since the Hill-Trumbull properties were opened and the analysis of same follows:

| <u>Coarse Non-Concentrating Material Above 40%:</u> | <u>YEAR</u> | <u>TONS</u> | <u>FE.</u> | <u>PHOS</u> | <u>SIL.</u> |
|---|-------------|-------------|--------------|-------------|------------------|
| Hill Mine----- | 1920 | 7245 | 32.90 | .028 | 42.65 (2) |
| Hill Mine----- | 1921 | 70 | 41.53 | .039 | 32.67 (1) |
| Hill Mine----- | 1923 | <u>212</u> | <u>41.91</u> | <u>.032</u> | <u>36.62</u> (1) |
| TOTAL AND AVERAGES----- | | 7527 | 33.23 | .028 | 42.38 |

(1) 1921 and 1923 tonnages stocked in No. 1 stockpile.

(2) 1920 tonnage stocked in No. 2 stockpile.

| <u>Concentrating Material above 25%:</u> | <u>YEAR</u> | <u>TONS</u> | <u>FE.</u> | <u>PHOS</u> | <u>SIL.</u> |
|--|-------------|---------------|--------------|-------------|--------------|
| Hill Mine----- | 1923 | 10,028 | 27.16 | .035 | 50.47 |
| Trumbull Mine----- | 1923 | 22,980 | 27.95 | .029 | 53.59 |
| Trumbull Mine----- | 1924 | <u>17,331</u> | <u>26.62</u> | <u>.038</u> | <u>55.43</u> |
| TOTAL AND AVERAGES----- | | 50,339 | 27.33 | .033 | 53.60 |

Waste Ore - Placed on Stripping Dump:

| | | | |
|--------------------|------|--------|-------|
| Hill Mine----- | 1923 | 3,192 | 29.58 |
| Trumbull Mine----- | 1923 | 52,007 | 19.49 |
| Trumbull Mine----- | 1924 | 81,180 | 20.62 |

HILL-TRUMBULL MINE.

WASHING PLANT

Washing operations started on April 25th and were completed September 13th.

The operation of the plant was very satisfactory during 1924. The lean material from the Model "60" Marion shovel and the rocky ore from the No. 26 machine slowed up the mill to a considerable extent.

The grade of the material put through the plant in 1924 was somewhat better analytically than that for the previous year, but the physical structure was very similar. We did not handle as much rocky material in 1924 as the previous year. The same size crew was employed in 1924 and approximately the same overtime was worked; namely, 51 hours.

The principal machine delays were the result of the breaking of two rollers on our 8' pan conveyor. The force of chunks falling onto the conveyor from the dump cars was responsible for these breakages and in order to break the force of the material striking the conveyor, a saddle was put in the receiving pocket.

We were delayed 45 hours during the past season waiting for Great Northern Railway cars. Aside from this, we were forced to shut down May 9th and 10th on account of an ore congestion on the Great Northern docks. A derailment of a Great Northern engine caused a 7 hours delay on July 10th.

The installation of our tailings pumps was started in March, but the pumps were not put in commission until the first of August.

The rather extensive work done on the tailings basin the past fall should be sufficient to take care of the tailings deposits during the 1925 ore operations. We feel that the installation of the overflow pipes will be a considerable improvement over the spillways and that we will have less trouble with our dyke than has been the case in the past.

Following is the tonnage and analysis of the crude ore treated and the concentrates produced during the seasons of 1923 and 1924, also the ratio of tonnage recovery and the recovery of iron units for these years:

| | <u>TONS.</u> | <u>FE.</u> | <u>PHOS</u> | <u>SIL.</u> |
|--|--------------|------------|-------------|-------------|
| Crude Ore Treated During 1924----- | 451,724 | 43.59 | .050 | 30.67 |
| Crude Ore Treated During 1923----- | 406,915 | 42.28 | .046 | 34.72 |
| Concentrates Produced During 1924----- | 287,146 | 59.75 | .063 | 7.40 |
| Concentrates Produced During 1923----- | 255,636 | 59.28 | .058 | 7.92 |

Ratio of Recovery for 1924----- 63.57%.
Ratio of Recovery for 1923----- 62.82%.

Recovery of Iron Units for 1924----- 87.06%.
Recovery of Iron Units for 1923----- 87.90%.

Considering that the physical structure of the crude ore handled in 1924 was very similar to that of 1923, our gross recovery for 1924 was satisfactory, being almost a point higher than for the previous year. The recovery of iron units, however, was not as satisfactory in 1924 as in 1923. This was due to the very fine structure of the ore in the south part of the Trumbull pit and the presence of some seams of painty material.

The average analysis of the product from the several machines during the years 1923 and 1924 follows:

| -----1-9-2-4----- | | | | -----1-9-2-3----- | | | |
|-------------------|------------|-------------|-------------|-------------------|------------|-------------|-------------|
| | <u>FE.</u> | <u>PHOS</u> | <u>SIL.</u> | | <u>FE.</u> | <u>PHOS</u> | <u>SIL.</u> |
| Screen----- | 60.00 | .063 | 7.25 | Screen----- | 60.87 | .061 | 5.82 |
| Logs----- | 58.87 | .061 | 9.20 | Logs----- | 58.79 | .059 | 8.89 |
| Turbos----- | 52.57 | .056 | 19.17 | Turbos----- | 54.69 | .053 | 16.63 |
| Tables----- | --- | - | --- | Tables----- | 45.49 | .039 | 29.82 |
| Tailings----- | 14.83 | - | --- | Tailings----- | 15.38 | - | --- |

The iron content of the product from the screen and logs was quite close for the two years, but the turbos showed considerably lower iron in 1924 and the material was such that we could not operate our tables successfully. The fact that we did not operate our tables and even then the tailings were half a point lower in iron than for either of the previous two years, shows that there was no recoverable ore below the turbos.

The tonnage of rock rejected from the mill and the analysis of same follows:

| | <u>Tons.</u> | <u>Fe.</u> | <u>Phos</u> | <u>Sil.</u> |
|--------------------|--------------|------------|-------------|-------------|
| Plant Rejects----- | 8,305 | 24.80 | .038 | 57.38 |

ACCIDENTS

Following is a list of the accidents which occurred at the Hill-Trumbull Mine during 1924 and were of a serious, or semi-serious nature:

JAMES SKELLEY

Injured-----May 6th, 1924.
Occupation-----Trackman.
Nationality-----American.
Time Lost-----28 Days.
Compensation Paid-----\$67.20.

Remarks: Skelley was carrying ties, two men to a tie. The man on the other end dropped his end without giving notice, bruising Skelley's shoulder.

DAN MARKOVICH

Injured-----June 5th, 1924.
Occupation-----Trackman.
Nationality-----Austrian.
Time Lost-----59 Days.
Compensation Paid-----\$145.60.

Remarks: Markovich was in the act of loading rail on flat car when he over-lifted and strained himself. Ruptured.

HARRY A. TAYLOR

Injured-----June 5th, 1924.
Occupation-----Washing Plant Laborer.
Nationality-----American.
Time Lost-----178 Days.
Compensation Paid-----\$539.93.

Remarks: Taylor tried to stop conveyor belt slipping by putting some C & G Compound on pulley with a wooden paddle. The paddle became caught and drew his left arm between belt and pulley and tore the arm off between the elbow and shoulder. Taylor should not have applied the compound from that side of the pulley, as there was more room on the other side and safety guards were installed.

PETE MILOSEVICH

Injured-----August 21st., 1924.
Occupation-----Trackman.
Nationality-----Jugo-Slav.
Time Lost-----12 Days.
Compensation Paid-----\$11.20.

Remarks: Milosevich and his partner were carrying a track jack when his partner tripped on a tie and caused track jack to fall, crushing Milosevich's left foot.

LOUIS JELCICH

Injured-----November 28th, 1924.
Occupation-----Test Pitter.
Nationality-----Jugo-Slav.
Time Lost-----27 Days.
Compensation Paid-----\$84.60.

Remarks: Jelcich was in the act of landing and dumping a bucket at mouth of test pit, when he slipped and fell over bucket, causing a rupture.

SHIPMENTS

Following are the cargoes of Hill-Trumbull ore shipped during the past season and the analysis of same as obtained at the Mine and by the Lower Lake Chemists:

| | | | | | | |
|-------------------------|----------------------|-------------|-------------|--------------|----------------|--------------|
| <u>W. E. FITZGERALD</u> | ----- 5/24/24 ----- | | | | | 6,966 Tons. |
| | <u>Fe.</u> | <u>Phos</u> | <u>Sil.</u> | <u>Mois.</u> | <u>Fe.Nat.</u> | |
| Mine----- | 59.37 | .072 | 9.08 | 8.99 | ----- | |
| Cremer & Case----- | 58.80 | --- | ---- | 6.71 | 54.85 | |
| <u>JAS. H. DUNHAM</u> | ----- 5/26/24 ----- | | | | | 6,799 Tons. |
| Mine----- | 59.84 | .068 | 9.16 | 8.59 | ----- | |
| Crowell & Murray----- | 59.35 | --- | ---- | 6.36 | 55.58 | |
| <u>GRAND ISLAND</u> | ----- 6/1/24 ----- | | | | | 8,157 Tons. |
| Mine----- | 59.37 | .068 | 9.83 | 8.03 | ----- | |
| Oscar Textor----- | 59.18 | --- | ---- | 4.63 | 56.44 | |
| <u>PONTIAC</u> | ----- 6/6/24 ----- | | | | | 11,060 Tons. |
| Mine----- | 60.06 | .070 | 8.98 | 8.10 | ----- | |
| Cremer & Case----- | 59.55 | --- | ---- | 5.63 | 56.20 | |
| <u>PETER WHITE</u> | ----- 6/9/24 ----- | | | | | 8,704 Tons. |
| Mine----- | 59.23 | .062 | 9.12 | 8.95 | ----- | |
| Hughes-Guentzler----- | 58.62 | --- | ---- | 6.33 | 54.91 | |
| <u>WM. G. MATHER</u> | ----- 6/15/24 ----- | | | | | 9,976 tons. |
| Mine----- | 59.84 | .069 | 8.35 | 7.60 | ----- | |
| Crowell & Murray----- | 59.33 | --- | ---- | 5.24 | 56.21 | |
| <u>MICHIGAN</u> | ----- 6/21/24 ----- | | | | | 9,909 Tons. |
| Mine----- | 59.98 | .062 | 7.13 | 7.09 | ----- | |
| Oscar Textor----- | 58.65 | --- | ---- | 4.94 | 55.75 | |
| <u>PONTIAC</u> | ----- 6/21/24 ----- | | | | | 10,684 Tons. |
| Mine----- | 59.20 | .063 | 9.38 | 7.22 | ----- | |
| Hughes-Guentzler----- | 59.25 | --- | ---- | 4.90 | 56.35 | |
| <u>MICHIGAN</u> | ----- 6/28/-24 ----- | | | | | 6,608 Tons. |
| Mine----- | 59.58 | .068 | 7.31 | 7.83 | ----- | |
| Cremer & Case----- | 58.25 | --- | ---- | 5.43 | 55.09 | |
| <u>PONTIAC</u> | ----- 6/29/24 ----- | | | | | 11,015 Tons. |
| Mine----- | 60.56 | .065 | 7.70 | 5.72 | ----- | |
| Crowell & Murray----- | 60.70 | --- | ---- | 5.85 | 57.15 | |

HILL-TRUMBULL MINE.

| | | | | | |
|--|------------|-------------|-------------|--------------|----------------|
| <u>ISHPEMING</u> - - - - - 7/1/24 - - - - - 3,462 Tons. | | | | | |
| | <u>Fe.</u> | <u>Phos</u> | <u>Sil.</u> | <u>Mois.</u> | <u>Fe.Nat.</u> |
| Mine----- | 61.39 | .065 | 6.94 | 7.61 | ----- |
| Oscar Textor----- | 60.15 | --- | ---- | 4.71 | 57.32 |
| <u>PONTIAC</u> - - - - - 7/6/24 - - - - - 5,346 Tons. | | | | | |
| Mine----- | 62.20 | .063 | 6.64 | 7.03 | ----- |
| Crowell & Murray----- | 61.80 | --- | ---- | 5.74 | 58.25 |
| <u>WM. H. WOLF</u> - - - - - 7/12/24 - - - - - 9,003 Tons. | | | | | |
| Mine----- | 60.27 | .063 | 7.59 | 8.24 | ----- |
| Cremer & Case----- | 59.00 | --- | ---- | 5.56 | 55.72 |
| <u>WM. G. MATHER</u> - - - - - 7/13/24 - - - - - 9,772 Tons. | | | | | |
| Mine----- | 60.49 | .063 | 6.17 | 7.74 | ----- |
| Oscar Textor----- | 59.30 | --- | ---- | 6.62 | 55.37 |
| <u>R. J. PAISLEY</u> - - - - - 7/15/24 - - - - - 3,082 Tons. | | | | | |
| Mine----- | 59.63 | .058 | 7.28 | 9.77 | ----- |
| Hugh-Guentzler----- | 59.12 | --- | ---- | 5.90 | 55.63 |
| <u>CADILLAC</u> - - - - - 7/19/24 - - - - - 5,941 Tons. | | | | | |
| Mine----- | 60.81 | .065 | 7.63 | 8.28 | ----- |
| Crowell & Murray----- | 61.25 | --- | ---- | 5.47 | 57.90 |
| <u>ISHPEMING</u> - - - - - 7/23/24 - - - - - 9,916 Tons. | | | | | |
| Mine----- | 59.42 | .062 | 8.72 | 8.47 | ----- |
| Cremer & Case----- | 58.70 | --- | ---- | 5.53 | 55.45 |
| <u>MUNISING</u> - - - - - 7/26/24 - - - - - 5,911 Tons. | | | | | |
| Mine----- | 60.99 | .066 | 5.24 | 7.94 | ----- |
| Oscar Textor----- | 60.05 | --- | ---- | 6.31 | 56.26 |
| <u>WM. G. MATHER</u> - - - - - 7/29/24 - - - - - 9,774 Tons. | | | | | |
| Mine----- | 59.92 | .061 | 5.89 | 7.21 | ----- |
| Crowell & Murray----- | 60.05 | --- | ---- | 5.35 | 56.84 |
| <u>A. E. R. SCHNEIDER</u> - - - - - 8/1/24 - - - - - 7,999 Tons. | | | | | |
| Mine----- | 59.83 | .058 | 7.05 | 7.56 | ----- |
| Oscar Textor----- | 58.25 | --- | ---- | 6.33 | 54.56 |
| <u>W. H. WOLF</u> - - - - - 8/1/24 - - - - - 2,249 Tons. | | | | | |
| Mine----- | 58.69 | .063 | 7.74 | 7.51 | ----- |
| Crowell & Murray----- | 58.95 | --- | ---- | 7.48 | 54.54 |
| <u>ISHPEMING</u> - - - - - 8/5/24 - - - - - 9,928 Tons. | | | | | |
| Mine----- | 61.24 | .068 | 5.14 | 6.98 | ----- |
| Oscar Textor----- | 59.80 | --- | ---- | 5.25 | 56.66 |
| <u>W. G. MATHER</u> - - - - - 8/6/24 - - - - - 6,580 Tons. | | | | | |
| Mine----- | 60.35 | .069 | 6.17 | 5.98 | ----- |
| Crowell & Murray----- | 60.10 | --- | ---- | 4.91 | 57.15 |

HILL-TRUMBULL MINE.

| | | | | | | | | | | | | |
|---------------------|-------|------------|-------------|-------------|--------------|----------|------------|-------------|--|--|--|--------------|
| <u>PONTIAC</u> | ----- | | | | | 8/9/24 | ----- | | | | | 11,079 Tons. |
| | | <u>Fe.</u> | <u>Phos</u> | <u>Sil.</u> | <u>Mois.</u> | | <u>Fe.</u> | <u>Nat.</u> | | | | |
| Mine | ----- | 60.16 | .065 | 6.07 | 7.10 | ----- | ----- | ----- | | | | |
| Cremer & Case | ----- | 59.00 | --- | ----- | 5.97 | 55.48 | | | | | | |
| <u>W. G. MATHER</u> | ----- | | | | | 8/15/24 | ----- | | | | | 9,975 Tons. |
| Mine | ----- | 60.79 | .069 | 4.87 | 6.20 | ----- | | | | | | |
| Oscar Textor | ----- | 58.50 | --- | ----- | 4.93 | 55.62 | | | | | | |
| <u>COLONEL</u> | ----- | | | | | 8/17/24 | ----- | | | | | 5,540 Tons. |
| Mine | ----- | 59.06 | .066 | 6.72 | 8.23 | ----- | | | | | | |
| Hughes-Guentzler | ----- | 57.50 | --- | ----- | 5.37 | 54.41 | | | | | | |
| <u>FRONTENAC</u> | ----- | | | | | 8/21/24 | ----- | | | | | 10,819 Tons. |
| Mine | ----- | 58.05 | .058 | 7.94 | 9.43 | ----- | | | | | | |
| Crowell & Murray | ----- | 59.30 | --- | ----- | 6.24 | 55.60 | | | | | | |
| <u>W. G. MATHER</u> | ----- | | | | | 8/25/24 | ----- | | | | | 5,640 Tons. |
| Mine | ----- | 57.64 | .059 | 8.46 | 9.52 | ----- | | | | | | |
| Hughes-Guentzler | ----- | 56.20 | --- | ----- | 7.57 | 51.95 | | | | | | |
| <u>ISHPEMING</u> | ----- | | | | | 9/1/24 | ----- | | | | | 9,914 Tons. |
| Mine | ----- | 58.62 | .055 | 7.62 | 11.95 | ----- | | | | | | |
| Crowell & Murray | ----- | 59.82 | --- | ----- | 6.72 | 55.81 | | | | | | |
| <u>W. G. MATHER</u> | ----- | | | | | 9/2/24 | ----- | | | | | 5,571 Tons. |
| Mine | ----- | 59.36 | .064 | 6.63 | 6.51 | ----- | | | | | | |
| Cremer & Case | ----- | 58.90 | --- | ----- | 6.74 | 54.93 | | | | | | |
| <u>FRONTENAC</u> | ----- | | | | | 9/9/24 | ----- | | | | | 10,974 Tons. |
| Mine | ----- | 58.38 | .059 | 8.06 | 6.47 | ----- | | | | | | |
| Oscar Textor | ----- | 57.40 | --- | ----- | 6.73 | 53.54 | | | | | | |
| <u>ISHPEMING</u> | ----- | | | | | 9/11/24 | ----- | | | | | 1,822 Tons. |
| Mine | ----- | 58.79 | .060 | 8.90 | 8.72 | ----- | | | | | | |
| Cremer & Case | ----- | 57.70 | --- | ----- | 5.74 | 54.39 | | | | | | |
| <u>PIONEER</u> | ----- | | | | | 9/12/24 | ----- | | | | | 9,016 Tons. |
| Mine | ----- | 58.80 | .062 | 7.70 | 7.82 | ----- | | | | | | |
| Oscar Textor | ----- | 57.70 | --- | ----- | 7.32 | 53.47 | | | | | | |
| <u>MICHIGAN</u> | ----- | | | | | 10/4/24 | ----- | | | | | 4,066 Tons. |
| Mine | ----- | 59.01 | .058 | 9.16 | 8.32 | ----- | | | | | | |
| Cremer & Case | ----- | 58.20 | --- | ----- | 6.62 | 54.35 | | | | | | |
| <u>PIONEER</u> | ----- | | | | | 10/5/24 | ----- | | | | | 6,482 Tons. |
| Mine | ----- | 58.48 | .060 | 8.38 | 8.64 | ----- | | | | | | |
| Crowell & Murray | ----- | 60.25 | --- | ----- | 6.31 | 56.45 | | | | | | |
| <u>W. G. MATHER</u> | ----- | | | | | 10/15/24 | ----- | | | | | 5,021 Tons. |
| Mine | ----- | 59.20 | .056 | 9.22 | 8.55 | ----- | | | | | | |
| Crowell & Murray | ----- | 59.36 | --- | ----- | 7.49 | 54.91 | | | | | | |

HILL-TRUMBULL MINE.

W. G. MATHER----- -10/24/24----- 4,193 Tons.

| | <u>Fe.</u> | <u>Phos</u> | <u>Sil.</u> | <u>Mois.</u> | <u>Fe.Nat.</u> |
|-----------------------|------------|-------------|-------------|--------------|----------------|
| Mine----- | 59.97 | .059 | 8.66 | 8.03 | ----- |
| Crowell & Murray----- | 59.20 | --- | ---- | 6.43 | 55.39 |

In addition to the above cargoes 24,042 tons of Hill-Trumbull ore was shipped as Upson Grade, which is made up of a mixture of 60% Boeing and 40% Hill-Trumbull ore. The Upson cargoes are listed in the Boeing Mine report.

A comparison of the Mine and Lower Lake analysis on the cargoes of straight Hill-Trumbull ore follows:

| | <u>Tons.</u> | <u>Fe.</u> | <u>Phos</u> | <u>Sil.</u> | <u>Mois.</u> | <u>Fe.Nat.</u> |
|-----------------------|--------------|------------|-------------|-------------|--------------|----------------|
| Mine Analysis----- | 278,953 | 59.70 | .064 | 7.53 | 7.92 | 54.97 |
| Lower Lake Analysis-- | 278,953 | 59.13 | --- | ---- | 5.91 | 55.63 |

A composite analysis of the season's shipments follows:

| | <u>Fe.</u> | <u>Phos</u> | <u>Sil.</u> | <u>Mn.</u> | <u>Alu.</u> | <u>Lime</u> | <u>Mag.</u> | <u>Sul.</u> | <u>Loss.</u> |
|------------------------|------------|-------------|-------------|------------|-------------|-------------|-------------|-------------|--------------|
| Hill Concentrates----- | 60.18 | .062 | 8.41 | .18 | .66 | .17 | .16 | .010 | 4.85 |
| Hill Direct----- | 59.04 | .053 | 9.05 | .20 | 1.03 | .14 | .14 | .011 | 5.35 |
| Trumbull Concentrates- | 59.42 | .061 | 6.79 | .18 | .78 | .15 | .13 | .012 | 7.20 |

ANALYSIS OF HILL-TRUMBULL COSTS FOR THE SEASONS OF 1923 & 1924

The production of direct shipping ore in 1923 was 44,723 tons, while in 1924 the output amounted to only 15,849 tons. The cost per ton for direct ore, however, was \$.063 per ton lower in 1924 and this was due to the fact that our track system had been laid out in 1923 and but very little work was necessary in conducting our operations last season. There was no expense in 1924 for drilling and blasting and the repairs to the equipment used in this service were extremely light in 1924. While our 1924 tonnage was much lower, the product loaded per day of operation was much higher and for this reason the cost per ton handled in 1924 showed a substantial decrease.

The production of wash ore for 1924 amounted to 451,724 tons, yielding 237,146 tons of concentrates, whereas in 1923 the output of wash ore was 406,915 tons, from which 255,635 tons of concentrates was realized. We handled 44,809 tons more of wash ore in 1924 and produced 31,511 tons more concentrates.

The following table shows the cost on cars for the ore shipped (Direct and Concentrates) from the Hill-Trumbull properties during the years 1923 and 1924:

| | <u>1923</u> <u>SEASON</u> | <u>1924</u> <u>SEASON</u> |
|------------------------------------|------------------------------|------------------------------|
| Mining Cost----- | \$.260 | \$.252 |
| Concentrating----- | .171 | .158 |
| Mine Superintendence----- | .007 | .008 |
| Stripping----- | .560 | .560 |
| Insurance----- | .003 | .004 |
| District Office----- | .013 | .012 |
| Central Office----- | .042 | .013 |
| Contingent Expense----- | .031 | .000 |
| Special Expenses----- | .003 | .002 |
| Depreciation----- | .200 | .200 |
| Taxes----- | .392 | .455 |
| Occupational Tax----- | .089 | .032 |
| Winter Expense----- | .186 | .179 |
| Less Misc. Debits and Credits----- | <u>.003</u> | <u>.002</u> |
| TOTAL COST ON CARS----- | \$1.954 | \$1.877 |

The "MINING COST" for 1924 shows a decrease of \$.008 per ton over that for the previous season. While the cost on the direct ore was considerably less in 1924, the tonnage involved was comparatively small and the effect per ton on the total shipment was not appreciable. The mining cost of direct ore was \$.063

per ton lower in 1924 and the concentrates \$.012 lower. The direct ore is produced at a considerably less cost than the concentrates and as the tonnage handled in 1923 was much higher, the average mining cost for the total shipments shows but a small decrease of \$.008 per ton. It was necessary to do considerable track work in our pit during 1924 in working out a permanent approach into the Trumbull property and in establishing a double track system throughout the pit, so that the mining and stripping operations would not be congested. This added to the cost in 1924, but should be reflected in lower costs during 1925. It was necessary to do considerably more blasting last season than during 1923, as a number of shallow sinking cuts were taken and we operated in rocky areas along the north side of the Hill pit. The other items entering into the mining cost were more favorable during 1924 and more than offset the higher costs for tracks and ballasting. The average output per day during 1924 was higher than for the previous year.

The decrease of \$.013 per ton for "CONCENTRATING" in 1924, as compared with the previous year, was due to the fact that we secured a larger tonnage per day of operation and our general repairs costs were lighter in 1924 and there was a slight decrease in the labor item.

The slight increase of \$.001 for 1924 "MINE SUPERINTENDENCE" is due to the fact that more time of the superintendent was chargeable to ore operations, on account of the fact that stripping in 1924 was completed in September, whereas in 1923 it continued throughout that year.

The charge for "STRIPPING" is the same each year, this being a fixed depreciation charge made in the Cleveland office.

"DISTRICT OFFICE" shows a decrease of \$.001 per ton for 1924, this being due to the fact that we conducted some operations at the Wade and Helmer Mines during the past year, whereas there was no activity at these properties in 1923. The District Office expense is charged off on a payroll basis to the several properties.

The decrease of \$.029 per ton against "CENTRAL OFFICE" for 1924, as compared with the previous year, is due to the fact that in 1923 an adjustment was made of the charges under this caption, with the result that previous

charges which had been made to the Boeing Mine, were reduced against that property and charged to the Hill-Trumbull. This was due to an objection raised by the Great Northern interests in the operation of our Boeing Mine. The Central Office charges to the Hill-Trumbull Mine for the year 1924 were normal, considering a reduction in the Company's activities.

The items "CONTINGENT" AND "SPECIAL EXPENSE" are Ishpeming charges.

The cost per ton shown against "DEPRECIATION" for the two years was the same, this being a fixed charge made in the Cleveland Office.

Under "TAXES" there was an increase of \$.063 per ton for 1924, this being due to the fact that one of the Trumbull forties was valued and taxed as active, in place of an inactive property. The increase in the taxes on this forty more than offset the smaller tonnage in the mines, as the result of shipments during the year.

The "OCCUPATIONAL TAXES" for 1923 included those for the two previous years and amounted to \$.089 per ton against that year's shipments. This year the Occupational Taxes amounted to \$.032 per ton, showing a decrease of \$.057, as compared with 1923. The reason that the 1921, 1922 and 1923 Occupational Taxes were included in the 1923 cost sheet was due to the fact that this matter was in litigation and was not settled until 1923.

The decrease of \$.007 per ton for "WINTER EXPENSE" is explained by the fact that our repairs to washing plant and open pit equipment were somewhat lighter during 1924 than for the previous year.

HILL-TRUMBULL MINE

AVERAGE MINE ANALYSIS ON OUTPUT FOR YEAR 1924.

| GRADE | IRON | PHOS. | SILICA |
|----------------------------------|-----------------|-------|--------|
| Hill Bessemer Concentrates, | (No Production) | | |
| Hill Non-Bessemer Concentrates, | 60.13 | .065 | 8.23 |
| Hill Direct, | 59.11 | .057 | 8.93 |
| Trumbull Bessemer Concentrates, | (No Production) | | |
| Trumbull Non-Bess. Concentrates, | 59.43 | .063 | 6.66 |

AVERAGE ANALYSIS ON STRAIGHT CARGOES FOR YEAR 1924.

| GRADE | Mine | | | Lake Erie | | |
|----------------------------------|----------------|-------|--------|-----------|-------|--------|
| | IRON | PHOS. | SILICA | IRON | PHOS. | MOIST. |
| Hill Bessemer Concentrates, | (No Shipments) | | | | | |
| Hill Non-Bessemer Concentrates, | (All Mixed) | | | | | |
| Hill Direct, | (All Mixed) | | | | | |
| Trumbull Bessemer Concentrates, | (No Shipments) | | | | | |
| Trumbull Non-Bess. Concentrates, | (All Mixed) | | | | | |

HILL-TRUMBULL MINE

ORE STATEMENT - DECEMBER 31ST, 1924.

| | HILL CRUDE | HILL BESS. CONCTS. | HILL NON-BESS. CONCTS. | HILL BESS. DIRECT | HILL NON-BESS. DIRECT | TRUMBULL CRUDE | TRUMBULL BESSEMER CONCTS. | TRUMBULL NON-BESS. CONCTS. | TOTAL | TOTAL LAST YEAR |
|-------------------------|---------------|--------------------------|------------------------------|-------------------------|-----------------------------|-------------------|---------------------------------|----------------------------------|---------|-----------------------|
| On hand Jan. 1, 1924, | | - | - | - | - | - | - | - | - | - |
| Output for Year, | 209,994 | - | 134,269 | - | 15,849 | 241,730 | - | 152,877 | 302,989 | 300,359 |
| Total, | 209,994 | - | 134,269 | - | 15,849 | 241,730 | - | 152,877 | 302,989 | 300,359 |
| Shipments, | 209,994 | - | 134,269 | - | 15,849 | 241,730 | - | 152,877 | 302,989 | 300,359 |
| Balance on Hand, | - | - | - | - | - | - | - | - | - | - |
| Percentage of Recovery, | 63.9% | | | | | 63.2% | | | 63.5% | |
| Output Last Year, | 299,245 | - | 184,234 | - | 44,723 | 107,670 | - | 71,402 | 300,359 | |
| Increase in Output, | | | | | | | | | 2,630 | |

1924 -- Mine Idle, Jan. 1st to Apr. 26th, 1924.
 1-10 Hour Shift, Apr. 26th to Sept. 13th, 1924.
 Mine Idle, Sept. 14th to Dec. 31st, 1924.

1923 -- Began producing May 5th; ceased Oct. 3rd, 1923.

HILL-TRUMBULL MINE

COMPARATIVE MINING COST FOR YEAR

| | 1924 | 1923 | INCREASE | DECREASE |
|---------------------------------------|---------|---------|----------|----------|
| PRODUCT | | | | |
| Direct Shipping | 15,849 | 44,723 | | 28,874 |
| Concentrates | 287,146 | 255,636 | 31,510 | |
| Total Production | 302,995 | 300,359 | 2,636 | |
| DIRECT SHIPPING ORE | | | | |
| Labor | .082 | .120 | | .038 |
| Supplies | .059 | .086 | | .027 |
| Total | .141 | .206 | | .065 |
| CRUDE ORE - CONCENTRATED BASIS | | | | |
| Labor | .144 | .171 | | .027 |
| Supplies | .114 | .100 | .014 | |
| Total | .258 | .271 | | .013 |
| MISCELLANEOUS GROUP | | | | |
| Superintendence | .008 | .007 | .001 | |
| Concentrating | .158 | .171 | | .013 |
| Stripping | .560 | .560 | | |
| Insurance | .004 | .003 | .001 | |
| District Office | .014 | .014 | | |
| Central Office | .013 | .045 | | .032 |
| Contingent Expense | .0 | .031 | | .031 |
| Special Expense | .003 | .003 | | |
| Occupation Tax | .076 | .089 | | .013 |
| Taxes | .414 | .459 | | .045 |
| Winter Expense | .187 | .161 | .026 | |
| Cost Adjustment | .004 | .005 | | .001 |
| Depreciation | .200 | .200 | | |
| Total Cost on Cars | 1.893 | 2.011 | | .118 |
| Misc. Debits & Credits | .003 | .003 | .006 | |
| Grand Total Cost | 1.896 | 2.008 | | .112 |

| | | | | |
|-------------------------------------|----------|----------|-----|--|
| DIRECT SHIPPING | | | | |
| No. Shifts & Hours | 1-10-13 | 1-10-43 | | |
| Avg. Daily Product | 1219 | 1040 | 179 | |
| CRUDE ORE CONCENTRATED BASIS | | | | |
| No. Shifts & Hours | 1-10-115 | 1-10-130 | | |
| Avg. Daily Product | 2459 | 1967 | 530 | |

HILL-TRUMBULL MINE

COMPARATIVE WAGES AND PRODUCT

| | 1 9 2 4 | 1 9 2 3 | INCREASE | DECREASE |
|-------------------------|----------------------|----------------------|----------|---------------------|
| PRODUCT | 302,995 | 330,359 | 2,636 | |
| No.Shifts & Hours | 1-10hr | 1-10hr | | |
| AVG.NO.MEN WORKING | 97 | 91 | 6 | |
| AVG.WAGES PER DAY | 5.13 | 5.22 | | .09 |
| PRODUCT PER MAN PER DAY | 23.17 | 20.42 | 2.75 | |
| LABOR COST PER TON | .222 | .256 | | .034 |
| TOTAL NO.OF DAYS | 14,703 $\frac{1}{4}$ | 14,703 $\frac{1}{2}$ | | 1,625 $\frac{1}{4}$ |
| AMOUNT PAID FOR LABOR | 67143.62 | 76776.33 | | 9632.71 |

In 1923 Production from May 5th to Oct.3rd.
 1924 " Apr.26th to Sept.13th.

HILL-TRUMBULL MINE

STATEMENT OF EXPLOSIVES USED FOR BREAKING ORE

| <u>KIND</u> | <u>QUANTITY</u> | <u>AVERAGE PRICE</u> | <u>AMOUNT 1924</u> | <u>AMOUNT 1923</u> |
|------------------------|-----------------|----------------------|--------------------|--------------------|
| 60% Powder | 2,100 | .1550 | 325.50 | 38.13 |
| 40% " | 4,450 | .1350 | 600.75 | 556.62 |
| 35% " | | | | 284.11 |
| 17% " | | | | 12.30 |
| Hercules Special #1 | 16,900 | .1450 | 2450.50 | 952.75 |
| " " #2 | 3,500 | .1350 | 472.50 | |
| DuPont Blasting Powder | 1,000 | .1180 | 118.00 | 53.75 |
| " 160 | 250 | .1450 | 36.25 | |
| Trojan Special C | 1,000 | .1450 | 145.00 | 45.00 |
| Trojan 17% | 900 | .1180 | 106.20 | 36.90 |
| Total Powder | 30,090 | .1414 | 4254.70 | 1779.56 |
| #6 Blasting Caps | 100 | .0106 | 1.06 | 2.92 |
| Electric Exploders | 4,375 | .0733 | 320.60 | 129.69 |
| Connecting Wire | 19 | .4300 | 8.17 | 4.49 |
| Total Caps, Etc. | | | 329.83 | 137.10 |
| Total Explosives | | | 4584.53 | 2116.66 |

| | 1924 CRUDE & DIRECT | 1924 CONCTS & DIRECT | 1923 CRUDE & DIRECT | 1923 CONCTS & DIRECT |
|------------------------------|------------------------------|-------------------------------|------------------------------|-------------------------------|
| Product | 467,573 | 302,995 | 451,638 | 300,358 |
| Lbs. Powder per ton of ore | .0643 | .0993 | .0312 | .0469 |
| Cost per ton for powder | .0091 | .0140 | .0044 | .0066 |
| " caps, etc. | .0007 | .0011 | .0003 | .0005 |
| " all explosives | .0098 | .0151 | .0047 | .0070 |
| Avg. cost per lb. for powder | .1414 | .1414 | .1404 | .1404 |

Commenced operating Apr. 26, 1924; suspended operations Sept. 13, 1924.

ANALYSIS OF HILL-TRUMBULL COSTS FOR THE SEASONS OF 1923 & 1924.

The production of direct shipping ore in 1923 was 44,723 tons, while in 1924 the output amounted to only 15,849 tons. The cost per ton for direct ore, however, was \$.063 per ton lower in 1924 and this was due to the fact that our track system had been laid out in 1923 and but very little work was necessary in conducting our operations last season. There was no expense in 1924 for drilling and blasting and the repairs to the equipment used in this service were extremely light in 1924. While our 1924 tonnage was much lower, the product loaded per day of operation was much higher and for this reason the cost per ton handled in 1924 showed a substantial decrease.

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The following table shows the cost on cars for the ore shipped (Direct and Concentrates) from the Hill-Trumbull properties during the years 1923 and 1924:

| | <u>1923 Season</u> | <u>1924 Season</u> |
|--------------------------------------|--------------------|--------------------|
| Mining Cost - - - - - | \$.260 | \$.252 |
| Concentrating - - - - - | .171 | .158 |
| Mine Superintendence - - - - - | .007 | .008 |
| Stripping - - - - - | .560 | .560 |
| Insurance - - - - - | .003 | .004 |
| District Office - - - - - | .013 | .012 |
| Central Office - - - - - | .042 | .013 |
| Contingent Expense - - - - - | .031 | .000 |
| Special Expenses - - - - - | .003 | .002 |
| Depreciation - - - - - | .200 | .200 |
| Taxes - - - - - | .392 | .455 |
| Occupational Tax - - - - - | .089 | .032 |
| Winter Expense - - - - - | .186 | .179 |
| Less Misc. Debts & Credits - - - - - | <u>.003</u> | <u>.002</u> |
| TOTAL COST ON CARS | \$1.954 | \$1.877 |

The "MINING COST" for 1924 shows a decrease of \$.008 per ton over that for the previous season. While the cost on the direct ore was considerably less in 1924, the tonnage involved was comparatively small and the effect per ton on the total shipment was not appreciable. The mining cost of direct ore was \$.063 per ton lower in 1924 and the concentrates \$.012 lower. The direct ore is produced at a considerably less cost than the concentrates and as the tonnage handled in 1923 was much higher, the average mining cost for the total shipment shows but a small decrease of \$.008 per ton. It was necessary to do considerable track work in our pit during 1924 in working out a permanent approach into the Trumbull property and in establishing a doubletrack system throughout the pit, so that the mining and stripping operations would not be congested. This added to the cost in 1924, but should be reflected in lower costs during 1923. It was necessary to do considerably more blasting last season than during 1923, as a number of shallow sinking cists were taken and we operated in rocky areas along the north side of the Hill pit. The other items entering into the mining cost were more favorable during 1924 and more than offset the higher costs for tracks and ballasting. The average output per day during 1924 was higher than for the previous year.

The decrease of \$.013 per ton for "CONCENTRATION" in 1924, as compared with the previous year, was due to the fact that we secured a larger tonnage per day of operation and our general repairs costs were lighter in 1924 and there was a slight decrease in the labor item.

The slight decrease of \$.001 for 1924 "MINE SUPERINDENDENCE" is due to the fact that more time of the superintendent was chargeable to ore operations, on account of the fact that stripping in 1924 was completed in September, whereas in 1923 it continued throughout the year.

The charge for "STRIPPING" is the same each year, this being a fixed depreciation charge made in the Cleveland Office.

"DISTRICT OFFICE" shows a decrease of \$.001 per ton for 1924, this being due to the fact that we conducted some operations at the Wade and Helmer Mines during the past year, whereas there was no activity at these properties in 1923. The District Office expense is charged off on a payroll basis to the several properties.

The decrease of \$.029 per ton against "CENTRAL OFFICE" for 1924, as compared with the previous year, is due to the fact that in 1923 an adjustment was made of the charges under this caption, with the result that previous charges which had been made to the Boeing Mine, were reduced against that property and charged to the Hill-Trumbull. This was due to an objection raised by the Great Northern interests in the operation of our Boeing Mine. The Central Office charges to the Hill-Trumbull Mine for the year 1924 were normal, considering a reduction in the Company's activities.

The item "CONTINGENT" AND "SPECIAL EXPENSE" are Ishpeming charges.

The cost per ton shown against "DEPRECIATION" for the two years was the same, this being a fixed charge made in the Cleveland Office.

Under "TAXES" there was an increase of \$.063 per ton for 1924, this being due to the fact that one of the Trumbull forties was valued and taxed as active, in place of an inactive property. The increase in the taxes on this forty more than offset the smaller tonnage in the mines, as the result of shipments during the year.

The "OCCUPATIONAL TAXES" for 1923 included those for the two previous years and amounted to \$.089 per ton against that year's shipments. This year the Occupational Taxes amounted to \$.032 per ton, showing a decrease of \$.057, as compared with 1923. The reason that the 1921, 1922 and 1923 Occupational Taxes were included in the 1923 cost sheet was due to the fact that this matter was in litigation and was not settled until 1923.

The decrease of \$.007 per ton for "WINTER EXPENSE" is explained by the fact that our repairs to washing plant and open pit equipment were somewhat lighter during 1924 than for the previous year.

BOEING MINE
ANNUAL REPORT FOR 1924.

The Boeing Mine was operated actively during the past year. Underground operations were conducted steadily and the open pit was worked from May 6th to October 27th. Upon the completion of open pit ore operations, clean-up and stripping activities were conducted.

Stockpile shipments were started on April 26th and concluded July 19th. Shipments from pocket extended from April 17th to October 25th, while ore was loaded in the pit from May 6th to October 27th. The shaft product was stockpiled from January 1st. to April 16th and from October 27th to December 31st.

The following table shows the tonnage and analysis of the product shipped during the 1924 season:

| | <u>Tons.</u> | <u>Fe.</u> | <u>Phos</u> | <u>Sil.</u> | <u>Mn.</u> | <u>Alu.</u> | <u>Mois.</u> |
|--------------------------------|--------------|--------------|-------------|-------------|-------------|-------------|--------------|
| Open Pit Shipments----- | 333,531 | 54.83 | .080 | 9.69 | .82 | 6.35 | 15.00 |
| Shaft Pocket Shipments----- | 106,061 | 55.95 | .081 | 10.56 | .82 | 4.27 | 13.38 |
| Shaft Stockpile Shipments---- | 58,451 | 56.77 | .075 | 9.87 | 1.00 | 3.47 | 13.76 |
| Boeing-Susquehanna Shipments-- | <u>7,305</u> | <u>56.06</u> | <u>.078</u> | <u>9.97</u> | <u>1.01</u> | <u>3.50</u> | <u>14.16</u> |
| TOTAL AND AVERAGES----- | 505,348 | 55.31 | .080 | 9.90 | .84 | 5.54 | 14.50 |

The tonnage and analysis of the ore placed in stock from October 27th until January 1st. was as follows:

| | <u>Tons</u> | <u>Fe.</u> | <u>Phos</u> | <u>Sil.</u> | <u>Mn.</u> | <u>Alu.</u> |
|-------------------------|--------------|--------------|-------------|-------------|------------|-------------|
| Boeing----- | 34,982 | 57.05 | .081 | 8.85 | 1.00 | 3.83 |
| Boeing-Susquehanna----- | <u>2,110</u> | <u>57.02</u> | <u>.078</u> | <u>9.05</u> | <u>.95</u> | <u>3.68</u> |
| TOTAL & AVERAGES----- | 37,092 | 57.05 | .081 | 8.86 | 1.00 | 3.82 |

Of the total shipments from the Boeing Mine during 1924, 469,191 tons went forward as straight Boeing Grade and 36,157 tons as Upson Grade. The Upson Grade was made up of a mixture of 60% Boeing ore and 40% Hill-Trumbull ore.

The iron content of the 1924 shipments was disappointing and below our expectations. The iron dried was over a point below the 1923 shipments, the silica was approximately the same and the alumina was nearly two points higher. We anticipate that the underground ore to be shipped during 1925 will run about the same as it did in 1924, but the tonnage to be secured from the open pit should average higher in iron and lower in alumina than for the past season.

A number of test pits were put down during the past season, and while we realized that the material was off grade, it was impossible to change our plan of operation, or sort any considerable amount of ore in the pit. We did cast some of the leaner ore behind the 350-ton shovel, but the entire face of the cut was at times very low. The test pits and drill holes put down the latter part of the season show that there will be a decided improvement in the ore remaining to be mined in the east end of the open pit. We expect to obtain quite high alumina during the first two months' operations, but subsequent to that, we should obtain close to the average of the mine.

The estimated tonnage and analysis of our 1925 shipments follows:

| | <u>Tons.</u> | <u>Fe.</u> | <u>Phos</u> | <u>Mn.</u> | <u>Sil.</u> | <u>Alu.</u> | <u>Mois.</u> |
|-----------------------|--------------|------------|-------------|------------|-------------|-------------|--------------|
| Underground Ore----- | 140,000 | 56.00 | .080 | .88 | 9.30 | 4.62 | 14.00 |
| Open Pit Ore----- | 360,000 | 55.96 | .080 | .90 | 8.83 | 4.85 | 15.00 |
| TOTAL & AVERAGES----- | 500,000 | 55.97 | .080 | .89 | 8.96 | 4.79 | 14.72 |

While we have not included any of the lean sandy ore in stock in this estimate, we are in hopes of moving around 16,000 tons of this material. If the analysis of our open pit ore is better than anticipated, we will be able to do this and any tonnage taken from the lean sandy ore stockpile will be deducted from the total open pit shipments.

In the event that a total shipment of 600,000 tons of Boeing ore was desired, the open pit operations could be double-shifted for a part of the season and we might be able to forward around two-thirds of our lean sandy ore stockpile, or handle about 24,000 tons of this material.

The plans for open pit operations during 1925 calls for the removal of all the ore at the east end of the pit, back to the deep ore channel, and taking a cut along the south side of the pit to a point some distance west of the shaft. We anticipate taking this cut down to the bottom rock, except along the deep ore channel.

The Great Northern car service was better during 1924 than the previous year. We suffered total delays of 241 $\frac{1}{4}$ hours at the Boeing open pit waiting for cars during 1923, whereas the total delay during 1924 amounted to but 99 $\frac{1}{2}$ hours.

Open pit loading during the latter part of the 1924 season was slowed

up considerably on account of the hard cretaceous ore capping, which necessitated the reduction of many large chunks and to the manoeuvring with the big shovel in cutting around the east end of the pit, the cut being quite narrow. During 1925 we will have comparatively little of the hard cretaceous ore to handle and provided the Great Northern car service is satisfactory, our average daily production from the open pit should show a material increase. The proposed enlargement of the Great Northern classification yards at Allouez should result in a decided improvement in car service. Further than this, there will be a larger number of 75-ton cars in operation.

BOEING MINE ORE ESTIMATE OF JANUARY 1ST. 1925

Following is an estimate of the ore in sight at the Boeing Mine on January 1st., 1925, and several tables with notes, showing the analysis of the several grades and the tonnage now available, and the deposits which can be made available by sinking the present shaft and developing at depth:

ESTIMATE OF BOEING ORE AS OF JANUARY 1ST. 1925

| | <u>Tons.</u> |
|------------------------------------|--------------|
| Underground Ore----- | 930,000 |
| Milling Ore----- | 338,000 |
| Open Pit - First Class Ore----- | 729,000 |
| " " - Second Class Ore----- | 445,000 |
| " " - Sandy Cretaceous Ore----- | 58,000 |
| TOTAL----- | 2,500,000 |

The above tonnage of second class open pit ore is included in this estimate, as we have found that during the past two seasons' operations, we have been mining a considerable quantity of this class material and we feel that the above tonnage will be taken in connection with our open pit merchantable ore operations.

The following table shows the analysis of the several grades making up our total estimate of 2,500,000 tons:

| | <u>Tons</u> | <u>Fe.</u> | <u>Phos</u> | <u>Sil.</u> | <u>Mn.</u> | <u>Alu.</u> |
|-------------------------|-------------|------------|-------------|-------------|------------|-------------|
| Underground----- | 930,000 | 56.96 | .085 | 8.02 | .94 | 3.67 |
| Milling----- | 338,000 | 56.56 | .068 | 9.76 | 1.29 | 2.43 |
| Open Pit First Class--- | 729,000 | 55.85 | .080 | 9.95 | .80 | 4.10 |
| " " Second Class-- | 445,000 | 52.27 | .081 | 14.17 | 1.90 | 1.69 |
| " " Cretaceous--- | 58,000 | 49.40 | .119 | 19.14 | .17 | 6.26 |
| TOTAL & AVERAGES----- | 2,500,000 | 55.57 | .081 | 10.17 | 1.28 | 3.34 |

The second class and cretaceous open pit ore are quite low in iron and high in silica, but we have been mining these grades during the past two seasons and we are showing them in this estimate. It would be very difficult to keep the second grade ore separate, as it is somewhat mixed with the first grade. While the iron in the cretaceous ore is very low, the moisture only runs about 10% and the iron natural averages close to 45%.

The following table shows the available ore now mineable, the tonnage made available from a second level, 120' below our present haulage level, and the unavailable ore:

| | <u>AVAILABLE ORE</u> <u>UNDER</u> | | <u>AVAILABLE ORE</u> <u>WITH</u> | | <u>TOTAL</u> <u>Available</u> | <u>UNAVAILABLE</u> <u>Underground</u> |
|------------------------|--------------------------------------|------------------|-------------------------------------|----------------|----------------------------------|--|
| | <u>PRESENT CONDITIONS</u> | | <u>SECOND LEVEL</u> | | | |
| | <u>Underground</u> | <u>Open Pit</u> | <u>Underground</u> | <u>Milling</u> | | |
| West Deposit----- | 168,000 | --- | 117,500 | ---- | 285,500 | 44,000 |
| East Deposit----- | 214,500 | --- | ----- | ---- | 214,500 | 7,000 |
| North Bank----- | --- | --- | ----- | ---- | --- | 127,000 |
| South Bank----- | --- | --- | 252,000 | ---- | 252,000 | ---- |
| Milling----- | --- | --- | ----- | 338,000 | 338,000 | ---- |
| <u>DIRECT LOADING:</u> | | | | | | |
| First Class---- | --- | 729,000 | ----- | ---- | 729,000 | ---- |
| Second Class---- | --- | 445,000 | ----- | ---- | 445,000 | ---- |
| Sandy----- | --- | 58,000 | ----- | ---- | 58,000 | ---- |
| TOTALS----- | 382,500 | 1,232,000 | 369,500 | 338,000 | <u>2,322,000</u> | 178,000 |

The underground unavailable ore lies below the first level in the channel at the west end of the property and is too great a distance from the shaft to warrant a drift for tramping. It is questionable whether it would pay to sink a winze for this small body of ore, but it may develop later that we can mine a part, if not all of it, by the tram to pit method.

The 7,000 tons of unavailable ore in the east deposit is located at the northeast corner of our easterly underground deposit. We would not be able to mine this ore without endangering the Susquehanna tracks, which are on Oliver land in this vicinity.

The 127,000 tons of unavailable north bank ore is made up of 63,000 tons above and 64,000 tons below our present main tramping level. This ore must be left to protect our shaft and it would only be available in the event that shaft operations were discontinued and the ore was trammed to pit and either handled on our approach or up an incline, when we have about completed operations at this property.

We have included the balance of the east deposit underground ore; namely, 214,500 tons, as available, assuming that the surface layout will be arranged so that this ore may be mined.

The following table shows the analysis of the Boeing ore that is available for mining under present conditions:

| | <u>Tons.</u> | <u>Fe.</u> | <u>Phos</u> | <u>Sil.</u> | <u>Mn.</u> | <u>Alu.</u> |
|----------------------------------|------------------|--------------|-------------|--------------|-------------|-------------|
| Undg. West Deposit----- | 168,000 | 56.97 | .081 | 8.96 | .87 | 3.91 |
| Undg. East Deposit----- | 214,500 | 57.07 | .086 | 6.49 | .84 | 5.36 |
| Open Pit - First Class----- | 729,000 | 55.85 | .080 | 9.95 | .80 | 4.10 |
| Open Pit - Second Class----- | 445,000 | 52.27 | .081 | 14.17 | 1.90 | 1.69 |
| Open Pit - Cretaceous----- | 58,000 | 49.40 | .119 | 19.14 | .17 | 6.26 |
| TOTAL & AVERAGES----- | 1,614,500 | 54.91 | .083 | 10.87 | 1.09 | 3.66 |

Below is shown the analysis of the Boeing ore that would be made available by the development of our second level 120' below the present main tramway:

| | <u>Tons</u> | <u>Fe.</u> | <u>Phos</u> | <u>Sil.</u> | <u>Mn.</u> | <u>Alu.</u> |
|---------------------------------------|------------------|--------------|-------------|--------------|-------------|-------------|
| Underground West Deposit----- | 117,500 | 58.98 | .082 | 7.91 | .93 | 2.60 |
| Underground South Bank----- | 252,000 | 57.20 | .092 | 7.30 | .76 | 3.29 |
| Milling----- | 338,000 | 56.56 | .068 | 9.76 | 1.29 | 2.43 |
| TOTAL & AVERAGES----- | 707,500 | 57.19 | .079 | 8.58 | 1.04 | 2.76 |
| GRAND TOTAL AVAILABLE ORE----- | 2,322,000 | 55.60 | .081 | 10.17 | 1.07 | 3.38 |

BOEING MINE.

The following table shows the analysis of the unavailable ore, which is included in our total estimate of 2,500,000 tons. It is quite likely that we will mine a part, if not all, of the 44,000 tons in the underground west deposit, but the 7,000 tons of the underground east deposit ore and the north bank ore will probably never be taken:

| | <u>Tons</u> | <u>Fe.</u> | <u>Phos</u> | <u>Sil.</u> | <u>Mn.</u> | <u>Alu.</u> |
|------------------------------|----------------|--------------|-------------|-------------|-------------|-------------|
| Underground West Deposit---- | 44,000 | 55.46 | .081 | 12.36 | 1.22 | 2.45 |
| Underground East Deposit---- | 7,000 | 55.70 | .065 | 8.87 | .68 | 7.01 |
| Underground North Bank----- | <u>127,000</u> | <u>55.03</u> | <u>.078</u> | <u>9.44</u> | <u>1.51</u> | <u>2.50</u> |
| TOTAL & AVERAGES----- | 178,000 | 55.16 | .078 | 10.14 | 1.41 | 2.67 |

The following table shows our several estimates of ore at the Boeing Mine, together with the tonnage mined during the various years, and a comparison with the first estimate made:

| <u>DATE OF</u> | <u>-----ORE IN SIGHT-----</u> | | | <u>TOTAL ORE</u> | <u>MINED TO-DATE.</u> | | <u>GRAND TOTAL</u> |
|------------------|-------------------------------|----------------|--------------|------------------|-----------------------|-----------------|--------------------|
| <u>ESTIMATE:</u> | <u>OPEN PIT</u> | <u>MILLING</u> | <u>UNDG.</u> | <u>IN SIGHT</u> | <u>UNDG.</u> | <u>OPEN PIT</u> | |
| 1/1/1920- | 2,160,000 | 275,000 | 505,000 | 2,940,000 | ----- | ----- | 2,940,000 |
| 1/1/1921- | 1,638,000 | 521,000 | 577,000 | 2,736,000 | 1,989 | ----- | 2,737,989 |
| 1/1/1922- | 1,638,000 | 521,000 | 637,000 | 2,796,000 | 21,927 | ----- | 2,817,927 |
| 1/1/1923- | 1,563,500 | 521,500 | 628,500 | 2,713,500 | 30,681 | 257,550 | 3,001,731 |
| 1/1/1924- | 1,200,000 | 521,500 | 491,000 | 2,212,500 | 168,181 | 620,775 | 3,001,456 |
| 1/1/1925- | 1,232,000 | 338,000 | 930,000 | 2,500,000 | 354,679 | 954,306 | 3,808,985 |

The discrepancy between the estimates of 1920 and 1921 was due to the fact that a number of drill records were found to be in error and the development work in the west end of the mine showed the existence of a deep ore channel that was not indicated by previous explorations. While this increased the amount of underground ore, the tonnage in the open pit deposit was reduced somewhat as the main ore channel was found to be narrower than we had expected.

There was an increase in the underground estimate as between the years 1921 and 1922, due to development work on our top sub, west deposit, which showed 80,000 tons more ore than the exploration records indicated.

Comparing the estimates of 1922 and 1923, the tonnage of open pit ore was increased by 183,000 tons, due to the fact that we disclosed a layer of sandy cretaceous material on top of the main ore body, which varied in thickness from 5' to 20'. Some of the drill holes did not show any of this ore, while others obtained a concentration. The result was that our merchantable tonnage was decreased 102,000 tons and the cretaceous ore increased 285,000 tons, or a net increase of 183,000 tons in the total open pit deposit.

Our new estimate, which has resulted from development work underground and in the pit, as well as from test pitting and churn drilling, shows a substantial increase in tonnage as compared with the original estimate, the tonnage mined from the property being taken into consideration. Pit operations, test pits and drilling have proved the existence of an additional 57,000 tons of open pit ore at the east end of the property. We have been mining a considerable tonnage of second class ore during the past two years and we have now included 445,000 tons of this second class ore, as being available for open pit mining.

The large decrease in the tonnage of milling ore shown in our recent

estimate, as compared with previous ones, is due to the fact that we have mined our berms closer to the toe of stripping than anticipated and the balance of the ore will be trammed to pit and should be classed as underground ore. Further than this, we have always considered track benches as milling ore, whereas we feel that they should be properly placed in the open pit class when there is very little clean up work to make them available, or underground when there is considerable dirt to remove.

The increase in the underground ore in our new estimate is also due to development work at the east end of the property.

GENERAL SURFACE

It was not necessary to do as much work around the location and mine ground in 1924 as during the previous year. The seeding and shrubbery planting, which was done during 1923, did quite well. There was also less cleaning done around the mine premises. The caved ground to the east of the boarding houses and the old site of the Captain's house was filled over a considerable area by a local contractor digging basements in North Hibbing. This filling has improved the appearance of the location and facilitates road conditions about the location.

The interior of the location houses were redecorated and a fence was constructed around the Captain's house and the lawn seeded.

The interior of the mine office, power house and shops were kalsomined and the steel work on the headframe was given a coat of paint. One of the locomotives was kept under steam from January 2nd to March 14th and switched a considerable part of our mining timber to the west end of the open pit. It was found economical to handle the timber to the west end subs from the open pit, rather than to handle the timber down the shaft, out the main level and hoist it up the several raises.

Work on the erection of the double stocking trestle was started in August and completed the forepart of October. Only a small crew was engaged on this work and they were only employed intermittently. The shift over to stocking was made on October 27th without any delay to hoisting operations.

The ropes on the skips broke at a point near the bails on November 25th just as the loaded skip was being hoisted. The loaded skip fell but a few feet, but the empty skip dropped from the headframe. Fortunately very little damage was done, two short dividers being broken at the bottom of the north skipway and the slide for handling spilled ore from the skips was collapsed. One shift was lost on account of this accident.

Some work was done on the drainage ditches handling the mine water, but as compared with previous years it amounted to very little. The drainage ditch

leading around the stripping dump became blocked with material washed down from the dump during the severe rains in September. A gang of men started digging a new ditch back from the toe of the dump, but before the ditch was completed we had several more heavy rains and the land to the north, belonging to Mike Pribich, was flooded and he sustained considerable damage to his crops and gravel pit, which he was operating. The new ditch should take care of flooding waters and a careful patrol will be maintained to see that the entire ditch is kept free from debris which might dam back the water. The land in the vicinity of our dumps is very flat and the ditch has very little grade.

The labor situation was quite satisfactory during 1924. We were able to maintain an adequate force on surface and in the pit at all times and the class of miners underground improved very decidedly during the year. The underground men worked steadier than they did in 1923, and while the rates paid per car were reduced, the miners secured a much better tonnage per man and their earnings were also somewhat higher.

STOCKPILES

Shipments from stockpile were started April 26th and continued at irregular intervals until the 19th of July. On account of congestion at the docks, only a small tonnage was shipped in April. It is advisable to ship as much ore as possible before May 1st., on account of the excessive taxes on stockpile ore.

Following is the tonnage and analysis of the ore shipped from stockpile during 1924:

| | <u>Tons</u> | <u>Fe.</u> | <u>Phos</u> | <u>Sil.</u> | <u>Mn.</u> | <u>Alu.</u> | <u>Mois.</u> |
|--------------------------|-------------|------------|-------------|-------------|------------|-------------|--------------|
| Stockpile Shipments----- | 58,451 | 56.77 | .075 | 9.87 | 1.00 | 3.47 | 13.76 |

The sampling of the ore as it was stocked showed 57.21% iron, which is nearly half a point over the analysis obtained when the ore was shipped.

An overrun of 3,814 tons was realized, or 6.6%.

The new double stocking trestle was erected and put in service on October 27th.

The tonnage and analysis of the ore in stock January 1st. follows:

| | <u>Tons.</u> | <u>Fe.</u> | <u>Phos</u> | <u>Sil.</u> | <u>Mn.</u> | <u>Alu.</u> |
|---------------------------------|--------------|------------|-------------|-------------|------------|-------------|
| In Stock Jan. 1st.--Boeing----- | 34,982 | 57.05 | .081 | 8.85 | 1.00 | 3.83 |
| " " " 1st.--Boeing-Susquehanna | 2,110 | 57.02 | .078 | 9.05 | .95 | 3.68 |
| TOTAL & AVERAGES----- | 37,092 | 57.05 | .081 | 8.86 | 1.00 | 3.82 |

BOEING MINE.

No shipments were made in 1924 from the lean sandy ore stockpiled from open pit operations in 1922. The tonnage and analysis of this lean sandy stockpile is as follows:

| | <u>Tons</u> | <u>Fe.</u> | <u>Phos</u> | <u>Sil.</u> | <u>Mn.</u> | <u>Alu.</u> |
|---------------|-------------|------------|-------------|-------------|------------|-------------|
| Lean Ore----- | 33,417 | 50.84 | .101 | 17.74 | -- | 5.91 |

Stocking operations during the months of January, February, March and April were conducted on day shift only, but in November and December it was necessary to hoist from 30 to 40 skips per night, due to the fact that the sub-level mining is at lower elevations and the capacity of the chutes has been decreased. Further than this, the daily production was higher at the end of the year than at the beginning. As we drop in our subs, it will be necessary to increase the amount of hoisting on night shift.

UNDERGROUND OPERATIONS

Underground operations were carried forward steadily throughout 1924 and with the exception of March and April, we were able to maintain a full crew. The men shifted about more or less during the spring months, owing to the fact that several underground properties started up in this district.

The following table shows the underground output by months, the tons per miner and the tons per man (total payroll) secured during 1924:

| <u>MONTH</u> | <u>TONS PRODUCED</u> | <u>TONS PER MINER IN ORE</u> | <u>TOTAL TONS PER MAN</u> |
|----------------|--------------------------|----------------------------------|-------------------------------|
| January----- | 12,011 | 8.39 | 3.88 |
| February----- | 11,183 | 8.10 | 3.84 |
| March----- | 10,364 | 7.84 | 3.61 |
| April----- | 12,788 | 8.90 | 4.41 |
| May----- | 16,138 | 10.83 | 5.18 |
| June----- | 16,059 | 10.48 | 5.38 |
| July----- | 18,210 | 11.06 | 5.73 |
| August----- | 18,662 | 10.47 | 5.45 |
| September----- | 17,920 | 10.94 | 5.66 |
| October----- | 20,689 | 11.34 | 6.10 |
| November----- | 16,474 | 11.82 | 6.01 |
| December----- | <u>16,938</u> | <u>12.01</u> | <u>5.70</u> |
| TOTAL----- | 187,436 | 10.28 | 5.12 |

It was necessary to partially clean the pump sump at frequent intervals and it was very thoroughly cleaned once in March and again in September. The accumulation of sand in the sump has not been as great as during the previous year, owing to the fact that our water was handled in the pit to better advantage and did not flow across so much surface material.

To provide ample drainage facilities for the water encountered at the east end of the property, the main level ditch was deepened from a point near the shaft to the extreme easterly workings. A concrete bulkhead was built in No. 2 crosscut during February to replace the timber dam placed there the previous summer, which failed to stop the water from seeping into the drift. The present dam is tight. As the open pit operations dug out crosscuts Nos. 4, 6 and 8, concrete bulkheads were built near the intersection of the crosscuts with the main drift. Pipes with valves were placed through the bulkheads, so that flood waters in the pit could be controlled at times of excess flowage.

More or less timbering work was done on the main level throughout the year, as the timber showed excessive decay, or weight developed. The main level timbering is now in pretty good shape and there should not be a great amount of repair work during the coming year.

The product from underground was hoisted on day shift during the forepart of the year, but due to the increased output and the decreased capacity of the sub-level raises, it was necessary to do some hoisting on night shift during the latter part of the season.

The rotary dump operated satisfactorily during 1924 and there were very few instances of car derailments, or any trouble with electric locomotives. The westerly main level workings are much drier than they were and this has resulted in better tramming conditions.

The underground mining force varied from 15 to 18 gangs, the average for the year being close to 17.

We were securing better than 11.00 tons per miner during the latter part of the year and there was a very small turnover in the force.

MAIN LEVEL

Contract No. 8 drove ahead in the east main level heading for 215' from January 1st. to April 5th. For the most part this was a single contract and on account of the very wet conditions, it was difficult to keep a gang working here steadily.

No. 18 pushed out No. 8 crosscut and put up raises at the end of both this and No. 6 crosscut within a few feet of the open pit bottom. Pipes were driven from the top of the raise to tap the water in the pit.

Contracts Nos. 18 and 19 put up Nos. 171, 174, 176, 178, 180, 182 and 184 raises to the 1358' sub-level. Underground development work at the east end of the property was accomplished from these raises.

1380 FOOT SUB-LEVEL

Contract No. 1 sliced out the small pillar adjacent to No. 135 raise and were transferred to the 1370' sub early in January.

No. 7 mined out the pillar west of Nos. 135 and 136 raises and were moved down to the 1370' sub early in May.

1370 FOOT SUB-LEVEL

At the beginning of the year 12 gangs were employed at this elevation, but the force has been gradually reduced until on December 31st., but five contracts remained here. Contract No. 1 gouged out the ore on top of the rock west of 131 raise from January 7th to the 14th of February, when they were transferred to the 1358' sub. The gang was brought back to this elevation April 21st. and during the remainder of the year they have mined out the pillars between Nos. 125 and 127, also 150 and 153, raises.

No. 2 contract was engaged until December 1st. in mining out the deposit to the south and east of No. 139 raise. Since December 1st. the gang has been drifting to the south from No. 155 raise.

No. 3 spent the entire year slicing and caving back to the south and west of No. 155 raise.

Contract No. 4 was engaged in slicing operations to the North of 126 raise until May 10th, when they were moved to the 1358' sub.

No. 5 mined out the remaining pillars to the east of 151 raise during the first two months of the year. The gang then put up No. 115 three compartment raise in rock from the main level to this elevation.

No. 3 contract was engaged from April 1st. to the end of the year in development work and slicing along the open pit face to the southwest of 115 raise.

No. 7 was transferred from the 1380' sub the forepart of May and was engaged in mining out pillars and slicing back to the west of 136 raise until December 1st., when they were transferred to the 1358' sub.

Contract No. 9 was engaged in slicing and caving operations to the north of 125 raise until the latter part of March. The gang drove a timber drift between 115 and 118 raises, which job was completed June 1st. and since that time, the contract has been engaged in slicing and caving to the west of 115 raise.

No. 10 continued mining the pillars in the vicinity of 123 raise until this ore was exhausted the latter part of February. The gang completed 117 raise, mined out the pillars adjacent thereto at this elevation and dropped down to the 1380' sub the forepart of December.

No. 11 mined out the pillars to the west of 137 raise between the latter part of February and the forepart of May and were then transferred to the 1358' sub.

Contract No. 12 sliced and scrambled the deposit to the north of 131 raise until the latter part of June, when they were transferred to the 1358' sub.

No. 15 contract sliced and caved back to the southwest of No. 139 raise from the first of the year until early in July. The gang then took the pillars west of 137 raise and were moved to the 1358' sub August 1st.

Contract No. 16 sliced out the pillars to the west of 137 raise until May 7th, when they were moved over to 135 raise and mined the pillars adjacent thereto. The gang was transferred to the 1358' sub the middle of October.

No. 17 scrambled out the pillars adjacent to Nos. 122 and 123 raises during the forepart of the year. The gang was engaged from February until the middle of June in mining the pillars adjacent to 125 and 150 raises. The contract was then disbanded.

1358 FOOT SUB-LEVEL

At the beginning of the year, but one contract was employed at this elevation, but on December 31st. there were 10 gangs, the bulk of the miners' output being derived from this sub.

Contract No. 1 drifted between 124 raise and the open pit for a timberway from February 14th to April 21st. The gang was then moved back to the 1370' sub, where they spent the remainder of the year.

No. 4 was transferred to this elevation on May 11th and spent the balance of the year developing the deposit and slicing back to the north of 130 raise.

Contract No. 6, the only gang at this elevation on January 1st., has been engaged throughout the year in development work and in slicing operations to the south and north of 118 and 119 raises.

Since being transferred to this elevation early in December, Contract No. 7 has cut out at 153 raise and has been engaged in drifting westerly for a timber tramway.

No. 10 was moved down to this sub during December. They have cut out
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from 117 raise and have started to drift to the north.

Contract No. 11 mined out the remaining ore to the south of 120 raise during the latter part of January and February. They were then moved to the 1370' sub for a few months. This contract spent the balance of the year mining along the shore line to the north and west of Nos. 131 and 132 raises.

Contract No. 12 has been engaged in slicing and caving back to the north of 128 raise since the latter part of June.

No. 14 mined out the ore on top of the rock between 120 and 126 raises since the forepart of March.

No. 15 connected Nos. 126, 128 and 150 raises with a timber drift and has been slicing and caving in the vicinity of No. 126 raise since the forepart of August. Since they were transferred to this elevation the middle of October, No. 16 has developed the deposit and is now slicing to the north of 129 raise.

No. 18 drove in rock between Nos. 31 and 115 raises for a timber tramway during April and May, when they were transferred to the east end of the property.

No. 19 was transferred to this sub November 10th and has been drifting west from 151 raise since then.

1346 FOOT SUB-LEVEL

Contract No. 8 has been scrambling on top of the rock to the south of 119 raise since being moved to this elevation from the east end on November 5th.

1356 FOOT SUB - EAST DEPOSIT

After completing operations on the main level, contract No. 8 was moved to this elevation and spent the months of April, May, June, July and August in development work to the north and south of 180 raise. The gang endeavored to raise up in the back and tap the water, which at that time was following seams of hardpan out to the open pit face. On account of a run of quick sand, it was impossible to put this raise up through the hardpan seam.

Contracts Nos. 8, 18, 17 and 19 were engaged from the first of August until the middle of November in driving development drifts and connecting the raises in the east deposit. Crosscuts were run to the north of 171, 174, 176,

178, 180, 182 and 184 raises. All of these crosscuts were extended to the rock, with the exception of those from Nos. 182 and 184 raises, which were driven to the Oliver Iron Mining Company's boundary line. Crosscuts were also extended to the south from 178, 180 and 182 raises until they intersected the Boeing-Sargent boundary line.

The tonnage of underground ore developed at the east end of the property exceeded our expectations quite materially. From drill records, we did not expect the ore to extend over 80' to the north of the raises, whereas two of the crosscuts showed close to 300'. The total underground ore developed at the east end of the property amounts to 221,500 tons and with the exception of 7,000 tons, all of this ore will be made available for mining by shifting the Great Northern tracks leading into our shaft and coal dock and throwing over a short distance the track leading from the mouth of the pit to our ore yards. These are all Great Northern tracks and we feel that that Company will shift the tracks for us entirely at their expense.

In order to mine the deposit it will also be necessary for us to change our surface drainage ditch, which carries the Boeing and Susquehanna mine water, and connect with the Webb Mine ditch, which is being dug this winter.

We anticipate that the Great Northern Railway Company will make the necessary changes in their lines and that we will make the changes in our ditch prior to the opening of navigation. Owing to the fact that the mining limits at the west end of the property are becoming narrower as we drop down in our subs, it will be necessary to place gangs slicing at the east end of the property this summer. We feel that it is very advisable to start our slicing operations at the east end of the property along the open pit face, but we will not be able to do any work here until the deep open pit ore is mined back some distance, due to the fact that caving operations underground along the open pit face would cause a very bad slough, which would mess things up badly in the pit bottom. It is the intention to extract the deep open pit ore at the east end of the pit during the first part of the ore season and throw a dirt dam across the pit on the rock, so that the slough and wash from the overburden bank will not flow out over the pit bottom to any great extent.

OPEN PIT ORE OPERATIONS

Preparatory to starting clean-up operations with the 350-ton shovel, it was necessary to put about one week's work on the tracks. This work was started the middle of March and on the 21st. the 350-ton shovel began a clean-up cut along the south side of the pit. Upon completing this cut, the shovel was moved to the north side and handled the surface material that had washed along the north berm and around the extreme east end of the pit. Progress was quite slow on this job, owing to the very wet condition of the material handled. The clean-up work was completed May 1st. and the shovel was moved westward to the end of the last season's ore cut. The thawing ground and heavy rains softened the tracks into the pit and it was necessary to do considerable work before ore operations could be started.

Ore loading began May 6th and was conducted until October 27th. The 350-ton shovel began digging down into last year's cut and then swung around and continued the cut to the extreme east end of the pit. The machine was turned here and started westerly on the second cut, the digging extending to the Boeing-Sargent boundary line.

The upper 15' to 20' of the ore bank at the east end of the pit was of a hard cretaceous nature and it was necessary to drill and blast it ahead of the shovel. A great number of large chunks of this cretaceous ore had to be broken up ahead of the shovel and a force of 11 men were engaged on this operation, 9 jackhammers being in use constantly for several months. In order to minimize the delay in loading operations, some of the chunks were cast behind the shovel and broken there, while others were transferred to the west end of the pit with the stripping cars and will be reduced before our ore cut is extended to that point in our 1925 operations.

A considerable area of the ore cleaned by the big shovel at the east end of the pit was covered by a slough from the stripping bank and it was necessary to reclean this with a small Thew shovel mounted on caterpillars, which we rented. We rented some 20-yard stripping cars from the Winston-Dear Company

and the No. 17 locomotive from the Hill-Trumbull Mine was used to serve the Thew shovel. The clean-up work with the Thew shovel was started on August 11th and was not completed until November 12th. Progress was quite slow, due to a conflict with our ore operations and also to the fact that the Thew shovel had but a 3/4 yard dipper and the material handled was quite soupy.

The top of the ore was so uneven along the south side of the pit at the east end that it was found advisable to load ore with the 350-ton shovel and dump it into the low places. This job was done subsequent to the completion of ore operations. It is necessary to have the top of the ore somewhat level, not alone to furnish a track grade, but to facilitate the cleaning operations that we will have to make next spring after the break-up occurs. We anticipate a considerable slough from the east and south stripping banks next spring.

Rock was encountered in the bottom of the ore cut near No. 6 crosscut and this checked out with the data indicated by our cross sections. The shovel climbed up on the rock for a short distance, but the ore was found to drop away to the east and the shovel dug down again, following the rock as far as possible, or until the ore extended to a greater depth than the shovel could dig and load on the track to the south. The shovel completed the operation at the east end of the pit at an elevation approximately 20' above the bottom of the ore. The bottom ore was determined by test pits and drill holes. We test pitted as far as possible, but the water conditions were such that the progress was slow and very costly and we decided to complete the work with churn drills.

The flow of water from the stripping bank at the east and southeast end of the pit was so heavy that it was almost impossible to keep the surface material from the ore. In order to tap this water, drifts were extended in the hardpan seam, which carries the water, some distance into the bank and an endeavor was made to drive them parallel with the face and tap the water at intervals from the back. Of the three drifts started, we were only able to get one in and while we proved that the water could be tapped in this way, it was quite costly and the progress had been so slow that we had to resort to some other means in order to complete the ore cut at the east end of the pit. A number of box

launders were placed along the edge of the stripping bank and pipes and cross launders were led into them from various points. The water was collected pretty well in this manner and we were able to complete the ore cut, without mixing in any surface material.

An electric centrifugal pump, duplicating the one in our underground pumphouse, was purchased and installed in the pit during April and has been used to handle the pit water, while the underground sump was being cleaned, or for any other reason the underground pumps were shut down for a time. A No. 10 Cameron pump was used to handle the water encountered in the ore cut ahead of the shovel at the extreme east end of the pit. The water from this pump was discharged into No. 8 crosscut.

The pit production by months and the analysis follows:

| <u>MONTH:</u> | <u>Tons</u> | <u>Fe.</u> | <u>Phos</u> | <u>Sil.</u> | <u>Mn.</u> | <u>Alu.</u> | <u>Mois.</u> |
|------------------|---------------|--------------|-------------|-------------|------------|-------------|--------------|
| May----- | 34,872 | 54.05 | .082 | 10.25 | 1.05 | 5.00 | 15.29 |
| June----- | 74,158 | 54.04 | .086 | 10.57 | 1.16 | 4.22 | 15.77 |
| July----- | 68,563 | 53.74 | .082 | 10.92 | .84 | 6.34 | 15.77 |
| August----- | 63,729 | 55.05 | .070 | 9.08 | .78 | 7.31 | 14.99 |
| September----- | 47,442 | 56.08 | .079 | 8.41 | .57 | 7.62 | 14.21 |
| October----- | <u>44,767</u> | <u>56.72</u> | <u>.077</u> | <u>8.16</u> | <u>.39</u> | <u>8.23</u> | <u>13.16</u> |
| TOTAL & AVERAGE- | 333,531 | 54.83 | .080 | 9.69 | .82 | 6.35 | 15.00 |

The iron content of the pit ore was very low during the early part of the season and this was due largely to painty seams on the upper part of the bank and to some blue sandy cretaceous ore. The iron and silica improved toward the end of the season, but the alumina showed a decided increase. The high alumina is found in the hard cretaceous formation capping the ore body at the east end of the pit.

From the test pitting and drill showings, we feel that our next year's pit operations will show a much better average ore.

STRIPPING

The Winston-Dear Company completed the repairs to the boom of their 300 shovel in the Boeing yards by the end of January, the balance of the repairs being made in their headquarters shops.

The repair work on the three locomotives and eighteen cars, which remained to be done the first of the year, was not completed until May.

The Model 60 Marion shovel from the Hill-Trumbull Mine was engaged in taking a clean-up cut along the south side of the lower approach bench during the forepart of November. This cut will permit the throwing of the track onto its permanent location. It will be necessary to do some clean-up work where the old track rested, so as to allow us to mine all the open pit ore. The Marion shovel spent the latter part of November in taking a clean-up cut along the south side of our upper approach track. The slough from the stripping bank has been encroaching on this track and the cut will provide for all the wash and slough that we may expect next year. The Marion 60 shovel was taken out of the pit on December 1st.

During October, November and December several hundred cars of rock from the Susquehanna Mine were dumped along the south stripping bank. Most of the rock was placed adjacent to the coal dock, where the rain has washed the fine sandy material and we have been apprehensive that our approach track might be pulled. A considerable amount of this rock rolled down to the bottom of the stripping cut and it will be very useful in ballasting our lower approach track. Permission was secured from the Susquehanna fee owners for using the rock and the only cost to us was that of switching it down into the approach with our engines.

ACCIDENTS

Following is a list of the accidents which occurred at the Boeing Mine during 1924 and were of a serious, or semi-serious nature:

JOE SKARICH

Injured-----January 26th, 1924.
Occupation-----Miner.
Nationality-----Serbian.
Time Lost-----71 Days.
Compensation Paid-----\$236.67.

Remarks: In an endeavor to avoid being hit with chunks of ore falling from the back of his working place, Skarich fell and bruised his right knee badly. The X-Ray showed no fractures.

JOHN PANTIN

Injured-----February 6th, 1924.
Occupation-----Rock Picker.
Nationality-----Italian.
Time Lost-----15 Days.
Compensation Paid-----\$30.80.

Remarks: Pantin was sorting rock from the ore stockpile, and a chunk rolled down the pile, and struck him on the back of the left hand. While the wound was not serious, infection set in.

PAUL MILLER

Injured-----February 14th, 1924.
Occupation-----Miner.
Nationality-----Finnish.
Time Lost-----26 Days.
Compensation Paid-----\$43.33.

Remarks: This man was mucking in his contract, when a small chunk of ore fell from the side of the drift, hitting him on the head, and inflicted a deep 1" cut to the bone and through the periosteum.

STEVE PAVICH

Injured-----February 26th, 1924.
Occupation-----Miner.
Nationality-----Croatian.
Time Lost-----Died of injuries.

Remarks: Pavich and his partner, Mike Chovek, were starting a new slice beside their old workings, south of #151 raise. The opening set was in place, and the first cut had been blasted, and mucked. The back was well poled and blocked and they were almost ready to put in the set, when, without warning, the entire opening back to the raise filled with cretaceous ore. Pontus Johnson, #17 contract, was in #5 to borrow some powder. He saw the timbers moving and grabbed Chovek, pulling him back to the raise. Pavich was caught under the timbers and was taken out about 3:00 P. M. His injuries consisted of fracture of bones in right foot and severe bruises over body. Pavich was taken to the Adams hospital where he died March 3rd from internal injuries.

VERNER PETERSON

Injured-----May 2nd, 1924.
Occupation-----Miner.
Nationality-----Swedish.
Time Lost-----20½ Days.
Compensation Paid-----\$48.60.

Remarks: Peterson was walking along the main drift, when he slipped and fell, spraining his left ankle.

GEORGE GLUMAC

Injured-----May 13th, 1924.
Occupation-----Miner.
Nationality-----Croatian.
Time Lost-----172½ Days.
Compensation Paid-----\$576.67.

Remarks: Glumac and his partner were lifting a piece of timber off a timber truck to take into their working place, when he sustained a strain which resulted in right inguinal hernia.

LEO PAPPILA

Injured-----May 20th, 1924.
Occupation-----Miner.
Nationality-----Finnish.
Time Lost-----20 Days.
Compensation Paid-----\$46.00.

Remarks: Pappila was coming off shift from #8 contract and climbing down #180 raise with his dinner bucket slung on his left arm. His bucket struck one of the rungs, causing him to miss his hold. He fell the length of the raise, severely bruising his right arm.

JACOB ALFONSEO

Injured-----May 26th, 1924.
Occupation-----Miner.
Nationality-----Italian.
Time Lost-----12 Days.
Compensation Paid-----\$20.00.

Remarks: While handling timber to his working place, Alfonso sustained a sprain to his back in the region of his hips.

MATT SIKICH

Injured-----May 29th, 1924.
Occupation-----Miner.
Nationality-----Austrian.
Time Lost-----16 Days.
Compensation Paid-----\$33.00.

Remarks: Sikich was descending from his working place, #14 Contract, at the end of his shift. A train was loading below from this chute and Sikich stepped on one of the cars prior to reaching the bottom of the drift. At this time his carbide lamp, which he wore on his miners hat, came in contact with the trolley wire and caused a shock strong enough to throw him to the ground, causing a bruise on the lower left side of his chest and a fracture to his 10th left rib.

JOHN NEIMI

Injured-----July 2nd, 1924.
Occupation-----Miner.
Nationality-----Finnish.
Time Lost-----158 Days.
Compensation Paid-----\$526.67.

Remarks: Neimi was carrying a drill machine down No. 131 raise. He either lost his balance or slipped, causing him to fall to the Main Level below. Neimi was found by Tony Fabrizzi, who was handling a train of empty cars into this stub drift. The end car became derailed and upon investigation by Frabizzi, Neimi was found lying between the front and rear trucks of the end car, the drill machine beside him. He was unconscious and has never recalled any details of the accident. Neimi suffered very severe cuts and bruises about the body.

VERTON L. ROCK

Injured-----July 27th, 1924.
Occupation-----Hoisting Engineer.
Nationality-----American.
Time Lost-----12 Days.
Compensation Paid-----\$20.00.

Remarks: Rock had left his post as hoisting engineer while the cage hoist was still in motion, to go to the compressor. When he returned, the cage had raised beyond its limit and Rock immediately shut off the current and applied the brake. The cable broke and wound about him, apparently striking his hand, causing deep cut on ventral surface of middle finger on the right hand. Rock was discharged for this carelessness.

MIKE SABIN

Injured-----August 29th, 1924.
Occupation-----Miner.
Nationality-----Croatian.
Time Lost-----91 Days.
Compensation Paid-----\$303.33.

Remarks: Sabin was placing a 7' post in his working place. In twisting the post into position, Sabin strained himself and suffered a right inguinal hernia.

JOHN PANTIN

Injured-----September 30th, 1924.
Occupation-----Pit Laborer.
Nationality-----Italian.
Time Lost-----28½ days.
Compensation Paid-----\$78.40

Remarks: Pantin was employed keeping launders open in the pit. In some manner he slipped and fell bodily across a launder, causing a sprain on left side over ribs.

FRANK ENSCH

Injured-----September 30th, 1924.
Occupation-----Timber Trammer.
Nationality-----American.
Time Lost-----10 Days.
Compensation Paid-----\$11.47.

Remarks: Ensch was pulling timber up a raise. He got his finger caught between cable and pulley on little tigger hoist, causing squeeze and several abrasions of left index finger.

WILLIAM GRAY

Injured-----October 2nd, 1924.
Occupation-----Timber Trammer.
Nationality-----American.
Time Lost-----14 Days.
Compensation Paid-----\$22.93.

Remarks: Gray was employed as a timber trammer. In moving some timber in the drift, a piece rolled off and struck him on the left foot, causing a sprain of the left ankle.

GUST OGREN

Injured-----October 13th, 1924.
Occupation-----Car Trimmer.
Nationality-----Finnish.
Time Lost-----15½ Days.
Compensation Paid-----\$28.00.

Remarks: Ogren, employed as a car trimmer at the ore loading shovel, slipped and fell off an ore car to the ground, causing cut over left molar bone and bruise over left side of chest under arm.

JOHN ZELINSKI

Injured-----October 30th, 1924.
Occupation-----Open Pit Driller.
Nationality-----Polish.
Time Lost-----52 Days.
Compensation Paid-----\$159.46.

Remarks: Zelinski was employed breaking chunks of ore with a drill in the open pit. During the course of his work, owing to the chunk he was drilling giving away, he lost his balance and fell a distance of about 14' down the ore bank. Some chunks rolled after him and caused bruises on the neck, back and both hips, and a cut $\frac{1}{4}$ " long over left knee. This knee cut was deep enough to cause a loss of the synoveal fluid in the joint.

STEVE LASTOVICH

Injured-----October 29th, 1924.
Occupation-----Miner.
Nationality-----Jugo-Slav.
Time Lost-----20 Days.
Compensation Paid-----\$53.33.

Remarks: Lastovich stepped on a slippery piece of timber in his workings. He lost his balance and fell headlong, striking his forehead in such a manner as to cut the upper eye-lid and eye-brow.

MATT SIKICH

Injured-----October 29th, 1924.
Occupation-----Miner.
Nationality-----Austrian.
Time Lost-----21 Days.
Compensation Paid-----\$53.33.

Remarks: Sikich was carrying a piece of timber with his partner. He slipped and fell on a lagging pile, and the piece of timber they were carrying struck his right leg, causing bruise of inner side calf of right leg.

MARINO FILORI

Injured-----November 19th, 1924.
Occupation-----Motor Brakeman.
Nationality-----Italian.
Time Lost-----35 Days.
Compensation Paid-----\$100.80.

Remarks: Filori was lifting the disc on chute #131 to fill a car and some rock rolled on his hand, causing severe bruise of left 4th finger and fracture of terminal phalangeal bone.

JOE ROSETTI

Injured-----December 17th, 1924.
Occupation-----Miner.
Nationality-----Italian.
Time Lost-----11 Days.
Compensation Paid-----\$16.67.

Remarks: Rosetti was working with a pick in his contract and some dirt flew upward into his left eye.

SHIPMENTS

Following are the cargoes of Boeing ore shipped during the 1924 season and the analysis of same as obtained at the Mine and by the Lower Lake

Chemists:

| | | | |
|--------------------------------|------------|-------------|----------------|
| <u>A. S. UPSON</u> - - - - - | 5/1/24 | - - - - - | 6,162 Tons. |
| | <u>Fe.</u> | <u>Phos</u> | <u>Sil.</u> |
| Mine----- | 55.83 | .080 | 10.53 |
| Cremer & Case----- | 56.10 | --- | 9.82 |
| | | | <u>Alu.</u> |
| | | | 3.68 |
| | | | <u>Mois.</u> |
| | | | 13.35 |
| | | | <u>Fe.Nat.</u> |
| | | | 48.46 |
| <u>THOS. BRITT</u> - - - - - | 5/10/24 | - - - - - | 5,908 Tons. |
| Mine----- | 55.53 | .081 | 10.42 |
| Crowell & Murray----- | 55.82 | --- | 4.32 |
| | | | 13.92 |
| | | | 15.25 |
| | | | 47.31 |
| <u>LUZON</u> - - - - - | 5/12/24 | - - - - - | 4,979 Tons. |
| Mine----- | 55.25 | .081 | 10.50 |
| Oscar Textor----- | 55.85 | --- | 4.42 |
| | | | 14.13 |
| | | | 14.97 |
| | | | 47.49 |
| <u>W. G. MATHER</u> - - - - - | 5/15/24 | - - - - - | 9,677 Tons. |
| Mine----- | 55.75 | .079 | 10.30 |
| Cremer & Case----- | 56.15 | --- | 4.37 |
| | | | 14.21 |
| | | | 14.26 |
| | | | 48.14 |
| <u>CADILLAC</u> - - - - - | 5/20/24 | - - - - - | 5,901 Tons. |
| Mine----- | 55.61 | .076 | 10.23 |
| Crowell & Murray----- | 56.65 | --- | 4.29 |
| | | | 14.13 |
| | | | 13.34 |
| | | | 49.09 |
| <u>PETER WHITE</u> - - - - - | 5/23/24 | - - - - - | 8,679 Tons. |
| Mine----- | 55.91 | .078 | 9.66 |
| Crowell & Murray----- | 55.80 | --- | 3.51 |
| | | | 14.71 |
| | | | 15.70 |
| | | | 47.04 |
| <u>WM. G. MATHER</u> - - - - - | 5/26/24 | - - - - - | 4,577 Tons. |
| Mine----- | 55.84 | .077 | 9.33 |
| Hughes-Guentzler----- | 56.22 | --- | 4.04 |
| | | | 14.46 |
| | | | 14.50 |
| | | | 48.07 |
| <u>PONTIAC</u> - - - - - | 5/28/24 | - - - - - | 10,780 Tons. |
| Mine----- | 55.48 | .074 | 9.82 |
| Oscar Textor----- | 56.20 | --- | 4.18 |
| | | | 14.37 |
| | | | 14.30 |
| | | | 48.16 |
| <u>F. W. HART</u> - - - - - | 5/30/24 | - - - - - | 5,994 Tons. |
| Mine----- | 55.08 | .085 | 9.47 |
| Hughes-Guentzler----- | 55.00 | --- | 4.53 |
| | | | 14.24 |
| | | | 14.65 |
| | | | 46.94 |
| <u>MICHIGAN</u> - - - - - | 6/2/24 | - - - - - | 9,674 Tons. |
| Mine----- | 55.21 | .083 | 9.56 |
| Cremer & Case----- | 56.10 | --- | 4.29 |
| | | | 14.29 |
| | | | 14.41 |
| | | | 48.02 |
| <u>W. FITZGERALD</u> - - - - - | 6/5/24 | - - - - - | 6,820 Tons. |
| Mine----- | 55.32 | .083 | 9.63 |
| Oscar Textor----- | 54.20 | --- | 4.40 |
| | | | 14.52 |
| | | | 14.95 |
| | | | 46.10 |

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