

TILDEN MINE  
ANNUAL REPORT  
YEAR 1934

5. LABOR  
AND  
WAGES

a. Comments

1. Labor & Wages

The operation which started on April 21st was continuous on a five day per week basis until July 15. From then until the end of the shipping season, October 15, the loading was intermittent.

From the closing down of operations in the fall of 1933 until they started in April, repairs were made to equipment which had had practically no overhauling for several years.

The N.R.A. regulations were in effect the whole year, viz., 8 hours per day and 40 hours per week, maximum working time.

There was an increase in wages effective April 1st, making the average 4.19 per day as compared with 3.88 for 1933 or an increase of 31¢ per day.

2. New Construction

The only new construction was the extending of the water mains in both East and West pits for hydraulic stripping.

b. Comparative Statement of Wages & Product

|   | <u>1934</u> | <u>1933</u> | <u>Increase</u> | <u>Decrease</u> |
|---|-------------|-------------|-----------------|-----------------|
| Production, Tons                          | 167,688     | 94,104      | 73,584          |                 |
| No. of Shifts & Hours                     | 109-1 8 Hr. | 70-1 8 Hr.  | 39              |                 |
| Avg.No. of Men Working                    | 21          | 20          | 1               |                 |
| Average Wages per Day                     | 4.19        | 3.88        | .31             |                 |
| Tons per man per day                      | 50.91       | 46.27       | 4.64            |                 |
| Labor Cost per ton, Labor Stmt.           | .082        | .084        |                 | .002            |
| " " " " , Cost Sheet                      | .109        | .092        | .017            |                 |
| Total Number of days                      | 3,295½      | 2,035½      | 1,260½          |                 |
| Amt.paid for labor as per Labor Statement | 13,807.54   | 7,905.63    | 5,901.91        |                 |
| Amt.paid for labor as per cost sheet      | 18,199.13   | 8,640.97    | 9,558.16        |                 |

6. SURFACE

Minor repairs were made to the mine building when necessary.

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7. OPEN PIT  
OPERATIONS

a. Stripping

Surface stripping operations were conducted at both pits during the 1934 season. Mining at the East Pit had reached a point where several blasts early in the season caved surface material with the ore because of the proximity of the stripping edge with the crest of the pit. The size of the pipe line from the pump house in the swamp was increased from 6" to 8" and a booster pump installed at the East Pit to increase the nozzle pressure to about 200 lbs. to the square inch. This combination, together with a new monitor, gave increased efficiency in hydraulicking operations throughout the season. Washing started May 9th, along the north side of the East Pit, progressed to the east and then south along the east edge and at the end of July had cleaned an area of roughly 65,000 square feet. A total of 10,790 cu. yd. of soil, sand, and boulders were removed from this area, and out of the way of future mining operations, at a total cost of 53.4¢ per cu. yd. Included in this figure also is the cost of clearing timber and brush. At the end of the season, the stripping edge was 100 to 150' in advance of the pit edge. This distance must be maintained because the slope of the hillside causes interference in churn drilling and mining as the latter approaches the hydraulicking operations.

Preparations to advance the east edge of the West Pit were begun in September by scraping the surface material 30 to 40' away from the crest so that churn drilling might begin. This material was moved temporarily so that it might be removed by hydraulicking early in 1935. The cost of scraping 780 yards of surface material was 62¢ per yard and this figure also includes the cost of timber and brush removal.

There also appears under the stripping account the sorting, removal, and dumping of 6,206 tons of dike from the blasted material in the West Pit. The wasting of this material at a direct cost of 22¢ per cu. yd. of course does not uncover additional ore that will be available for mining as in the case of the surface stripping.

c. Open Pit Operations

Loading operations for the year started on April 21st with one shovel in each pit, and this arrangement continued until Sept. 13, when loading was discontinued at the East Pit. No. 31 shovel was then moved to the West Pit and remained there the balance of the season, at which time it was again transferred to the East Pit to be in readiness for the opening in 1935.

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7. OPEN PIT  
OPERATIONS (Cont.)

c. Open Pit Operations (Cont.)

As stated, last year it was found that a better cargo of West Pit ore could be obtained by using two shovels in this pit. There are rich and lean areas which need mixing to secure a uniform product.

Ore from the East and West Pits were loaded simultaneously this year but no mixing was permitted in the pocket. The cars from the East Pit were sampled individually so that the low phosphorus ore could be separated. The off grade East Pit and the regular product from the West Pit were mixed on a basis of 40% and 60% respectively for Tilden grade.

Whenever possible, two shovels are used in the West Pit. Ordinarily, if one shovel is operating, it requires a crew of fifteen men to operate the crusher, pocket, shovel, two locomotives, etc. By the addition of five men, a second shovel can operate and the product of the mine doubled.

f. Drilling, Blasting & Explosives

The drilling for the year 1934 at the East Pit amounted to 3500' of which 213' were lost and 348' is deferred drilling for 1935.

At the West Pit, 8 exploratory holes, with a total footage of 543', were drilled along the East end of the Pit. Some of these may ultimately be used as blast holes. In addition, 3 holes are being drilled near the center of the face to blast down a loose mass of ore which otherwise would have made loading dangerous next season. The total footage drilled here amounted to 265' by December 31st.

The total tonnage broken for the year was 87,800.

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7. OPEN PIT  
OPERATIONS (Cont.)

f. Drilling, Blasting & Explosives (Cont.)

Cost of Operating Churn Drills in East Pit, 1934

|                               |              |                 |              |                                |                               |
|-------------------------------|--------------|-----------------|--------------|--------------------------------|-------------------------------|
| Feet of Holes Drilled         |              |                 | 3,287'       |                                |                               |
| Feet of Holes Lost            |              |                 | 213'         |                                |                               |
|                               |              |                 | 3,500'       |                                |                               |
| <u>Operating</u>              | <u>Labor</u> | <u>Supplies</u> | <u>Total</u> | <u>Cost Per</u><br><u>Foot</u> | <u>Cost per</u><br><u>Ton</u> |
| Drilling at Mine              | 4,293.48     | 745.20          | 5,038.68     | 1.533                          |                               |
| Sharpening Bits               | 330.72       | 73.00           | 403.72       | .123                           |                               |
| Pipe & Fittings               |              | 75.95           | 75.95        | .023                           |                               |
| Rope                          |              | 382.87          | 382.87       | .117                           |                               |
| New Drill Bits                |              | 174.28          | 174.28       | .053                           |                               |
| Electric Power                |              | 406.50          | 406.50       | .123                           |                               |
| Truck and Tractor             | 288.96       | 80.52           | 369.48       | .112                           |                               |
| Total Operating               | 4,913.16     | 1,938.32        | 6,851.48     | 2.084                          |                               |
| <u>Maintenance</u>            |              |                 |              |                                |                               |
| Drills                        | 111.32       | 95.06           | 206.38       | .063                           |                               |
| Drill Sharpener               | 11.93        | 161.19          | 173.12       | .053                           |                               |
| Total Maintenance             | 123.25       | 256.25          | 379.50       | .116                           |                               |
| Total Operating & Maintenance | 5,036.41     | 2,194.57        | 7,230.98     | 2.20                           | .074                          |

|  |             |
|--|-------------|
| Feet of Holes blasted, 3,287' - estimated to produce | 87,800 tons |
| Feet of holes to be blasted next year 348'           | 9,700 "     |
|  | 97,500 "    |

Cost of Churn Drilling in the West Pit, 1934

|                               |              |                 |              |                                |  |
|-------------------------------|--------------|-----------------|--------------|--------------------------------|--|
| Feet of Holes Drilled         |              |                 | 808'         |                                |  |
| <u>Operating</u>              | <u>Labor</u> | <u>Supplies</u> | <u>Total</u> | <u>Cost per</u><br><u>Foot</u> |  |
| Drilling at mine              | 712.15       | 55.51           | 767.66       | .95                            |  |
| Sharpening Bits               | 70.67        | 18.05           | 88.72        | .11                            |  |
| Pipe & Fittings               |              | 34.76           | 34.76        | .04                            |  |
| Electric Power                |              | 163.55          | 163.55       | .20                            |  |
| Truck & Tractor               | 95.95        | 57.35           | 153.30       | .19                            |  |
| Total Operating               | 878.77       | 329.22          | 1,207.99     | 1.49                           |  |
| <u>Maintenance</u>            |              |                 |              |                                |  |
| Drills                        | 103.45       | 86.67           | 190.12       | .24                            |  |
| Drill Sharpener               | 12.21        | .52             | 12.73        | .01                            |  |
| Total Maintenance             | 115.66       | 87.19           | 202.85       | .25                            |  |
| Total Operating & Maintenance | 994.43       | 416.41          | 1,410.84     | 1.74                           |  |

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7. OPEN PIT  
OPERATIONS (Cont.)

f. Drilling, Blasting & Explosives (Cont.)

Statement of Cost of Drilling & Blasting 87,800 Tons  
of Ore in the East Pit, 1934

|                               |                 |                 |                 |                 |                 |
|-------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Number of Holes Drilled       | 47              |                 |                 |                 |                 |
| Feet of Holes Drilled         | 2,939           |                 |                 |                 |                 |
| Feet of Holes Lost            | 213             |                 |                 |                 |                 |
|                               | <u>3,152</u>    |                 |                 |                 |                 |
| <u>Operating</u>              | <u>Labor</u>    | <u>Supplies</u> | <u>Total</u>    | <u>Cost per</u> | <u>Cost per</u> |
|                               |                 |                 |                 | <u>Foot</u>     | <u>Ton</u>      |
| Drilling at Mine              | 3,761.50        | 682.29          | 4,443.79        | 1.51            |                 |
| Sharpening Bits               | 288.32          | 63.00           | 351.32          | .12             |                 |
| Pipe and Fittings             |                 | 75.95           | 75.95           | .03             |                 |
| Rope                          |                 | 289.87          | 289.87          | .10             |                 |
| New Drill Bits                |                 | 174.28          | 174.28          | .06             |                 |
| Electric Power                |                 | 323.45          | 323.45          | .11             |                 |
| Truck & Tractor               | 255.24          | 72.53           | 327.77          | .11             |                 |
| Total Operating               | <u>4,305.06</u> | <u>1,681.37</u> | <u>5,986.43</u> | <u>2.04</u>     |                 |
| <u>Maintenance</u>            |                 |                 |                 |                 |                 |
| Drills                        | 63.24           | 79.33           | 142.57          | .048            |                 |
| Drill Sharpener               | 5.72            | 158.69          | 164.41          | .052            |                 |
| Total Maintenance             | <u>68.96</u>    | <u>238.02</u>   | <u>306.98</u>   | <u>.10</u>      |                 |
| Total Operating & Maintenance | 4,374.02        | 1,919.39        | 6,293.41        | 2.14            | .072            |
| <u>Primary Blasting</u>       |                 |                 |                 |                 |                 |
| Labor Loading Holes           | 196.04          |                 | 196.04          |                 |                 |
| Explosives                    |                 | 3,495.72        | 3,495.72        |                 |                 |
| Other Supplies                |                 | 79.57           | 79.57           |                 |                 |
| Total                         | <u>196.04</u>   | <u>3,575.29</u> | <u>3,771.33</u> | <u>1.28</u>     | <u>.043</u>     |
| TOTAL                         | 4,570.06        | 5,494.68        | 10,064.74       | 3.42            | .115            |

Statement of Cost of Explosives Used for Year  
December 31, 1934

| <u>Kind</u>               | <u>PRIMARY BLASTING</u> |              |                 |
|---------------------------|-------------------------|--------------|-----------------|
|                           | <u>Quantity</u>         | <u>Price</u> | <u>Amount</u>   |
| Gelamite #2               | 4,800                   | 11.75        | 564.00          |
| 40% LF Extra Gelatin 5x16 | 3,000                   | 10.50        | 315.00          |
| 60% LF " " 5x16           | 3,450                   | 12.00        | 414.00          |
| 60% LF " " 1½x8           | 150                     | 12.00        | 18.00           |
| 80% LF " " 5x16           | 5,550                   | 15.75        | 874.13          |
| 90% LF " " 5x16           | 6,100                   | 18.25        | 1,113.26        |
| Total Powder              | <u>23,050</u>           | <u>14.30</u> | <u>3,298.39</u> |

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7. OPEN PIT  
OPERATIONS (Cont.)

f. Drilling, Blasting & Explosives (Cont.)

Statement of Cost of Explosives Used for Year Dec. 31, 1934

| <u>Blasting Supplies</u>                | <u>Primary Blasting</u>   |                   |               |
|---|---------------------------|-------------------|---------------|
|   | <u>Quantity</u>           | <u>Price</u>      | <u>Amount</u> |
| Electric Caps                           | 200                       | 5.15              | 10.30         |
| Plain Cordeau Bickford Fuse             | 894                       | 40.55             | 39.83         |
| Double Countered " "                    | <u>2,512</u>              | <u>58.67</u>      | <u>147.20</u> |
| Total                                   | 3,606                     |                   | 197.33        |
| TOTAL ALL EXPLOSIVES                    |                           |                   | 3,495.72      |
| Total Ore blasted 1934.....             |                           |                   | 87,800        |
| Pounds of Powder per ton of ore.....    |                           |                   | .324          |
| Cost per ton for powder.....            |                           |                   | .037          |
| Cost per ton for Fuse caps, etc.....    |                           |                   | .002          |
| Cost per ton for all explosives.....    |                           |                   | .039          |
| Average price per pound for powder..... |                           |                   | .143          |
|   | <u>Secondary Blasting</u> |                   |               |
| <u>Kind</u>                             | <u>Quantity</u>           | <u>Price</u>      | <u>Amount</u> |
| 60% Gelatin                             | 3,450                     | 12.00             | 414.00        |
| <u>Blasting Supplies</u>                |                           |                   |               |
| Connecting Wire                         | 40                        | .40               | 16.00         |
| Hot Wire Lighters 7'                    | 200                       | .67 $\frac{1}{2}$ | 1.35          |
| Crescent Fuse                           | 15,550                    | .582              | 90.60         |
| No. 6 Blasting Caps                     | <u>3,500</u>              | <u>1.15</u>       | <u>40.29</u>  |
| Total Fuse, Caps, etc.                  | 19,290                    |                   | 148.24        |
| TOTAL ALL EXPLOSIVES                    |                           |                   | 760.24        |
| Product.....                            |                           |                   | 167,688 tons  |
| Pounds of powder per ton of ore.....    |                           |                   | .168          |
| Cost per ton for powder.....            |                           |                   | .019          |
| Cost per ton for Fuse, Caps, etc.....   |                           |                   | .002          |
| Cost per ton for all explosives.....    |                           |                   | .021          |
| Average price per pound for powder..... |                           |                   | .120          |

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7. OPEN PIT  
OPERATIONS (Cont.)

f. Drilling, Blasting & Explosives (Cont.)

Statement of Cost of Explosives for year ending Dec. 31, 1934

| <u>Kind</u>                             | <u>Quantity</u> | <u>Price</u> | <u>Amount</u> |
|---|-----------------|--------------|---------------|
| Gelamtie #2                             | 4,800#          | 11.75        | 564.00        |
| 40% EF Extra Gelatin 5x16               | 3,000           | 10.50        | 315.00        |
| 60% LF " " 5x16                         | 3,450           | 12.00        | 414.00        |
| 60% LF " " 1 1/2 x 8                    | 5,250           | 12.00        | 630.00        |
| 80% LF " " 5x16                         | 5,550           | 15.75        | 874.13        |
| 90% LF " " 5x16                         | 6,100           | 18.25        | 1,113.26      |
| Total Powder                            | 28,150          | 13.89        | 3,910.39      |
| <br><u>Blasting Supplies</u>            |                 |              |               |
| Electric Caps                           | 200             | 5.15         | 10.30         |
| No. 6 Blasting Caps                     | 3,500           | 1.15         | 40.29         |
| Connecting Wire                         | 40              | .40          | 16.00         |
| Hot Wire Lighters 7'                    | 200             | .67 1/2      | 1.35          |
| Crescent Fuse                           | 15,550          | .582         | 90.60         |
| Plain Cordeau Bickford Fuse             | 894             | 44.55        | 39.83         |
| Double Countered " "                    | 2,512           | 58.67        | 147.20        |
| Total Fuse, Caps, etc.                  |                 |              | 345.57        |
| TOTAL ALL EXPLOSIVES                    |                 |              | 4,255.96      |
| TOTAL ORE BLASTED 1934                  |                 |              | 87,800        |
| Pounds of Powder per ton of ore.....    |                 |              | .324          |
| Cost per ton for Powder .....           |                 |              | .044          |
| Cost per ton for Fuse, Caps, etc.....   |                 |              | .004          |
| Cost per ton for all Explosives.....    |                 |              | .048          |
| Average price per pound for powder..... |                 |              | .1389         |

| <u>WEST PIT</u>                   | <u>TONS</u> |
|-----------------------------------|-------------|
| Broken Ore remaining year 1933    | 174,435     |
| Ore Shipped 110,650               |             |
| Rock Wasted 6,706                 | 116,856     |
| Balance on hand December 31, 1934 | 57,579      |

| <u>EAST PIT</u>                        | <u>TONS</u> |
|--|-------------|
| Broken ore remaining year 1933         | 3,428       |
| Blasted 1934                           | 87,800      |
| Total Tons                             | 91,228      |
| Ore shipped 1934 57,038                |             |
| Rock wasted 140                        | 57,178      |
| Balance on hand December 31, 1934      | 34,050      |
| Total broken ore on hand Dec. 31, 1934 | 91,629      |

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8. COST OF OPERATING

a. Comparative Mining Costs

|                             | <u>1934</u> | <u>1933</u> | <u>Increase</u> | <u>Decrease</u> |
|-----------------------------|-------------|-------------|-----------------|-----------------|
| Production                  | 167,688     | 94,104      | 73,584          |                 |
| Average Daily product       | 1,530       | 1,344       | 186             |                 |
| Tons per man per day        | 50.91       | 46.27       | 4.64            |                 |
| Number of days operating    | 109         | 70          | 39              |                 |
| Number of shifts & hours    | 1-8 hr.     | 1-8 hr.     |                 |                 |
| <u>Cost</u>                 |             |             |                 |                 |
| Pit operating accounts      | .273        | .257        | .016            |                 |
| Pit General Accounts        | .041        | .056        |                 | .015            |
| Cost at Mine per Cost Sheet | .314        | .313        | .001            |                 |
| <u>Depreciation</u>         |             |             |                 |                 |
| Plant and equipment         | .077        | .077        |                 |                 |
| Taxes                       | .030        | .053        |                 | .023            |
| Stripping                   | .016        | .016        |                 |                 |
| Total cost at Mine          | .437        | .459        |                 | .022            |
| Idle Expense                | .052        | .062        |                 | .010            |
| GRAND TOTAL COST AT MINE    | .489        | .521        |                 | .032            |
| <u>Expense Beyond Mine</u>  |             |             |                 |                 |
| Rail Freight                | .640        | .640        |                 |                 |
| Lake Freight                | .760        | .760        |                 |                 |
| Cargo Insurance & analysis  | .010        | .010        |                 |                 |
| Shrinkage                   | .011        | .012        |                 |                 |
| TOTAL COST LOWER LAKES      | 1.910       | 1.943       |                 | .033            |

b. Detailed Cost Comparison

1. Days and Shifts

The mine did not operate on any definite schedule during 1934, operating only 109 days for the season, an increase of 39 days over 1933. The pit was worked when cargos were wanted and holes were drilled and blasted at the East Pit as the low phosphorus ore was required.

2. Production

The 1934 production showed an increase of 73,584 tons over 1933. The average daily product loaded showed an increase of 186 tons per day.



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8. COST OF OPERATING (Cont.)

b. Detailed Cost Comparison (Cont.)

3. Cost of Production

The year 1934 shows a decrease in cost on cars over 1933 of .032. This was principally due to increased production which more than offset the increase in wages and increased idle expense. Taxes for the year were .023 per ton lower than in 1933.

| 4. <u>Open Pit Costs</u> | <u>1934</u> | <u>1933</u> | <u>Increase</u> | <u>Decrease</u> |
|--------------------------|-------------|-------------|-----------------|-----------------|
| Days per week            |             |             |                 |                 |
| Shifts and Hours         | 1-8 hr.     | 1-8 hr.     |                 |                 |
| Production, Tons         | 167,688     | 94,104      | 73,584          |                 |
| Average daily product    | 1,537       | 1,344       | 193             |                 |
| Number of days worked    | 109         | 70          | 39              |                 |

|                                 | <u>1934</u>      |                | <u>1933</u>      |                | <u>Increase</u>  |                | <u>Decrease</u> |                |
|---------------------------------|------------------|----------------|------------------|----------------|------------------|----------------|-----------------|----------------|
|                                 | <u>Amount</u>    | <u>Per Ton</u> | <u>Amount</u>    | <u>Per Ton</u> | <u>Amount</u>    | <u>Per Ton</u> | <u>Amount</u>   | <u>Per Ton</u> |
| <u>PIT OPERATING</u>            |                  |                |                  |                |                  |                |                 |                |
| <u>DIRECT ORE</u>               |                  |                |                  |                |                  |                |                 |                |
| 1. Drilling & Blasting          | 23,647.26        | .141           | 11,454.88        | .122           | 12,192.38        | .019           |                 |                |
| 2. Electric Shovels Operating   | 4,464.73         | .027           | 2,024.04         | .021           | 2,440.69         | .006           |                 |                |
| 3. Electric Shovels Maintenance | 2,706.49         | .016           | 1,353.82         | .014           | 1,352.67         | .002           |                 |                |
| 4. Locos. & Cars Operating      | 4,516.94         | .027           | 2,179.66         | .024           | 2,337.28         | .003           |                 |                |
| 5. Locos & Cars Maintenance     | 210.26           | .001           | 172.75           | .002           | 37.51            |                | .001            |                |
| 6. Track Expense                | 1,414.50         | .009           | 1,254.25         | .013           | 160.25           |                |                 | .004           |
| <b>TOTAL DIRECT ORE</b>         | <b>36,960.18</b> | <b>.221</b>    | <b>18,439.40</b> | <b>.196</b>    | <b>18,520.78</b> | <b>.030</b>    |                 | <b>.005</b>    |

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8. COST OF OPERATING (CONT)

b. Detailed Cost Comparison (Continued)

|                               | <u>1934</u>   |                | <u>1933</u>   |                | <u>Increase</u> |                | <u>Decrease</u> |                |
|-------------------------------|---------------|----------------|---------------|----------------|-----------------|----------------|-----------------|----------------|
|                               | <u>Amount</u> | <u>Per Ton</u> | <u>Amount</u> | <u>Per Ton</u> | <u>Amount</u>   | <u>Per Ton</u> | <u>Amount</u>   | <u>Per Ton</u> |
| <u>GENERAL PIT EXPENSE</u>    |               |                |               |                |                 |                |                 |                |
| 9. Water Supply               | 21.86         | .000           | 68.06         | .001           |                 |                | 46.20           | .001           |
| 11. Crushing & Screening      | 6,102.86      | .037           | 3,621.74      | .039           | 2,481.12        |                |                 | .002           |
| 12. General Open Pit Expense  | 1,598.52      | .011           | 1,039.65      | .011           | 558.87          |                |                 |                |
| 13. Open Pit Supts.           | 955.96        | .004           | 610.75        | .006           | 345.21          |                |                 | .002           |
| 15. Waste Pile Expense        | 49.61         | .000           | 385.83        | .004           |                 |                | 336.22          | .004           |
| Total General Pit Expense     | 8,728.81      | .052           | 5,726.03      | .061           | 3,385.20        |                | 382.42          | .009           |
| Total Pit Operation           | 45,688.99     | .273           | 24,165.43     | .257           | 21,905.98       | .030           | 382.42          | .014           |
| <u>GENERAL MINE EXPENSE</u>   |               |                |               |                |                 |                |                 |                |
| 18. Insurance                 | 70.82         | .000           | 47.96         | .000           | 22.86           |                |                 |                |
| 19. Mining Engineering        | 430.31        | .003           | 116.08        | .001           | 314.23          | .002           |                 |                |
| 20. Mech. & Elec. Engineering | 384.56        | .003           | 168.17        | .002           | 216.39          | .001           |                 |                |
| 21. Analysis & Grading        | 1,678.76      | .010           | 572.18        | .006           | 1,106.58        | .004           |                 |                |
| 22. Personal Injury           | 669.98        | .004           | 236.08        | .003           | 433.90          | .001           |                 |                |
| 23. Geological                | 61.47         | .000           | 15.21         | .000           | 46.26           | .000           |                 |                |
| 24. Safety Dept.              | 40.00         | .000           | 32.95         | .000           | 7.05            |                |                 |                |
| 25. Welfare Expense           | 415.83        | .003           | 619.31        | .007           |                 |                | 203.48          | .004           |
| 26. Special Expense           | 566.55        | .004           | 1,133.43      | .012           |                 |                | 566.88          | .008           |
| 27. Ishpeming Office          | 1,070.00      | .006           | 1,699.82      | .018           |                 |                | 629.82          | .012           |
| 29. Mine Office               | 1,247.23      | .006           | 614.04        | .007           | 633.19          |                |                 | .001           |
| Saranac Investigation Exp.    | 268.51        | .002           |               |                | 268.51          | .002           |                 |                |
| TOTAL GEN. MINE EXPENSE       | 6,904.02      | .041           | 5,255.23      | .056           | 3,048.97        | .010           | 1,400.18        | .025           |
| COST OF PRODUCTION            | 52,593.01     | .314           | 29,420.66     | .313           | 24,954.95       | .040           | 1,782.60        | .039           |

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8. COST OF OPERATING (Cont.)

b. Detailed Cost Comparison (Cont.)

|                             | <u>1934</u>      |                | <u>1933</u>      |                | <u>Increase</u>  |                | <u>Decrease</u> |                |
|-----------------------------|------------------|----------------|------------------|----------------|------------------|----------------|-----------------|----------------|
|                             | <u>AMOUNT</u>    | <u>PER TON</u> | <u>AMOUNT</u>    | <u>PER TON</u> | <u>AMOUNT</u>    | <u>PER TON</u> | <u>AMOUNT</u>   | <u>PER TON</u> |
| 30. Depr. Plant & Equipment | 12,911.98        | .077           | 7,246.01         | .077           | 5,665.97         |                |                 |                |
| 32 Amortization Stripping   | 2,683.01         | .016           | 1,505.66         | .016           | 1,177.35         |                |                 |                |
| 33. Taxes                   | 5,117.00         | .030           | 4,994.34         | .053           | 122.66           |                |                 | .023           |
| <b>COST AT MINE</b>         | <b>73,305.00</b> | <b>.437</b>    | <b>43,166.67</b> | <b>.459</b>    | <b>31,920.93</b> | <b>.040</b>    | <b>1,782.60</b> | <b>.062</b>    |
| 34 Inventory Adjustment     |                  |                | 13.76            |                |                  |                | 13.75           |                |
| 35. Idle Expense            | 8,700.10         | .052           | 5,843.01         | .062           | 2,857.09         |                |                 | .010           |
| <b>TOTAL COST AT MINE</b>   | <b>82,005.10</b> | <b>.489</b>    | <b>49,023.43</b> | <b>.521</b>    | <b>34,778.02</b> | <b>.040</b>    | <b>1,806.35</b> | <b>.072</b>    |

GENERAL

The product for 1934 was 73,584 tons more than in 1933. As a consequence, the total cost at mine was reduced .032 per ton over 1933. Taxes, Ishpeming office and special expense were all lower, while drilling, blasting and operating shovels were slightly higher.

1. Drilling & Blasting

The drilling in 1934 was practically all at the East Pit where difficulties were encountered. On account of the nature of the ground, it was almost impossible to keep the deeper holes straight and the average advance per shift was reduced over previous years. Secondary blasting in the West Pit was unusually heavy on account of the large chunks encountered.

The broken ore remaining in the pit is as follows:

|          |                 |
|----------|-----------------|
| East Pit | 34,050 tons     |
| West Pit | <u>57,579 "</u> |
| Total    | 91,629 tons     |

2. Electric Shovels Operating

The increased cost was due principally to increase in wages and to increased cost in electric power.

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8. COST OF OPERATING (Cont.)

b. Detailed Cost Comparison (Cont.)

3. Electric Shovels, Maintenance

The maintenance for 1934 was \$2706.49 as compared with \$1353.82 for 1933. The increased cost per ton however, was only \$ .002. There were no unusual maintenance charges.

4. Locomotives & Cars, Operating

The increased cost per ton of \$ .002 was due to increase in wages.

6. Track Expense

Decrease of \$ .004 was due to less track laying.

11. Crushing & Screening

The decreased cost per ton of \$ .002 over 1933 was due to the increased product per day of 193 tons, which more than compensated for the increase in wages and charge for current.

12. General Open Pit Expense

This cost was the same in 1933 and 1934, viz. \$ .011 per ton.

13. Open Pit Superintendence

The mine operated over a longer period in 1934 than in 1933 and more of the Captain's time was charged to this account. The increased tonnage, however, reduced the cost \$ .002 per ton.

15. Waste Pile Expense

While there was a decrease of \$336.32 or \$ .004 per ton in this account, the actual expense was considerably higher and was charged to shipping. A large volume of dike at the northwest end of the West Pit was removed after the shipping season, to permit loading ore from this area in 1935.

19. Mining Engineering

Engineering required in 1934 on account of drilling in the East Pit increased the cost \$341.23 or \$ .002 per ton.

21. Analysis & Grading

There was an increased cost here in 1934 of \$1106.58 or \$ .004 per ton. This was due to extra sampling, in one car lots, of the East Pit product, to save as much low phosphorus ore as possible.

22. Personal Injury

Increased cost \$433.90 or \$ .001 per ton. There were two lost time accidents, one of which was fatal.

25. Welfare Expense

This is a distributive account, the decreased cost being due to the larger tonnage.

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8. COST OF OPERATING (Cont.)

b. Detailed Cost Comparison (Cont.)

26. Special Expense

This is a distributive account from the Ishpeming Office. Decreased in 1934 account of increased tonnage.

27. Ishpeming Office

This is a distributive account from the Ishpeming office. Less cost per ton on account of smaller charge.

29. Mine Office

The increased cost of \$633.19 is due to more clerk's time being charged to this account but the cost per ton is decreased \$ .001 per ton owing to the increased product.

30. Saranac Investigation

Expense \$268.51, \$ .002 per ton. There was no charge to this account in 1933.

33. Taxes

Decreased charges and increased tonnage shows a decrease of \$ .023 per ton.

35. Idle Expense

|              | <u>LABOR</u>       | <u>SUPPLIES</u> | <u>TOTAL</u>    |
|--------------|--------------------|-----------------|-----------------|
| January      | \$ 635.54          | 1,637.40        | 2,272.94        |
| February     | 547.48             | 252.59          | 800.07          |
| March        | 626.75             | 344.02          | 970.77          |
| October      | 289.46             | 135.04          | 424.50          |
| November     | 979.98             | 585.58          | 1,565.56        |
| December     | 1,278.18           | 1,379.05        | 2,657.23        |
| <b>TOTAL</b> | <b>\$ 4,357.39</b> | <b>4,333.68</b> | <b>8,691.07</b> |

10. TAXES

| <u>Tilden Township</u><br><u>Tilden Mine</u>       | <u>1934</u>      |                 | <u>1933</u>      |                 |
|--|------------------|-----------------|------------------|-----------------|
|  | <u>Valuation</u> | <u>Taxes</u>    | <u>Valuation</u> | <u>Taxes</u>    |
| <u>N<sup>1</sup>/<sub>2</sub> of Sec. 26,47-27</u> | 125,000          | 3,418.26        | 115,000          | 3,249.51        |
| <u>Personal, Supplies &amp; Equipt.</u>            | 60,000           | 1,640.94        | 60,000           | 1,695.38        |
| <u>Total</u>                                       | 185,000          | 5,059.20        | 175,000          | 4,944.89        |
| <u>Collection Fees</u>                             |                  | 50.59           |                  | 49.45           |
| <u>Total Tilden Mine</u>                           |                  | <u>5,109.79</u> |                  | <u>4,994.34</u> |

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11. PERSONAL INJURY

The perfect record which was held by the Tilden from Dec. 14, 1929 was broken in 1934. There were two lost time accidents, one of which was fatal.

On July 24th, while Capt. John Nicholas was applying belt dressing to the conveyor belt, his right arm was caught between the belt and the power pulley. His arm was wrenched off at the elbow. Although first aid was immediately rendered and a doctor reached the mine a few minutes after the accident, he died that night at the Ishpeming Hospital, evidently from shock.

Captain Nicholas had been in charge of operations at the Tilden since the mine opened in 1928. In his death, the Company lost a valuable foreman. His place has been filled temporarily by Ernest Kalm, for many years our diamond drill foreman.

12. NEW CONSTRUCTION  
AND PROPOSED  
NEW CONSTRUCTION

The only new construction was extending the 8" water line at the East Pit and the 6" lines at both East and West Pits. This was done to give a larger volume of water for hydraulicking.

14. MAINTENANCE  
AND REPAIRS

1. Shovels

The dipper fronts on #29 and #21 electric shovels were repaired during the year 1933. During the winter season, these shovels will be overhauled so as to be put in first class working condition for the year 1935.

2. Locomotives

The boiler of No. 3 locomotive was overhauled during the operating season. During the winter months, the locomotives will be overhauled to be in good condition for next year.

3. Cars

The Easton cars, used between the pit and crusher, were in operation throughout the year. These cars have had practically no repairs since they were purchased in 1928 and should be overhauled this winter if possible.

4. Crushing Plant

The large Traylor crusher having been overhauled during the winter of 1933, no repairs were necessary during the year. The ordinary operating repairs were made to the crushing plant during the season including a new power belt for the conveyor. During the winter, the plant will be completely overhauled, new concaves will be provided for the large crusher.

5. General

The mine roads from the Cliffs Drive to the Office and shops were graded during the year.

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15. NATIONALITY  
REPORT

|                 | <u>American</u><br><u>Born</u> | <u>Foreign</u><br><u>Born</u> | <u>Total</u> |
|-----------------|--------------------------------|-------------------------------|--------------|
| English         | 12                             | 5                             | 17           |
| Norwegian       | 1                              |                               | 1            |
| Finnish         | 7                              | 4                             | 11           |
| Swedish         | 6                              | 2                             | 8            |
| Irish           | 6                              |                               | 6            |
| French Canadian | 2                              |                               | 2            |
| Total           | <u>34</u>                      | <u>11</u>                     | <u>45</u>    |

NEGAUNEE MINE  
ANNUAL REPORT  
YEAR 1934

1. GENERAL:

The Negaunee Mine operated on a three days per week schedule from January 1st to September 1st when the working time was reduced to two days per week. The mine actually operated six days per week to September 1st and four days per week since with two crews of men, this gave each man the equivalent of three days per week to September 1st and two days since September 1st. The division of the working force into two crews gives a more continuous operation with less idle time which is of great benefit from the operating standpoint, it also decreases by one half the number of working places and equipment required by the miners. The decrease in number of working places decreases the timber repair costs required to keep the operating sub levels open, also the cost of repairing the necessary timber and ventilation connections from the main levels to the sub levels. It also doubles the speed of mining in the areas being worked which reduces the amount of repairs very materially. These advantages are offset somewhat by rotting of timber in raises in the idle areas. The working schedule is determined by the product desired and necessarily the present small product, less than one third of capacity, means increased costs for pumping, taxes and all other fixed costs.

The average number of men employed on the two crews during the first six months was 217. For the second six months period it was 229. The small increase in the second half of the year was due to the repairing of the ventilation system (No. 2 shaft and airways connecting with the operating levels in No. 3 shaft) and general repairs to timbering on the main 11th and 12th levels.

The cumulative bad effects of the two shut-downs and the low operating schedules in effect since 1931 are shown in the timber costs this year. Idle raises are crushing and timber sets on the main levels are crushing and falling down due to dry rot. The idle raises have to be repaired to keep them open for use at some future time and the rotten timber and lagging replaced in the main level drifts.

Shipments from stockpile in 1934 were 51,151 tons as compared with 467,216 tons in 1933 and 10,024 tons in 1932. Due to the low product in 1934 there is ample stocking room available for the winter of 1934-1935, even if the operating schedule is materially increased during the present winter. At the present rate of production there will be approximately 258,500 tons in stock on May 1st, 1935, exclusive of the overrun.

Repair of No. 3, the operating shaft, which had been underway during 1933 was completed early in 1934. In the summer repair work was started in No. 2 (the ventilation shaft). This shaft was repaired from surface to the 3rd level in 1931, below the 3rd level, the old shaft timber had fallen out leaving the shaft open. A section 102 ft. in length extending from the 3rd level to the 6½ level was retimbered, after which work was started on the 6½ and 9th levels where the old drifts were cleaned, raises enlarged, etc. At the end of the year this work was completed to the 10th level except for a new rock raise which was started in December to double the size of the airway from the 10th to 9th levels. After this raise is finished an airway raise in rock from the 11th to 10th levels will be enlarged to twice its present size. As a result of the work which has thus far been done the volume of air reaching the 10th level No. 3 shaft has materially increased with the result that ventilation has improved in all working places both in the Negaunee and Maas Mines. The cost of the repair of ventilation drifts, enlargement of raises, etc., exclusive of the cost of repairing No. 2 shaft has been divided with the Maas Mine who shares equally in the benefits obtained by the increase in the volume of fresh air.



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1. GENERAL: (Cont'd)

A small amount of Bessemer ore was produced during the shipping season. Due to the few contracts producing this grade, it was very difficult to keep the Bessemer ore free from contamination on its journey to railroad cars on surface. An old book balance between the Cleveland-Cliffs Iron Company and the Bethlehem Steel Company was wiped out after which no further effort was made to produce this grade. Mining of footwall areas is underway where the phosphorous runs between .100 and .300 and it is nearly impossible to make a Bessemer grade with only two or three contracts mining low phosphorous ore out of a total of twenty-five. Only 22% of the ore hoisted as Bessemer grade actually graded .045 phosphorous.

During the year there was one fatal and three other lost time accidents. At the end of the year the mine had operated 175 days without a lost time accident. There were also a number of minor accidents that did not cause any loss of time. Safety meetings were held during the year - both general meetings at the Ishpeming office and local meetings at the mine office. Frequent inspections of the mine are made and careful attention given to safety devices and general safety in working places. Absolute prevention of accidents is the goal but the failure of men to observe safety rules is the stumbling block. Incessant work is necessary to keep employees alive to the dangers associated with their work. Due to the one fatal accident, the years record was not as good as in 1933 when there were two lost time accidents in an operating period of five months.

2. PRODUCTION,  
SHIPMENTS &  
INVENTORIES:

a. Production by Grades:

|                       | <u>1934</u> | <u>1933</u> | <u>Increase</u> |
|-----------------------|-------------|-------------|-----------------|
| Negaunee Bessemer Ore | 1,105       | 0           | 1,105           |
| Negaunee Ore          | 234,559     | 61,941      | 172,618         |
| Total Ore             | 235,664     | 61,941      | 173,723         |
| Rock                  | 5,112       | 3,776       | 1,336           |
| Total Hoist           | 240,776     | 65,717      | 175,059         |

b. Shipments:

| <u>Grade of Ore</u> | <u>Pocket</u><br><u>Tons</u> | <u>Stockpile</u><br><u>Tons</u> | <u>Total</u><br><u>Tons</u> | <u>Total</u><br><u>Last Year</u> |
|---------------------|------------------------------|---------------------------------|-----------------------------|----------------------------------|
| Negaunee Bessemer   | 1,105                        | 0                               | 1,105                       | 0                                |
| Negaunee Ore        | 97,545                       | 51,151                          | 148,696                     | 476,114                          |
| Total               | 98,650                       | 51,151                          | 149,801                     | 476,114                          |
| Total Last Year     | 8,898                        | 467,216                         | 476,114                     |                                  |
| Increase            | 89,752                       |                                 |                             |                                  |
| Decrease            |                              | 416,065                         | 326,313                     |                                  |

Shipments decreased 68% in 1934, and were 85,863 tons less than the product for the year.

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2. PRODUCTION,  
SHIPMENTS &  
INVENTORIES:

c. Stockpile Inventories:

| <u>Grade of Ore</u> | <u>Dec. 31, 1934</u> | <u>Dec. 31, 1933</u> | <u>Increase</u> |
|---------------------|----------------------|----------------------|-----------------|
| Negaunee Bessemer   | 0                    | 0                    |                 |
| Negaunee Ore        | <u>198,404</u>       | (a) <u>112,541</u>   | <u>85,863</u>   |
| Total               | <u>198,404</u>       | <u>112,541</u>       | <u>85,863</u>   |

(a) Includes 50,903 tons overrun taken up in 1933.

Including estimated overrun in stockpile there were approximately 215,000 tons in stock at the end of the year.

d. Division of Product by Levels:

|            | <u>1934</u>    |               | <u>1933</u>   |               |
|------------|----------------|---------------|---------------|---------------|
| 10th Level | 2,410          | 1.0%          |               |               |
| 11th Level | 108,058        | 45.9%         | 29,776        | 48.1%         |
| 12th Level | <u>125,196</u> | <u>53.1%</u>  | <u>32,165</u> | <u>51.9%</u>  |
| Total      | <u>235,664</u> | <u>100.0%</u> | <u>61,941</u> | <u>100.0%</u> |

e. Production by Months:

| <u>Month</u>     | <u>Bessemer</u> | <u>Negaunee</u> | <u>Total</u>   | <u>Rock</u>  |
|------------------|-----------------|-----------------|----------------|--------------|
| January          | -               | 18,767          | 18,767         | 648          |
| February         | -               | 19,130          | 19,130         | 348          |
| March            | -               | 19,464          | 19,464         | 636          |
| April            | -               | 19,205          | 19,205         | 220          |
| May              | -               | 21,846          | 21,846         | 404          |
| June             | 968             | 25,230          | 26,198         | 416          |
| July             | 1,597           | 20,807          | 22,404         | 652          |
| August           | 1,507           | 24,607          | 26,114         | 360          |
| September        | 597             | 14,345          | 14,942         | 460          |
| October          | 314             | 16,949          | 17,263         | 216          |
| November         | -               | 15,731          | 15,731         | 120          |
| December         | -               | <u>14,600</u>   | <u>14,600</u>  | <u>632</u>   |
| Total            | <u>4,983</u>    | <u>230,681</u>  | <u>235,664</u> | <u>5,112</u> |
| Transferred from | <u>3,878</u>    | to <u>3,878</u> | -              | -            |
| Total            | <u>1,105</u>    | <u>234,559</u>  | <u>235,664</u> | <u>5,112</u> |
| Total 1933       | -               | <u>61,941</u>   | <u>61,941</u>  | <u>3,776</u> |
| Increase         | <u>1,105</u>    | <u>172,618</u>  | <u>173,723</u> | <u>1,336</u> |

The product by leases was distributed as follows:

|                     | <u>1934</u>    | <u>1933</u>   | <u>Increase</u> |
|---------------------|----------------|---------------|-----------------|
| Negaunee Mine       | 215,268        | 57,945        | 157,323         |
| American Mining Co. | <u>20,396</u>  | <u>3,996</u>  | <u>16,400</u>   |
| Total               | <u>235,664</u> | <u>61,941</u> | <u>173,723</u>  |

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2. PRODUCTION, SHIPMENTS & INVENTORIES: (Cont'd)

f. Ore Statements:

|                         | <u>Neg. Bess.</u> | <u>Negaunee</u> | <u>Total 1934</u> | <u>Total 1933</u> |
|-------------------------|-------------------|-----------------|-------------------|-------------------|
| On Hand Jan. 1, 1934    | -                 | (a) 112,541     | (a) 112,541       | 475,811           |
| Product for Year        | 4,983             | 230,681         | 235,664           | 61,941            |
| Overrun                 | -                 | -               | -                 | -                 |
| Transferred from        | 3,878             | to 3,878        |                   |                   |
| Total                   | 1,105             | 347,100         | 348,205           | 537,752           |
| Shipments               | 1,105             | 148,696         | 149,801           | 476,114           |
| Balance on Hand         | -                 | 198,404         | 198,404           | 61,638            |
| Increase in Output      | 1,105             | 172,618         | 122,820           |                   |
| Increase in Ore on Hand | -                 | 85,863          |                   |                   |

(a) Includes 50,903 tons stockpile overrun taken up in 1933.

1934 - 1 8-hour shift, 6 days per week, Jan. 1st to Sept. 4th  
1 8-hour shift, 4 days per week, Sept. 4th to Dec. 31st

1933 - 1 8-hour shift, 4 days per week, Jan. 1st to April 8th  
Mine idle April 8th to November 9th  
1 8-hour shift, 6 days per week Nov. 9th to Dec. 31st

g. Delays:

The mine was idle October 8th account of a fire in the top landing shanty in the shaft house. No product was lost as the mine operated on an idle day at the end of the week to make up the lost time.

h. Delays from Lack of Current:

There were no delays in 1934.

3. ANALYSIS:

a. Average Mine Analysis on Output:

| <u>Grade</u>      | <u>Iron</u> | <u>1934</u>  |               | <u>Iron</u> | <u>1933</u>  |               |
|-------------------|-------------|--------------|---------------|-------------|--------------|---------------|
|                   |             | <u>Phos.</u> | <u>Silica</u> |             | <u>Phos.</u> | <u>Silica</u> |
| Negaunee Bessemer | 64.36       | .045         | 5.06          | -           | -            | -             |
| Negaunee Ore      | 61.30       | .104         | 6.26          | 60.78       | .110         | 6.27          |
|                   |             | <u>Tons</u>  |               |             |              |               |
| Negaunee Bessemer |             | 1,105        |               |             |              |               |
| Negaunee Ore      |             | 234,559      |               |             |              |               |

b. Average Analysis on Straight Cargoes:

| <u>Grade</u> | <u>Tons</u> | <u>Iron</u> | <u>Mine</u>  | <u>Silica</u> | <u>Lake Erie</u> |                 |
|--------------|-------------|-------------|--------------|---------------|------------------|-----------------|
|              |             |             | <u>Phos.</u> |               | <u>Iron</u>      | <u>Moisture</u> |
| Negaunee Ore | 56,584      | 61.35       | .106         | 6.64          | None             |                 |

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## 4. ESTIMATE OF ORE RESERVES:

## a. Developed Ore:

Assumption: 12 Cubic feet equals one ton.  
10% deducted for rock.  
10% deducted for loss in mining.  
Percentage of Bessemer equals 5.

Above 9th Level:

|  |                |                |
|--|----------------|----------------|
| No. 1 Shaft Pillar                             | 1,148,681 tons |                |
| No. 2 " "                                      | 113,906 "      |                |
| Total above 9th Level                          | 1,262,587 "    | 1,262,587 tons |
| Between 10th and 11th Levels                   |                | 660,565 "      |
| " 11th and 12th "                              |                | 1,715,696 "    |
| Total developed ore above 12th level, 12/31/34 |                | 3,638,848 "    |

The last previous estimate was made in December 1931. In 1932 and 1933 the product was deducted to determine the ore reserves. All new ore developed since 1931 is included in the estimate this year - it amounts to 160,404 tons. The new ore was found near the south footwall between No. 1 and No. 2 dikes, also south of No. 1 dike, also in the area below the 11th level adjoining the Maas boundary.

## b. Statement showing ore reserves and new ore developed for the following years:

|                      | <u>1934</u> | <u>1933</u> | <u>1932</u> | <u>1931</u> | <u>1930</u> |
|----------------------|-------------|-------------|-------------|-------------|-------------|
| Ore in Mine Jan. 1st | 3,693,712   | 3,751,657   | 3,831,393   | 4,160,089   | 4,702,191   |
| Production (a)       | 215,268     | 57,945      | 79,736      | 340,838     | 579,740     |
| Balance              | 3,478,444   | 3,693,712   | 3,751,657   | 3,819,251   | 4,122,451   |
| Ore Reserves 12/31   | 3,638,848   | 3,693,712   | 3,751,657   | 3,831,393   | 4,160,089   |
| New Ore Developed    | 160,404     | -           | -           | 12,142      | 37,638      |

(a) Ore produced from the American Mining Co. strip is not included in the product.

## c. Estimated Analysis:

Ore Reserves: Approximate expected natural analysis:

|       | <u>Iron</u> | <u>Phos.</u> | <u>Silica</u> | <u>Mang.</u> | <u>Alum.</u> | <u>Lime</u> | <u>Mag.</u> | <u>Sul.</u> | <u>Igni.</u> | <u>Moist.</u> |
|-------|-------------|--------------|---------------|--------------|--------------|-------------|-------------|-------------|--------------|---------------|
| Bess. | 53.50       | .044         | 5.60          | .220         | 2.30         | .900        | .290        | .008        | 1.50         | 12.00         |
| Nega. | 53.00       | .094         | 6.50          | .210         | 2.60         | 1.10        | .320        | .010        | 1.94         | 12.00         |

Ore in Stock: Average natural analysis:

|       | <u>Iron</u> | <u>Phos.</u> | <u>Silica</u> | <u>Mang.</u> | <u>Alum.</u> | <u>Lime</u> | <u>Mag.</u> | <u>Sul.</u> | <u>Igni.</u> | <u>Moist.</u> |
|-------|-------------|--------------|---------------|--------------|--------------|-------------|-------------|-------------|--------------|---------------|
| Nega. | 53.20       | .094         | 6.40          | .210         | 2.55         | 1.00        | .290        | .010        | 1.94         | 11.50         |

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5. LABOR AND WAGES:

a. Comments:

(1) Labor:

From January 1st to September 4th, labor was on a three day a week basis with two full crews of men employed. Starting in September the working time of each crew was reduced to two days per week. The mine actually operated six days per week until September and four days per week since. Some extra time on repair work is given a few men every week on the idle days, men with large families are selected for this work. The lack of available jobs has increased the efficiency of employees and reduced the labor turnover to zero. There is a waiting list of idle men for every kind of a job, the applicants are all registered at the company employment office at Ishpeming. Copies of their applications are on file at the mine office so that it is now possible to select a man for any available job. Many of the idle men have been given some work under the F. E. R. A. but as this is only temporary they are anxious to get work at the mines. The short working schedule gives the surface employees earnings sufficient to buy plain food and some fuel but not enough for clothing and other necessities. This is also true for all underground labor with the exception of most of the contract miners. The employees are trying to get along on their small earnings with the constant hope that conditions will soon improve. A long delay in increasing the working time will destroy the morale of the men. Thus far it has been surprisingly good in view of the long duration of the depression but it cannot stand a long continuation of existing conditions.

The hours of surface labor were reduced from nine to eight hours per day on July 16th, 1933. The present year was the first full year with surface labor on the same hour basis as the underground labor. When the mines reopened in November 1933, the difficulties due to the change in hours were soon adjusted. This year the loss of one hour labor per man per day on surface has had no effect on costs. Increased efficiency has overcome the hour lost.

(2) New Construction:

There was no E. & A. authorized or active in 1934.

b. Comparative Statement of Wages and Product:

|                      | <u>1934</u> | <u>1933 (a)</u> | <u>Increase</u> |
|----------------------|-------------|-----------------|-----------------|
| PRODUCT              | 235,664     | 61,941          | 173,723         |
| No. Shifts and Hours | 1 8-hour    | 1 8-hour        |                 |

AVERAGE NO. MEN WORKING:

|             |     |     |    |
|-------------|-----|-----|----|
| Surface     | 42  | 34  | 8  |
| Underground | 179 | 100 | 79 |
| Total       | 221 | 134 | 87 |

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5. LABOR AND WAGES: (Cont'd)b. Comparative Statement of Wages and Product: (Cont'd)

|  | <u>1934</u>           | <u>1933 (a)</u>          | <u>Increase</u>      | <u>Decrease</u> |
|--|-----------------------|--------------------------|----------------------|-----------------|
| <b>AVERAGE WAGES PER DAY:</b>  |                       |                          |                      |                 |
| Surface  | 4.23                  | 3.91                     | .32                  |                 |
| Underground  | 4.94                  | 4.02                     | .92                  |                 |
| Total  | 4.78                  | 3.93                     | .85                  |                 |
| <b>AVERAGE WAGES PER MONTH:</b> 12.25 days      9.84 days            |                       |                          |                      |                 |
| Surface  | 67.58                 | 45.29                    | 22.29                |                 |
| Underground  | 61.36                 | 39.86                    | 21.50                |                 |
| Total  | 62.36                 | 41.13                    | 21.23                |                 |
| <b>PRODUCT PER MAN PER DAY:</b>                                      |                       |                          |                      |                 |
| Surface  | 29.26                 | 13.77                    | 15.49                |                 |
| Underground  | 8.83                  | 5.46                     | 3.39                 |                 |
| Total  | 6.79                  | 3.91                     | 2.88                 |                 |
| <b>LABOR COST PER TON:</b>   |                       |                          |                      |                 |
| Surface  | .145                  | .269                     |                      | .124            |
| Underground  | .559                  | .737                     |                      | .178            |
| Total  | .704                  | 1.006                    |                      | .302            |
| <b>AVERAGE PRODUCT MINING:</b>                                       |                       |                          |                      |                 |
| Stopping   | 21.60 Tons            | 19.80 Tons               | 1.80 Tons            |                 |
| Ore Development  | 9.52 "                | -                        | 9.52 "               |                 |
| Total  | 21.45 "               | 19.80 "                  | 1.65 "               |                 |
| <b>AVERAGE WAGES CONT. LABOR</b> 5.60      4.32      1.28            |                       |                          |                      |                 |
| <b>TOTAL NUMBER OF DAYS:</b>   |                       |                          |                      |                 |
| Surface  | 8,055                 | 4,497 $\frac{1}{2}$      | 3,557 $\frac{3}{4}$  |                 |
| Underground  | 26,671 $\frac{1}{2}$  | 11,345 $\frac{1}{2}$     | 15,325 $\frac{1}{2}$ |                 |
| Total  | 34,726 $\frac{1}{2}$  | 15,843                   | 18,883 $\frac{1}{2}$ |                 |
| <b>AMOUNT FOR LABOR:</b>   |                       |                          |                      |                 |
| Surface  | 34064.50              | 16644.18                 | 17420.32             |                 |
| Underground  | 131770.73             | 45622.39                 | 86148.34             |                 |
| Total  | 165835.23             | 62266.57                 | 103568.66            |                 |
| <b>AVERAGE WAGES PER MONTH BASED ON MEN CARRIED ON MINE PAYROLL:</b> |                       |                          |                      |                 |
|  | <u>Avg. 13 da.mo.</u> | <u>9 &amp; 13 da.mo.</u> |                      |                 |
| Surface  | 63.50                 | 43.06                    | 20.44                |                 |
| Underground  | 60.22                 | 38.41                    | 21.81                |                 |
| Total  | 60.80                 | 40.73                    | 20.07                |                 |

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5. LABOR AND WAGES: (Cont'd)

b. Comparative Statement of Wages and Product: (Cont'd)

Note: (a) Includes 5 months operating and 7 months idle period.

15% increase in wages effective July 16th, 1933.

10% increase in wages effective April 1st, 1934.

Proportion of Surface to Underground Men:

1934: 1 to 4.26 -- 1 8-hour shift, 3 days per week  
January 1st to December 31st.  
1 8-hour shift, 2 days per week  
September 4th to December 31st.

1933: 1 to 3.53 -- 1 8-hour shift, 2 days per week  
January 1st to April 8th  
Mine idle April 8th to November 9th.  
1 8-hour shift, Nov. 9th to Dec. 31st.

6. SURFACE:

A. Buildings, Repairs :

Only minor repairs were made to buildings in 1934. The steam heating plant installed in the shop building late in 1933 went into operation early in February 1934. Unit heaters, one in each shop, were installed in January. The amount of coal burned in the main heating plant decreased immediately and the expense of installation of the plant at the shops will soon be returned.

The interior of the mine office building was cleaned in 1934. All the walls were washed and the walls of the captain's change and wash room painted, also the walls of the warehouse room.

Some expense was incurred at the dry house for a new hot water tank and heater for the tank. This new tank is being held in reserve as the present tanks are quite old and have already developed leaks which thus far have been repaired.

A few repairs were made to the coal dock trestle, several rotted legs being replaced. A certain amount of replacement is necessary every year to keep the trestle in condition to handle railroad cars.

b. Stockpiles:

Shipments from stockpiles were small in 1934, but the large shipments of 1933 left ample room for stocking from the steel trestles this winter.

b-1. Rock Trestle:

Since opening No. 3 shaft and erecting the steel trestles, rock has been stocked from a wood trestle erected at the west end of the steel trestle. After filling ahead of the steel trestle for 800 ft. a new rock trestle was erected further north. This made a curve in the tracks at the end of the steel trestle. This new trestle was filled early in 1934. In view of the

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6. SURFACE: (Cont'd)

b-1. Rock Trestle: (Cont'd)

large amount of rock that will come from the development of the 13th level, it was decided to erect a new rock trestle branching to the northeast at the end of the permanent trestle east of the shaft. This new trestle would shorten the rock tram to 600 ft. as compared with 2000 ft. on the old tram. It would reduce the length of top tram rope on the haulage system nearly 1000 ft., thereby reducing maintenance expense, also it would eliminate delays on the top landing. The new trestle was erected in the summer and went into commission in August. There were fifteen bents erected of which six are available for stocking and when they are filled, the trestle will be extended to the northeast. It will soon reach caved ground where there is unlimited room for stocking.

c. Tracks, Roads:

There was no expense in 1934 for tracks or roads.

d. Water Supply:

The cost of water purchased from the City of Negaunee and used at the mine for the last six years was as follows:

|             | <u>1934</u> | <u>1933</u> | <u>1932</u> | <u>1931</u> | <u>1930</u> | <u>1929</u> |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 1st Quarter | 47.39       | 54.25       | 58.11       | 104.72      | 180.01      | 257.57      |
| 2nd "       | 76.80       | 36.00       | 68.68       | 57.41       | 175.71      | 279.79      |
| 3rd "       | 75.85       | 52.14       | 51.25       | 76.41       | 219.47      | 305.55      |
| 4th "       | 35.98       | 36.29       | 40.43       | 46.55       | 147.36      | 173.39      |
| Total       | 236.02      | 178.68      | 218.47      | 284.99      | 722.55      | 1016.30     |
| Product     |             |             |             |             |             |             |
| Tons        | 235,664     | 61,761      | 84,046      | 338,696     | 579,740     | 555,919     |
| Cost Per    |             |             |             |             |             |             |
| Ton         | .001001     | .002893     | .0026       | .0084       | .00124      | .00182      |

e. Grounds:

The expense for upkeep of the grounds around the mine buildings was slightly higher than in 1933 on account of cleaning the shrubbery beds which had been neglected for several years.

7. UNDERGROUND:

a. Shaft Sinking:

There was no shaft sinking in 1934.

b. Development:

There was relatively little development work in 1934.



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7. UNDERGROUND: (Cont'd)

b. Development: (Cont'd)

Development in Rock

Early in 1934, a rock raise was extended 62 ft. from the 460 ft. sub level on the north footwall near the Maas boundary, to the 10th level to provide a traveling and ventilation road.

A rock drift was driven 90 ft. in the footwall at the elevation of the 11th level to the main footwall haulage drift. This drift provided a traveling, ventilation and timber road to the footwall pillar where mining has been underway all the year.

In September a drift was driven 20 ft. in the dike on the 360 ft. sub level and a raise put up in jasper to connect with another raise on the 385 ft. sub level that extended in the footwall to the 11th level haulage drift. The new raise provided a fresh air inlet to the 360 ft. sub level, also a traveling road from the 11th level.

On the 11th level, No. 1106 raise was extended through a 20 ft. seam of jasper and ore again encountered. No. 1108 raise nearby was extended 25 ft. in jasper but did not find ore.

In December No. 4 crosscut on the 12th level was extended 32 ft. in rock with 30 ft. to drive at the end of the month to connect with the main haulage drift that parallels the Maas boundary. This connection is being driven to improve ventilation in No. 4 crosscut, later on it will be used for haulage.

On the 360 ft. sub level the drift connecting the No. 1240 series of raises was extended 20 ft. through the jasper hanging which drops down to the sub level near No. 1245 raise.

In January No. 1209 raise on the 12th level was extended a short distance in rock when ore was encountered at the elevation of the 395 ft. sub level.

In December a rock drift was being driven in the footwall on the 395 ft. sub level to connect No. 1209 and No. 1280 raises.

Early in the year No. 1284 branch raise was started on the 360 ft. sub level and extended to the 11th level elevation. It replaced old No. 1284 raise which had caved above the 360 ft. sub level. The first 16 ft. was in footwall rock, the balance in ore.

A drift in rock was being driven in the footwall on the 475 ft. sub level at the end of the year to provide a traveling, timber and ventilation connection with the 10th level. It had advanced 24 ft. in rock on December 31st with 16 ft. to drive, then 24 ft. to raise to hole to the 10th level.

A drift was driven 40 ft. in jasper to connect No. 1106 and No. 1108 and No. 1110 raises on the 475 ft. and 488 ft. sub levels.

In drifting from No. 1109 raise to the ore it was necessary to drive 25 ft. in jasper.

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7. UNDERGROUND: (Cont'd)

b. Development: (Cont'd)

Development in Ore

There was some ore development in 1934, none in 1933. Only necessary development work in connection with mining operations was undertaken.

Two raises, No. 1108 and No. 1106, were put up on the 11th level to the hanging.

No. 1115-A raise was extended from the 11th level to the 488 ft. sub level.

No. 1209 raise on the footwall side of the 12th level which was nearly completed in 1933, was extended 12 ft. in ore in 1934.

No. 1231 raise was put up from the 12th level to the jasper hanging at the elevation of the 360 ft. sub level, a distance of 40 ft. in ore.

No. 1284 raise on the 12th level, caved during the shut-down in 1933 and could not be reopened above the 360 ft. sub level. A branch was extended from the 360 ft. sub level through rock, ore and old timber to the 11th level elevation. It was extended 36 ft. in ore.

A drift was driven 35 ft. in ore at the 11th level elevation from a transfer raise to the footwall and 90 ft. in rock to make a connection to the 11th level haulage drift for a ventilation, traveling and timber road.

c. Stoping:

In 1932 and 1933 mining was restricted to the ore body on the north and south footwalls just below the 10th level and the north central portion of the ore body just below the 11th level. On reopening in November 1933 preparations were made to start mining in the central and south areas in the main ore body just below the 11th level, also in the area between No. 1 and No. 2 dikes near the south footwall a short distance below the 10th level. These areas had been idle since 1930 and 1931 when drastic curtailment of product was effected. They were developed for mining and the raises could no longer be left idle or they would be lost due to dry rot and crushing. In 1934, the areas mined covered the 3rd and 4th subs below the 10th level on the north footwall, the 2nd and 3rd subs below the 10th level on the south footwall, the 10th level and 2nd sub below the 10th level in the ore body between No. 1 and No. 2 dikes, and the main ore body from the 11th level on the north footwall to the 4th sub below the 11th level on the hanging wall side.

Spreading of mining operations over a larger territory has reduced crushing, improved ventilation and reduced hazards incidental to mining. As now planned, each mining gang mines the area controlled by two contiguous raises usually consisting of an area at least 70 ft. in width. The ore at one raise is mined then the scraper equipment is moved to the next raise and mining continued. In the meantime, the ore has been mined at the 3rd raise in the series and mining is underway at the 4th raise. The pillar supporting the connecting raises is left intact longer, thereby reducing repair cost, there is less pressure on the slices due to the solid pillar on one side and danger from blasting and loosening the ground

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7. UNDERGROUND: (Cont'd)

c. Stoping: (Cont'd)

is decreased due to the greater distance between the mining gangs. Safety is therefore increased by reducing the hazard from falls of ground. This system can be applied at the Negaunee Mine with its large ore body and the small number of mining gangs under the present plan of operation with two crews of men. In fact, the ore body is large enough to permit of materially increasing the product under the present plan of operation with two crews and still retain the mining plan outlined above.

During the year, there was an average of 24 gangs mining, although at times some of them would be on repair work for a week or more, usually when changing from one territory to another. Averaged over the year, they were divided as follows: Stopping - 16; drifting - 5; cutting out at raises - 2; raising - 1.

There was an average of 35 men on repair work on the idle days at weekends. They repaired raises and main level drifts, work which could not be done when the mine was operating. Most of this expense is chargeable to the two idle periods, as it covered replacements due to rotting of timber which proceeded at an accelerated rate in 1932 and 1933. Earnings of the men working extra time while the mine was on a three day a week basis was mostly credited to back rent and hospital bills.

Following is a detail of mining operations:

10th Level - South Footwall

There had been no mining at this elevation since 1930, at which time it was assumed all the ore was mined. In June 1934 several test raises put up on the 488 ft. sub under the hanging in the area between No. 1 and No. 2 dikes found ore extending to the 530 ft. elevation or 15 ft. above the 10th level. A new raise, No. 1106, was put up from the 11th level and a small area under the hanging was mined, the work of covering down and blasting down hanging to make a fill being completed early in December.

Subs Above the 11th Level

500' Sub Level - South Footwall

In December, a contract cut out in No. 1106 raise and at the end of the year was about ready to start mining the small ore body described in the preceding paragraph.

488' Sub Level - South Footwall

This sub level comprises the ore area on the south footwall and also the ore body between No. 1 and No. 2 dikes. The area directly on the south footwall was opened in February 1931 and mining completed here in October 1934. The area between the two dikes was opened in 1930 and the east half mined in 1931. The west half of this area was opened in 1932 and a small area mined with great difficulty. This area is very wet and under heavy pressure. The two shut-downs delayed mining as both times the drifts and raises crushed. On reopening in November 1933 it was decided to make an effort to mine the remaining ore even though it might prove difficult on account of water. Four contracts worked here most of the year and in

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7. UNDERGROUND: (Cont'd)

c. Stoping: (Cont'd)

488' Sub Level - South Footwall - (Cont'd)

December two were mining the last few small pillars. The ore body proved much larger than was anticipated, particularly at the north west end under the hanging adjacent to No. 2 dike. It was here that test raises found the ore extending 40 ft. up in the hanging in a small area. The area to the south near No. 1 dike was very wet and proved difficult to mine. Many times, runs of mixed ore and jasper came in with a rush of water and filled the slice. This had to be cleaned up and forepoles driven ahead very carefully to permit of an advance. Special care was taken to cover down closely to guard against runs on the next lower sub level. Mining costs are high under the conditions encountered on this sub level but it is expected that they will be lower on the next sub level. The wet area must be mined first, this will concentrate the water and prevent it spreading over the entire sub level.

475' Sub Level - South Footwall

The east half of the ore body between No. 1 and No. 2 dikes was opened for mining at the elevation of this sub level in January 1931 and was not completely mined until in March 1934. Mining of this area was then temporarily abandoned until mining had reached this same elevation in the west half of this ore body.

Mining was started in August 1934 at this elevation in the area south of No. 1 dike and at the end of the year several of the raises had been connected preparatory to slicing early in 1935. In December two contracts were drifting here, one of which was driving a traveling and ventilation road in the footwall to connect with the 10th level above. This drift will be 75 ft. in length of which 34 ft. in ore and 25 ft. in rock had been completed at the end of the year, leaving 16 ft. to drive in rock and 24 ft. to raise in rock to reach the 10th level.

One contract started to connect raises in the west half of the area between No. 1 and No. 2 dikes in December. They are working directly under the hanging beyond the three contracts that are mining the last pillars on the sub above. It is planned to mine the hanging side first in the expectation that when this area is caved it will get most of the water.

475' Sub Level - North Footwall

Mining at this elevation in the north footwall pillar was started early in 1933 and in December 1934 one contract was mining one of the two last small pillars. The ore area was 98% mined at the end of the year.

460' Sub Level - North Footwall

The first work on this sub level was done in July 1934 when a traveling and ventilation drift was driven in the footwall and a raise extended to the 10th level, 40 ft. above. Three of the five raises on the sub level were then connected by drifts and mining started in October. In December two contracts were mining, one in the American Mining Company strip adjoining the Maas Mine and one towards the old working. About 10% of the ore was mined at the end of the year.

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7. UNDERGROUND: (Cont'd)

c. Stoping: (Cont'd)

11th Level

Mining at the elevation of the 11th level was confined to the north footwall pillar of the main mining area. Late in 1933 a transfer drift was driven in the footwall on the elevation of the 360 ft. sub level, about 40 ft. below the 11th level. Three small transfer raises were put up to the 11th level in 1934 also a branch raise from No. 1284 raise. The raises were then connected on the 11th level and mining started. During the greater part of the year four contracts worked here but in December only two remained to mine the few small pillars left in this area. This will complete mining on the 11th level until the north and south footwall pillars are mined down to this elevation. The central ore body footwall pillar has been difficult to mine due to heavy pressure. In 1928 and 1929 the 11th level haulage drifts crushed and mining was delayed until raises were put up from the 12th level. Owing to the heavy pressure the raises crushed also a transfer sub level and transfer raises. With great difficulty and many delays the pillar was finally mined down to the floor of the first sub above the 11th level. In 1934 mining has progressed at the 11th level elevation due largely to no mining on other sub levels adjacent to this pillar. The pillar grows smaller on each succeeding sub level and will be mined out on two sub levels below the 11th level.

During the year three raises were put up in ore from the 11th level drift between No. 1 and No. 2 dikes to the 475 ft. and 488 ft. sub levels and the 10th level respectively.

395' Sub Level

In the early part of the year a number of small pillars left on this sub level when the mine closed in 1932 and 1933 were mined by slides or incline raises put up from the next lower sub level. These slides were extended from raises so that the ore mined could be scraped directly into the main raises and thereby avoid a transfer. These pillars were left when the sub levels crushed during the idle periods.

A connection was made on the 395 ft. sub to the 11th level and to the 385 ft. sub level from a new raise, No. 1209, which was completed to this elevation early in 1934. The connections provided ventilation and a traveling roads.

In November, drifting preliminary to mining was started from No. 1209 raise and in December a connection had nearly been completed to No. 1280 raise. Most of this drift has been in rock, it is being driven for ventilation and a traveling road. Mining of the footwall pillar in the central mining area on this sub level will be started from No. 1280 raise.

385' Sub Level

This sub level was opened in 1930 from the 1240 and 1250 series of raises and in 1933 from the 1290 and 1290-A series. Mining was completed in the 1240 and 1250 series in 1931 and in 1934 from the 1290 and 1290-A series of raises which are located near the Maas Mine boundary. Also in 1934, the 1260 and 1270 series of raises were connected by drifts to provide for a circulation of air through the raises to decrease the rotting of timber.

The opening of these raises

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7. UNDERGROUND: (Cont'd)

c. Stopings: (Cont'd)

385' Sub Level - (Cont'd)

also provided a number of working places that are available in case an increased product is wanted on short notice. Mining was started in August at the west end of the 1260 series of raises and a short time later at the east end of this series. These gangs are 260 ft. apart, one working near the footwall and the other near the hanging.

In October, one contract started mining at the west end of the 1270 series, mining the pillar to the south to the area mined by the contract working at the west end of the 1260 series. To avoid throwing pressure on the footwall pillar being mined on the 11th level it is not planned to do any mining at this time north of the 1270 series of raises.

370' Sub Level

Mining was started on this sub level from the 1240 series of raises near the hanging in 1931 and completed in 1932. There was no further work done on this sub level until in May 1934, when the 1290-A series of raises were opened. Mining has been started here at the 1st and 3rd raises in the series, the next contract added will start at the 5th raise. This gives two raises to each contract which reduces timber repair cost and mining hazards. In December, two contracts were mining here, both working in the Adams strip near the Maas boundary.

360' Sub Level

Prior to 1934 the only work done at the elevation of this sub level consisted of a ventilation drift from No. 1298-A raise and a raise to the 11th level, also a drift driven in the footwall from No. 1284 raise for a transfer sub level system to mine the north central footwall pillar on the 11th level.

Early in 1934, the 1240 and 1230 system of raises were opened and connected by drifts. Mining then started and has been continued throughout the year. In December three gangs were mining here. During the year 60% of the ore was mined. This area is near the hanging and the ore should be Bessemer grade but only one small area near the west side consistently ran low in phosphorous.

12th Level

During the year two raises were put up from the 12th level, No. 1209 in rock to the 385 ft. sub and No. 1231 in ore to the 360 ft. sub.

A powder house was excavated in rock on the south side of the footwall drift to the winze. The old powder house was in the winze drift and blocked it completely. It was decided to reopen the winze drift to increase the area of airway between the 11th and 12th levels which made it necessary to provide another powder house.

A heavy program of repair work has been underway most of the year on the 12th level. Nearly every timber set has been replaced in No. 3 and No. 4 crosscuts and many sets in the other drifts and crosscuts. The timber rotted very rapidly the last three years due to the shut-downs in 1932 and 1933.

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7. UNDERGROUND: (Cont'd)

c. Stoping: (Cont'd)

12th Level - (Cont'd)

In December drifting in rock to connect No. 4 and No. 5 crosscut was resumed after several years delay. These crosscuts lacked about 60 ft. of being connected and the work is being done at this time to improve ventilation and prevent rotting of timber in No. 4 crosscut. At the end of the year the drift had advanced 32 ft., it will be completed in January.

13th Level

No work was done on the 13th level in 1934. Electric equipment removed when the mine closed in 1933 was recently replaced in anticipation of the resumption of drifting here early in 1935. It is not considered advisable to longer delay the development of this level.

d. Timbering:

The cost per ton for timber decreased in 1934 to almost exactly the cost in 1931. It was 8.7% higher than in 1930. There was no charge for timber that had rotted in the yards and no idle period in 1934, both of which were factors in the high cost for timber in 1933. The increased cost in 1934 as compared with 1930 was due to use of more timber and lagging and more poles for covering down floors of sub levels. Nine foot timber is in general use on sub levels while in 1930 eight foot timber was used. The nine foot legs and caps run larger in size than the eight foot timber formerly used. Comparison of timber cost in 1934 and 1933 is of little value as 1933 was an abnormal year with only five months operating period and seven months idle period. The timber used in repair work during the idle period is included in the total and to this is added timber charged out account of being in yard so long that it had rotted. Replacement of rotted timber in the mine chargeable to the idle periods of 1932 and 1933 accounts for the use of more timber and lagging than in either 1930 or 1931. Costs will continue higher than normal for several years on account of replacing rotted timber in main drifts and raises.

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7. UNDERGROUND: (Cont'd)d. Timbering: (Cont'd)Statement of Timber Used:

|                        | <u>Linear<br/>Feet</u> | <u>Avg. Price<br/>per Foot</u> | <u>Amount<br/>1934</u> | <u>Amount<br/>1933</u> |
|------------------------|------------------------|--------------------------------|------------------------|------------------------|
| 6" to 8" Cribbing      | 45,124                 | .0401                          | 1,809.42               | 450.03                 |
| 8" Stulls              | 36,199                 | .0539                          | 1,949.75               | 765.44                 |
| 10" "                  | 50,006                 | .0816                          | 4,078.59               | 2,061.72               |
| 12" "                  | 31,482                 | .110                           | 3,475.26               | 2,213.53               |
| 14" "                  | 2,224                  | .147                           | 328.31                 | 640.37                 |
| 16" "                  |                        |                                |                        | 61.35                  |
| Total - 1934           | 165,035                | .0706                          | 11,641.33              |                        |
| Total - 1933           |                        |                                |                        | 6,192.44               |
| Lagging - 7 ft.        | 763,539                | .702                           | 5,359.42               | 1,381.33               |
| Poles - 9½ ft.         | 520,780                | 1.159                          | 6,035.34               | 1,523.05               |
| Total - 1934           |                        |                                | 11,394.76              |                        |
| Total - 1933           |                        |                                |                        | 2,904.38               |
| Wire Fencing W 60 rods | 477                    | .852                           | 405.82                 | 51.00                  |
| Grand Total - 1934     |                        |                                | 11,800.58              |                        |
| Grand Total - 1933     |                        |                                |                        | 2,955.38               |

|                                 |         |        |
|---------------------------------|---------|--------|
| Product                         | 235,664 | 61,941 |
| Feet of Timber per ton of ore   | .7002   | 1.062  |
| " " Lagging per ton of ore      | 3.24    | 3.19   |
| " " " " ft. of timber           | 4.63    | 3.00   |
| " " Wire fencing per ton of ore | .0334   |        |
| Cost per ton for timber         | .0494   | .0999  |
| " " " " lagging                 | .0227   | .0223  |
| " " " " poles                   | .0256   | .0246  |
| " " " " wire fencing            | .0018   | .0008  |
| " " " " total                   | .0995   | .1477  |

|   |         |         |
|---|---------|---------|
| Equivalent of stull timber to board measure | 387,839 | 198,747 |
| Feet of board measure per ton of ore        | 1.65    | 3.21    |

## Total Cost for Timber, Lagging, Poles, etc.

| <u>Year</u> | <u>Product</u> | <u>Amount</u> | <u>Cost per Ton</u> |
|-------------|----------------|---------------|---------------------|
| 1934        | 235,664        | 23,441.91     | .0985               |
| 1933        | 61,941         | 9,147.82      | .1477               |
| 1932        | 84,046         | 8,988.22      | .1069               |
| 1931        | 338,696        | 33,408.70     | .0986               |
| 1930        | 579,740        | 52,500.62     | .0906               |



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7. UNDERGROUND: (Cont'd)

e. Drifting and Raising:

There was comparatively little development in ore and rock in 1934. It was curtailed on account of the mine operating at less than 40% of capacity in order to reduce expenditures. It was, however, 125% greater than in 1933 when the mine only operated five months. Following is a statement for the years 1934 and 1933:

| <u>Year</u> | <u>Drifting</u> | <u>Raising</u> |             | <u>Total</u> |
|-------------|-----------------|----------------|-------------|--------------|
|             | <u>Rock</u>     | <u>Ore</u>     | <u>Rock</u> |              |
| 1934        | 248'            | 419'           | 244'        | 911'         |
| 1933        | 290'            | 90'            | 157'        | 401'         |
| Increase    |                 | 329'           | 87'         | 510'         |
| Decrease    | 42'             |                |             |              |

f. Explosives, Drilling and Blasting:

The cost per pound for powder decreased 4.7% in 1934 and is now lower than at any time in the past twenty years. The following statement is included to show changes during a five year period:

| <u>Year</u> | <u>Cost per Lb. For Powder</u> | <u>Lbs. Powder per Ton of Ore</u> | <u>Cost per Ton Powder</u> | <u>Cost per Ton Fuse &amp; Caps</u> | <u>Total Cost</u> |
|-------------|--------------------------------|-----------------------------------|----------------------------|-------------------------------------|-------------------|
| 1934        | .1140                          | .4350                             | .0507                      | .0106                               | .0613             |
| 1933        | .1196                          | .5110                             | .0610                      | .0130                               | .0740             |
| 1932        | .1235                          | .4191                             | .0518                      | .0099                               | .0617             |
| 1931        | .1268                          | .4025                             | .0510                      | .0091                               | .0602             |
| 1930        | .1273                          | .3904                             | .0497                      | .0077                               | .0574             |

This table shows that more pounds of powder per ton of ore were used in 1934 than in any year since 1930 with the exception of 1933, but that the decrease in cost per pound for powder resulted in a cost per ton lower than in any year since 1931. It is interesting to note that the cost for fuse and caps is higher than in any year except 1933. A comparison with 1933 is of no value on account of the small product due to reopening and the short operating period. The cost for fuse and caps has been higher since 1930 when the company started giving the miners capped fuses cut to the uniform length of 6 ft. The cost for fuse and caps in 1934 as compared with 1931, the last previous year with no shut-downs is .0005 higher. This shows that more holes were blasted in producing an equal tonnage.

The cost per ton for explosives in a fully developed mine increases as the product decreases. The product in 1934 was 30% less than in 1931 therefore it is reasonable to expect a higher cost per ton. There was also more mining in 1934 in areas where the ore was tough and hard to break.

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7. UNDERGROUND: (Cont'd)f. Explosives, Drilling and Blasting: (Cont'd)Statement of Explosives Used: (Ore Development and Stopping)

|   | <u>Quantity</u> | <u>Average Price</u> | <u>Amount</u><br><u>1934</u> | <u>Amount</u><br><u>1933</u> |
|---|-----------------|----------------------|------------------------------|------------------------------|
| 50% Gelatin                               | 102,550         | .114                 | 11,676.75                    | 2,156.07                     |
| 60% "                                     | 2,200           | .121                 | 266.87                       | 96.13                        |
| Gelamite "A"                              |                 |                      |                              | 1,055.50                     |
| " 2X                                      |                 |                      |                              | 481.25                       |
| Total Powder - 1934                       | 104,750         | .114                 | 11,943.62                    |                              |
| Total Powder - 1933                       | 31,675          | .1196                |                              | 3,788.95                     |
| Fuse - feet                               | 323,021         | 5.75                 | 1,857.47                     | 575.10                       |
| Caps, No. 6                               | 54,627          | 10.30                | 562.21                       | 185.34                       |
| Tamping Bags                              | 21,600          | 2.23                 | 48.26                        | 20.92                        |
| Fuse Lighters                             | 5,400           | 6.75                 | 36.46                        | 11.50                        |
| Delay Fuses                               |                 |                      |                              | 12.00                        |
| Total Fuse, etc., - 1934                  |                 |                      | 2,504.40                     |                              |
| Total Fuse, etc., - 1933                  |                 |                      |                              | 804.86                       |
| Total all Explosives - 1934               |                 |                      | 14,448.02                    |                              |
| Total all Explosives - 1933               |                 |                      |                              | 4,593.81                     |
| Product                                   |                 |                      | 235,664                      | 61,941                       |
| Pounds of powder per ton of ore           |                 |                      | .435                         | .511                         |
| Cost per ton for powder                   |                 |                      | .0507                        | .061                         |
| Cost per ton for fuse, caps, etc.         |                 |                      | .0106                        | .013                         |
| Cost per ton for all explosives           |                 |                      | .0613                        | .074                         |
| <u>Sinking, Rock Development, Etc.</u>    |                 |                      |                              |                              |
| 50% Gelatin                               | 4,050           | .114                 | 458.64                       |                              |
| 60% "                                     | 150             | .121                 | 18.38                        |                              |
| Total Powder - 1934                       | 4,200           | .114                 | 477.02                       |                              |
| Fuse - feet                               | 13,784          | 5.75                 | 78.72                        |                              |
| Caps, No. 6                               | 2,083           | 10.30                | 23.17                        |                              |
| Total Fuse, etc. - 1934                   |                 |                      | 101.89                       |                              |
| Total explosives for Rock Drifting - 1934 |                 |                      | 578.91                       |                              |
| Total Explosives used in mine             |                 |                      | 15,026.93                    | 4,593.81                     |
| Avg. Price per lb. for Powder             |                 |                      | .114                         | .1196                        |

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7. UNDERGROUND: (Cont'd)

g. Mining and Loading:

Comment has been made elsewhere in this report concerning wider distribution of contracts mining ore which it is believed has advantages over the plan of working a large number of gangs in a small area. Careful study will be given this plan which has been put in operation during 1934 to determine its effect on safety and cost per ton.

All ore is handled with electric scraper hoists, even in wet areas. Both 10 and 15 H. P. units are in use. Except for long hauls due to irregularities in the hanging wall contact, the 10 H. P. units handle the 42" scrapers just as well as the 15 H. P. units. There is only one spare hoist at the mine and whenever a larger product is wanted additional units will have to be purchased.

h. Ventilation:

Ventilation in the Negaunee and Maas Mines is maintained by 24-hour operation of the 100,000 cubic feet per minute capacity fan at No. 2 shaft. The fresh air is forced into the mine through No. 2 shaft to the 6½ level where it travels 200 ft., then down through two raises to the 9th level then on the 9th level over 600 ft. to a winze connecting with the 10th level - No. 3 shaft. Measurements taken early in the year of the volume reaching the 10th level showed a loss in excess of 33-1/3%. In the summer steps were taken to correct this condition with the result that in December when the program was still incomplete the loss had been reduced to less than 25%, the gain in cubic feet per minute was 15,000. The loss was due to two causes, viz., leakage of air to surface through caved areas and restricted openings for passage of air in the mine. The first had to be corrected by sealing off drifts connecting with mined and caved areas, the second by enlarging raises and winzes and by cleaning up rock and rotted timber in drifts on the 6½ and 9th levels. Before any work on the level could be started it was necessary to complete the work of retimbering No. 2 shaft which was started in 1931 and then abandoned on account of the depression. When this work stopped the shaft had been retimbered from ledge to a point near the 4th level, leaving a section 102 ft. in length to the 6½ level without timber. The work in the shaft was rushed to completion so that work could be started on the 6½ level. The cage had to be in operation to take supplies down to the 6½ level and also to handle men. Timber was installed on the 6½ level only where absolutely necessary to prevent caving, all caved rock and timber cleaned up and stored in open drifts outside the airway. The airway drift was enlarged where necessary to a minimum area of 120 square feet. It was necessary to install an air line from the 9th to 6½ levels also electric current line for lighting and operating scraper hoists. When work was completed on the 6½ level the two connections to the 9th level were stripped and enlarged to give an area of 120 square feet of airway between the two levels. The rock from this work was handled on the 9th level and stored in the old drift to No. 2 shaft. While the work of enlarging the connection from the 6½ level to the 9th was underway a crew of men started cleaning the 600 ft. of drift on the 9th level. The old timber in drift had rotted and partly fallen down, ground had slabbed from the back so that the area of the drift was restricted over 50% at some points. The old timber and rock was stored in open footwall drifts branching from the airway drift. Work was continued with two crews of men, each crew working three days per week until about the middle of December, by

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7. UNDERGROUND: (Cont'd)

h. Ventilation: (Cont'd)

which time it was nearly completed. In order to provide adequate openings between the 9th and 10th levels it was decided to put up another raise in rock which was started in December and will be completed early in 1935.

The work remaining to be done at the end of 1934 is as follows:

Gunite the 6½ and 9th level rock drifts to seal them from the air to prevent slabbing.

Complete the new rock raise from 10th to 9th level.

Seal off three old drifts on 9th level and one on 6½ level with concrete to prevent loss of air to the old workings.

Strip a rock raise from 11th to 10th level to give increased free passage of fresh air between these levels.

One half of the cost of all the work on the 6½ and 9th levels has been taken up by the Maas Mine. The Maas Mine is paying all the cost of the new rock raise from the 10th to 9th level and will also pay the cost of stripping the raise from the 11th to the 10th level. They share equally in the benefit gained by increasing the volume of fresh air and when the two raise jobs are completed will get fresh air which has not passed through the Negaunee Mine operating sub levels. They therefore, have assumed the entire cost of the incompletd raise work on 11th and 10th levels.

There has always been good air in the Negaunee Mine but recently not enough for the large area being mined at the Maas. However, the Negaunee Mine benefits materially from the increase as the air is noticeably fresher all through the mine since the improvements to airways has been nearly completed. The cost of repairs to No. 2 shaft in 1934 amounted to \$2,420.99 and the Negaunee Mine share of other work on the airways was \$1,954.08. The total cost incurred by the Negaunee Mine was \$4,374.87. To complete the program now planned will cost about \$4,000.00 of which \$2,000.00 will be the Negaunee Mine share. This expense does not include the cost of the two rock raises which will be assumed by the Maas Mine.

i. Pumping:

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

| <u>Month</u>  | <u>1934</u> | <u>1933</u> | <u>1932</u> | <u>1931</u> | <u>1930</u> |
|---------------|-------------|-------------|-------------|-------------|-------------|
| January       | 815         | 814         | 942         | 990         | 1118        |
| February      | 788         | 808         | 982         | 914         | 1183        |
| March         | 779         | 751         | 963         | 891         | 1095        |
| April         | 796         | 816         | 973         | 878         | 1058        |
| May           | 807         | 926         | 1000        | 847         | 958         |
| June          | 826         | 876         | 835         | 960         | 1087        |
| July          | 837         | 984         | 918         | 972         | 1073        |
| August        | 854         | 882         | 885         | 923         | 1071        |
| September     | 857         | 889         | 889         | 953         | 1063        |
| October       | 859         | 866         | 786         | 931         | 1075        |
| November      | 875         | 849         | 920         | 839         | 934         |
| December      | 876         | 826         | 771         | 875         | 1011        |
| Total Average | 831         | 857         | 905         | 914         | 1060        |

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7. UNDERGROUND: (Cont'd)

i. Pumping: (Cont'd)

The amount of water pumped per minute decreased 26 gallons in 1934, as compared with a decrease of 48 gallons in the previous year. This is the fifth consecutive year to show a decrease.

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

| <u>Year</u> | <u>Gallons per Minute</u> |
|-------------|---------------------------|
| 1934        | 831                       |
| 1933        | 857                       |
| 1932        | 905                       |
| 1931        | 914                       |
| 1930        | 1060                      |
| 1929        | 1230                      |
| 1928        | 1198                      |
| 1927        | 1144                      |
| 1926        | 819                       |
| 1925        | 705                       |

j. Underground in General:

The mine was in fairly good condition at the end of the year. Extensive repairs have been underway for months in No. 3 and No. 4 cross-cuts where most of the old rotted timber has been replaced with treated timber. In October the 11th level footwall drift on the northeast side of the main ore body was subjected to a sudden surge of pressure and many caps were broken. Repairs are still underway in this section. There has been also some general repairs on both levels but not as extensive as in 1933. There are many idle raises on the 12th level that will have to be re-cribbed and lined with hardwood plank, also new ladders and sollar installed before they go into service. Careful watch is maintained in all idle areas to prevent crushing and loss of ventilation drifts and the raises. Extensive propping is now done in idle areas as this was demonstrated to be the most economical way to maintain the drifts during the idle periods. Operations should be stepped up to three days per week with two crews to obtain lower costs. The mine is now operating at less than one third capacity, efficiency is better than ever before and many economies have been effected which are not as evident in the costs as would be the case with an increased product.

k. Sumps:

There was no expense incurred for cleaning sumps during the past several years due to the depression. This year it was necessary to clean them in order to maintain necessary sump capacity in case of accidents to pumps or power lines. Work of cleaning the 12th level sump was started in the late summer; about 150 cars of fine ore were cleaned out of this sump with a scraper and loaded direct into cars.

The 10th level sump was the next one given attention. This sump was excavated about 1910 and cleaning has been done by washing the mud to the suction and pumping it to surface. This method was used this year and at the end of December the work was about half completed. Capacity of this sump was reduced nearly 40% by the mud which filled the sump drifts from 1/3 to 1/2 full. When the 10th level sump is cleaned, work will be started on the 11th level sump where very little cleaning is necessary at this time.

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9. EXPLORATIONS  
AND  
FUTURE  
EXPLORATIONS:

There was no diamond drilling on Negaunee Mine property in 1934. There are no future explorations contemplated at the Negaunee Mine at this time.

The drill hole on Maas property near the Negaunee boundary was completed early in 1934. It struck the cave above the Maas workings only a relatively short distance above the top sub level indicating no probability of a cave extending to surface in the immediate future. The drill hole was put down to determine how soon a cave to surface might occur.

10. TAXES:

The Negaunee City tax rate decreased, also the valuation set by the state tax commission on the mine, and as a result the taxes paid by the Negaunee Mine Company were lowered again in 1934.

A comparison of taxes paid by the Negaunee Mine Company in 1934 and 1933 follows:

|   | <u>1 9 3 4</u>   |              | <u>1 9 3 3</u>   |              |
|---|------------------|--------------|------------------|--------------|
|   | <u>Valuation</u> | <u>Taxes</u> | <u>Valuation</u> | <u>Taxes</u> |
| Realty - 213.19 Acres                                   | 2,730,000        | 73,170.28    | 2,485,000        | 68,943.84    |
| Personal-Stockpile, Equip. & Supp.                      | 435,000          | 11,659.00    | 1,035,000        | 28,715.04    |
| Total by Tax Commission                                 | 3,165,000        | 84,829.28    | 3,520,000        | 97,658.88    |
| Collection Fees   |                  | 848.29       |                  | 976.59       |
| Total Optg. Negaunee Mine                               | 3,165,000        | 85,677.57    | 3,520,000        | 98,635.47    |
| Rented Buildings  | 31,400           | 841.54       | 34,400           | 954.58       |
| Collection Fees   |                  | 8.42         |                  | 9.55         |
| Total Negaunee Mine Co.                                 | 3,196,400        | 86,527.53    | 3,554,000        | 99,599.60    |
| <br>  |                  |              |                  |              |
| Tax Rate  |                  | 2.6802       |                  | 2.774        |
| Total Tax City of Negaunee<br>(Includes collection fee) |                  | 339,407.51   |                  | 357,648.77   |
| Negaunee Mine Co. % of City Tax                         |                  | 25.49%       |                  | 27.85%       |

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**11. ACCIDENTS  
AND  
PERSONAL  
INJURY:**

The following table gives the number and classification of accidents causing personal injury during the past five years:

|  | <u>1934</u>   | <u>1933</u>   | <u>1932</u>   | <u>1931</u>   | <u>1930</u>    |
|--|---------------|---------------|---------------|---------------|----------------|
| Fatal  | 1             | 0             | 0             | 0             | 1              |
| Time Lost - Over four months   | 1             | 0             | 1             | 1             | 2              |
| "    "    - One to four months   | 1             | 2             | 1             | 4             | 5              |
| "    "    - Less than one month  | $\frac{1}{1}$ | $\frac{0}{2}$ | $\frac{1}{3}$ | $\frac{0}{5}$ | $\frac{3}{11}$ |
| Total Compensable Accidents  | 4             | 2             | 3             | 5             | 11             |
| Number of cases paid compensation for accidents prior to Jan. 1st, 1934  | 10            | 14            | 14            | 12            | 12             |
| Number of cases being paid difference in wages (Included in above total) | 4             | 4             | 4             | 5             | 4              |

The nature of injuries caused by non-fatal accidents in 1934 were as follows:

One man who lost 67 days on account of contusion of back by fall of ground.

One man who lost 12 days on account of abrasions and lacerations of face when hit by broken scraper rope.

One man who lost 177 days in 1934, sustained severe strain and bruise of right ankle when struck by falling chunk - still at home.

**Fatal Accident:**

I regret to report that a fatal accident occurred at 8:00 A. M. Tuesday morning, March 20th, Wm. Merrila, a miner in No. 10 contract being instantly killed when struck by a falling fore pole.

No. 10 contract was engaged in mining the pillar northwest of 1292-A raise on the 385 ft. sub level. They had finished the long slices and were removing the triangular pillar between 1292-A and 1293-A raise at the time of the accident. When the mine closed down in 1932 there was a small pillar left on the sub above and during the idle period this sub caved. This small pillar was the real cause of the accident.

Merrila and his partner blasted a cut at noon on Monday then drove fore poles ahead and started scraping out the broken ore. About 2:30 P. M. part of the small pillar above caved breaking the fore poles and leaving an opening above. The breast had broken too far ahead for the 9½ ft. fore poles to reach across the opening, so the miners rested one end of the poles on the cap and cut a hitch in the ore for the other end. They were unable to properly block the opening above these poles which extended up to the top of the pillar on the sub above. On arriving at their working place on Tuesday morning Merrila and his partner decided to put in two gin poles from the cap of the last set to the breast for the head block for the scraper rope. Merrila started to pick out ground for one of the hitches

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11. ACCIDENTS  
AND  
PERSONAL  
INJURY:

Fatal Accident: (Cont'd)

when without warning some ground caved off the pillar above, broke down the hitch for the fore poles, causing them to fall. One of these poles struck Merrila on the back of the neck. Very little ore came down at this time, actually less than a wheelbarrow load. The place was idle for 48 hours after the accident and during this time the entire pillar caved down to the 385 ft. sub.

This unfortunate accident was due to the failure of the miners to provide proper covering ahead of the front set, also failure of the shift boss to instruct the miners how to do the work in a safe way. The accident was classified by the Central Safety Committee as II-5, Failure to instruct man as to method of doing work and hazards incident thereto.

There have been four fatal accidents at the Negaunee Mine in the past 20 years, all caused by falls of ground. The conditions were different in each accident although the underlying cause was the same. No set of rules will cover all these accidents as new and unexpected conditions arise that are different from any previous occurrence. The extra experience and skill of the Captain and Foremen are necessary to plan the safe method to follow. If the miners fail to report unusual conditions, they must proceed on their own initiative. To guard against this, instructions have been given the miners to send for the foreman or captain if they are confronted with any unusual condition in their working place. All unmined pillars are marked on the mine maps and extraordinary precautions taken when mining beneath them. The idle periods in 1932 and 1933 have added many hazards in the mine and accidents can only be avoided by close and intelligent supervision by all foremen and the full cooperation of the miners.



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12. NEW CONSTRUCTION AND PROPOSED NEW CONSTRUCTION:

No new E. & A.s were authorized and no old ones were active in 1934. Improvement to the dry building involving ceiling the rooms and installation of unit heaters is contemplated when conditions warrant the expenditure.

13. EQUIPMENT AND PROPOSED EQUIPMENT:

a. Steam Shovels:

The 51,151 tons of ore shipped from the stockpile was loaded by No. 7 shovel. Only minor repairs were made to the shovel last spring as it is so old that it is questionable if a thorough overhauling is warranted.

b. Stockpile Trestles:  
(2) Wooden Trestle:

A new wood rock trestle was erected in 1934, as a branch trestle to the northeast from the east permanent trestle. Only enough bents were erected to handle rock for a limited period, more bents will be added as required. The old rock trestle west of the shaft was filled, the tram was nearly 2,000 ft. in length as compared with 600 ft. on the new trestle. Salvaged material from ore stocking trestles was used so that the only expense was for labor.

c. Scraper Hoists:

Following is a list of scraper hoists at the mine:

| Company                | On Hand<br>1-1-1934 | Purchased<br>1934 | Total     | Cost for Repairs<br>per Machine |      |
|------------------------|---------------------|-------------------|-----------|---------------------------------|------|
|                        |                     |                   |           | 1934                            | 1933 |
| Ing-Rand 15 H.P. Elec. | 6                   | 1 2nd hand        | 7         | 11.00                           | 2.97 |
| " 10 H.P. "            | 5                   | 1 " "             | 6         | 1.66                            | 2.14 |
| Sullivan 25 H.P. "     | 2                   | 0                 | 2         | .00                             | 2.11 |
| " 20 H.P. "            | 1                   | 0                 | 1         | .56½                            | .00  |
| " 15 H.P. "            | 10                  | 0                 | 10        | .00                             | .91  |
| Gard-Den 15 H.P. "     | 2                   | 0                 | 2 )       | 52.40                           | 1.49 |
| " 10 H.P. "            | 3                   | 0                 | 3 )       |                                 |      |
| Total                  | <u>26</u>           | <u>2</u>          | <u>28</u> |                                 |      |

Lake Shore Engine Works 25 H.P. Electric Scraper Slide (Loaned to Maas Mine) 1

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13. EQUIPMENT  
AND  
PROPOSED  
EQUIPMENT: (Cont'd)

c. Scraper Hoists: (Cont'd)

The Ingersoll-Rand air scraper hoists included in previous annual reports have been converted into timber hoists and are therefore omitted this year.

The 6½ H.P. Sullivan electric hoists are omitted from the above list this year as they are obsolete. One has been converted into a one drum hoist for turning a grindstone on the 12th level and another will be similiarly converted in 1935 for the 11th level.

The 7½ H.P. Gardner-Denver electric hoists are obsolete, also the Gardner-Denver air hoists and accordingly they have been omitted from the above list.

The Negaunee Mine has 26 electric scraper hoists, 2 transfer scraper hoists and one electric operated scraper slide. This equipment is sufficient under the present operating schedule but if the working time is increased to four days per week single shift which will eliminate one crew of miners, a large number of electric scraper hoists will have to be purchased, as the number of working places will have to be nearly doubled to obtain the same daily product.

14. MAINTENANCE  
AND REPAIRS:

Repairing of the circular concrete shaft, 960 ft. in depth which was started in 1932 was completed early in 1934. The shaft is now in good condition and maintenance expense should be low for several years.

Extensive repairs were made at No. 2 shaft and airways leading to the 10th level No. 3 shaft. This work was well advanced at the end of the year and will be continued in 1935. It is fully described elsewhere in this report. As a result of the work already completed the volume of air reaching the 10th level has materially increased.

Quite a number of the decking timbers or ties on the permanent steel stocking trestle west of the shaft were replaced in 1934. They had rotted after many years of service. The new ties were dipped in creosote before being installed. Also a number of ties which had rotted on the west steel stocking trestle were replaced with new fir ties.

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15. POWER:

Electric power was purchased from the Cliffs Power & Light Company a subsidiary of the Cleveland-Cliffs Iron Company. A voluntary change in rate was offered by the power Company and approved by the State Utility Commission which went into effect in May.

The new rate was based on the peak load for a 15 minute period. It required some time to adjust operations so as to lower the 15 minute demand and thus obtain a higher load factor. In September when operations were reduced 33-1/3%, the cost was higher but later adjustments in operation of pumps, etc. were effected which lowered it again.

| <u>Year - 1934</u> | <u>K.W. Per Mo.</u> | <u>Cost per K.W.</u> | <u>Amount</u> | <u>15 Min. Load Demand</u> | <u>Factor</u> |
|--------------------|---------------------|----------------------|---------------|----------------------------|---------------|
| January            | 320,562             | .01545               | 4,952.68      |                            |               |
| February           | 333,002             | .01545               | 5,144.88      |                            |               |
| March              | 326,864             | .01545               | 5,050.05      |                            |               |
| April              | 331,690             | .01545               | 5,124.61      |                            |               |
| May                | 344,058             | .01625               | 5,592.31      | 1,400                      | 38%           |
| June               | 354,840             | .01619               | 5,745.99      | 1,440                      | 38%           |
| July               | 363,590             | .01476               | 5,366.38      | 1,200                      | 45%           |
| August             | 365,540             | .01496               | 5,471.49      | 1,200                      | 44%           |
| September          | 328,080             | .01500               | 4,922.43      | 1,200                      | 43%           |
| October            | 316,565             | .01554               | 4,919.91      | 1,200                      | 39%           |
| November           | 352,040             | .01478               | 5,202.75      | 1,200                      | 45%           |
| December           | 343,190             | .01498               | 5,140.23      | 1,200                      | 43%           |
| Total              | 4,080,021           | .01535               | 62,633.71     |                            |               |

The above statement shows that the average cost since May 1st was slightly below the cost for the first four months of the year when the fixed rate of 1½ cents per K.W. was in effect. Charges after May 1st were based on the main line meter reading, prior to this time the separate meter readings were used. The mine now pays for the line loss but even with this added expense the rate is slightly lower than under the former method of charging a flat rate of 1½ cents per K.W.

The following is a detail of electric current purchased:

|                               | <u>1934 - 12 Months Optg.</u> |                     | <u>1933 - 5 Months Optg.</u> |                     |
|-------------------------------|-------------------------------|---------------------|------------------------------|---------------------|
|                               | <u>Cost</u>                   | <u>Cost per Ton</u> | <u>Cost</u>                  | <u>Cost per Ton</u> |
| Stopping                      | 348.82                        | .0015               | 95.00                        | .002                |
| Timbering                     | 79.89                         | .0003               | 28.33                        | .                   |
| Ventilation                   | 7,035.82                      | .0299               | 2,196.25                     | .035                |
| Pumping                       | 24,415.17                     | .1036               | 10,192.86                    | .165                |
| Hoisting                      | 11,182.87                     | .0475               | 3,850.59                     | .062                |
| Stocking Ore                  | 240.68                        | .0010               | 241.01                       | .004                |
| Dry House                     | 176.86                        | .0007               | 74.79                        | .001                |
| Telephone & Safety Devices    | 504.18                        | .0021               | 181.59                       | .003                |
| Mine Office                   | 22.10                         | .0001               | 7.84                         |                     |
| Electric Haulage              | 2,779.39                      | .0118               | 758.02                       | .012                |
| Shops                         | 138.15                        | .0006               | 146.26                       | .002                |
| Optg. Compressors             | 15,645.01                     | .0665               | 4,738.04                     | .077                |
| Total                         | 62,568.94                     | .2656               | 22,510.58                    | .363                |
| Main Line Meter - K.W.        |                               | 4,080,021           |                              |                     |
| Separate Meter Reading - K.W. |                               | 3,971,304           |                              |                     |
| Line Loss - K.W.              |                               | 108,717             | (May to Dec. Inc.)           |                     |
| Product                       |                               | 235,664             |                              |                     |
| K.W. Per Ton (Inc. Line Loss) |                               | 17.32               |                              |                     |
| Cost per K.W. (Avg. for Year) |                               | .01535              |                              |                     |
| Cost Per K.W. (After May 1st) |                               | .01530              |                              |                     |

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17. CONDITION  
OF  
PREMISES:

The grounds around the mine were kept in good condition during 1934. Expense of upkeep increased slightly due to cleaning the planted areas which had not been done since 1931 in order to reduce expenditures. The lawn and planted areas need fertilizer and if conditions warrant the expenditure they should be given a liberal application next spring.

18. NATIONALITY  
OF  
EMPLOYEES:

The new registration of all employees in 1934 corrected previous errors in the nationalities as to country of birth. The 1934 tabulations are correct for the first time since the nationality reports have been made. In prior years definite information was not always available.

| <u>As to Parentage</u> | <u>1934</u> | <u>%</u> | <u>1933</u> | <u>%</u> |
|------------------------|-------------|----------|-------------|----------|
| English                | 42          | 18       | 41          | 20       |
| Finnish                | 93          | 41       | 75          | 38       |
| Italian                | 34          | 15       | 22          | 11       |
| Swedish                | 29          | 12       | 28          | 14       |
| French (Canadian)      | 18          | 8        | 21          | 11       |
| German                 | 3           | 1        | 3           | 2        |
| Austrian               | 5           | 2        | 1           | 0        |
| Irish                  | 1           | .5       | 2           | 1        |
| Norwegian              | 1           | .5       | 2           | 1        |
| Danish                 | 3           | 2        | 3           | 2        |
| Total                  | 229         | 100      | 198         | 100      |

| <u>As to Birth</u> | <u>American Born</u> |             | <u>Foreign Born</u> |             |
|--------------------|----------------------|-------------|---------------------|-------------|
|                    | <u>1934</u>          | <u>1933</u> | <u>1934</u>         | <u>1933</u> |
| English            | 22                   | 18          | 20                  | 23          |
| Finnish            | 33                   | 28          | 60                  | 47          |
| Italian            | 9                    | 4           | 25                  | 18          |
| Swedish            | 14                   | 5           | 15                  | 23          |
| French (Canadian)  | 17                   | 6           | 1                   | 15          |
| German             | 2                    | 0           | 1                   | 3           |
| Austrian           | 3                    | 0           | 2                   | 1           |
| Irish              | 1                    | 1           | 0                   | 1           |
| Norwegian          | 0                    | 0           | 1                   | 2           |
| Danish             | 2                    | 2           | 1                   | 1           |
| Total              | 103                  | 64          | 126                 | 134         |

MAAS MINE  
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1. GENERAL

The Maas Mine operated continuously through the year 1934 on a curtailed basis. From January 1st to August 31st, the working schedule was six day shifts, with two crews each working three days per week and hoisting one half shift six nights. Further, in order to realize our Bessemer production, six places in the Bessemer area were worked five nights per week in addition to the six days. Three crews divided the time in the contracts operated day and night shift. On September 1st, the time was reduced to four day shifts and four night shifts in the Bessemer area and continued on this schedule for the balance of the year.

During March, in order to ease up on the mining above the Fourth Level, eight contracts were started above the Third Level in the Roman Catholic Cemetery Lease and adjacent territory and in the area west of the main cross-cut to the Shaft. It took some time before we realized any production from these contracts as no work had been done in these areas for over a year and considerable repair work was necessary. A number of the places are very wet and scraping can only be done when a car is spotted under the ore chute. This operation is slow and reduces the product from the wet places. An effort will be made to either drain these wet areas by sinking wells and pumping from surface or by drifts driven along the footwall underground in advance of mining operations. The latter method will be tried first.

The development drifting on the Fifth Level was completed early in the year, and then an extensive raising campaign was started so as to mine the ore from the 150 foot sub-level and below through the Fifth Level. Ten gangs, working day and night shift, were employed on this work. It was important to complete these raises as rapidly as possible to eliminate the expense of repairing the motor drifts on the Fourth Level, which were continually crushing due to closeness of mining operations, and also to eliminate the delays account of the small storage capacity in the raises from the Fourth Level. By the end of the year, the raising gangs had been reduced to three and within a few months these will have finished the remaining raises needed for the present.

Shipments from the Maas were in excess of production by some 52,000 tons and our stockpile ground left in good condition. The Maas Mine was the largest shipper of The Cleveland-Cliffs Iron Company's Michigan properties.

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2. PRODUCTION  
SHIPMENTS &  
INVENTORIES

| a. <u>Production by Grades</u> | <u>1934</u> | <u>1933</u> | <u>Increase</u> | <u>Decrease</u> |
|--------------------------------|-------------|-------------|-----------------|-----------------|
| Maas Bessemer                  | 98,920      | 51,428      | 47,492          |                 |
| Race Course Bessemer           | 28,645      | 4,807       | 23,838          |                 |
| Maas                           | 130,752     | 51,642      | 79,110          |                 |
| Race Course                    | 19,830      | 23,697      |                 | 3,867           |
| Total                          | 278,147     | 131,574     | 147,673         |                 |
| Rock                           | 16,153      | 21,711      |                 | 5,558           |
| Total Hoist                    | 294,300     | 153,285     | 141,015         |                 |

  

| b. <u>Shipments</u>  | <u>Pocket</u> | <u>Stockpile</u> | <u>Total</u> | <u>Total</u>     |
|----------------------|---------------|------------------|--------------|------------------|
| <u>Grade of Ore</u>  | <u>Tons</u>   | <u>Tons</u>      | <u>Tons</u>  | <u>Last Year</u> |
| Maas Bessemer        | 26,628        | 73,604           | 100,232      | 79,316           |
| Race Course Bessemer | 11,217        | 9,198            | 20,415       | 15,741           |
| Maas                 | 66,216        | 124,266          | 190,482      | 344,297          |
| Race Course          | 11,645        | 8,639            | 20,284       | 26,539           |
| Total                | 115,706       | 215,707          | 331,413      | 465,893          |
| Total Last Year      | 50,431        | 415,462          | 465,893      |                  |
| Increase             | 65,275        |                  |              |                  |
| Decrease             |               | 199,755          | 134,480      |                  |

  

| c. <u>Stockpile Inventories</u> | <u>12-31-34</u> | <u>12-31-33</u> | <u>Increase</u> | <u>Decrease</u> |
|---------------------------------|-----------------|-----------------|-----------------|-----------------|
| <u>Grade of Ore</u>             |                 |                 |                 |                 |
| Maas Bessemer                   | 19,206          | 20,518          |                 | 1,312           |
| Race Course Bessemer            | 11,720          | 3,490           | 8,230           |                 |
| Maas                            | 79,064          | 138,794         |                 | 59,730          |
| Race Course                     | 2,568           | 2,084           | 484             |                 |
| Total                           | 112,558         | 164,886         |                 | 52,328          |

  

| d. <u>Division of Product by Levels</u> | <u>1934</u> | <u>%</u> | <u>1933</u> | <u>%</u> |
|---|-------------|----------|-------------|----------|
| Third Level                             | 48,571      | 17.4     | 5,202       | 4.0      |
| Fourth Level                            | 219,172     | 78.6     | 96,319      | 72.2     |
| Fifth Level                             | 11,242      | 4.0      | 30,053      | 22.8     |
| Total                                   | 278,985     | 100.0    | 131,574     | 100.0    |

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2. PRODUCTION  
SHIPMENTS &  
INVENTORIES

e. Production by Months

| <u>Month</u> | <u>Maas</u>    |                | <u>R. C.</u>  | <u>Race</u>   | <u>Total</u>   | <u>Rock</u>   |
|--------------|----------------|----------------|---------------|---------------|----------------|---------------|
|              | <u>Bess.</u>   | <u>Maas</u>    | <u>Bess.</u>  | <u>Course</u> |                |               |
| January      | 10,675         | 8,275          | 1,788         | 1,265         | 22,003         | 2,597         |
| February     | 9,969          | 7,458          | 1,271         | 1,768         | 20,466         | 1,956         |
| March        | 11,797         | 10,761         | 1,196         | 471           | 24,225         | 2,747         |
| April        | 10,578         | 11,818         | 1,424         | 867           | 24,687         | 965           |
| May          | 11,424         | 13,960         | 2,314         | 1,271         | 28,969         | 848           |
| June         | 8,990          | 13,977         | 2,902         | 1,820         | 27,689         | 1,257         |
| July         | 8,693          | 11,500         | 4,114         | 2,043         | 26,350         | 1,635         |
| August       | 8,733          | 12,177         | 3,954         | 3,032         | 27,896         | 1,421         |
| September    | 5,472          | 9,280          | 1,660         | 2,488         | 18,900         | 1,002         |
| October      | 6,538          | 9,428          | 2,794         | 1,405         | 20,165         | 1,101         |
| November     | 6,015          | 7,948          | 2,991         | 1,318         | 18,272         | 291           |
| December     | 5,146          | 9,060          | 3,157         | 1,162         | 18,525         | 333           |
| <b>Total</b> | <b>104,030</b> | <b>125,642</b> | <b>29,565</b> | <b>18,910</b> | <b>278,147</b> | <b>16,153</b> |

This year's  
stockpile  
overrun

|  |         |         |        |        |         |        |
|--|---------|---------|--------|--------|---------|--------|
|  |         |         |        | 838    | 838     |        |
|  | 104,030 | 125,642 | 29,565 | 19,748 | 278,985 | 16,153 |

Prior year's  
stockpile  
overrun

|  |         |         |        |        |         |        |
|--|---------|---------|--------|--------|---------|--------|
|  |         |         |        | 100    | 100     |        |
|  | 104,030 | 125,642 | 29,565 | 19,848 | 279,085 | 16,153 |

The product was distributed as follows:

|                         | <u>1934</u>    | <u>1933</u>    | <u>Increase</u> | <u>Decrease</u> |
|-------------------------|----------------|----------------|-----------------|-----------------|
| George Maas Lease       | 208,857        | 104,465        | 104,392         |                 |
| Catholic Cemetery       | 13,936         | 2,771          | 11,165          |                 |
| American Mining Co.     | 1,896          | 2,747          |                 | 851             |
| C.C.I.Co.(Right of Way) | 2,750          | 5,626          |                 | 2,876           |
| Race Course             | 49,413         | 28,504         | 20,909          |                 |
| City of Negaunee        | 2,233          | 594            | 1,639           |                 |
|                         | <u>279,085</u> | <u>144,707</u> | <u>134,378</u>  |                 |

f. Ore Statement

|                         | <u>Maas</u>    |                | <u>R.C.</u>   | <u>Race</u>   | <u>Total</u>   | <u>Total Last Year</u> |
|-------------------------|----------------|----------------|---------------|---------------|----------------|------------------------|
|                         | <u>Bess.</u>   | <u>Maas</u>    | <u>Bess.</u>  | <u>Course</u> |                |                        |
| On hand 1-1-34          | 20,518         | 138,794        | 3,490         | 2,084         | 164,886        | 352,995                |
| Product for Year        | 104,030        | 125,642        | 29,565        | 18,910        | 278,147        | 258,558#               |
| Overrun this Year       |                |                |               | 838           | 838            | 6,093                  |
| " Prior "               |                |                |               | 100           | 100            | 13,133                 |
| Transfer to & from      | 5,110          | 5,110          | 920           | 920           |                |                        |
| <b>Total</b>            | <b>119,438</b> | <b>269,546</b> | <b>32,135</b> | <b>22,852</b> | <b>443,971</b> | <b>630,779</b>         |
| Shipments               | 100,232        | 190,482        | 20,415        | 20,284        | 331,413        | 465,893                |
| Balance on hand         | 19,206         | 79,064         | 11,720        | 2,568         | 112,558        | 164,886                |
| Increase in Output      |                |                |               |               | 19,589         |                        |
| Decrease in ore on hand |                |                |               |               | 52,328         |                        |

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2. PRODUCTION  
SHIPMENTS &  
INVENTORIES

f. Ore Statement (Continued)

# Estimated stockpile overrun taken into 1933 output as follows:

|                                 |              |
|---------------------------------|--------------|
| Maas Bessemer                   | 5,822 tons   |
| Maas                            | 125,200 "    |
| Race Course Bessemer            | 1,955 "      |
| Race Course                     | <u>100 "</u> |
| Total Est. stockpile<br>overrun | 133,077 tons |

1934 1-8 hr. shift, 6 days per week and 5 nights in 6 Bessemer places; 3 crews working 3 or 4 days per week Jan. 1st to Sept. 1st.  
4 days per week and 4 nights in 6 Bessemer places; 3 crews working 2 or 3 days per week Sept. 1st to Dec.31,1934.

1933 1-8 hr. shift, 4 days per week; 2 crews working alternate weeks. Jan. 1st to April 8th.  
Mine idle from April 8th to July 1st.  
6 days per week, 3 crews 2 days each, April 8th to July 1st. 5th Level Development.  
6 days per week, 3 crews 2 days each, July 1st to August 1st, Bessemer production and 5th Level Development.  
5 days per week, 2 crews working alternate weeks, August 1st to November 13th.  
6 days per week, and 5 nights; 3 crews working three or four days per week, Nov.13 to Dec.31st.

1932 1-8 hr. shift, 2 days per week, Jan. 1st to May 31st.  
Mine idle June 1st to October 31st.  
2 days per week, Nov. 1st to Dec. 31st.

1931 1-8 hr. shift, 5 days per week, Jan. 1st to May 1st.  
4 days per week, May 1st to June 8th.  
3 days per week, June 8th to Nov. 16,.  
2 days per week, Nov. 16 to Dec. 31st.

1930 1-8 hr. shift, 6 days per week, Jan. 1st to July 16.  
5 days per week, July 16th to Dec. 31st.

g. Delays

| <u>Date</u> | <u>Shift</u> | <u>Duration</u> | <u>Loss in Product</u> | <u>Cause</u>                             |
|-------------|--------------|-----------------|------------------------|--|
| Jan. 30th   | Day          | 3 hours         | 250 tons               | Ice accumulated in grove of head sheave. |
| Feb. 15th   | Day          | 4 hours         | 400 tons               | Wearing shoe on north skip broke.        |
| April 24th  | Day          | 1 hour          |                        | Roller in north skip dump broke.         |
|             | Night        | 4 hours         | 500 tons               |  |







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5. LABOR & WAGES

a. Comments

1. Labor

There was a 10% increase in both surface and underground wages April 1st, 1934. Common labor or surface wages are now \$ .44 per hour or \$3.52 per 8 hour day.

Only a few changes have been made in our force during the year. Due to hoisting continuously, a floor man or engineer, was employed to look after the various machines in the power house. A few men were taken on in April to fill in for men home sick and making repairs to the Maas Crushing Plant. In May, men were hired for shovel pitmen and laid off at the end of the shipping season.

There have been plenty of men looking for work all year but only a few with experience. The majority of those seeking employment are under 25 years of age. P.W.A. work projects were discontinued in March, which increased the unemployment situation for a time. Then the first of September, the Cambria Mine of the Republic Steel Corporation, laid off 70 men, mostly former employees of the Athens, Maas and Negaunee mines, who were taken on by them after our shut down in the spring of 1933. We were only able to re-employ a few of the former Maas Mine men.

Capt. William Tamblin died on September 15th, after a lingering illness of four months. Capt. Tamblin had been in the employ of the Company for 33 years, having worked at various mines as Shift Boss and Captain. Captain John Tregoning of the Athens Mine was appointed Captain of the Maas and assumed active charge on October 8th.

2. New Construction

There was no new construction undertaken during 1934.

b. Comparative Statement of Wages & Product

|                              | <u>1934</u> | <u>1933</u> | <u>Increase</u> | <u>Decrease</u> |
|------------------------------|-------------|-------------|-----------------|-----------------|
| Product                      | 278,147     | 131,574     | 146,573         |                 |
| Number of Shifts & Hours -8- | 273         | 90½         | 182½            |                 |
| <u>AVG. NO. MEN WORKING</u>  |             |             |                 |                 |
| Surface                      | 52½         | 35½         | 17              |                 |
| Underground                  | 246½        | 171         | 75½             |                 |
| Total                        | 299         | 206½        | 92½             |                 |
| <u>AVG. WAGES PER DAY</u>    |             |             |                 |                 |
| Surface                      | 4.12        | 3.68        | .44             |                 |
| Underground                  | 4.78        | 4.20        | .58             |                 |
| Total                        | 4.65        | 4.09        | .56             |                 |

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5. LABOR  
AND  
WAGES

b. Comparative Statement of Wages & Product

| <u>AVG. WAGES PER MONTH</u> | <u>1934</u> | <u>1933</u> | <u>Increase</u> | <u>Decrease</u> |
|-----------------------------|-------------|-------------|-----------------|-----------------|
| <u>3 Days per Week</u>      |             |             |                 |                 |
| Surface                     | 65.96       | 52.94       | 13.02           |                 |
| Underground                 | 72.70       | 45.73       | 26.97           |                 |
| Total                       | 71.50       | 46.96       | 24.54           |                 |

| <u>AVG. WAGES PER MONTH</u> |       |  |  |  |
|-----------------------------|-------|--|--|--|
| <u>2 Days per Week</u>      |       |  |  |  |
| Surface                     | 60.50 |  |  |  |
| Underground                 | 52.54 |  |  |  |
| Total                       | 53.76 |  |  |  |

| <u>PRODUCT PER MAN PER DAY</u> |       |       |      |  |
|--------------------------------|-------|-------|------|--|
| Surface                        | 26.97 | 21.63 | 5.34 |  |
| Underground                    | 6.75  | 5.89  | .86  |  |
| Total                          | 5.40  | 4.63  | .77  |  |

| <u>LABOR COST PER TON</u> |      |      |  |      |
|---------------------------|------|------|--|------|
| Surface                   | .153 | .170 |  | .017 |
| Underground               | .708 | .713 |  | .005 |
| Total                     | .861 | .883 |  | .022 |

| <u>AVG. PRODUCT MINING</u> |       |       |      |  |
|----------------------------|-------|-------|------|--|
| Stoping                    | 17.10 | 20.60 | 3.50 |  |
| Ore Development            | 9.84  | 11.69 | 2.15 |  |
| Total                      | 15.72 | 16.49 | .77  |  |

|                               |       |      |      |  |
|-------------------------------|-------|------|------|--|
| <u>AVG. WAGES CONT. LABOR</u> | 5.255 | 4.74 | .515 |  |
|-------------------------------|-------|------|------|--|

| <u>TOTAL NO. OF DAYS</u> |                      |                      |                      |  |
|--------------------------|----------------------|----------------------|----------------------|--|
| Surface                  | 10,342 $\frac{3}{4}$ | 6,081 $\frac{3}{4}$  | 4,261                |  |
| Underground              | 41,275 $\frac{1}{2}$ | 22,327 $\frac{3}{4}$ | 18,947 $\frac{1}{2}$ |  |
| Total                    | 51,618               | 28,409 $\frac{1}{2}$ | 23,208 $\frac{1}{2}$ |  |

| <u>AMOUNT FOR LABOR</u> |            |            |            |  |
|-------------------------|------------|------------|------------|--|
| Surface                 | 42,659.53  | 22,395.60  | 20,263.93  |  |
| Underground             | 197,515.95 | 93,831.88  | 103,684.07 |  |
| Total                   | 240,175.48 | 116,227.48 | 123,948.00 |  |

| <u>AVG. WAGES PER MONTH BASED ON MEN CARRIED ON MINE PAYROLL</u> |       |       |  |  |
|--|-------|-------|--|--|
| Surface  | 64.63 | 36.68 |  |  |
| Underground  | 65.97 | 41.67 |  |  |
| Total  | 65.75 | 40.67 |  |  |

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5. LABOR  
AND  
WAGES

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

Proportion of Surface to Underground Men

- 1934 - 1 to 4.7 1-8 hr. shift, 6 days and 5 nights per week,  
3 crews working 3 and 4 days per week, Jan.1  
to Aug. 31st.  
1-8 hr. shift, 4 days per week, 3 crews working  
2 and 3 days per week. Sept. 1st to Dec.31st.
- 1933 - 1 to 4.85 1-8 hr. shift, 2 days per week. Jan.1st to April.8  
Mine idle April 8th to July 1st.  
1-8 hr. shift, 2 days per week, April 8th to  
July 1st - 5th Level Development.  
1-8 hr. shift, 2 days per week, partial operation  
July 1st to August 1st.  
1-8 hr. shift, 5 days per week, 2 crews working  
alternate weeks August 1st to Nov. 13.  
1-8 hr. shift, 6 days & 5 nights per week, 3 crews  
working 3 and 4 days per week, Nov.13 to Dec.31st.
- 1932 - 1 to 4.88 1-8 hr. shift, 2 days per week, Jan. 1 to May 31st.  
Mine idle June 1st to October 31st.  
1-8 hr. shift, 2 days per week, Nov. 1st to Dec.31st.
- 1931 - 1 to 4.63 1-8 hr. shift, 5 days per week, Jan. 1 to May 1st.  
1-8 hr. shift, 4 days per week, May 1st to June 8.  
1-8 hr. shift, 3 days per week, June 8th to Nov.16.  
1-8 hr. shift, 2 days per week, Nov.16 to Dec.31st.
- 1930 - 1 to 4.49 1-8 hr. shift, 6 days per week, Jan. 1 to July 16.  
1-8 hr. shift, 5 days per week, July 16 to Dec.31.

6. SURFACE

a. Buildings, Repairs

The Machine and Carpenter Shops were given a general cleaning. The walls and ceiling were sprayed with white wash and the lower 6 feet of the walls painted a dark maroon. This has brightened up the shops and made them a more pleasant place in which to work.

32 additional lockers, secured from the Wade and Armour Mines equipment, were installed in the wash room of the Dry to take care of the extra surface crew during shipping and crushing season. We also put in more shower baths on account of the large crew changing in the Dry at one time.

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6. SURFACE

a. Buildings, Repairs (Cont.)

New lighting fixtures were installed in the Mine Office in the early winter and are a great improvement over the old drop cord lamp with shade, making it easier on the men's eyes.

b. Stockpiles

The stockpiles along the East steel trestle were almost entirely cleaned up leaving plenty of room for this year's stocking. While only part of a cut was taken on the South side of the Maas pile, still we have sufficient room by adding 7 bents to the west end of the wood trestle West of the Shaft. Even with the extension, the tram is not as long as to the end of the steel trestle, where the Race Course Bessemer grade is being stocked.

The rock trestle, which was extended to the East Line of the Maas property about a year ago, is now filled to capacity and the carpenters are framing timber to erect a branch of 10 bents both to the South and North of the present pile from the end of the steel trestle. The tonnage of rock being handled has decreased materially during the past several months as our development above the Fifth Level is nearing completion.

d. Timber Yard

We have been receiving our mine timber throughout the year and at no time have more than a thirty to sixty day supply on hand. By being able to secure delivery any time during the year, we are able to eliminate the waste of having to cull a percentage due to rot when kept on hand a long time. Further, we are able to maintain a steady surface crew and can work in the unloading of a few cars a week along with our other work. We received 186 cars of stull timber, cribbing, poles, lagging and plank during the year.

7. UNDERGROUND

a. Shaft Sinking

There was no shaft sinking during 1934.

b. Development

Third Level

One contract was employed during June and July on a double shift working 5 days and 5 nights putting up No. 20 W. Raise. This Raise

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7. UNDERGROUND

b. Development (Cont.)  
Third Level (Cont.)

is located 75' West of the end of the horseshoe drift west of the main crosscut from the shaft. It was put up to eliminate the transfer on the next sub below the 435' elevation. At the height of 50' above the level, drift sets were put in and branch raises started both to the North and South. The one to the north was only extended 8' and then stopped. At this time we do not have sufficient information to say whether this branch should be extended to a higher elevation. This raise was in rock up to the elevation of 90' above the level.

Fourth Level

During June, one contract working double shift put up No.623 raise 50' southwest of No.511. From the development from 511 and 621 raises, this was advisable. The ore extended 68' southeast from 511 Raise and about 70' southwest of where No.623 would hole to the 160' sub. No.623 Raise was in rock the entire distance and we had to drift 20 feet northerly to strike the ore on the 160' elevation. Raise No.510 is now being put up from the 5th Level and will hole about 35' west of No.623 Raise south of the main dike.

The only other development on the Fourth Level during the year was the connecting of 22 raises put up from the Fifth Level to the main tramways for handling of timber and ventilation. Mining from these raises was started from the 150' sub level and below.

No.5518 Raise holed to the Fourth Level in a roll in the hanging and the ore to the east and on the 140' elevation and below is being mined through a transfer raise put up 20 feet back of the dike.

Toward the end of the year, all ore being mined above the Fourth Level, except from 3 chutes, Nos.240,621 and 622, was being handled through the Fifth Level. Only one motor crew is operating on the Fourth Level handling the timber and tramping the ore from the 3 raises.

There was a great deal of repair work on this Level the first half of the year when mining was in progress in the southeastern part of the ore body from 4th Level raises. Mining was only about 50' above the level and the pressure on the main drifts was very great. As soon as enough 5th Level raises were holed to the 4th and connected to the sub levels above, the eastern part of the mining area was abandoned and some of the drifts allowed to crush while others were propped so that they would remain open for ventilation.

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7. UNDERGROUND

b. Development (Cont.)  
Fifth Level

The shaft was sunk to this level and the plat cut in 1929. The main drift from the shaft was driven in 1930 and reached the ore body in 1931. The development of this level was resumed in March, 1933 and since that time three cross-cuts and a north and south footwall drift have been driven. Early in 1934, Nos. 5 and 6 cross-cuts were connected to the south footwall drift. This footwall drift was extended to the southwest 140 feet from the point of switch during January and February, a distance to allow the switching of a motor train. It was also advanced northeast from No. 4 cross-cut 60 feet, a distance so the scraper slide, and a locomotive and several cars, would not interfere with tramming operations when the drift is to be developed for mining to the northeast.

On account of the crushing of the Fourth Level, an extensive raise program was started early in the year. Ten raising crews were organized and employed 5 days per week. During the year 22 raises were completed through to the 4th Level and either to the 150' or 140' sub level above the Fourth. In December 2 more raises were started which will complete the raises for the mining of Block No.1, a total of 28.

There was 300' of rock drifting, 591 feet of rock raise and 2,114 feet of ore raise credited to Fifth Level development during 1934.

c. Stoping  
General

There was an average of 26 contracts engaged in mining at the Maas Mine during the year, of which 6 worked double shift. In single shift contracts, there were two crews, each working alternate weeks, while in double shift contracts, there were three crews alternating in the one place day and night shift. The 26 contracts were distributed as to steps in mining as follows: stoping in open stope  $1\frac{1}{2}$  contracts; slicing 19; drifting 4; cutting out from raises for new places 1; and blasting filling under new hanging  $1\frac{1}{2}$  contract.

Mining was confined mainly to 3 areas; first, the East Footwall pillar above the 3rd Level on the 475', 465' and 450' sub-levels. Second, the West Footwall area south of the dike above the 3rd Level on the 435', 425', 401', 355' and 345' sub-levels. Third, the area in the Southeast part of the Race Course, and Southwest of the Maas on the 160', 150', 140' and 130' sub levels above the 4th Level.



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7. UNDERGROUND (CONT.)

c. Stoping (Cont)  
General (Cont.)

The first mentioned area is very wet and difficult to mine. It includes the Roman Catholic Cemetery Lease, C.C.I.Co. strip, Adams strip and Maas fee. The second area is being mined by the sub-level stoping system as well as top slicing and caving system. This area includes Race Course, City of Negaunee and Maas fee.

The third territory has been subject to several changes during 1934. Up until the middle of March, all mining gangs were employed in this area and mining through raises from the 4th Level. As certain local areas became too heavy on the main level, causing a crushing condition, they were abandoned upon completion of mining at any one elevation. Repair gangs, together with extra crews of men, over the weekends were kept busy repairing these main level drifts and raises until the cost became prohibitive and development of the raises from the Fifth Level was rushed.

Further, in order to reduce the repair expense, about the middle of the year it was decided to set off mining limits dependent on an efficient scraping distance from the 5th Level raises, calling the area tributary to the raises from No. 5 and No.6 cross-cuts on the 5th Level as No. 1 Mining Block, which is divided into No. 1 and No. 1 A, holding No. 1 A one or two sub-levels behind No. 1 block which is nearer the hanging to the Southwest. It is our intention to mine down Nos. 1 and 1 A blocks at least 6 subs before starting No. 2 Block, thus decreasing the amount of main level drifts and raises to be kept open. By concentrating on smaller areas, we believe we can reduce the pressure by undercutting a limited amount of hanging at any one time.

Subs Between 2nd & 3rd Levels

475' Sub-Level East Footwall Pillar

Mining at this elevation was resumed in March of this year after being idle since 1932. There were only two pillars left on this sub-level to be mined and one contract has worked continuously since March. One pillar was mined through No. 119 Raise and the other is now being taken through No. 118 Raise, and is about exhausted. This is in the Roman Catholic Cemetery Lease.

465' Sub-Level East Footwall Pillar

This sub-level has been opened up for mining several times, the first time was in 1916 when a small amount was mined under the hanging and several drifts also driven in the footwall area. It was then found

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7. UNDERGROUND (CONT.)

c. Stoping (Cont.)

465' Sub-Level East Footwall Pillar (Cont.)

that there was more ore above than had been anticipated, and mining was stopped. It was reopened in 1928 and used as a tramping sub to transfer some ore from above. Later a new drift was put in on the 3rd Level footwall and new raises put up so that all the ore could be mined direct to the 3rd Level. In 1931 slicing started from these raises and was stopped again in 1932 when the mine was closed. It then remained idle until March, 1934 when mining was resumed with 4 contracts. One completed its respective area in August and cut out on the sub below from No. 108 A. The other 3 contracts continued here throughout the year and have several more months work on this elevation. This area is mostly non-Bessemer grade and is equally divided between the Maas and Roman Catholic Leases. It is a very wet territory, which not only handicaps mining itself but also causes trouble in the chutes, making it necessary to have the motor cars spotted under the chute when scraping. This increases tramping costs as well as increases track cleaning on account of so much soupy ore collecting on the tracks and blocking the ditches. The cars loaded from these wet chutes contain so much water they must be dumped direct into the skip and during shipping season must be placed on stockpile to allow the water to drain off.

435' Sub Level West Footwall Pillar

This territory North of the dike was opened upon the 3rd Level in 1930, and exploration work to find the hanging continued through 1931. Mining started on this elevation January 1932 from a transfer raise put up from the 401' sub and continued until the mine was closed in May. Nothing was done here until March of this year, when one contract started to slice out the ore just under the hanging and to the west of the small dike which forms a limit between the slicing method of mining to the west and the sub level stoping system along the flat foot to the Northeast. Mining was completed here in October and the contract moved to 20 W Raise on the 425' sub level. Except for a narrow strip of ore on the east side of this sub, which was in the City of Negaunee Lease, all mining was in the Race Course Lease.

425' Sub-level, West Footwall Pillar

In June of this year, a new raise, No. 20 W was put up from the 3rd Level to eliminate the transfer on the 401 sub level. It holed to this elevation in August when mining was started by the raising gang. In December, one contract was mining here in the Race Course Lease.

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7. UNDERGROUND (Cont.)

c. Stoping (Cont.)

401' Sub Level, West Footwall Pillar

This sub-level was opened up several years previous to resuming work here in April 1934. One stope had been started by drifting up on the foot until the hanging was reached and the mining by the bench method of open stoping. Two contracts have been employed in this area, one stoping and the other developing new stopes. The new stopes have been developed so as to mine the ore by the sub-level stoping system. Four stopes have been started along the foot. All this ore has to be transferred from the entrance to the stopes to No. 1 W Raise, leading direct to the 3rd Level. The transfer pull varies from 50' to 150'.

A raise put up in December from the most westerly stope drift struck Diamond drill hole No. 7. This hole showed ore and is responsible for the development in this area and elevation. Considerable drifting and raising had been done in an effort to locate the ore and hole but has been just to the north of these stopes. Before the hole was actually tapped, due to its closeness to the back of the stope, there was considerable seepage from the back making the ore very sticky and sloppy at times and together with the long transfer haul offset the advantage derived from mining by the stoping method.

The first stope, 65' northwest of the transfer raise, has been mined out from foot to hanging as wide as safe practice would permit. The second or next one west, was in a roll in the hanging as Jasper was encountered close to the footwall. On the other hand, the ore in the third stope extends further north and to a higher elevation than No. 1 stope. In December mining was in progress in the North end where an area 50' in diameter has been stoped. The hanging here is about 50' above the 401' sub.

A raise from No. 4 stope encountered No. 7 Drill Hole. This hole is draining better than 150 gallons of water per minute into the mine. The underground location of this hole is 15' South and 115' West of where it was started on surface. An attempt to seal it off was made but due to it following so close to the back of No. 3 stope, when the valve in the pipe was closed it built up a static pressure of 320 pounds and spread all over the back of the stope. We are starting to raise up so as to strike it at a higher elevation and in more solid formation and will try again.

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7. UNDERGROUND (Cont.)

c. Stoping (Cont.)

355' and 345' Sub-Levels, West Footwall Pillar

This sub-level was first opened up in this territory in 1930 as an exploratory level. Mining of a small chimney of ore in the hanging started on the 385' elevation in 1931 and in January 1933 mining started on this elevation. It was stopped again when the mine was closed in April. Mining was resumed in July by one contract and completed east of the mining limit in August when they dropped down and cut out on the sub below from the same raise. By the end of December they had almost completed mining this pillar.

Sub-Levels Above Fourth Level

170' Sub-Level

Four contracts, two on double shift, were mining in the area South of the Race Course and near the Negaunee boundary until May, when it was completed. This is in the territory opened up last year to secure Bessemer ore. It is mostly in the Maas Lease with a small amount in the C.C.I.Co. and American Mining Company strip. It ran a high percentage of Bessemer grade.

160' Sub-Level

The first mining at this elevation was in 1929 when the area along the East Boundary of the Race Course was opened. Operations have been continuous since that time, except for the idle periods of the whole mine. Mining at this elevation above the Southwest end of the Fourth Level was completed in November of this year. The ore from this area was about 75% Bessemer and the larger proportion mined through the Fourth Level Raises. Most of the tonnage was from the Maas Lease with a small amount from the C.C.I.Co. and American Mining Company strips. A small body of ore was developed South of the dike near the Negaunee boundary. This was mined from the 160' elevation as it was the top sub in this area. It was covered with poles and wire fencing and then the hanging blasted in for filling. This ore is very hard and the rock walls irregular so that the production has not been large. It has been nearly all Bessemer grade.

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7. UNDERGROUND (Cont.)

c. Stoping (Cont.)

150' Sub-Level

During the year the Fourth Level developed considerable pressure due to mining above and was expensive to keep open. It was decided to abandon mining in the eastern part of the territory which had been mined above. A limit was set and raises brought up from the Fifth Level to the West. Nearly all the ore mined on this elevation this year has been through 5th Level Raises. This mining area has been designated as Block No. 1 and is further divided into No. 1 and No. 1 A. Block No. 1 has been very nearly completed and No. 1 A is just being opened up. The small area South of the dike has increased in size on this elevation and another raise has been planned from the 5th Level to come up in this territory.

In December there were four gangs mining in No. 1 area, five in No. 1 A, all drifting and three South of the dike. All but one contract, which was in the American Mining Company strip, were in the Maas Lease. This ore runs a large percentage Bessemer.

140' Sub-Level

One contract has been employed since November off No. 240 Raise along the North Footwalland has taken two slices to the mining limit. This ore is all high phosphorus.

The main mining activity on this elevation has been on the Race Course Lease through six raises put up from the Fifth Level, and has been continuous since the first of the year. This ore is practically all high grade Bessemer. Except for a few small pillars Block No. 1 is exhausted. Two of these contracts have been double shift.

During November a transfer raise was put up to this elevation from the drift on the Fourth Level off of 5518 Raise. There is only a small amount of ore on this elevation to be mined in this manner and is cheaper than raising and drifting to the ore in rock. This ore is hard blue steel ore and progress has been slow.

The latter part of the year raises in the Maas Lease South of the Race Course were opened up and in December five contracts were mining on this elevation, two in the Maas and three in the Race Course.

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7. UNDERGROUND (Cont.)

c. Stoping (Cont.)

130' Sub-Level

This sub-level immediately above the 4th Level was started in August from raises in the Race Course Lease. Mining has been done from 4 raises and in December 3 contracts were employed on this sub. About 85% of the ore has been Bessemer grade.

d. Timbering

There was a marked decrease in the amount of timber used considering that the 1934 production was more than twice that in 1933. This is partly explained by the repair work carried on during the idle period of 1933 with no production, and partly to the fact that we had to cull a fairly large portion of timber that was not used in mining but charged to operating. The price paid for timber was less in 1934 than 1933. The cost per ton for timber is the lowest it has been since 1930. The fact that we have operated continuously during the year is reflected in a reduction of timber repairs and in ultimate cost.

We used about 50% more cribbing this year than in 1933 with 85% more new raises. This difference between the increase in amount of cribbing and footage raised is explained by the large amount of repairs to old raises during 1933. No record is kept of the total footage of repairs made.

Our timber yard is all cleaned up of old timber and we are receiving it as it is consumed, never allowing more than a 60 day supply to accumulate. By this plan of ordering timber, we will never have to cull any quantity like was the case in 1932 and 1933. The amount of timber culled in 1933 is reflected in the cost per ton of ore which is the highest in many years.

Statement of Timber Used

| <u>Kind</u>             | <u>Linnear<br/>Feet</u> | <u>Price</u> | <u>Amount<br/>1934</u> | <u>Amount<br/>1933</u> |
|-------------------------|-------------------------|--------------|------------------------|------------------------|
| 6" x 8" Cribbing Timber | 190,604                 | .0334        | 6,363.44               | 5,455.04               |
| 8" x 10" Stull "        | 43,623                  | .0552        | 2,406.73               | 1,138.02               |
| 10" x 12" " "           | 67,850                  | .0781        | 5,297.46               | 2,903.21               |
| 12" x 14" " "           | 27,943                  | .0982        | 2,743.24               | 3,792.68               |
| 12" x 14" Treated "     |                         |              |                        | 3,084.79               |
| Total Timber - 1934     | 330,020                 | .0509        | 16,810.87              |                        |
| Total " - 1933          | 214,084                 |              |                        | 16,373.74              |
| 7' Lagging              | 981,913                 | .678         | 6,661.73               | 3,309.87               |
| 9½' Poles               | 489,240                 | 1.185        | 5,800.81               | 3,557.65               |
| Total - 1934            | 1,471,153               |              | 12,462.54              |                        |
| Total - 1933            | 773,792                 |              |                        | 6,867.52               |
| Wire Fencing - Sq. Ft.  | 26,125                  | .0062        | 161.95                 | 44.45                  |
| Grand Total - 1934      |                         |              | 29,435.36              |                        |
| Grand Total - 1933      |                         |              |                        | 23,285.71              |

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7. UNDERGROUND (Cont.)

d. Timbering (Cont.)

|   | <u>Amount</u><br><u>1934</u> | <u>Amount</u><br><u>1933</u> |
|---|------------------------------|------------------------------|
| Product, Tons                               | 278,985                      | 131,574                      |
| Feet of Timber per ton of Ore               | 1.183                        | 1.627                        |
| Feet of Lagging per ton of Ore              | 3.5196                       | 3.9497                       |
| Feet of Poles per ton of Ore                | 1.7536                       | 1.9314                       |
| Feet of Wire Fencing per ton of Ore         | .0234                        | .0261                        |
| Feet of Lagging per Foot of Timber          | 2.9753                       | 2.4274                       |
| Feet of Poles per Foot of Timber            | 1.4824                       | 1.1870                       |
| Cost per ton for Timber                     | .0602                        | .1244                        |
| Cost per ton for Lagging                    | .0239                        | .0252                        |
| Cost per ton for Wire Fencing               | .0006                        | .0003                        |
| Cost per ton for Poles                      | .0208                        | .0270                        |
| Cost per ton for all Timber                 | .1055                        | .1769                        |
| Equivalent of Stull Timber to Board Measure | 587,534                      | 439,889                      |
| Feet of Board Measure per ton of Ore        | 2.106                        | 3.343                        |

Total Cost for Timber, Laggings, Poles, Etc. and Cost per Ton

| <u>Year</u> | <u>Amount</u> | <u>Cost per Ton</u> |
|-------------|---------------|---------------------|
| 1934        | 29,435.36     | .1055               |
| 1933        | 23,285.71     | .1769               |
| 1932        | 10,857.50     | .1199               |
| 1931        | 32,879.88     | .1076               |
| 1930        | 42,731.94     | .1025               |
| 1929        | 43,332.70     | .1305               |
| 1928        | 28,083.62     | .1074               |

e. Drifting and Raising

The following is a comparison of the drifting and raising in the years 1934 and 1933:

| <u>Year</u> | <u>Drifting</u> |             | <u>Raising</u> |             |
|-------------|-----------------|-------------|----------------|-------------|
|             | <u>Ore</u>      | <u>Rock</u> | <u>Ore</u>     | <u>Rock</u> |
| 1934        | 1,296           | 541         | 2,889          | 721         |
| 1933        | 1,057           | 1,439       | 1,805          | 146         |
| Increase    | 239             |             | 1,084          | 575         |
| Decrease    |                 | 898         |                |             |

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7. UNDERGROUND (Cont.)

e. Drifting and Raising (Cont.)

The increase in ore drifting is due to the large amount of sub-level development from the raises put up from the 5th Level and the drifts on the 4th Level connecting these raises.

The decrease in rock drifting is due to only a small amount of rock work being done this year in connection with the 5th Level development.

The large increase in both ore and rock raising is due to putting up 24 new raises from the 5th Level during 1934.

f. Explosives, Drilling and Blasting

The cost per ton for all explosive shows a small decrease, being \$ .0614 compared with \$ .0634 in 1933, and is due to lower price paid for powder. The amount of fuse used the past year is high and due to the raising done where we increased the length 2 feet for each 50 feet after reaching a height of 50 feet above the level, that is, a 6 foot fuse is used to a height of 50 feet, 8 foot from 50 feet to 100 feet, and 10 feet from 100 feet to 150 feet.

We also purchased two blasting machines and have been blasting with electric caps in wet places. The electric caps cost \$ .1035 each compared with #6 blasting caps of \$1.14 per hundred.

There was a decrease in explosives used on rock development as only a small amount of rock drifting was done the past year compared with the development on the 5th Level in 1933. The large footage of rock raising in 1934 was more than offset by the decrease in rock drifting.

Stoping and Ore Development

| <u>Kind</u>                | <u>Quantity<br/>Pounds</u> | <u>Average<br/>Price</u> | <u>Amount<br/>1934</u> | <u>Amount<br/>1933</u> |
|----------------------------|----------------------------|--------------------------|------------------------|------------------------|
| 1 1/4" 40% Amonia Gel.Pwd. | 1,950                      | .1050                    | 204.75                 |                        |
| 1 1/4" 50% " " "           | 119,745                    | .1130                    | 13,533.09              | 4,935.25               |
| 1 1/4" 60% " " "           | 180                        | .1225                    | 22.05                  | 306.25                 |
| 1 1/4" Gelamite "A"        |                            |                          |                        | 1,425.00               |
| 1 1/4" " 2X                |                            |                          |                        | 125.00                 |
| Total Powder 1934          | 121,875                    | .1129                    | 13,759.89              |                        |
| " " 1933                   | 57,870                     | .1173                    |                        | 6,791.50               |



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7. UNDERGROUND (Cont.)

f. Explosives, Drilling and Blasting (Cont.)

| <u>Kind</u>            |        | <u>Quantity</u><br><u>Pounds</u> | <u>Average</u><br><u>Price</u> | <u>Amount</u><br><u>1934</u> | <u>Amount</u><br><u>1933</u> |
|------------------------|--------|----------------------------------|--------------------------------|------------------------------|------------------------------|
| Fuse                   | ft.    | 405,775                          | .562 C Ft.                     | 2,280.76                     | 1,128.15                     |
| #6 Blasting Caps       | No.    | 63,768                           | 1.14 C                         | 729.66                       | 349.77                       |
| Electric " "           | Ea.    | 775                              | .1035                          | 80.26                        |                              |
| Powder Bags            | Ea.    | 54                               | 1.97½                          | 106.65                       | 51.36                        |
| Tamping Bags           | M      | 8,000                            | 2.15 M                         | 17.25                        |                              |
| Fuse Lighters          | M      | 9,500                            | 6.75 M                         | 64.13                        | 20.93                        |
| Fuse Seal              | Pt.Can | 20                               | .60 Pt.                        | 12.00                        |                              |
| Blasting Machines      | Ea.    | 2                                | 35.00                          | 70.00                        |                              |
| Total Fuse, Caps, etc. |        |                                  |                                | <u>3,360.71</u>              | <u>1,550.21</u>              |
| Total All Explosives   |        |                                  |                                | 17,120.60                    | 8,341.71                     |

|                                   |  |         |         |
|-----------------------------------|--|---------|---------|
| Product, Tons                     |  | 278,985 | 131,574 |
| Pounds of Powder per ton of Ore   |  | .4368   | .4393   |
| Cost per ton for Powder           |  | .0493   | .0516   |
| Cost per ton for Fuse, Caps, Etc. |  | .0120   | .0118   |
| Cost per ton for all Explosives   |  | .0614   | .0634   |

Rock Development & Filling

|  |     |        |           |               |               |
|--|-----|--------|-----------|---------------|---------------|
| 1½" 50% Amonia Gel. Powder               |     | 7,205  | .1130     | 814.44        | 929.70        |
| 1½" 60% " " "                            |     | 1,870  | .1225     | 229.08        | 393.88        |
| 1½" Gelamite "A"                         |     |        |           |               | 12.50         |
| Total Powder, 1934                       |     | 9,075  | .1150     | 1,043.52      |               |
| Total " 1933                             |     | 11,130 | .1200     |               | 1,336.08      |
| Fuse                                     | Ft. | 35,699 | .546 Cft. | 195.00        | 227.25        |
| #6 Blasting Caps                         |     | 5,312  | 1.13 C    | 60.06         | 66.09         |
| Total Fuse, Caps, etc.                   |     |        |           | 255.06        | 293.34        |
| Total All Explosives                     |     |        |           | 1,298.58      | 1,629.42      |
| Total Explosives used at Mine            |     |        |           | 18,419.18     | 9,971.13      |
| Average price per pound for powder       |     |        |           | .11304        | .11779        |
| Percentage of 1½" 40% Amonia Gel. Powder |     |        |           | 1.6           |               |
| Percentage of 1½" 50% " " "              |     |        |           | 98.25         | 71.25         |
| Percentage of 1½" 60% " " "              |     |        |           | .15           | 27.85         |
| Percentage of 1½" Gelamite "A"           |     |        |           |               | .90           |
| Total                                    |     |        |           | <u>100.00</u> | <u>100.00</u> |

Statement showing cost per ton for Explosives, exclusive of rock development, for the period 1928 to 1934:

| <u>Year</u> | <u>Cost per Ton</u> | <u>Production</u> |
|-------------|---------------------|-------------------|
| 1934        | .0614               | 278,985           |
| 1933        | .0634               | 131,574           |
| 1932        | .0593               | 90,531            |
| 1931        | .0629               | 305,604           |
| 1930        | .0603               | 416,653           |
| 1929        | .0654               | 331,922           |
| 1928        | .0607               | 261,454           |

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7. UNDERGROUND (Cont.)

h. Mining and Loading

All the ore mined has been handled with scrapers. We have had three places where the ore has had to be transferred. On account of the long haul and size of scraper used in these transfer subs, we have used 20 H.P. and 25 H.P. hoists. The standard hoist in contracts mining direct into raises is 10 and 15 H.P. We still have two  $6\frac{1}{2}$  H.P. hoists in operation but they are not efficient and they should be replaced with larger units when we can afford to purchase new equipment. In order to put all our contracts on day shift, which is more efficient than night work, we have borrowed a 15 H.P. Ingersoll-Rand hoist from the Spies Virgil Mine and will order two more. We have six gangs double shift, so by working each gang four days every other week, the same time as the other ones on single shift, three hoists will be sufficient.

We have been using the scraper hoist to handle the timber up the raises into the working places. We find this arrangement causes delays in the mining operation and we are having our old double drum air hoists changed over to single drum machines and will use these in some of the places as we only have about 12 air hoists that are in shape to be reconditioned.

i. Ventilation

The ventilation condition has been improved over what it was early in the year when we had isolated contracts on the 170' and 160' sub levels. Booster fans are used on the levels to provide ventilation in the sub levels but at best it is not always effective. The temperature of many of the working places is high and the efficiency of the men greatly impaired.

A survey of the air being forced into the mine disclosed that the airways were not of sufficient size to allow the required amount to reach the Maas Mine. During the summer the Negaunee No. 2 shaft (ventilating shaft) was repaired and retimbered for a distance of 102'. 200' of drift on the  $6\frac{1}{2}$ ' level was cleaned of timber and rock slabbed from the sides and enlarged in places to give a maximum area of 120 square feet. On the 9th Level, 600 feet of drift was cleaned and repaired. The Maas Mine paid for one half of the cost of all the above work, except the shaft repairs, as this would have had to be done for the Negaunee Mine account.

The middle of October, we sent two of our raising crews to the Negaunee Mine to put up new raises and enlarge others so as to increase the airways and amount of air reaching the Maas Mine. They stripped a

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7. UNDERGROUND (Cont.)

i. Ventilation (Cont.)

a raise between the 9th and 6½ level a distance of 115' from a 4' x 4' open raise to 8' x 8' without timber. They then moved to the 10th Level and are putting up a rock raise to the 9th Level, vertical distance of 100', incline distance 140'. The size of the raise is 8' x 8' and will double the present airways. This work directly affecting the Maas Mine, is all being charged to us. The work done so far has increased the air 15,000 cubic feet.

j. Pumping

The number of gallons pumped per minute during 1934, 1933, 1932, 1931 and 1930 are shown below:

| <u>Month</u>  | <u>1934</u> | <u>1933</u> | <u>1932</u> | <u>1931</u> | <u>1930</u> |
|---------------|-------------|-------------|-------------|-------------|-------------|
| January       | 1,036       | 1,039       | 1,103       | 925         | 1,102       |
| February      | 1,034       | 1,065       | 1,156       | 1,114       | 1,042       |
| March         | 1,014       | 1,049       | 1,105       | 1,124       | 1,036       |
| April         | 1,014       | 1,052       | 1,090       | 1,149       | 1,080       |
| May           | 1,023       | 1,070       | 1,085       | 1,147       | 1,094       |
| June          | 1,031       | 1,071       | 1,070       | 1,134       | 1,009       |
| July          | 1,075       | 1,047       | 1,083       | 1,135       | 1,106       |
| August        | 1,044       | 1,068       | 1,079       | 1,061       | 1,095       |
| September     | 1,085       | 1,070       | 1,076       | 1,091       | 1,103       |
| October       | 1,080       | 1,029       | 1,087       | 1,115       | 1,202       |
| November      | 1,072       | 1,047       | 1,089       | 1,113       | 1,147       |
| December      | 1,079       | 1,050       | 1,101       | 1,232       | 1,108       |
| Total average | 1,049       | 1,055       | 1,094       | 1,112       | 1,102       |

9. EXPLORATIONS  
AND FUTURE  
EXPLORATIONS

There was no exploration by diamond drilling at the Maas Mine except in connection with No. 22 hole put down to test the condition existing over the mined area on the Maas property, South and East of the Race Course, and adjacent to the Negaunee Mine, which had been mined for a vertical distance of 160' over an area about 500 feet square and had not caved through to surface.

A condition like this is unusual and may not be safe unless sufficient of the hanging has broken away to fill in the opening made by the removal of the ore and form a matting when

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9. EXPLORATIONS  
AND FUTURE  
EXPLORATIONS (Cont.)

the cave does go through to surface. In December 1933, it was decided to put down a churn drill hole in the center of the mined area from surface to determine actual conditions. As drilling had to be done from dangerous ground, every precaution possible was taken. A trolley line of 5/8" steel cable was stretched from high poles set in the ground 150' back in the safe area. The poles were anchored and guyed. There was a trolley for each man working at the drill. A rope fastened to the trolley is tied to a safety belt worn by the man. In case the ground should cave, the men would hang up to the trolley line. A hand winch is fastened to one of the poles and a rope goes out to a rope ladder attached to the trolley. In case of necessity, the men were instructed to limb onto this ladder and be pulled in to safe ground. The crew was large enough so that one man was left on watch at the pole.

The Armstrong No. 29 steel churn drill from the Tilden Mine was used on this hole. Drilling actually started on December 20th, 1933. Eight inch pipe was driven to broken ledge which was encountered at 156'. Then a six inch pipe was put inside and a six inch hole drilled in ledge. Solid ledge was struck at 165'.

No water was found above ledge, which seemed to indicate that the ledge is dipping to the east and the surface water is draining into the Maas-Negaunee cave to the East. There was some seepage in the ledge, but not very much, as the water did not rise in the hole to the top of ledge between shifts. The fact that the water accumulated in the hole, gave us a feeling that the ground was solid and we felt more secure in working over the area, there being little danger of a sudden cave. The ground was hard Jasper and progress averaged about 15 feet per day. Drilling went along smoothly until the 13th of February when the drill encountered softer material and the bit stuck in the hole at a depth of 561'.

Work of trying to jar it loose with a 150 pound bumper attached to the bailer rope at the same time taking a strain on the drill cable, was started without effect. A 500 pound bumper was machined from an old drill stein and tried but the drill cable broke due to the excessive strain and it was impossible to recover the string of tools.

It was then decided to wedge off a diamond drill hole from the top of the stuck tools and finish the hole through to the underground workings. A wedge was cast at the Lake Shore Engine Works and a diamond drill outfit set up. The hole was cemented to a point above the top of the churn drill tools and the wedge set on top of the cement plug. The churn drill hole encountered trouble on February 13th and the diamond drill was not started until March 21st.

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9. EXPLORATIONS  
AND FUTURE  
EXPLORATIONS (Cont.)

The top of the wedge was 530' below the collar of the hole and was 15' long and was set so as to have the hole drill to the Northwest. Difficulty was encountered at the start due to caving ground, which, no doubt, was the cause of the churn drill tools sticking. The hole was cased as drilled. Drilling into the rock started at 540' and continued to a depth of 662' on April 10th, when the drill went through into space.

The following tabulation shows the results of diamond drillings:

540' - 552' - Iron formation and seams of dike.  
552' - 650' - Iron formation.  
648' lost water and hole cemented.  
650' - 661' - Iron formation, drilled out cement.  
660' lost water and hole cemented.  
661' - 662' - Drilled out cement, lost water at 662'  
and went through into space.  
662' - 688' - Space from bottom of hole to top of caved  
ground 26'.

The hole discloses the following points:

156' - Surface material, dry.  
506' - Hard rock with little water.  
26' - Space from back of capping to top of  
pile of broken ground.  
512' - Broken ground on top of workings.  
Sufficient protection for any sudden  
drop from the back.

In order to be able to tell how fast the cave is working upward, a cement plug was put in at 600' or 62' above the point where the hole drilled through. A line of one inch pipe is resting on this plug and when it drops away, the pipe will drop as far as a clamp which is fastened to the pipe about 24 inches above the collar of the hole. After it breaks away, another plug will be put in higher up and in this way we can keep a record of how fast the capping is dropping off and know when to expect a break through to surface.

The total cost of drilling Hole No. 22, begun in December, 1933 and finished in April, 1934, was \$3739.15.

A new fence 7' high was built around the South and East sides of the dangerous ground. One width of 48" wire fencing was used on the bottom and then two strands of barbed wire on top, which we hope will keep the children and cattle out of the enclosure.

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10. TAXES

|                             | 1934         |            | 1933         |            |
|-----------------------------|--------------|------------|--------------|------------|
|                             | Valuation    | Taxes      | Valuation    | Taxes      |
| Maas Mine                   | \$ 1,225,000 | 32,832.82  | \$ 1,060,000 | 29,408.64  |
| Race Course                 | 800,000      | 21,441.84  | 760,000      | 21,085.44  |
| Adams Strip                 | 190,000      | 5,092.44   | 180,000      | 4,993.92   |
| Stockpile&Equipment         | 625,000      | 16,751.44  | 835,000      | 23,166.24  |
| Miscellaneous Parcels       | 12,700       | 340.48     | 12,100       | 335.72     |
| Total Mine                  | 2,852,700    | 76,459.02  | 2,847,100    | 78,989.96  |
| Collection Fees             |              | 764.59     |              | 789.90     |
| Total Optg.Maas Mine        |              | 77,223.61  |              | 79,779.86  |
| Tax Rate                    |              | 2.6802     |              | 2.774      |
| Total, City of Negaunee Tax |              | 336,047.04 |              | 354,107.70 |
| Maas Mine % of City Tax     |              | 23.0%      |              | 23.2%      |
| Maas Mine Rented Houses \$  | 247,600      | 6,636.23   | 238,900      | 6,628.14   |
| Mineral Lands, etc.         | 21,700       | 660.09     | 24,100       | 668.63     |
| Total Houses & Lands        | 269,300      | 7,296.32   | 263,000      | 7,296.77   |
| Collection Fee              |              | 72.18      |              | 72.97      |
| Total                       |              | 7,368.50   |              | 7,369.74   |

11. ACCIDENTS  
AND  
PERSONAL  
INJURY

|  | 1934 | 1933 |
|--|------|------|
| Fatal  | 0    | 2    |
| Time lost, over 4 months   | 1    | 0    |
| " " 1 to 4 "   | 2    | 0    |
| " " less than 1 month  | 1    | 2    |
| Total accidents  | 4    | 4    |
| Number of cases paid compensation<br>for accidents prior to Jan. 1, 1934 | 6    | 6    |
| Number of cases paid difference in wages                                 | 0    | 0    |

There were four lost time accidents during the year compared with two for the previous one. The first accident occurred on January 31st at 11:30 A. M. to Albin Seppanen, who was employed in No. 50 contract on the 160' sub level. Seppanen and his partner were lifting a cap and as he reached up to slide it into place, he felt a sharp pain. This happened on the last day of his working period and he worked again on February 8th, 9th and 10th, his next regular working days and was operated on for hernia on the 12th. This was one of few hernia cases caused from lifting that has ever been considered an accident. He was home 9 weeks receiving \$162.00 compensation. When he returned to work he went back to the Negaunee Mine.

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11. ACCIDENTS  
AND  
PERSONAL  
INJURY

John Antell, Dryman and Fireman, was injured on April 30th at 3:00 P.M. He was throwing kerosene into the boiler to clean out the flues, when the fire shot back, burning both his hands and face. This method of cleaning flues is prohibited and when Antell was discharged by the doctor and had worked a week, he was disciplined by being given a lay off. Antell was home 3 weeks receiving \$38.79 compensation.

Matt Hill, miner, employed in No. 27 contract, 284 Raise, 160' sub level, was injured on September 20th at 4:30 P.M. Hill was working with the timbermen, taking out the scraper hoist to send it down to the level as they had finished their place. The hoist was wedged in by the crushing timbers and the space was small. They were trying to move the hoist on its own power, the rope broke and the hoist swung around suddenly in Hill's direction and struck his left leg, causing a fracture internal malcolus comminuted fracture fibula (lower extremity). Hill is still home and will be for some time. Due to some condition, new bone is forming very slowly. To December 31st he has received \$252.00 in compensation.

Leo Laneville, Chuteman, on a 5th Level motor, was injured on October 17th at 7:00 P.M. Laneville was working with Trewhella, motorman, and had thrown the switch against their train as they went in to load cars. When they came out with a loaded train, Trewhella noticed the open switch too late to stop his train and he and his crew jumped. Laneville landed in the drainage ditch and sustained a hernia. He was home 11-1/3 weeks, receiving \$183.15, compensation.

12. NEW CONSTRUCTION  
AND PROPOSED NEW  
CONSTRUCTION

There was no new construction during the year 1934 and we do not contemplate any at this time for 1935.

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13. EQUIPMENT  
AND PROPOSED  
EQUIPMENT

a. Steam Shovels

The No. 16 shovel, which was stored at the Negaunee Mine during the winter, was gone over and put in running condition in April. It was operated the entire season with only a few delays on account of mechanical troubles. At the end of the season it was taken to the General Shops at Ishpeming for a thorough overhauling.

The No. 44 shovel, an 85C model, which had been reconditioned during the winter of 1933-1934, was moved to the Maas Mine in May and loaded ore from the steel trestle. This shovel is in good repair and is stored at the Maas for the winter.

b. Stockpile Trestles

After taking part of a cut along the South side of the Maas pile, this trestle was repaired by putting in several new legs and then adding 7 new bents to the west.

c. Scraper Hoists

The hoists on hand December 31st, 1934 were as follows:

|                           |                  |           |
|---------------------------|------------------|-----------|
| Ingersoll-Rand            | 15 H.P. Electric | 8         |
| "                         | 10 H.P. "        | 3         |
| Sullivan                  | 25 H.P. "        | 2         |
| "                         | 20 H.P. "        | 1         |
| "                         | 15 H.P. "        | 15        |
| "                         | 7½ H.P. "        | 1         |
| "                         | 6½ H.P. "        | 4         |
| Total Electric Hoists     |                  | <u>34</u> |
| Ingersoll-Rand Air Hoists |                  | 15        |

There are 32 contracts employed at the Maas Mine, 29 mining and 3 raising. The raising gangs are using air hoists. The 34 electric hoists are all in use and divided as follows: 29 in the contracts, 4 used in transferring the ore mined from a higher elevation and one in the skip pit level. It will be noted we are still using 6½ H.P. and 7½ H.P. hoists, which are much too light for efficient operation. Of the 29 contracts, 6 are working double shift. This



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13. EQUIPMENT  
AND PROPOSED  
EQUIPMENT (Cont.)

c. Scraper Hoists (Cont.)

was due to not having the working places developed in the Bessemer area and also to lack of scraper hoists. A night operation at best is not efficient but more especially with only a part crew. Three additional hoists are necessary to eliminate the night shift crews. This will be done early in 1935. An Ingersoll-Rand 15 H.P. hoist has been borrowed from the Spies Virgil Mine and 2 new Sullivan 15 H.P. hoists will be ordered. Even with this additional equipment, we do not have any spares.

We have had three of the double drum air hoists changed to single drums for handling timber up raises and three more changed at a time until all are reconditioned for this service.

d. Underground Cars

Three underground motor cars were received in February. These were ordered on E&A #640. They were taken to the 3rd Level.

14. MAINTENANCE  
AND REPAIRS

There were no extraordinary repairs made during the year. All the equipment has been kept in good working condition and there have been no serious breakdowns causing a heavy repair expense.

The following are the main items of maintenance and repairs;

- February - Changed North Skip
- March - Changed South Skip
  - Put on new cage rope and spliced in 500' in top tram rope.
  - Put on new brake band on skip hoist.
- April - South skip rope changed end for end and new one put on in August after handling 90,685 tons of ore.
- May - New rope put on North skip after handling 131,000 tons.
- October - Changed South skip
- December - Changed North skip.

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15. POWER

Electric power was supplied by the Cliffs Power & Light Company, a subsidiary of the Cleveland-Cliffs Iron Company. The rate charged for current since May, 1934, has been based on the power factor and 15 minute peak load, instead of a flat rate of \$ .015 per K.W.H. as previously. The rate for the eight months was as follows:

|                            |                    |
|----------------------------|--------------------|
| January to April inclusive | \$ .015 per K.W.H. |
| May                        | .0146 "            |
| June                       | .0142 "            |
| July                       | .0144 "            |
| August                     | .0142 "            |
| September                  | .0158 "            |
| October                    | .0146 "            |
| November                   | .0146 "            |
| December                   | .0146 "            |

The high rate in September is due to a high 15 minute peak account of starting too many pumps during the interval. The auxiliary steam turbine plant at the Maas Mine was not operated during the year.

17. CONDITIONS OF PREMISES

There were no improvements of the grounds around the mine. The grounds were kept in good condition through the year.

18. NATIONALITY OF EMPLOYEES

| <u>As to Parentage</u> | <u>1934</u> | <u>%</u>     | <u>1933</u> | <u>%</u>     |
|------------------------|-------------|--------------|-------------|--------------|
| English                | 92          | 29.7         | 86          | 29.9         |
| Finnish                | 123         | 39.8         | 111         | 38.5         |
| Italian                | 29          | 9.4          | 26          | 9.0          |
| Swedish                | 23          | 7.4          | 23          | 8.0          |
| Germans                | 8           | 2.6          | 9           | 3.1          |
| Crotains               | 1           | .4           | 1           | .4           |
| Norwegians             | 3           | 1.0          | 2           | .7           |
| Danes                  | 3           | 1.0          | 4           | 1.4          |
| Irish                  | 6           | 1.9          | 6           | 2.1          |
| French (Canadian)      | 18          | 5.8          | 16          | 5.5          |
| Americans              | 3           | 1.0          | 4           | 1.4          |
|                        | <u>309</u>  | <u>100.0</u> | <u>288</u>  | <u>100.0</u> |

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18. NATIONALITY OF  
EMPLOYEES (Cont.)

| <u>As to Birth</u> | <u>Total</u> |             | <u>American Born</u> |             | <u>Foreign Born</u> |             |
|--------------------|--------------|-------------|----------------------|-------------|---------------------|-------------|
|                    | <u>1934</u>  | <u>1933</u> | <u>1934</u>          | <u>1933</u> | <u>1934</u>         | <u>1933</u> |
| English            | 92           | 86          | 44                   | 32          | 48                  | 54          |
| Finnish            | 123          | 111         | 51                   | 38          | 72                  | 73          |
| Italian            | 29           | 26          | 9                    | 6           | 20                  | 20          |
| Swedish            | 23           | 23          | 17                   | 12          | 6                   | 11          |
| German             | 8            | 9           | 6                    | 8           | 2                   | 11          |
| Crotains           | 1            | 1           | -                    | -           | 1                   | 1           |
| Norwegians         | 3            | 2           | 2                    | 1           | 1                   | 1           |
| Danes              | 3            | 4           | 2                    | 3           | 1                   | 1           |
| Irish              | 6            | 6           | 6                    | 6           | -                   | -           |
| French (Canadian)  | 18           | 16          | 18                   | 16          | -                   | -           |
| Americans          | 3            | 4           | 3                    | 4           | -                   | -           |
| <b>Total</b>       | <b>309</b>   | <b>288</b>  | <b>158</b>           | <b>126</b>  | <b>151</b>          | <b>162</b>  |
| <b>Percentage</b>  |              |             | <b>51%</b>           | <b>44%</b>  | <b>49%</b>          | <b>56%</b>  |

It will be noted that this is the first time that the percentage of American born exceeds the foreign born.

19. MAAS CRUSHER

Work on repairs and putting the Crushing Plant in operating condition was started on April 16th with a crew of 4 men. New concaves were put in the crusher, belt conveyor motor cleaned and overhauled, and plates renewed in the pockets.

Operations started on May 9th and were intermittent throughout the season, working only a few shifts per month. A total of 37 shifts were worked compared with 77 in 1933. Besides the operating days about 12 days were spent in cleaning up the spill for the past several seasons and minor repairs.

Ore from the Cliffs Shaft, Morris, Lloyd, Negaunee, Maas and Morris for the Inland Steel was put through the plant as follows:

| <u>Mine</u>            | <u>1934</u>   | <u>1933</u>    | <u>Incr.</u> | <u>Decr.</u>  |
|------------------------|---------------|----------------|--------------|---------------|
|                        | <u>Tons</u>   | <u>Tons</u>    | <u>Tons</u>  | <u>Tons</u>   |
| Cliffs Shaft           | 7,986         |                | 7,986        |               |
| Lloyd & Morris         | 22,671        | 108,925        |              | 86,254        |
| Negaunee               | 973           | 16,159         |              | 15,186        |
| Maas                   | 1,690         | 4,700          |              | 3,010         |
| Athens                 |               | 2,808          |              | 2,808         |
| <b>Total C.C.I.Co.</b> | <b>33,320</b> | <b>132,592</b> |              | <b>99,272</b> |
| Morris-Inland Steel    | 6,062         | 559            | 5,503        |               |
| <b>Total</b>           | <b>39,382</b> | <b>133,151</b> |              | <b>93,769</b> |

ATHENS MINE  
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1. GENERAL:

The Athens Mine operated on a three day per week schedule until September 1st when the working time was reduced to two days per week. The mine actually operated six days per week to September and four days since September, with two crews of men, which gave employees three days per week for eight months and two days per week for the last four months of the year. When operating six days per week, one crew worked the last three days of the week and the first three days of the following week, which gave each man six successive days work in each half month or an average of thirteen days per month. Since the two day schedule was adopted, each crew has worked four successive days in alternate weeks or an average of nine days per month. Under the present plan of operation the mine is idle three successive days each week. The division of the working force into two crews gives a more continuous operation with less idle time which is of great benefit from the operating standpoint. It decreases by one half the number of working places and equipment required by the miners, it also reduces expense for repairs of traveling and ventilation roads on account of fewer openings to maintain. However, the mine was developed for a much larger production with the result that a number of raises are idle. The six months idle periods in 1932 and 1933 accelerated the rotting of cribbing, hardwood lining plank, sollars and ladders in all the raises. The raises in use have been kept in repair but practically all the idle ones are in bad condition and extensive repairs must soon be undertaken to prevent caving and loss of the raises.

Satisfactory costs are impossible on the present basis of operation due to the heavy maintenance expense and the fixed costs that do not vary with the product. During 1934 there was an unusual expense for maintenance on surface, namely, new ties on the permanent steel trestle west of the shaft and new ties on the steel stocking trestle north east of the shaft. This was a continuation of the work begun in 1933, that of replacing all ties on the steel trestles for the first time since the trestle was built in 1922. This expense will not be incurred again for at least 12 to 15 years.

Production from the area being mined above the 8th level has been below normal account of the heavy flow of water. The unfavorable operating conditions here are due to the cave to surface that occurred in June 1932. An effort will be made to cut off the water by pumping the Breitung Hematite Mine, an adjoining property owned by the Jones & Laughlin Steel Company. It is planned to lower the water in this mine sufficiently to cause the water in the swamp south of the Athens cave to reverse its flow (from the Athens cave over to the Breitung Hematite Mine). An easement has been granted by the Jones & Laughlin Steel Company and it is expected that the work will be undertaken early in 1935. A few weeks test will determine if the reduction in amount of water entering the Athens Mine warrants continued pumping at the Breitung property.

Shipments in 1934 were 139,021 tons of which 77,393 tons came from stockpile. In 1933, shipments were 237,283 and tonnage from stockpile was 230,997 tons, the decrease in 1934 was 68%. There is ample stocking room available however, for the winter of 1934-1935 even if production is increased before the shipping season opens.

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1. GENERAL: (Cont'd)

Extensive repairs and revamping of the timber treating plant was undertaken in the early part of the summer. As a result the cost of treating timber has been reduced approximately 40% and the capacity of the plant materially increased. Due to higher temperatures in the hot tank better penetration of the treating agent, Zinc Chloride, has been obtained which should increase the life of the treated timber. The first timber treated with Zinc Chloride (1925) is now being replaced in the mine. The treated timber, therefore, has a life of from eight to nine years as compared with a life of from 18 months to two years for untreated timber.

The heating system at the mine was revamped this year, individual heating plants being installed in the office and engine houses. Both buildings are over 400 ft. from the heating plant; the original steam lines had rotted and would have had to be replaced. To reduce the heating cost account of the long steam lines and replacement cost of same, it was decided to install individual heating plants in these two buildings. The old steam line from the heating plant to the shop building was also replaced and later it is planned to replace the pipe heaters in the shops with unit heaters. Heaters of the unit type have been in service at the Negaunee Mine for over a year and have given excellent satisfaction. The work was covered by E. & A. No.649.

The mine operated all the year as compared with a five months operating and seven months idle period in 1933. There was one lost time accident in 1934 as compared with one in 1933. General safety meetings for all foremen were held at the Ishpeming office and local meetings at Negaunee. The general discussions arising at these meetings are of great value in keeping the foremen alive to the many dangers that confront the workmen. Many good safety suggestions are made and put into effect in the mines. Due to the physical structure of the Athens ore, this mine has the greatest hazard from falls of ground of any of the soft ore mines operated by the company. Extraordinary efforts are necessary to prevent accidents. The greatest hazard lies in the failure of the miners to observe the safety standards that have been adopted for all operations. To overcome this it is necessary to constantly instruct the men and to inflict penalties for violations. It is believed that the workmen are more alive to the hazards of their occupation than ever before but elimination of accidents can only be approached by eternal vigilance.

The two days per week schedule of operation in effect since September give the men an average of nine days per month which provides barely a living wage for an average size family. The large families, comprising six to fourteen persons are compelled to get help from outside sources. It is hoped that an increased schedule of operations will soon go into effect. The morale of the men is not good and a feeling of unrest will probably develop if conditions show no improvement in 1935.

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2. PRODUCTION,  
SHIPMENTS &  
INVENTORIES:

a. Production by Grades:

|                | <u>1934</u> | <u>1933</u> | <u>Increase</u> |
|----------------|-------------|-------------|-----------------|
| Athens Ore     | 109,116     | 37,590      | 71,526          |
| Mitchell Lease | 53,590      | 9,778       | 43,812          |
| Total Ore      | 162,706     | 47,368      | 115,338         |
| Rock           | 3,751       | 2,138       | 1,613           |
| Total Hoist    | 166,457     | 49,506      | 116,951         |

b. Shipments:

| <u>Grade of Ore</u> | <u>Pocket</u><br><u>Tons</u> | <u>Stockpile</u><br><u>Tons</u> | <u>Total</u><br><u>Tons</u> | <u>Total</u><br><u>Last Year</u> |
|---------------------|------------------------------|---------------------------------|-----------------------------|----------------------------------|
| Athens Ore          | 32,170                       | 77,333                          | 109,503                     | 224,663                          |
| Mitchell Lease      | 29,518                       | 0                               | 29,518                      | 12,620                           |
| Total               | 61,688                       | 77,333                          | 139,021                     | 237,283                          |
| Total Last Year     | 231                          | 237,052                         | 237,283                     |                                  |
| Decrease            |                              |                                 | 98,262                      |                                  |

c. Stockpile Inventories:

| <u>Grade of Ore</u> | <u>Dec. 31, 1934</u> | <u>Dec. 31, 1933</u> | <u>Stockpile</u><br><u>Overrun 1933</u> | <u>Total</u><br><u>1933</u> | <u>Increase</u> |
|---------------------|----------------------|----------------------|---|-----------------------------|-----------------|
| Athens Ore          | 119,452              | 49,245               | 70,594                                  | 119,839                     | 387             |
| Mitchell Lease      | 33,706               | 6,159                | 3,475                                   | 9634                        | 24072           |
| Total               | 153,158              | 55,404               | 74,069                                  | 129,473                     | 23685           |

d. Division of Product by Levels:

The ore hoisted from the various levels was as follows:

|           | <u>1934</u> |        | <u>1933</u> |        |
|-----------|-------------|--------|-------------|--------|
| 4th Level |             |        | 680         | 1.0%   |
| 6th Level | 79,700      | 48.9%  | 19,092      | 40.7%  |
| 8th "     | 82,600      | 50.8%  | 27,596      | 58.3%  |
| 9th "     | 406         | .3%    |             |        |
| Total     | 162,706     | 100.0% | 47,368      | 100.0% |

3. Production by Months:

The production by months is as follows:

| <u>Month</u> | <u>Athens</u> | <u>Mitchell</u> | <u>Total</u> | <u>Rock</u> |
|--------------|---------------|-----------------|--------------|-------------|
| January      | 8,803         | 3,604           | 12,407       | 1,056       |
| February     | 8,670         | 3,340           | 12,010       | 786         |
| March        | 9,240         | 3,689           | 12,929       | 303         |
| April        | 9,036         | 4,458           | 13,494       | 314         |
| May          | 9,881         | 6,709           | 16,590       | 102         |
| June         | 10,185        | 7,499           | 17,684       | 106         |
| July         | 9,896         | 6,374           | 16,270       | 169         |
| August       | 11,374        | 4,880           | 16,254       | 97          |
| September    | 7,798         | 3,693           | 11,491       | 18          |
| October      | 8,988         | 3,639           | 12,627       | 124         |
| November     | 8,270         | 2,475           | 10,745       | 345         |
| December     | 6,975         | 3,230           | 10,205       | 331         |
| Total        | 109,116       | 53,590          | 162,706      | 3,751       |
| Total 1933   | 37,590        | 9,778           | 47,368       | 2,138       |
| Increase     | 71,526        | 43,812          | 115,338      | 1,613       |

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2. Production:  
Shipments &  
Inventories:

f. Ore Statement:

|                         | <u>Athens</u> | <u>Mitchell Lease</u> | <u>Total</u> | <u>Total Last Year</u> |
|-------------------------|---------------|-----------------------|--------------|------------------------|
| On Hand Jan. 1, 1934    | 119,839       | 9,634                 | 129,473      | 245,319                |
| Product for Year        | 109,116       | 53,590                | 162,706      | (a) 121,437            |
| Overrun                 | 0             | 0                     | 0            | 0                      |
| Total                   | 228,955       | 63,224                | 292,179      | 366,756                |
| Shipments               | 109,503       | 29,518                | 139,021      | 237,283                |
| Balance on Hand         | 119,452       | 33,706                | 153,158      | 129,473                |
| Increase in Product     |               |                       | 41,269       |                        |
| Increase in Ore on Hand |               |                       | 23,685       |                        |

(a) Includes Athens overrun of 70,594 tons and Mitchell Lease overrun of 3,475 tons or a total of 74,069 tons taken up in 1933 product.

1934 - 1 8-hour shift, 6 days per week with 2 crews  
Jan. 1st to Sept. 4th.  
1 8-hour shift, 4 days per week with 2 crews  
Sept. 4th to Dec. 31st.

1933 - 1 8-hour shift, 4 days per week with 2 crews  
Jan. 1st to April 8th.  
Mine idle April 8th to Nov. 9th.  
1 8-hour shift, 6 days per week with 2 crews  
Nov. 9th to Dec. 31st

g. Delays:

There were no delays in 1934.

h. Delays from Lack of Current:

There were no delays from lack of current in 1934.

3. ANALYSIS:

a.

Average Mine Analysis on Output:

|                |             | <u>1934</u>  |               |               |                    |             | <u>Tons</u> | <u>1933</u>  |              |              |              |               |
|----------------|-------------|--------------|---------------|---------------|--------------------|-------------|-------------|--------------|--------------|--------------|--------------|---------------|
|                |             | <u>Iron</u>  | <u>Iron</u>   | <u>Moist.</u> | <u>Natl. Phosl</u> | <u>Sil.</u> |             | <u>Iron</u>  | <u>Iron</u>  | <u>Moist</u> | <u>Natl.</u> | <u>Phos.</u>  |
|                | <u>Tons</u> | <u>Dried</u> | <u>Moist.</u> | <u>Natl.</u>  | <u>Phosl</u>       | <u>Sil.</u> |             | <u>Dried</u> | <u>Moist</u> | <u>Natl.</u> | <u>Phos.</u> | <u>Silica</u> |
| Athens Ore     | 109,116     | 61.26        | 12.30         | 53.73         | .120               | 6.03        | 108,184     | 61.68        | 11.28        | 54.72        | .123         | 5.63          |
| Mitchell Lease | 53,590      | 61.28        | 12.78         | 53.45         | .125               | 6.41        | 13,253      | 61.65        | 11.28        | 54.70        | .134         | 5.74          |

b. Average Mine Analysis on 1934 Shipments

|                | <u>Tons</u> | <u>Ir. Dr.</u> | <u>Moist</u> | <u>Ir. Natl.</u> | <u>Phos.</u> | <u>Silica</u> |
|----------------|-------------|----------------|--------------|------------------|--------------|---------------|
| Athens         | 109,503     | 61.05          | 12.30        | 53.54            | .124         | 6.43          |
| Mitchell Lease | 29,518      | 61.31          | 12.78        | 53.47            | .126         | 6.47          |

c. High Sulphur Ore

No high sulphur ore was encountered in 1934.

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4. ESTIMATE  
OF ORE  
RESERVES:

a. Developed Ore:

Assumption: 12.75 cubic feet equals one ton  
10% deducted for rock  
10% deducted for loss in mining  
Percentage of Bessemer equals 0%

|                                 |                 |
|---------------------------------|-----------------|
| 4th Level and above             | 966,385 tons    |
| 4th " " to 6th Level            | 1,828,097 "     |
| 6th " " 8th "                   | 1,170,967 "     |
| 8th " " 9th "                   | 403,015 "       |
| 9th " " 10th "                  | 354,812 "       |
| Below 10th Level                | <u>49,236 "</u> |
| Total developed ore Dec.31,1934 | 4,772,512 "     |

An estimate of ore reserves was made this year, the first since 1931. Estimates in 1932 and 1933 were obtained by subtracting the output from the estimate made in 1931. Adding to the new estimate the product for 1934, and then subtracting this figure from last years estimate shows a decrease of 113,303 tons in developed ore. This decrease was mainly due to intrusion of jasper on footwall of the ore body on the Mitchell Lease above the 6th level and to increase in size of the lean ore area north of the fault dike above the 8th level.

b. Prospective Ore:

All ore in mine considered as developed since 1928.

c. Estimated Analysis:

|   |                  |              |               |              |             |             |             |             |              |               |
|---|------------------|--------------|---------------|--------------|-------------|-------------|-------------|-------------|--------------|---------------|
| <u>Ore Reserves: Approximate Expected Natural Analysis:</u> |                  |              |               |              |             |             |             |             |              |               |
| <u>Iron Dr.</u>   | <u>Iron Nat.</u> | <u>Phos.</u> | <u>Silica</u> | <u>Mang.</u> | <u>Alum</u> | <u>Lime</u> | <u>Mag.</u> | <u>Sul.</u> | <u>Igni.</u> | <u>Moist.</u> |
| 60.34   | 52.50            | .115         | 5.90          | .390         | 2.70        | 1.00        | .90         | .011        | 1.44         | 13.00         |
| <u>Ore in Stock: Average Natural Analysis:</u>              |                  |              |               |              |             |             |             |             |              |               |
| <u>Iron Dr.</u>   | <u>Iron Nat.</u> | <u>Phos.</u> | <u>Silica</u> | <u>Mang.</u> | <u>Alum</u> | <u>Lime</u> | <u>Mag.</u> | <u>Sul.</u> | <u>Igni.</u> | <u>Moist.</u> |
| 60.57   | 53.30            | .115         | 5.60          | .400         | 2.76        | 1.10        | .730        | .010        | 1.32         | 12.00         |

5. LABOR  
AND  
WAGES:

A. Comments:

(1) Labor:

There was no labor turnover in 1934. Efficiency of labor is above normal and loss of time except for sickness is practically unknown. Employees seem to be contented except that they want more days work per week. A few men have been employed during the year as needed for repair work and cleaning levels, the total is about the same as in 1932.

(1a) Wages:

There was an increase of 15% in wages on July 16th, 1933 and a 10% increase on April 1st, 1934.



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5. LABOR  
AND  
WAGES: (Cont'd)

a. Comments: (Cont'd)

(2) New Construction:

This will be reported under 12 - New Construction and Proposed New Construction. E. & A. No. 649 was authorized in 1934 and the work completed. There was no outside labor employed on E. & A. No. 649.

b. Comparative Statement of Wages and Product:

| PRODUCT                          | 1934               | 1933(a)           | Increase | Decrease |
|----------------------------------|--------------------|-------------------|----------|----------|
| No. Shifts and Hours             | 162,706<br>1 8-hr. | 47,368<br>1 8-hr. | 115,338  |          |
| <u>AVERAGE NO. MEN WORKING:</u>  |                    |                   |          |          |
| Surface                          | 43                 | 31                | 12       |          |
| Underground                      | 150                | 86                | 64       |          |
| Total                            | 193                | 117               | 76       |          |
| <u>AVERAGE WAGES PER DAY:</u>    |                    |                   |          |          |
| Surface                          | 4.03               | 3.57              | .46      |          |
| Underground                      | 4.77               | 4.01              | .76      |          |
| Total                            | 4.58               | 3.88              | .50      |          |
| <u>AVERAGE WAGES PER MONTH:</u>  |                    |                   |          |          |
|                                  | 13.5 days          | 10.5 days         |          |          |
| Surface                          | 62.66              | 42.83             | 19.83    |          |
| Underground                      | 61.85              | 40.17             | 21.68    |          |
| Total                            | 62.03              | 40.87             | 21.16    |          |
| <u>PRODUCT PER MAN PER DAY:</u>  |                    |                   |          |          |
| Surface                          | 20.27              | 10.62             | 9.65     |          |
| Underground                      | 6.97               | 4.58              | 2.39     |          |
| Total                            | 5.18               | 3.20              | 1.98     |          |
| <u>LABOR COST PER TON:</u>       |                    |                   |          |          |
| Surface                          | .199               | .336              |          | .137     |
| Underground                      | .684               | .875              |          | .191     |
| Total                            | .883               | 1.211             |          | .328     |
| <u>AVERAGE PRODUCT MINING:</u>   |                    |                   |          |          |
| Stoping                          | 22.20              | 21.41             | .79      |          |
| Ore Development                  | 9.13               | 11.83             |          | 2.70     |
| Total                            | 22.04              | 20.80             | 1.24     |          |
| <u>AVERAGE WAGES CONT. LABOR</u> |                    |                   |          |          |
|                                  | 5.66               | 4.59              | 1.07     |          |
| <u>TOTAL NUMBER OF DAYS:</u>     |                    |                   |          |          |
| Surface                          | 8,025½             | 4,462             | 3,563½   |          |
| Underground                      | 23,355½            | 10,340            | 13,015½  |          |
| Total                            | 31,380½            | 14,802            | 16,578½  |          |

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5. LABOR  
AND  
WAGES: (Cont'd)

b. Comparative Statement of Wages and Product: (Cont'd)

|   | <u>1934</u>          | <u>1933(a)</u>       | <u>Increase</u>  |
|---|----------------------|----------------------|------------------|
| <b>AMOUNT FOR LABOR:</b>  |                      |                      |                  |
| Surface   | 32,333.54            | 15,934.05            | 16,399.49        |
| Underground   | <u>111,324.10</u>    | <u>41,453.41</u>     | <u>69,870.69</u> |
| Total   | 143,657.64           | 57,387.46            | 86,270.18        |
| <b><u>AVERAGE WAGES PER MONTH BASED ON MEN CARRIED ON MINE PAYROLL:</u></b> |                      |                      |                  |
|   | 13½ Days             | 10 Days              |                  |
|   | Per Mo. <sup>x</sup> | Per Mo. <sup>x</sup> |                  |
| Surface   | 54.24                | 39.79                | 14.45            |
| Underground   | 60.16                | 38.85                | 21.31            |
| Total   | <u>54.52</u>         | <u>39.32</u>         | <u>15.20</u>     |
|   | x Average            |                      |                  |

- (a) Includes 5 months operating and seven (7) months idle period.  
15% increase in wages effective July 16th, 1933.  
10% increase in wages effective April 1st, 1934.

Proportion of Surface to Underground Men:

- 1934 - 1 to 3.49 - 1 8-hr. shift, 3 days per week, Jan. 1st to Sept. 1st.  
2 days per week, Sept. 1st to Dec. 31st.
- 1933 - 1 to 2.77 - 1 8-hr. shift, 2 days per week, Jan. 1st to Apr. 8th.  
Mine idle Apr. 8th to Nov. 9th.  
1 8-hr. shift, 3 days per week, Nov. 9th to Dec. 31st.

6. SURFACE:

a-1. Buildings:

Some expense was incurred in the summer when the hospital room in the dry house was converted into a change room for the mining captain, superintendent and mining engineers. Formerly the captain's change room was in the mine office building. Due to the character of the Athens ore it was impossible to keep the office building clean and also the captain was not in direct contact with the bosses and the miners. A shower bath was installed in the former hospital room, an outside doorway cut through the brick wall and the room redecorated.

Early in the year the shower bath in the office building collapsed due to rotting of the floor and joists and had to be rebuilt. The lighting in the office rooms was very unsatisfactory and new fixtures were installed in the summer. The foundations of the front porch rotted, new joists and new steps were installed. No decorating had been done for many years and in the fall the walls were painted and the woodwork varnished. The warehouse room was very dark and the ceiling was painted white, also the upper three quarters of the side walls. After the walls of the warehouse room were painted the concrete floor was given two coats of floor paint.

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6. SURFACE: (Cont'd)

a-1. Buildings: (Cont'd)

The steam line from the heating plant in the dry building to the office which was installed when the mine opened in 1917 started to leak in many places last spring. There was no return system and the condensed water was removed by a steam trap at the office. It was decided to install an individual heating boiler in the basement of the office. The necessary alterations were made to the building, a chimney and coal bin built and a concrete floor laid in the furnace room. The new plant went into commission in the fall. E.&A. No.649 covered the expense.

Leaks developed last summer in a portion of the roof of the engine house and it was given a filler coat and then painted with roofing paint. The loose joints were renailed and the roof should now be in good condition for several years.

An individual heating plant was installed in the engine house in the fall which went into operation on November 20th. The old steam line from the dry building which was over 400 ft. in length was leaking in a number of places and would have had to be replaced. It was decided that a steam boiler in the basement of the engine house would save enough fuel to pay for itself in a few years. The expense was covered by E. & A. No.649. A coal bin was built in the basement and a concrete floor installed in the furnace room. A trestle for handling coal had to be built on the north side of the engine house on account of the slope of the hill. A doorway was cut in the concrete floor of the engine house and a stairway installed, also a chimney, part brick and part 10" spiral riveted pipe was built. The saving in coal burned at the main heating plant in the month of December was in line with expectations and fully justified the expenditure for installation of the individual heating plants in the office and engine houses.

a-2 Docks, Trestles and Pockets:

The ties on the northeast steel trestle were replaced in September and October on the idle days each weekend. Most of the old ties had been in service since the trestle was built in 1922. A total of 440 Oregon Fir ties, 5" thick, 8" wide and 4 ft. long were installed on the south tract. These ties were treated with Zinc Chloride. On the north track 450 ties treated with Creosote were installed. Definite data will thus be obtained of the comparative life of fir ties under the two treatments. Every tie has two bolts which fasten it to the steel girders. The rotten ties have to be unbolted, the men that did this job, worked in cages hung on each side of a truck that was moved forward on the tracks as the work progressed. After the ties were unbolted for a rail length, average 30 ft., the rail was removed and the old ties thrown off the trestle and new ties laid and bolted. The track was relaid after all the new ties were installed. On completing this work, the rotted ties on the permanent steel trestle south-east of the shaft were replaced. These ties are 5" x 8" x 32 ft. in size and are commonly called decking timbers. This work required a crew of ten men under the direction of the surface foreman as the tracks had to be in service again when the mine resumed work on Monday after the three day idle period. The nailing strips, 3" x 6" in size, on top of the girders were also replaced and after the work was finished a new guard railing was built.

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6. SURFACE: (Cont'd)

a-2. Docks, Trestles and Pockets: (Cont'd)

This work was suspended late in November before it was entirely completed. The balance of the old ties, about 10% of the total number, will be replaced next year on the permanent steel trestle. The cost of this maintenance work exceeded \$1500.00, as more than a carload of 5" x 8" fir timber, about 25,000 ft., was used.

b. Stockpiles:

Shipments from stockpile in 1934 removed practically all the ore from the northeast steel stocking trestle. The ore was cleaned entirely from about 200 ft. of the ground at the end of the trestle, to make room for stocking Mitchell Lease Ore. The wooden trestle at the southeast end of the southeast steel trestle was in use for stocking this grade until the new grounds were available. The wooden stocking trestle is in bad condition as it has been in service for several years, many legs are broken and the tracks are out of line. No Mitchell ore was shipped from stockpile in 1934 as shipments of this grade from pocket were more than ample to take care of the minimum royalty. Both Mitchell and Athens Ore will be stocked this winter from the northeast steel trestle in two separate piles. There is also a reserve space for stocking Athens Ore from the southeast steel trestle in an area which was not entirely filled last winter.

c. Timber Treating Plant:

Extensive repairs were made to the treating plant in the early part of the summer. The vertical steel boilers used as treatment tanks for many years were abandoned and a steel lining placed in the concrete tanks, which had been abandoned in 1930 due to leaks. One quarter inch plate was welded into a tank on surface and lowered into the concrete tanks. A new heater was installed in the hot tank with trap to drain off the water which was discharged back into the tank. Steel cradles holding from 11 to 20 pieces of timber depending on the size, were built at the general shop at Ishpeming. A loading pit was excavated in front of the tanks so that the untreated timber could be rolled into the steel cradles by hand. The derrick which handled the timber was old and partly rotted, and was rebuilt and improved by the addition of a horizontal steel member on which a trolley runs. Double quadruple blocks were hung from the trolley for handling the loaded cradles which weigh between four and five tons. The derrick was moved about 20 ft. to bring it into position for handling the cradles from the loading pit to the treatment tanks and from the treatment tank to the stocking yard. Each treatment tank holds two cradles or from 22 to 40 pieces of timber. After treatment is started the cycle of operations covers the transfer of two cradles from the cold tank to the treated timber yard, then the transfer of two cradles from the hot tank to the cold tank, then two cradles of untreated timber from the loading pit to the hot tank. The cycle starts at 8 A. M. and is completed by 9:30 A.M. The treated timber is then dumped by power from the two cradles and decked on the pile. The empty cradles are returned to the loading pit and loaded. This cycle is repeated between 2:30 and 5 P. M. Each 24 hours from 44 to 80 pieces of timber are treated. It requires the services of three men about five hours per day to operate the plant. Peeling and framing of the timber is a separate operating, as is also the decking of the green timber for drying which requires from 60 to 90 days depending on the weather.

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6. SURFACE: (Cont'd)c. Timber Treating Plant: (Cont'd)

The total expense for revamping the treating plant was slightly over \$2000.00. It is now in shape for efficient and economical operation as is shown in the following tables which give comparative costs for three years:

|                   | Cost per Ft.<br><u>1934</u> | Cost per Ft.<br><u>1933</u> | Cost per Ft.<br><u>1931</u> |
|-------------------|-----------------------------|-----------------------------|-----------------------------|
| Peeling           | .0287                       | .0278                       | .0312                       |
| Treating          | .0211                       | .0367                       | .0365                       |
| Decking           | .0133                       | .0119                       | .0124                       |
| Zinc Chloride     | .0212                       | .0517                       | .0681                       |
| Heat, Water, etc. | .0091                       | (a) .0430                   | .0075                       |
| Total             | .0934                       | .1711                       | .1557                       |
| Maintenance Cost  | .0000                       | .0082                       | .0118                       |
| Grand Total       | .0934                       | .1793                       | .1675                       |

(a) Heating cost high in 1933 account of operating heating plant during time mine was idle, when all expense was charged to treating timber.

| <u>Year</u> | No. of Pieces<br><u>Treated</u> | No. of Feet<br><u>Treated</u> |
|-------------|---------------------------------|-------------------------------|
| 1934        | 1,930                           | 16,848                        |
| 1933        | 991                             | 8,800                         |

|   | <u>1934</u> | <u>1933</u> |
|---|-------------|-------------|
| No. of Pieces used at Athens                      | 324         | 976         |
| No. of Pcs. shipped to Maas<br>and Negaunee Mines | 975         | 1,102       |
| Total Pcs. used and Shipped                       | 1,299       | 2,078       |
| Decrease  | 779         |             |

|              | Treated Timber on<br><u>Hand 12/31/34</u> | Peeled Untreated Timber<br><u>On Hand 12/31/34</u> |
|--------------|---|--|
| 9 Ft. Pieces | 762                                       | None   |
| 8 Ft. Pieces | 54  | 180  |
| Total        | 816                                       | 180  |

d. Water Purchased for Heating, Cooling, etc.:

The following table shows the cost of the water consumed in heating, cooling, watering lawns, etc., for the years 1932, 1933, and 1934:

|              | 1934      |        | 1933      |        | 1932      |        |
|--------------|-----------|--------|-----------|--------|-----------|--------|
|              | Gals.     | Amount | Gals.     | Amount | Gals.     | Amount |
| 1st Quarter  | 297,000   | 27.85  | 240,000   | 22.98  | 508,000   | 43.40  |
| 2nd "        | 294,000   | 28.28  | 145,000   | 17.02  | 441,000   | 40.07  |
| 3rd "        | 303,000   | 30.57  | 403,000   | 35.49  | 159,000   | 19.29  |
| 4th "        | 274,000   | 26.86  | 223,000   | 21.21  | 149,000   | 15.66  |
| Total        | 1,168,000 | 113.56 | 1,011,000 | 96.70  | 1,257,000 | 118.42 |
| Cost Per Ton |           | .00070 |           | .00204 |           | .00155 |