

**THE CLEVELAND-CLIFFS IRON COMPANY**  
**Ore Mining Department**  
**ANNUAL REPORT OF GENERAL MANAGER**  
**For Year Ending December 31, 1960**

MS 86-100  
2031

THE CLEVELAND-CLIFFS IRON COMPANY  
ORE MINING DEPARTMENT

1960  
Manager's Annual Report Year 1959

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WESTLON BOMB

AGNEW MINE  
ANNUAL REPORT  
YEAR 1960

1. GENERAL

There was no production from the South Agnew trespass during 1960.

The Alworth-Agnew lease extension expired on December 31, 1960, and was not renewed.

12. TAXES

<u>Real Estate</u>	<u>1960</u>		<u>1959</u>		<u>Increase-Decrease</u>	
	<u>Assessed Value</u>	<u>Taxes</u>	<u>Assessed Value</u>	<u>Taxes</u>	<u>Assessed Value</u>	<u>Taxes</u>
Mineral	\$6,578	\$1,433.15	\$10,691	\$2,237.94	-\$4,113	\$-804.79
Lands	480	104.57	401	83.94	+ 79	+ 20.63
	<u>\$7,058</u>	<u>\$1,537.72</u>	<u>\$11,092</u>	<u>\$2,321.88</u>	<u>-\$4,034</u>	<u>-\$784.16</u>
Average Mill Rate		217.87		209.33		- 8.54

Note: Mineral valuation reduced by new fixed class rate per ton on unavailable undeveloped underground ores. Total taxes charged to Rhude & Fryberger. No tax liability after 1960 as the lease is cancelled.

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ALWORTH LAND RESERVE

ANNUAL REPORT

YEAR 1960

1. GENERAL

There was no production by the Scranton from a trespass on the Alworth in 1960.

Rhude & Fryberger produced and shipped 117,660 tons of ore. 23,052 cubic yards of surface were moved and 5,680 tons of lean ore stockpiled.

The Alworth-Agnew lease extension expired December 31, 1960, and was not renewed.

12. TAXES

<u>Real Estate</u>	<u>1960</u>		<u>1959</u>		<u>Increase-Decrease</u>	
	<u>Assessed Value</u>	<u>Taxes</u>	<u>Assessed Value</u>	<u>Taxes</u>	<u>Assessed Value</u>	<u>Taxes</u>
Mineral	\$57,213	\$17,726.30	\$69,729	\$20,945.20	-\$12,516	-\$3,218.90
Land, Bldg, Machinery	3,240	1,003.84	2,667	801.12	+ 573	+ 202.72
Accounts Receivable			5,289	1,588.72	- 5,289	- 1,588.72
	<u>\$60,453</u>	<u>\$18,730.14</u>	<u>\$77,685</u>	<u>\$23,335.04</u>	<u>-\$17,232</u>	<u>-\$4,604.90</u>
Average Mill Rate		309.83		300.38		+ 9.45

Note: Mineral valuation decreased by mining in 1959.  
Buildings removed by Oliver Iron Mining Division.  
All taxes charged to Rhude & Fryberger.  
No tax liability after 1960 because lease is cancelled.

CANISTEO MINE

ANNUAL REPORT

YEAR 1960

I. GENERAL

The Canisteco mine was on standby basis during the month of January while stripping operations were being conducted at the Sally mine. Repairs to plant equipment were started on February 1 and continued until the start of ore operations on April 22. Plant repairs resumed at the end of the ore season on September 11 and continued until December 30 when all repair work required prior to the 1961 season was completed. All repair work was conducted on a 1-shift, 5-day week schedule.

Stripping operations in 1960 were conducted as follows:

<u>Date</u>	<u>Surface Area</u>	<u>Cubic Yards</u>
February 15 - March 6	North Bovey	353,035
September 11 - October 23	North Bovey	627,834
December 1 - December 24	South Bovey	394,689
		<u>1,375,558</u>

Stripping was conducted on a 20-shift-a-week schedule with hourly employees working five days a week. A major portion of the stripping material was used to raise and reinforce tailings dikes and some of it to construct new railroad grades and concentrate stockpiling areas. Stripping in the South Bovey was done in connection with a crossmining agreement with M. A. Hanna Company.

On January 1, 1960, 17,484 tons of ore remained in the Canisteco and Sally stockpile. Shipments from stockpile were started on April 12 and completed April 15. 1960 ore was loaded out intermittently throughout the year until November 5. 315,425 tons of ore were placed in stock during the year and 287,427 tons loaded out, leaving a balance of 45,482 tons of Canisteco-Sally concentrates in stockpile as of January 1, 1961. This balance was split 26,347 tons coarse and 19,135 tons fines.

Ore operations started April 22, 1960, on a 2-shift, 6-day-week schedule. A reduced schedule of 2-shifts, 5-days-per-week went into effect on June 19 and continued until shutdown of ore operations on September 11.

1,074,352 tons of crude ore, including 104,145 tons of screen rock, were mined. In addition, 40,530 tons of pit rock and other lean materials were removed during mining.

Operating the same schedule as the pit, the main concentrating plant received 970,207 tons of crude and produced 378,623 tons of concentrates. The fine ore plant received 458,103 tons of tailings from the main plant and produced 36,585 tons of concentrates.

The Henry Schultze Company put down two structure drill holes on the north and west sides of the North Bovey forties for a total of 489 feet.

In 1960, it was necessary to purchase surface rights on a Bovey forty described as the  $NW\frac{1}{4}$ - $NE\frac{1}{4}$  Section 30, 56-24, for \$10,000 under E&A CC-75 as a first step in an over-all plan for cheaper disposal of Canisteo heavy-density coarse rejects.

2. PRODUCTION-SHIPMENTS-INVENTORIES

a. Production by Grades

<u>Crude Retreat</u>	<u>Tons</u>
Snyder	365,766
Bovey	541,745
Hemmens	<u>62,696</u>
	<u>970,207</u>

<u>Retreat Concentrates</u>	<u>Bessemer</u>	<u>Non-Bessemer</u>	<u>Total</u>
Snyder	1,620	158,679	160,299
Bovey	12,412	218,074	230,486
Hemmens	<u>114</u>	<u>24,309</u>	<u>24,423</u>
	<u>14,146</u>	<u>401,062</u>	<u>415,208</u>

b. Shipments by Grades

<u>Ore</u>	<u>Retreat</u>		<u>1959 Stockpile</u>		<u>1959 Stockpile Overrun</u>		<u>Total</u>
	<u>Bessemer</u>	<u>Non-Bessemer</u>	<u>Bessemer</u>	<u>Non-Bessemer</u>	<u>Bessemer</u>	<u>Non-Bessemer</u>	
Snyder	1,619	150,292	540	1,527	1	453	154,432
Bovey	12,412	204,439	2,151	6,119		1,772	226,893
Hemmens	114	21,747	360	1,020		301	23,542
	<u>14,145</u>	<u>376,478</u>	<u>3,051</u>	<u>8,666</u>	<u>1</u>	<u>2,526</u>	<u>404,867</u>

c. Stockpile Inventories

<u>Retreat Concentrates</u>	<u>Tons</u>
Snyder	7,933
Bovey	11,863
Hemmens	2,261
	<u>22,057</u>

d. Production by Months

<u>Month</u>	<u>Crude</u>			<u>Total</u>
	<u>Snyder</u>	<u>Bovey</u>	<u>Hemmens</u>	
April		51,628		51,628
May		174,761		174,761
June		170,073		170,073
July		135,172		135,172
August	365,766			365,766
Sept		10,111	62,696	72,807
	<u>365,766</u>	<u>541,745</u>	<u>62,696</u>	<u>970,207</u>

<u>Concentrates</u>				
April	454	22,279	301	23,034
May		65,805		65,805
June		73,653		73,653
July		64,429		64,429
August	160,172			160,172
Sept	-327	4,320	24,122	28,115
	<u>160,299</u>	<u>230,486</u>	<u>24,423</u>	<u>415,208</u>



3. ANALYSIS

a. Crude Ore Produced

<u>Retreat Ore</u>	<u>Tons</u>	<u>Iron</u>	<u>Silica</u>
Snyder	365,766	45.41	29.99
Bovey	541,745	44.39	31.70
Hemmens	62,696	37.09	40.66
	<u>970,207</u>	<u>44.30</u>	<u>31.63</u>

b. Concentrates Produced - Tonnage & Analysis

<u>Retreat</u>	<u>Tons</u>	<u>Iron</u>	<u>Phos</u>	<u>Silica</u>	<u>Mang</u>	<u>Alum</u>	<u>Moisture</u>
<u>Snyder</u>							
Bessemer	1,620	59.48	.037	10.65	.27	.51	7.13
Non-Bessemer	158,679	57.93	.053	11.55	.29	.55	6.95
<u>Bovey</u>							
Bessemer	12,412	58.96	.037	11.66	.28	.43	6.58
Non-Bessemer	218,074	57.80	.048	11.58	.38	.48	6.61
<u>Hemmens</u>							
Bessemer	114	57.24	.042	13.22	.32	.43	7.54
Non-Bessemer	24,309	56.77	.048	12.32	.42	.56	6.82
	<u>415,208</u>	<u>57.83</u>	<u>.050</u>	<u>11.61</u>	<u>.35</u>	<u>.51</u>	<u>6.75</u>

c. Tonnage & Analysis (Complete) of Concentrates Shipped

<u>Concentrates</u>	<u>Tons</u>	<u>Iron</u>	<u>Phos</u>	<u>Silica</u>	<u>Mang</u>	<u>Alum</u>	<u>Lime</u>	<u>Mag</u>	<u>Sulf</u>	<u>Ign Loss</u>	<u>Moist</u>
<u>Snyder Retreat</u>											
Bessemer	1,219	60.22	.036	9.80	.26	.54	.20	.15	.015	2.74	6.99
Non-Bessemer	85,241	58.17	.056	11.37	.27	.52	.20	.15	.015	4.06	7.17
<u>Bovey Retreat</u>											
Bessemer	10,086	59.36	.036	11.30	.27	.43	.20	.14	.015	2.57	6.36
Non-Bessemer	149,316	57.92	.048	11.37	.41	.44	.20	.14	.015	4.32	6.61
<u>Hemmens Retreat</u>											
Non-Bessemer	4,482	54.49	.041	13.66	.68	.45	.12	.16	.025	6.60	7.40

c. Tonnage & Complete Analysis of Concentrates Shipped (con't)

<u>Concentrates</u>	<u>Tons</u>	<u>Iron</u>	<u>Phos</u>	<u>Silica</u>	<u>Mang</u>	<u>Alum</u>	<u>Lime</u>	<u>Mag</u>	<u>Sulf</u>	<u>Ign Loss</u>	<u>Moist</u>
<u>1959 Stockpile</u>											
Bessemer	3,051	56.42	.046	12.52	.31	1.44	.12	.20	.015	4.49	7.90
Bessemer Overrun	1	55.10	.046	14.88	.32	1.26	.12	.20	.015	4.18	8.85
Non-Bessemer	8,666	55.79	.055	13.22	.33	1.26	.12	.20	.015	4.82	7.65
Non-Bessemer Overrun	2,526	55.90	.055	13.03	.33	1.34	.12	.20	.015	4.77	7.35
<u>1960 Stockpile</u>											
Bessemer	2,840	57.24	.042	13.22	.32	.43	.20	.20	.014	3.54	7.54
Non-Bessemer	137,439	57.60	.048	11.84	.32	.58	.20	.20	.014	4.24	6.61
	<u>404,867</u>	<u>57.80</u>	<u>.050</u>	<u>11.61</u>	<u>.35</u>	<u>.53</u>	<u>.20</u>	<u>.17</u>	<u>.015</u>	<u>4.22</u>	<u>6.77</u>

d. Analysis of Ore in Stockpile

<u>Retreat</u>	<u>Tons</u>	<u>Iron</u>	<u>Phos</u>	<u>Silica</u>	<u>Mang</u>	<u>Alum</u>	<u>Moisture</u>
Snyder	7,933						
Bovey	11,863						
Hemmens	<u>2,261</u>						
	<u>22,057</u>	57.50	.052	12.00	.37	.50	6.92

4. ESTIMATE OF ORE RESERVES

a. Developed Ore - Factors Used

<u>Concentrates</u>	<u>Cubic Feet/Ton</u>	<u>Per Cent Recovery</u>
Wash	14	47
Retreat	14	32

b. Ore Reserves as of December 31, 1960

<u>Lease</u>	<u>Reserve 12-31-59</u>	<u>Mined 1960</u>	<u>Balance after Mining</u>	<u>Changed by Re-estimate</u>	<u>Reserve 12-31-60</u>
Bovey	872,727	230,486	642,241		642,241
Snyder	623,537	160,299	463,238		463,238
Hemmens	<u>1,087,074</u>	<u>24,423</u>	<u>1,062,651</u>		<u>1,062,651</u>
	<u>2,583,338</u>	<u>415,208</u>	<u>2,168,130</u>		<u>2,168,130</u>

c. Estimated Analysis of Ore Reserves

<u>Concentrates</u>	<u>Tons</u>	<u>Iron</u>	<u>Phos</u>	<u>Silica</u>
<u>Bovey</u>				
Bessemer Wash	58,978	58.80	.030	8.90
Non-Bessemer Wash	112,620	58.70	.100	8.30
Bessemer Retreat	226,407	56.46	.028	11.52
Non-Bessemer Retreat	<u>244,236</u>	<u>56.34</u>	<u>.102</u>	<u>10.72</u>
	642,241	57.02	.069	10.41
<u>Snyder</u>				
Bessemer Wash	64,080	61.10	.037	8.60
Non-Bessemer Wash	283,474	61.10	.055	8.10
Bessemer Retreat	27,755	57.40	.031	12.00
Non-Bessemer Retreat	<u>87,929</u>	<u>59.43</u>	<u>.061</u>	<u>9.94</u>
	463,238	60.56	.052	8.75
<u>Hemmens</u>				
Bessemer Wash	263,254	59.50	.027	9.30
Non-Bessemer Wash	138,053	58.50	.047	9.00
Bessemer Retreat	390,719	56.91	.030	11.69
Non-Bessemer Retreat	<u>270,625</u>	<u>56.94</u>	<u>.061</u>	<u>11.77</u>
	1,062,651	57.77	.039	10.77
<u>Mine Totals</u>				
Bessemer Wash	386,312	59.66	.029	9.12
Non-Bessemer Wash	<u>534,147</u>	<u>59.92</u>	<u>.062</u>	<u>8.37</u>
	920,459	59.81	.048	8.68
Bessemer Retreat	644,881	56.77	.030	11.64
Non-Bessemer Retreat	<u>602,790</u>	<u>57.07</u>	<u>.078</u>	<u>11.08</u>
	1,247,671	56.91	.053	11.37
Total Bessemer	1,031,193	57.85	.030	10.70
Total Non-Bessemer	<u>1,136,937</u>	<u>58.41</u>	<u>.069</u>	<u>9.81</u>
	2,168,130	58.14	.050	10.23

5. LABOR & WAGES

a. Comments

During the year labor relations were satisfactory and three grievances were processed--all of a minor nature and none appealed to beyond Step 2.

A new labor contract was signed effective as of January 1, 1960. Under the terms of this agreement, the basic wage schedule remained unchanged until December 1, 1960. Effective December 1, 1960, the basic rate (Job Classes 1 and 2) was increased by \$0.07 to \$2.030 an hour. The increment above the basic rate was increased by \$0.002 from \$0.067 to \$0.069 per job class. The cost of living increase is now \$0.17.

b. Comparative Statement of Production and Wages

	<u>1960</u>	<u>1959</u>
Concentrate Tonnage	415,208	258,713
Number of Days Operated	60	45.5
Number of Shifts Operated	120	91
Average Product per Shift	3,460	2,836
Average Number of Men Employed	134	130
Tons per Man per Day	45.34	39.41
Average Wages per Day	\$24.23	\$27.05
Total Amount of Labor	\$246,489.56	\$177,583.45
Labor Cost per Ton	\$0.571	\$0.686

6. GENERAL SURFACE

a. Buildings & Repairs

No new buildings were constructed in 1960 and repairs were minor.

b. Roads, Transmission Lines, etc.

On September 21, 1960, \$15,029 was authorized under E&A CC-74 to convert the pit power system from 2300 to 4160 volts. This conversion will add to pit operation efficiency. The project was completed on October 15.

No new roads were constructed during the year.

c. Miscellaneous General Construction

Construction of a \$1,173,980 cyclone plant authorized under E&A CC-22 on October 21, 1959, was started in September, 1960, immediately after shutdown of ore operations. Construction of the cyclone plant proper, detailed engineering, and design was awarded to Western-Knapp Engineering Company. Revisions required to existing plant facilities are being carried on by mine crews. The contractor expects to complete his portion of the contract by February 15, 1961. Erection of this plant necessitated the relocation of Great Northern tracks serving the main plant as well as the rearrangement of the concentrate stockpiling area.

The addition of the cyclone plant will greatly improve the grade of the fine fraction of the concentrates and enable the Canisteo to produce as high a grade of concentrates as is possible with standard Mesabi ores.

7. OPEN PIT

a. Stripping

E&A CC-31 authorized removal of 400,000 cubic yards of surface stripping at \$0.410 per cubic yard at an estimated expenditure of \$164,000. Stripping was started February 15 on a 20-shift schedule and 353,035 cubic yards removed from the North Bovey forties at a cost of \$0.384 per cubic yard for an actual expenditure of \$137,085. A major portion of the stripping material was used to raise and reinforce tailings dikes. This stripping was completed March 6.

After shutdown of ore operations on September 11, stripping resumed under E&A CC-83 on a 20-shift schedule in the North Bovey forties. 627,834 cubic yards were moved and operations were then transferred to Sally stripping.

In connection with a crossmining agreement with M. A. Hanna Company, stripping resumed in the Canisteo in the South Bovey forty on the first of December and was completed on the 24th with the removal of 394,689 cubic yards of surface overburden.

The original E&A CC-83 authorized removal of 600,000 cubic yards of surface overburden at \$0.383 per cubic yard for an estimated expenditure of \$230,000. A supplement to E&A CC-83 authorized an additional 300,000 cubic yards at \$0.400 for an estimated

\$120,000, making a total 900,000 estimated yards at \$0.389 and a total estimated \$350,000 expenditure. Under this program, 1,022,523 cubic yards were actually moved at an average rate of 5,731 cubic yards per shift and a cost of \$0.331 for a total expenditure of \$338,431.

b. Open Pit Mining

Blasthole drilling in preparation for the 1960 ore season was started March 16 on a 3-shift, 5-day-week schedule. Drilling was suspended April 14 and the drill moved to the Holman mine.

Ore operations started on April 22 on a 2-shift, 5-day-week schedule which continued until June 19 when operations were reduced to 2 shifts, 5 days a week and continued until shutdown of operations on September 11.

The pit operated 120 shifts to produce 1,074,352 tons of crude which included 104,145 tons of screen rock. In addition, 40,530 tons of pit rock and cleanup were moved, making a final total of 1,114,882 tons of material moved from the pit at an average rate of 9,291 tons a shift. Gross crude removed from various leases is shown below and includes 493,204 tons of crude mined from lean ore stockpiles:

<u>Lease</u>	<u>Tons</u>
Bovey	623,452
Hemmens	69,014
Snyder	<u>381,886</u>
	<u>1,074,352</u>

Bovey ore was mined from the North Bovey forties; Hemmens ore along the Hemmens-Walker line; and along the Snyder-Hunner line and in the West Snyder forty for Snyder ore.

c. Pumping & Drainage

About 2,493 gallons per minute were pumped from the pit at a cost of \$0.066 per ton of concentrates. Mine water pumped out of the pit flows north and eventually enters Prairie River.

8. BENEFICIATION

a. Plant Operation

Operating the same schedule as the pit, the concentrating plant received 970,207 tons of crude to produce 378,623 tons of retreat concentrates at an average rate of 3,155 tons a shift and a weight recovery of 38.65 and 42.80 per cent respectively on pit and plant crude.

The heavy-media plant received 240,870 tons of feed to produce 123,974 tons of concentrates at a weight recovery of 51.47 per cent. Coarse tailings totalled 116,896 tons.

The fine ore plant, operating on current tailings from the main plant, received 458,103 tons of feed to produce 36,585 tons of fine ore concentrates at a weight recovery on plant crude of 3.77 and on plant tailings of 7.99 per cent.

During the operating season, it was necessary to stockpile 175,532 tons of concentrates. 153,475 tons were shipped from stockpile, leaving 22,057 tons in stock as of January 1, 1961.

Of the total standard concentrates produced, 29 per cent was split coarse and fine; and of the split ore, 45 per cent was coarse and 55 per cent fine.

Concentration data follows:

<u>Retreat Product</u>	<u>Tons</u>	<u>Per Cent Weight</u>		<u>Per Cent</u>			<u>Iron Units</u>
		<u>Plant</u>	<u>Pit</u>	<u>Iron</u>	<u>Phos</u>	<u>Silica</u>	
Crude to Plant	970,207	100.00	87.66	44.30		31.63	
Pit Rock	32,375		2.93	25.07		60.37	
Screen Rock	104,145		9.41	26.77		57.17	
Pit Crude	1,106,727		100.00	42.09		34.88	
Concentrates Produced	376,096	38.76	33.98	57.74	.053	11.67	
Stockpile Overrun	2,527						
Total Concentrates Produced	378,623	39.02	34.21	57.74	.053	11.58	
Heavy-Media Concentrates	123,974	12.78	11.20	57.95		10.61	
Heavy-Media Rejects	116,896	12.05	10.56	38.70		37.55	
Heavy-Media Feed	240,870	24.83	21.76	51.60		19.50	
Total Fine Tailings (by difference)	477,215	49.19	43.12	35.08		45.91	

<u>Fine Ore Plant</u>	<u>Tons</u>	<u>Per Cent Weight</u>		<u>Per Cent</u>			<u>Iron Units</u>
		<u>Plant</u>	<u>Pit</u>	<u>Iron</u>	<u>Phos</u>	<u>Silica</u>	
Crude to Plant	458,106	100.00		29.61		54.23	
Total Concentrates Produced & Shipped	36,585	7.99		58.20	.038	12.69	
Total Fine Tailings (by difference)	421,521	92.01		27.12		57.84	

Following is a brief classification of delay time at the beneficiation plant:

<u>Source of Delay</u>	<u>Hours</u>	<u>Per Cent of Total Working Hours</u>
<u>Washing Plant</u>		
Screening Plant	27.50	2.87
Plant Conveyors	6.75	.70
Plant Machines	13.00	1.36
Tailings Line	1.00	.10
Electric Power	10.50	1.09
Storms	1.25	.13
	<u>60.00</u>	<u>6.25</u>
<u>Heavy-Media Plant</u>		
Plant Conveyors	.50	.50
Plant Machines	1.00	.10
Electric Power	1.00	.10
Storms	1.25	.13
Pumps	2.00	.21
	<u>5.75</u>	<u>.59</u>
<u>Fine Ore Plant</u>		
Pumps	22.50	2.40
Out of Cars	20.50	2.19
Plant Machines	3.75	.40
Due to Wash Plant	32.50	3.47
	<u>79.25</u>	<u>8.46</u>



9. MAINTENANCE & REPAIRS

Canisteo plant repairs started on February 1 and continued until startup of ore operations on April 22. Repairs were resumed on September 11 after shutdown of ore operations and continued until December 30 when all repairs to plant equipment necessary for the startup of the 1961 ore season were completed. Repair work was conducted on a 1-shift, 5-day-week schedule.

10. COST OF PRODUCTION

a. Comparative Mining Costs

<u>Product</u>	<u>1960</u>		<u>1959</u>
	<u>Budget</u>	<u>Actual</u>	<u>Actual</u>
Retreat Concentrates	385,000	378,623	258,713
Fine Ore Concentrates	40,000	36,585	
	<u>425,000</u>	<u>415,208</u>	<u>258,713</u>
Per Cent Gross Crude Recovery	34.98	38.65	33.70
Average Product Per Shift		3,487	2,843
Tons Per Man Per Day		42.65	39.41
Days Operated		59.5	45.5
	<u>Costs</u>		
Pit Operating	\$0.245	\$0.233	\$0.281
Beneficiation	0.165	0.184	0.155
Fine Ore Concentrating	0.800	0.724	
Loading Stockpile Ore	0.010	0.015	0.051
Sampling & Analysis	0.040	0.027	0.038
Safety & First Aid Supplies	0.001	0.001	0.001
Employees Vacation Pay	0.059	0.010	0.061
Personal Injury Expense	0.005	0.005	0.002
Social Security Taxes	0.029	0.023	0.031
Total Pit & Beneficiation	<u>\$1.314</u>	<u>\$1.201</u>	<u>\$1.468</u>
General Mine Expense	0.191	0.213	0.200
Winter & Idle Expense	0.420	0.512	0.274
Cost of Production	<u>\$1.925</u>	<u>\$1.926</u>	<u>\$1.942</u>

	<u>1960</u> <u>Actual</u>	<u>1959</u> <u>Actual</u>
<u>Depreciation</u>		
Plant & Equipment	\$0.216	\$0.217
Motorized Equipment	0.039	0.070
Movable Equipment	0.010	0.006
<u>Amortization</u>		
Leasehold	0.104	0.105
<u>Taxes</u>		
Ad Valorem	0.348	0.261
Occupational	0.557	0.868
Royalty	<u>0.036</u>	<u>0.060</u>
Total Depreciation, Amortization, Taxes	\$1.310	\$1.586
Royalty	<u>0.330</u>	<u>0.330</u>
Total Cost on Cars	<u>\$3.566</u>	<u>\$3.859</u>

b. Detailed Cost Comparison

Cost of Production: \$0.001 over the budget and \$0.016 under 1959 costs. While some costs were over the budget, a high rate of concentrate production compensated for the increases. The total Canisteo-Sally production of 807,706 tons as compared to the estimated tonnage of 850,000 tended to increase General Mine, Winter & Idle, and Miscellaneous Overhead costs.

Pit Operating: \$0.012 under the budget of \$0.245 and \$0.048 under 1959 costs.

Beneficiation: \$0.019 over the budget of \$0.165 and \$0.029 over 1959 costs. Most of the increase was noted in Concentrating and Maintenance. The purchase of screen cloth and repair parts was held to a minimum in 1959 and consequently was higher in 1960 than anticipated.

Fine Ore Concentration: \$0.076 under the budget of \$0.800. A high rate of production with a minimum of downtime and costly repairs resulted in the decrease.

Miscellaneous Pit & Beneficiation: \$0.062 under the budget of \$0.144. A reduction in employee vacation pay accounted for most of the decrease.

General Mine Expense: \$0.022 over the budget of \$0.191 and \$0.013 over 1959 costs due mostly to Special Expense and Insurance.

Winter & Idle Expense: \$0.092 over the budget of \$0.420 and \$0.238 over 1959 costs. The increase was due largely to the decrease in over-all tonnage plus an early shutdown. Also, major repairs to plant equipment required for the 1961 operating season were completed prior to January 1, 1961.

## II. EXPLORATION & FUTURE EXPLORATION

During 1960, under E&A CC-998, the Henry Schultze Company put down two holes for a total of 489 feet in the northwest corner of the Canisteo pit on the North Bovey forties to determine the extent of mineable ore in this area. This drilling revealed a probable 250,000 tons of additional retreat concentrates. More drilling in the North Bovey, and along the east and south sides of the pit, will be required before the ultimate pit limits and actual reserves can be determined.

### 12. TAXES

	1960		1959		Increase-Decrease	
	Assessed Value	Taxes	Assessed Value	Taxes	Assessed Value	Taxes
<u>Real Estate</u>						
Mineral	\$635,421	\$124,978.03	\$333,004	\$ 82,710.69	<del>/\$302,417</del>	<del>/\$42,267.34</del>
Lands, Buildings, Machinery	83,767	16,702.59	84,479	21,207.12	- 712	- 4,504.53
<u>Personal Property</u>						
Equipment	78,942	15,355.00	99,108	24,508.42	- 20,166	- 9,153.42
Stockpile Concentrates	1,164	226.42	6,264	1,549.02	- 5,100	- 1,322.60
Tailings Basin Stockpile	12,235	2,379.83	14,420	3,565.92	- 2,185	- 1,186.09
	<u>\$811,529</u>	<u>\$159,641.87</u>	<u>\$537,275</u>	<u>\$133,541.17</u>	<u><del>/\$274,254</del></u>	<u><del>/\$26,100.70</del></u>
Average Mill Rate		196.72		248.55	-	51.83

Note: Mineral valuations increased by use of present worth method of valuation for 1960, boosting average value per ton to \$0.2469 as compared to a 1959 fixed class rate average value per ton of \$0.1175. Land and building value decreased by sale of three forties to Balkan Mining Company and sale of one house. Personal property valuation decreased by a new depreciation schedule which allows faster writeoff. Of the above taxes, \$14,622 was charged to the Sally for shops, office buildings, mining machinery, beneficiating plant, and lands used for its operations. The mill rate decreased because of greater valuation in Itasca County.

Tax Commission Reserve as of May 1, 1960

1959	2,833,906
1960	<u>2,573,592</u>
	-260,314

13. ACCIDENTS & PERSONAL INJURY

George Tobeck, Age 45, Automechanic-Standard

On May 4, 1960, while installing valve on mobile crane, bumped right knee cap against radiator brace. Lost 5 days. Compensation paid: \$15.

Lawrence Tanner, Age 48, Shift Boss "A" Open Pit

On May 28, 1960, shovel bucket dropped without warning, knocking Tanner to ground and running over right leg and foot. Lost 22 weeks. Compensation paid: \$1260.

John Riley, Age 41, Maintenance Mechanic-Standard

On October 18, 1960, Riley was helping unload shovel from flatcars. He placed a cable through the bucket bail and the cable became looped around the padlock. When slack taken up, cable slipped off padlock. The padlock fell on Riley's foot fracturing and injuring right ankle. Lost 7 weeks and 4 days. Compensation paid: \$360. Hospital charges paid: \$327.

14. PROPOSED NEW CONSTRUCTION - None

15. EQUIPMENT RECEIVED & PROPOSED NEW EQUIPMENT

a. Equipment Received

A rebuilt P&H Model 1800 8-yard shovel was received. This shovel was originally requested for the Cushing mine and was then transferred to the Canisteo when development of the Cushing was postponed.

b. Proposed New Equipment

A new 30-inch concentrate stockpiling stacker and auxiliary equipment will be purchased for the Canisteo to replace the stacker dismantled and shipped to the Humboldt mine in Michigan in the fall of 1960.

2 Pickup Trucks  
1 Service Truck

SEA-COTTON FIBER

MESLON BOND

SEA-COTTON FIBER

MESLON BOND



<u>Total Breakdown</u>	<u>Bessemer</u>				<u>Non-Bessemer</u>				<u>Total</u>
	<u>Tons</u>	<u>Iron</u>	<u>Phos</u>	<u>Silica</u>	<u>Tons</u>	<u>Iron</u>	<u>Phos</u>	<u>Silica</u>	
Wash					1,058,035	58.76	.045	8.73	1,058,035
Retreat	595,914	56.50	.035	11.00	1,080,501	56.50	.045	11.00	1,676,415
	595,914	56.50	.035	11.00	2,138,536	57.63	.045	9.86	2,734,450
<u>Grand Total</u>						<u>57.38</u>	<u>.043</u>	<u>10.08</u>	

11. EXPLORATION & FUTURE EXPLORATION

No exploration drilling was done. A seismic survey was made in an attempt to determine location of the erosion channel.

12. TAXES

<u>Real Estate</u>	<u>1960</u>		<u>1959</u>		<u>Increase-Decrease</u>	
	<u>Assessed Value</u>	<u>Taxes</u>	<u>Assessed Value</u>	<u>Taxes</u>	<u>Assessed Value</u>	<u>Taxes</u>
Mineral	\$178,209	\$48,777.59	\$183,989	\$54,635.53	-\$5,780	-\$5,857.94
Lands,Bldgs,Machinery	6,016	1,572.19	5,397	1,550.97	+ 619	+ 21.22
	\$184,225	\$50,349.78	\$189,386	\$56,186.50	-\$5,161	-\$5,836.72
Average Mill Rate		273.31		296.68	-	23.37

Note: Mineral value reduced by new present worth valuation and arbitrary value on lease assigned from W. S. Moore. Land value increased by purchases of three additional forties. Mill rate reduced by greater valuation in Itasca County, by other properties in taxing district.

Tax Commission Reserve as of May 1, 1960

1959	2,734.450
1960	2,734,450



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WORLD WIDE  
LOW BOND

WORLD WIDE  
WORLD WIDE

HAWKINS MINE  
ANNUAL REPORT  
YEAR 1960

I. GENERAL

After a complete shutdown of the mine during December, 1959, maintenance crews were recalled on January 4 to ready equipment for stripping operations and on January 11, rock stripping was started in the east pit extension. In addition to stripping, 7 men were recalled for plant repairs. Rock stripping operations were completed on March 20 and crews reduced for pit and plant equipment repairs.

During the month of March, nine cars of coarse ore were loaded and shipped to Lincoln Electric Company. Drilling and blasting in ore continued after the stripping program was completed on March 11 on a 3-shift, 5-day-week basis.

Stockpile loading was started on April 13 and intermittent loading was carried on until April 19 when the stockpile was depleted. Ore operations started on April 25 on a 2-shift, 6-day-week schedule and continued until June 20 when a 2-shift, 5-day-schedule went into effect because of reduced ore requirements. In August, a power line was built, and a shovel was moved into the lean ore dump south of the highway for a plant test run. The results of the test indicated a 54.50 natural iron. A portion of the dump was moved into the pit for further testing during 1961 ore operations. Production was suspended on September 2 because of the reduced ore requirements and stripping cleanup was completed on September 9.

At the end of the 1959 season, 8,545 tons of ore remained in stockpile. 133,082 tons were placed in pile during the year and 83,192 tons removed, leaving 58,435 tons in stockpile at the end of the 1960 season. After ore operations were completed, pit and plant crews were shifted to other mines, leaving 30 men at the Hawkins to complete pit and plant repairs. Twelve trucks and one tractor were rented to other mines. Intermittent stockpile loading continued until November 10. Pit and plant equipment repairs were completed on December 30 and the mine placed on standby basis with one hourly employee to take care of pumping and snow removal.

The International Harvester fines plant operated on the same schedule as the Hawkins mine. Production from jointly-owned Pond C was completed on July 19 and operations then moved into the lake area. 42,108 tons were produced from Pond C and 6,641 tons from the lake area, totalling 48,749 tons. Operations were completed on August 12.

On January 21, 1960, district personnel from the Hawkins mine office was moved into the building vacated by the Central Warehouse in Taconite, Minnesota.

The program for disposal of all International Harvester Company houses to be completed by the end of the lease in 1962 was partially carried out when in June four houses were sold from the Hawkins location and removed from the property and in December two more houses were sold in Nashwauk proper.

The tax dispute over the O'Brien lake tailings pond in contention with the state during the year was settled after the close of 1960 to the satisfaction of Cliffs and Harvester.

2. PRODUCTION-SHIPMENTS-INVENTORIES

a. Production by Grades

Hawkins crude retreat 1,465,788 tons

<u>Concentrates</u>	<u>Tons</u>
Bessemer	71,382
Non-Bessemer	<u>419,759</u>
	491,141

<u>Hawkins Tailings Basin</u>	<u>Cliffs</u>	<u>IHC</u>	<u>Total</u>
Crude	102,822	29,433	132,255
Concentrates	42,108	6,641	48,749

b. Shipments by Grades

	<u>Fines</u>	<u>Bessemer</u>	<u>Non-Bessemer</u>	<u>Total</u>
Hawkins Retreat		76,535	364,717	441,252
CCI				42,108
IHC				<u>6,641</u>
				48,749

c. Stockpile Inventories

Hawkins Retreat 58,435 tons

d. Production by Months

<u>Month</u>	<u>Hawkins Retreat</u>	<u>Crude Ore</u>		
		<u>CCI</u>	<u>IHC</u>	<u>Total Fines</u>
April	76,338	9,513		9,513
May	369,375	41,163		41,163
June	369,080	36,621		36,621
July	305,939	15,525	12,129	27,654
August	317,509		17,304	17,304
Sept	27,547			
	<u>1,465,788</u>	<u>102,822</u>	<u>29,433</u>	<u>132,255</u>

<u>Concentrates</u>				
April	35,926	4,956		4,956
May	112,089	15,740		15,740
June	115,819	14,496		14,496
July	107,785	6,916	4,139	11,055
August	107,888		2,502	2,502
Sept	11,634			
	<u>491,141</u>	<u>42,108</u>	<u>6,641</u>	<u>48,749</u>

3. ANALYSES

a. Tonnage & Analysis of Crude Ore Produced

<u>Hawkins Crude</u>	<u>Tons</u>	<u>Iron</u>	<u>Silica</u>
Retreat	1,465,788	35.54	44.80
Fine Ore	132,255	42.69	35.07

b. Tonnage & Analysis of Concentrates Produced

<u>Hawkins Retreat</u>	<u>Tons</u>	<u>Iron</u>	<u>Phos</u>	<u>Silica</u>	<u>Mang</u>	<u>Alum</u>	<u>Moist</u>
Bessemer	71,382	57.35	.032	11.14	.30	.43	5.94
Non-Bessemer	<u>419,759</u>	<u>56.92</u>	<u>.041</u>	<u>12.14</u>	<u>.64</u>	<u>.54</u>	<u>6.15</u>
	491,141	56.98	.040	11.99	.59	.52	6.12
<u>Hawkins Tailings Basin</u>							
CCI	42,108	58.35	.029	12.72	.31	.52	7.27
IHC	<u>6,641</u>	<u>58.23</u>	<u>.029</u>	<u>12.55</u>	<u>.28</u>	<u>.50</u>	<u>7.07</u>
	48,749	58.33	.029	12.69	.31	.52	7.24

c. Tonnage & Analysis of Concentrates Shipped

<u>Hawkins Retreat</u>	<u>Tons</u>	<u>Iron</u>	<u>Phos</u>	<u>Silica</u>	<u>Mang</u>	<u>Alum</u>	<u>Lime</u>	<u>Mag</u>	<u>Sulf</u>	<u>Loss</u>	<u>Moist</u>
Bessemer	76,535	57.30	.032	11.09	.31	.42	.12	.18	.008	5.74	5.88
None-Bessemer	<u>364,717</u>	<u>56.95</u>	<u>.041</u>	<u>11.93</u>	<u>.64</u>	<u>.52</u>	<u>.12</u>	<u>.18</u>	<u>.008</u>	<u>4.80</u>	<u>6.04</u>
	441,252	57.01	.040	11.78	.58	.50	.12	.18	.008	4.97	6.01
<u>Fine Ore</u>											
CCI	42,108	58.35	.029	12.72	.31	.52	.08	.22	.007	2.51	7.27
IHC	<u>6,641</u>	<u>58.23</u>	<u>.029</u>	<u>12.55</u>	<u>.28</u>	<u>.50</u>	<u>.08</u>	<u>.22</u>	<u>.007</u>	<u>2.92</u>	<u>7.07</u>
	48,749	58.33	.029	12.69	.31	.52	.08	.22	.007	2.57	7.24

d. Tonnage & Analysis of Ore in Stockpile

<u>Ore</u>	<u>Tons</u>	<u>Iron</u>	<u>Phos</u>	<u>Silica</u>	<u>Mang</u>	<u>Alum</u>	<u>Moist</u>
Hawkins Retreat	58,435	56.53	.040	13.58	.63	.63	6.87

4. ESTIMATE OF ORE RESERVES

a. Developed Ore - Factors Used

	<u>Concentrates</u>	<u>Cubic Feet per Ton</u>	<u>Per Cent Recovery</u>
Wash		14	50
Retreat		14	30

b. Ore Reserves as of December 31, 1960

<u>Lease</u>	<u>Reserve 12-31-59</u>	<u>Mined 1960</u>	<u>Balance after Mining</u>	<u>Changed by Re-estimate</u>	<u>Reserve 12-31-60</u>
<u>SE<math>\frac{1}{4}</math>-NE<math>\frac{1}{4}</math> 31-57-22</u>					
Open Pit Wash	111,204		111,204	-39,204	72,000
Open Pit Retreat	<u>287,330</u>	<u>186,334</u>	<u>100,996</u>	<u>439,204</u>	<u>140,200</u>
	398,534	186,334	212,200		212,200
<u>NE<math>\frac{1}{4}</math>-SE<math>\frac{1}{4}</math> 31-57-22</u>					
Open Pit Wash	182,178		182,178	-54,551	127,627
Open Pit Retreat	<u>554,660</u>	<u>197,463</u>	<u>357,197</u>	<u>454,551</u>	<u>411,748</u>
	736,838	197,463	539,375		539,375
<u>SW<math>\frac{1}{4}</math>-NW<math>\frac{1}{4}</math> 32-57-22</u>					
Open Pit Wash	31,043		31,043	-16,043	15,000
Open Pit Retreat	<u>194,885</u>	<u>14,975</u>	<u>179,910</u>	<u>416,043</u>	<u>195,953</u>
	225,928	14,975	210,953		210,953
<u>NW<math>\frac{1}{4}</math>-SW<math>\frac{1}{4}</math> 32-57-22</u>					
Open Pit Wash	193,147		193,147	-90,739	102,408
Underground Wash	127,319		127,319		127,319
Open Pit Retreat	<u>1,630</u>	<u>92,369</u>	<u>-90,739</u>	<u>490,739</u>	
	322,096	92,369	229,727		229,727
<u>Total Hawkins Mine</u>					
Open Pit Wash	517,572		517,572	-200,537	317,035
Underground Wash	127,319		127,319		127,319
Open Pit Retreat	<u>1,038,505</u>	<u>491,141</u>	<u>547,364</u>	<u>4200,537</u>	<u>747,901</u>
	1,683,396	491,141	1,192,255		1,192,255

c. Estimated Analyses of Ore Reserves

<u>Concentrates</u>	<u>Tons</u>	<u>Iron</u>	<u>Phos</u>	<u>Silica</u>
<u>SE<math>\frac{1}{4}</math>-NE<math>\frac{1}{4}</math> 31-57-22</u>				
Bessemer Open Pit Wash	72,000	61.13	.026	8.72
Bessemer Open Pit Retreat	<u>140,200</u>	59.38	.028	10.66
	212,200			
<u>NE<math>\frac{1}{4}</math>-SE<math>\frac{1}{4}</math> 21-57-22</u>				
Bessemer Open Pit Wash	127,627	59.95	.029	8.72
Bessemer Open Pit Retreat	<u>411,748</u>	57.48	.029	11.78
	539,375			
<u>SW<math>\frac{1}{4}</math>-NW<math>\frac{1}{4}</math> 32-57-22</u>				
Bessemer Open Pit Wash	15,000	56.60	.012	9.87
Bessemer Open Pit Retreat	113,364	57.50	.028	10.90
Non-Bessemer Open Pit Retreat	<u>82,589</u>	57.97	.064	10.59
	210,953			
<u>NW<math>\frac{1}{4}</math>-SW<math>\frac{1}{4}</math> 32-57-22</u>				
Bessemer Open Pit Wash	72,000	59.08	.029	7.63
Non-Bess Open Pit Wash	30,408	56.85	.062	9.78
Bessemer Underground Wash	62,974	58.00	.030	9.00
Non-Bess Underground Wash	<u>64,345</u>	57.00	.060	9.50
	229,727			
<u>Total Open Pit Wash</u>				
Bessemer	286,627	59.80	.027	8.56
Non-Bessemer	<u>30,408</u>	<u>56.83</u>	<u>.062</u>	<u>9.86</u>
	317,035	59.38	.032	8.75
<u>Total Open Pit Retreat</u>				
Bessemer	665,312	57.86	.029	11.36
Non-Bessemer	<u>82,589</u>	<u>57.97</u>	<u>.064</u>	<u>10.59</u>
	747,901	57.87	.032	11.34
<u>Total Underground Wash</u>				
Bessemer	62,974	58.00	.030	9.00
Non-Bessemer	<u>64,345</u>	<u>57.00</u>	<u>.060</u>	<u>9.50</u>
	127,319	57.49	.045	9.25
<u>GRAND TOTAL HAWKINS MINE</u>	<u>1,192,255</u>	<u>58.24</u>	<u>.032</u>	<u>10.39</u>

5. LABOR & WAGES

a. Comments

An ample labor supply was available during the year and very little turnover was experienced. Four men retired upon reaching age 65.

A new labor contract was signed effective January 1, 1960, under which the basic wage schedule remained unchanged until December 1, 1960. Effective December 1, 1960, the basic rate (Job Classes 1 and 2) was increased by \$0.07 to \$2.030 an hour. The increment above the basic rate was increased by \$0.002 from \$0.067 to \$0.069 per job class. The cost of living increase is now \$0.17.

b. Comparative Statement of Production

	<u>1960</u>	<u>1959</u>
Concentrate tonnage	491,141	318,121
Number of shifts worked	204	128
Number of hours	108,233	70,317
Average number of men working	113	78
Average wages per hour	\$3.183	\$3.391
Production per man per day	36.61	36.19
Labor cost per ton	\$0.725	\$0.732
Number of days operated	102	64
Total amount paid for labor	\$356,225.07	\$232,893.98

6. GENERAL SURFACE

a. Buildings & Repairs

Only necessary repairs were made to mine buildings.

b. Roads, Transmission Lines, etc.

500 feet of transmission line were extended to the dump south of the highway for a plant test run on lean ore. 900 feet of power line were moved in the pit for future ore operations.

c. Miscellaneous General Construction - None



7. OPEN PIT

a. Stripping

Rock stripping in the east pit extension under E&A CC-33 was started on January 11 on a 20-shift-a-week schedule using 2 shovels and 10 trucks. Although drilling had been started 5 weeks in advance, it was not possible to keep ahead of the shovels and stripping had to be delayed for a week in February to advance the drilling. When the two top cuts were completed, the material was softer and with an additional rotary drill from the Hill-Trumbull mine, it was possible to keep ahead of the drilling. Stripping was completed on March 20, except for 4 shifts of cleanup which were completed on September 9.

The following stripping was completed in 1960:

<u>Material</u>	<u>Cubic Yards</u>	<u>Shifts</u>	<u>Yards per Shift</u>	<u>Man Hours</u>	<u>Cost per Yard</u>
Rock	637,790	179	3,563		
Surface	<u>41,292</u>	<u>12</u>	<u>3,441</u>		
	679,082	191	3,555	58,875	\$0.745

b. Open Pit

Ore operations started on April 25 on a 2-shift, 6-day-week schedule using 2 shovels and 8 trucks. This schedule was reduced to a 5-day week on June 20 because of reduced ore requirements. Pit operations were conducted in the east pit extension and in the northwest corner. A higher-than-average rock reject was encountered but in spite of this the rate of production to the plant was normal. Production from the pit averaged 8,368 tons per shift and brought the total for the year to 1,740,516 tons.

During May, 12,220 tons of special sized low phos ore were produced for the Lincoln Electric Company.

Crude production from the pit follows:

Wash Plant Retreat				Pit					
Shifts	2" Rejects	Plant Crude	Tons per Shift	Shifts	Screen Rock	Rock	Crude	Tons per Shift	Tons per Ton
204	984	1,466,772	7,190	208	226,512	47,232	1,740,516	8,368	\$0.279

c. Pumping & Drainage

Pumping from the pit averaged about 1200 gallons per minute.

d. General Pit Activities

Activity was confined to mining of ore and removal of pit rock.

8. BENEFICIATION

a. Washing Plant

The plant operated on the same shift schedule as the pit except for a small maintenance crew on the third shift. Production rate through the plant was good, averaging 7,190 tons per shift.

Delay time shown below does not necessarily mean an interruption in plant production as in most instances bypassing of these units was possible:

<u>Source of Delay</u>	<u>Hours</u>	<u>Per Cent</u>	<u>Per Cent of 1632.00 Working Hours</u>
Out of ore	4.75	20.15	0.29
Pit screening plant	3.00	12.73	0.18
Crude ore conveyor	2.58	10.95	0.16
Primary screens	0.67	2.84	0.04
Secondary screens	2.33	9.89	0.14
Surge pile conveyor	1.08	4.58	0.07
Full surge	1.00	4.24	0.06
Miscellaneous chutes & launders	5.66	24.01	0.35
Tailings line	2.00	8.49	0.12
Electric power	0.50	2.12	0.03
	<u>23.57</u>	<u>100.00</u>	<u>1.44</u>

<u>Recapitulation</u>	<u>Hours</u>	<u>Per Cent</u>	<u>Per Cent of 1632.00 Working Hours</u>
Crude ore to head of mill	10.33	43.83	0.63
Ore processing delays	<u>13.24</u>	<u>56.17</u>	<u>0.81</u>
	23.57	100.00	1.44

b. Heavy-Media Plant

The heavy-media plant operated satisfactorily with a minimum of downtime. Rate of crude through the plant averaged 345 tons an hour. Media losses averaged 1.149 pounds per ton of feed. During the season, 100 tons of spheroid media purchased from Knapsack-Griesheim Company of Germany were charged into the circuit on an experimental basis. No conclusive results can be obtained from this test until laboratory work is completed during the coming winter.

Delay time follows:

<u>Source of Delay</u>	<u>Hours</u>	<u>Per Cent</u>	<u>Per Cent of 1713.75 Working Hours</u>
Out of ore	20.00	27.70	1.17
Surge pile feeder	20.83	28.85	1.22
Feed preparation screen	1.09	1.51	0.06
Akins separator	1.92	2.66	0.11
Coarse concentrate screen	7.75	10.73	0.45
Coarse reject screen	5.23	7.24	0.31
Circulating pump (media)	1.25	1.73	0.07
Miscellaneous chutes & launders	3.15	4.36	0.18
Reject truck	6.07	8.41	0.35
Wash plant classifier	1.17	1.62	0.07
Wash plant tailings line	2.17	3.00	0.13
Miscellaneous	<u>1.58</u>	<u>2.19</u>	<u>0.09</u>
	72.21	100.00	4.21

<u>Recapitulation</u>			
Crude ore to head of mill	40.83	56.54	2.38
Ore processing delays	<u>31.38</u>	<u>43.46</u>	<u>1.83</u>
	72.21	100.00	4.21

c. Cyclone Plant

The cyclone plant, although troublesome during the first two months of operations because of magnetite ore in the crude, smoothed out the last part of the season by varying the material feed to the plant from the pit. Media losses were 12.04 pounds per ton of feed.

Delay time is shown below:

<u>Source of Delay</u>	<u>Hours</u>	<u>Per Cent</u>	<u>Per Cent of 1632.00 Working Hours</u>
Out of ore	17.42	22.96	1.07
Feed dewatering screens	3.88	5.11	0.24
Cyclone feed pumps	2.21	2.91	0.13
Cyclones	8.25	10.87	0.50
Symons Float screens	6.46	8.51	0.40
Hewitt-Robins sink screens	9.73	12.82	0.60
Magnetic separators	2.00	2.64	0.12
Thickeners	8.50	11.20	0.52
Media feed pump	6.50	8.57	0.40
Wash ore	7.75	10.21	0.47
Miscellaneous	<u>3.18</u>	<u>4.20</u>	<u>0.15</u>
	<u>75.88</u>	<u>100.00</u>	<u>4.65</u>

Recapitulation

Crude ore to head of mill	21.30	28.07	1.31
Ore processing delays	<u>54.58</u>	<u>71.93</u>	<u>3.34</u>
	<u>75.88</u>	<u>100.00</u>	<u>4.65</u>

d. International Harvester Tailings Basin Plant

The fine ore plant started operating on April 25 on a 2-shift, 6-day-week schedule. On June 20, this schedule was reduced to a 5-day week to coincide with Hawkins mine operations. Operations in Pond C were completed July 19 and the screening plant then moved into Pond D, or the O'Brien Lake pond. Two shifts were necessary to make this move. Production from Pond C was very good, averaging 329 tons a shift. Pond D was much lower in recovery, averaging only 190 tons per shift.

1960 plant production is as follows:

	Production			
	Pond C	Pond D	1960 Actual	1959 Actual
Concentrates	42,108	6,641	48,749	27,406
Per cent recovery	40.95	22.56	36.86	30.26
Average daily output	658	380	598	428
Tons per man per day	26.89	13.05	23.49	24.86
Days operated	64	17.5	81.5	64

Delay time is shown below:

<u>Source of Delay</u>	<u>Hours</u>	<u>Per Cent</u>	<u>Per Cent of 1384.00 Working Hours</u>
Out of ore-dragline	81.83	30.72	5.92
Moving screening plant	54.91	20.61	3.97
Screen plant feeder	5.40	2.03	0.39
Repair screen plant	13.00	4.88	0.94
Repair screen plant pump	20.91	7.85	1.51
Plant feed line	57.66	21.65	4.17
Feed booster pump	9.16	3.44	0.66
Concentrate dewatering classifier	0.75	0.28	0.05
Plant startup	0.33	0.12	0.02
Loading pocket	0.50	0.19	0.04
Clear water pump	11.92	4.48	0.86
Clear water line	6.00	2.25	0.43
Railroad cars and tracks	4.00	1.50	0.29
	<u>266.37</u>	<u>100.00</u>	<u>19.25</u>
<u>Recapitulation</u>			
Crude ore to head of mill	242.87	91.18	17.55
Ore processing delays	23.50	8.82	1.70
	<u>266.37</u>	<u>100.00</u>	<u>19.25</u>

e. Complete Concentration Data

Product	Tons	Per Cent Weight		Per Cent			Iron Units
		Plant	Pit	Iron	Phos	Silica	
Crude to Plant	1,466,772	100.00	84.27	35.54		44.80	100.00
Pit Rock	47,232		2.71	21.52		64.62	
Screen Plant Rock	226,512		13.02	23.56		62.14	
Pit Crude	1,740,516		100.00	33.60		47.59	
Total Concentrates Produced	480,542	32.76	27.61	57.01	.041	12.10	52.56
Unsized Concentrates Produced	267,074	18.21	15.34	57.35	.039	11.83	
Coarse Concentrates Produced	156,991	10.70	9.02	57.19	.042	11.20	
Fine Concentrates Produced	56,477	3.85	3.24	54.83	.040	15.67	
1959 Stockpile Overrun	10,599	0.72	0.62				
Total Concentrates Produced & Shipped	491,141	33.48	28.22	57.01	.041	12.10	53.71
Heavy-media Concentrates	351,531	23.97	20.20	57.57		11.25	
Heavy-media Rejects	240,064	16.37	13.79	37.79		40.28	
Heavy-media Feed	591,595	40.34	33.99	49.54		23.03	
Cyclone Concentrates	116,080	7.91	6.67	55.81		14.42	
Cyclone Rejects	37,235	2.54	2.14	36.47		40.98	
Cyclone Feed	153,315	10.45	8.81	51.11		20.87	
1/2" Wash Plant Rejects	984	0.07	0.06	26.30		63.75	
Total Fine Tailings (by difference)	707,947	48.26	40.67	20.16		68.70	

Hawkins Fine Ore Plant

Crude to Plant	132,255	100.00	42.69	42.69		35.07	100.00
Total Concentrates Produced	48,749	36.86		58.33	.030	12.70	50.36
Total Fine Tailings (by difference)	83,506	63.14		33.56		48.13	

9. MAINTENANCE & REPAIRS

Repair work which had been deferred after the strike in 1959 was started in the plant on January 4 with 6 men. The crew was increased after completion of the stripping program to 29 men to insure completion of the repair program by the beginning of ore operations. Repairs to the plant were of a general nature with no change in the flowsheet. Repairs to pit equipment were started after completion of stripping and continued until April 25 when ore operations started. After ore operations were completed, all pit and plant equipment--except for rental trucks and tractors--went through the regular repair program. All repairs were completed December 30 which in effect gave us a 2-year program in 1960.

10. COST OF OPERATIONS

a. Comparative Mining Costs

<u>Product</u>	<u>1960</u>		<u>1959</u>
	<u>Estimated</u>	<u>Actual</u>	<u>Actual</u>
Retreat Concentrates Produced	700,000	491,141	318,121
Per Cent Recovery	30.00	29.01	31.37
Average Daily Output	4,488	4,815	4,971
Tons per Man per Day		36.30	36.19
Days Operated	156	102	64
<u>Costs</u>			
Pit Operating	\$0.294	\$0.279	\$0.299
Concentrating	0.200	0.206	0.191
Loading Stockpile Ore	0.008	0.008	0.018
Miscellaneous Pit & Beneficiation	0.150	0.139	0.154
Total Pit & Beneficiation	\$1.743	\$1.752	\$1.676
General Mine Expense	0.190	0.240	0.198
Winter & Idle	0.500	0.717	0.421
Cost of Production	\$2.433	\$2.709	\$2.295
<u>Depreciation</u>			
Plant & Equipment		0.408	0.322
Motorized & Other Equipment		0.048	0.068
Movable Equipment		0.006	0.014
<u>Taxes</u>			
Ad Valorem		0.486	0.375
Occupational		0.087	-0.036
Royalty		0.079	0.183
<u>Total Depreciation &amp; Taxes</u>		\$1.114	\$0.926
Administrative Expense		0.050	0.050
Miscellaneous Expense & Income		0.022	0.013
Royalty		1.492	1.443
<u>Total Cost on Cars</u>		\$5.387	\$4.727

Above costs do not include Cleveland adjusted figures.

b. Detailed Cost Comparison

Pit Operating: Under the estimate of \$0.294 by \$0.015 and under 1959 costs by \$0.020.

Concentrating: Over the estimate of \$0.200 by \$0.006 and over 1959 costs by \$0.015.

Loading Stockpile Ore: Costs were same as the estimate by were under 1959 costs by \$0.010 because of high costs in 1959 due to the strike.

Miscellaneous Pit & Beneficiation: Under the estimate of \$0.150 by \$0.011 and under 1959 costs by \$0.015.

Total Pit & Beneficiation: Over the estimate of \$1.743 by \$0.009 and over 1959 costs by \$0.076 because of a 2 per cent decrease in recovery.

General Mine Expense: Over the estimate of \$0.190 by \$0.050 and over 1959 costs by \$0.042. Costs were estimated on a production of 700,000 tons which was reduced to an actual production of 491,141 tons. Since costs are constant, the reduced tonnage could not be a factor in reducing costs.

Winter & Idle: Over the estimate of \$0.500 by \$0.217 and over 1959 costs by \$0.296. 1959 repairs were deferred until after the first of the year in 1960 and all 1960 repairs were completed by January 1, 1961. This meant a 2-year program of repairs completed in 1960. In addition, an extra 2 months of downtime were added to the drop in production.

Cost of Production: Over the estimate of \$2.433 by \$0.276 and over 1959 costs by \$0.414. Due to increase in Winter & Idle and General Mine Expense, and also to the reduction in production and to the 2-year repair program in 1960.

11. EXPLORATION & FUTURE EXPLORATION - None



12. TAXES

<u>Real Estate</u>	<u>1960</u>		<u>1959</u>		<u>Increase-Decrease</u>	
	<u>Assessed Value</u>	<u>Taxes</u>	<u>Assessed Value</u>	<u>Taxes</u>	<u>Assessed Value</u>	<u>Taxes</u>
Mineral	\$332,381	\$150,937.54	\$162,851	\$ 87,421.67	<del>/\$169,530</del>	<del>/\$63,515.87</del>
Lands, Bldgs, Machinery	135,873	60,066.85	139,575	72,367.71	- 3,702	- 12,300.86
IHC Basin Lands, Plant	4,590	1,652.91	3,474	1,381.54	<del>/ 1,116</del>	<del>/ 271.37</del>
<u>Personal Property</u>						
Equipment	65,018	29,525.32	99,636	53,486.60	- 34,618	- 23,961.28
Stockpile Concentrates	1,204	546.76	875	470.00	<del>/ 329</del>	<del>/ 76.76</del>
Hawkins Tailings Basin	10,978	3,953.30	14,045	5,586.02	- 3,067	- 1,632.72
	<u>\$550,044</u>	<u>\$246,682.68</u>	<u>\$420,456</u>	<u>\$220,713.54</u>	<del>/ \$129,588</del>	<del>/ \$25,969.14</del>
Average Mill Rate		448.48		524.94	-	76.46

Note: Mineral valuation increased by State basing value on present worth method of valuation for an average valuation of \$0.2018 per ton for 1960 as compared to fixed class rate in 1959 of \$0.820. Lands and building valuation reduced by sale of two houses and smaller percentage of IHC tailings basin plant and lands. Personal property equipment valuation reduced by new depreciation schedule allowing faster writeoff. Lone Pine Township increased value of buildings 25 per cent on all other than rural. Mill rate decreased by greater valuation in Itasca County.

Tax Reserve as of May 1, 1960 (Tax Commission Reserve)

1959	1,984,151
1960	<u>1,647,470</u>
	336,681

13. ACCIDENTS & PERSONAL INJURY

Toivo Nurkka, Age 60, Car Dropper & Feeder Cleanup Man

On January 26, 1960, Toivo Nurkka injured left foot when raising bumper weight to jar stem loose that was lodged in drill hole. Brake failed and bumper weight came down on foot. Lost 243 days. Compensation Paid: \$2070. Hospital Expense: \$2823.

Earl Barsness, Age 27, Truck Driver

On February 18, 1960, Barsness injured back when truck rolled over dump when he backed up to crest of dump to unload. Lost 12 weeks 2 days. Compensation Paid: \$555. Hospital Expense: \$561.

Wayne Koski, Age 54, Tire Repairman

On March 9, 1960, Koski injured right leg while repairing flat tire on rear tandem of haulage truck and tire fell on leg. Time lost 212 days. Compensation Paid: \$1800. Hospital Expense: \$260.

14. PROPOSED NEW CONSTRUCTION - None
15. EQUIPMENT RECEIVED & PROPOSED NEW EQUIPMENT - None

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HILL-TRUMBULL MINE

ANNUAL REPORT

YEAR 1960

I. GENERAL

The 1959-1960 fall stripping program under E&A MC-368 was discontinued January 9, 1960. General repair work on the concentrating plant and pit equipment and construction work under E&A MC-366 on cyclone plant revisions started on January 11. Blasthole drilling in preparation for the 1960 ore season began March 7 on a 3-shift, 5-day-week schedule. Remodelling of the pit screening plant to install a new Lecco double-deck screen started March 14. General repairs, construction, and remodelling work were completed April 25, 1960.

Ore production started April 25, 1960, on a 3-shift, 6-day schedule. On June 19, operations were reduced to a 3-shift, 5-day schedule, and on July 3 were further reduced to a 2-shift, 5-day schedule. Ore production was completed October 7, 1960.

The 1960-1961 fall stripping program under E&A MC-377 got under way on October 10, 1960, on a 3-shift, 5-day-week schedule and was completed December 10, 1960. Washing down and general work at the concentrating plant, plus work to be done by company employees on the new reject rock conveyor system under E&A MC-372, started on October 10 and was terminated December 23. Structural drilling by Schultze began in the Gross-Marble lease on September 30 under E&A MC-374 and was completed December 30.

The mine was placed on standby basis on December 30 with one hourly district man (analyst) employed. The Abe Mathews Engineering Company is continuing with its portion of the contract work on the rock reject conveyor system and concrete work is nearing completion. Company employees will be recalled as work is available on this project.

2,594,904 tons of crude ore mined from the Gross-Marble, Hill, and Hill-Walker leases produced 587,213 tons of concentrates at an average rate per shift of 1,919 tons and an average pit recovery of 22.63 per cent.

Crude tonnages produced and concentrates yielded are as follows:

<u>Lease</u>	<u>Material</u>	<u>Tons Crude</u>	<u>Concentrates</u>
Gross-Marble	Retreat	418,919	103,446
Hill	Retreat	848,652	193,510
Hill-Walker	Retreat	1,302,888	273,701
Hill-Walker	Wash	29,445	16,556
		<u>2,594,904</u>	<u>587,213</u>

During the season it was necessary to stockpile 161,795 tons of concentrates. 127,509 tons were loaded out from May through October, leaving 70,993 tons in stockpile as of December 31, 1960. This balance was made up of 55,938 tons of regular, 10,559 tons coarse, and 4,496 tons fines.

The following E&A projects were completed during the year:

<u>E&amp;A No.</u>	<u>Project</u>
MC-364	Land Purchase
MC-365	Dump Land Purchase
MC-366	Cyclone Plant Revisions
MC-368	Stripping Program
MC-370	2-inch Pit Scalping Screen
R&M MC-10	Shovel Cable

The following E&A's were approved during the year but not completed:

MC-372	Plant Rock Reject Conveyor
MC-374	Structure Drilling
MC-377	Stripping Program

E&A MC-381 for the remodelling of two Dings magnetic separators was submitted for approval.

2. PRODUCTION-SHIPMENTS-INVENTORIES

a. Production by Grades

	<u>Crude</u>	<u>Wash</u>	<u>Retreat</u>	<u>Total</u>
Gross-Marble			287,234	287,234
Hill			551,618	551,618
Hill-Walker	25,420		860,407	885,827
			<u>1,699,259</u>	<u>1,724,679</u>

<u>Concentrates</u>	<u>Bessemer Retreat</u>	<u>Non-Bessemer</u>		<u>Total</u>
		<u>Wash</u>	<u>Retreat</u>	
Gross-Marble	34,206		69,240	103,446
Hill	63,967		129,543	193,510
Hill-Walker	<u>11,384</u>	<u>16,556</u>	<u>262,317</u>	<u>290,257</u>
	<u>109,557</u>	<u>16,556</u>	<u>461,100</u>	<u>587,213</u>

b. Shipments

Gross-Marble	34,206		69,240	103,446
Hill	63,967		101,096	165,063
Hill-Walker	<u>11,384</u>	<u>16,556</u>	<u>219,771</u>	<u>247,711</u>
	<u>109,557</u>	<u>16,556</u>	<u>390,107</u>	<u>516,220</u>

c. Inventories

	<u>Retreat</u>	<u>Tons</u>
Hill		28,447
Hill-Walker		<u>42,546</u>
		70,993

d. Production by Months

<u>Month</u>	<u>Hill-Walker</u>		<u>Hill</u>	<u>Gross-Marble</u>	<u>Total</u>
	<u>Wash</u>	<u>Retreat</u>	<u>Retreat</u>	<u>Retreat</u>	
<u>Crude Ore</u>					
April				69,589	69,589
May			195,537	217,645	413,182
June		51,737	356,081		407,818
July	1,710	241,877			243,587
Aug	23,710	236,637			260,347
Sept		266,235			266,235
Oct		63,921			63,921
	<u>25,420</u>	<u>860,407</u>	<u>551,618</u>	<u>287,234</u>	<u>1,724,679</u>

<u>Concentrates</u>					
April				24,317	24,317
May			65,323	77,272	142,595
June		14,978	128,187	1,857	145,022
July	600	85,677			86,277
Aug	15,956	76,755			92,711
Sept		76,682			76,682
Oct		19,609			19,609
	<u>16,556</u>	<u>273,701</u>	<u>193,510</u>	<u>103,446</u>	<u>587,213</u>

3. ANALYSIS

a. Crude Ore

<u>Product</u>	<u>Tons</u>	<u>Iron</u>	<u>Silica</u>
Gross-Marble Retreat	287,234	37.38	42.23
Hill-Retreat	551,618	40.75	38.51
Hill-Walker Wash	25,420	47.88	26.53
Hill-Walker Retreat	860,407	42.49	36.17
	<u>1,724,679</u>	<u>41.16</u>	<u>37.79</u>

b. Tonnage & Analysis of Concentrates Produced

<u>Product</u>	<u>Tons</u>	<u>Iron</u>	<u>Phos</u>	<u>Silica</u>	<u>Mang</u>	<u>Alum</u>	<u>Moisture</u>
<u>Gross-Marble</u>							
Bessemer Retreat	34,206	57.38	.037	12.47	.18	.51	6.88
Non-Bessemer Retreat	69,240	57.39	.041	11.93	.18	.43	6.45
<u>Hill</u>							
Bessemer Retreat	63,967	59.01	.037	11.84	.14	.51	7.28
Non-Bessemer Retreat	129,543	59.04	.040	11.68	.13	.52	7.09
<u>Hill-Walker</u>							
Non-Bessemer Wash	16,556	58.06	.042	12.31	.13	.91	11.02
Bessemer Retreat	11,384	60.06	.046	9.82	.16	.93	8.89
Non-Bessemer Retreat	262,317	60.37	.048	9.82	.14	.60	9.09
	<u>587,213</u>	<u>59.33</u>	<u>.044</u>	<u>10.92</u>	<u>.14</u>	<u>.56</u>	<u>8.06</u>

c. Tonnage & Complete Analysis of Concentrates Shipped

<u>Product</u>	<u>Tons</u>	<u>Iron</u>	<u>Phos</u>	<u>Silica</u>	<u>Mang</u>	<u>Alum</u>	<u>Lime</u>	<u>Mag</u>	<u>Sulf</u>	<u>Ign Loss</u>	<u>Moist</u>
<u>Gross-Marble</u>											
Bessemer Retreat	34,206	57.38	.037	12.47	.18	.51	.20	.15	.008	4.28	6.88
Non-Bessemer Retreat	69,240	57.39	.041	11.93	.18	.43	.20	.15	.008	4.87	6.45
<u>Hill</u>											
Bessemer Retreat	63,967	59.01	.037	11.84	.14	.51	.10	.25	.010	2.63	7.28
Non-Bessemer Retreat	101,096	59.02	.040	11.66	.13	.51	.10	.25	.010	2.81	7.01
<u>Hill-Walker</u>											
Non-Bessemer Wash	16,556	58.06	.042	12.31	.13	.91	.10	.24	.011	3.13	11.02
Bessemer Retreat	11,384	60.06	.046	9.82	.16	.93	.11	.24	.011	2.68	8.89
Non-Bessemer Retreat	219,771	60.04	.048	9.91	.14	.94	.11	.24	.011	2.63	9.12
	<u>516,220</u>	<u>59.12</u>	<u>.043</u>	<u>11.01</u>	<u>.14</u>	<u>.71</u>	<u>.12</u>	<u>.23</u>	<u>.010</u>	<u>3.09</u>	<u>8.03</u>



d. Analysis of Ore in Stockpile

<u>Retreat Concentrates</u>	<u>Tons</u>	<u>Iron</u>	<u>Phos</u>	<u>Silica</u>	<u>Mang</u>	<u>Alum</u>	<u>Moisture</u>
Hill-Walker	45,546	60.39	.048	9.37	.15	.93	8.97
Hill	<u>28,447</u>	<u>59.10</u>	<u>.039</u>	<u>11.72</u>	<u>.14</u>	<u>.54</u>	<u>7.36</u>
	70,993	59.62	.044	10.45	.15	.75	8.17

4. ESTIMATE OF ORE RESERVES

a. Developed Ore - Factors Used

<u>Hill, Trumbull, Hill-Walker Concentrates</u>	<u>Cubic Feet per Ton</u>	<u>Rock Deduction</u>	<u>Per Cent Recovery</u>
Merch	14	0	100
Wash	14	0	54
Retreat	14	0	30
<u>Gross-Marble and Potter</u>			
Merch			
Wash	14	0	54
Retreat	14	0	25

b. Ore Reserves Estimated as of December 31, 1960

<u>Lease</u>	<u>Reserve 12-31-59</u>	<u>Mined 1960</u>	<u>Balance after Mining</u>	<u>Changed by by Re-estimate</u>	<u>Reserve 12-31-60</u>
Trumbull	1,265,216		1,265,216		1,265,216
Hill	697,227	193,510	503,717		503,717
Hill-Walker	601,257	290,257	311,000		311,000
Potter	74,100		74,100		74,100
Gross-Marble	<u>461,439</u>	<u>103,446</u>	<u>357,993</u>		<u>357,993</u>
	3,099,239	587,213	2,512,026		2,512,026

c. Estimated Analyses of Ore Reserves

<u>Concentrates</u>	<u>Tons</u>	<u>Iron</u>	<u>Phos</u>	<u>Silica</u>	<u>Mang</u>	<u>Alum</u>
<u>Trumbull</u>						
Bessemer Wash	17,093	57.61	.037	9.63	.10	.39
Non-Bessemer Wash	139,002	58.73	.053	8.70	.11	.54
Bessemer Retreat	171,219	58.46	.037	9.58		
Non-Bessemer Retreat	<u>937,902</u>	<u>58.40</u>	<u>.055</u>	<u>9.61</u>		
	1,265,216	58.43	.052	9.51	.11	.52
<u>Hill</u>						
Non-Bessemer Direct	63,317	60.05	.063	8.82		
Bessemer Wash	172,988	62.38	.028	9.24	.11	.48
Non-Bessemer Wash	34,924	60.62	.053	9.76	.12	.36
Bessemer Retreat	192,448	61.13	.027	10.35		
Non-Bessemer Retreat	<u>40,040</u>	<u>60.14</u>	<u>.042</u>	<u>10.34</u>		
	503,717	61.31	.034	9.73	.11	.46
<u>Hill-Walker</u>						
Non-Bessemer Retreat	311,000	60.36	.050	8.75		
<u>Potter</u>						
Non-Bessemer Retreat	74,100	58.00	.045	11.50		
<u>Gross-Marble</u>						
Non-Bessemer Wash	160,915	58.25	.054	9.35		
Bessemer Retreat	27,883	57.59	.031	10.79		
Non-Bessemer Retreat	<u>169,195</u>	<u>58.37</u>	<u>.051</u>	<u>8.87</u>		
	357,993	58.26	.051	9.24		
<u>Total Direct</u>						
Non-Bessemer	63,317	60.05	.063	8.82		
<u>Total Wash</u>						
Bessemer	190,081	61.95	.029	9.28	.11	.47
Non-Bessemer	<u>334,841</u>	<u>58.70</u>	<u>.053</u>	<u>9.12</u>	<u>.11</u>	<u>.48</u>
	524,922	59.87	.044	9.17	.11	.48
<u>Total Retreat</u>						
Bessemer	391,550	59.72	.032	10.04		
Non-Bessemer	<u>1,532,237</u>	<u>58.82</u>	<u>.053</u>	<u>9.46</u>		
	1,923,787	59.00	.049	9.58		
<u>Total Concentrates</u>						
Bessemer	581,631	60.45	.031	9.79		
Non-Bessemer	<u>1,930,395</u>	<u>58.84</u>	<u>.053</u>	<u>9.38</u>		
	2,512,026	59.21	.048	9.47		

5. LABOR & WAGES

a. Comments

A new labor contract was signed effective January 1, 1960, under which the basic wage schedule remained unchanged until December 1, 1960. Effective December 1, 1960, the basic rate (Job Classes 1 and 2) was increased by \$0.07 to \$2.030 an hour. The increment above the basic rate was increased by \$0.002 from \$0.067 to \$0.069 per job class. The cost of living increase is now \$0.17.

During the early part of the ore season, college students were hired to fill in on the manpower shortage. During the last part of the ore season and during the stripping operation, men were hired from the Central District on a preferential-hiring basis to fill out the crews.

b. Comparative Statement of Production & Wages

	<u>1960</u>	<u>1959</u>
Product	587,213	291,948
Average Number of 8-hour Shifts	2	2
Average Number of Men Working	145	151
Average Wages per Day	25.78	25.31
Product per Man per Day	25.50	28.10
Labor Cost per Ton	\$1.030	\$0.901
Total Number of Days Worked	126	64
Amount Paid for Labor	\$604,781.03	\$262,994.03

6. GENERAL SURFACE

a. Buildings & Repairs

No buildings were erected and no major building repairs undertaken during the year. Minor repairs to buildings were made as required.

b. Roads, Transmission Lines, Tracks, Construction

No major road or transmission line changes were made during the year. A power line was extended a few hundred feet to supply power to the shovel stripping in the Hill lease in the fall of 1960. A normal track repair program was carried on throughout the ore season.

E&A MC-372 was approved and construction started on a new plant rock reject conveyor and stacker system. The Abe Mathews Engineering Company was awarded the contract for a portion of the work including: engineering, final grading, pier excavating, back filling, fabricating, erecting, concrete work, and purchase of equipment. The portion of the work reserved for the company includes: fill and rough grading, removal of existing conveyors and rock reject bin, purchase of conveyor belting and electrical equipment, and installation of conveyor belting, mechanical equipment, electric motors, and complete electrical installation.

7. OPEN PIT

a. Stripping

The 1959-1960 stripping program under E&A MC-368 continued on a 20-shift-a-week schedule through January 9, 1960, using two shovels and ten trucks per shift. Surface material removed under this E&A from the various leases is as follows:

<u>Lease</u>	<u>Cubic Yards</u>
Hill-Walker	370,934
Hill	387,950
Trumbull	28,911
Potter	<u>90,593</u>
	878,388

18,438 cubic yards of surface material were removed from the Hill-Walker lease before the ore season under Supplemental E&A MC-368.

Under E&A MC-377, the 1960-1961 stripping program started on the 10th of October, 1960, on a 3-shift, 5-day-week schedule using two shovels and ten trucks on each shift. One shovel worked in the Hill-Walker lease and one in the Hill. This stripping program was completed December 10, 1960. Surface material removed from the leases follows:

Hill-Walker	245,731
Hill	314,673
Potter	<u>18,385</u>
	578,789

Surface material moved under both E&A's MC-368 and 377 during 1960 follows:

Hill-Walker	316,715
Hill	315,159
Potter	<u>97,237</u>
	729,111

b. Open Pit Mining

A new 8'6" x 14'0" Lecco double-deck screen was installed in the pit screening plant prior to the 1960 ore season. This screen was installed with a gate so that the 1/2"-4" material could be eliminated in the pit or be sent to the plant as feed. The 1/2"-4" material was rejected in the pit for most of the season.

1960 ore operations started April 25, 1960, on a 3-shift, 6-day-week schedule. On June 19, operations were reduced to a 3-shift, 5-day schedule, and on July 3 were further reduced to a 2-shift, 5-day-week schedule. Two to three shovels and eight to eleven trucks were used per shift under normal operating conditions. Ore production was completed October 7, 1960.

2,594,904 tons of crude were produced in 312 shifts at an average rate of 8,317 tons a shift. From this crude, 747,860 tons of 1/2" screen rock and 122,365 tons of pit rock were removed in the pit and the balance of 1,724,679 tons sent to the plant at an average rate of 5,636 tons a shift. Screen rock made up 28.6 per cent of the total crude mined in 1960--the increase in percentage of screen rock for 1960 over the 13.35 per cent in 1959 due primarily to 2-inch scalping in the pit. Retreat crude totalled 2,565,459 tons and wash crude totalled 29,445 tons.

Retreat tonnage produced from the various leases follows:

<u>Lease</u>	<u>Retreat Ore</u>	<u>Area Mined</u>
Gross-Marble	418,919	Northwest & southwest sides
Hill	843,652	North side & east end
Hill-Walker	<u>1,302,888</u>	East & west ends & north side
	<u>2,565,459</u>	