12. TAXES

	1952	1951	Increase	Decrease
Canisteo Mine, Washing Plant, Shops & Office	$145,018.04	$130,376.75	$14,641.29	
Washing Plant Auxiliary Lands	1,358.41	1,427.24		$68.83
Personal Property	12,974.07	15,113.28		$2,139.21
Total	$159,350.52	$146,917.27	$12,433.25	
Village Lots	240.05	238.75	1.30	
Grand Total	$159,590.57	$147,156.02	$12,434.55	
Average Tax Rate (Mills)	123.69	133.68	9.99	

There was an increase in the taxable value of washing plant, shops, office, etc. due to the general increase of 10% on the value of all buildings in Villages in Itasca County.

An increase of $189,592.00 in Mineral Valuation is the result of a blanket increase of 15% in rates effecting the different classes of ore and the changing of the classification of a certain tonnage of ore from undeveloped to developed, due to stripping.

Personal property taxes were lower than in 1951 due to a reduction in the tonnage of ore in stockpile and a reduced mill rate.

13. ACCIDENTS & PERSONEL INJURY

There were sixty slight accidents at the Canisteo Mine during 1952. There were three lost time accidents during the year, which are described as follows:

(1) Name: Waino Raki
Date of Injury August 31, 1952
Cause Raki removed the bolts that held one of the 20" panels in the conveyor, without first blocking the panel. When he removed the last bolt, it dropped about 4", striking Raki on the side of his left foot.
Nature of Injury Contusion and swelling over 5th metatarsal left foot. Fractured 5th metatarsal lower third. No displacement.

Days Lost 26 days
Compensation: $138.67

(2) Name Glen Workman
Date of Injury September 8, 1952
Cause Glen Workman was climbing up onto a power shovel and while stepping around the railing, he slipped and bumped his left testicle.
Nature of Injury Contusion of left testicle. Some swelling
Days Lost 35 days
Compensation $186.67

(3) Name Sulo Nuorala
Date of Injury December 30, 1952
Cause Nuorala was connecting a rigid tow-bar between a heavy duty truck and a rubber tired dozer, when the first finger of his right hand was pinched between bar and pin.
Nature of Injury Contusion of finger, amputation at distal joint, rx. closure of stump, had to resect some of II phalanx to close. Hospitalized.
Days Lost 1 day in 1952. Not returned to work as of Feb. 12, 1953.
Compensation $128.00 paid as of Jan. 30, 1953.

14. PROPOSED NEW CONSTRUCTION

Plans are underway for the construction of a second unit of heavy media at the Canisteo Plant. This unit is to be ready for operation at the beginning of the 1954 season.

15. EQUIPMENT RECEIVED & PROPOSED NEW EQUIPMENT

Equipment received during 1952:

1420 ft.	36" conveyor belt for crude ore conveyors
2	250 HP motors and gear reducers from Holman Mine.
1	new steel carpenter shop building
1	300 HP motor for tailings pump
1	8 cu. yd. Hendricks dragline bucket
1	new tractor - TD 24
4	34-ton Euclid trucks
1	new steel oil house
1	60' dragline boom for 54-B shovel

Proposed New Equipment

3	Pickup trucks
1	service truck

HAWKINS MINE
ANNUAL REPORT
YEAR-1952

1. GENERAL

Stripping operations and relocation of the washing plant were in progress at the close of 1951 and continued into 1952, with stripping in taconite and paint rock on the East side of the pit as well as stripping of surface at the MacKillican Mine. Stripping operations at the MacKillican were suspended March 29th in order to overhaul equipment for the 1952 ore season. Rock stripping, under E&A Nol CC-417 followed the same schedule.

In the pit, the screening plant and conveyor system was relocated to fit the new washing plant location which meant moving the 44,624 tons of retreat ore and stocking it in the pit in dumps to avoid conflict with future operations.

Washing plant construction was continued on a 7-day week basis by contract erection crews and general repairs to plant equipment were carried on by plant crews on a six day per week schedule.

Erection of a fine ore plant at the old washing plant site to process the old tailings pond, was started in Ajpril and erection was started on a second unit heavy media plant to take care of future low grade ores.

After completion of the washing plant section, ore operations were started on May 20th on a two shift basis and production continued until June 2nd when the steel strike went into effect, ending on July 26th and ore operations were then resumed on a 2-shift basis. Production was slowed down on resuming production due to recalling men to work and the inavailability of Great Northern cars until the completion of the stacker system. Stripping operations continued under E&A No. CC-417 after the strike.

Wash ore crude, produced entirely from the bottom of the Hawkins Pit, totaled 640,412 tons with no production from the MacKillican Mine, as had been originally planned, since stripping operations had not been completed at that property. Washed concentrates totaled 321,829 tons with shift production average on crude of 5,350 tons.

The first unit of the heavy media plant was put into operation on September 2nd and retreat crude ore was produced from the Hawkins Pit bottom. This near wash material had to be removed in order to open up areas where wash ore could be reached. A total of 83,313 tons of retreat feed was treated to produce 66,791 tons of retreat concentrates. Average concentrate production per shift was 2,508 tons.

The fine ore plant, at the old tailings pond, went into operation on September 22nd. Numerous changes had to be made to chuting, piping, etc. and production was slow for this reason, but a good grade of ore was produced and with few changes made to speed up production, a good operation is anticipated for the coming year. Average concentrates produced per shift was 218 tons.

Due to railroad car shotrages, 156,482 tons of concentrates were stockpiled during the 1952 season.

The 1952 ore season closed on October 19th due to a freezing period which made plant operation impossible and crews were then shifted to the MacKillican Mine stripping project. This operation was carried forward on a twenty shift per week basis, and continued until the end of the year. Total material moved from the MacKillican Mine for the year of 1952 amounted to 1,456,462 cu. yds. A total of 60,958 cu. yds. were removed under E&A CC-493. Material moved from rock stripping under E&A CC-417 amounted to 618,991 cu. yds.

1. GENERAL (Continued)

Following the close of the ore season, plants were immediately washed out and winter repairs and revisions began. A two unit cyclone plant was put under construction in November in order to take care of the fine ore problem encountered at this property in 1952.

Stockpile loading began after the plants were shut down and was completed in November, with 150,004 tons loaded out. This completed shipments for the year.

2. PRODUCTION, SHIPMENTS & INVENTORIES

a. Production by Grades

	Tons
Hawkins Wash Crude	640,412
Hawkins Retreat Crude	378,756
	1,019,168
Hawkins Tailings Basin Crude	13,154
Hawkins Bess. Wash Conct. Coarse	96,499
Hawkins N.B. Wash Concts.	216,942
Hawkins N.B. Fines Used as Coarse	1,362
Hawkins Bess. Retreat Concts.	84,786
Hawkins N.B. Retreat Concts.	94,247
Hawkins N.B. Fines used as fines	63,589
	557,425
Hawkins Tailings Basin Fines	5,454

b. Shipments by Grades

Hawkins Bess. Wash Concts. Coarse	119,784
Hawkins N.B. Wash Concts. Coarse	321,017
Hawkins N.B. Fines used as Coarse	1,362
Hawkins Bess. Retreat Concts.	84,786
Hawkins N.B. Retreat Concts.	91,591
Hawkins Bess. "B" S.P.	10.738
Hawkins N.B. "B" S.P.	11,390
Hawkins N.B. Fines Con. Used as Fines	63,589
	704,257
Hawkins N.B. Tailings Basin Fines	5,454

c. Stockpile Inventories

Hawkins Coarse Concts.	3,822
Hawkins Retreat Concts.	2,656
Hawkins "B" S.P. Con.	54,659

d. Production by Months - Crude Ore

Month	Wash Crude Ore	Retreat Crude	Total	Tailings Basin Crude
May	59,564		59,564	
June	7,633		7,633	
July	34,898		34,898	
August	257,021		257,021	
September	238,678	178,701	417,379	2,517
October	42,241	199,869	242,110	10,637
Adjust.	377	186	563	
Total	640,412	378,756	1,019,168	13,154

2. PRODUCTION, SHIPMENTS & INVENTORIES (Continued)

a. Production by Months - Concentrates

Month	Hawkins Wash	Hawkins Fines	Hawkins Ret.	Total	Tailings Basin
May	31,360	7,537		38,897	
June	3,937	525		4,462	
July	21,905	4,455		26,360	
August	134,260	23,450		157,710	
September	84,145	19,918	82,447	196,510	1,351
October	37,834	9,066	86,586	133,486	4,103
Total	313,441	64,951	179,033	557,425	5,454

3. ANALYSIS

a. Tonnage & Analysis of Crude Ore Produced

	Tons	Iron	Phos	Sil.	Mang.	Alu.	Moist.
Hawkins Wash	640,012	41.22	.027	35.80			
Hawkins Retreat	378,756	40.51	.024	36.41			
Total	1,018,768	40.96	.026	36.03			
HawkinsTail.B. Crude	13,154	41.72	.026	35.18			

b. Tonnage & Analysis of Concentrates Produced

HawkinsBess.Wash	96,499	55.96	.034	12.86	.38	.36	6.55
Hawkins N.B.Wash	216,942	56.07	.040	12.78	.46	.37	6.79
Hawkins Bess.Ret.	84,786	55.24	.030	13.43	.33	.35	6.62
Hawkins N.B. Ret.	94,247	55.52	.033	12.96	.37	.37	6.74
Hawkins Fines as coarse	1,362	50.83	.034	19.61	1.73	.42	8.21
Hawkins Fines as fines	63,589	55.10	.032	15.94	.40	.37	8.23
Total	557,425	55.71	.035	13.30	.41	.37	6.88
Hawkins Tail.B. Fines	5,454	58.62	.034	11.72	.25	.48	9.56

c. Tonnage & Complete Analysis of Concentrates Shipped

	Tons	Iron	Phos	Sil.	Mn.	Alu.	Lime	Mag.	Sul.	Loss	Moist.
Haw.Bess.Wash. Coarse Concts.	119,784	56.11	.035	12.62	.37	.36	.28	.20	.011	5.74	6.40
Haw.N.B. Fines used as coarse	1,362	50.83	.034	19.61	1.73	.42	.28	.21	.011	4.23	8.21
Hawk.N.B. coarse	321,017	56.36	.041	12.13	.46	.37	.27	.21	.012	5.72	6.45
Hawk.Bess.Ret.	84,786	55.24	.030	11.40	.31	.35	.27	.21	.011	8.31	6.62
Hawk.N.B.Ret.Con.	91,591	55.54	.033	12.95	.38	.37	.27	.20	.010	6.22	6.73
Hawk.Bess."B"S.P.	10,738	51.23	.031	21.07	.43	.39	.28	.19	.011	4.12	8.26
Hawk.N.B. "B"S.P.	11,390	51.74	.031	20.64	.45	.40	.28	.19	.011	3.63	8.17
Hawk.FinesCon.used as fines	65,589	55.10	.032	15.94	.40	.37	.28	.21	.011	3.76	8.23
Total	704,257	55.80	.036	12.86	.41	.37	.27	.20	.011	5.84	6.72
Hawk.N.B. Tailings Basin Fines	5,454	58.62	.034	11.73	.25	.48	.28	.21	.011	8.31	9.56

d. Tonnage & Analysis of Ore in Stockpile

	Tons	Iron	Phos	Sil.	Mn.	Alu.	Moist.
Hawk.Coarse Concts.	3,822	56.10	.032	12.47	.45	.36	7.18
Hawk.Ret. Concts.	2,656	54.95	.031	13.74	.34	.31	6.92
Hawk."B" S.P. Concts.	54,659	53.26	.027	18.88	.45	.42	7.99

4. ESTIMATE OF ORE RESERVES

a. Ore Factors

	Cu.Ft. per Ton	Rock Deduction	Recovery
Wash Conct.	14	0	60
Lean Wash Concts.	14	0	40
Low Grade Wash "	14	0	55
Lean, Low Grade Wash Concts.	14	0	40
Retreat Concts.	14	0	40

b. Estimated Reserves

	Reserve 12-31-51	Mined 1952	Balance After Mng.	Changed By Re-Est.	Reserve 12-31-52
Hawkins SW-NW 32,57-22					
O.P. Wash Concts.	442,719	205,613	237,106	-	237,106
O.P. Ret. Concts.	1,235,951	179,033	1,056,918	-	1,056,918
U.G. Wash Concts.	150,819	-	150,819	-	150,819
U.G. Ret. Concts.	265,513	-	265,513	-	265,513
Total	2,095,002	384,646	1,710,356	-	1,710,356
NW-SW, 32,57-22					
O.P. Wash Concts.	73,999	-	73,999	-	73,999
O.P. R t. Concts.	640	-	640	-	640
U.G. Wash Concts.	687,053	-	687,053	-	687,053
U.G. Ret.Concts.	56,138	-	56,138	-	56,138
Total	817,830	-	817,830	-	817,830
Hawkins NE-SW 31, 57-22					
O.P. Wash Concts.	968,596	57,581	911,015	—	911,015
O.P. Ret. Concts.	1,170,487	-	1,170,487	—	1,170,487
U.G. Wash Concts.	81,074	-	81,074	-	81,074
U.G. Ret. Concts.	364,806	-	364,806	-	364,806
Total	2,584,963	57,581	2,527,382	-	2,527,382
SE-NE 31,57-22					
O.P. Wash Concts.	654,164	115,199	538,965	-	538,965
O.P. Ret. Concts.	707,486	-	707,486	-	707,486
Total	1,361,650	115,199	1,246,451	-	1,246,451
Total Hawkins	6,859,445	557,426	6,302,019	—	6,302,019

5. LABOR & WAGES

a. Comments

Although labor was scarce during the early part of the ore season, the supply picked up rapidly after the strike. Due to the increased wage rate of truck drivers, where the shortage usually exists, many men from outlying areas and other states were induced to come to the mining areas.

b. Comparative Statement of Wages and Production

Product	506,528 tons
Number of shifts and hours	3 shifts - 8 hours
Average number of men working	258
Average wages per hour	2.425
Product per man per day	27.60
Labor cost per man, per ton	.564
Total number of days	202
Amount paid for labor	$314,287.75

6. GENERAL SURFACE

a. Buildings and Repairs

The sample crushing house, quick laboratory and dry house were moved from the old plant site to the new plant location.

At the shops, a new floor was poured in the truck repair section of the building. Other than the above, only minor and necessary repairs were made to mine buildings.

b. Roads, Transmission Lines & Tracks

A new entrance road on the south side of the MacKillican Mine was completed in order to divert truck traffic around the new stockpile area.

Power transmission lines under construction for the new plant site were completed, and new power line into the MacKillican Mine was installed.

The new track location under construction at the end of 1951, to service the washing plant and stockpile system, was completed. The Great Northern spur to the fine ore plant was raised in order to give additional tailing basin room.

7. OPEN PIT

a. Stripping

Stripping in taconite and paint rock on the east side of the Hawkins under E&A No. CC-417 continued into 1952. This operation utilized one 5 yard shoveland 7 trucks. After E&ANo. CC-417 was completed in August, rock stripping continued under E&A CC-493.

Taconite stripping was discontinued on September 13, 1952 since sufficient trucks were not available for a satisfactory operation. A total of 514,781 cu. yds. of rock stripping was removed at a shift average of 1510 cu. yds.

MacKillican stripping continued into 1952, until March 29th, when operations were halted due to spring break-up, after which all equipment was shifted to ore and pit cleanup for the current ore program. MacKillican stripping was resumed on October 13th, on a one shovel, seven truck operation, and on October 20th was increased to two shovels, 16 trucks. A third shovel was added the latter part of November and was used to cast the second lift to ledge thereby giving a good base for truck travel and eliminating pontoons under lower shovels.

A total of 1,456,462 cu. yds. of MacKillican surface material was removed in 450 shifts for an average of 3237 cu. yds. per shift. This job involved a one way haul of approximately 7080 feet and this long haul, coupled with a good deal of truck and shovel delays, reduced production considerably and adversely affected costs.

The following tabulation shows the stripping removed during the year under both E&A CC-417 and E&A CC-493 and from the MacKillican Mine.

	Taconite	Waste	Paint Rock	Surface	Total
E&A CC-417	359,856	10,264	75,278	173,593	618,991
MacKillican				1,456,462	1,456,462
E&A CC-493	49,903	7,170	31,885	-	60,958
Total Cu. Yds.	409,759	17,434	79,163	1,630,055	2,136,411

In addition 44,624 tons of retreat ore was stocked in the pit.

b. Open Pit Mining

The 1952 ore season, after considerable delay due to the non-completion of the washing plant, opened on May 20th on a 2-shift, 5-day week basis. On June 2nd operations were halted due to the steel strike which lasted until July 26th. Operations were resumed on the same schedule and continued so until October 19th, when a third shift was added to take care of the production lost during the strike.

Operations in the pit were for a total of 83 days and 202 shifts, producing a total of 1,080,666 tons of crude from which 61,498 tons of rock rejects were scalped at the pit screening plant.

b. Open Pit Mining (Continued)

The average crude ore produced per day was 13,020 tons and average per shift was 5,350 tons.

Ore production in 1952 were both straight wash and retreat grade, with 321,829 tons of wash ore produced and 184,699 tons of retreat. All of the ore produced came from the east side and the lower sump area of the pit.

c. Pumping & Drainage

The pit pumping system was changed during the year from the old shaft deep well pump to two 1000 gallon pit pumps mounted on floats in the pit sump. The system was changed since the pit is now lower than the old shaft and pumping from the shaft had to be abandoned to continue pit operations.

d. Pit Activities (Gen'l)

Pit activities at the Hawkins Mine were confined to the mining of iron ore and removal of pit rock. There was no lean ore or waste movement of any consequence.

8. BENEFICIATION

a. Washing Plant

The washing plant began operations on May 20th and followed the same schedule as the pit in 202 shifts of operation. This plant handled 1,019,168 tons of crude ore, of which 640,412 tons were wash and 378,756 tons retreat. From this was produced 262m544 tons of coarse concentrates and 59,285 tons of fine concentrates, and an estimated 83,313 tons of retreat feed. On wash ore, the plant averaged 2,508 tons of concentrates per shift at a weight recovery of 50.25%. On retreat feed the plant produced 1,190 tons per shift with an estimated average recovery of 48.77%.

Plant operations were hampered during the early part of the season by the usual kaks in sumps, chutes, etc, which seem to go along with putting a plant into operation for the first time. Many changes were made throughout the season and final changes are being completed during the winter downtime.

Due to high silica in the fine ore from this property, it was difficult to make grade this past season. To improve this situation, a two-unit heavy media cyclone plant is under construction.

With two heavy media units - one on coarse and one on fines, it is anticipated that all grading requirements can be met the coming season.

Considerable delay was encountered in the tailings pump set up the past season, which is being overcome by a revision of the tails pump layout and installing of Ni-hard liners to replace the old troublesome rubber type liners.

Following is a brief statement showing lost time in percentage of total operating time.

Washing Plant Delays Source of Delay	Total Hours	Per Cent	Per Cent of 1600 Working Hours
Out of Ore	137.17	37.94	8.57
Crude Ore Pocket	0.33	0.09	0.02
Pit Screening Plant	19.47	5.46	1.12
Pit Screen	0.67	0.18	0.04
Crude Conveyor	26.07	7.21	1.63
Primary Screens	6.43	1.78	0.46
Secondary Screens	4.34	1.20	0.27
Crusher	0.67	0.18	0.04
Crusher Chute	5.45	1.51	0.34
Crusher Screen Pump Undersize	9.47	2.62	0.59
Akins Classifier	11.64	3.22	0.73

a. Washing Plant (Continued)

Washing Plant Delays (Continued)

Source of Delay	Total Hours	Per Cent	Per Cent of 1600 Working Hours
Surge Pile Full	2.00	0.55	0.13
Conveyors	40.40	11.18	2.53
Fines, Conc. Conveyor	2.37	0.66	0.15
Conc. Shuttle Conveyor	5.53	1.53	0.34
Conc. Loading Pocket	1.00	0.28	0.06
Conc. Stacker	8.75	2.42	0.55
R.R. Cars & Track	37.65	10.41	2.35
Tailings Pump	3.74	1.03	0.23
Tailings Line	6.00	1.66	0.37
Misc. Chutes & Launders	11.96	3.31	0.75
Freezing Weather	19.33	5.07	1.15
Total	361.51	100.00	22.59

Complete Concentration data for 1952 is as follows:

	Tonnage	% of Total Mined	% of Iron Dried	Tonnage Rec'y.	Iron Unit Recovery
Crude Ore & Rock Mined	673,534	100.00	40.61		
Less:Rock Removed in Mining	4,358	.65	25.68		
Crude Ore Transported to Scr.Plt.	669,176	99.35	40.71		
Less: Rock Rejects in Scr.Plt.	28,764	4.27	29.25		
Crude Ore Entering the Mill	640,412	95.08	41.22		
Coarse Concts.Produced	313,441	46.54	56.04	48.94	66.54
Fines Concts.Produced	64,951	9.64	55.01	10.14	13.54
Tailings by Deduction	262,020	38.90	20.07		

b. Retreat Plant

The first unit retreat plant was completed and put into operation on September 5th. This plant operated very satisfactorily, although it was too small for the tonnage required for retreat ore at this property. With the second unit nearing completion, there should be sufficient capacity the coming season.

The plant worked 70 shifts during the season, working on shifts while the plant was operating on wash ore, obtaining feed on these shifts from the surge pile. Feed to this plant totaled 83,313 tons, from which 66,791 tons of retreat concts. were produced, at an average rate of 954 tons per shift.

Total retreat concentrates amounted to 184,699 tons, of which a total of 90,225 tons were stockpiled.

Only minor revisions are being made to this plant during the winter down time. The surge pile feeder which caused considerable delay is being lengthened to give a better flow of material and cut out cleaning time.

The following is a breakdown of delays for the 1952 season:

(Continued on next page)

8. BeNEFICIATION (Continued)

b. Retreat Plant (Continued)

Source of Delay	Total Hours	Per Cent	Per Cent of 384 Working Hours
Crude Ore	4.50	5.81	1.19
Surge Pile Feeder	28.50	36.83	7.42
Conc. Wash Screen	4.25	5.49	1.11
Cir. Media Pump	9.00	11.63	2.34
Primary Crocketts	2.50	3.23	0.65
Conc. Stacker	3.00	3.88	0.78
Misc. Chutes & Launders	0.33	0.43	0.09
Conveyors	1.00	1.29	0.26
Freezing	24.30	31.41	6.33
Total	77.38	100.00	20.15

Due to the short period this plant operated, delay percentage appears very high, but disregarding 6.33% of freezing delay and 7.42% of feeder delay, dealy was of a minor consequence.

Complete Concentration data for 1952 is as follows:

	Tonnage	% of Total Mined	% of Iron Dried	Tonnage Rec'y.	Iron Unit Recovery
Crude Ore & Rock Mined	418,005	100.00	39.31		
Less:Rock Removed in Mining	6,515	1.56	26.41		
Crude Ore Transported toScr.Plt.	411,490	98.44	39.51		
Less:Rock Rejects inSc.Plt.	32,734	7.83	27.96		
Crude Ore Entering Mill	378,756	90.61	40.51		
Concentrates Produced	179,033	42.83	55.39	47.27	64.63
Heavy Density Rejects	16,522	3.95	36.76		
Tailings (By Deduction)	183,201	43.83	26.31		

c. Tailings Basin Plant

The tailings basin fine ore plant was put into operation on September 20th and continued on a 2-shift basis until October 16th. A total of 25 shifts were utilized to treat 13,154 tons of crude, from which 5,454 tons of concentrates were recovered at a weight recovery of 41.46%. Product per shift was 218 tons.

This being a new plant, with more than its share of bugs, considerable delay was encountered in starting operation. As the following record shows, the plant was run only a short time, and delays encountered in getting the plant into operation are high in percentage of hours worked.

(Continued on next page)

8. BENEFICIATION (Continued)

c. Tailings Basin Plant (Continued)

Source of Delays	Total Hours	Per Cent	Per Cent of 208 Working Hours
Crude Ore	0.75	0.72	0.36
Crude Ore Feed Pump	2.00	1.92	0.96
Screening Plant	18.33	17.60	8.81
Plant Feed Screen	11.00	10.56	5.29
Sizes	0.88	0.84	0.42
Concentrating Pump	4.75	4.56	2.28
Clear Water Pump	3.00	2.88	1.44
Hydro-Separators	2.45	2.35	1.18
Starting and Tying Up	8.00	7.68	3.85
Dewatering Classifier	1.25	1.21	0.60
Misc. Chutes & Launders	2.50	2.40	1.20
Elect. Power	2.00	1.92	0.96
R.R. Cars & Tracks	11.00	10.56	5.29
Freezing Weather	36.25	34.80	17.43
Total	104.16	100.00	50.07

Complete Concentrating data for 1952 is as follows:

	Tonnage	% of Total Mined	% of Iron Dried	Tonnage Rec'y.	Iron Unit Rec'y.
Tailings Basin Crude Through Plant	13,154	100.00	41.72		
Concts. Produced	5,454	41.46	58.62	41.46	58.26
Tailings (By Deduction)	7,700	58.54	29.75		

9. MAINTENANCE & REPAIRS

Due to no repair period between ore and stripping programs at this property, very few major repairs were possible on any of the mobile equipment. Trucks were repaired as required in order to operate. The same also was true of tractors, graders and shovels.

It is planned that during the downtime this winter, the equipment can be gone over and put into shape for the coming ore season.

Old plant equipment, re-used in the new plant, was repaired before being placed in the new structure and is again undergoing repairs after the 1952 operating season.

Pit screening plant and conveyor system was repaired under the regular off-season repair program.

10. COST OF OPERATIONS

Product	1952 Budget	1952 Cost Per Ton	1951 Cost Per Ton
Wash Concts.	800,000 (Original)		666,848
Coarse	585,000 (Revised)	313,441	
Recovery		48.94	47.99
Fines		64,951	
Recovery		10.14	
Total Wash Concts. Recovery		59.08	
Retreat Concts.		179,033	
Recovery		47.27	
Grand Total Production		557,425	

(Continued on next page)

10. COST OF PRODUCTION

	1952 Budget	1952 Cost Per Ton	1951 Cost Per Ton
Average Daily Output		6,716	7.754
Tons Per Man Per Day		34.94	39.44
Days Operated		83	86
Cost			
Total Pit Operating	.263	.572	.250
Total Concentrating	.268	.262	.180
Loading Stockpile Ore	.011	.035	.001
Total Gen'l Mine Expense	.240	.276	.186
Winter & Idle Expense	.484	.605	.442
Cost of Production	1.538	2.287	1.330
Depreciation - Plant & Equipment		.182	..100
" - Motorized Equipment	-	.053	.091
" - Movable Equipment		.013	.012
Amortization - Stripping		.619	.285
Taxes - Ad Valorem		.364	.281
" - Occupational		.060	.133
" - Royalty		.110	.171
Total Depreciation, Amortization & Taxes		1.401	1.023
Administrative Expense		.050	.050
Misc. Expense & Income		.013	.008
GRAND TOTAL COST AT MINE		$3.751	$2.411

b. Detailed Cost Comparison

Pit operating costs show an increase of $.309 over the budget and $.322 over the 1951 cost. Major increases occurred in trucks, truck maintenance. Increase in both of these items was due chiefly to frequent breakdowns because of continual operation. This, in turn, resulted in greater maintenance, more down time, less production and therefore increased costs.

Two wage adjustments, one retroactive to March and the other July, both of which were charged against pit operating, resulted in a direct increase of $.121 over 1951 costs and $.132 over the budget. In other items cost difference was minor and tended to balance out.

Concentration costs were $.006 under the budget but $.082 over 1951. This, of course, was due chiefly to the addition of the retreat plant and the treatment of lower grade ores and lower recovery which in turn increased power, washing and maintenance costs.

General Mine Expense was $.036 over the budget and $.054 over 1951 costs due to increase in vacation pay of $.049 over 1951 and $.005 over the budget. Increased cost of insurance amounted to $.013 over 1951. Increases or decreases in other items balance out fairly well.

Winter & Idle expense showed an increase of $.163 over 1951 and an increase of $.121 over the 1952 budget. Winter and idle costs were low in 1951 due to a continuation of pit operations and the moving of the washing plant which absorbed most of the idle expense. Also, for the same reason, no major equipment overhaul was done, which held winter expense to a minimum.

11. EXPLORATION & FUTURE EXPLORATION

No exploratory driloing was done in 1952, and no drilling is contemplated for 1953.

12. TAXES

	1952	1951	Increase	Decrease
Hawkins Mine (Includes shops & Location)	$151,057.18	$159,783.60		$8,726.42
Hawk.Mine Wash.Plant	13,135.12	5,928.08	$7,207.04	
Auxiliary Lands	1,805.74	1,456.40	349.34	
Personal Property	48,977.43	20,156.31	28,821.12	
Total	$214,975.47	$187,324.39	$27,651.08	
Average Tax Rate (Mills)	209.46	213.03		3.57

There was a blanket increase in the rates affecting mineral values; however, this was offset by the deduction from the ore reserves of the ore mined and by the removal of the screening plant and conveyor system from the pit.

The personal property tax was higher in 1952 for the following reasons: washing plant was moved to a higher taxing district; conveyor, screening plant, and loading pocket were added to the washing plant; general increase of 10% in value of all buildings in Villages in Itasca County; the tailings basin was added to the tax list in 1952; more ore remained in concentrate stockpile than in 1951; and a number of pieces of new equipment were added.

13. ACCIDENTS & PERSONAL INJURIES

There were nine compensable accidents at the Hawkins Mine during 1952, as follows:

(1) Name — Herbert Lance
Date of Accident — January 20, 1952
Cause — Lance had made a fire in bucket during lunch hour to thaw out frozen dirt. He then started to grease around the bucket. He stopped too close to the fire and his clothing on right leg became ignited. He ran toward the shovel and Emil Salo, shovel operator, caught him and extinguished the fire by tearing off his trouser leg and by using a fire extinguisher.
Nature of Injury — Burns, right leg, with epidermis peeling. Burns on buttocks and small area of right hand.
Time Lost — 164 days
Compensation — $1466.10

(2) Name — Fred Schmidt
Date of Accident — January 23, 1952
Cause — Schmidt intended to back his truck to the left on narrow dyke to dump, but due to steam from exhaust pipe he could not see the dumpman signalling and he backed to right and went over bank into water basin. After truck went over once, he was thrown against the door and fell out of truck onto the ground.
Nature of Injury — Fractured 11th, 12th ribs, 1st, 2nd and 3rd transverse processes of the lumbar vertebrae.
Time Lost — 56 days
Compensation — $298.67

13. ACCIDENTS & PERSONAL INJURY

(3) Name: Steve Niksich
Date of Accident: January 26, 1952
Cause: Niksich had finished drilling hole and was pulling up starting can. When the can came up, it wedged and then let loose, causing it to swing over and it struck Niksich on the left ear and he struck the right side of his head on frame of drill.
Nature of Injury: Left ear lacerated down to scalp. Extand canal intact. 4 cm. laceration right side of head.
Time Lost: 12 days
Compensation: $32.00

(3) Name: Waino Raki
Date of Accident: February 9, 1952
Cause: Raki was standing on top of old screen plant site loading holes for blasting. Shovel #92 was operating in bank below. An old piece of cable which was hanging down, hooked on dipper teeth, and when shovel moved the cable in turn moved an old piece of 12 inch spiral pipe, which laid across cable and pipe struck Raki on his right leg.
Nature of Injury: Fracture of right tibial table.
Time Lost: 144 days
Compensation: $1568.00

(5) Name: Frank Tomczak
Date of Accident: February 29, 1952
Cause: Steelworkers were moving a fabricated steel bent with mobile crane. Tomczak was in the act of trying to steady the bant with his right hand when the boom of the mobile crane came in contact with a high power line carrying 22,000 volts.
Nature of Injury: Electrocution - fatal
Time Lost: Fatal
Compensation: $1472.00

(6) Name: Ray Johnson
Date of Injury: April 23, 1952
Cause: While Johnson was helping to load a transmission into a pickup truck, he felt a kink in his back.
Nature of Injury: Complete gluteal - left group with pelvis posterior sacral rotation
Time Lost: 15 days
Compensation: $48.00

(7) Name: Victor Daoust
Date of Accident: August 7, 1952
Cause: Daoust was backing up with loaded truck #213 when the right rear wheel went off the road, causing the truck to tip over on its side. Daoust was assisted from overturned truck by fellow workers.
Nature of Injury: Bruised right leg. X-ray showed no fracture
Time Lost: 15 days
Compensation: $20.16

13. ACCIDENTS & PERSONAL INJURY

(8)

Name	Kenneth MacDiarmid
Date of Injury	October 4, 1952
Cause	While MacDiarmid was helping to lift head off diesel motor, he slipped and felt a sharp pain in his right side.
Nature of Injury	Right inguinal hernia
Time Lost	21 days
Compensation	$112.00

(9)

Name	Caryle Garrett
Date of Injury	December 29, 1952
Cause	Garrett was burning a steel beam, when he stepped down on slanting beam and wrenched his left knee.
Nature of Injury	Torn medial meniscus
Time Lost	2 days in 1952. Not returned to work as of 2/12/53.
Compensation	$144.38 as of 2/4/53

14. PROPOSED NEW CONSTRUCTION

Construction has been started on a new two unit cyclone plant to up-grade the fine ore at this property. This was necessitated by the high silica in the lower grade wash ore and retreat ore encountered this past season.

Plans are also underway for the construction of a screening plant and short conveyor at the MacKillican Mine to lower trucking costs by shortening haul of crude ore to the bottom of the pit to the existing screening plant.

15. EQUIPMENT & PROPOSED NEW EQUIPMENT

a. During the year the following equipment was received at the mine:

1 - 2-ton International truck
Stand-by parts: Bucket, bail, dipper sticks, crowd motor and parts and brakes for P&H shovel.
1 - 60 ft. dragline boom for 54-B shovel
2 - 1/2 ton International pick-ups

b. Proposed new equipment

No new equipment is planned to be purchased at this time for 1953.

HILL-TRUMBULL MINE
ANNUAL REPORT
YEAR-1952

1. GENERAL

The year opened at the Hill-Trumbull Mine with a stripping project in progress, continued from work begun in the fall of 1951. This work (E&A's MC-235 and MC-236) involved removal of surface material overlying a lean retreat ore on the North side of the Hill lease, extending the pit limits northeast in the so-called Barbara extension of the Hill ore body. Work was conducted on a 7-day week basis using four crews scheduled at forty hours each. The stripping was completed on January 21, with 252,000 cu. yds. moved during the month and a total of 941,752 yards stripped during the program covered by the above E&A's.

In addition to stripping, an extensive repair and maintenance program was conducted. The mine shops were engaged in repairs to locomotives, cars, drills and miscellaneous equipment, and following the shutdown of stripping operations, repairs were began on trucks, tractors and shovels.

A new 6-yard Bucyrus-Erie 150-B shovel was erected and moved to the pit shortly before the ore season began. A 151-M Marion shovel was purchased from the Al Johnson Construction Co. and erected during 1952.

Continuing the work began in 1951, general repairs were completed at the pit screening plant and crude ore conveyor. Repairs were normal except for some timbering required in the No. 1 transfer station to support the back which had started to cave.

General repairs in the washing and retreat plants, begun in thefall of 1951, were continued throughthe winter and spring. In addition to the normal winter repairs, a rock scalping conveyor system and a secondary crusher circuit were installed. Plans for a new 2-unit heavy media cyclone plant were completed and concrete foundation poured by ore season.

Stockpile loading was begun April 7th and continued until ore season with 125,481 tons loaded out. Unusually heavy frost considerably hampered this work.

Due to a mild spring which thawed the ground earlier than usual, stripping was resumed on April 21. This work, a continuation of E&A MC-236, consisted of removal of a shallow layer of surface left on top of the ore. In addition, a general cleanup of the pit roads and benches was conducted, and the two projects, stripping and cleanup, were continued until ore season. A total of 48,700 cu. yds. were moved during this period.

The ore season began on May 5th with operations conducted on a 3-shift, 6-day per week schedule. The mine was closed from June 2nd until July 28th by a strike of the USA-CIO. Following the strike, mining was resumed on the same schedule until October 24th.

Two shovels in ore production, serviced by 7 to 10 trucks, produced 1,878,310 tons of crude wash and retreat ore, from which was obtained 607,681 tons of concentrates. No direct ore was produced.

Wash ore was mined solely from the Trumbull-Delaware #2 trespass area. From 57,273 tons of crude, 34,894 tons of concentrates were produced. Shift production of washed concentrates averaged 2,326 tons, with a recovery of 60.93%.

Retreat crude, totalling 1,821,037 tons, was mined from the West and Southwest areas of the Trumbull lease and from the North side of the Hill, with a small tonnage produced from the Hill scram area. Trumbull retreat crude totalled 1,369,737 tons, from which 439,916 tons of concentrates were obtained. Hill Retreat crude, including that from the scram area, totalled 451,300 tons, producing 132,871 tons of concentrates.

1. GENERAL (Continued)

Shift production of retreat concentrates averaged 2,029 tons, with net recovery averaging 31.42%.

Due to a shortage of railroad cars, 246,794 tons of concentrates were stockpiled during the season.

When the ore season closed on October 24th, plants and conveyor systems were cleaned out and crews were immediately transferred to stripping and repair work. The new stripping project, E&A MC-238, involved removal of approximately 1,800,000 cu. yds. of surface stripping from a pit area in the Hill-Walker lease and an approach from the Trumbull pit to the Hill-Walker. Three shovels were used on this project, serviced by 16 to 20 trucks. Due to the large shovels and new 34-ton trucks, coupled with a short haul and unusually mild weather conditions, excellent progress was made on stripping, with 1,693,579 cu. yds. removed by December 31, at an average production of 8,752 cu. yds. per shift.

The repair program in the plants and shop followed a normal pattern of inspection of all equipment and repair where necessary, with minor revisions of the flow circuits. The heavy media cyclone plant construction which had proceeded during ore season, was completed except for some wiring and pipt work. Although this unit replaces the spiral circuit for concentration of fine ore, the spiral unit was repaired for use in case of trouble with the cyclone plant.

Stockpile loading was begun immediately after the shutdown of mining operations and continued through November 28, with 139,308 tons loaded out, leaving a stockpiled reserve of 113,985 tons.

Exploration drilling on the north bank of the trumbull, in progress at the close of 1951, was discontinued in January. Sample drilling was then begun in the Hill lease on the north side of the pit and completed in February. A test pit on the Potter lease previously sunk to 29 ft. was completed at 69 ft. with samples taken for test work. There was no other exploratory work done during the year.

2. PRODUCTION, SHIPMENTS & INVENTORIES

a. Production by Grades

	Tons
Hill Retreat Crude	385,205
Trumbull wash crude	56,988
Trumbull retreat crude	1,238,211
Total Crude	1,680,404
Hill Bess. Ret. Crude	71,741
Hill N.B. Ret. Concts.	61,131
Trumbull N.B. Wash Concts.	34,894
Trumbull Bess. Ret. Concts.	112,527
Trumbull N.B. Ret. Concts.	327,388
Total Concts. Produced	607,681

b. Shipments

Hill Bess.Ret. Concts.	85,252
Hill N.B. Ret. Concts.	39,760
Trumbull Bess. Wash Concts.	11,231
Trumbull N.B. Wash Concts.	24,123
Trumbull Bess. Ret. Concts.	145,062
Trumbull N.B. Ret. Concts.	362,782
Total Shipments	668,210

c. Stockpile Inventories

	Tons
Hill Retreat	49,887
Trumbull Wash	34,122
Trumbull Retreat	29,976
Total	113,985

d. Production by Months - Crude Ore

Month	Hill Retreat	Trumbull Wash	Trumbull Reatreat	Total
May			363,778	363,778
June			8,068	8,068
July			59,758	59,758
August	106,827	16,647	346,442	469,943
September	110,728	24,716	320,088	455,532
October	167,650	15,598	140,077	323,325
Total	385,205	56,988	1,238,211	1,680,404

e. Production by Months - Concentrates

Month	Hill Retreat	Trumbull Wash	Trumbull Retreat	Total
May			118,262	118,262
June			a 3,486	3,486
July			20,670	20,670
August	36,120	10,704	118,800	165,624
m September	41,573	15,256	124,115	180,944
October	55,179	8,934	54,582	118,695
Total	132,872	34,894	439,915	607,681

3. ANALYSIS

a. Analysis of Crude Ore

	Tons	Iron	Phos	Sil.	Mn.	Alu.	Moist.
Hill Retreat	385,205	35.66	.030	44.74			
Trumbull Wash	56,988	40.91	.032	35.42			
Trumbull Retreat	1,238,211	34.32	.033	45.69			
Total	1,680,404	34.85	.032	45.12			

b. Tonnage & Analysis of Concentrates Produced

Hill Bess.Ret.Concts.	71,741	57.11	.039	12.55	.19	.39	6.63
Hill N.B.Ret.Concts.	61,131	57.21	.040	12.35	.17	.40	6.32
Trum.N.B. Wash Concts.	34,894	59.68	.045	5.80	.17	.41	8.02
Trum.Bess.Ret. Concts.	112,527	56.00	.046	12.37	.17	.39	6.28
Trum.N.B. Ret.Concts.	327,388	55.79	.048	12.87	.18	.39	6.11
Total	607,681	56.35	.046	12.28	.18	.39	6.33

c. Tonnage & Complete Analysis of Concentrates Shipped

	Tons	Iron	Phos	Sil.	Mn.	Alu.	Lime.	Mag.	Sul.	Loss	Moist.
Hill Bess.Ret.Con.	85,252	56.83	.040	12.74	.18	.28	.26	.17	.011	4.83	6.44
Hill N.B. Ret. Con.	39,760	55.86	.048	13.00	.19	.39	.26	.17	.010	5.92	6.02
Trum.Bess.WashCon.	11,231	54.52	.042	15.25	.16	.41	.25	.17	.011	5.63	5.90
Trum.N.B.Wash Con.	24,123	54.61	.045	14.91	.16	.42	.26	.16	.010	5.83	5.93
Trum.Bess.Ret.Con.	145,062	55.97	.045	12.52	.18	.39	.26	.17	.011	6.26	6.17
Trum.N.B.Ret.Con.	362,782	55.79	.048	13.03	.17	.39	.24	.16	.010	6.03	6.21
Total	668,210	55.90	.046	12.98	.18	.39	.25	.16	.010	5.92	6.20

d. Mine Analysis of Ore in Stockpile

	Tons	Iron	Phos	Sil.	Mn.	Alu.	Moist.
Hill Retreat	49,887	57.32	.038	12.29	.16	.39	6.12
Trumbull Wash	34,122	59.77	.045	5.64	.17	.41	8.07
Trumbull Retreat	29,976	55.87	.048	12.69	.16	.40	5.63
Total	113,985	57.86	.043	10.40	.16	.40	6.57

4. ESTIMATE OF ORE RESERVES

a. Factors Used

	Cu.Ft. Per Ton	Rock Deduction	Recovery
Merch	14	0	100
Wash Concts.	14	0	60
Lean Wash Concts.	14	0	48
Low Grade Wash Concts.	14	0	57
Lean, Low Grade Wash Concts.	14	0	45
Retreat Concts.	14	0	36

b. Estimated Ore Reserves

Lease	Reserve 12/31/51	Mined 1952	Balance After Mng.	Changed by Re-Est.	Reserve 12-31-52
Trumbull	1,961,415	474,810	1,486,605	-	1,486,605
Hill	1,433,730	132,871	1,300,859	-	1,300,859
Hill-Walker	1,157,905	-	1,157,905	-	1,157,905
Total Hill-Trumbull	4,553,050	607,681	3,945,369	-	3,945,369

c. Estimated Analysis of Ore Reserves

	Tons	Iron	Phos	Sil.	Mang.	Alu.
Total Direct	120,805	59.27	.064	10.50		
Bess. Wash Concts.	518,618	61.58	.029	9.30	.10	.47
N.B Wash Concts.	492,537	59.33	.054	9.57	.11	.50
Total Wash Concts.	1,011,155	60.48	.041	9.43	.11	.50
Bess. Ret. Concts.	436,745	59.71	.032	10.14	-	-
N.B. Ret. Concts.	2,376,664	57.81	.054	11.65	-	-
Total Ret. Concts.	2,813,409	58.10	.051	11.42		
Total Bess. Concts.	955,363	60.73	.030	9.68	.10	.47
" N.B. Concts.	2,990,006	58.12	.054	11.26	.11	.50
Total Hill-Trum.	3,945,369	58.75	.048	10.88	.11	.50

5. LABOR & WAGES

a. Comments

The Labor supply during 1952 was ample, although new men coming from farming and logging areas were inexperienced.

A strike over wage increases and Union shop issues was called by the USA-CIO on June 2nd and lasted until July 26th. During this period the mine was completely shut down. The strike settlement gave the Union a 12½¢ per hour wage increase and a modified Union shop. Negotiations were conducted with the Union throughout the year on the job evaluation program. This issue was finally settled and retroactive pay back to December, 1950, based on this job evaluation program, will be paid early in 1953.

Relations between the Company and the Union were otherwise normal.

b. Comparative Statement of Production & Wages

Product	607,681 tons
Number of shifts & hours	3 - 8 hrs.
Average Number of men working	227
Average Wages per Day	$18.77 *
Product per man per Day	27.75
Labor Cost per Ton	$.698
Total number of days workeda	101
Amount paid for labor	$340,506.27 **

*Includes retroactive wage adjustment
**Operating Cost only - does not include W&I

6. GENERAL SURFACE

a. Buildings & Repairs

In view of the heavy fall stripping program, it was decided to install a truck garage at the stripping site. For this purpose, a wooden garage was purchased from the Peter Kiewitt Sons & Co., dismantled, and re-erected near the Hill-Walker pit area. The building was insulated and equipped with concrete floor and an oil-fired furnace. There was no other new construction of buildings. Houses and other buildings were repaired and painted as required.

b. Roads, Transmission Lines, Tracks and Construction

In order to adequately serve the Hill-Walker Potter area with electric power, a 22,000 volt power line was strung from the south to the north side of the Trumbull pit, a substation built and 2200 volt feeder lines built to the Hill-Walker pit area.

At the plant, installation of scalping and secondary crushing facilities begun in the fall of 1951 was completed. Plans for a new 2-unit heavy media cyclone plant were completed early in 1952. Construction proceeded through the year, with work nearly complete at the year's end.

7. OPEN PIT

a. Stripping

At the start of the year a stripping project on the North side of the Hill lease was in progress (E&A MC-236). This program originally called for the removal of 560,000 cu. yds. of surface from the North bank of the Hill lease, extending the pit toward the Barbara. It was later decided to strip more than the originally estimated yardage; consequently, this project was still in operation at the start of the year. Two shovels, serviced by ten to twelve trucks, were used on this stripping. The job was completed on January 21st, except for a shallow cut on top of ore, with 252,437 cu. yds. removed in 1952. On April 21st, stripping of this shallow surface layer was begun with most of it moved by ore season, which opened on May 5th.

Shift production on this project in January, when in full scale operation, averaged 4,632 cu. yds. On the cleanup cut in April, shift production was reduced to an average of 1,475 cu. yds. Cost on this project in 1952, excluding depreciation, averaged $.255 per yard, well under the budget estimate of $.340.

Early in 1952, plans were completed for stripping a pit in the Hill-Walker lease and a narrow strip along the north side of the Trumbull lease for a haul road from the Hill-Walker to the Trumbull. It was originally planned to begin this work in August, but the strike forced deferment of the project until after ore season.

This stripping program, under E&A MC-238, involved the removal of approximately 1,800,000 cu. yds. of surface, with 1,268,000 yds. from the Hill-Walker pit area and 532,000 yds. from the road cut in the Trumbull. The pit stripping developed approximately 387,000 tons of retreat ore while the road stripping eventually exposed 125,000 tons of Trumbull retreat ore. During ore season all possible preliminary work was done. Access roads and haul roads between pit and dump areas were built and surfaced with screen rock. Power lines to the area were constructed. A 5-stall garage was erected for service and repair of trucks on the job. A 6½ yd. Marion 151M shovel, purchased from the Al Johnson Construction Co., was erected and moved to the pit.

Following the close of the ore season on October 24, two shovels were started digging approach cuts. By November 1st full scale stripping operations were in progress, using 3 shovels and 16 trucks, with two shovels stripping the Hill-Walker pit and one stripping the Trumbull road cut. Operations were conducted on a 20-shift per week schedule, using 4 crews scheduled at 40 hours each. Stripping was wasted on dump lands immediately North of the Hill-Walker pit area. As length of haul increased, the truck fleet was increased to a maximum of 20. Included in the fleet

7. OPEN PIT (Continued)

a. Stripping (Continued)

were twelve 34-ton Euclids, six belonging to the Hill-Trumbull, six rented from the Holman-Cliffs Mine. Three trucks had been received and put into operation just after the strike. A fourth shovel was run occasionally as required to improve operations, start new cuts, etc.

Due to the large shovels and trucks, a short haul, good weather and a good spirit of cooperation on the part of men and foremen, excellent progress was made on this stripping project. By Dec. 31, 1,693,579 cu. yds. of stripping had been removed, at an average rate of 8,752 yds. per shift. In December alone, the best month, 846,479 yds. were moved, at an average rate of 10,323 yds. per shift. Stripping cost, excluding depreciation, averaged $0.16 per yard, about $0.10 under the revised budget.

Stripping production on this project was unusually high and costs were unusually low. In explanation, it must be pointed out that this, the first time during the Company's operations that big shovels (one 4-yd., one 5½ yd., two 6½yd.) and big trucks have been available for stripping an area large enough to put them all to work. The weather during November and December was unusually mild and ideal for stripping. Not a single shift was lost due to inclement weather. Very little frozen ground was encountered, which effected a considerable saving on blasting. The haul was short, averaging about 3,000 feet, and the lift was moderate. Delays due to equipment failure wereminor. All the above factors, combined with the good planning and supervision by the foremen and a good cooperative spirit among the men, served to make this an outstanding stripping job.

The following tabulation shows the stripping material moved in 1952:

Lease	Surface Cu.Yds.	Waste Ore Cu.Yds.	Lean Ore Cu.Yds.	Total Cu. Yds.
Hill	306,923	-	-	306,923
Trumbull	539,531	-	-	539,531
Hill-Walker	1,154,048	-	-	1,154,048
	2,000,502	-	-	2,000,502

b. Open Pit Mining

The 1952 ore season began on May 5 on a 3-shift, 6-day per week basis. This schedule was continued until June 2nd, when a strike of the C.I.O. terminated all mine activity except pumping. The strike was settled on July 26th and mining was resumed on July 28th on the same schedule and continued until October 24th.

Operating two shovels and 7 to 10 trucks in normal mining operations, the mine produced 1,878,310 tons of crude ore in 101 days, at an average shift production of 6,324 tons. From the above crude tonnage, 197,906 tons of +4" waste rock was screened out in the pit, the balance of 1,680,404 tons being sent to the plants at an average rate of 5,658 tons per shift.

Screen rock constituted 10.54% of the total crude ore;.5% of the wash crude and 12.17% of the retreat. Although rock percentage in the wash ore continued to be minor and inconsequential, the proportion of rock in the retreat ore showed an increase over last season. This was particularly true of October, when the rock rose to 17.9% of the retreat crude, due to the mining of some very rocky retreat ores.

As in the past several years, retreat ore constituted the major portion of the pit production, totalling 1,821,037 tons, as compared with 57,273 tons of wash ore crude. The trumbull lease continued to produce the major portion of the retreat crude, with 1,369,737 tons, while 451,300 tons were obtained from the Hill. Trumbull ore came from the west and southwest areas of the pit, while Hill retreat was produced mainly from the north bank of the west Hill forty.

7. OPEN PIT

b. Open Pit Mining (Continued)

One shovel, with two trucks, worked most of the season in the Hill scram area, sorting retreat ore from rocky areas. This ore, approximately 127,647 tons, was stocked and reloaded with other Hill ores. Rock sorted out was hauled to the rock dump.

All wash crude was produced from the Trumbull-Delaware #2 trespass area. This area is being mined down as the Gross-Marble pit is deepened by the Oliver Iron Mining Division.

During mining operations in all areas, rock too large to pass through the screening plant was sorted and loaded out at the shovel. This pit rock amounted to 59,160 tons, which when combined with 15,667 yards of sand and waste cleanup, gave a total of 82,661 tons waste material removed from the mine during the operating season. Removing this material at an estimated $.200 per ton cost approximately $.009 per ton of crude ore.

Mining conditions during the 1952 operating season were generally satisfactory. There were few heavy rains, equipment breakdowns were average, and the whole operation could be termed normal. Grade of crude ore did not change markedly from that of the past two years. Pit production showed a healthy rise, which contributed materially to lower costs despite an increase in labor rates and the cost of supplies.

c. Pumping & Drainage

Pit pumping was no problem during the year. The pit bottom was allowed to fill with water until April when the pump was installed and the water lowered. Pumping continued intermittently through the ore season, handling an estimated in-flow of 300 - 400 gpm. At the end of the ore season, the pump was again pulled out for the winter. Cost of pumping was $.001 per ton of crude ore.

Relocation of the drainage ditch on the north side of the Hill lease, begun in the fall of 1951, was completed in February. A ditch was dug to drain a swamp near Calumet, the natural drainage having been cut off by our 1951 stripping dump.

Development of the Hill-Walker pit cut off the north side drainage ditch in that area. Since ground contours prohibited changing the course of this ditch, a new ditch was dug along the north side of the Hill-Walker pit. Water will be pumped from a sump at the lower ditch to the upper ditch.

d. General Pit Activities

Pit activity during the year consisted of surface stripping, mining, scramming, and minor exploratory drilling. Except for pit rock and sand cleanup, there was no movement of waste or lean ore.

8. BENEFICIATION

a. Washing Plant

Operation of the washing plant began on May 5th, worhing 3 shifts, 6 days per week, with general repair and maintenance work conducted on Sundays. Except for the strike period, this schedule was maintained throughout the season, which closed October 24th. During the year of 1952 the plant operated 297 shifts, treating 1,680,404 tons of crude ore. Of this total, 56,988 tons was wash and 1,623,416 tons retreat. The plant produced 1,042,912 tons of concentrates, of which 34,894 tons was washed concentrates and 1,008,018 tons retreat feed. Plant production on wash ore averaged 2,326 tons, at a weight recovery of 61.23%. On retreat ores, the plant produced 3,575 tons retreat feed per shift, at an estimated recovery of 62%.

At the close of the 1951 season, it was decided that improvement of grade and increased mill capacity could be attained by scalping $-2"$ rock on the primary screens. Also that increased crushing capacity was desirable and would improve grade on lean, silicious ores. The scalping and secondary crushing units were installed with the flow circuits revised to accommodate them, during the winter repair season, and

a. Washing Plant (Continued)
during the operating season proved their value.

Washing plant delays totalled 11.67% of the available operating time. Of this total, by far the major portion of the delay was caused by lack of crude ore, due in large part to the increased crude feed demand of the mill and the consequent inability of the haulage system to keep the mill supplied. Also, at times excessive screen rock in the crude ore slowed operation of the pit screening plant. To overcome the haulage delays, it was decided that 80-ton electric locomotives should be purchased to replace the present 60-ton units. These locomotives were available at the Hill-Annex Mine of the Jones & Laughlin Steel Corporation at Calumet, and, at year's end, negotiations were being completed for purchase of this equipment. Plans were under way for enlarging the crude ore pocket to give additional surge capacity.

Following is a brief statement showing source of delays, time lost and percentage of total operating time:

Source of Delay	Total Hours	Per Cent	% of 2396 Working Hours
Crude Ore	146.25	52.28	6.10
Crude Ore Conveyor	1.08	0.39	0.05
Plant Crude Pocket	0.25	0.09	0.01
8' pan feeder	26.78	9.57	1.12
Primary Screens	2.17	0.78	0.09
Primary Crusher	0.50	0.19	0.02
Secondary Screens	13.42	4.80	0.57
66" Classifier	1.00	0.36	0.04
Ball Mill	4.50	1.61	0.19
1st Stage Spiral Feed Pump	1.00	0.36	0.04
Spiral Concentrate Pump	2.00	0.71	0.09
Spiral Tail Pump	2.75	0.98	0.11
Plant Tie-up for Weekend	10.75	3.84	0.45
Spiral Tramp Screen	0.42	0.15	0.02
Main Tailings P mp	8.75	3.13	0.37
Main Tailing Line	0.33	0.12	0.01
Concentrate Stacker	2.00	0.71	0.08
Surge Pile Feed Belt	36.90	13.19	1.54
Scalping Unit	1.91	0.68	0.08
Surge Pile Full	5.61	2.01	0.23
Conc. Stockpile Belt	4.58	1.64	0.19
Electric Power	2.75	0.98	0.11
Misc. Chutes and Launders	0.50	0. 18	0.02
Clear Water Pump	3.50	1.25	0.15
TOTAL	279.70	100.00	11.67

Recapitulation

Crude Ore Delays (Ore to head of mill)	172.36	62.34	7.28
Ore Prodessing Delays	105.34	37.66	4.39
TOTAL	279.70	100.00	11.67

Complete Concentrating data for 1952 is as follows:

	Tonnage	%of Total Mined	%Dried Iron	Tonnage Recovery	Iron Unit Recovery
Crude Ore & Rock Mined	57,273	100.00	40.83		
Less: Rock removed in Mining	-	-	-		
Crude Ore Transported to Scr.Pl.	57,273	100.00	40.83		
Less: Rock rejects in Scr.Plt.	285	.50	24.60		
Crude ore entering the mill	56,988	99.50	40.91		
Concentrates Produced	34,894	60.93	59.68	61.23	89.32
Tailings (by deduction)	22,094	38.57	11.27		

b. Retreat Plant

Retreat plant operation began on May 5th and followed the same schedule as the pit and wash plant. During periods when the wash plant was down or operating on wash ore, the retreat plant was fed from the surge pile. From 1,008,018 tons of retreat feed, 572,787 tons of concentrates was obtained, at an average shift production of 2,030 tons and a net weight recovery from the plant crude ore feed of 35.25%.

The heavy media plant continued to produce a generally satisfactory concentrate even when running on very lean, low recovery ores. As previously mentioned, scalping and finer crushing improved production and grade.

At the end of the 1951 season, plans were begun on a 2-unit heavy media cyclone plant to replace the spirals in the treatment of the —1/8" fraction of the retreat feed. This plant should have been in operation late in the season of 1952, but the strike delayed construction to such an extent that the plant could not be operated. However, it will be ready for operation in 1953, and it is believed that this method of concentration will materially improve the grade of the fine retreat concentrates. During 1952 it again was demonstrated that spirals cannot adequately cope with the lean ore currently being fed to them.

Retreat plant delays were not excessive and, as in the wash plant, out of ore delays constituted the major source of lost time. Following is a brief resume' of retreat plant delays:

Source of Delay	Total Hours	Per Cent	% of 2396 Working Hours
Out of Ore	45.42	48.98	1.90
Surge Pile Feeder	0.33	0.35	0.01
Feeder Pit Pump	0.75	0.81	0.03
H.M. Feed Conveyor	2.42	2.61	0.10
Feed Preparation Screen	0.50	0.54	0.02
78" Akins Separator	0.50	0.54	0.02
Coarse Conc. Wash Screen	1.00	1.08	0.04
Coarse Reject Wash Screen	7.00	7.55	0.29
Fine Reject Drain Screen	3.25	3.50	0.14
Fine Reject Wash Screen	0.83	0.89	0.04
Circulating Media Pumps	0.17	0.18	0.01
Crockett Sands Pump	1.17	1.26	0.05
Reject Conveyor	2.00	2.16	0.08
Rock Pocket	0.50	0.54	0.02
Rock Truck	5.91	6.37	0.25
North Densifier	0.33	0.36	0.01
Adjust Gravity	1.00	1.08	0.04
Concentrate Stacker	7.49	8.08	0.31
Misc. Chutes & Launders	0.83	0.90	0.04
Charging & Tie-up for weekend	10.58	11.41	0.44
R.R. Cars and Tracks	0.50	0.54	0.02
Electric Power	0.25	0.27	0.01
TOTAL	92.73	100.00	3.87

b. Retreat Plant (Continued)

Complete;concentrating data for 1952 is as follows:

	Tonnage	% of Total Mined	% Iron Dried	Tonnage Recovery	Iron Unit Recovery
Crude Ore & Rock Mined	1,880,197	100.00	33.02		
Less:Rock Removed inMining	59,160	3.15	22.57		
Crude Ore Transported toScr.Pl	1,821,037	96.85	33.18		
Less: Rock Rejects inScr.Pl.	197,621	10.51	22.87		
Crude Ore Entering the Mill	1,623,416	86.34	34.64		
Concentrates Produced	572,787	30.46	56.15	35.28	57.20
Heavy Density Rejects	362,117	19.26	21.03		
+ 2" W.P. Rejects Scalped	73,114	38.89	24.73		
Tailings (By Deduction)	615,398	32.73	23.81		

9. MAINTENANCE & REPAIRS

The usual winter repair program in progress at the start of the year was continued until ore season. After the termination of stripping in January, all mobile pit equipment was brought into the shop for a general inspection and overhaul. Shovel repairs were conducted in the pit. Normal repairs were conducted at the pit screen plant and conveyor system. New decks, consisting of rails imbedded in concrete, were installed on the screen plant ramps.

The plant repair program was normal except for construction which has been covered elsewhere.

Following the close of the 1952 ore season, all plants were cleaned out in preparation for the usual winter repair program. Construction of the cyclone plant continued. At the shops, locomotives, cars, drills and miscellaneous plant equipment was brought in for repair.

10. COST OF OPERATION

A. Comparative Mining Costs

		Budget 1952	1952 Cost Per Ton	1951 Cost Per Ton
Product				
Wash Concentrates	(Original)	700,000	34,894	93,274
Retreat Concentrates	(Revised)	400,000	572,787	712,283
Total Product			607,681	805,557
Recovery			31.68	35.67
Average Daily Output			6,017	5,880
Tons Per Man Per Day			27.75	26.36
Days Operated			101	140
Costs				
Total Pit Operating		.316	.266	.314
Concentrating		.614	.514	.500
Loading Stockpile Ore		.011		
Gen'l Mine Expense		.305	.254	.204
W & I Expense		.800	.571	.397
Cost of Production		2.630	2.210	1.990
Depreciation - Plant & Equip.			.053	.176
Depreciation - Motorized Equip.			.090	.082
" - Movable Equip.			.005	.004
Amortization-Defense Facilities			.089	-
" -Stripping			.105	.304
Taxes-Ad Valorem			.126	.099
" -Occupational			.078	.127
" -Royalty			.188	.095
Total Depr., Amortization & Taxes			.735	.887

h. Comparative Mining Costs - Continued

	Budget 1952	1952 Cost Per Ton	1951 Cost Per Ton
Administrative Expense		.100	.100
Misc. Expense & Income		.007	.006
TOTAL COST AT MINE		3.052	2.983

b. Detailed Cost Comparison

The 1952 Pit Operating cost was $.050 under the budget and $.048 under the 1951 cost. The major reason for the reduction in pit costs was the increased production which held costs down despite a substantial wage increase. Cost of drilling went up $.016 over the 1951 cost due to increased powder costs and more drilling and blasting in the scram area. The major reduction in cost was in truck operation and maintenance, $.021 under the budget and $.039 below 1951 cost. This was due, in part, to the use of six 34-ton Euclid trucks which went into operation after the strike. Tractor maintenance showed a saving of $.008 below budget and 1951 costs. Minor reductions in the cost of screening, road maintenance and general open pit expense were due to the increased rate of production. Structure drilling cost was $.026 below 1951 cost, although $.002 over the budget. The reduction was due to the reduced drilling program. Deferred road building charges, wage adjustments and retroactive wage payments totalled $.028, all charged against 1952 pit operation. These charges did not occur in 1951, are not included in the budget, and except for the deferred ore charges, are due to wage increases granted during the year.

Concentrating cost was $.014 over the 1951 cost, but $.100 below the budget. Cost of transportation, washing, power and maintenance combined, was $.013 below the 1951 cost, but cost of operating the retreat plant rose $.027 due to a reduction in percentage of wash ore produced. Actual retreat plant costs were slightly lower in 1952 due to increased production. Higher costs anticipated in the budget figures did not materialize, due mainly to increased production over the estimate.

General Mine expense showed an increase of $.050 over 1951 costs, explainable in the most part by increased cost of running offices and other departments due to salary increases. Vacation pay costs rose $.027 over the 1951 figure. Here again, costs were below the budget estimate, due to increased production.

Winter & Idle Expense was $.174 over 1951 costs, due mainly to the strike which reduced the tonnage over which W&I expenditures could be written off. W&I expense was also increased by shutting down the stripping in January, 1952, whereas in 1951, a stripping operation was carried on through the winter and spring. Repairs and overhead that in 1951 were charged to stripping were thus charged to W&I in 1952.

Recovery dropped in 1952 as compared to 1951. This reduced recovery, plus the wage increase in 1952 would have increased costs well above the figures shown, except that a substantial mine production increase kept the 1952 cost down. This indicates that efforts and money spent toward increasing production have had a very definite effect in holding down mine costs.

11. EXPLORATION & FUTURE EXPLORATION

At the start of the year, exploratory drilling was in progress on the North bank of the Trumbull lease, looking for a connecting ore channel between the Trumbull and Hill-Walker pits that could be used as a roadway. Results were disappointing and this drilling was stopped in January upon completion of the holes in progress. A contract drill continued drilling sample holes in the Hill lease, completing this project in March. A test pit on the Potter lease dug to 39' in 1951 was sunk toa total depth of 69'.

11. EXPLORATION & FUTURE EXPLORATION (Continued)

Drilling completed in 1952 is as follows:

Hill	591½ ft.
Trumbull	97 ft.
Total .	688½ ft.

Although little exploratory drilling was done during 1952, much exploration remains to be done at the Hill-Trumbull Mine. Within the present pit limits, the Trumbull has been drilled to bottom of ore in sufficient amount to give a good indication of possible reserves. This is not true of most ofnthe Hill lease, particularly the East and central forties. The exposed formation in the adjoining Hill-Annex pit indicates a strong possibility of ore at a depth below the present bottom of the Hill pit and well below any present drill holes. What was once thought to be bottom rock now appears to be an inter-bedded rock layer cut up by ore channels, with a layer of ore below, If this supposition is true, this area comprises one of the largest future reserves at the mine.

Further exploration is required on the North bank of the Hill lease between the Hill pit and the Barbara. Most of this area has only the original drilling on 300 ft. centers, which, though admittedly inaccurate, does show ore in some holes. Actually, nothing can be said at this time of the possibilities for ore in this area because drill information is so limited. However, it certainly should be explored in the future.

A few more holes are required along the North bank of the Trumbull to determine actual mining limits.

The Potter lease requires more exploration, only the eastern half of the forty having been drilled to any extent. More test pits must be sunk to check drill information on this very lean formation.

Hill-Walker drilling is fairly complete. A few holes should be drilled along the South line to determine final limits.

12. TAXES

	1952	1951	Increase	Decrease
Hill Mine	$23,659.16	$24,678.89		$1,019.73
Trumbull Mine	17,145.61	22,327.86		5,182.25
Hill-Trumbull Shops	1,314.73	1,281.85	32.88	
Hill-Trumbull Washing Pl. & Auxiliary Lands	13,670.59	13,558.80	111.79	
Potter Forty	68.56	45.56	23.00	
Hill-Walker	4,137.91	527.64	3,772.70	
" " Dump Lands	162.43			
Personal Property	16,616.09	14,232.56	2,383.53	
Total	$76,775.08	$76,653.16	$ 121.92	
Village Lots	537.18	530.08	7.10	
GRAND TOTAL	$77,312.26	$77,183.24	$ 129.02	
Average Tax Rate (Mills)	137.60	146.04		8.44

There was a decrease in Ad Valorem taxes due to a reduction in the reserve tonnage by the amount of ore mined. The assessed valuation of ore was established at 35% of full and true in 1952 instead of 39½% used in 1951. These percentages are based on the per cent of recovery realized in the treatment of low grade ores.

The principal increase in personal property tax was due to the placing of a stockpile in the pit on a lower lake value instead of a ground value as was done in 1951. The Hill-Walker parcel 6 taxes show an increase due to the fact that this property was changed from a reserve status to an established mine status. This change was the result of a reserve estimate being submitted to the Tax Commission, which also increases the reserve tonnage by 1,502,966 tons.

13. ACCIDENTS & PERSONAL INJURIES

There were three compensable injuries at the Hill-Trumbull Mine in 1952, as follows:

(1)	Name	August Jacobson
	Date of Injury	November 19, 1952
	Cause	Jacobson was standing on the fender of Truck #207. He was in the act of putting water into a radiator, when his foot slipped and he fell striking his right side on the fender.
	Nature of Injury	Back and right side sore.
	Time Lost	10 days
	Compensation	$21.33
(2)	Name	Karl Pelto
	Date of Injury	April 2, 1952
	Cause	Pelto was riding in back of service truck. The driver stopped the truck and a screen vibrating shaft, which was in the truck, slid foreward and struck Pelto's right leg, pushing his leg against the truck box.
	Nature of Injury	Contusion lower 2/3 right leg. Fractured lower third fibula.
	Time Lost	96 days.
	Compensation	$531.20
(3)	Name	Donald Wilson
	Date of Injury	November 2, 1952
	Cause	Shovel #87 hoist cable broke over Wilson's truck. This caused the shovel bucket to drop into truck box. The driver was thrown against roof of cab and against side of truck.
	Nature of Injury	Cerebral concussion, hospitalized. Dizziness. Headache and staggers occasionally while walking.
	Time Lost	50 days in 1952 - not returned to work as of 2/12/53
	Compensation	$384.00 as of 2/3/53

14. PROPOSED NEW CONSTRUCTION

A truck service garage has been proposed for the pit. Extension of the rock reject belt at the mill will be made as needed.

The present tailings pond is almost completely filled and a new pond is being provided just West of the present one. At year's end, the land was being cleared. It is proposed that the dyke be constructed by casting with a dragline, spreading and compacting the fill with a bulldozer.

With heavy locomotives being purchased, capable of handling 7 to 8 car trains, a 150' extension of the tail track at the plant will be required. Extension of the track fill will cover the present access road to the plant, requiring a new road. This work, totalling about 70,000 cu. yds. of fill, will be completed for the 1953 ore season.

Increasing the haulage capacity of the locomotives requires a similar increase in the crude pocket capacity. This will be accomplished by remodelling the present pocket, extending the 8' pan feeder and shifting the track over the pocket so as to increase pocket capacity from the present 300 tons to 500 tons.

14. PROPOSED NEW CONSTRUCTION (Continued)

It had been proposed that a crude surge be provided at the plant. Due to other expenditures, this matter was postponed for the present, and it is hoped that the new locomotives will reduce the need for this facility. However, if crude ore delays continue at anywhere near the rate of 1951-1952 crude surge pocket or pile will unquestionably pay dividends.

15. EQUIPMENT RECEIVED & PROPOSED NEW EQUIPMENT

During the year, the following new equipment was received at the Mine:

- 2 - KVA transformers
- 1 - 6 drawer steel filing cabinet
- 1 - CAA-10 Monroe Calculator
- 1 - Visible cabinet
- 1 - 60" steel desk with chair
- 1 - 60 HP Westinghouse Gearmotor
- 1 - 4-drawer steel filing cabinet
- 6 - Model 1FFD rear-dump Euclid trucks, 30 ton
- 1 - No. JD-4000-6-Electric Coffing Hoist
- 1 - No. TQ-2003-AL torqometer
- 1 - 1/2" Black & Decker electric drill
- 1 - Model RB2860 Rotabin
- 1 - Model F-2 3/4-Ton Ford pickup
- 1 - M 10,000 gallon fuel oil tank
- 1 - Tokheim Fuel pump
- 1 - Hydro-lift truck crane
- 1 - Model F-6, 2-ton Ford Chassis & Cab
- 2 - 1½ Ton Coffing hoists
- 1 - General Motors Diesel Engine
- 1 - Caterpillar Diesel D-8 tractor
- 1 - 15 KVA transformer
- 1 - 10 " "
- 1 - 1-tonChisholm-Moore hoist
- 1 - 2-ton " " "
- 1 - Pangborn Bit Blasting Unit
- 1300 - ft. 24" Conveyor belting
- 53 - ft. 14" " "
- 110 - ft. 18" Elevator Belt
- 1096 - ft. 36" Conveyor Belt
- 1 - Model 500-A Art Craft Ind. Furnace
- 1 - Marion 151M 6½ yd. electric shovel
- Machinery & Equipment for Cyclone Plant

Proposed New Equipment:

- 3 - 85-ton electric locomotives
- 2 - Converters for "
- 110 - ;ft. 13" wide, 6 ply, elevator belting
- 35 - ft. 36" wide, 6 ply, conveyor belting
- 310 - ft. 30" wide, 4 ply " "
- 388 - ft. 24" wide, 4 ply " "
- 3 - 250 KVA transformers
- 1 - Kerrick Steam Kleaner
- 1 - WD--44 400 Amp., G.E. Welding Machine

HOLMAN-CLIFFS MINE
ANNUAL REPORT
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1. GENERAL

The usual winter and idle program of repairs to pit and plant equipment was carried forward from first of the year to April 21st. At that time stripping was started and continued until May 5th, when ore operations in pit commenced for the season. An area-wide strike suspended all operations from June 2nd to July 28th. Upon resumption of work, operations were increased from 2 to 3 shifts per day until completion on October 24th. In order to utilize equipment and crews to full advantage, a small amount of stripping was moved in conjunction with ore operation. The Lake Concentrator was put into operation on May 21st and was operated until October 11th.

Upon completion of ore season, repairs to equipment continued until the end of the year.

Except for disruption of work due to the strike, operating conditions during the year were good, and no serious delays were encountered.

Construction of the Lake Concentrator and addition to the truck shop were completed, and the addition to the test laboratory was practically finished by the end of the year.

2. PRODUCTION, SHIPMENTS & INVENTORIES

a. Production by Grades - Crude

	Tons
Holman Wash	339,713
Holman Retreat	435,269
Brown Wash	186,016
Brown Retreat	478,104
North Star Wash	82,249
North Star Retreat	111,055
Holman Cliffs Lake	126,130
Total	1,758,536

Production by Grades - Concentrates

Holman Bess. Wash Concts.	77,626
Holman N.B. Wash Concts.	106,092
Holman Bess. Ret. Concts.	100,826
Holman N.B. Ret. Concts.	110,648
Brown Bess. Wash Concts.	13,122
Brown N.B. Wash Concts.	89,983
Brown Bess. Ret. Concts.	58,035
Brown N.B. Ret. Concts.	151,043
North Star Bess. Wash Concts.	37,467
North Star N.B. Wash Concts.	31,983
North Star Bess. Ret. Concts.	10,838
North Star N.B. Ret. Concts.	53,714
Holman-Cliffs Bess. Lake Concts.	11,843
Holman-Cliffs N.B. Lake Concts.	30,946
Total	884,166

b. Shipments

Holman Bess. Wash Concts.	77,626
Holman N.B. Wash Concts.	29,779
Holman Bess. Ret. Concts.	100,827
Holman N.B. Ret. Concts.	57,619
Brown Bess. Wash Concts.	13,123
Brown N.B. Wash Concts.	85,647
Brown Bess. Ret. Concts.	58,035
Brown N.B. Ret. Concts.	164,929
North Star Bess. Wash Concts.	37,467
North Star N.B. Wash Concts.	31,983
North Star Bess. Ret. Concts.	10,838

(Continued on next page)

b. Shipments (Continued)

	Tons
North Star N.B. Ret. Concts.	55,363
Holman Lake Bess. Concts.	11,843
Holman Lake N.B. Concts.	30,946
Total	766,025

c. Inventories

Holman Wash Concts.	76,313
Holman Retreat Concts.	53,028
Brown Wash Concts.	5,682
Brown Ret. Concts.	1,751
Total	136,774

d. Production by Months - Crude Ore

Month	Holman Wash	Holman Ret.	Brown Wash	Brown Ret.	No.Star Wash	No.Star Ret.	Holman Lake Conct.	Total
May	12,802	168,890		8,707	12,961	29,945	46.41	237,946
June	546	1,627	4,792	1,084	1,472		1,175	10,696
July		74,862	24,196		11,173			60,231
August	38,266	46,784	4,569	280,765	24,233	31,221	31,632	457,470
Sept.	217,602	46,031	138,872	46,380	3,703	38,461	67,196	558,245
Oct.	70,497	147,075	13,587	141,168	28,707	11,428	21,486	433,948
	339,713	435,269	186,016	478,104	82,249	111,055	126,130	1758536

Production by Months - Concentrates

April			243	1,827	9,137	2,777		13,984
May	7,851	93,237k		4,785	10,312	18,709	2,422	137,316
June	354	863	3,320	708	1,179		354	6,778
July		10,972	16,846		9,197			37,015
August	21,110	19,776	1,294	119,288	16,746	16,857	9,380	204,451
Sept.	119,516	20,373	75,719	19,721	2,559	19,786	21,143	278,817
Oct.	34,887	66,253	5,683	62,749	20,320	6,423	9,490	205,805
	183,718	211,474	103,105	209,078	69,450	64,552	42,789	884,166

3. ANALYSIS

a. Tonnage & Analysis of Crude Ore Produced

	Tons	Iron	Phos	Silica
Holman Wash Crude	339,713	45.43	.031	30.30
Holman Ret. Crude	435,269	42.14	.035	34.18
Brown Wash Crude	186,016	44.85	.037	31.24
Brown Ret. Crude	478,104	40.24	.037	37.04
North Star Wash Crude	82,249	50.30	.038	22.65
North Star Ret. Crude	111,055	47.37	.047	26.90
Holman Lake Crude	126,130	45.36	.045	29.34
Total	1,758,536	43.49	.037	32.55

b. Tonnage & Analysis of Concentrates Produced

	Tons	Iron	Phos	Sil.	Mang.	Alu.	Moist.
Holman Bess. Wash	77,626	57.42a	.032	11.52	.28	.43	7.38
Holman N.B. Wash	106,092	57.14	.037	12.16	.23	.42	7.26
Holman Bess. Ret.	100,826	57.01	.035	11.38	.31	.39	7.28
Holman N.B. Ret.	110,648	56.85	.045	11.44	.34	.41	7.40
Brown Bess. Wash	13,122	57.35	.033	12.55	.18	.39	7.72
Brown N.B. Wash	89,983	56.66	.048	12.39	.24	.38	7.34
Brown Bess. Ret.	58,035	56.66	.037	11.77	.25	.38	7.20
Brown N.B. Ret.	151,043	56.88	.048	11.79	.25	.39	7.19
No.Star Bess. Wash	37,467	57.04	.036	11.91	.34	.39	7.35
No. Star N.B. Wash	31,983	57.27	.051	11.31	.38	.39	7.41
No. Star Bess.Ret.	10,838	57.78	.040	10.91	.40	.39	7.49
No. Star N.B. Ret.	53,714	57.21	.053	11.34	.40	.39	7.57
Holman Lake Bess.Conct.	11,843	55.13	.044	14.86	.26	.57	7.74
Holman Lake N.B. Conct.	30,946	55.66	.047	13.94	.24	.49	7.51

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c. Tonnage & Complete Analysis of Concts. Shipped

	Tons	Iron	Phos	Sil.	Mn.	Alu.	Lime	Mag.	Sul.	Loss	Moist.
Holman Bess. Wash	77,626	57.43	.032	11.51	.28	.43	.26	.17	.010	5.03	7.39
Holman N.B. Wash	29,779	56.72	.041	12.43	.24	.43	.25	.17	.010	5.17	7.58
Holman Bess.Ret.	100,827	57.01	.036	11.37	.31	.39	.27	.16	.011	5.74	7.28
Holman N.B. Ret.	57,619	56.58	.048	11.56	.40	.43	.27	.16	.010	5.99	7.62
Brown Bess.Wash	13,123	57.34	.033	12.55	.18	.39	.26	.17	.011	4.30	7.72
Brown N.B. Wash	85,647	56.65	.048	12.38	.24	.39	.26	.17	.010	5.34	7.31
Brown Bess. Ret.	58,035	56.66	.037	11.76	.25	.38	.26	.17	.011	5.96	7.21
Brown N.B. Ret.	164,929	57.76	.050	11.92	.25	.40	.26	.18	.011	5.60	7.06
North StarBess.Wash	37,467	57.04	.036	11.91	.34	.39	.27	.17	.010	5.12	7.35
No.Star N.B. Wash	31,983	57.27	.051	11.30	.38	.39	.26	.17	.010	5.32	7.41
No.StarBess.Ret.	10,838	57.78	.040	10.91	.40	.39	.25	.17	.010	4199	7.50
No.Star N.B. Ret.	55,363	57.18	.053	11.38	.40	.39	.26	.17	.011	5.34	7.59
Hol.LakeBess.Con.	11,843	55.13	.044	14.86	.26	.57	.27	.17	.011	4.82	7.74
HolLake N.B. Con.	30,946	55.66	.047	13.95	.24	.49	.27	.18	.011	5.06	7.51
	766,025	56.85	.043	11.90	.29	.41	.27	.17	.011	5.44	7.34

d. Mine Analysis of Ore in Stockpile

	Tons	Iron	Phos	Sil.	Mn.	Alu.	Moist.
Hol.Wash Concts.	76,313	57.31	1036	12.06	.22	.41	7.13
Hol.Ret.Concts.	53,028	57.14	.042	11.32	.28	.39	7.17
Brown Wash Concts.	5,682	56.87	.041	12.56	.20	.39	7.66
Brown Ret.Concts.	1,751	56.42	.047	12.37	.22	.39	7.47
Total	136,774	57.21	.039	11.80	.24	.40	7.17

4. ESTIMATE OF ORE RESERVES

a. Factors

	Cu. Ft. Per Ton	Rock Deduction	Recovery
Merch	14	0	100.00
Wash Concts.	14	0	58.00
Lean Wash Concts.	14	0	48.00
Low Grade Wash Concts.	14	0	58.00
Lean, Low Grade W.C.	14	0	45.00
Retreat Concts.	14	0	40.00

b. Ore Reserves 12-31-52

	Reserve 12-31-51	Mined 1952	Balance After Mng.	Changed by Re-Est.	Reserve 12-31-52
North Star					
N½-NE 21,56-24	445,414	134,003	311,411	427,040	738,451
Bingham					
NW-SE 21,56-24	1,686,464	xx	1,686,464	-141,451	1,545,013
Holman					
SE-NE 21,56-24	2,177,657	395,192	1,782,465	8,899	1,791,364
Brown No. 1					
SW-NE 21,56-24	782,765	xx	782,765	- 8,653	774,112
Brown No. 2					
SW-NW 22,56-24	3,521,653	312,182	3,209,471	-530,791	2,678,680
Total	8,613,953	841,377	7,772,576	-244,956	7,527,620

c. Estimated Analyses of Ore Reserves

	Tons	Iron	Phos	Sil.	Mang.	Alu.
Total Direct	53,259	57.98	.051	11.83		
Bess. Wash Concts.	2,512,794	58.10	.029	10.36	.17	.45
N.B. Wash Concts.	1,186,051	57.86	.055	10.32	.29	.69
Total Wash Concts.	3,698,845	58.70	.037	10.35	.21	.53
Bess. Ret. Concts.	2,141,159	58.17	.028	10.99		
N.B. Ret. Concts.	1,634,357	58.18	.055	10.68		
Total Ret. Concts.	3,775,516	58.17	.040	10.86		
Total Bess.	4,653,953	58.67	.029	10.65	.17	.45
Total Non-Bess.	2,873,667	58.04	.055	10.55	.29	.69
Total Holman-Cliffs	7,527,620	58.43	.039	10.61	.22	.54

5. LABOR & WAGES

a. Comments

The supply of labor barely kept pace with requirements and was of average quality. Except for area-wide strike during June and July, relations with the Union were normal. Job evaluation program was completed and put into operation the latter part of the year.

b. Comparative Statement of Production & Wages

1952

Product	Loading & Concentrate Lake Conc'r.	Mining & Concentrating Holman Pit & Plant	Total
Wash & Retreat Conct.	42,789 tons	841,377 tons	884,166
No. of Days Mine Operated	64	101	101
Average No. of Men Working	25	161	186
Average wages per day	$13.56	$19.22	$18.46
Production per man per day	16.93 tons	51.73 tons	47.05
Labor Cost per Ton	$0.801	$0.372	$0.392
Total no. of man days	2,527½	16,265½	18,793
Amount paid for Labor	$34,282.40	$312,679.99	$346,962.39

6. GENERAL SURFACE

a. Buildings & Repairs

Normal maintenance work was carried on throughout the year on company owned dwellings. In addition to the usual maintenance work on mine buildings, the old machine shop was remodelled for use as a district electrical shop. The old blacksmith and welding shops were remodelled and, together with old carpenter shop, made suitable for district carpenter shop.

b. Roads, Transmission Lines, etc.

In addition to new installations to service Lake Concentrator, an entire new set up of transmission lines to service pit was built in order to release a rock dump area.

c. Miscellaneous General Construction

E&A MC-213 - Addition to Truck Shop - completed
E&A MC-215 - Lake Concentrator - completed
E&A MC-214 - Addition to Test Laboratory - 95% complete
E&A MC-225 - 300 HP drives for pit conveyors installed.

In addition to the above, a 150 ft. extension to stockpile system added and put into use.

7. OPEN PIT

a. Stripping

Stripping operations were carried forward during the year under E&A MC-234. These operations were in conjunction with ore loading and were only to utilize crews and equipment when available.

A total of 58,012 cu. yds. of surface material from North Star lease was moved on 27 shifts for a shift average of 2,150 cu. yds. A cost per yard of $0.347 was realized against an estimated $0.432 per yard.

b. Open Pit Mining

Open Pit Mining operations were started on May 5th on a 2-shift, 6-day basis with two shovels and from 5 to 7 trucks. After the strike, which lasted from June 2nd to July 26th, ore loading was on an alternate week schedule of 2 shifts, 6 days and 3 shifts, 6 days until the second week in September, at which time a 3-shift, 6-day schedule was put into effect and continued for the balance of the season.

During the season a total of 1,752,691 tons of gross crude was moved on 260 shifts for an average of 6,741 tons per shift. From the above gross crude, 120,285 tons of screen rock were moved for a net crude to mill of 1,632,406 tons and a shift average of 6,278 tons. In the course of mining, some 130,394 tons of pit rock, lean and waste material were moved and placed on respective dumps for a ratio of .15 tons per ton of shipping ore. The cost of this movement was $.004 per ton of shipping ore.

The following tabulations show the material mined from the various leases:-

Lease	Gross Crude	Scr.Plant Rock	Net Crude	Pit Rock Lean & Waste Mat'l.
Holman	823,132	48,150	774,982	89,032
Brown #2	706,720	42,600	664,120	23,280
North Star	222,839	29,535	193,304	12,115
TOTAL	1,752,691	120,285	1,632,406	130,394

Operations on Holman lease were mainly from South side, but an area on North side was cleaned of ore in order to expand rock dump area. Approximately 43% of the ore mined was wash ore and 57% retreat.

On the Brown No. 2, ore was loaded from upper benches on North side and also from South side along Oliver Iron Mining Division line. The ratio of ore from this lease was 27% wash and 73% retreat.

All mining on North Star was from NE-NE and comprised removing of benches to the North. A special effort was made to clean up along East side in order to release further rock dump area. As mined, the ore was 42% wash and 58% retreat.

Of the total ore mined from all leases, 37% was wash and 63% was retreat. With two shovels operating and mixing ores, no trouble was encountered in producing grade ore. Mining conditions during the year were average. There were no serious breakdowns and a good production was maintained. The total cost of producing crude ore was $0.203 per ton.

c. Pumping & Drainage

There were no changes in pumping arrangements during the year, and flow of water remained constant. Sumps and drainage ditches were cleaned as the need arose. The pumping cost per ton of shipping ore was $0.016.

d. General Pit Activities

The cost per ton on shipping grade ore was $0.016. This was due mainly to changes in pit power lines to release areas for mining and rock dumps.

8. Beneficiation

a. Plant

Plant was operated on the same schedule as the pit; while on 2-shift basis, the third shift was utilized for repairs and when on a three shift basis, repairs were made on Sunday.

On 260 shifts of operation, a total of 1,632,406 tons of crude was treated to obtain 827,393 tons of concentrates for a weight redovery of 49.31% and an average rate of production of 3,182 tons of concentrates per shift.

Of the wash ore portion of the feed, 607,978 tons produced 346,893 tons of concentrates for a recovery of 57.06%. The retreat feed of 1,024,428 tons produced 480,500 tons for a recovery of 46.91%.

There were no major changes in the flowsheet during the year and the lower recovery compared to 1951 is due to type of material treated. There were no serious breakdowns, and a very satisfactory operation was obtained.

Previous to the 1952 season, the 200 HP drives on the pit conveyor system were replaced with 300 HP drives and belt conveyor replaced with USTEX belting from the Hawkins Mine. This change allowed for an increase of approximately 100 TPH from pit and with the stronger belts there were no delays due to belt repairs.

The pilot plant to treat the fine sizes by heavy media process, utilizing the cyclone unit, was tested intermittently throughout the year. An average reduction of silica from 13.36 to 10.78 was obtained with a weight recovery of 88%. Due to disruption of operations by strike, no tests were made with the Hardinge Separator Unit.

A 150 foot extension to the stacker system was added during the year which greatly increased the capacity. Ore was stockpiled during the shortage of cars. During the season, 277,845 tons were stocked and 141,071 tons loaded out leaving a balance of 136,774 tons at the end of the year.

The following shows time lost on production due to delays:-

Source of Delay	Hours Loss	Per Cent of Total Work Hours
Pit		
No Power - Storm	1.25	0.06
Pit Screen Plant & Crude Conveyor		
8' Pan	0.33	0.02
Screen	4.58	0.22
Conveyors	1.75	0.08
Plant Equipment		
Primary Screens	0.05	0.02
Crushers	1.25	0.06
Secondary Screens	8.62	0.40
Classifier	0.25	0.01
ConcentratesConveyor	1.25	0.06
Concentrates Stacker	0.25	0.01
Chutes & Launders	1.83	0.09
R.R. Cars & Tracks	2.17	0.10
Heavy Media Plant Delays	7.26	0.35
Electric Power	6.50	0.31
Freezing Weather	8.00	0.38
GRAND TOTAL	45.21	2.17

8. BENEFICIATION (Continued)

The following tabulations show tonnages and analysis of various mill rejects and products:

Total Holman-Cliffs Wash

	Tonnage	%Total Mined	%Iron Dried	Tonnage Recovery	Iron Unit Recovery
Crude Ore & Rock Mined	662,678	100.00	44.82		
Less: Rodk Removed in Mining	21,255	3.21	32.27		
Crude Ore Transported to Screening Plant	641,423	96.79	45.23		
Less: Rock Rejects in Screening Plant	33,445	5.05	32.90		
Crude Ore Entering Mill	607,978	91.74	45.91		
Concentrates Produced	356,273	53.76	57.09	58.60	72.87
Tailings (By Deduction)	251,705	37.98	30.09		

Total Holman-Cliffs Retreat Plant

Crude & Rock Mined	1,139,927	100.00	40.76		
Less:Rock removed in mining	29,094	2.55	31.54		
Crude Ore Transported to Screening Plant	1,110,833	97.45	41.00		
Less: Rock Rejects in Scr. Plant	86,405	7.58	31.30		
Crude Ore Entering Mill	1,024,428	89.87	41.82		
Concentrates Produced	485,104	42.56	56.93	47.35	64.46
Heavy Density Rejects	94,162	8.26	42.81		
Tailings(By Deduction)	455,162	39.05	25.14		

HOLMAN LAKE CONCENTRATING PLANT

Crude Ore and Rock Mined	145,837	100.00	43.57		
Less: Rock Removed in Mining	3,762	2.58	30.82		
Crude Ore Transported to Screening Plant	142,075	97.42	43.90		
Less: Rock Rejects in Screening Plant	15,945	10.93	32.39		
Crude Ore Entering the Mill	126,130	86.49	45.36		
Concentrates Produced	42,789	29.34	55.51	33.92	41.52
Heavy Density Rejects	21,655	14.85	41.14		
Tailings (By Deduction)	61,686	42.30	39.80		

Due to delay in completion of Lake Concentrator by contractor, this plant was not put into operation until May 21st on a one shift basis. After considerable difficulty in eliminating "bugs" in design and construction, together with disruption due to strike, the plant was put on a two shift basis August 11th. Although operation improved the latter part of the season, it was found that tailings pump was not capable of handling tailings with plant at full capacity and scalping screen blinded continuously. Although the grade of concentrates was about as expected, production was far below that estimated due to tailings pump and scalping screen. However, changes in deck of screen, the latter part of the season rectified this trouble and a larger capacity tailings pump will be installed before next season, when it is expected this plant will be capable of full production. The plant was shut down on October 11th. No tabulation of delays is given here as the intermittent operation of the plant makes them meaningless.

9. MAINTENANCE & REPAIRS

The usual maintenance work on all mine equipment was carried on throughout the year. The concentrating plant equipment, pit screening plant and crude conveyors were completely overhauled during spring and fall.

Shovels, trucks and other pit equipment was given a thorough check and repair where necessary during shutdown period.

10. COST OF OPERATION

A. Comparative Cost of Operation

	1952 Budget	1952 Cost Per Ton	1951 Cost Per Ton
Product			
Concentrates 900,000 tons (Original)			
639,500 tons (Revised)		841,377	930,008
Direct		-	1,505
Re-Wash Tailings 200,000 tons (Original)		-	
113,500 tons (Revised)		42,789	-
Total Product		884,166	931,513
Recovery		46.67%	52.63%
Average Daily Output		8,754	6,596
Tons Per Man Per Day		47.59	48.08
Days Operated		101	141
Costs			
Total Pit Operating	.260	.202	.239
Total Concentrating	.387	.216	.292
Loading Stockpile Ore	.006	.009	.008
Lake Concentrator (Rewash Tailings)	2.546	2.297	-
Total Gen'l Mine Expense	.178	.172	.176
Winter & Idle Expense	.378	.460	.427
Cost of Production	1.715	1.368	1.358
Depreciation-Plant & Equipment		.181	.155
" -Motorized & Other Equip.		.060	.043
" -Movable Equipment		.003	.004
Amortization - Defense Facilities		.042	-
Amortization - Leasehold		.222	.125
" - Stripping		.395	.403
Taxes - Ad Valorem		.199	.211
" - Occupational		.295	.288
" - Royalty		.139	.102
Total Depreciatipn, Amortization & Taxes		1.536	1.331
Administrative Expense		.100	.100
Misc. Expense & Income		.006	-.015
TOTAL COST AT MINE		3.010	2.774

b. Comments

The cost of production in 1952 was $.347 lower than budget and $.010 higher than 1951 cost. In comparison to the budget, the decrease was spread throughout the various items and was due to the re-estimated budget after the strike being set too high.

11. EXPLORATION & FUTURE EXPLORATION

During the year a total of 281 ft. 7 inches of structure drilling was completed on the Brown #2 along the South side. Inasmuch as this drilling proved up additional ore for tax rolls and information was not required, at this time, all drilling was suspended. No exploration plans have been formulated for the year of 1953.

12. TAXES

	1952	1951	Increase	Decrease
Holman-Brown Mine	$109,959.55	$129,504.96		$19,545.41
Bingham Mine	27,055.81	27,335.76		2,799.95
North Star Mine	14,175.13	12,769.67	$1,405.46	
Test Lab. & Truck Shop	758.91	578.54	180.37	
Washing Plant Site	6,297.38	5,893.09	404.29	
Auxiliary and Dump Lands	800.89	924.99		124.10
Holman-Cliffs Shops, Office, Fuel Oil Pl. & Central Warehouse	2,726.75	2,531.38	195.37	
Holman-Cliffs Personal Property	12,098.61	12,095.63	2.98	
Lake Concentrator	2,673.16	-	2,673.16	
Total	$176,546.19	$191,634.02		$15,087.83
Rented Buildings	386.71	321.00	65.71	
GRAND TOTAL	$176,932.90	$191,955.02		$15,022.12
Average Tax Rate (Mills)	123.40	131.05		7.65

A new reserve estimate was submitted to the Tax Commission in 1951, which reduced the reserve tonnage by 244,936 tons, in addition to the reduction resulting from mining operations. This decrease, and a decrease in mill rate, more than offset the 15% blanket increase in mineral values applied by the Tax Commissioner.

The Lake Concentrator is now on the tax list in 1952. Lean ore stockpiles being treated were placed on the list at a tax of $12,098.61. The normal depreciation on equipment and the removal of five Terracobras from the lists reduced the personal property taxes by about the same amount as the tax on stockpile.

A general increase of 10% on all building values within the Villages in Itasca County has increased taxes on shops, offices, etc.

13. ACCIDENTS & PERSONAL INJURIES

There were three compensable accidents at the Holman-Cliffs Mine in 1952, as follows:

(1)

Name	Raymond Castallano
Date of Injury	June 24, 1952
Nature of Injury	While spading garden at Holt residence, injured felt kink in back.
Cause	Strained right lower lumbar muscles.
Time Lost	11 days
Compensation	$25.60

(2)

Name	Edward Kihlgren
Date of Injury	Sept. 27, 1952
Cause	While injured was striking angle iron with sledge hammer, hammer bounced and struck him on his right knee. He started to fall, and while doing so, he reached and grabbed side of screen and felt pain in left groin.
Nature of Injury	Left inguinal hernia
Time Lost	60 days
Compensation paid	$256.00

13. ACCIDENTS & PERSONAL INJURY (Continued)

(3)

Name	Mike Markovich
Date of Injury	October 17, 1952
Cause	Markovich was lowering a can of powder into a blast hole with a tripod and winch, when the can hung up on the side of the hole. In trying to free the can, he lost control and the can dropped. He stopped the fall of the can by catching the winch crank, but in so doing, he suffered a severe blow on the right hand from the crank.
Nature of Injury	Sprained right wrist.
Time Lost	57 days
Compensation	$133.33

14. NEW CONSTRUCTION

a. Completed in 1952

Truck Shop addition
Central Warehouse Addition
Lake Concentrator
Addition to stacker
300 HP drives and exchange belts on pit conveyors
Changes in fine ore pilot plant
Remodeling old machine shop

b. To be Constructed and to be Completed in 1953

Test Lab. Addition to be completed
Remodel old blacksmith shop
Remodel pit screening plant trestle and pocket

15. EQUIPMENT RECEIVED & PROPOSED NEW EQUIPMENT

a. Received in 1952

2 300 HP motors, drives, switches and brakes
6 34-ton Euclid trucks
1 Malsbary steam cleaner
1 3/4 ton pickup
2 10,000 gallon tanks
1 151 Marion Electric shovel (Hill-Trumbull Mine)
1 3/4 ton International pickup
1 35' bare boom - spare
1 2-ton Ford line truck
Addition to test laboratory
Pilot sink float unit
5 30' conveyor sections and belting
1 300 HP motor, tailings
1629' - 30" conveyor belting
Hill Lake Concentrator
1 dynamometer
Addition to truck shop

b. To be received in 1953

1 10" diamond alloy slurry pump
1 60 HP motor
1 4" x 6" jaw crusher and pulverizer
1 36" x 8' - 5" springfield lathe

SALLY MINE
ANNUAL REPORT
YEAR-1952

1. GENERAL

This property has merely been explored and no mining operations have been conducted to date.

2. PRODUCTION, SHIPMENTS & INVENTORIES

None

3. ANALYSIS

None

4. ESTIMATE OF ORE RESERVES

a. Ore Factors

	Cu. Ft. Per Ton	Rock Deduction	Recovery
Merch	14	-	100.00
Wash	14		56.76
Low Wash	14		45.85
Low Grade Wash	14		58.38
Lean, Low Grade Wash	14		50.50
Retreat	14		40.00

b. Estimated of Ore Reserves

	Reserve 12-31-51	Mined 1951	Bal. After Mining	Changed by Re-Estimate	Reserve 12-31-52
Bovey #1	1,751,579	-	1,751,579	-	1,751,579

c. Estimated Analysis of Ore Reserves

	Tons	Iron	Phos	Silica
Bessemer Merch	88,457	64.01	.020	5.50
N.B. Merch	63,657	62.22	.078	5.59
Bess. Wash Concts.	755,429	60.92	.026	7.85
N.B. Wash Concts.	450,438	58.89	.067	8.65
Bess. Ret. Concts.	229,073	58.33	.031	11.73
N.B. Ret. Concts.	164,525	57.73	.061	10.03
Total	1,751,579	59.96	.042	8.57
Total Bessemer	1,072,959	60.62	.027	8.48
Total Non-Bessemer	678,620	58.91	.067	8.70
Total Bovey #1	1,751,579	59.96	.042	8.57

5. LABOR & WAGES

None

6. GENERAL SURFACE

None

7. OPEN PIT

None

8. BENEFICIATION

None

9. MAINTENANCE & REPAIRS

None

10. COST OF OPERATION

No production

11. EXPLORATION & FUTURE EXPLORATION

None

12. TAXES

	1952	1951	Increase	Decrease
Sally Mine	$28,559.45	$26,823.19	$1,736.26	
Auxiliary Lands	52.97	28.30	24.67	
Total	$28,612.42	$26,851.49	$1,760.93	
Average Tax Rate (Mills)[a]	123.38	133.24	9.86	

The rates for mineral valuation were given a blanket increase of 15% by the Department of Taxation.

13. ACCIDENTS & PERSONAL INJURIES

None

14. PROPOSED NEW CONSTRUCTION

None

15. EQUIPMENT RECEIVED & PROPOSED NEW EQUIPMENT

None

SARGENT UNDERGROUND MINE
ANNUAL REPORT
YEAR - 1952

1. GENERAL

Mining operations at the Sargent Underground Mine were carried forward from the first of the year to November 24th on a two shift, six day a week basis. Starting on November 24th, all operations were started on a two shift, five day a week basis. In addition to time lost on holidays, forty-six regular working days were lost due to the strike from June 2nd through July 26, 1952. In march, all mining was suspended in the northweast corner of the mine for the summer months due to danger of mud runs from old caves. In April, mining under the West side milling pit was temporarily suspended to allow water from the spring thaw to drain. Production was suspended during the week of November 17th due to the number of men that wanted their vacations and to repair hoist and compressor. Crude ore was placed on stockpile from January 2nd to May 6th. Direct ore was stockpiled intermittently during this same period.

On April 12th, 196 tons of direct ore was loaded from the shaft, and on May 12th, 191 tons of direct ore was loaded from the shaft. This total of 387 tons constituted the total direct ore loading direct from the shaft. The direct ore stockpile was loaded out as cars were available from May 12 to May 19. The washing plant was put into operation on May 5th and operated until October 27th. During October low grade merch was hauled from the East side stockpile to the crude pile and washed. Also 3,992 tons of low grade merch was loaded on October 5th through October 7th. Winter stockpiling of crude ore was started on October 28th and continued to the end of the year.

2. PRODUCTION, SHIPMENTS & INVENTORIES

a. Production by Grades

	Tons
Crude Ore	188,718
Direct Shaft Ore	14,377
Concentrates	125,285
Total	139,662

b. Shipments

Sargent Direct Shaft Ore	17,485
Sargent Concentrates	125,285
Total	142,770

c. Stockpile Inventory

No stockpile balance

d. Production by Months

Month	Sargent Crude	Sargent Concts.	Sargent Shaft	Total
January	19,950		3858	3858
February	19,395		3522	3522
March	19,626			
April	17,301		196	196
May	19,143	21,951	2809	24,760
June	786	1,131		1,131
July	1,377	4,546		4,546
August	22,107	30,661		30,661
September	20,634	36,393		36,393
October	28,257	30,253	3,992	34,245
November	8,160	350		350
December	11,982			
Total ...	188,718	125,285	14,377	139,662

3. ANALYSIS

a. Tonnage & Analysis - Crude Ore

Tons	Iron	Phos	Silica
188,718	51.85	.056	17.75

b. Tonnage & Analysis - Concentrates & Direct Produced

	Tons	Iron	Phos	Sil.	Mn.	Alu.	Moist.	Iron Natl.
Sargent Concts.	125,285	55.82	.059	12.31	.84	1.55	12.93	48.60
Sargent Shaft	14,377	51.69	.058	17.47	.85	1.95	13.26	44.84
Total . . .	139,662	55.39	.059	12.84	.84	1.59	12.96	48.21

c. Tonnage & Analysis of Ore Shipped

Sargent Concts.	125,285	55.82	.059	12.31	.84	1.55	12.93	48.60
Sargent Shaft	17,485	51.75	.058	17.33	.87	1.99	13.30	44.87
Total . . .	142,770	55.32	.059	12.92	.84	1.60	12.98	48.14

e. Complete Analysis of Ore Shipped

	Iron	Phos	Sil.	Mn.	Alu.	Lime	Mag.	Sulph.	Loss
Sargent Concts.	55.82	.059	12.31	.84	1.55	.34	.21	.011	4.43
Sargent Shaft	51.75	.058	17.33	.87	1.99	.34	.20	.012	4.75

4. ESTIMATE OF ORE RESERVES

a. Factors

	Cu. Ft. Per Ton	Per Cent Recovery
Merch	14	100%
Wash Concts.	14	60%

b. Ore Reserves as of 12-31-52

	Reserve 12-31-51	Mined 1952	Balance After Mining	Changed by Re-Est.	Reserve 12-31-52
Total Merch O.P.	-	96,792	-	+ 98,644	98,644
Total Merch U.G.	773,176	14,377	662,007	-482,100	179,907
Total Wash Conce. U.G.	547,589	126,588	421,001	-201,832	219,169
GRAND TOTAL...	1,320,765	237,757	1,083,008	-585,288	497,720

c. Analysis of Ore Reserves

	Tons	Iron	Phos	Sil.	Mn.	Alu.
O.P. Merch	98,644	56.57	.065	9.38	2.07	1.25
U.G. Merch	179,907	55.67	.057	12.15	.86	2.05
U.G. Wash Concts.	219,169	55.48	.061	12.32	.76	1.65
GRAND TOTAL..	497,720	55.76	.060	11.68	1.06	1.72

5. LABOR & WAGES

a. Comments

The labor supply was ample throughout the year. The working force was reduced from an average of 95 men at the beginning of the year to 78 men at the end of the year. Local labor relations continued satisfactory. From March 1, 1952, a general increase of $0.125 per hour was granted. On July 26, 1952, the job classification program went into effect. Under this program, the base pay, on job class I was set at $1.435 per hour, and the increment between job classes at $0.045. The miner was set at Job Class 14 with a minimum rate of $2.02 per hour.

5. LABOR & WAGES (Continued)

b. Comparative Statement of Production & Wages

	Tons
Direct Ore	14,377
Crude Ore	188,718
Total Direct & Crude	203,095
Concentrates	125,285
Total Concentrates & Direct	139,662
Number of Days Operated	251 days
Average Daily Production	812 tons
Average number of men working	99 men
Tons per man per miner	23.70 tons
Tons per man total underground	13.29 tons
Tons per man total mine	8.74 tons
Average Rate Per Day	
Surface	$13.48
Underground	17.59
Contract Miners	19.16
Amount paid for Labor	$417,160.53
Labor Cost per Ton	$2.054

6. SURFACE

a. Building & Repairs

Minor maintenance repairs to buildingswere carried on throughout the year.

b. Timber Shafts

During the spring, the No. 2 timber shaft was discontinued. Lightning struck the #1 timber shaft during an electrical storm and fire broke out at 6:00 A.M. on June 2nd. The timber head frame and shed with contents were completely burned. The timber hoist from the #2 shaft was moved to the #1 shaft. A new shed and timber head frame were constructed during the strike.

c. Washing Plant Repairs

Minor maintenance repairs were carried on throughout the year.

d. Roads

Road on the East side of the dyke was built up to improve road in spring and also to serve as a dyke for the tailings pond.

7. UNDERGROUND MINING

a. Main Shaft

New studdles were installed as needed. Minor repair was done as needed to keep the shaft in shape for the short remaining period left to mine out present underground workings.

b. Development

There was no extensive development. Drifts and raises were driven as needed to mine back pillars in an orderly manner.

c. Mining

Mining was carried forward during the year with an average of eight and one-half gangs employed. Of these eight and one-half gangs, four mined by sub-level caving, three by drifting for sub-level caving, and one and a half gangs by developing and making timber repairs. In the sub-level caving places, blocks approximately 28 feet high and 25 feet wide were caved. Pillars were mined back in an orderly manner on the various sub-levels.

In March two gangs were moved out of the Northweast corner of the mine to avoid mud runs during the spring and summer rains. One gang was put back in November to complete the pillar. During the summer two gangs were put under the old milling pit on

c. Mining (Continued)
the West side. These gangs, by sub-level caving methods, went under the pit banks and caved the sides out. The tons per man for the entire mine were increased from these places.

d. Timber, Explosives, etc.

The supply of timber was ample and of good quality. Elm has been substituted fully for tamarack in all caving places. Elm is cheaper than tamarack and just as good in pillars that are mined out in short periods of time.

Lineal feet of timber used per ton of ore	0.388 ft.
Cost per ton for timber	$0.085
Cost per ton for lagging, poles and boards	$0.074
Cost per ton for wire	$0.000
Pounds of explosives per ton	.540 lbs.
Cost of explosives per ton of ore	$0.088

e. Pumping & Drainage

There were no changes in pumping arrangements. Minor repairs were done as needed.

The greatest pumping problem was encountered during severe rainstorms at which time production from the West side of the mine had to be stopped, the dams closed, and water released slowly as the pumps were able to handle it.

8. BENEFICIATION

The washing plant started operations on May 5th on a two shift, six day basis. this operation continued on a two shift per day basis until the strike. After the strike, the washing plant operated on a three shift basis until October 27, when the plant was shut down due to freezing weather.

During the season, the plant operated 293 shifts, treating 187,584 tons of crude ore, producing 125,285 tons of concentrates, for an average weight recovery of 66.8 per cent. An average of 82.86 TPH was maintained, with a resulting product of 55.18 tph of concentrates.

In general, the plant worked satisfactorily except for the need of continuous blowing to work the wet, sticky ore through the shutes.

The following represents the plant product distribution for the Sargent Mine:

	Tons	% of Tonnage Mined	% of Iron Mined	Tonnage Recovery	Iron Unit Recovery
crude ore thru plant*	187,584	100.00	51.60		
Concentrates produced	125,285	66.79	55.83	66.79	72.26
tailings(by deduction)	62,299	33.21	43.09		

*This crude applicable to concentrates produced.

9. COST OF OPERATIONS

a. Comparative Cost Statement

Product	1952 Budget	1952 Cost Per Ton	1951 Cost Per Ton
Direct Ore	80,000	14,377	137,992
Crude Ore		188,718	162,015
Total Direct & Crude	105,000 (Original)	203,095	300,007
Concentrates	90,000 (Revised)	125,285	112,658
Total Concentrates & Direct Ore		139,662	250,650
Recovery		66.80%	64.82%
Average Daily Product		812 tons	1,000 tons
Tons per Man per Day		8.74	9.28
Days Operated		251	300

10. COST OF OPERATIONS

a. Comparative Cost Statement (Continued)

	1952 Budget	1952 Cost Per Ton	1951 Cost Per Ton
Costs			
Total Underground Costs	2.640	2.068	1.922
Total Surface Costs	.254	.246	.181
General Mine Expense	.554	.499	.327
Cost of Production	3.448	2.813	2.430
Concentrating Costs	.431	.373	.358
Total Cost Production Merch. Ore	5.735	4.422	3.284
Depreciation - Plant & Equipment		.182	.123
" - Motorized Equipment		.002	.002
" - Movable Equipment		.005	.003
Taxes - Ad Valorem		.001	.135
" -Occupational		.009	.000
" -Royalty		.061	.061
Total Depreciation & Taxes		.360	.324
Loading & Shipping		.023	.037
Total Cost at Mine		4.805	3.645
Administrative Expense		.050	.050
Misc. Expense & Income		.044	.044
GRAND TOTAL COST		4.899	3.739

b. Comments

Cost of production of crude ore in 1952 as shown above was $.675 lower than the budget and $.383 higher than the 1951 costs.

Concentrating costs were $.058 lower than the budget and $.015 lower than the 1951 costs.

Cost of production of merchantable ore for 1952 was $1.313 lower than the budget and $1.138 higher than the 1951 costs.

10. MAINTENANCE & REPAIRS

A continuous program of maintenance and repair was carried on throughout the year as the need arose. During the week of November 17, production was suspended to allow for repairs on the hoist and compressor equipment. These repairs were done on equipment that would hinder production if done when the mine was hoisting ore.

11. EXPLORATION & FUTURE EXPLORATION

No extensive program of exploration during 1952 was conducted.

12. TAXES

A. Statement of Taxes

	1952	1951	Increase	Decrease
Sargent Mine	$22,052.91	$31,461.89		$9,408.98
Auxiliary Lands	180.32	54.94	$125.38	
Personal Property	1,413.69	2,233.03		819.34
Grand Total	$23,646.92	$33,749.86		$10,102.94
Average Tax Rate (Mills)	189.24	235.40		46.16

12. TAXES (Continued)

The reserve tonnage was decreased by the amount of shipments, resulting in lower taxes. The tax on auxiliary lands shows an increase due to the fact that a bridge over a highway was placed on the tax rolls. This bridge is Hanna property and they are billed for the amount of the tax.

Personal property tax is less on account of less ore in stockpile and a lower mill rate.

13. ACCIDENTS & PERSONAL INJURIES

There were four compensable accidents at the Sargent Mine during 1952

(1)	Name	Matt Gregorich
	Date of Injury:	Jan. 31, 1952
	Cause:	Gregorich was driving a wedge with an axe. After striking the wedge, the axe handle came up, striking his index finger of left hand.
	Nature of Injury	Traumatic amputation, partial, of terminal digit, index finger of left hand.
	Time Lost	102 days.
	Compensation	$1600.00 paid as of Jan. 26, 1953
(2)	Name	Alex Pochucha
	Date of Injury	February 2, 1952
	Cause:	Miners had drilled 3 holes in breast and were drilling 4th and last hole before plasting. Injured braced himself against post while in act of drilling with a 6' auger. A large rock let loose on right side, fell striking auger and pinned Pochucha against post. His partner pulled rock away with tugger to release him.
	Nature of Injury	Fracture of 11th dorsal vertebrae with the 11th dorasl vertebra displaced over the 12th with complete paralysis extending from crest of ilium downward bilaterally.
	Time Lost:	285 days - not returned to work as of 2/12/53
	Compensation	$1600.00 as of 1/28/53
(3)	Name	George Cayanovich
	Date of Injury	October 8, 1952
	Nause	While Cayanovich was picking dirt in his working place, he tripped over a chunk of dirt and fell on his back, at the same time he hit his right shoulder on another chunk.
	Nature of Injury	Tenderness over lateral head of clavicle. Some swelling, but asymmetry questionable. Can't raise arm laterally.
	Time Lost	72 days in 1952 - not returned to work as of 2/12/53
	Compensation	$512.00 as of 2/2/53
(4)	Name	David Anderson
	Date of Injury	September 27, 1952
	Cause	Anderson was breaking a chukn of ore with a sledge hammer and a piece of the ore broke off and struck right ankle.
	Nature of Injury	Contusion & bruise of ankle bones and long tendon
	Time Lost	18 days
	Compensation Paid	$96.00

14. PROPOSED NEW CONSTRUCTION

No new construction is anticipated for the present underground workings.

15. EQUIPMENT RECEIVED & PROPOSED NEW EQUIPMENT

a. Equipment Received in 1952

2 Aerodyne Midget Blowers
1 16" ventilating fan

b. Proposed new Equipment

None

SARGENT OPEN PIT MINE
ANNUAL REPORT
YEAR - 1952

1. GENERAL

Equipment was brought in, and on March 3, 1952 stripping operations commenced on E&A CC-494. Surface material was used to fill for Great Northern tracks to loading pocket, accessroad to the pit operations from the underground road and also for the ramp to screening and crushing plant.

This stripping operation continued on a three shift per day basis to April 1, 1952, when operations were suspended to April 15th because of the spring breakup. Again operations were discontinued on May 1st for repair of equipment for the ore season.

During March the concrete foundations and piers for the screening plant, crusher, conveyor and loading pocket were completed. During April there was very little progress on the construction work; however, in May the erection of the screen plant was 50% completed and the repairs to the pan feeder and grizzly were also completed and the extension to the power lines to the edge of the pit finished.

Structural drill operations were started in January and continued throughout all of the year to December 30, 1952. On account of the steel strike, the drilling was down from June 2nd to July 31st.

With all operations down due to the strike, construction of the plant was not resumed until July 28th and was completed on September 18th. The Great Northern Railroad also completed the laying and ballasting of their tracks for movement of ore to the docks.

On August 20, 1952, stripping was again resumed on a 1-shift, 6-day per week basis under E&A CC-528. This material was used for the ramp to trestle approach to the screening plant and a large yardage went to the West, South and East sides of the underground washing plant tailings pond.

On September 18th ore production was begun on a single shift, six day per week basis and during the months of September and October production was on an intermittent basis with stripping, production of ore as required by the grading department, and stripping when ore was not wanted.

In November, to complete our requirements, operations were entirely in ore, and a total of 96,792 tons was attained for the season, which closed on November 26th.

On December 1st stripping under E&A CC-563 was begun and was completed on December 5th. Practically all of this material was used to raise the dyke and road level on the West and Southwest side of the tailings pond and some on the East side. This operation was a one shift per day - five day per week operation.

On December 18th the foundations and two piers were poured on the West side of the screening plant to support the pan feeder to be used in disposing of over-size from the grizzly before it enters the crusher. This addition will be completed before the 1953 ore season.

At the close of the stripping operation on December 5th all men were transferred to the Hawkins Mine for employment there so that on December 30th and when the structural drillers completed their final hole all work was suspended at the Sargent Open Pit.

2. PRODUCTION, SHIPMENTS AND INVENTORIES

A. Production by Grades

	Tons
Open Pit Direct Ore	96,792

2. PRODUCTION, SHIPMENTS & INVENTORIES

b. Shipments

	Tons
Sargent Open Pit Direct Ore	96,792

c. Stockpile Inventories

No stockpile balance

d. Production by Months

Month	Sargent Open Pit
September	15,118
October	36,251
November	45,773
December	- 350
Total	96,792

3. ANALYSIS

A. Tonnage & Analysis - Concentrates

	Tons	Iron	Phos	Sil.	Mn.	Alu.	Moist.	Iron Nat'l.
Sarg.O.P.Direct	96,792	55.22	.064	12.96	1.15	2.23	15.37	46.73

b. Tonnage & Analysis of Ore Shipped

Sarg.O.P.Direct	96,792	55.22	.064	12.96	1.15	2.23	15.37	46.73

c. Complete Analysis of Ore Shipped

Sarg.O.P.Direct	55.22	.064	12.96	1.15	2.23	.32	.20	.010	3.53

4. ESTIMATE OF ORE RESERVES

See Sargent Underground Report

5. LABOR & WAGES

a. Comments

For the year of 1952, labor was somewhat scarce, especially during shipping season, but was better toward fall. The attitude of labor, and I think this was more evident with the truck drivers, was as bad in 1952 as in 1951. Many of them came from outlying districts and were attracted here by the high wages with the overtime.

b. Comparative Statement of Wages & Product

Product	96,792 tons
Number of days operated	53 1/2
Number of shifts operated	53 1/2
Average Daily Product	1809.20
Average product for shift	1809.20
Average product of men working	77.55
Average wages per hour (ore season)	$2.043
Amount paid for labor (ore season)	$63,656.24
Labor cost per ton	$.2474

6. GENERAL SURFACE

Very little, if any, work is contemplated on buildings and repairs

b. Roads, Transmission, Tires, etc.

No new work is proposed at present time.

c. Miscellaneous Gen'l Construction

Before the start of the 1953 ore season, it is proposed to complete installation of a pan feeder to remove rock rejects at the screening plant before the ore enters the crusher and also provide some additional screening at an estimated cost of $3,000.00.

7. OPEN PIT

a. Stripping

This new stripping project under E&A CC-494 was started on March 3, 1952 on a 3-shift per day, 6-day per week basis, placing the waste material on the dump. Some stripping was used to provide roads and to provide fill for the Great Northern tracks to the loading bin and tail track. Two shifts were used to haul rock for roads and eight shifts were lost because of soft roads.

Stripping was suspended on April 1st due to spring breakups and started again April 15th. Two and one-half shifts were lost to shovel breakdowns. On May 1, 1952, stripping operations were shut down for the repair of equipment and E&A CC-494 was completed with a total of 154,266 cu. yds., consisting of 149,851 cu. yds. of surface and 4,415 cu. yds. of rock. A total of 104 1/2 shifts were used to strip this material for an average of 1,492 cu. yds. per shift. In this work and 85-B 3¼ yd. shovel was used with five 22 ton trucks.

The estimated cost per cubic yard under the E&A CC-494 was $.350 and actual cost was $.392.

The steel strike began on June 2nd and all work came to a standstill, and operations were not resumed until July 28th and then they were resumed on construction work. On August 20th stripping operations were again resumed under E&A CC-528 under a single shift, six days per week basis. This work was intermittent with single shift ore operations which commenced on September 18th. Material removed was used to complete the ramp to the screening plant, leveling off of areas aroung the shop and screening plant and to build up the dyke around the tailings pond and the dump area.

This program under E&A CC-528 removed 60,269 cu. yds. of material, consisting of 49,778 cu. yds. of surface, 638 cu. yds. of waste and 9,853 cu. yds. of rock. Five trucks were used to haul to dump and dyke and 3 and 4 trucks to the ramp. Stripping production averagedd 1,555 cu. yds. per shift for a total of 38 3/4 shifts. The estimated cost of this program was $.320 per cu. yd. and actual cost was $.341. This cost was higher than estimated due to a larger amount of rock removed to uncover the ore.

The month of November was entirely devoted to ore and on December 1st under E&A CC-563, stripping was again commenced on a single shift, five day per week basis. This work was done only to protect the dykes on the west and south sides of the tailings pond and the road into the mine had to be raised at the same time, which delayed the whole operation. Only 4,259 cu. yds. were removed, of which 310 cu. yds. was rock, with an average of 852 cu. yds. per shift. Estimated cost per yard of this stripping was $.417 and actual cost was $.790.

The following is a breakdown of the stripping removed during the year.

	Surface	Waste	Rock	Season Total
E&A CC-494	149,851		4,415	154,266
E&A CC-528	49,778	638	9,853	60,269
E&A CC-563	3,949		310	4,259
Total	203,578	638	14,578	218,794

b. Open Pit Mining

Upon the completion of construction of the screening plant, crusher, conveyor and loading pocket, ore operations commenced on September 18, 1952, on a single shift six days per week basis. During September and October, the ore and stripping were intermittent, delivering ore as required by the grading department and when not required, shifting into stripping. During November, the entire production was on ore.

7. OPEN PIT

b. Open Pit Mining (Continued)

For the season, 96,792 tons of ore was produced and shipped in 53½ shifts for an average of 1,809 tons per shift. In addition, 700 tons of pit rock, 7,600 tons of lean ore and 3,460 tons of waste material was removed with the ore operation.

The 85-B 3¼ yd. electric shovel was used in stripping and ore operation and three twenty-ton trucks delivered ore to the screening plant. At times a fourth truck was used when lean ore had to be stockpiled. The cost per ton of mining the direct ore was $.334 per ton.

Most of the ore mined for the 1952 season came from areas north and south on Section 11 and some from Section 12. The ore which was expected on Section 10 and which had been projected from drilling on Section 11, did not materialize. It developed as mining operations progressed, that the concentration was localized close to the drill holes and that this ore shown in Section 11 was in a north and south channel, averaged about 70 feet in width, with a vertical wall of rock on the west side. On the east side of this channel to Section 12, the material encountered was little more than decomposed taconite and ore with bands of unaltered taconite. The tonnage for the 1952 season was obtained mostly from Section 11, and the top ores between Section 11 and 12. The 1953 ore season should tell us to what extent we have ore on Section 12. It is my belief that we have not the ore as originally planned.

By introducing additional facilities to screening out + 4" rock and a pan feeder, we should reduce the silica somewhat by scalping off the oversize which was formerly fed into the crusher.

For each 8.2 tons of ore shipped, 1 ton of pit rock, lean ore and waste was removed.

c. Pumping & Drainage

A small amount of pumping was done during the spring breakup. No pumping was done during the ore season but the road grades are such that a low point was developed during the ore season at the south end of the ore channel on Section 11. A carver self-priming pump with 20 H.P. motor was purchased during the year to serve for pit pumping.

8. BENEFICIATION

a. Plant operations - Grizzly and Crushers

The ore is delivered to the screen plant by truck and dumpedon a moving chain grizzly. The over-size is fed to the crusher set at 4"and crusher undersize is fed to the conveyor belt for delivery to the ore loading pocket. The undersize from the chain grizzly is fed to the belt by means of a pan feeder.

From the season's operation of this plant, it was found advisable to plan additional screening to scalp off more of the oversize before it entered the crusher. The chain grizzly carried too much feed to the crusher, which hampered the production. The shovel sorted out as much rock as possible in the pit.

This proposed change in the setup for 1953 will help production and also tend to reduce the silica content of the ore by removal of blocks of taconite.

In 428 hours of plant operation, time lost was 43 hours, or 10%. This appears high; however, the plant, being new, required some alterations. Time was lost due to lack of crude ore from pit as well as to the grizzly, pan feeder, crusher, motors, conveyor belt, pocket and waiting for great Northern cars.

9. MAINTENANCE & REPAIRS

There will be a small amount of repairs to the shovel and other equipment prior to 1953 operations and the change in the screening plant as noted above.

10. COST OF OPERATIONS

a. Comparative Cost Statement

	1952 Budget	Cost Per Ton 1952	Cost Per Ton 1951
Product			
Direct Ore	100,000	96,792	None
Average Daily Output		1809.19	
Tons Per Man Per Day		76.09	
Days Operated		53½	
Costs			
Total Pit Operating	.330	.334	
Total Gen'l Mine Expense	.283	.394	
Total Winter & Idle Expense	.330	-	
Cost of Production	.943	.728	
Depreciation, Plant & Equip.		.188	
" -Motorized Equip. & Other		.002	
" -Movable Equipment		.001	
Taxes - Ad Valorem		.097	
" - Occupational		.155	
" - Royalty		.078	
Total Depreciation & Taxes		.521	
Administrative Expense & Income		.050	
Misc. Exp. & Income		.043	
TOTAL COST AT MINE		1.342	

11. EXPLORATION & FUTURE EXPLORATION

Following is a summary of the drilling completed on the NE-SE, Section 23, 57-22 and the NW-SE, Section 23, 57-22 by H. J. Schultze Co. drill and the company churn drill.

1952	Schultze Drill	Company Drill	Total
January	292 ft.		292 ft.
February	44' 6"		44' 6"
March	255'		255'
April	430' 6"		430' 6"
May	456' 8"		456' 8"
June	33'		33'
July	11'		11'
August	299'	194'	493'
September	431'	280'	711'
October	450' 6"	240'	690' 6"
November	194'	208'	402'
December	85'	150'	235'
Total	2982' 2"	1072'	4054' 2"

Some additional drilling should be done on the east side to develop a possible pit in the upper layer of ore. One hole has already been put down that showed very little ore. The surface in this area is from 45 to 64 feet deep.

12. TAXES

(See Sargent Underground Report)

13. ACCIDENTS & PERSONAL INJURY

There were no compensable accidents during the year at the Sargent Open Pit Mine.

14. PROPOSED NEW CONSTRUCTION

There is no new construction contemplated at the present time other than additional screening and pan conveyor as described in prior paragraphs.

15. EQUIPMENT RECEIVED &
PROPOSED NEW EQUIPMENT

In addition to the equipment that was required for theopening of the Sargent Open Pit, which included a steel truck repair shop and tools, approach trestle timber, screen and crusher plant with its chain grizzly, pan feeder, motors, conveyor and belt, loading pocket, transformers and wiring for lights and power, a Carver Self-priming pump with 20 H.P. motor was purchased for pit drainage.

No new equipment is contemplated for purchase at the present time.

WANLESS MINE
ANNUAL REPORT
YEAR-1952

1. GENERAL

Stripping at the Wanless Mine was carried on from January 1st until January n19th, when operations were suspended in order to repair equipment. Following this repair period, operations were again resumed on April 17, and with the opening of the shipping season, activities consisted largely of mining with some concurrent stripping. Ore in stockpile was completely loaded out in the month of April. First shipment of ore out of the pit was made on May 12. The year of 1952 found the Wanless again able to enter full scale production.

During 1952 very few major delays were encountered, one of the main reasons being the short season due to the strike and the overage equipment.

The new Hammermill crusher was received and installed, resulting in increased production per shift, being at a higher rate than in 1951.

On June 2nd the Union went out on a strike which was ended July 26th. The loss of production due to the strike was approximately 75,000 tons of ore and 90,000 yards of stripping.

The tail track for car loading was extended this year, making it possible to spot more cars in the loading area to aid in stockpile loading. This was also aided by the enlargement of our stockpile area.

Operating conditions in the pit were as good as could be expected for the Wanless Mine because of wet conditions.

During August the 151-M shovel which was bought from Al Johnson Construction Company was dismantled at the Wanless and shipped to the Hill-Trumbull Mine.

2. PRODUCTION, SHIPMENTS & INVENTORIES

a. Production

		Tons
Wanless		147,678
Woodbridge		59,611
	Total	207,289

b. Shipments

Wanless N.B. Direct		173,412
Woodbridge N.B. Direct		64,495
	Total	237,907

c. Stockpile Inventories - No balance

d. Production by Months

Month	Wanless	Woodbridge	Total
April	111	116	227
May	15,139	687	15,826
July	10,510	277	10,787
August	39,001		39,001
September	30,081	27,686	57,767
October	39,066	24,011	63,077
November	13,770	6,834	20,604
Total	147,678	59,611	207,289k

3. ANALYSIS

a. Tonnage & Analysis - Production

-Continued on next page-

	Tons	Iron	Phos	Sil.	Mn.	Alu.	Moist.	Iron Nat'ls
Wanless N.B.Direct	147,678	51.87	.102	11.13	.92	4.86	19.95	41.43
Woodbridge N.B."	59,611	52.41	.106	11.60	.87	4.31	18.59	42.67
Total . . .	207,289	51.95	.103	11.27	.91	4.70	19.56	41.79

b. Tonnage & Analysis - Shipments

Wanless N.B.Direct	173,412	51.48	.101	11.21	.93	5.12	19.85	41.26
Wood.N.B.Direct	64,495	52.04	.104	11.82	.87	4.61	18.83	42.24
Total . .	237,907	51.63	.102	11.38	.91	4.98	19.57	41.53

c. Complete Analysis of Shipments

	Iron	Phos	Sil.	Mn.	Alu.	Lime	Mag.	Sulph.	Loss
WanlessN.B.Direct	51.48	.101	11.21	.93	5.12	.05	.07	.010	8.37
Woodbr.N.B.Direct	52.04	.104	11.82	.87	4.61	.08	..11	.012	7.47

4. ESTIMATE OF ORE RESERVES

a. Factors

	Cu.Ft. per Ton	Rock Deduction	Recovery
No. 1 Ore	14	0	100
No. 2 Ore	14	0	100

b. Reserves as of 12-31-52

	Reserve 12-31-51	Mined 1952	Balance After Mining	Changed by Re-Est.	Reserve 12-31-52
Woodbridge	410,838	59,611	351,227	-	351,227
Wanless O.P.	1,261,085	147,678	1,113,407	-	1,113,407
Wanless U.G.	91,772	-	91,772	-	91,772
Total Wanless Lease	1,352,857	147,678	1,205,179	-	1,205,179
Total Wanless Mine	1,763,695	207,289	1,556,406	-	1,556,406

5. LABOR & WAGES

a. Comments

The labor supply was adequate during most of the year. There was less labor turnover than had even been previously encountered because of the six day, two shift schedule.

b. Comparative statement of Production & Wages

Production	
Direct Ore	207,289
No. Days Operated	89
Ave. No. of Men Working	42.25
Ave. Wage per Man	$16.43
Production per man per day	62.43
Labor Cost per Man per Day	.327
Total No. of man days	3320
Amount paid for labor	$67,727.11

6. GENERAL SURFACE

a. Buildings & Repairs

A change house for the shop personnel as well as a dump shack were constructed during the year. No major building program took place during 1952.

b. Roads

The roads had to be covered with rock at times under the wet pit bottom conditions.

c. Dumps

A new surface dump was started.

7. OPEN PIT

a. Stripping

The stripping program was carried over from 1950 until January 19th when pit operations were suspended to provide for the equipment repair period, as mentioned above. Equipment available for stripping and mining operations during the year consisted of 8 trucks which had been used an average of 23,000 hours each; one 85-B electric shovel 12 years old; and one 1201 Lima 3 years old which suffers frequent breakdowns.

During the year stripping operations were carried on under E&A CC-489 and E&A CC-495. E&A CC-489 for 167,000 yards was completed in March and E&A CC-495 calling for 470,152 cu. yds. was commenced in April and not yet completed at the end of the year.

The joint stripping contract between the Kosmerl, Whiteside and Wanless Mines which was being carried out by the Al Johnson Construction Company was completed on May 7th. Total yardage moved under this contract was 96,741 cu. yds. After the Al Johnson Construction Company gave up their contract, the Wanless Mine took over the stripping program of the trespass material on the Kosmerl-Whiteside property. This stripping will enable the Cleveland-Cliffs Iron Co. to obtain ore from the ultimate approach road on the Kosmerl-Whiteside line. The contract provides that the Oliver Iron Mining Division and the Snyder Mining Co. will pay for the removal of the various material at cost plus 10%.

During the year of 1952 a total of 460,693 cu. yds. of various classes of material was moved in 300 shifts. The average yardage moved per shift amounted to 1,537 cu. yds. The yardage removed by The CCI Co. for 1952 totalling 111,773 cu. yds. was trespass stripping. The estimated cost for the stripping was $.518 as compared to actual cost of $.450 for the season.

b. Open Pit Mining

During the year of 1952, a total of 207,289 tons of ore was produced and shipped, which tonnage was about equally divided between the Wanless and Woodbridge lease and approximately 15,000 tons from the lean ore stockpile. In the lean ore stockpile there is approximately 225,000 tons available in the form of lean ore running about 44% iron and 18% silica.

Ore was first shipped in May, with no shipments from June 2nd to July 28th due to the strike. Following the strike, shipments continued for the remaineder of the season until October 28th.

The Hammermill crusher which was installed this year aided greatly in production, eliminating delays caused by the old jaw crusher used in 1951.

c. Pumping & Drainage

A deep well pump was operated in the Woodbridge caved area again this year. The deep well pump in the Wanless shaft is now operating very little because operations are below the bottom of the shaft in the pit. This pump will still be maintained for fire and to obtain water for our equipment.

A new pump was received for the open pit to handle dirty water but was not installed because of the ore production being so heavy it didn't allow time to put it into a new sump. This pump will be installed in the spring along with a new sump.

A new settling basin was constructed during the year in a joint venture with the W. S. Moore Co. This basin is located just Southwest of the Wanless Mine between the Great Northern and D.M.& I.R. tracks which serve the Whiteside Mine. It will be in operation in the year 1953. This basin will take care of all turbical water for the life of the mine.

9. MAINTENANCE & REPAIRS

A shutdown period from January 19 to April 17 made possible the general overhauling of trucks, tractors and shovels.

A Hammermill crusher was installed and a new base had to be made. A new conveyor belt was installed this fall during the operating season.

10. COST OF OPERATIONS

a. Comparative Mining Costs

	1952 Budget	1952 Cost Per Ton	1951 Cost Per Ton
Product	250,000(Original)		
Direct Ore	155,000(Revised)	207,289	286,6767
Average Daily Output		2329.09	2180.00
Tons Per Man Per Day		62.43	63.40
Days Operated		89	131½
Costs			
Total Pit Operating	.521	.530	.484
Loading S.P. Ore	.017	.024	.005
Total Gen'l Mine Expense	.207	.227	.162
Winter & Idle Expense	.484	.414	.296
Cost of Production	1.268	1.195	.947
Depreciation - Plant & Equipment		.071	.068
" - Motorized & Other		.012	.012
" - Movable Equipment		.011	.016
" - Equipment Loaned		-	.005
Amortization - Stripping		.596	.708
Taxes - Ad Valorem		.090	.079
" - Occupational		.024	.003
" - Royalty		.003	.003
Misc. Expense & Income		.004	.004
TOTAL COST AT MINE		2.006	1.841

b. Comments

A fair comparison can be made between 1951 and 1952 costs except for one thing; that is, in 1952 there was increase in wages. Open Pit operating costs showed an increase of $.009 over the budget, which wasn't too bad because of the wet conditions that the pit had to be operated in. Truck maintenance increased due to the fact that the trucks were old and were continually requiring more maintenance. Tire costs were high because of wet operating conditions. Other items showed some minor increase and decrease.

11. EXPLORATION & FUTURE EXPLORATION

There was no exploration carried on in 1952 and none is contemplated for 1953.

12. TAXES

	1952	1951	Increase	Decrease
Wanless Mine	$17,217.49	$20,592.11		$3,374.62
Personal Property	1,360.34	2,065.88		705.54
Total	$18,577.83	$22,657.99		$4,080.16
Average Tax Rate (Mills)	80.28	85.91		5.63

Reserve tonnage was decreased by the amount of 1952 tonnage shipped and ad valorem taxes were decreased accordingly. Personal property taxes were less in 1952 as no ore was left in stockpile after May 1st.

13. ACCIDENTS & PERSONAL INJURY

Although there were 19 minor accidents at the Wanless Mine during 1952, there were no compensable accidents.

14. PROPOSED NEW CONSTRUCTION

One new Hammermill crusher was installed. No new construction is anticipated for the life of the property.

15. EQUIPMENT RECEIVED & PROPOSED NEW EQUIPMENT

A. Equipment received in 1952

Hammermill crusher
Allis-Chalmers pump 1000 GPM to handle dirty water. To be installed in spring of 1953
27-T electric drill purchased from Holman-Cliffs Mine.
22-ton Euclid truck #201 with 24,000 hrs. purchased from Canisteo Mine.

b. Proposed new Equipment

1 new pickup truck for shop and pit to replace one now in use which is over 2 years old and has 40,000 miles on it.

ANNUAL REPORT

On

WILDCAT EXPLORATIONS

MINNESOTA DISTRICT

YEAR 1952

MESABA RANGE

Beginning in February, magnetic surveys were run along the south side of the iron formation. These surveys extended from the Village of Biwabik, on the east, to the Village of Bovey, on the west, a distance of approximately 60 miles. Readings were taken along existing roads in the areas traversed.

As a result of the magnetic surveys, two locations were chosen as having possibilities for the development of ore bodies. One of these locations was the SE¼-SE¼ of Section 34, 58-20, St. Louis County, Minnesota, and the other location consisted of two State mining units, comprising the S½-NE¼ and N½-SE¼ of Section 36, 58-20, St. Louis County, Minnesota. Prospecting permits were acquired on these mining units through competitive bidding, on August 18, 1952.

A total of three drill holes were put down in the SE¼-SE¼ of Section 34, 58-20, with the following results:

Hole No.	Ft. Surface	Ft. Iron Formation	Ft. Sand	Ft. Decomposed Slate	Ft. Total Depth
1	115	20	65	27	227
2	110	25	25	28	188
3	120	15	- -	46	180

This property was abandoned since the drilling showed nothing of value.

One drill hole was put down in each of State mining units described above, with the following results.

Description	Hole No.	Ft. Surface	Ft. Slate	Ft. Total
NE¼-SE¼, Section 36, 58-20	1	114	26	140
SW¼-NE¼, " " "	2	85	93	178

The prospecting permits from the State of Minnesota, covering the above-described mining units, were surrendered, since only slate was disclosed by the drilling.

As a result of successful bidding, the State of Minnesota awarded The Cleveland-Cliffs Iron Co., two prospecting permits, covering two mining units comprising the S½-SW¼ and N½-SW¼ of Section 36, 56-25, Itasca County, Minnesota. Drilling operations were started on these lands on October 2, 1952, and was continuous to the first of the year. Three drill holes were completed, with results as follows:

Description	Hole No.	Surface	Ft. Lean N.G. Material	Ft. Wash Ore	Ft. Retreat Ore	Ft. Quartzite	Ft. Total
NE¼-SW¼ Sec. 30, 56-25	1	60	184	30	120	1	395
NW¼-SW¼ " 30, 56-25	2	74	101	5	161	-	341
SW¼-SW¼ " 30, 56-25	3*	71	179	-	45	-	295

* Hole not completed - broken drill rod.

The footages shown in the above tabulation, for the several classes of material, are not in the order of succession, as the layers occurred in the drill holes, but are the total footages of each class of material in each hole.

VERMILION RANGE:

The geological field crew started work on the Vermilion Range on May 13th and continued until October 31, 1952. A considerable amount of office work was required after the field work was completed. The activities of the field crew consisted in running compass lines for location purposes, conducting magnetic surveys along such compass lines and in making preliminary surveys for the location of access roads to possible drilling sites. During the period from May 13th to October 31st, a total of 42 miles of compass line was run and a total of 40 miles of magnetic surveys was completed, with readings at 100-foot intervals. The magnetic survey embraced a total of 156 forty-acre tracts of land. This work was done to determine whether or not there were indications in the area covered, which would encourage the acquisition of any State-owned or privately-owned lands for exploration purposes.

As a result of the survey, The Cleveland-Cliffs Iron Company bid for, and was awarded seven prospecting permits covering seven State mining units, described as follows:

Permit No.	Description
1329	S½-SW¼, Section 16, 61-14
1330	E½-NE¼ " 21, 61-14
1331	N½-SE¼ " 21, 61-14
1332	S½-SE¼ " 22, 61-14
1333	N½-NW¼ " 26, 61-14
1334	SW¼-NW¼ " 26, 61-14
1335	N½-NE¼ " 27, 61-14

No privately-owned property, in the area, has, as yet, been taken under option.

When the seven prospecting permits were awarded to the Company it was necessary to locate the corners of the land involved and, to accomplish this purpose, a contract was awarded to a registered land surveyor to carry out the work. The survey required the running of approximately 16 miles of line to establish the necessary corners.

From the anomalys disclosed by the magnetic surveys, three locations were chosen for drill holes. One of these is found in the SW¼-SW¼ of Section 16-61-14, another in the NE¼-SE¼ of Section 21-61-14 and the other in the SE¼-SE¼ of Section 22-61-14.

Plans have been made for the drilling of two 45° angle holes, 600 feet deep, on each of the above-described lands, or a total of 3,600 feet of preliminary drilling.

A contract was entered into with the Adex Corporation of Duluth, as of November 24, 1952, for the above-mentioned drilling and it is expected that drilling operations will be started some time after the first of the year 1953.

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Safety Department

Annual Report

Year 1952

11. ACCIDENTS AND PERSONAL INJURY

a. Fatal Accidents

The average number of employees for the year was 4906 and with five fatal accidents during the year the fatality rate is 1.02 based on per thousand employees.

In my estimation all of the fatal accidents were preventable.

The first fatal accident of the year was at the Athens Mine when a timber repair man was squeezed by a air-lock door. Main cause was failure to use a proper chain to open this door which was under high pressure and failure to open the manways doors to relieve the air pressure on the door.

In the second accident which occurred at the Hawkins Mine it was a case of a number of men failing to see when the mobile crane approached the high voltage overhead wires and causing electrocution.

The third accident occurred when a miner violated safe practices when he tried to place a charge of powder on some chunks of ore in a mill raise without the use of a pole. A chunk slipped down and squeezed him just inside the raise.

A fourth accident occurred when a double rocker type ore car dumped its contents on a group of men. No one seemed to have noticed that the catch on one end of the car was missing and one on the other end was not latched.

A mechanical loading machine caused the fifth accident when the miner ran the loader over the end of one slide rail and at the same time engaged the dipper in a ledge of rock. The machine tipped and squeezed him. The safety outrigger leg had been removed but by whom we do not know.

Interesting is the fact that we did not have a falls of ground fatality.

Even though our record for the year is not good it is considerably better than that of many of the larger operating companies.

A glance of Table I on fatal accident records of the company since 1898 shows the improvement over the years up to date even with increased employment.

A brief summary of fatal accidents for the past year follows:

ATHENS MINE - LOUIS TERZAGHI

Louis Terzaghi, a timberman, was fatally injured on January 29th when he was squeezed between an air-lock door and the door frame at the Athens Mine.

(Continued on next page)

Safety Department

Annual Report

Year 1952

11. ACCIDENTS AND PERSONAL INJURY

a. Fatal Accidents (Continued)

ATHENS MINE - LOUIS TERZAGHI (Cont'd)

Because a timber repair crew had blasted and broken the compressed air line just previous to the accident the air lock door could not be operated by the usual method of compressed air power. Terzaghi and his partner had filled a car of rock and intended to haul the loaded car to the shaft. On reaching the air door they decided to open it by attaching a chain from the electric locomotive to the door. This was done but somehow the chain slipped and the door struck Louis Terzaghi who had stepped between the door and frame. Because the manway doors had not been opened there was enough air pressure on the air lock door to cause fatal injuries to Terzaghi.

HAWKINS MINE - FRANK TOMCZAK

Frank Tomczak, aged 50, a steel worker at the Hawkins Mine, was electrocuted on February 28 when a fabricated steel bent was being moved with a mobile crane and crane came in contact with a power line carrying 22,000 volts just as Tomczak, who was on the ground, tried to stop the sway of the bent.

MATHER MINE "A" SHAFT - VITO ROTI

Vito Roti, age 57, Contract Miner was fatally injured in the Mather Mine "A" Shaft on April 1st when squeezed by a chunk of ore in mouth of a mill.

A number of large chunks of ore had blocked up the mill opening and when barring did not loosen them Roti and his partner decided to blast the chunk loose. Roti placed the powder charge on one of the chunks and probably noticed that one of the chunks moved and in trying to move out of the way he possibly slipped and fell into the mouth of the mill into the path of the chunk which came to rest on his shoulders and neck. Death was instantaneous.

Roti is survived by his wife.

MAAS MINE - WILLIAM COPLEY

In an unusual accident at the Maas Mine on April 2nd, William Copley, age 26, Company Account Miner was fatally injured when a loaded rocker type car dumped its contents on him. Copley together with a number of other men had pulled the loaded car from under a chute where the wet ore had overloaded the car and partly filled the drift. The locomotive pulled the car from the cross-cut to the main haulage drift, then pushed the car inside to another cross-cut where the crew intended leaving the car. As the car was brought to a stop it suddenly dumped with the contents spilling on four men, including Copley who were sitting on a bench on the side of the drift. Apparently Copley had his shoulders against a timber and a chunk of ore struck his chest causing fatal internal injuries from which he died after reaching the hospital.

Copley is survived by a wife and son.

(Continued on next page)

Safety Department

Annual Report

Year 1952

11. ACCIDENTS AND PERSONAL INJURY

a. Fatal Accidents (Continued)

MATHER MINE "A" SHAFT - ARVO SIPPOLA

Arvo Sippola, 26, a Contract Miner at Mather Mine "A" Shaft received injuries in a mechanical loading accident on October 13th which caused his death.

While Sippola's partners had gone to the shaft with a train of loaded cars, Sippola started loading rock with a mechanical loader. He had completed the loading with the exception of one or two dippers of rock when he ran the loader over the end of one of the rails and at the same time the dipper caught in a ledge of rock in the lower right side of the breast causing the loader to tip and pinning Sippola's chest between the conveyor of the loader and a sprag which was inserted between two steel sets.

Sippola is survived by his wife and two children.

Safety Department

Annual Report

Year 1952

11. ACCIDENTS AND PERSONAL INJURY

a. Fatal Accidents (Continued)

TABLE I

FATAL ACCIDENT RECORD
THE CLEVELAND-CLIFFS IRON CO. AND CLIFFS POWER & LIGHT CO.
1898-1952, INCLUSIVE

YEAR	NO. MEN EMPLOYED	NO. OF FATALITIES	FATALITY RATE
1898	1065	6	5.63
1899	1174	4	3.41
1900	1427	4	2.80
	3,666	14	3.79
1901	1317	9	6.83
1902	1485	8	5.38
1903	1551	8	5.15
1904	1338	4	2.97
1905	2038	12	6.54
	7,729	41	5.30
1906	2418	10	4.13
1907	2843	17	6.00
1908	2340	6	2.52
1909	2520	13	5.15
1910	2907	20	6.88
	13,028	66	5.06
1898 - 1910		121	4.99
1911	2633	5	1.90
1912	2335	4	1.71
1913	2521	11	4.19
1914	2435	10	4.10
1915	3308	5	1.51
	13,332	35	2.70
1916	3063	8	2.61
1917	3457	6	1.73
1918	3765	13	3.45
1919	3938	11	2.79
1920	4125	5	1.21
	18,348	43	2.36
1921	2309	6	2.60
1922	2301	1	.43
1923	2728	6	2.20
1924	2472	5	2.02
1925	2472	2	.81
	12,282	20	1.61

(Continued)

Safety Department

Annual Report

Year 1952

11. ACCIDENTS AND PERSONAL INJURY

a. Fatal Accidents (Continued)

TABLE I (Cont'd)

YEAR	NO. MEN EMPLOYED	NO. OF FATALITIES	FATALITY RATE
1926	2119	55	25.96
1927	1969	4	2.03
1928	1784	4	2.25
1929	2000	4	2.00
1930	2566	5	1.95
	10,438	72	6.90
1931	1651	3	1.82
1932	630	0	0.00
1933	631	2	3.17
1934	1073	4	3.74
1935	1313	2	1.53
	5,298	11	2.05
1936	2125	2	.94
1937	2763	1	.36
1938	2590	3	1.17
1939	2457	1	.41
1940	2756	5	1.88
	12,691	12	.94
1941	3570	5	1.40
1942	3562	2	.56
1943	3609	4	1.11
1944	3584	3	.84
1945	3078	1	.32
	17,403	15	.86
1946	2791	0	0.00
1947	3942	7	1.78
1948	4003	3	.75
1949	4191	1	.24
1950	4344	5	1.15
	19,271	16	.83
1951	4975	2	.40
1952	4906	5	1.02
1911 - 1952	118,944	231	1.94

BASED ON PER THOUSAND EMPLOYEES

Safety Department

Annual Report

Year 1952

11. ACCIDENTS AND PERSONAL INJURY

a. Fatal Accidents (Continued)

TABLE II

CLASSIFICATION OF CAUSES OF FATAL ACCIDENTS
FROM DECEMBER 1, 1898 TO DECEMBER 31, 1952

A.	Fall Of Ground	114	
	Run Of Mud Or Sand	60	
	Fall Of Chunk Of Ore From Chute	3	
	Stray Chunk Or Stick Down Raise Or Stope	4	181
B.	Shaft Accidents:		
	Falling Down Shaft	16	
	Rock Or Timber Falling Down Shaft	3	
	Struck Or Caught By Cage, Skip, Bucket, Tool	8	
	Falling From Cage, Skip Or Bucket	11	
	Falling From Ladder In Shaft	5	
	Carried Or Pushed Into Shaft By Car	3	
	Jumping On Or Off Cage, Skip Or Bucket	3	
	Struck By Crosshead	5	
	Struck By Falling Material	2	56
C.	Use Of Explosives:		
	Explosion Of Powder	16	
	Premature Blast	3	
	Fall Of Ground Or Timber Due To A Blast	4	
	Overcome By Gas	3	
	Miscellaneous Causes	2	28
D.	Mine And Railroad Cars:		
	Caught By Haulage Cars	16	
	Riding Or Attempting To Ride Cars	6	
	Falling With Car From Trestle	4	
	Run Over By Railroad Car	8	
	Struck By Locomotive	2	
	Miscellaneous Causes	1	37
E.	Miscellaneous Causes:		
	Falling In Raise, Stope Or Posket	10	
	Electric Shock	12	
	Falling From Ladder, Trestle, Etc.	8	
	By Moving Machinery	8	
	Mine Fires	3	
	Stockpile Slide	3	
	Slipping And Falling	1	
	Miscellaneous Causes	5	50
	TOTALS		352

Safety Department

Annual Report

Year 1952

11. ACCIDENTS AND PERSONAL INJURY

a. Fatal Accidents (Continued)

TABLE III

CLASSIFICATION OF FATAL ACCIDENTS - 1911 TO 1952, INCLUSIVE BY THE CENTRAL SAFETY COMMITTEE

I.	Trade Risk		124
II.	Negligence Of The Company		
	Violation Of Rules	6	
	Failure To Provide Safety Devices	7	
	Improper Method Of Doing Work	12	
	Failure To Provide Tools Or Safe Places To Work	5	
	Failure To Instruct Men	5	
	Improper Act Or Selection Of Improper Method Of Doing Work (By Foreman)	1	36
III.	Negligence Of Workmen		
A.	Injured Men:		
	Improper Act Or Improper Method Of Work	27	
	Violation Of Rules	10	
	Failure To Use Tools Or Appliances Provided	4	
	Failure To Use Safety Devices	4	45
B.	Other Workmen:		
	Improper Act Or Improper Method Of Work	14	
	Violation Of Rules	4	
	Failure To Use Tools Or Appliances Provided	1	19
A-B.	Injured Men And Other Workmen:		
	Improper Act Or Improper Method Of Work	3	3
II-5 & III-A-3 III-B-3	Failure To Instruct Men By Foreman And Violation Of Rules By Injured Man And Partner	1	1
II-5 & III-A-4 III-B-4	Failure To Instruct Men As To Method Of Work And Improper Act Or Selection Of Improper Method Of Doing Work By Injured Workman And Other Workman ...	2	2
II-2 & III-A-2 III-B-2	Failure To Use Proper Tools Or Appliances Provided (By The Foreman, Injured Workman And Other Workman)	1	1
	TOTALS		231

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11. ACCIDENTS AND PERSONAL INJURY

b. All Injuries

INTERPRETATION OF INJURY RATES

That injury frequency rates are much more significant than sets of abstract figures punctuated with decimal points is forcefully recognized when they are interpreted in terms of employees.

Using an average of 2,000 hours per employee per year, 1,000,000 hours represents the yearly exposure of about 500 employees. An injury frequency rate of 10.0 per 1,000,000 man-hours, then, indicates 10 disabling injuries per year among each 500 employees, or 1 injury among 50. In a plant with a frequency rate of 20.0 approximately one employee out of every 25 is suffering a disabling injury each year.

The severity rate is the number of days lost and charged per each 1,000 hours worked. Because of the inclusion of time charges, which generally are in excess of the actual number of days lost, it is incorrect to say that the rate represents days lost in relation to a given number of employees.

The severity rate actually is a single rate which measures both the frequency and severity of injuries. Whereas the frequency rate is determined by counting each injury as 1, regardless of the seriousness of the case, the severity rate is determined by counting each injury the number of times indicated by its time charge--i.e., according to its relative severity.

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11. ACCIDENTS AND PERSONAL INJURY

b. All Injuries (Continued)

During the past year we had a total of 323 lost-time injuries. Of these 166 lost from one to seven days, 152 were compensable or in each case the man lost more than seven days and five were fatalities.

These figures show a decrease of 98 non-compensable injuries but an increase of 19 compensable injuries.

The underground mines had a total of 120 compensable injuries, 15 of which were from falls of ground. One of these which occurred at the Sargent Mine was a total disability case with a time charge of 6000 days.

Persons stumbling and falling caused 14 injuries, moving machinery 11, haulage 10 and 9 each from chunks falling down shafts, chutes and raises, handling material and falling and moving material.

Table Number VII gives details of causes.

11. ACCIDENTS AND PERSONAL INJURY

b. All Injuries (Continued)

TABLE IV

CLASSIFICATION OF COMPENSABLE INJURIES

CLASSIFICATION	AGNEW	ATHENS	CAMBRIA-JACKSON	CANISTEO	C. P. & L. CO.	CLIFFS SHAFT	HAWKINS	HILL-TRUMBULL	HOLMAN CLIFFS	LLOYD	MAAS	MATHER MINE "A" SHAFT	MATHER MINE "B" SHAFT	MISCELLANEOUS	NEGAUNEE SHAFT	SARGENT	SPIES-VIRGIL	STHSE & SHOPS	TOTAL
I. Trade Risk, Incidental and Non-Preventable	2	5	1			3	1	1	2		3	5				1	2	2	28
II. Negligence Of Company:																			
1. Failure To Use Safety Devices Provided																			0
2. Failure To Use Proper Tools Provided																			0
3. Violation Of Rules																			0
4. Improper Act Or Selection Of Method Of Doing Work(By Foreman)							1			1									2
5. Failure To Instruct Men As To Hazards, Method, Etc.							1												1
6. Failure To Provide Safety Devices						1													1
7. Failure To Provide Tools, Appliances Or Places To Work		2		1		1													4
III. Negligence Of Workman:																			
A. Injured Workman																			
1. Failure To Use Safety Devices Provided																			0
2. Failure To Use Proper Tools, Etc. Provided													1						1
3. Violation Of Rules	1				1							3	1	1					7
4. Improper Act Or Method Of Doing Work	1	10	1	2	1	6	4		2	1	13	24	17		3	2	2		89
B. Other Workman																			
1. Failure To Use Safety Devices Provided																			0
2. Failure To Use Proper Tools, Etc. Provided																			0
3. Violation Of Rules												1							1
4. Improper Act Or Method Of Doing Work			1		1			2				1	1						6

(Continued - Next Page)

11. ACCIDENTS AND PERSONAL INJURY

b. All Injuries (Continued)

TABLE IV (Continued From Previous Page)

CLASSIFICATION OF COMPENSABLE INJURIES

COMBINED CLASSIFICATIONS	AGNEW	ATHENS	CAMBRIA-JACKSON	CANISTEO	C. P. & L. CO.	CLIFFS SHAFT	HAWKINS	HILL TRUMBULL	HOLMAN CLIFFS	LLOYD	MAAS	MATHER MINE "A" SHAFT	MATHER MINE "B" SHAFT	MISCELLANEOUS	NEGAUNEE SHAFT	SARGENT	SPIES-VIRGIL	SHOPS & SHOPS	TOTAL
III-A-4 and III-B-4		2					1			1	1	2	2		2		1		12
II-2, III-A-2 and III-B-2											1								1
III-A-4, III-B-4 and II-7												1							1
III-A-1 and III-B-1												1							1
III-A-2 and III-B-2															1				1
III-A-2 and III-A-4																1			1
TOTALS*	4	19	3	3	3	11	8	3	4	3	18	38	22	1	6	4	5	2	157

* Totals Are For This Page And Preceding Page.

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11. ACCIDENTS AND PERSONAL INJURY

b. All Injuries (Continued)

TABLE V

NUMBER OF MAN-SHIFTS WORKED
AND TONS OF ORE PRODUCED PER FATALITY

YEAR	NUMBER OF FATALITIES	NUMBER OF MAN-DAYS WORKED PER FATALITY	NUMBER OF TONS OF ORE MINED PER FATALITY
1933	2	94,689	398,357
1934	4	80,477	451,046
1935	2	196,883	1,136,215
1936	2	283,945	1,850,898
1937	1	765,702	5,216,879
1938	3	163,434	385,954
1939	1	564,433	3,713,389
1940	5	142,878	1,156,387
1941	5	182,340	1,456,528
1942	2	512,356	3,808,258
1943	4	269,351	1,624,315
1944	3	331,090	1,995,787
1945	1	915,666	5,970,577
1946	0	747,079*	4,416,253 **
1947	7	153,031	1,130,679
1948	3	386,965	2,869,090
1949	1	1,013,442	7,162,324
1950	5	233,060	1,647,066
1951	2	679,740	4,507,045
1952	5	239,483	1,493,841
TOTALS	58	15,687,417	104,643,405
20 Year Average	2.90	270,473	1,804,197

* Man-Days Worked During Year Without Fatality

** Amount Of Ore Mined During Year Without Fatality

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11. ACCIDENTS AND PERSONAL INJURY

b. All Injuries (Continued)

TABLE VI

RESUME OF ALL LOST TIME INJURIES & FATALITIES

Mine Or Plant	Less Than 7 Days	7 Days Or More	Fatalities	TOTAL
AGNEW	5	4		9
ATHENS	12	18	1	31
CAMBRIA-JACKSON	10	3		13
CANISTEO	3	3		6
C. P. & L. CO.	0	3		3
CLIFFS SHAFT	18	11		29
HAWKINS	6	7	1	14
HILL TRUMBULL	5	3		8
HOLMAN CLIFFS	0	4		4
HUMBOLDT	0	0		0
LLOYD	7	3		10
MAAS	18	17	1	36
MATHER MINE "A" SHAFT	38	36	2	76
MATHER MINE "B" SHAFT	35	22		57
MISCELLANEOUS	0	1		1
MISCELLANEOUS-HIBBING	0	0		0
NEGAUNEE SHAFT	3	6		9
OHIO	0	0		0
RESEARCH LABORATORY	0	0		0
SARGENT	2	4		6
SPIES-VIRGIL	2	5		7
STHSE AND SHOPS	2	2		4
TILDEN	0	0		0
WANLESS	0	0		0
TOTALS	166	152	5	323

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11. ACCIDENTS AND PERSONAL INJURY

b. All Injuries (Continued)

TABLE VII

CAUSES OF COMPENSABLE INJURIES - UNDERGROUND (INCLUDING FATALITIES)

CAUSE	AGNEW	ATHENS	CAMBRIA-JACKSON	CLIFFS SHAFT	LLOYD	MAAS	MATHER MINE "A" SHAFT	MATHER MINE "B" SHAFT	NEGAUNEE SHAFT	SARGENT	SPIES-VIRGIL	TOTAL
Fall Of Ground	1	5		1			2	5			1	15
Falling Chunks(Shafts Chutes, Raises)		1	2	1		2	2	1				9
Rolling Chunks				2				2		1		5
Persons Falling(Raises, Shafts, Scaffolds)	1		1			2	4					8
Persons Falling (Slipping & Stumbling)		2		1		4	2	4		1		14
Haulage		1		1		3	4		1			10
Drilling Equipment						2	2	2	1		1	8
Loading Equipment							1					1
Machinery (Moving)					1	1	7	1	1			11
Hand Tools		1					3			1	1	6
Flying Objects		1		1			1	1		1	1	6
Handling Materials	1	2		1		2		1	1		1	9
Lifting Or Pulling		2										2
Electrical		1										1
From Nails Or Sharp Objects	1	1					2					4
Falling Or Moving Material				2	2	1	3		1			9
Explosives							1					1
Miscellaneous									1			1
TOTALS	4	17	3	10	3	17	34	17	6	4	5	120

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11. ACCIDENTS AND PERSONAL INJURY

B. All Injuries (Continued)

TABLE VII (Cont'd)

OPEN PITS

CAUSE	CANISTEO	HAWKINS	HILL-TRUMBULL	HOLMAN-CLIFFS	TOTAL
Persons Falling (Slipping And Stumbling)	1	2			3
Haulage	1	2	1		4
Drilling Equipment		1			1
Machinery (Moving)				1	1
Hand Tools				1	1
Falling Or Moving Material	1	1	1		3
Loading Equipment			1		1
Electrical		1			1
Falling From Platform Or Stage				1	1
Miscellaneous		1		1	2
TOTALS	3	8	3	4	18

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11. ACCIDENTS AND PERSONAL INJURY

b. All Injuries (Continued)

TABLE VII (Cont'd)

SURFACE (Underground Mines)

CAUSE	ATHENS	CLIFFS SHAFT	MAAS	MATHER "A"	MATHER "B"	TOTAL
Machinery (Moving)	1				2	3
Hand Tools	1					1
Persons Falling (Slipping And Stumbling)		1			1	2
Falling Or Moving Material			1			1
Haulage				1		1
Persons Falling (Shafts Pockets And Scaffolds)				1		1
Handling Material				1	1	2
Lifting Or Pulling					1	1
Miscellaneous				1		1
TOTALS	2	1	1	4	5	13

OTHER OPERATIONS

CAUSE	C. P. & L. CO.	GARAGE STHSE. & SHOPS	MISCELLANEOUS	TOTAL
Electrical	2			2
Persons Falling (Slipping & Stumbling)		2		2
Machinery (Moving)			1	1
Miscellaneous	1			1
TOTALS	3	2	1	6

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11. ACCIDENTS AND PERSONAL INJURY

b. All Injuries (Continued)

TABLE VIII

FREQUENCY RATES, ALL COMPENSABLE INJURIES

YEAR	TOTAL MAN DAYS WORKED	NUMBER OF COMPENSABLE INJURIES NON-FATAL	FATAL	FREQUENCY * RATE
1938	491,303	46	3	12.49
1939	564,542	44	1	9.96
1940	714,391	59	5	11.19
1941	918,300	79	5	11.43
1942	1,024,713	75	2	9.39
1943	1,077,402¼	171	4	20.30
1944	993,272½	121	3	15.61
1945	915,665 3/4	107	1	14.74
1946	747,079	101	0	16.89
1947	1,071,219	149	7	18.20
1948	1,160,896¼	145	3	15.94
1949	1,013,442	126	1	15.66
1950	1,165,301½	145	5	16.09
1951	1,359,479 3/4	136	2	12.69
1952	1,197,416½	152	5	15.87

* Based On One Million Man-Hours Of Labor.

TABLE VIII-A

SEVERITY RATES, ALL COMPENSABLE INJURIES

YEAR	NON-FATAL DAYS LOST	RATE	FATAL DAYS LOST	DAYS LOST ALL INJURIES	SEVERITY * RATE
1938	6,290	1.600	18,000	24,290	6.181
1939	3,264	.723	6,000	9,264	2.051
1940	3,442	.602	30,000	33,442	5.852
1941	5,403	.735	30,000	35,403	4.819
1942	5,851	.500	12,000	17,851	2.177
1943	10,355	1.201	24,000	34,355	3.986
1944	7,759	.976	18,000	25,759	3.242
1945	7,624	1.041	6,000	13,624	1.860
1946	7,994	1.337	0	7,994	1.337
1947	9,946	1.161	42,000	51,946	6.062
1948	14,526	1.564	18,000	32,526	3.502
1949	5,833	.719	6,000	11,833	1.390
1950	7,063	.757	30,000	37,063	3.976
1951	10,657	.979	12,000	22,657	2.083
1952	17,716	1.849	30,000	47,716	4.981

* Based On Days Lost By Injuries Per 1,000 Man-Hours Of Labor.

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11. ACCIDENTS AND PERSONAL INJURY

b. All Injuries (Continued)

TABLE IX

COMPARISON OF COMPENSABLE ACCIDENTS, INCLUDING FATALITIES BY MINES

Mine Or Plant	FREQUENCY 1951	FREQUENCY 1952	SEVERITY 1951	SEVERITY 1952
AGNEW	12.32	16.02	.712	.941
ATHENS	10.19	27.50	.362	10.275
CAMBRIA-JACKSON	3.97	6.63	.325	.762
CANISTEO	4.67	8.94	.530	.629
C. P. & L. CO.	-----	15.99	----	.474
CLIFFS SHAFT	21.88	11.88	1.150	.363
GENERAL ROLL	-----	-----	----	----
HAWKINS	19.68	12.57	1.717	11.623
HILL TRUMBULL	8.39	8.10	.266	.538
HOLMAN CLIFFS	6.76	13.07	.773	.405
HUMBOLDT	-----	-----	----	----
LLOYD	25.42	12.33	18.424	.871
MAAS	10.99	22.30	.320	8.480
MATHER MINE "A" SHAFT	17.63	26.43	2.654	10.887
MATHER MINE "B" SHAFT	20.30	21.63	7.146	1.140
MISCELLANEOUS	-----	15.03	----	45.092
MISCELLANEOUS-HIBBING	-----	-----	----	----
NEGAUNEE SHAFT	10.49	30.28	1.673	2.270
OHIO	19.23	-----	.173	----
SARGENT (UNDERGROUND)	20.16	21.69	.681	33.986
SARGENT (OPEN PIT)	-----	-----	----	----
SPIES-VIRGIL	11.16	21.92	.695	2.516
STHSE AND SHOPS	7.77	4.19	.765	.054
TILDEN	-----	-----	----	----
WANLESS	6.94	-----	.104	----
All Properties	12.69	15.87	2.083	4.981

TABLE X

COMPENSABLE INJURIES INCLUDING FATALITIES

Mine Or Plant	Tons Of Ore Produced	Hours Of Labor	No. Of Fatalities	No. Of Comp. Inj.	Days Lost, Fatalities	Compens. Days Lost	Total Days Lost Fatalities & Compens.	Frequency	Severity
AGNEW	330,758	249,732		4		235	235	16.02	.941
ATHENS	497,277	654,580	1	18	6,000	726	6,726	27.50	10.275
CAMBRIA-JACKSON	345,000	452,567		3		345	345	6.63	.762
CLIFFS SHAFT	548,076	925,967		11		336	336	11.88	.363
LLOYD	85,365	243,386		3		212	212	12.33	.871
MAAS	497,867	762,132	1	17	6,000	463	6,463	22.30	8.480
MATHER MINE "A" SHAFT	1,015,204	1,361,937	2	36	12,000	2,828	14,828	26.43	10.887
MATHER MINE "B" SHAFT	686,139	1,016,955		22		1,160	1,160	21.63	1.140
NEGAUNEE SHAFT		198,176		6		450	450	30.28	2.270
SARGENT	139,662	184,427		4		6,268	6,268	21.69	33.986
SPIES-VIRGIL	155,010	228,152		5		574	574	21.92	2.516
TOTALS	4,300,358	6,278,011	4	129	24,000	13,597	37,597	20.55	5.989
CANISTEO	743,024	335,564		3		211	211	8.94	.629
HAWKINS	562,879	556,677	1	7	6,000	470	6,470	12.57	11.623
HILL TRUMBULL	607,681	370,155		3		199	199	8.10	.538
HOLMAN CLIFFS	884,166	306,130		4		124	124	13.07	.405
HUMBOLDT		16,352		0		0	0	0.00	.000
OHIO	59,507	110,370		0		0	0	0.00	.000
SARGENT	96,792	32,674		0		0	0	0.00	.000
TILDEN	7,510	20,513		0		0	0	0.00	.000
WANLESS	207,289	90,896		0		0	0	0.00	.000
TOTALS	3,168,848	1,839,331	1	17	6,000	1,004	7,004	9.24	3.808
C. P. & L. CO.		187,571		3		89	89	15.99	.474
GENERAL ROLL		645,278		0		0	0	0.00	.000
MISCELLANEOUS		66,531		1		3,000	3,000	15.03	45.092
MISCELLANEOUS-HIBBING		85,033		0		0	0	0.00	.000
STHSE AND SHOPS		477,578		2		26	26	4.19	.054
TOTALS		1,461,991		6		3,115	3,115	4.14	2.131
GRAND TOTALS	7,469,206	9,579,333	5	152	30,000	17,716	47,716	15.87	4.981

TABLE XI

THE CLEVELAND-CLIFFS IRON COMPANY
SAFETY DEPARTMENT, ACCIDENT STATISTICS, YEAR 1952

Mine Or Plant	Tons Of Ore Produced	Hours Of Labor	No. Of Fatalities	No. Of Compens. Injuries	No. Of Non-Comp. 1 - 7 Days	Days Lost-Fatalities	Compensable Days Lost	Days Lost, Non-Compens., 1 - 7 Days	Total No. Lost-Time Injuries, Incl. Fatals.	Total Days Lost, All Inj. & Fatalities	Frequency	Severity	Average No. Days Lost Per Accident	Position Rating
AGNEW	330,758	249,732		4	5		235	11	9	246	36.04	.985	27.3	4
ATHENS	497,277	654,580	1	18	12	6,000	726	23	31	6,749	47.36	10.310	217.7	9
CAMBRIA-JACKSON	345,000	452,567		3	10		345	27	13	372	28.72	.822	28.6	2
CLIFFS SHAFT	548,076	925,967		11	18		336	48	29	384	31.32	.415	13.2	1
LLOYD	85,365	243,386		3	7		212	18	10	230	41.09	.945	23.0	3
MAAS	497,867	762,132	1	17	18	6,000	463	51	36	6,514	47.24	8.547	180.9	8
MATHER MINE "A" SHAFT	1,015,204	1,361,937	2	36	38	12,000	2,828	98	76	14,926	55.80	10.952	196.4	10
MATHER MINE "B" SHAFT	686,139	1,016,955		22	35		1,160	93	57	1,253	56.05	1.232	21.9	5
NEGAUNEE SHAFT	-------	198,176		6	3		450	5	9	455	45.41	2.296	50.5	6
SARGENT	139,662	184,427		4	2		6,268	7	6	6,275	32.53	34.024	1045.8	11
SPIES-VIRGIL	155,010	228,152		5	2		574	8	7	582	30.68	2.550	83.1	7
TOTALS	4,300,358	6,278,011	4	129	150	24,000	13,597	389	283	37,986	45.08	6.050	134.2	
CANISTEO	743,024	335,564		3	3		211	6	6	217	17.88	.647	36.2	8
HAWKINS	562,879	556,677	1	7	6	6,000	470	17	14	6,487	25.15	11.653	463.4	9
HILL TRUMBULL	607,681	370,155		3	5		199	11	8	210	21.61	.567	26.2	7
HOLMAN CLIFFS	884,166	306,130		4	0		124	0	4	124	13.07	.405	31.0	6
HUMBOLDT	-------	16,352		0	0		0	0	0	0	0.00	.000	0.0	5
OHIO	59,507	110,370		0	0		0	0	0	0	0.00	.000	0.0	1
SARGENT	96,792	32,674		0	0		0	0	0	0	0.00	.000	0.0	3
TILDEN	7,510	20,513		0	0		0	0	0	0	0.00	.000	0.0	4
WANLESS	207,289	90,896		0	0		0	0	0	0	0.00	.000	0.0	2
TOTALS	3,168,848	1,839,331	1	17	14	6,000	1,004	34	32	7,038	17.40	3.826	219.9	
C. P. & L. CO.	-------	187,571		3	0		89	0	3	89	15.99	.474	29.6	
GENERAL ROLL	-------	645,278		0	0		0	0	0	0	0.00	.000	0.0	
MISCELLANEOUS	-------	66,531		1	0		3,000	0	1	3,000	15.03	45.092	3000.0	
MISCELLANEOUS-HIBBING	-------	85,033		0	0		0	0	0	0	0.00	.000	0.0	
STHSE AND SHOPS	-------	477,578		2	2		26	7	4	33	8.38	.069	8.2	
TOTALS	-------	1,461,991		6	2		3,115	7	8	3,122	5.65	2.204	390.2	
GRAND TOTALS	7,469,206	9,579,333	5	152	166	30,000	17,716	430	323	48,146	33.72	5.026	149.0	

FREQUENCY- $\frac{\text{No. Of Lost-Time Accidents x 1,000,000}}{\text{Man Hours Worked}}$

SEVERITY - $\frac{\text{No. Of Days Lost x 1,000}}{\text{Man Hours Worked}}$

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11. ACCIDENTS AND PERSONAL INJURY

b. All Injuries (Continued)

TABLE XII

SHOWING TIME PERIODS WHEN COMPENSABLE INJURIES OCCURRED

TIME	NUMBER	WORKING PERIOD
8:00 A.M. To 12:00 NOON	59	FIRST HALF OF DAY SHIFT
12:00 NOON To 4:00 P.M.	33	SECOND HALF OF DAY SHIFT
4:00 P.M. To 8:00 P.M.	25	FIRST HALF OF AFTERNOON SHIFT
8:00 P.M. To 12:00 MIDNIGHT	24	SECOND HALF OF AFTERNOON SHIFT
12:00 MIDNIGHT To 4:00 A.M.	12	FIRST HALF OF NIGHT SHIFT
4:00 A.M. To 8:00 A.M.	4	SECOND HALF OF NIGHT SHIFT
TOTALS	157	

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11. ACCIDENTS AND PERSONAL INJURY

b. All Injuries (Continued)

TABLE XIII

SHOWING OCCUPATION OF INJURED WORKERS

COMPENSABLE INJURIES

UNDERGROUND		SURFACE		OPEN-PIT	
Miner	64	Laborer	4	Truck Operator	3
Shaft Miner	4	Timber Tunnel Motorman	3	Shovel Oiler	2
Motorman	4	Timber Tunnel Brakeman	1	Mechanic	2
Motor Brakeman	7	Machinists Helper	1	Steel Worker	2
Cage-Tender	1	Machinist	1	Conveyor attendant	1
Scraper Operator	11	Carpenter	1	Drill Operator	1
Timberman	9	Timber Trammer	1	Blaster's Helper	1
Shift Boss	2	Lampman	1	Mechanic's Helper	1
Electrician	2			Laborer	1
Trammer	2			Wash Plant Repairman	1
Pumpman	2			Engineer's Helper	1
Chuteman	2			Machine Operator	1
Timber Hoister	2			Blaster	1
Shaft Repairman	2				
Scraper Repairman	1				
Diamond Drill Helper	1				
Laborer	1				
Skip Tender	1				
Mining Captain	1				
Mining Engineer	1				
TOTALS	120		13		18

TABLE XIII-A

C. P. & L. CO.		GENERAL STOREHOUSE		MISCELLANEOUS	
Laborer	2	Steel Worker	1	Sample Crusher	1
Lineman	1	Policeman	1		
TOTALS	3		2		1

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11. ACCIDENTS AND PERSONAL INJURY

c. Safety Inspection

Safety inspection is a routine business on the part of members of the Safety Department. The main work is to check the safety work being done by all supervisors and other employees and try to foresee new hazards and means of prevention. In most cases there are rules to follow, in other cases it is a matter of plain common sense together with a knowledge of expected hazards. All employees do not have open minds to safety and especially if it is to cause more work for them. The labor unions certainly have not been of much help in promoting safety. In fact the union at times has been opposed to some of our most important safety rules.

When making a safety inspection the inspector travels with one of the mine or plant supervisors. On completion of the inspection the safety inspector makes out two written reports, one covering all safety orders or recommendations of the supervisor and one which covers his own recommendations, unsafe practices and violations of rules which the supervisor failed to notice and correct. During the course of the inspection trip all problems are discussed between the safety inspector and supervisor. At the end of the day or finish of the inspection the safety inspector discusses all his problems with the mining captain or the mine superintendent or both.

During the past year each of the larger mines have appointed an underground foreman to work almost 100% of his time on safety inspection. Results of these inspections should be noticeable within the next year as it requires quite some time before a production man can become a safety inspector and usually all underground safety inspectors have been production men in the past.

Usually once a month a representative of the labor union travels with the safety inspector. To date the union men have had very little to say or recommend. It is quite certain that if one of his fellow union members is found violating safe practices he will not mention the fact. On the other hand if the company or the supervisor is at fault he most certainly will speak up. It is our policy in the department to not encourage their recommendations or suggestions.

Idle Property

Twice each year, usually early spring and fall season, all idle properties are inspected and written recommendations for repairs and correction of conditions are sent to Peter DeRoche, Landscape Foreman, who has charge of these repairs. On completion of repairs he returns one copy of the recommendations stating repairs have been completed.

11. ACCIDENTS AND PERSONAL INJURY

c. Safety Inspection (Continued)

Fire Patrol Inspections

On surface these inspections are made by the surface foreman and his assistants during the day shift but at night the police and watchmen take over. The police and watchmen reported nine fires during the year. Most of these fires were checked in the incipient stage and damage was slight.

Underground fire patrols examine the entire mine after the last shift preceeding each idle period and once every 24 thereafter.

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11. ACCIDENTS AND PERSONAL INJURY

c. Safety Inspection (Continued)

TABLE XIV

1952

Mine Or Plant	Violations Of Standards	Safety Suggestions	Recommendations	Fire Hazard	Total
ATHENS	25	22	9	19	75
CAMBRIA-JACKSON	20	18	6	12	56
CLIFFS SHAFT	22	23	14	17	76
DIAMOND DRILLS			2	1	3
GEN. STHSE. & SHOPS			2		2
HUMBOLDT		14	1	5	20
LLOYD	7	8	10	15	40
MAAS	30	14	5	11	60
MATHER MINE "A" SHAFT	22	19	9	8	58
MATHER MINE "B" SHAFT	23	20	9	10	62
NEGAUNEE SHAFT	7	8	4	17	36
OHIO		1	3		4
SPIES-VIRGIL	5	5	1	22	33
RESEARCH LAB. & PELLET.PLANT	0	0	0	0	0
POWER PLANT	0	0	0	0	0
TOTALS	161	152	75	137	525

TABLE XV

1951

Mine Or Plant	Violations Of Standards	Safety Suggestions	Recommendation	Fire Hazard	Total
ATHENS	20	5	4		29
CAMBRIA-JACKSON	22	3	2		27
CLIFFS SHAFT	34	20	12	1	67
DIAMOND DRILL		2	3		5
GEN. STHSE. & SHOPS		1	1	2	4
LLOYD	9	3	1	1	14
MAAS	37	7	4		48
MATHER MINE "A" SHAFT	25	7	4		36
MATHER MINE "B" SHAFT	12		1	2	15
NEGAUNEE SHAFT	1	2	2	1	6
SPIES-VIRGIL	6	6	3		15
RESEARCH LAB. & PELLET.PLANT	1	1	2		4
POWER PLANT		1	2		3
TOTALS	167	58	41	7	273

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11. ACCIDENTS AND PERSONAL INJURY

c. Safety Inspection (Continued)

Blasting Inspections

Our rules call for a blasting inspection at least once every two months of each mining contract. These written reports are first checked by the mine superintendent or mining captain and then placed on file so the Safety Department can check these reports at the mine office.

During the past year 1148 blasting inspections were made at the nine underground mines. The Negaunee Shaft did not report any blasting inspections because all blasting was under the supervision of the foreman on shift and all this blasting was done electrically.