2. PRODUCTION - Continued

c. Ore Statement

	Maas	Race Course	Total	Total Last Year
On Hand 1-1-55	285,863	48,907	334,770	100,042
Product for Year	315,277	38,015	353,292	401,117
Overrun	19,747	3,735	23,482	- -
Total	620,887	90,657	711,544	501,159
Shipments	534,654	85,835	620,489	166,389
Balance on Hand	86,233	4,822	91,055	334,770
Increase in Output				
Decrease in Output	17,773	6,570	24,343	

Schedule of Operations 1951 - 55

Days	Shifts	Hours	
6	2	8	1-1-51 to 5-18-52
5½	2	8	5-19-52 to 11-16-52
5	2	8	11-17-52 to 4- 4-54
4	2	8	4- 5-54 to 4-18-55
5	2	8	4-18-55 to 12-31-55

d. Division of Product by Levels

	1955	%	1954	%
Fourth Level	20,685	5.9	53,405	13.3
Fifth Level	4,115	1.1	32,122	8.0
Sixth Level	45,409	12.9	142,443	35.5
Seventh Level	283,083	80.1	173,147	43.2
Total	353,292	100.0	401,117	100.0

e. Production Delays

	Tons Lost
Jan. 10 - fire at #2 ventilating plant	250
June 30 - July 2 - strike by hourly rate employees	2000
Oct. 6 - car fell down winze	1000
Dec. 12 - cage jammed in winze	1100
Total Loss	4350 tons

3. ANALYSIS

a. Average Mine Analysis on Output

	1955				1954			
Grade	Iron	Phos.	Sil.	Sul.	Iron	Phos.	Sil.	Sul.
Maas	58.21	.085	7.76	.397	57.69	.104	8.33	.251
Race Course	58.44	.088	7.31	.394	57.80	.101	7.97	.283

b. Average Mine Analysis on Ore Shipped

Grade	Iron	Phos.	Sil.	Mang.	Alum.	Lime	Mag.	Sul.	Loss	Moist
Maas	57.90	.097	8.28	.23	3.48	1.06	.41	.306	2.46	12.25
Race Course	57.73	.093	8.38	.23	3.52	1.03	.44	.298	2.46	12.43

c. Average Natural Analysis of Ore in Stock - December 31, 1955

Grade	Tons	Iron	Phos.	Sil.	Mang.	Alum.	Lime	Mag.	Sul.	Loss	Moist
Maas	86,283	50.54	.075	7.37	.20	3.05	.93	.36	.305	2.33	12.25
Race Course	4,822	50.30	.065	7.28	.20	3.08	.90	.39	.292	2.15	12.43

d. Straight Cargo Shipments

Tons	Iron	Phos.	Sil.	Sul.	Moist
4,403	58.17	.087	8.19	.380	12.61

4. ESTIMATE AND ANALYSIS OF ORE RESERVES

After deducting production for the year, there was an increase of 670,840 tons in proven ore reserves based on the estimate submitted to the Michigan State Tax Commission. This is the result of the addition of the Pioneer and Arctic reserve figure to the table on the following page showing proven ore reserves. This figure of 885,000 tons, although carried by the Tax Commission, was not shown on the annual report previously. The reduction in reserves in the Maas and Race Course Leases is due to the footwall in the east end of the ore body being at a higher elevation above 7th Level than originally estimated in 1954 and of the unavailability of many small ore pillars left in the east end of the Maas, Race Course, and City of Negaunee properties. The pillars are well-scattered and do not warrant the driving of new drifts to recover them. The estimate of proven ore reserves as reported on December 31, 1955 to the Tax Commission follows:

4. ESTIMATE AND ANALYSIS OF ORE RESERVES - Continued

Statement of Reserves

	Maas Lease	Race Course Lease	City of Negaunee Lease	Mulvey	Pioneer & Arctic Lease	Total Mine
Reserves, 12-31-54	3,165,763	181,566	19,598	374,322	--	3,741,249
Produced, 1955	327,285	41,750	7,739	--	--	376,774
Reserves, 12-31-55 (By subtraction)	2,838,478	139,816	11,859	374,322	--	3,364,475
Reserves, 12-31-55 (Based on report to the Tax Commission)	2,708,173	65,899	--	376,243	885,000	4,035,315
Increase in Reserves				1,921	885,000	670,840
Decrease in Reserves	130,305	73,917	11,859			

Expected Average Natural Analysis of Ore Reserves

(Based on report to Tax Commission 12-31-55)

Grade	Tons	Iron	Phos.	Sil.	Mang.	Alum.	Lime	Mag.	Sul.	Loss	Moist.
Maas	2,841,434	51.00	.094	8.10	.18	2.45	.57	.120	.350	1.43	13.50
Race Course	74,275	51.00	.094	8.10	.18	2.45	.57	.120	.350	1.43	13.50
Mulvey	376,243	51.00	.094	8.10	.18	2.45	.57	.120	.350	1.43	13.50

5. LABOR AND WAGES

Labor Relations

Labor relations between management and the employees at the Maas Mine were generally excellent throughout the year. Some minor grievances were received, but these were quickly settled before they were reduced to writing.

Employment

No. employed 1-1-55	289
Added during year	39
Separations	65
Laid-off	0
No. employed 12-31-55	263

The separations reported above were for the following reasons:

Quit	4
Transferred	50
Drafted or enlisted	0
Retired at age 65 or over	11
Discharged	0
Retired - medical reasons	0
Deceased	0
Total	65

The mine ceased production for a 1-week vacation during the 3rd week of August. A total of 253 men received an average of 2.67 weeks vacation pay based on a 40-hour week.

Wages

Effective July 1, 1955, a general increase of $.115 per hour plus $.005 per hour per job class increment was granted to all hourly wage employees.

Statement of Wages

	1955	1954	Increase	Decrease
Average Wages Per Day				
Surface	18.08	17.00	1.08	- -
Underground	21.94	20.67	1.27	- -
Total	20.95	19.87	1.08	- -
Average Wages Contract Labor	22.26	22.01	.25	- -

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5. LABOR AND WAGES - Continued

Average Wages Per Month
(19.5 Days Per Month)
(9.0 Shifts Per Week)

	1955	1954	Increase	Decrease
Surface	352.56	295.80	56.76	- -
Underground	427.83	359.66	68.17	- -
Total	408.53	345.74	62.79	- -

Product Per Man Per Day

Surface	26.74	26.98		.24
Underground	9.20	7.47	1.73	
Total	6.85	5.85	1.00	

Labor Cost Per Ton

Surface	.676	.630	.046	
Underground	2.384	2.768		.384
Total	3.060	3.398		.338

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6. SURFACE

General

On the morning of January 10th, the building housing the boiler, coal bin and fan of the Maas Mine ventilating plant at the Negaunee No. 2 Shaft was completely destroyed by fire. There was some damage to the rotating element of the fan, but the 125 H.P. fan motor and the boiler were not damaged. Although it is known that the fire broke out in the coal bin, the cause was not determined.

On August 25th, the No. 1 air compressor caught fire in the high pressure cylinder, due mainly to poor circulation of cooling water through the intercooler. As a result, a complete overhaul of the compressor was carried out before it was put back in operation.

Because of the large amount of ore remaining on the stockpile at the end of the 1954 shipping season, considerable bulldozing was required to make room on the stockpile for the ore produced during 1955. This is reflected in the increased loading and shipping costs during 1955.

Drainage

The Maas Mine discharge water is directed to the settling area northwest of the Carp River, where it is effectively cleaned before entering the river.

Purchase and Disposal of Dwellings

The following is a list of houses and lots purchased by the Mining Department during 1955:

Block No.	Lot No.	Property	No. of Houses
1	7	Harris Addition	1
11	8	Pioneer Iron Co. 2nd Addition	1
25	8 & East 10' of 9	Pioneer Iron Co. Plat	1
35	1	Pioneer Iron Co. Plat	2

The house on Lot 18, Block 2 was torn down and the lot cleared during 1954.

7. UNDERGROUND

The block development program, which will be the backbone of the change in mining methods from the sub-level caving method to the block caving and long-hole stoping methods, commenced in September of 1955. The ore body above the Maas 7th Level can be roughly divided into two sections, based on the physical characteristics of the ore. East of the 7300 cross-cut, the ore is generally soft and friable -- good caving ground. Here, it is intended to use the block caving method of mining, that is, undercutting on the footwall elevation and letting it cave by gravity to the hangingwall. Three blocks of this type are presently being developed in this area. West of the 7300 cross-cut, the ore is quite hard and does not cave freely. In this area, the long-hole stoping method will be used whereby all the ore produced from the block is drilled and blasted. There are two blocks using this method now under development. Production from these new areas is estimated to come in at the time of the Maas-Bunker Hill merger in 1956.

The changeover from sub-level caving to block caving and long-hole stoping is shown by the following comparison between the distribution of contracts during an average month in 1954 and the month of December 1955:

	Avg. Month, 1954		December, 1955	
Sub-Level Caving	18	Contracts	4	Contracts
Block Cave Development	3	"	6	"
Block Cave Mining	-	"	3	"
Long-hole Stoping Dev.	-	"	3	"
Main Level Development	2	"	3	"
Total	23	Contracts	19	Contracts

Although the major portion of production was from the sub-level caving method, block caving tonnage rose to its highest point during 1955. A comparison of the proportion of production by mining methods between 1954 and 1955 is shown below:

	1955 Tonnage	% 1955	1954 Tonnage	% 1954
Sub-Level Caving	201,177	56.9	328,482	81.9
Block Caving	151,522	42.9	72,635	18.1
Long-hole Stoping	593	0.2	- -	-
Total	353,292	100.0	401,117	100.0

An increase in tons per man per shift was realized in 1955, largely as a result of the greater proportion of tonnage mined by the block caving system. It rose from 5.85 in 1954 to 6.85 in 1955.

Main level drifting in 1955, which all took place on 7th Level, totalled 2713 feet compared to 1343 feet in 1954. Of this amount, 1658 feet was driven in the Maas-Bunker Hill connecting drift, which "holed-through" in December with near-perfect alignment and grade. This drift will be used for both haulage of ore and supplies after the Maas-Bunker Hill merger in 1956. The south main level drift was extended west past the 3000 W. co-ordinate during the year and 760 cross-cut was driven from this drift toward the Phase I limit line. The 7500 cross-cut was advanced from the north footwall drift toward the south drift with only a small amount remaining to be driven at the end of the year before the breakthrough.

7. UNDERGROUND - Continued

Recovery by sub-level caving of the small pillars remaining above 4th, 5th, and 6th Levels at the end of 1954 was completed during the year. By October, all the mining contracts had been shifted from the upper levels to 7th Level and the total Maas production was being hoisted from this level.

On 7th Level, sub-level caving was carried on over 7100, 7200, and 7400 cross-cuts. At the end of the year only 4 contracts were sub-level caving, all over 7200 cross-cut. Three of these contracts were mining in pillars too small for block mining and the other was caving along the north footwall to drain the area for future block caves south of this area.

Production from the block caving method of mining was realized from two areas above 7th Level throughout the year. Block 703, which is located along the Maas side of the Maas-Pioneer and Arctic boundary line, had been undercut in 1954 and continued in full production during the entire year of 1955. Recovery from this block had reached over 100,000 tons by the end of the year. The other block, located east of the 7400 cross-cut was developed and undercut in the early part of the year. Production from both of these blocks was near completion at the end of 1955.

Presently under development under the new program are three block caves east of the 7300 cross-cut and two long-hole stopes west of this cross-cut. The three block caves are blocks 7101, 7102, and 7106. Blocks 7101 and 7106 are in the Maas property while block 7102 will mine out the remaining Race Course reserves during 1956. The long-hole stopes now being developed are blocks 706 and 7409. Block 7409 lies in the Maas property over 7400 cross-cut while approximately half of Block 706 is located in the Pioneer and Arctic and the other half in the Maas. Development in all of these areas is being particularly stressed in order that they will be ready at the time of the consolidation of the Maas and Bunker Hill Mines.

Diamond Drilling

No diamond drilling was carried on from January to June at the Maas Mine. In July, a diamond drilling program to outline the ore south of the Pioneer and Arctic property line and up to the Phase I limit line was started. As drilling progressed along the 2400 W. co-ordinate to the 2700 W. co-ordinate, it became apparent that there is a cut-off of the orebody approximately along the 1200 S. co-ordinate. To further explore the possibility of a fault zone in this area, 760 cross-cut was extended along the 3000 W. co-ordinate toward the Phase I limit line. From this drift, two diamond drill cut-outs will be put in to delimit the orebody in this area and to intersect the expected fault zone.

Six diamond drill holes were put in during the year. Three were drilled along the 2400 W. co-ordinate and three along the 2700 W. co-ordinate. The logs of these holes follow:

U. H. #82 Collar - S 982.19 and W 2423.75 Elev. -137.52
drilled S 8° 10' W at plus 41°.

0 - 59	argillaceous iron formation
59 - 156	first class high sulphur ore
156 - 248	first class standard ore
248 - 267	iron formation

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7. UNDERGROUND - Continued

Diamond Drilling - Continued

U. H. #83 Collar - S 983.48 and W 2424.12 Elev. -138
drilled S 8° 14' W at plus 24° 30'.

0 - 134	iron formation
134 - 224	first class sulphurous ore
224 - 380	iron formation

U. H. #84 Collar - S 980.94 and W 2422.40 Elev. -127.40
drilled S 8° 47' W at plus 74° 08'.

0 - 5	iron formation
5 - 161	first class high sulphur ore
161 - 191	iron formation

U. H. #85 Collar S 986.53 and W 2700.12 Elev. -195.12
drilled S 3° 26' E at plus 65° 48'.

0 - 49	argillaceous iron formation
49 - 105	first class sulphurous ore
105 - 125	iron formation
125 - 156	first class standard ore
156 - 186	iron formation
186 - 206	first class standard ore
206 - 280	iron formation

U. H. #86 Collar - S 990.07 and W 2700.27 Elev. -194.23
drilled S 0° 34' W at plus 41° 30'.

0 - 125	argillaceous iron formation
125 - 141	first class sul. argillaceous ore
141 - 146	second class standard argillaceous ore
146 - 156	first class sul. argillaceous ore
156 - 165	first class std. argillaceous ore
165 - 170	first class high sul. arg. ore (59.40%)
170 - 185	first class sul. soft gran. ore (62.05%)
185 - 221	first class std. soft gran. ore (63.52%)
221 - 302	hematitic cherty iron formation

U. H. #87 Collar - S 981.72 and W 2701.35 Elev. -194.48
drilled N 5° 19' W at plus 53° 30'.

0 - 28	hematitic arg. cherty iron formation
28 - 38	ferruginous argillite
38 - 75	first class sulph. arg. ore
75 - 144	first class high sulph. ore
144 - 147	first class standard ore
147 - 164	intrusive
164 - 279	first class standard ore
279 - 285	intrusive
285 - 309	hematitic cherty iron formation

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7. UNDERGROUND - Continued

Diamond Drilling - Continued

The classification of ore in the preceding logs is made according to the following table:

1st class ore - over 57.50% iron (Dry)
2nd class ore - 50.00% to 57.50% iron
standard ore - below .050% sulphur
sulphurous ore- .050% to .250% sulphur
high sulphur ore - over .250% sulphur

Timber Statement

	1955			1954	
Kind	Lineal Ft.	Avg. Price Per Ft.	Total Cost	Avg. Price Per Ft.	Total Cost
Cribbing	41,767	.1181	$ 4,934.21	.0853	$ 3,144.39
Stulls	51,607	.2941	15,176.57	.3237	21,707.71
Lagging	573,831	.0216	12,391.23	.0215	16,657.25
Poles	190,899	.0391	7,459.72	.0396	13,152.69
Norm. Steel Sets	19,250	1.0480	20,173.04	.9686	12,558.33
Cir. Steel Sets	3,733	2.5112	9,376.02	2.6250	19,764.03
Total			$ 69,510.79		$ 86,984.40
Cost per ton - Product			.1845		.217

Explosives Statement

	1955			1954	
	Quantity	Avg. Price Per Lb.	Total Cost	Avg. Price Per Lb.	Total Cost
Gelamite 1X (1-1/8" x 8")	108,000	.1779	$ 19,210.03	.1748	$ 23,723.32
Hercomite 2 (1¾" x 24")	73,350	.1699	12,465.08	.1673	5,197.87
60% Hi Pr. Gelatin (4" x 2")	24,000	.2381	5,714.49	.2370	3,412.15
80% Gelatin Extra (1" x 8")	45,250	.2221	10,048.13	- -	- -
60% Gelatin Extra (7/8" x 8")	1,500	.2215	332.25	- -	- -
60% Gelatin (5" x 5")				.2115	105.75
Total	252,100	.1895	$ 47,769.98	.1786	$ 32,439.09
Other Blasting Supplies			19,021.66		11,580.36
Total All Explosives			$ 66,791.64		$ 44,019.45
Cost Per Ton - Product			.1773		.1097

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7. UNDERGROUND - Continued

Ventilation

Repairs to the Negaunee No. 2 Shaft, which was the main intake for the Maas Mine, were completed in January. However, because of the fire which destroyed the surface buildings housing the main fan and the boilers, the No. 2 Shaft was not used for ventilation during the year. The auxiliary ventilating fan, located on the 5th Level of the Bunker Hill Shaft, was used as the main ventilation supply in 1955.

During the latter part of the year, a ventilation drift connecting the 7100 crosscut and the Maas-Bunker Hill 7th Level drift was started. Upon completion, the ventilating fan formerly at the Negaunee No. 2 Shaft will be installed in this drift and will be used as the main source of ventilation for the Maas Mine.

Pumping

The pumping set-up remained unchanged in 1955. As in 1954, frequent repairs were required to keep the system operating. Plans call for abandoning the present pumping system upon completion of development and installation of automatic pumping equipment at the Bunker Hill Shaft. This change-over will be effected in 1956.

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8. COST OF OPENING, EQUIPPING, DEVELOPING, AND OPERATING

Comparative Mining Costs

	1955	1954
Product	376,774	401,117
Underground Costs	3.385	3.616
Surface Costs	.465	.478
General Mine Expense	.573	.952
Cost of Production	4.423	5.046
Depletion - Original Cost	.025	.025
Depreciation		
Plant & Equipment	.066	.051
Development	.029	.038
Movable Equipment	.006	.008
Misc. Equipment	.001	-
Taxes	.372	.391
Loading & Shipping	.141	.043
Total Cost at Mine	5.063	5.602
Budget - Estimated Cost Per Ton	5.415	5.731

Number of Days Operated

1-8 Hour		
2-8 Hour	234	209
Total	234	209

Proportion of Labor & Supplies	1955	%	1954	%
Labor Cost per Ton	3.307	65.3%	3.651	65.2%
Supplies	1.756	34.7%	1.951	34.8%
Total Cost Per Ton	5.063	100.0%	5.602	100.0%

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8. COST OF OPERATING

In spite of the substantial wage increase granted to the hourly employees during the year, the cost of production for 1955 showed a decrease of $0.623 per ton under that of 1954. This can be directly attributed to a greater proportion of ore being mined by the block caving method and the resultant increase in production per man per day.

Detailed Cost Comparison	1955		1954	
	Amount	Per Ton	Amount	Per Ton
Underground Costs:				
Development	$117,803.45	.313	126,976.36	.317
Mining	426,102.71	1.131	536,172.56	1.336
Tramming	275,323.44	.731	283,971.51	.708
Auxiliary Hoisting	61,000.37	.162	43,339.53	.108
Ventilation	31,586.20	.084	68,619.31	.171
Pumping	88,961.89	.236	87,343.83	.218
Compressors & Air Lines	43,043.76	.114	43,008.43	.107
U.G. Superintendence	78,102.95	.207	99,491.49	.248
Maint. Pockets & Chutes	2,574.74	.007	3,465.24	.009
" Mining Equipment	44,298.57	.117	58,877.37	.147
" Levels & X-Cuts	11,971.80	.032	80,013.03	.199
" Shaft	10,910.13	.029	19,212.48	.048
Telephones & Safety Dev.	10,982.54	.029	- - -	-
Holiday Pay	22,088.68	.059	- - -	-
Vacation Allowance	50,690.93	.134	- - -	-
Total Underground Costs	$1,275,442.16	3.385	$1,450,491.14	3.616
Surface Costs:				
Hoisting	59,975.40	.159	77,590.70	.194
Crushing & Screening	- - -	-	229.74	.001
Stocking	43,898.41	.117	36,157.04	.090
Timber Yard	21,258.18	.057	24,420.39	.061
Dry House	17,066.73	.045	17,040.28	.042
Policing	11,600.03	.031	14,006.60	.035
General Surface	2,750.61	.007	3,638.77	.009
Maint.-Head Fr. Bldg. & Eqpt.	1,187.09	.003	3,458.74	.008
" Other Mine Buildings	894.22	.002	15,276.64	.038
Holiday Pay	4,850.16	.013	- - -	-
Vacation Allowance	11,881.37	.032	- - -	-
Total Surface Costs	$175,362.20	.466	$191,818.90	.478

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8. COST OF OPERATING - Continued

	1955		1954	
	Amount	Per Ton	Amount	Per Ton
General Mine Expenses:				
Geological Department	$ 2,207.06	.006	$ 5,478.96	.014
Mining Engr. Department	14,871.89	.039	20,240.61	.051
Mech. & Elect. Eng. Dept.	2,451.37	.007	15,164.04	.037
Safety Department	4,240.33	.011	5,106.52	.012
Research Laboratory	3,706.54	.010	576.73	.002
Analysis & Grading - Laboratory	17,961.55	.048	23,210.26	.058
" " - Shipping	3,009.61	.008	4,956.78	.013
Special Expense - Pensions	67.91	.000	80.05	.000
" - Retirements	3,325.19	.009	4,357.97	.011
" - Hygiene Clinic	4,699.54	.012	5,929.98	.014
" - Empl. Office	743.25	.003	1,313.74	.003
Ishpeming Office	50,583.82	.134	51,518.32	.129
Mine Office - Supt. & Clerks	30,702.16	.081	42,435.84	.106
Central Warehouse Overhead	8,353.28	.022	13,358.67	.005
Insurance - Property	1,700.57	.005	1,823.49	.005
" - Group Health & Life	2,916.01	.008	15,692.62	.039
" - Group Annuity	6,543.19	.017	10,959.84	.027
" - Catastrophe	2,450.37	.007	3,181.99	.008
Personal Injury - Comp. & Doctors	16,275.21	.043	11,376.27	.028
" " - Comp. Dept.	828.85	.002	2,241.60	.006
Taxes - Unemployment Insurance	2,761.95	.007	13,439.69	.034
" - Old Age Benefit	19,402.43	.051	23,683.41	.059
Electrical Eng. Dept.	2,236.40	.006	- - -	-
Employees Ins. & Comp.	12,665.46	.034	- - -	-
E & A 640 - Automatic Pumping	1,075.27	.003	- - -	-
Telephones & Safety Dev.	- - -	-	13,202.91	.033
Welfare - General			2,782.44	.007
" - District			264.82	.001
Spec. Expense - Legal			2,844.15	.007
Vacation Pay - Current Year			71,959.22	.179
" " - Prior Year Adj.			15,180.00	.038
Holiday Allowance			29,626.72	.074
Design Dept.			123.56	.000
Total General Mine Expenses	$215,779.21	.573	$381,751.20	.952
Total Cost of Production	$1,666,583.57	4.423	$2,024,061.24	5.046

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8. COST OF OPENING, EQUIPPING, DEVELOPING, AND OPERATING

There were three active E&A's at the Maas Mine during 1955, two of which were closed out at the end of the year. They were E&A CC-632, the account for repairs to the Negaunee No. 2 Air Shaft, and E&A CC-633, the account for 7th Level main level development. The only active E&A at the end of the year was E&A CC-662, which is the account covering all the development and equipment necessary for the consolidation of the Maas and Bunker Hill Mines, with the exception of Maas and Pioneer and Arctic main level development and Pioneer and Arctic diamond drilling. Funds granted for these projects were only for 1955 development, and therefore were closed out of E&A CC-662 at the end of the year and new monies for these accounts requested for 1956. The following is a summary of expenditures for the Maas E&A's during 1955:

Reference	Prior Years Expenditures	1955 Expenditures	Total Expenditures
E&A CC-632	$46,959.83	$27,379.84	$74,339.67
E&A CC-633	32,828.47	9,335.00	42,163.47
E&A CC-662	- -	553,347.00	553,347.00

9. TAXES

Taxes for the Maas Mine showed a decrease of approximately $10,000 under those of 1954. This reduction is primarily the result of the decrease in proven ore reserves for the Maas and Race Course Parcels. The increase in the "Stockpile and Equipment" category is due to the large amount of ore remaining on the stockpile at the end of the 1954 shipping season and carried over into 1955. The tax valuation for the Pioneer and Arctic Parcel, although carried by the State Tax Commission in previous years, is shown in the following table for the first time in the annual report.

	1955		1954	
	Valuation	Taxes	Valuation	Taxes
Maas Mine	$ 1,815,000	$ 76,901.55	$ 2,565,000	$ 114,091.20
Race Course	170,000	7,202.90	230,000	10,230.40
Pioneer & Arctic	150,000	6,355.50	- -	- -
Stockpile & Equipment	1,280,000	54,233.60	685,000	30,468.80
Miscellaneous Parcels	11,930	505.51	11,930	530.65
Total Oprtg. Maas Mine	$ 3,426,930	$145,199.06	$ 3,491,930	$ 155,321.05
Collection Fees		1,452.00		1,553.21
Total		$146,651.06		$ 156,874.26
Tax Rate		42.37		44.48
Total City of Negaunee		$856,368.67		$ 848,592.33
Maas Mine % of City Tax		17.1%		18.5%
Maas Mine Rented Houses	$ 121,405	$ 5,143.92	$ 108,880	$ 4,842.98
Mineral Lands, etc.	13,110	555.49	13,310	592.03
Total Houses and Lands	$ 134,515	$ 5,699.41	$ 122,190	$ 5,435.01
Collection Fees		56.98		54.35
Total		$ 5,756.39		$ 5,489.36

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10. ACCIDENTS AND PERSONAL INJURY

Eight compensable accidents were reported in 1955 as compared to four in 1954. However, they were not as serious and the severity rate dropped considerably. A brief description of each accident follows:

Date	Employee Injured	Injury	No. of Days Lost
Jan. 26	Edgar Staples	Fracture and laceration in left forearm	240
Feb. 17	Henry Houseman	Laceration, nose and left eyebrow	11
Mar. 7	Joseph Pezzotti	Bruised left leg	9
Apr. 11	Albert Hemmila	Laceration, left ankle	50
May 5	Edward Ecklid	Bruised right hip	28
June 27	Telesphor Latendresse	Loss of first joint, middle finger, right hand	75
Oct. 5	Leonard Chevrette	Fracture in left foot	32
Dec. 15	Richard Kalisch	Bruised right leg	7
		Total Days Lost	452

The accident statistics compiled by the Safety Department show the following rates for the past five years at the Maas Mine:

Year	Frequency	Severity
1955	22.38	934
1954	19.51	3,420
1953	31.83	731
1952	47.24	8,547
1951	39.56	7,743

11. POWER

Electric power during 1955 was purchased from the U.P. Power Company which had taken over the transmission lines and customers of the Cliffs Power and Light Company in 1953. The cost of power used during 1955 compared with the previous year follows:

	1955	1954
Total Kwh used	9,326,657	8,796,721
Total cost of power	$86,188.02	$83,548.01
Cost per Kwh	$0.00924	$0.00950
Cost per ton product	$0.229	$0.208

MATHER MINE "B" SHAFT
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1. GENERAL:

Production from the Mather Mine "B" Shaft increased steadily throughout the year culminating in the highest annual production the mine has attained since its inception.

The production for the year totaled 1,233,222 tons, of this tonnage, 238,340 tons were produced from the 6th Level; 485,467 tons from 7th Level; and 509,415 tons from the 8th Level.

Several new production records were attained this year. The previous record hoist for twenty-four hours set in 1954 was 6,146 tons, this was exceeded on August 1, 1955 when 7,350 tons were hoisted. The previous record of 203 skips per shift was exceeded on December 17, 1955 when 250 skips per shift were hoisted. A record high in monthly production was attained in September when 120,844 tons were produced.

Hoisting capacity was increased when Jeto bottom dump skips were installed during the August vacation period.

The analysis of output on both the Standard and Special grades was very good in both iron and silica for the year.

Average Mine Analysis on Output (Incl. Stockpile)

Grade	Iron	Phos.	Silica	Sulphur
Mather Standard	58.48	.089	9.74	.035
Mather Special	55.90	.093	7.14	1.562

The shipping season was somewhat longer this year since the demand for iron ore increased. The season opened on April 5, 1955 and closed on December 2, 1955. Shipments from pocket and stockpile totaled 1,315,263 tons.

Average Analysis of Shipments (Total Average)

Grade	Iron	Phos.	Silica	Sulphur
Mather Standard	58.25	.090	10.15	.034
Mather Special	56.40	.109	6.61	1.456

During the latter part of the year the working force was increased, however, a shortage of available trained miners limited the expansion program. Despite an increased working force of new men and a sizeable wage increase, the cost per ton was well below that of any year to date. The cost of production was decreased by $0.91 per ton and the total cost at mine was decreased by $1.421 per ton over the previous year.

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1. GENERAL: (Cont'd)

Labor relations continued on a satisfactory basis throughout the year. No grievances were advanced beyond Step 2.

Pumping operations continued in the North Jackson Pit area, an additional pump was installed in the area this year. Two water wells were drilled on the southwest side of the Mather "B" property in order to determine the amount of surface water that is flowing through the broken ledge and over the underground workings. Additional wells will be drilled as the program progresses.

The Mather Mine "B" Shaft subsidence program was initiated in 1953. In that year a hole was drilled from the 4th Level cut-out to intersect the area above the 6th Level workings. This year a hole was drilled from the 2nd Level cut-out approximately over the 4th Level hole. A surface hole was also drilled over the area. Microseismic studies have continued since the initiation of the subsidence program.

The Mather Mine "A" Shaft crew completed driving of the 5th Level main line. The connection to the "B" Shaft cut-out was completed on October 17, 1955. The drifting on 5th Level totaled 400' for the year.

The 8th Level crusher-conveyor system was placed in operation in October of this year. Secondary blasting costs were reduced appreciably as grizzlies were opened to accommodate large chunks. Early in 1956 the 7th Level ore will be handled through this installation.

Drifting on the 9th Level main line totaled 1,575', of this footage 1,465' were supported by roof bolts and 110' with steel sets.

The total drifting on 10th Level was 2,170'. The main line was advanced 1,865'; 10,500 Cross-cut and 10,200 Cross-cut were advanced 170' and 135' respectively. Of this footage 1,325' were supported by roof bolts and 845' with steel sets.

Roof bolting has proved very successful in the main line headings. This year roof bolting was introduced in the sub-level drifts and was used in conjunction with steel supports to reduce repairing costs. A total of 12,913 roof bolts were used this year.

The automatic pumping system was completed this year with the installation of 500 g.p.m. vertical centrifugal pumps on 7th and 8th Levels and also on the 10th Level. An additional 500 g.p.m. vertical centrifugal pump will be installed on the 10th Level early in 1956.

Due to revised mining limits of blocks and depletion as a result of ore mined during the year, the ore reserves were decreased by 4,077,573 tons in 1955.

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2. PRODUCTION, SHIPMENTS & INVENTORIES:

a. Production by Grade and Months:

	Standard	Special	Total Tons	Rock
January	60,162	10,554	70,716	7,404
February	66,203	9,513	75,716	7,260
March	79,934	11,464	91,398	7,464
April	62,153	15,991	78,144	8,786
May	84,002	12,341	96,343	8,724
June	90,149	15,808	105,957	6,720
July	91,369	11,287	102,656	7,176
August	79,030	13,474	92,504	8,160
September	98,660	22,184	120,844	8,472
October	96,435	15,937	112,372	11,244
November	100,903	10,297	111,200	8,880
December	85,882	18,083	103,965	12,288
Total	994,882	166,933	1,161,815	102,578
After Stockpile Transfer	+ 3,402	- 3,402		
Overrun	54,708	16,699	71,407	
Total	1,052,992	180,230	1,233,222	

b. Shipments:

	Pocket Tons	Stockpile Tons	Total Tons	Total 1954	Increase or Decrease
Mather Standard	613,897	541,607	1,155,504	554,590	600,914
Mather Special	1,061	158,698	159,759	306,407	146,648
Total	614,958	700,305	1,315,263	860,997	454,266

c. Ore Statement:

	1955	1954
On Hand January 1, 1955	227,395	179,041
Output for Year	1,161,815	886,296
Overrun	71,407	23,055
Total	1,460,617	1,088,392
Shipments	1,315,263	860,997
Balance on Hand	145,354	227,395
Increase in Output	275,519	193,854
Decrease in Ore on Hand	82,041	48,355

MATHER MINE "B" SHAFT
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2. PRODUCTION, SHIPMENTS & INVENTORIES: (Cont'd)

Working Schedule:

1955 - Four 2-8 hr. shifts from January 1, 1955 to April 14, 1955. Five 2-8 hr. shifts from April 15, 1955 to December 31, 1955.

1954 - Five 3-8 hr. shifts from January 1, 1954 to March 31, 1954. Four 3-8 hr. shifts from April 1, 1954 to May 14, 1954. Four 2-8 hr. shifts from May 15, 1954 to December 31, 1954.

1953 - Five 3-8 hr. shifts from January 1, 1953 to December 31, 1953.

1952 - Five 3-8 hr. and one 2-8 hr. shifts per week from January 1, 1952 to May 31, 1952. Five and one-half 3-8 hr. shifts from June 1, 1952 to November 16, 1952. Five 3-8 hr. shifts per week from November 17, 1952 to December 31, 1952.

1951 - Five 3-8 hr. and one 2-8 hr. shifts per week from April 1, 1951 to December 31, 1951.

d. Division of Product by Levels and by Months:

	6th Level Special	7th Level Standard	8th Level Standard	Total Tons Standard	Special
January	10,554	42,113	18,049	60,162	10,554
February	9,513	48,719	17,484	66,203	9,513
March	11,464	53,380	26,554	79,934	11,464
April	15,991	41,500	20,653	62,153	15,991
May	12,341	49,040	34,962	84,002	12,341
June	15,808	49,582	40,567	90,149	15,808
July	11,287	42,943	48,426	91,369	11,287
August	13,474	30,031	48,999	79,030	13,474
September	22,184	21,172	77,488	98,660	22,184
October	15,937	29,895	66,540	96,435	15,937
November	10,297	48,433	52,470	100,903	10,297
December	18,083	28,659	57,223	85,882	18,083
Total	166,933	485,467	509,415	994,882	166,933
After Stockpile Transfers				+ 3,402	- 3,402
Overrun				54,708	16,699
Total				1,052,992	180,230

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

e. Production Delays:

During the year three delays were caused by mechanical failures. The other delay was the walkout which caused the loss of four production shifts. On June 29th four hours were lost when the east skip pedestal bolts sheared. When the bearing housing pedestals on the headframe pan feeder failed a total of sixteen hours production was lost on the 20th and 21st of October. On the day shift of October 31st, four hours production was lost when the safety latch on the east skip failed. Three production shifts were lost on November 25th when the runner guide on the west skip failed and the skip was replaced. Four producing shifts were lost as the result of the United Steelworkers of America C.I.O. walkout which was effective on the night shift of June 30th through three shifts of July 1st.

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3. ANALYSIS:

a. Average Mine Analysis on Output: (Incl. Stockpile)

Grade	Iron	Phos.	Silica	Sulphur
Mather Standard	58.48	.089	9.74	.035
Mather Special	55.90	.093	7.14	1.562

b. Average Analysis of Shipments: (Total Average)

Grade	Iron	Phos.	Silica	Sulphur	Moist.	Iron Nat'l.
Mather Standard	58.25	.090	10.15	.034	10.22	52.30
Mather Special	56.40	.109	6.61	1.456	9.55	51.01

c. Average Analysis of Ore in Stock:

Grade	Tons	Iron	Phos.	Silica	Mang.	Alum.	Lime	Mag.	Sulph.	Loss	Moist.
Mather Standard	104,268	58.37	.090	9.36	.34	2.48	.40	.52	.049	3.19	11.65
Mather Special	41,086	55.86	.100	6.86	.48	2.03	3.06	.45	1.714	3.19	10.45

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4. COST OF OPENING, EQUIPPING, DEVELOPING AND OPERATING:

a. Comparative Mining Costs:

	1955	1954
Product	1,233,222	909,351
Underground Costs	$ 2.244	$ 2.718
Surface Costs	.283	.359
General Mine Expense	.385	.745
Cost of Production	$ 2.912	$ 3.822
Amortization of Defense Facilities	$ .360	$ .456
Depreciation:		
Plant and Equipment	$ .163	$ .171
Development after 12/31/44	.104	.104
Pre-Production Development	.013	.013
Movable Equipment	.010	.013
Miscellaneous Equipment		.001
Taxes	.196	.232
Administration	.050	.050
Loading and Shipping	.046	.053
Total Cost at Mine	$ 3.854	$ 4.915
Budget-Estimated Cost Per Ton	$ 3.852	$ 4.806
Number of Shifts and Hours	1 1-8 Hr. 233 2-8 Hr. 0 3-8 Hr.	18 1-8 Hr. 121 2-8 Hr. 82 3-8 Hr.
Total 8 Hr. Operating Shifts	467	506
Number of Operating Days	233½	208 2/3
Average Daily Product	4,951	4,358

Proportion of Labor and Supplies

	Amount	Per Ton	Per Cent
Labor	$2,452,136.69	$1.988	57%
Supplies	1,857,034.37	1.506	43
Total Cost at Mine	$4,309,171.06	$3.494	100%

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4. COST OF OPENING, EQUIPPING, DEVELOPING AND OPERATING: (Cont'd)

b. Detailed Cost Comparison (Operating):

	1955		1954	
	Amount	Per Ton	Amount	Per Ton
Development	$ 549,676.14	$ .444		
Mining	1,161,292.99	.942		
Tramming	411,692.28	.334		
Ventilation	20,257.37	.017		
Pumping	38,654.44	.031		
Compressors and Air Lines	54,770.01	.044		
Crushing and Screening - Underground	3,021.56	.003		
Underground Superintendence	162,703.86	.132		
Maint: Pockets and Chutes	1,532.89	.001		
Mining Equipment	146,844.78	.119		
Levels and Cross-cuts	38,723.48	.032		
Shaft	8,335.35	.007		
Telephones and Safety Devices	41,980.45	.034		
Vacation Pay	82,095.02	.067		
Holiday Allowance	45,939.22	.037		
Total Underground Cost	$2,767,519.84	$2.244	$2,471,444.09	$2.718
Hoisting	$ 119,844.21	$ .096		
Crushing and Screening - Surface	49,071.73	.040		
Stocking	47,644.74	.038		
Timber Yard	14,132.14	.012		
Dry House	33,156.07	.027		
Policing	19,637.27	.016		
General Surface	28,235.44	.023		
Maint: Headframe Bldg. and Equipment	1,272.49	.001		
Other Mine Buildings	3,159.19	.002		
Telephones and Safety Devices	3,170.98	.003		
Vacation Pay	23,223.58	.019		
Holiday Allowance	7,124.09	.006		
Total Surface Cost	$ 349,671.93	$ .283	$ 326,302.94	$ .359
Geological Department	$ 9,289.93	$ .008		
Mining Engineering Department	35,506.28	.029		
Mechanical Engineering Department	6,287.16	.005		
Safety Department	8,776.32	.007		
Research Laboratory	11,070.15	.009		
Analysis and Grading - Laboratory	49,281.69	.040		
Analysis and Grading - Shipping	5,983.13	.005		
Special Expense	18,997.02	.015		
Ishpeming Office	99,403.99	.081		
Mine Office - Superintendent and Clerks	65,804.73	.054		
Central Warehouse Overhead	15,443.14	.013		
Insurance	45,237.63	.037		
Employees' Insurance and Compensation	10,003.36	.008		
Personal Injury - Comp. and Doctors	29,757.78	.024		
Taxes - Unemployment Insurance	16,619.76	.013		
Taxes - Old Age Benefit	43,472.61	.035		
Electrical Engineering	2,572.90	.002		
Total General Mine Expense	$ 473,507.58	$ .385	$ 677,989.13	$ .745
COST OF PRODUCTION	$3,590,699.35	$2.912	$3,475,736.16	$3.822

MATHER MINE "B" SHAFT
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4. COST OF OPENING, EQUIPPING, DEVELOPING AND OPERATING: (Cont'd)

Capital account expenditures for the year amounted to $959,071.83 which brings the cumulative expenditures in E&A to $13,557,615.20.

Capital Expenditures for Year:

E&A NM-44	$130,190.76
E&A NM-95	9,580.20
E&A NM-96	8,865.00
E&A NM-103	558,890.70
E&A NM-110	39,856.26
E&A NM-111	207,428.65
E&A NM-112	4,260.26
Total	$959,071.83

Total Charge Offs 1955	$1,391,364.17
Total Capital Expenditures 1955	959,071.83
Net Decrease in Capital Account	$ 432,292.34

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5. ESTIMATE AND ANALYSIS OF ORE RESERVES:

The net ore reserves reported to the Tax Commission on December 31, 1955 were 15,157,855 tons, a decrease of 4,077,573 tons from the previous year. Of this total, 989,604 tons are located in the shaft pillar and to the east of the shaft pillar and will not be mined at present. The reserves were decreased primarily because of changes in structure on the 7th Level that were not anticipated in 1954.

	Mather Standard	Sulphurous	Total Tons
Above 5th Level	122,466	2,688,208	2,810,674
Between 5th and 6th Levels		1,085,098	1,085,098
Between 6th and 7th Levels	3,464,378		3,464,378
Between 7th and 8th Levels	5,113,426		5,113,426
Between 8th and 9th Levels	1,964,167		1,964,167
Between 9th and 10th Levels	2,009,375		2,009,375
Below 10th Level	653,541		653,541
Sec. 1 Diamond Drill Hole Estimate	403,172		403,172
Total Gross as of July 31, 1955	13,730,525	3,773,306	17,503,831
Less 10% for Mining and Rock			1,750,383
Net Total as of July 31, 1955			15,753,448
Less August 1955 Production			92,504
Net Total as of August 31, 1955			15,660,944
Less Prod. August 31 to Dec. 31, 1955			503,089
Total as of December 31, 1955			15,157,855

Expected Average Natural Analysis of Ore Reserves as of December 31, 1955:

Grade	Total Tons	Iron	Phos.	Sil.	Mang.	Alum.	Lime	Mag.	Sulph.	Loss	Moist.
By Surface Diamond Drilling	362,855	54.40	.081	5.08	.10	2.62	.58	.60	.017	2.20	11.50
By Underground Development	14,795,000	51.50	.090	8.85	.45	2.62	2.50	.50	.300	2.00	10.50
	15,157,855										

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6. LABOR AND WAGES:

a. Comments:

It was impossible to obtain a sufficient number of skilled miners during the latter half of the year. The shortage of miners was partially offset by pairing-off experienced miners with new men. Unskilled manpower was no problem during the year.

Labor relations were excellent throughout the year, as no grievances were advanced beyond Step 2.

b. Employment Record:

At the end of the year 650 men were employed at the mine. This represents a net increase of 170 employees for the year.

Number of Men 1/1/55		480
Losses - Drafted	1	
Deceased	4	
Quit	21	
Retired	1	
Discharged	1	
Transferred to other properties	78	
	106	-106
		374
Gains - Transferred from other properties	116	
Service Returnees	8	
Rehires	152	
	276	+276
Total on Payroll 12/31/55		650

c. Vacations and Holidays:

A one week vacation period from August 15th to August 21st was taken this year. There was no production during the vacation shutdown.

The men benefited from six paid holidays which were as follows: New Years, Memorial Day, Independence Day, Labor Day, Thanksgiving and Christmas. This was in accordance with the provisions of the labor contract.

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6. LABOR AND WAGES: (Cont'd)

d. Comparative Statement of Wages and Product:
(Operating Only - Not Including E&A Work)

	1955	1954	Increase or Decrease
Average Wages Per Day:			
Surface	$ 19.10	$ 17.83	$ 1.27
Underground	21.81	20.66	1.15
Total	$ 21.27	$ 20.06	$ 1.21
Average Wages Contract Miner:	$ 23.88	$ 22.63	$ 1.25
Wages Per Month of 19½ Days: (1954 Based on 16 Days)			
Surface	$372.45	$285.28	$87.17
Underground	425.30	330.56	94.74
Total	$414.77	$320.96	$93.81
Tons Per Man Per Day:			
Surface	59.38	41.89	17.49
Underground	14.63	11.27	3.36
Total	11.74	8.88	2.86
Labor Cost Per Ton:			
Surface	$ .321	$ .426	$ .105
Underground	1.490	1.834	.344
Total	$ 1.811	$ 2.260	$ .449

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7. SURFACE:

Buildings:-

The buildings remained in excellent condition and required only a minimum amount of upkeep.

New Installations and New Equipment:-

A Fairbanks-Morse 1350 g.p.m. pump was installed in the North Jackson Pit area.

Engine House:-

Shop made slow down controls replaced the controls which were in current use on the ore hoist in December. The new controls smoothed out the slow down period considerably.

Headframe and Stocking:-

On September 11th the 36" main conveyor belt parted, however no production time was lost as the belt was immediately clipped together and was vulcanized on the following week-end. The only major delay, comprised of twelve hours, occurred when the bearing housing pedestals on the pan feeder failed.

New scrolls were installed in the skip dump in conjunction with the change to bottom dump skips.

Real Estate:-

The long range program for clearing the area southwest of the shaft continued. This year eight houses and lots were purchased at a total cost of $31,200.

Pumping:-

Pumping of the North Jackson Mine underground workings continued throughout 1955. This area overlies a portion of the future underground workings. The pumping program began in November 1954 with a Byron-Jackson pump rated at between 500 - 600 g.p.m. pumping out the old Jackson stope at an average of approximately 450 g.p.m. The slow initial drawdown plus the Spring runoff necessitated the installation of an additional larger pump. In June 1955, an additional hole was drilled into the stope and a Fairbanks-Morse pump with a capacity of 1350 g.p.m. was installed. With this added capacity the stope was drained. On August 11th the smaller pump was disconnected. Since August the one large pump has been pumping the normal ground water recharge. The record to date shows that the recharge is generally slackening off. However, not until after the Spring runoff can any prediction be made on the volume of water to be expected.

The pumping program was accelerated in September when a 6" churn drill hole was drilled on the southwest side of Mather "B" property in the Jackson Pits area. The well averaged 55 g.p.m. A 10" churn drill hole was completed in December in the same area and tests show the well averages approximately 175 g.p.m. The well drilling program is continuing into 1956 with several wells planned to be drilled. The purpose of drilling these holes is to intercept the underground drainage and divert it away from the underground workings. A sump has been built in Partridge Creek downstream

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7. SURFACE: (Cont'd)

Pumping:- (Cont'd)

from the pumping area. The drainage will run into the sump, thence, pumped through a pipeline to be later discharged into the Negaunee storm sewer or Maas Mine discharge line.

Three experimental test holes were drilled in the same area during the late summer. The holes were drilled to ledge and impregnated with a chemical to determine if the overburden could be successfully made impervious to the flow of fluids. Final results of this test are pending.

Subsidence:-

A diamond drill hole was drilled from the surface for additional subsidence studies over the mined out areas.

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8. UNDERGROUND:

a. General:

Ore production increased from an average of 75,800 tons per month in 1954 to 102,768 tons per month in 1955. The increase in production is due to an increase in working force and schedule.

Total production increased from 909,351 tons in 1954 to 1,233,222 tons in 1955, a total of 323,871 tons over the 1954 production.

Of the yearly tonnage, 238,340 tons or 19% came from 6th Level, 485,467 tons or 40% came from 7th Level and 509,415 tons or 41% came from 8th Level.

2nd Level:-

Excavation of a diamond drill cut-out at the -500' elevation in the shaft was started in May and completed in June of 1955. An exploration hole was drilled to a depth of 1,500' in order to gain additional information about the location of the cave above the mining areas of the 6th and 7th Levels.

5th Level:-

On October 17, 1955 the main line heading, which was advanced from the Mather "A" Shaft, "holed through" 30' west of the Mather "B" Shaft. The development work for the year consisted of excavating a small cage plat and advancing the main line heading 400'. Since the ore that is to be mined above this level will be transferred to the 6th Level via ore pass raises, development of a trench will not be required.

6th Level:-

Sub-level and long-hole stoping were employed in the mining of 238,340 tons of Hi-Sulphur ore from the 6th Level. The block-caving system of mining is not adaptable to this deposit because of its extreme hardness.

Excavation for the 6th Level crusher was completed and installation was started at the end of the year.

Area Between 6000 and 6100 Cross-cuts:-

Block #60-A: A total of 448,225 tons of Hi-Sulphur ore has been mined from this area by the sub-level stope method since September of 1952.

Area Between 6100 and 6200 Cross-cuts:-

Block #61-A: Long hole stoping with a grizzly sub system of slushing the ore was the method applied to mine 30,070 tons of Hi-Sulphur ore during the year.

Area Between 6200 and 6300 Cross-cuts:-

Block #62-B: A total of 66,340 tons of Hi-Sulphur ore were mined from this area during the year by a combination of the sub-level and long-hole stoping methods.

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8. UNDERGROUND: (Cont'd)

6th Level:- (Cont'd)

Area Between 6300 and 6400 Cross-cuts:-

Block #63-A: Development work continued throughout the year in this 125,000 ton Hi-Sulphur deposit. Production will begin in January of 1956.

Block #63-B: At the end of the year development work was started in this Hi-Sulphur area which extends on either side of the 6300 Cross-cut. The ore that will be mined in this area will be transferred to a crusher that is located below this block and above the 6th Level.

7th Level:-

The block caving system of mining is adaptable for use in all the Standard ore deposits on the 7th Level. The production from this level totaled 485,467 tons for the year.

Excavating and concreting of an ore pass raise from the 8th Level crusher trench will be completed in the first quarter of 1956. All of the 7th Level ore will be transferred through this raise to the 8th Level crusher-conveyor system, which will lower the mining cost because larger size material can be handled throughout the active mining areas.

At the end of the year development work on a 400' and 1,100' conveyor belt drift was started. This system, which will convey two million tons of ore to the 8th Level ore pass raise, will eliminate rail tramming costs in this area.

Area of 7000 Cross-cut:-

Block #70-A: The western portion of this block and the pillar above the cross-cut were mined during the year. Production for the year showed 10,540 tons of Standard ore.

Block #70-B: Block-caving was utilized in this 150,000 ton Standard ore body as production advanced from 46,000 tons in 1954 to 60,000 tons in 1955. The ore zone is found above the cross-cut as a result of a roll in the footwall.

Block #70-C: Development and mining were advanced in this 200,000 ton Standard ore body. A total of 15,500 tons have been block-caved through three slusher drifts, that were driven with a yielding arch section of steel.

Area Between 7000 and 7100 Cross-cuts:-

Block #71-A: Block-caving continued throughout the year in this area which is found along the south side of Dike #22. Production for the year amounted to 399,219 tons of Standard ore.

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8. UNDERGROUND: (Cont'd)

7th Level:- (Cont'd)

Area Between 7100 and 7200 Cross-cuts:-

Block #72-A: Two slusher drifts were advanced at top timber height on the south side of Dike #22 in this 350,000 ton Standard ore body. At the end of the year a portion of the block was undercut with a roto-auger drifter from a drilling sub 25' above the slusher drifts. Production from this block during the year totaled 48,980 tons.

Area Between 7200 and 7300 Cross-cuts:-

Block #73-A: This ore body, which is located along the south side of Dike #22, was undercut by ring drilling from the four slusher drifts. Block-caving accounted for 44,020 tons of ore during the year.

Area Between 7300 and 7400 Cross-cuts:-

Block #73-D: In 1955, 31,124 tons of Standard ore was block-caved from this small deposit.

Area Between 7400 and 7500 Cross-cuts:-

Block #74-A: This block, which was undercut by a drilling sub, accounted for 90,830 tons of Standard ore.

Block #75-B: Development was started in December in this small Standard ore zone which is built-up along the footwall and north of #22 Dike.

Area Between 7500 and 7600 Cross-cuts:-

Block #76-B: Mining continued with 8,370 tons of Standard ore being block-caved from this area, which is located 100' above the level and along the footwall.

Area From 7600 Cross-cut to Boundary Line:-

This area is being developed and mined by Mather Mine "A" Shaft.

8th Level:-

All of the 8th Level Standard ore bodies are adaptable to the block-caving system of mining. Production advanced from 143,463 tons in 1954 to 509,415 tons in 1955 from this level.

This year the 8800, 8900 and 8910 Cross-cuts were advanced 1,104'. A 250' ventilation drift between the 8100 Cross-cut and the main line was developed and the Joy 100,000 c.f.m. fan from the 6th Level was installed during vacation week.

The 8th Level crusher-conveyor system that was started in July of 1953 was completed in October of 1955. Since October this crusher-conveyor system has proven to be very successful in that it has lowered the rail tramming, scraping and secondary blasting costs.

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8. UNDERGROUND: (Cont'd)

8th Level:- (Cont'd)

Area East of 8400 Cross-cut:-

Block #84-A: Mining continued in this 200,000 ton Standard ore body with 118,420 tons produced at the end of the year. Development work consisted of a grizzly sub, two slusher drifts and two drilling subs located at the north and south boundaries of the block.

Block #84-B: This is a 95,000 ton zone on the north side of the Negaunee fault zone. Development of the slusher drifts was started in the last quarter.

Area Between 8400 and 8500 Cross-cuts:-

Block #85-A: Production totaled 114,080 tons in this Standard ore body.

Block #85-B: Preparations to undercut this 105,000 ton Standard ore body were started in December. The block is located along the south side of Dike #22 and 50' below the 7th Level.

Area Between 8500 and 8600 Cross-cuts:-

Block #86-A: Block-caving continued in this area with 80,910 tons of Standard ore being mined in 1955.

Block #86-B: In the last quarter, development of the north slusher drift was started in this 125,000 ton Standard ore body which lies along the south side of #22 Dike.

Area Between 8600 and 8700 Cross-cuts:-

Block #87-A: At the end of the year development work to undercut this 225,000 ton Standard ore body from two drilling subs was started. This block was developed at top timber height with a portion of the four slusher drifts being advanced in the footwall rock.

Area Between 8700 and 8800 Cross-cuts:-

Block #88-A: Block-caving began in March of 1955 in this 275,000 ton Standard ore body located along the south side of Dike #22 and east of an inferred fault zone. Production for the year totaled 121,530 tons of ore which was mined through four slusher drifts at top timber height.

Block #88-D: Production from this small block-cave area showed 34,100 tons of Standard ore.

Area Between 8800 and 8900 Cross-cuts:-

Development work was started at the end of the year in this 200,000 ton Standard ore body found along the north side of Dike #22 and the footwall.

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8. UNDERGROUND: (Cont'd)

9th Level:-

The main level heading, which was advanced 1,650' during the year, is located 1,839' southwest of the shaft. Roof bolting has been utilized throughout the year and has proven successful to date. Excavation of the rock pass raise from 10th Level was completed at the end of 1955.

10th Level:-

The location of the main line heading is 3,381' southwest of the shaft. A total of 2,145' was advanced during the year. In the first three months, the size of the heading was 9' x 15' to facilitate a conveyor belt which will be installed at a later date. This portion of the drift was advanced with roof bolts, but as the heading progressed westward the footwall rock required steel sets for support.

In the 10th Level pump station, one 500 g.p.m. Byron-Jackson pump was installed.

A ventilation raise between the 9th and 10th Levels was started in July of 1955. By the end of December the raise was 120' above the level. This raise will also be used as an ore pass to the proposed 10th Level crusher-conveyor system.

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8. UNDERGROUND: (Cont'd)

b. Exploration:

The diamond drill program carried out at Mather Mine "B" Shaft in 1955 was reduced by 2,000' in comparison to last year's drilling program. The major portion of the drilling was carried out from 8th Level with the remainder being distributed among 2nd, 7th and 10th Levels. In the last quarter of the year the emphasis was placed on 10th Level exploration. The program was designed to cover the following objectives.

1. 2nd Level subsidence studies.

2. Detailing 7th Level ore.

3. Outlining and detailing 8th Level ore.

4. Outlining 10th Level ore.

2nd Level:

One hole was drilled from the 2nd Level shaft cut-out for the purpose of installing geophones for subsidence studies. One geophone was installed in the hole to record the frequency and intensity of rock movements over the mining area. The results have shown that the microseismic counts are very weak from this level.

The hole was started at ∠5½° at S 60° W for a distance of 1,500' in order to locate it over the large stopes above 6th and 7th Levels. The collar elevation of the hole is at ∠506' but at 1,500' the elevation of the hole is figured to be approximately ∠379' due to changes in dip during drilling. This would place the bottom of the hole at approximately 930' above the top of the 6th Level stope. This hole along with the 4th Level subsidence hole, which was drilled in 1953 in the same direction from the 4th Level cut-out, will be used for geophone triangulation.

7th Level:

Only one hole was drilled from 7th Level during the year and this hole was drilled to test for the height of and extent of the ore body above 7th Level within the western edge of the shaft pillar.

8th Level:

Diamond drilling was primarily centered on 8th Level from which twelve holes were drilled. Of this total, seven holes were drilled to outline and detail the ore prior to block development and for extension of the cross-cuts. Four holes were drilled to test for footwall contacts below 8th Level and for a possible ore build-up for 9th Level mining development. One hole was drilled to explore the 10th Level ore body west of the Cambria-Jackson fault.

10th Level:

Two holes were drilled from 10th Level to outline the 10th Level ore body.

In the 1956 drilling program emphasis will be placed on outlining the 9th and 10th Level ore bodies.

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8. UNDERGROUND: (Cont'd)

b. Exploration: (Cont'd)

Subsidence:

A diamond drill hole was drilled from the 2nd Level cut-out in order to extend it over the mined out areas. This hole was designed to supplement the 4th Level hole for further subsidence studies. Geophones have been installed. In November rock movement had apparently occurred in the 4th Level subsidence hole at approximately 880' from the collar. A diamond drill rig is being employed in the hole in order to get information as to the nature of caving.

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8. UNDERGROUND: (Cont'd)

b. Exploration: (Cont'd)

The following table shows the drilling for the year.

Holes Drilled From 2nd Level For Subsidence Studies		Drilled From	Footage Drilled	1st Class Ore Drilled	Total Depth
Hole Number:	300	0'	1,500'	0'	1,500'
Holes Drilled From 7th Level To Explore 7th Level					
	275	263'	102'	102'	365'
Holes Drilled From 8th Level To Explore 8th Level					
	279 *	84'	277'	164'	361'
	281 *	0'	215'	91'	215'
	297	0'	95'	59'	95'
	301	0'	160'	56'	160'
	305	0'	240'	102'	240'
	311	0'	295'	260'	295'
	313	0'	295'	43'	295'
	282	0'	37'	0'	37'
	286	0'	150'	42'	150'
	292	0'	215'	137'	215'
	294	0'	206'	148'	206'
Holes Drilled From 8th Level To Explore 10th Level					
	289	0'	816'	0'	816'
Holes Drilled From 10th Level To Explore 10th Level					
	306	0'	990'	126'	990'
	312	0'	441'	205'	441'
Totals	16		6,034'	1,535'	
Holes Drilled in Sec. 2 For Mather "A" Shaft	-2		- 492'		
	14		5,542'	(Total Sec. 1 Drilling)	

* Holes Drilled For "A" Shaft

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8. UNDERGROUND: (Cont'd)

c. Timbering:

Statement of Ground Support Material Used Under Development and Mining Accounts

Item	Amount	Cost Per Ton
Cribbing	$ 5,914.35	$ .00480
Stull Timber	6,850.59	.00555
Lagging	25,414.35	.02061
Poles	12,208.61	.00990
Steel	92,553.98	.07505
Total 1955	$142,941.88	$ .11591
Total 1954	$239,016.55	$ .26281
Total 1953	$211,907.78	$ .19618
Total 1952	$115,926.64	$ .16895
Total 1951	$ 64,141.28	$ .13411

d. Explosives:

Explosives Used in Breaking 1,233,222 Tons of Ore In Development and Mining Accounts

Item	Amount	Cost Per Ton
Gelamite (1¼x8)	$ 26,050.26	$ .02112
Gelamite (1¾x8)	1,454.61	.00118
Hercomite (1¾x24)	47,236.81	.03830
Gelatin	43,527.73	.03530
Total Powder	$118,269.41	$ .09590
Blasting Supplies	73,526.26	.05962
Grand Total Powder and Blasting Supplies	$191,795.67	$ .15552

Pounds of Powder Per Ton of Ore	.498806
Tons of Ore Per Pound of Powder	2.004785
Cost Per Ton For Powder	.095902
Cost Per Ton For Fuse, Caps, etc.	.059621
Cost Per Ton For All Explosives	.155523

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8. UNDERGROUND: (Cont'd)

e. Pumping:

This year the pumping system at the Mather Mine "B" Shaft was changed to an automatic system. Two Fairbanks-Morse 500 g.p.m. vertical centrifugal pumps were installed, one on the 7th Level and one on the 8th Level. On the 10th Level a Byron-Jackson 500 g.p.m. vertical centrifugal pump was installed and an additional 500 g.p.m. vertical centrifugal pump will be put into operation on this level in the near future.

All the mine water at "B" Shaft flows to "A" Shaft along the 6th Level footwall drift. The water from 7th and 8th Levels flows toward the shaft where it is pumped to 6th Level. The average flow on 6th Level was 70 g.p.m., 7th Level 32 g.p.m. and 8th Level 59 g.p.m., for a total of 161 g.p.m.

All the shaft water is collected behind a dam on 4th Level and is used as drilling water.

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9. TAXES:

Mather Mine "B" Shaft, including stockpile, supplies and equipment as placed by State Tax Commission:

	1955			1954		
	Valuation	Rate	Taxes	Valuation	Rate	Taxes
Section 1, 47-27						
Real	$3,725,000		$157,828.25	$3,000,000		$133,440.00
Personal	1,925,000		81,562.25	1,710,000		76,060.80
Total	$5,650,000	42.3700	$239,390.50	$4,710,000	44.4800	$209,500.80
Coll. Fee		.4237	2,393.91		.4448	2,095.01
Total Mather Mine "B" Shaft (Sec. 1 City of Negaunee)	$5,650,000	42.7937	$241,784.41	$4,710,000	44.9248	$211,595.81

	1955		
	Taxes	Per Ton Produced	Per Ton Shipped
Operating	$241,784.41	$0.196	$0.184
Idle Expense	-	-	-
Total	$241,784.41	$0.196	$0.184

	1954		
	Taxes	Per Ton Produced	Per Ton Shipped
Operating	$211,595.81	$0.232	$0.246
Idle Expense	-	-	-
Total	$211,595.81	$0.232	$0.246

MATHER MINE "B" SHAFT
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10. ACCIDENTS AND PERSONAL INJURY:

There were twenty-four compensable injuries during the year. The twenty-four compensable injuries occasioned lost time of 6,564 days. One fatality was incurred in 1955. There were also nineteen non-compensable injuries with a total of 46 days lost. The grand total days lost, including compensable and non-compensable injuries and one fatality, was 6,610 days. This resulted in a severity rate of 6.83 days lost per thousand man hours worked and a frequency rate of 44.44 injuries per million man hours. The total hours worked were 967,696 as compared with 920,472 for 1954.

Date	Name	Nature of Injury	Days Lost
1-12-55	Hugo Siikila	Bruised left side of ribs and under arm.	7
4- 7-55	Walter Lakari	Contusion of left thigh.	8
4-18-55	Kaspar Ranta	Contusion right lower ribs.	33
4-26-55	Carl Saari	Sore left thigh.	15
4-29-55	William Juidici	Cuts and fragments imbedded in flesh of right hand, face and chest.	15
5- 3-55	James Quantz	Bruised and swollen left instep.	8
5- 6-55	Roy Coduti	Cuts and bruises on back of both legs.	42
5-26-55	Joe Comensoli	Sore ribs right side.	11
6- 1-55	Abraham Vashaw	Fracture right ring finger.	37
6-15-55	Arthur Moore	Bruised left knee.	10
6-20-55	William Tapola	Broken bone in right thumb.	35
8- 5-55	Matt Koski	Alkali burn over right hip.	30
8-24-55	Waino Kamminen	Swollen left ankle.	37
8-29-55	Gene Currie	Shock, cuts and bruises around face and shoulders, lower body.	29
8-29-55	Wilfred Mallett	Fatality	6,000
8-29-55	Oliver Hill	Cut on right side of neck and right thigh.	19
8-30-55	Arthur Pellinen	Contusion side of right knee.	18
10-10-55	Eugene Pohjanen	Fractured bone instep of right foot.	41
10-26-55	Edward Berry	Bruises on legs and arms.	9
11-14-55	John Baratona	Chipped bone right ankle.	35
12- 6-55	Wesley Martilla	Fractured two bones in left foot.	15
12- 7-55	John Leppanen	Puncture wound right thigh.	40
12- 8-55	Angelo Zenti	Inhaled smoke.	50
12-14-55	Paul Laine	Wire in right thumb.	20
			6,564

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11. POWER:

	CONSUMPTION K.W. HOURS	AVERAGE MAX. DEMAND	AVERAGE DEM. FACTOR	COST OF CURRENT	AVERAGE PRICE PER K.W. HOUR
1955 -	15,193,755	3,300 K.W.	53.1%	$140,408.83	$0.00924
1954 -	12,486,451	3,020 K.W.	47.6%	$116,430.27	$0.00932
1953 -	13,519,000	2,780 K.W.	55.5%	$217,415.82	$0.01608
1952 -	10,626,000	1,161 K.W.	66.7%	$170,935.03	$0.01608
1951 -	8,680,000	1,876 K.W.	52.8%	$138,129.28	$0.01591

SPIES-VIRGIL MINE
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I. GENERAL

The Spies Mine production for 1955 was 79,361 tons which includes 11,820 tons of stockpile overrun. Shipments for 1955 were 222,944 tons as compared to the 101,368 tons for 1954.

The operating schedule for the Spies was four days per week from January 1st through April 17, 1955, at which time the mine increased to a 5-day per week schedule. On May 26 and 27, 1955, the last two producing stopes caved which resulted in the termination of operations at the Spies Mine. On June 2, 1955, the last skip of ore was hoisted. During June and July, a reduced mine crew was employed in abandoning the mine and building dams on the 4th, 6th and 8th Levels for the Inland Steel Company. A surface cave occurred near the intersection of the Bates Road and Highway U.S.-2 on July 24th and a small crew of men fenced that area and the area around the old Virgil shaft in August. During the balance of the shipping season, only three men remained on the property; and as of November 15, 1955 only two men were left on the Spies Mine payroll. These men are building fences around the shaft houses and the idler stands and they will also dismantle some of the old buildings and sheds that would actually create a hazard if they were left standing.

Production from the Spies Mine was realized from the 4th and 8th Levels. There were 15,724 tons of ore mined from the 4th level Old Spies Deposit and 51,817 tons produced from the 8th level Spies East Deposit.

Mining in the Old Spies ore body above 4th Level was concentrated on the 3rd level elevation because the analyses on the subs below became increasingly poor with depth. In the Spies East ore body no rock development work was done. Some ore development was needed for the pillar recovery work that constituted all of the mining work for 1955. The mining was done in the pillars between the #1 & #2, #2 & #3, and the #5 & #6 stopes.

Some trouble was encountered with the sulphur fumes emitting from the #1 stope area. However, it was possible to isolate the area before any complaints were registered by the residents of the Ice Lake Location.

Diamond drilling underground at the Spies Mine amounted to the completion of U. G. Hole #87. This hole was drilled from the Old Spies 6th level drift south under the Allen-Carlson forties to check information obtained from surface drilling. The hole proved there was no mineable ore near the 8th Level elevation on C.C.I. lands. The Inland Steel Company was given permission to continue the drilling in this hole and obtained information to substantiate their surface drilling.

No new equipment was purchased at the Spies Mine in 1955. The 54-B Bucyrus-Erie stockpile shovel was transferred to the Humboldt Mine during the beginning of shipping season. The Caspian Construction Company was awarded a contract to load out the remaining stockpile at $.07 per ton.

Wage adjustments during 1955 amounted to an over-all $.11½ per hour add-on plus a half cent increase in job class increment to hourly wages as well as to incentive wages as of July 1, 1955. When the mining industry was hit by the brief strike in July, Mr. Diadace Dion, the Menominee Range Union Organizer, told the Spies employees that they had to leave the job but the Spies Union members told Dion "to get lost". So the Spies Mine continued to work during the strike and there were no Union "incidents" because of their actions.

SPIES-VIRGIL MINE
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2. PRODUCTION

a. Production by Grades and Months

Month	Days	Spies Grade Tons	Hi-Sul Grade Tons	Total Tons Ore	Total Tons Rock	Tons Per Man Per Day
January	17	2,185	8,183	10,368	188	6.00
February	16		9,844	9,844	408	6.00
March	19		13,534	13,534	372	7.32
April	18	2,346	11,843	14,189	204	8.48
May	21	17,801	1,185	18,986		10.09
June	1	620		620		.73
July	Idle					
August	"					
September	"					
October	"					
November	"	11,820(°)		11,820(°)		
December	"					
Total	92	34,772	44,589	79,361	1,172	8.24

(°) Stockpile Overrun

b. Shipments

The following table shows the shipments for the past five years:

Year	Pocket Tons	Stockpile Tons	Total Tons
1955	8,959	213,985	222,944
1954	24,170	77,198	101,368
1953	80,786	96,620	177,406
1952	59,642	67,085	126,727
1951	156,988	93,135	250,123
Spies Grade 1955	8,959	190,477	199,436
Hi-Sulphur Grade 1955	-	23,508	23,508
Total Ore Shipped 1955	8,959	213,985	222,944

The increase in shipments over 1954 was due to the much improved ore sales picture.

A breakdown of shipments is as follows - 213,985 tons were loaded from stockpile and 8,959 tons were shipped from pocket. All the ore loaded out was shipped as Cliffs Group ore from the Escanaba dock.

SPIES-VIRGIL MINE
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2. PRODUCTION (Cont'd)

c. Ore Statement

	Spies Grade	Hi-Sul. Grade	Total	Total Last Year
On Hand, Jan. 1, 1955	137,462	6,121	143,583	98,211
Output for Year	22,952	44,589	67,541	146,740
Stockpile Overrun	11,820		11,820	-
Total	172,234	50,710	222,944	244,951
Transferred	27,202	27,202		
Shipments	199,436	23,508	222,944	101,368
Balance on Hand	None	None	None	143,583
Decrease in Output			79,199	
Increase in Shipments			121,576	
Decrease in Ore on Hand			143,583	

The operating schedule for the past five years is as follows:

1955 - Hoisting and mining operations - 2-8 hour shifts per day, 4 days per week, from January 1st through April 17th. Effective April 18th, 2-8 hour shifts per day, 5 days per week. Mining operations ceased as of May 31st. The last skip of ore was hoisted as of June 2nd. Continued with regular crew through June 15th for abandoning mine and building dams on 4th, 6th and 8th levels for the Inland Steel Company (Sherwood Mine). There was a reduction in force of 40 employees in June and a reduction in force of 40 more employees as of the last of July. The dam construction was completed as of the first of July. Work continued abandoning mine and loading ore from stockpile through July 31st with a crew of 15 men. On July 24th there was a cave to surface in the East Spies area. This took extra men to fence this caved area which was completed August 20th. The area around the Virgil shaft was refenced during August. There were 3 hoisting engineers and an electrician on the Spies roll to assist Inland Steel in building new dams and dewatering the Spies shaft. On August 26th there was a reduction of 6 men from the fencing job. From September 19th through October 7th, there was a hoisting engineer and an electrician employed to assist the Sherwood Mine with their water problems. A Surface Foreman and a sampler biller remained to the end of the year to take care of ore shipping from stockpile and cleaning up the surface grounds.

1954 - Hoisting and mining operations - two eight hour shifts per day, 5 days per week January 1st to April 4th. Effective April 5th, 2-8 hour shifts per day, 4 days per week.

1953 - Hoisting and mining operations - 2-8 hour shifts per day, 5 days per week.

1952 - Hoisting and mining operations - 2-8 hour shifts per day, five and one-half days per week January 1st to November 15th. Effective November 16th, 2-8 hour shifts per day, 5 days per week.

1951 - Hoisting and mining operations - 2-8 hour shifts per day, 6 days per week January 1st to February 1st. Effective February 2nd, 2-8 hour shifts per day, five and one-half days per week.

SPIES-VIRGIL MINE
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2. PRODUCTION (Cont'd)

d. Division of Product by Levels and Months

Month	8th Level	4th Level	Total Ore
January	8,324	2,044	10,368
February	7,277	2,567	9,844
March	10,806	2,728	13,534
April	10,829	3,360	14,189
May	14,211	4,775	18,986
June	370	250	620
Total (°)	51,817	15,724	67,541

(°) Less Overrun

e. Production Delays

There were no major delays during the operating year.

3. ANALYSIS

a. Average Mine Analysis on Output

	Tons	Iron	Phos.	Silica	Sulphur
SPIES	34,772	58.00	.341	5.19	.108
HI-SULPHUR	44,589	57.52	.339	5.58	.140

b. Average Analysis of Shipments

Grade	Tons	Iron	Phos.	Silica	Mang.	Alum.	Lime	Mag.	Sul.	Loss	Moisture
Spies	222,944										
Dried		57.10	.270	6.73	.12	1.91	.31	.35	.121	7.37	7.70
Nat'l		52.70	.249	6.21	.11	1.76	.29	.32	.112	6.80	-

c. Average Analysis of Ore in Stock

Grade	Iron	Phos.	Silica	Mang.	Alum.	Lime	Mag.	Sul.	Loss	Moisture
Spies Dried	57.12	.306	6.74	.12	1.91	.31	.35	.151	7.37	7.70
Spies Nat'l	52.72	.282	6.22	.11	1.76	.29	.32	.139	7.80	-

4. ESTIMATE AND ANALYSIS OF ORE RESERVES

a. Estimated Reserves

Inasmuch as the Spies Mine is an exhausted property and that the workings are completely filled with water as a result of the surface cave occurring July 24, 1955, the State Tax Commission has stated that they would not assign any residual mineral or real estate valuation to these lands. They said, however, the personal property items, such as, the 23,732 tons in stock (at $7.38 per ton = $175,000) and the salvage value of the headframe and buildings (approximately $5,000) made it necessary to place an assessment value of $180,000 on this abandoned mine. This compares to $535,000 value of last year.

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5. LABOR AND WAGES

a. Labor Relations

The Spies Mine had 100% union membership which is the same as in the past. The relationship between the Union and the Company has been good, which is demonstrated by the fact that there were no grievances filed in 1955. This is further exemplified by the fact that when the Spies employees were told by the Union to go out on strike on July 1, 1955, the men told Union officials very emphatically that they were going to continue to work. There were no Union repercussions because of their actions.

b. Employment

The following is a table of employment statistics:

Number of men on payroll beginning of year	98
Number of men added during the year	0
Number of separations during the year	96
Number of men working at the end of the year	2 (°) on general roll

Separations

Men given opportunity to transfer	77
Men quitting of own accord	12
Men who retired	6
Inactive	1
	96

Average number of men as per May Labor Statement	98
Average number of men as per Dec. Labor Statement	2

The percent of absenteeism in 1955 was 6.3%

c. Statement of Wages

Average Wages Per Day	1955	1954	
Surface	18.66	18.53	
Underground	20.71	20.57	
Total	19.96	19.82	
Average Wages Per Month			**Increase**
Surface	333.43	321.12	12.31
Underground	279.87	356.48	23.39
Total	363.03	343.48	19.55
Tons Per Man Per Day			
Surface	22.25	18.24	
Underground	13.11	10.56	
Total	8.24	6.69	
Labor Cost Per Ton			
Surface	.861	1.016	
Underground	1.654	1.948	
Total	2.515	2.964	

6. SURFACE

There was no new construction at the Spies Mine in 1955 other than fencing around the new cave that occurred near the intersection of U.S. 2 and the Bates Road. The fence around the old Virgil Shaft was repaired.

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6. SURFACE (Cont'd)

During the latter part of May, the 54-B electric shovel was transferred to the Humboldt Mine and the Caspian Construction Company was contracted to load out the stockpiles.

When mining operations were terminated, all the supplies and equipment at the Spies Mine that were salvagable were shipped to properties on the Marquette Range.

7. UNDERGROUND

a. General

There was no rock development work and only a limited amount of ore development done in 1955.

In the Old Spies ore body above 4th level, mining was concentrated on the 3rd level elevation. The grade of ore sharply increased in sulphur and decreased in iron units with depth below the 3rd level. Actually, this ore could only be mined while it was being mixed 75% Spies East to 25% Old Spies.

On the 8th level, in the Spies East Deposit, mining was limited to recovery of the supporting pillars between the #1 and #2, #2 and #3, and the #5 and #6 stopes.

Mining was completed in the #1 supporting pillar in April. On midnight shift, May 26, 1955, the #6 pillar operation caved and on the following night the #2 pillar stope caved thus terminating mining operations at the Spies Mine as of May 31, 1955. The last skip of ore was hoisted on June 2nd, 1955.

On June 10th, all underground equipment, with the exception of the equipment that the Inland Steel Company needed for constructing dams, was hoisted to surface. The Inland dams were completed on July 1st and on July 2nd the pumps and the balance of the underground equipment was removed from the mine.

The Spies, Virgil and air shafts were all capped with rails, plate and concrete during the first week of July.

On July 24th, when the cave occurred in the Southeast corner of the Spies East property, the Inland Steel Company made arrangements to re-enter the Spies Shaft to repair the damaged dams. Some Spies men were hired by Inland to help out on this project.

It should be mentioned here that the C.C.I. Company is in no way responsible for the failure of the Inland dams. An Inland engineer was on the job continuously during the excavation of the dam sites, during the construction of forms and most important, their engineers were present while the concrete was being poured. The Spies men and the Inland engineers were instructed as to the use of the concrete placer and if there was any deviation from the prescribed practice, it was done under orders of the Inland engineers without the knowledge of the Spies Mine Superintendent. Actually, upon investigation after the 8th level dam had failed, this was the case.

On several occasions, suggestions were made by the Spies supervisors which might have, in some way, helped to prevent the mishap, but the suggestions were received by arrogant as well as deaf ears.

The Spies men and bosses that were on this job worked long, hard hours through Saturdays and Sundays to complete the job as expeditiously as possible at Inland's request. The superintendent of the Spies Mine can assure management that their employees did a very fine job and the Inland Steel Company has no reason to hold the C.C.I. Company responsible for the failures of the dams.

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7. UNDERGROUND (Cont'd)

a. General (Cont'd)

Underground drilling amounted to the completion of U.G. Hole #87 from the Old Spies 6th level south under the Allen-Carlson forties. The hole was intended to check information obtained from surface drilling at a depth of approximately 1400' below surface. There was no ore encountered on the C.C.I. lands. The Inland Steel Company was given permission to continue this hole onto their MacDonald property and obtained information to substantiate their surface drilling.

b. Timbering

Regular wood stull timber was used for support in transfer drifts and very little additional support was needed underground other than repair and replacement of the timber in the transfers. The following is the comparative timber statement:

Kind	Lineal Feet	Avg. Price	1955 Amount	1954 Amount
Lagging	2,596	.0192	49.90	297.62
Poles	1,644	.0369	60.66	648.95
Stull Timber	960	.1630	156.48	656.81
Total			267.04	1,603.38

c. Explosives

The use of electric blasting was continued in all types of work and the advantages offered by this method of detonation from a safety and ventilation standpoint warranted its continuance in preference to the conventional fuse blasting.

The following is the comparative explosives statement:

Type	Unit Cost	Quantity	1955 Amount	1954 Amount
#2 Gelex	17.45 CWT	42,450 lb.	7,407.53	16,010.39
Electric Caps	23.28 C	11,635	2,709.15	7,769.20
Wire - feet	4.88 M	79,900 ft.	389.79	1,086.27
Fuse - feet	28.00 M	1,400 ft.	39.20	92.70
Other			50.47	159.48
Total Explosives			10,596.14	25,118.04

d. Pumping

The stainless steel pumps and rubber-lined discharge pipe handled the highly-acid water satisfactorily during the months the mine was in operation.

Good ventilation was maintained in the mine by the Aerodyne fan at the collar of the air shaft. Only minor repairs were required to the system.

8. COST OF OPERATING

a. Comparative Mining Costs

The following table shows the comparative mining costs for 1955 and 1954:

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8. COST OF OPERATING (Cont'd)

a. Comparative Mining Costs (Cont'd)

	1955	1954	Increase	Decrease
Production	79,361	146,740		67,379
Underground Costs	2.899	3.125		
Surface Costs	.639	.750		
General Mine Expense	.682	.944		
Cost of Production	4.220	4.819		
Depreciation	.089	.055		
Taxes	.234	.125		
Loading & Shipping	.508	.076		
Total Cost at Mine	5.051	5.075		
Budget: Estimated Cost	6.335	5.335	1.020	
Number of Shifts & Hours	2-8	2-8		
Number of Operating Days	92	208		116
Average Daily Hoist	862	705	157	

b. Comparison of Labor and Supplies

	1955 Amount	Per-Cent	1954 Amount	Per-Cent
Labor	231,675.04	57.8	471,898.96	63.3
Supplies	169,165.88	42.2	272,774.53	36.7
Total	400,840.92		744,673.49	

c. Detailed Cost Comparison

Underground Costs	1955 Amount	1955 Per Ton	1954 Amount	1954 Per Ton
Development	19,058.21	.240	84,496.14	.576
Mining	70,184.80	.884	102,444.46	.698
Tramming	23,620.28	.298	68,505.50	.467
Ventilation	3,308.02	.042	37,579.72	.256
Pumping	20,308.22	.257	58,324.09	.397
Compressor & Air Lines	7,808.02	.098	20,807.09	.142
Underground Superintendence	18,110.53	.229	42,929.32	.293
Maint: Pockets and Chutes	1,512.81	.019	4,911.98	.034
Mining Equipment	14,819.13	.187	28,202.95	.192
Levels and X-cuts	1,322.83	.016	5,630.72	.038
Shaft	1,373.95	.017	4,752.60	.032
Holiday Allowance	2,179.76	.027		
Vacation Pay	5,420.56	.068		
Abandoning Mine	41,021.96	.517		
Total Underground Costs	230,049.08	2.899	458,584.57	3.125

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8. COST OF OPERATING (Cont'd)

c. Detailed Cost Comparison (Cont'd)

	1955		1954	
Surface Costs	Amount	Per Ton	Amount	Per Ton
Hoisting	21,063.55	.265	43,754.82	.298
Crushing & Screening-Surface	4,775.05	.060	11,796.01	.080
Stocking	9,552.72	.120	22,502.07	.153
Timber Yard	882.02	.011	3,440.10	.023
Dryhouse	5,110.38	.065	10,890.05	.075
Policing			313.16	.002
General Surface	4,357.76	.055	11,912.46	.081
Maint: Headframe Building	18.76	-	2,044.46	.014
Other Mine Buildings	1,003.16	.013	3,455.94	.024
Holiday Allowance	1,156.38	.014		
Vacation Pay	2,813.88	.036		
Total Surface Costs	50,733.66	.639	110,109.07	.750
General Mine Expense				
Geological Department	950.49	.012	3,217.85	.022
Mining Engineering Department	4,412.28	.055	8,334.06	.057
Mech. and Elect. Engineering Dep't.	215.80	.003	2,191.85	.015
Safety Department	993.95	.013	1,860.04	.013
Research Laboratory	89.59	.001	1,079.61	.007
Analysis & Grading-Laboratory	3,768.67	.047	8,916.99	.061
Analysis & Grading-Shipping	544.42	.007	1,480.74	.010
Telephone & Safety Devices			7,539.76	.051
Welfare - General			831.20	.006
Welfare - District			439.25	.003
Special Expense - Pensions	12.28	-	23.91	-
Retirements	601.51	.007	1,301.86	.009
Legal			849.64	.006
Hygienic Clinic	993.68	.013	802.20	.005
Employment Office	134.45	.002	392.45	.003
Other	150.85	.002	369.18	.002
Ishpeming Office	9,148.29	.115	15,390.00	.105
Mine Office - Supt. and Clerks	21,284.62	.268	28,647.71	.195
Central Warehouse Overhead	1,242.74	.016	4,341.60	.030
Insurance Property	933.09	.012	923.94	.006
Insurance-Group, Health & Life	639.50	.008	4,991.98	.034
Insurance-Group Annuity	1,474.14	.019	4,036.01	.027
Insurance-Catastrophe	556.41	.007	1,019.08	.007
Personal Injury-Comp. and Doctors	2,543.99	.032	3,778.92	.026
Personal Injury-Comp. Department	111.86	.001	669.64	.005
Vacation Pay - Current Year			17,583.08	.120
Vacation Pay - Prior Year Adjustment			1,890.00	.012
Holiday Allowance			9,393.00	.064
Taxes - Unemployment Insurance	713.61	.009	3,966.32	.027
Taxes - Old Age Benefit	4,771.62	.060	7,074.75	.048
Personal Injury-Hospital Deficit	246.34	.003	433.11	.003
Flooding Land - Rental			200.00	.001
Rental - Ford Truck & Trailer			217.14	.001
Mine Office Expense Sup. Inventory Adj.			1,951.37	.013
Employee Insurance & Compensation	1,090.00	.014		
Overhead Charge to Inland Steel Co.	3,302.11	.042		
Total General Mine Expense	54,098.35	.682	138,455.50	.944
COST OF PRODUCTION	334,881.09	4.220	707,149.14	4.819

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8. COST OF OPERATING (Cont'd)

c. Detailed Cost Comparison (Cont'd)

Because the Spies Mine was through hoisting as of June 2nd, 1955, it is rather difficult to make a cost comparison in view of the fact that considerable money was expended for abandoning mine purposes. Therefor, a good comparison of cost cannot be expressed.

9. TAXES

The following is a comparison of the taxes for the past two years in Iron County:

Description	1955 Valuation	1955 Taxes	1954 Valuation	1954 Taxes
IRON RIVER TOWNSHIP				
SPIES MINE:				
NE¼ of NW¼ of Sec. 24, 43-35, 40 A)				
SE¼ of NW¼ of Sec. 24, 43-35, 40 A)				
Virgil Mine Lease No. 51)	35,000	875.00	35,000	875.00
SW¼ of NW¼ of Sec. 24, 43-35, 40 A)				
Pers. Prop., Stockpiles, Supplies & Equip.	400,000	10,000.00	400,000	10,000.00
Total Spies Mine	435,000	10,875.00	435,000	10,875.00
Mineral Lands	450	11.25	-	-
Spies Dwellings & Mineral Lands	1,250	31.25	1,250	31.25
TOTAL IRON RIVER TOWNSHIP	436,700	10,917.50	436,250	10,906.25
Tax Rate		25.00		25.00
CRYSTAL FALLS TOWNSHIP				
Mineral Lands	5,450	212.55	5,525	215.52
Tax Rate		29.00		39.00
VILLAGE OF MINERAL HILLS				
SPIES MINE				
NE¼ of NW¼ of Sec. 24, 43-35, 40 A)				
SE¼ of NW¼ of Sec. 24, 43-35, 40 A)				
VIRGIL MINE LEASE No. 51	35,000	275.31	35,000	270.75
SW¼ of NW¼ of Sec. 24, 43-35, 40 A)				
Pers. Prop., Stockpiles, Supplies & Equip.	400,000	3,146.34	400,000	3,094.27
Total Spies Mine	435,000	3,421.65	435,000	3,365.02
Spies Dwellings	1,250	9.83	1,250	9.67
TOTAL VILLAGE OF MINERAL HILLS(°)	436.250	3,431.48	436,250	3,374.69
Tax Rate		7.8658368		7.7356705
CITY OF IRON RIVER				
SPIES-JOHNSON FEE				
SE¼ of NE¼ of Sec. 24, 43-35, 40 A.	50,000	2,000.00	50,000	2,000.00
NE¼ of SE¼ of Sec. 24, 43-35, 40 A.	50,000	2,000.00	50,000	2,000.00
Mineral Lands				
W½ of E½ of Sec. 25, 43-35 (McDermott Lease)	4,000	160.00	4,000	160.00
NE¼ of NE¼ of Sec. 24, 43-35, 40 A.	2,000	80.00	2,000	80.00
NW¼ of NE¼ of Sec. 24, 43-35, 40 A.	1,600	64.00	1,600	64.00
NW¼ of SE¼ of Sec. 24, 43-35, 40 A.	1,600	64.00	1,600	64.00
NE¼ of SW¼ of Sec. 24, 43-35, 40 A.	1,400	56.00	1,400	56.00
Mineral Lands - Other	1,120	44.80	1,120	44.80
Collection Fees		44.68		44.68
TOTAL CITY OF IRON RIVER	111,720	4,513.48	111,720	4,513.48
Paid in August 1955		2,256.74		2,256.74
Paid in January 1956		2,256.74		2,256.74
Tax Rate		40.00		40.00

(°) Iron River Township & Village of Mineral Hills taxes are assessed on same valuation.

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10. ACCIDENTS AND PERSONAL INJURY

a. Compensable Injuries

There were no compensable injuries in 1955.

b. Accident Statistics

	Frequency Rate	Severity Rate
1955	11.32	34
1954	23.65	.479

11. POWER

The Cleveland-Cliffs Iron Company had a contract with the Wisconsin-Michigan Power Company which carried through 1957 for a minimum charge of $1,127.00 per month. When the Spies Mine was closed, the power company was requested to cancel the contract which they very obligingly did as of July, 1955.

Year	Maximum Demand	Per K.W.H.	Total K.W.H.	Cost Per Ton
1955	886	.0142	2,629,000	.471
1954	971	.0141	5,121,900	.493

AGNEW MINE

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1. GENERAL

Operations were carried forward from the first of the year on a 2-shift, 5-day-per-week schedule. Ore was placed in stockpile from the first of the year until April 19. Loading of direct ore into cars from the pocket started on April 19 and continued until November 28 at which time stocking was resumed for the balance of the year. Loading of the Agnew-Alworth stockpile began April 22 and continued until May 26.

The M. A. Hanna Company produced for Cliffs account 7,333 tons of merch ore and 19,079 tons of concentrates for a total of 26,412 tons of ore under the Agnew-South Agnew cross mining agreement.

The Range Mining & Contracting Company was awarded a contract to mine the North Pillar ore. This ore was stockpiled in the Hull pit and reloaded by the Oliver Iron Mining Division into railroad cars and hauled out of their Hull-Rust pit. A total of 27,123 tons of ore was shipped from the North Pillar, including 204 tons of ore the Oliver owed from a previous trespass.

2. PRODUCTION-SHIPMENTS-INVENTORIES

a. Production

Crude Ore		26,803
Concentrates-Agnew		19,079
Direct Ore:		
Shaft	115,622	
Open Pit	7,333	
Pillar	27,123	150,078

b. Shipments

Agnew Shaft	111,527
Agnew Direct*	7,333
Agnew Concentrates*	19,079
Agnew Pillar**	27,123
	165,062

c. Inventory

Agnew Shaft	11,668

d. Production by Months

Crude Ore

September	11,381
October	15,422
	26,803

Concentrates

Month	Shaft	Direct	Pillar	Concts	Total
January	7,287				7,287
February	6,977				6,977
March	7,524				7,524
April	8,772				8,772
May	16,478				16,478
June	11,443				11,443
July	6,977				6,977
August	11,489				11,489
September	10,048	3,494		7,649	21,191
October	9,167	3,839		11,430	24,436
November	9,287		27,123		36,410
December	10,173				10,173
	115,622	7,333	27,123	19,079	169,157

(*) Ore Mined by M. A. Hanna Company
(**) Ore Mined by Range Improvement Company

3. ANALYSIS

a. Tonnage and Analysis of Ore Produced

Agnew	Tons	Iron	Phos	Silica	Mang	Alum	Moisture
Shaft	115,622	55.50	.063	11.24	.80	1.57	14.40
Direct	7,333	55.85	.051	10.46	.80	1.22	13.45
Concentrates	19,079	55.20	.051	12.08	.54	1.34	11.65
Pillar	27,123	54.71	.056	10.74	.87	1.02	12.94
	169,157	55.35	.060	11.22	.78	1.44	13.81

b. Tonnage and Complete Analysis of Ore Shipped

Agnew	Tons	Iron	Phos	Silica	Mang	Alum	Lime	Mag	Sulfur	Ign Loss	Moisture
Shaft	111,527	55.63	.063	11.12	.79	1.60	.12	.12	.009	6.21	14.53
Direct	7,333	55.85	.051	10.46	.80	1.22	.07	.07	.009	7.05	13.45
Concentrates	19,079	55.20	.051	12.08	.54	1.34	.10	.07	.009	6.72	11.65
Pillar	27,123	54.71	.056	10.74	.87	1.02	.12	.12	.009	8.39	12.94
	165,062	55.44	.060	11.14	.78	1.46	.12	.11	.009	6.64	13.89

c. Mine Analysis of Ore in Stockpile

Agnew	Tons	Iron	Phos	Silica	Mang	Alumina	Moisture
Shaft	11,668	54.15	.062	12.37	.83	1.36	13.18

4. ESTIMATE of ORE RESERVES

a. Developed Ore - Factors Used

Merch

Cubic Feet Per Ton	14
Rock Deduction	0
Per Cent Recovery	100

b. Ore Reserves as of December 31, 1955

Agnew Lease NE-NE,11-57-21	Reserve 12-31-54	Mined 1955	Balance After Mining	Changed by Re-estimate	Reserve 12-31-55
Underground	62,900	142,745*		87,345	7,500
Open Pit	54,059	26,412	27,647	10,353	38,000
	116,959	169,157	27,647	97,698	45,500

(*) Includes 27,123 tons underground ore in North Pillar, mined open pit.

Note: Based on estimated production to deplete mines.

c. Estimated Analysis of Reserves

NE-NE 11-57-21	Tons	Iron	Phos	Silica	Mang	Alum
Underground Merch	7,500	55.65	.063	11.11	.80	1.59
Open Pit Merch	25,000	55.75	.050	11.00	.60	1.50
Open Pit Wash	13,000	55.50	.050	12.00	.48	1.25
	45,500	55.66	.052	11.30	.60	1.44

Note: Underground - Estimated Production to Deplete Mine
Open Pit - Hanna Trespass on Agnew

5. LABOR and WAGES

a. Comments

The labor supply was more than ample throughout the year. There were five gangs of miners employed during the entire year. An increase in wages was granted effective July 1,1955, setting the miner's (Job Class 14) minimum rate at $2.465 per hour. Favorable union relations continued throughout the year. On a combined basis for the Agnew-Alworth mines, tons per man per day for underground was 2.537 tons higher and for surface 3.241 lower, for a total of 1.468 tons per man per day higher than last year. An even greater increase could have been effected in tons per man per day if the surface labor could have been decreased in proportion to the decrease in tonnage over last year. On a combined basis for the Agnew-Alworth mines, cost per ton for underground labor was $0.379 lower and for surface labor $0.084 higher than last year, for a total of $0.295 per ton lower than last year. Even with the increase in wages over last year, this lower cost is due mainly to the increase in tons per man per day.

b. Comparative Statement of Production and Wages - 1955

Production	Agnew	Alworth	Combined
Direct Ore	116,622	45,034	160,656
Number of Days Operated	253	253	253
Average Daily Production	457	178	635
Average Number of Men Working			71.75
Tons Per Man Per Day-Miners			21.539
Tons Per Man Per Day-Underground			11.748
Tons Per Man Per Day-Total Mine			9.033

Average Rate Per Day	Combined
Surface	18.22
Underground	22.47
Contract Miners	23.56
Total Mine	21.49
Amount Paid for Labor	$382,198.05
Labor Cost Per Ton	$2.379

6. SURFACE

a. Building & Repairs

Minor maintenance repairs to buildings were carried on through the year.

b. Roads & Water Lines — No major changes.

c. Miscellaneous General Construction — None.

7. UNDERGROUND

a. Minor maintenance repairs to the shaft were carried on through the year.

b. Development — None.

c. Mining

Mining was carried on throughout the year with five gangs employed caving and drifting. Hard drilling and blocky ore made caving conditions a little less than ideal. Conveyor equipment has been removed as drift pillars were mined back. A new drift was driven to meet the old ventilation drift to provide better circulation of air.

d. Timber, Explosives, Etc.

The supply of timber was ample and of good quality. Timber inventories were brought down to a minimum and only enough timber was ordered to keep supplying the needs of the mine for a couple of weeks at a time. All timber on inventory of such sizes that looked as though it would not be used during the year was cut to smaller lengths to meet other demands. Tamarack was used in all of the slicing work.

Lineal Feet of Timber Used Per Ton	.359
Cost Per Ton	
Timber	$0.082
Lagging, Poles, Boards	0.056
Wire	0.000
Explosives	0.115
Pounds of Explosives Per Ton	0.547

e. Pumping & Drainage

Some work was done on top of the dump with a bulldozer to prevent water draining into the caves. Mine water flow averaged 450 gallons per minute, considerably less than in past years.

8. BENEFICIATION — None

9. MAINTENANCE & REPAIRS

A continuous program of maintenance and repair was carried on throughout the year, with the major repair work done on regularly scheduled shifts.

10. COST of PRODUCTION

a. Comparative Cost Statement

Product	1955 Budget	1955 Actual	1954 Actual
Direct Ore	110,347	108,287	98,534
Stockpile Overrun		7,335	5,711
	110,347	115,622	104,245
South Agnew Boundary Ore		26,412	
North Pillar Contract Mining		27,123	
	110,347	169,157	104,245
Average Daily Product		668.60	422.04
Tons Per Man Per Day-Combined		9.033	7.565
Days Operated		253	247

Costs	1955 Budget	1955 Actual	1954 Actual
Total Costs			
Underground	$2.449	$2.402	$2.838
Surface	0.319	0.310	0.313
General Mine	0.656	0.503	0.623
	$3.424	$3.215	$3.774
Depletion - Original Cost		0.034	0.038
Depreciation			
Plant and Equipment		0.295	0.215
Motorized Equipment			0.002
Taxes			
Ad Valorem		0.042	0.054
Occupational		0.028	
Royalty		0.117	0.070
Total Depletion, Depreciation, Taxes		$0.516	$0.379
Loading and Shipping		0.084	0.091
Total Cost at Mine		$3.815	$4.244
Administrative Expense		0.046	0.050
Miscellaneous Income & Expense		0.054	0.049
		$3.915	$4.343
Royalty		0.688	
South Agnew Boundary Ore		2.716	
North Pillar Contract Mining		2.340	
Total Cost of Production		$3.945	$4.343

Note: Figures are taken from mine cost sheets and are not final costs from Cleveland.

Average daily product figure of 668.60 is arrived at by dividing days operated into total production of 169,157 tons, which includes South Agnew boundary ore and North Pillar--both produced by outside operations. The actual production of 115,622 tons at the Agnew divided by 253 operating days will yield an average daily product of 457.00.

b. Cost Comments

Total underground cost was $0.047 lower than the yearly budget and $0.436 lower than last year's cost. Surface cost was $0.009 lower than the yearly budget and $0.003 lower than last year's cost. Higher production than estimated was a contributing factor to the lower-than-budget cost. Higher Agnew production partially offset the lower Alworth production. Items charged to both mines on a proportionate basis are higher for the Agnew than the overproduction would indicate because the Alworth mine produced less than estimated.

11. EXPLORATION & FUTURE EXPLORATION

An exploratory drilling program has been proposed before abandoning the mine.

12. TAXES

	1955		1954		Increase Decrease	
	Assessed Value	Taxes	Assessed Value	Taxes	Assessed Value	Taxes
Mineral	$28,073	$3579.02	$35,070	$4127.38	-$6,997	-$548.36
Lands,Bldgs,Mach.	6,532	832.76	6,532	768.75		+ 64.01
Personal Property						
Equipment	2,358	300.62	3,406	400.85	- 1,048	- 100.23
Stockpile	1,049	133.74	2,409	283.52	- 1,360	- 149.78
	$38,012	$4846.14	$47,417	$5580.50	-$9,405	-$734.36
Average Mill Rate	127.49			117.69		

Mill rate increase 8.33 per cent. Mineral value decreased by mining. Some equipment removed from property reduced personal property value. Also, smaller stockpile on hand than previous year.

13. ACCIDENTS & PERSONAL INJURY

Name	Date of Injury	Cause	Nature	Time Lost	Compensation Paid
Peter Grcevich	2-1-55	Motorman and crew had parked train of six empty cars by Contract #8 slide and took motor and two trucks of timber into #5 Contract. Grcevich saw men as he left Contract #5 and proceeded to #8. Men finished unloading timber and motorman had just coupled motor on to empty cars as Grcevich stepped out of #8 Contract. Slack in cars pushed train ahead about 20 inches, just far enough to catch Grcevich across abdomen and chest as he was squeezed between end car and open set post.	Multiple fractures of ribs anteriorly-bilaterally with a severe hematoma left hip and groin with complicating pneumonitis and moderately severe ecchymosis of head and shoulders.	8 weeks	$595
Guyo Skarich	4-12-55	While rolling large rock squeezed right hand between rock and post.	Fractured second metacarpal bone about 3/4 inch from distal end.	8 weeks	$320

14. PROPOSED NEW CONSTRUCTION — None

15. EQUIPMENT RECEIVED & PROPOSED NEW EQUIPMENT

a. Equipment Purchased & Put Into Use in 1955 — None

b. Proposed New Equipment — None

ALWORTH LAND RESERVE

ANNUAL REPORT

YEAR 1955

1. GENERAL

Operations were carried forward from the first of the year on a 2-shift, 5-day schedule. Ore was placed in stockpile until April 19; loading of direct ore into cars from the pocket started April 19 and continued until November 28 when stockpiling was resumed for the balance of the year; loading of the Agnew-Alworth stockpile continued from April 22 until May 26.

The Rhude-Gilbert Company stripped 516,432 cubic yards of material for the year. 3,500 tons of lean material were put in the lean ore dump and 212,539 tons of direct ore were shipped during the year. Stripping operations were discontinued on December 23.

2. PRODUCTION-SHIPMENTS-INVENTORIES

Alworth	Production	Shipments	Stockpile
Underground Shaft	45,034	48,968	1,483
Open Pit Direct	212,539	212,539	
	257,573	261,507	1,483

d. Production by Months

	Tons		
Month	Underground Shaft	Open Pit Direct	Total
January	6,794		6,794
February	6,070		6,070
March	4,343		4,343
April	2,684	6,711	9,395
May	7,201	20,386	27,587
June	2,915	36,889	39,804
July	3,024	36,215	39,239
August	2,029	36,355	38,384
September	2,936	39,374	42,310
October	3,447	19,504	22,951
November	2,108	17,105	19,213
December	1,483		1,483
	45,034	212,539	257,573

3. ANALYSIS

a. Analysis of Production

Alworth	Tons	Iron	Phos	Silica	Mang	Alum	Moisture
Underground Shaft	45,034	55.63	.064	10.88	.76	1.65	15.08
Open Pit Direct	212,539	56.93	.069	9.00	.98	2.69	16.24
	257,573	56.70	.068	9.33	.94	2.51	16.04

b. Tonnage & Complete Analysis of Ore Shipped

Alworth	Tons	Iron	Phos	Silica	Mang	Alum	Lime	Mag	Sulfur	Ign Loss	Moist.
Underground Shaft	48,968	55.49	.064	11.04	.77	1.58	.08	.08	.011	6.62	14.85
Open Pit Direct	212,539	56.93	.069	9.00	.98	2.69	.16	.11	.008	3.65	16.24
	261,507	56.66	.068	9.38	.94	2.48	.15	.10	.008	3.96	15.98

c. Analysis of Ore in Stockpile

Alworth	Tons	Iron	Phos	Silica	Mang	Alum	Moisture
Underground Shaft	1,483	59.28	.078	6.25	.77	2.57	17.58

4. ESTIMATE of ORE RESERVES

a. Developed Ore - Factors Used

Material	Cubic Feet Per Ton	Per Cent Rock Deduction	Per Cent Recovery
Merch	14	0	100
Siliceous Merch	14	0	90
Wash Concentrates	14	0	61
Low Grade Wash Concentrates	14	0	60
Lean Wash Concentrates	14	0	46
Retreat Concentrates	14	0	40

b. Estimate of Ore Reserves as of December 31, 1955

Lease	Reserve 12-31-54	Mined 1955	Balance after Mining	Changed by Re-estimate	Reserve 12-31-55
Alworth	681,844	257,573	424,271	+12,934	437,205

c. Estimated Analysis of Ore Reserves

Alworth	Tons	Iron	Phos	Silica	Mang	Alum
Bessemer Merch Open Pit	97,832	57.18	.030	9.91	.22	.48
Non Bessemer Merch Open Pit	173,921	58.26	.091	7.16	1.01	2.35
Non Bessemer Merch Underground	2,500	55.51	.063	11.04	.76	1.62
Bessemer Wash Concentrates Open Pit	8,236	57.45	.034	9.45		
Non Bessemer Wash Concts Open Pit	89,695	55.70	.058	12.92		
Non Bessemer Retreat Concts Open Pit	32,415	58.20	.078	10.32		
Non Bessemer Siliceous Merch Open Pit	32,606	52.73	.084	15.79	.40	1.60
	437,205	57.05	.067	9.90	.69	1.67
Merch						
Bessemer	97,832	57.18	.030	9.91	.22	.48
Non Bessemer	176,421	58.23	.090	7.20	1.00	2.34
Non Bessemer Siliceous	32,606	52.73	.084	15.79	.40	1.60
	306,859	57.31	.070	8.98	.69	1.67
Concentrates						
Bessemer Wash	8,236	57.45	.034	9.45		
Non Bessemer Wash	89,695	55.70	.058	12.92		
	97,931	55.85	.056	12.63		
Non Bessemer Retreat	32,415	58.20	.078	10.32		
Total Alworth	130,346	56.43	.062	12.05		
Grand Total Alworth Ore Reserves	437,205	57.05	.067	9.90	.69	1.67

5. LABOR & WAGES

a. Comments

An ample labor supply existed throughout the year. Five gangs of miners were employed for the first three months, and only two for the remainder of the year. A wage increase effective July 1, 1955, established the miner's (Job Class 14) minimum rate at $2.465 per hour. Favorable union relations existed during the year.

On a combined basis for the Agnew-Alworth mines, tons per man per day for underground labor was 2.537 tons higher and for surface labor 3.241 tons lower, for a total of 1.468 tons higher than last year. The total increase in tons per man per day might have been even greater if surface labor could have been decreased proportionately to the decrease in tonnage over last year.

On a combined basis for the Agnew-Alworth mines, the cost per ton for underground labor was $0.379 lower and for surface labor $0.084 higher, for a total of $0.295 per ton lower than last year. Even with an increase in wages over last year, this lower labor cost was due mainly to increased tons per man per day.

b. Comparative Statement of Production and Wages 1955

Production	Agnew	Alworth	Combined
Direct Ore	115,622	45,034	160,656
Number of Days Operated	253	253	253
Average Daily Production	457	178	635
Average Number of Men Working			71.75
Tons Per Man Per Day			
Miners			21.539
Underground			11.748
Total Mine			9.033
Average Rate Per Day			
Surface			$18.22
Underground			22.47
Contract Miners			23.56
Total Mine			21.49
Amount Paid for Labor			$382,198.05
Labor Cost Per Ton			$2.379

6. SURFACE

a. Buildings & Repairs

Minor maintenance repairs to buildings were carried on through the year.

b. Roads & Water Lines — None

c. Miscellaneous General Construction — None

7. UNDERGROUND

a. Ventilating Shaft — None

b. Development — None

c. Mining

Five gangs mined for the first three months and two gangs for the balance of the year. Slices varied from six to fourteen feet in height and ten feet in width. Low mining height and a sand back were a drawback in increasing tons per man per day. Conveyor equipment was removed as drift pillars were mined back.

d. Timber, Explosives, Etc.

The timber supply was ample and of good quality. Timber inventories were brought down to a minimum, and only enough timber was ordered to maintain supplies for a couple of weeks. All timber on inventory of such sizes that looked as though it would not be used during the year was cut to shorter lengths to meet other demands. Jackpine was used in all slicing work.

Used Per Ton of Ore	
Lineal Feet of Timber	1.017
Pounds of Explosives	0.472

Cost Per Ton	
Timber	$0.214
Lagging, Poles, Boards	0.190
Wire	0.025
Explosives	0.098

e. Pumping & Drainage

Use of small individual pumps was continued in working places to improve working conditions and to keep ore from being slushed through the water in the drifts.

8. BENEFICIATION None

9. MAINTENANCE & REPAIRS

A continuous program of maintenance and repair was carried on throughout the year, with the majority of repair work being done on regularly scheduled shifts.

10. COST of PRODUCTION

a. Comparative Cost Statement

Product	1955 Budget	1955 Actual	1954 Actual
Direct Ore	46,564	41,414	110,084
Stockpile Overrun		3,620	8,581
	46,564	45,034	118,665
Average Daily Output		178.00	480.34
Tons Per Man Per Day-Combined		9.033	7.565
Days Operated		253	247
Costs			
Total			
Underground	$2.909	$2.925	$3.195
Surface	0.341	0.322	0.319
General Mine Expense	0.656	0.539	0.623
	$3.906	$3.786	$4.137
Depletion - Original Cost		0.036	0.051
Depreciation			
Plant & Equipment		0.313	
Motorized Equipment			0.001
Development		0.119	0.009

Costs	1955 Budget	1955 Actual	1954 Actual
Taxes			
Ad Valorem		$0.115	$0.051
Occupational		-0.056	
Royalty		0.111	0.073
Total Depletion, Depreciation, Taxes		$0.638	$0.185
Loading & Shipping Costs		0.114	0.114
Total Cost at Mine		$4.538	$4.436
Miscellaneous Income & Expense		0.037	0.050
Royalty		0.688	
Total Cost of Production*		$5.263	$4.486

*Figures above are not final yearend figures from Cleveland.

b. Cost Comments

Total underground cost was $0.016 higher than the budget and $0.270 lower than last year's cost; total surface cost was $0.019 lower than the budget and $0.003 higher than last year's cost.

The Alworth mine produced 1,530 tons less than estimated and the conclusion reached is that cost should have been higher than estimated. This is offset by the Agnew's overproduction of 5,275 tons, thereby making all charges that were on a proportionate basis lower than estimated. Underground and surface costs for the Alworth mine, therefore, compare favorably with the budget.

11. EXPLORATION & FUTURE EXPLORATION — None

12. TAXES

	1955		1954		Increase Decrease	
	Assessed Value	Taxes	Assessed Value	Taxes	Assessed Value	Taxes
Mineral	$109,848	$19,604.58	$156,228	$25,424.54	-$46,380	-$5,819.96
Land, Bldgs, Mach	6,941	1,238.76	6,941	1,129.58		+ 109.18

	1955		1954		Increase Decrease	
	Assessed Value	Taxes	Assessed Value	Taxes	Assessed Value	Taxes
Personal Property						
Equipment	$ 933	$ 166.51	$ 933	$ 151.84		+$ 14.67
Stockpile	1,298	231.65	2,968	483.00	-$ 1,670	-$ 251.35
	$119,020	$21,241.50	$167,070	$27,188.96	-$48,050	-$5,947.46
Average Mill Rate	178.47		162.74			

Mineral value decrease by mining and a smaller stockpile on hand May 1 more than offset the 10.97 per cent increase in mill rate.

13. ACCIDENTS & PERSONAL INJURY

There have been no compensable injuries during the entire year.

14. PROPOSED NEW CONSTRUCTION — None

15. EQUIPMENT RECEIVED & PROPOSED NEW EQUIPMENT

a. Equipment Purchased & Put Into Use in 1955 — None

b. Proposed New Equipment — None

CANISTEO MINE

ANNUAL REPORT

YEAR 1955

1. GENERAL

Total shutdown of all activities, effective November 26, 1954, continued until March 1, 1955, when a limited number of employees were recalled to repair pit, plant, and stripping conveyor equipment prior to the start of the 1955 ore season.

Pit cleanup and blasthole drilling in preparation for the ore season were conducted during the week of April 18 on a 2-shift, 5-day-per-week schedule.

Loading of ore from stockpile was started on April 30. 27,929 tons were loaded out by May 5, depleting the 1954 stockpile.

Ore operations began on April 25 on a 2-shift, 5-day-per-week schedule and were increased to a 2-shift, 6-day-per-week schedule on June 25 and continued until shutdown of ore operations on October 27. 2,216,948 tons of gross crude ore were moved, which included 189,599 tons of screen rock. This ore was produced from three separate leases in the pit at an average rate of 7,592 tons per shift.

Operating on the same schedule as the pit, the concentrating plant received 2,027,349 tons of crude ore and produced 908,813 tons of concentrates at an average rate of 3,112 tons per shift.

The fine ore plant was operated on the same schedule as the main plant, treating current tailings on the day and afternoon shifts and basin tailings on the night shift.

A total of 106,524 tons of fine ore concentrates was produced at an average rate of 248 tons per shift. This included 66,060 tons from classifier overflows at 231 tons per shift and an average weight recovery of 8.29 per cent, and 40,464 tons from basin tails at 281 tons per shift and an average weight recovery of 23.21 per cent.

After shutdown, ore was shipped from stockpile intermittently until November 26. 261,982 tons of ore were shipped from the 1955 stockpile, leaving 66,585 tons in stockpile at the end of the 1955 season.

Conveyor stripping operations, started on May 2 on a 3-shift, 5-day schedule, were stepped up to a 6-day schedule on June 25 and carried forward until the shutdown of operations on October 20. 611,095 cubic yards of surface overburden were removed at an average rate of 1,539 cubic yards per shift.

At the close of ore season, pit operations were immediately diverted to truck stripping on a 3-shift, 5-day schedule which continued into 1956. Up to January 1, a total of 506,939 cubic yards was removed at an average rate of 3,357 cubic yards per shift. Approximately 139,000 cubic yards of this material were used to raise and repair tailings pond dykes.

Necessary repairs to pit and plant equipment were started immediately after completion of ore operations and continued into 1956.

2. PRODUCTION-SHIPMENTS-INVENTORIES

a. Production by Grades

	Crude	Wash	Retreat	Tailings Basin Fines	Total
Snyder		17,005	243,271		260,276
Bovey		1,904	926,819		928,723
Hemmens		10,914	827,436		838,350
Canisteo				174,348	174,348
		29,823	1,997,526	174,348	2,201,697

	Wash	Retreat		Fines		Classifier		
Concentrates	Non-Bess	Bess	Non-Bess	Bess	Non-Bess	Bess	Non-Bess	Total
Snyder	9,915	10,686	99,770			5,242	4,224	129,837
Bovey	1,568	4,612	417,677			6,725	28,342	458,924
Hemmens	5,862	35,844	322,879			12,299	9,228	386,112
Tails Basin				17,362	23,102			40,464
	17,345	51,142	840,326	17,362	23,102	24,266	41,794	1,015,337

b. Shipments by Grades

Material Shipped	Wash	Retreat		Tailings Basin Fines		Classifier		Total
	Non-Bess	Bess	Non-Bess	Bess	Non-Bess	Bess	Non-Bess	
Snyder	9,111	10,686	99,824			5,242	4,224	129,087
Bovey	1,511	4,612	385,992			6,725	28,342	427,182
Hemmens	5,917	35,844	311,328			12,299	9,228	374,616
Canisteo				17,362	23,102			
	16,539	51,142	797,144	17,362	23,102	24,266	41,794	971,349

c. Stockpile Inventories

Material	Wash	Retreat	Total
Snyder	921	5,063	5,984
Bovey	57	35,635	35,692
Hemmens	1,059	23,850	24,909
	2,037	64,548	66,585

d. Production by Months

Crude Ore

Month	Snyder		Bovey		Hemmens		Canisteo Tailings Basin Fines	Total
	Wash	Retreat	Wash	Retreat	Wash	Retreat		
April		48,892				9,232		58,124
May	12,875	65,334		5,899		195,966	19,784	299,858
June	4,130	53,201		42,615		214,951	26,978	341,875
July				304,104			23,564	327,668
Aug.			1,904	362,460		12,287	29,684	406,335
Sept.		31,172		211,741		135,307	34,436	412,656
Oct.		44,672			10,914	259,693	39,902	355,181
	17,005	243,271	1,904	926,819	10,914	827,436	174,348	2,201,697

Concentrates

Month	Snyder Wash	Snyder Retreat	Snyder Class	Bovey Wash	Bovey Retreat	Bovey Class	Hemmens Wash	Hemmens Retreat	Hemmens Class	Tailings Basin Fines	Total
April		15,036	900					4,301			20,237
May	6,917	30,694	3,296		3,101	511	262	83,184	4,710	2,978	135,653
June	2,998	23,631	1,814		17,894	1,830		92,461	3,880	7,009	151,517
July					138,726	10,212				5,414	154,352
Aug.				1,568	164,091	12,756		4,525	313	6,642	189,895
Sept.		15,389	1,383		98,477	9,758		64,113	3,461	8,840	201,421
Oct.		25,706	2,073				5,600	110,139	9,163	9,581	162,262
	9,915	110,456	9,466	1,568	422,289	35,067	5,862	358,723	21,527	40,464	1,015,337

3. ANALYSIS

a. Crude Ore

Material	Tons	Iron	Silica
Snyder			
Wash	17,005	47.31	30.25
Retreat	243,271	45.01	30.12
Bovey			
Wash	1,904	47.80	25.40
Retreat	926,819	43.14	30.49
Hemmens			
Wash	10,914	34.68	41.77
Retreat	827,436	41.20	34.06
Canisteo Tailings Basin Fines	174,348	28.67	53.99
	2,201,697	41.47	33.71

Canisteo Mine
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b. Tonnage & Analysis of Concentrates Produced

Concentrates	Tons	Iron	Phos	Silica	Mang	Alum	Moisture
Snyder							
Non Bessemer Wash	9,915	56.31	.070	11.67	.48	.44	7.53
Bessemer Retreat	10,686	56.65	.040	11.28	.41	.46	7.88
Non Bessemer Retreat	99,770	56.95	.060	11.27	.49	.41	7.67
Bessemer Classifier	5,242	58.14	.037	12.52	.28	.37	7.17
Non Bessemer Classifier	4,224	56.72	.039	13.61	.31	.35	7.60
Bovey							
Non Bessemer Wash	1,568	55.07	.084	13.27	.48	.31	6.18
Bessemer Retreat	4,612	56.73	.068	12.08	.39	.42	6.82
Non Bessemer Retreat	417,677	55.90	.090	11.75	.67	.39	6.82
Bessemer Classifier	6,725	57.73	.047	11.79	.31	.41	6.93
Non Bessemer Classifier	28,342	56.46	.058	13.06	.36	.35	6.93
Hemmens							
Non Bessemer Wash	5,862	55.07	.071	11.53	.94	.47	7.27
Bessemer Retreat	35,844	56.64	.038	11.31	.35	.41	8.21
Non Bessemer Retreat	322,879	55.15	.065	11.70	1.16	.43	7.44
Bessemer Classifier	12,299	56.29	.036	13.30	.65	.44	7.94
Non Bessemer Classifier	9,228	54.66	.048	14.21	.83	.40	8.09
Canisteo							
Bessemer Tailings Basin Fines	17,362	57.13	.039	12.27	.39	.38	7.65
Non Bessemer Tailings Basin Fines	23,102	56.60	.041	12.71	.39	.36	7.62
	1,015,337	55.88	.072	11.79	.77	.40	7.24

c. Tonnage & Analysis of Concentrates Shipped

Material	Tons	Iron	Phos	Silica	Mang	Alum	Lime	Mag	Sulfur	Ign Loss	Moisture
Snyder											
Non Bess Wash	5,129	56.47	.068	11.48	.44	.42	.18	.30	.015	6.08	7.73
Bessemer Retreat	9,853	56.61	.039	11.26	.41	.46	.18	.30	.015	6.17	7.93
Non Bess Retreat	65,440	57.35	.054	11.09	.45	.39	.18	.30	.015	4.45	7.93
Bess Classifier	5,242	58.14	.037	12.52	.28	.37	.18	.30	.015	3.00	7.17
Non Bess Classifier	4,224	56.72	.039	13.61	.31	.35	.18	.30	.015	3.91	7.60

Material	Tons	Iron	Phos	Silica	Mang	Alum	Lime	Mag	Sulfur	Ign Loss	Moisture
Bovey											
Non Bessemer Wash	1,353	54.91	.084	13.51	.48	.29	.18	.30	.015	4.95	6.10
Bessemer Retreat	1,211	55.48	.114	13.43	.27	.30	.18	.30	.015	3.45	5.92
Non Bess Retreat	250,222	55.79	.095	11.81	.75	.35	.18	.30	.015	6.28	6.71
Bess Classifier	6,725	57.73	.047	11.79	.31	.41	.18	.30	.015	4.21	6.93
Non Bess Classifier	28,342	56.46	.058	13.06	.36	.35	.18	.30	.015	4.72	6.93
Hemmens											
Non Bessemer Wash	900	55.50	.059	9.37	.75	.33	.18	.30	.015	9.24	7.00
Bessemer Retreat	33,426	56.60	.037	11.29	.34	.41	.18	.30	.015	6.31	8.28
Non Bess Retreat	207,382	54.74	.061	11.72	1.43	.41	.18	.30	.015	6.91	7.56
Bess Classifier	12,299	56.29	.036	13.30	.65	.44	.18	.30	.015	4.27	7.94
Non Bess Classifier	9,228	54.66	.048	14.21	.83	.40	.18	.30	.015	5.44	8.09
Canisteo											
Bess T.B. Fines	17,362	57.13	.039	12.27	.39	.38	.18	.30	.015	4.52	7.65
Non Bess T.B.Fines	23,102	56.60	.041	12.71	.39	.36	.18	.30	.015	5.36	7.62
Bess Concts-1955	6,651	57.18	.051	11.60	.43	.46	.18	.30	.015	5.51	7.14
Non Bess Concts-1955	35,329	55.99	.076	11.70	.59	.47	.18	.30	.015	7.02	6.97
Non Bess Concts-1954	5,332	55.64	.073	10.97	.59	.36	.18	.30	.015	8.37	8.55
Non Bess S.P.Concts	22,597	55.81	.072	11.23	.40	.35	.18	.30	.015	7.91	6.67
	971,349	55.87	.071	11.79	.77	.40	.18	.30	.015	6.16	7.20

d. Mine Analysis of Ore in Stockpile

Material	Tons	Iron	Phos	Silica	Mang	Alum	Moisture
Snyder							
Wash	921	56.72	.057	12.62	.25	.44	8.63
Retreat	5,063	57.48	.055	11.18	.43	.42	8.10
Bovey							
Wash	57	56.50	.102	11.75	.26	.33	6.00
Retreat	35,635	56.35	.102	11.57	.43	.35	7.01
Hemmens							
Wash	1,059	51.47	.066	12.94	2.34	.61	8.19
Retreat	23,850	55.55	.060	11.64	.94	.41	8.01
	66,585	56.08	.082	11.60	.64	.38	7.49

4. ESTIMATE of ORE RESERVES

a. Developed Ore - Factors Used

Concentrates	Cubic Feet Per Ton	Rock Deduction	Per Cent Recovery
Wash	14	0	60
Lean Wash	14	0	50
Low Grade Wash	14	0	55
Lean Low Grade Wash	14	0	45
Retreat	14	0	33

b. Ore Reserves as of December 31, 1955

Lease	Reserve 12-31-54	Mined 1955	Balance after Mining	Changed by Re-estimate	Reserve 12-31-55
Bovey	1,687,714	458,924	1,228,790		1,228,790
Snyder	1,350,708	129,837	1,220,871		1,220,871
Hemmens	2,091,918	386,112	1,705,806		1,705,806
	5,130,340	974,873	4,155,467		4,155,467

c. Estimated Analysis of Reserves

Concentrates	Tons	Iron	Phos	Silica	Mang	Alum
Bovey						
Bessemer Wash	240,082	58.70	.026	9.16	.47	.44
Non Bessemer Wash	666,007	58.49	.077	9.61	.29	.49
Bessemer Retreat	35,034	57.84	.031	10.87		
Non Bessemer Retreat	287,667	56.75	.066	10.28		
	1,228,790	58.11	.063	9.71	.33	.48
Snyder						
Bessemer Wash	576,689	60.94	.038	9.20	.17	.33
Non Bessemer Wash	627,076	60.91	.055	8.33	.19	.34
Bessemer Retreat	17,106	59.05	.036	9.22		
	1,220,871	60.90	.047	8.75	.18	.34

Concentrates	Tons	Iron	Phos	Silica	Mang	Alum
Hemmens						
Bessemer Wash	728,000	59.36	.030	9.86	.26	.55
Non Bessemer Wash	816,583	57.78	.056	9.70	.41	.65
Bessemer Retreat	118,822	58.26	.033	10.45		
Non Bessemer Retreat	42,401	57.11	.077	10.09		
	1,705,806	58.47	.044	9.83	.34	.60
Mine Totals						
Bessemer Wash	1,544,771	59.85	.032	9.50	.26	.45
Non Bessemer Wash	2,109,666	58.93	.062	9.26	.31	.51
	3,654,437	59.32	.049	9.36	.29	.49
Bessemer Retreat	170,962	58.25	.033	10.41		
Non Bessemer Retreat	330,068	56.79	.067	10.26		
	501,030	57.29	.056	10.31		
Total Bessemer	1,715,733	59.69	.032	9.59	.26	.45
Total Non Bessemer	2,439,734	58.64	.063	9.38	.31	.51
	4,155,467	59.07	.050	9.48	.29	.49

5. LABOR & WAGES

a. Comments

Labor relations during the year were generally good. The nation-wide steel strike stopped operations from June 30 to July 2. The strike settlement included an increase in wages of $0.115 cents per hour plus a one-half cent increase in job class increment. Because of the normal turnover in personnel due to retirements, quits, etc., and because of increased operations, all of the available men on the seniority list were recalled to work in 1955. However, outside of men on a preferential list from other union locals, no new men were hired.

b. Comparative Statement of Production & Wages

Production (Tons)	1,015,337
Number of Days Operated	149
Number of Shifts Operated	303
Average Product Per Shift (Tons)	3,353
Average Number of Men Employed	141
Product Per Man Per Day (Tons)	49.32
Average Wages Paid Per Day	$20.37
Total Amount Paid for Labor	$427,800.45
Labor Cost Per Ton	$0.421

6. GENERAL SURFACE

a. Buildings & Repairs

No new buildings were constructed at the mine during 1955, and repairs were minor.

During the summer of 1955, conversion from coal to completely automatic oil-heating systems was completed in the shops and office, resulting in a considerable savings in labor by the elimination of stationary firemen.

b. Roads, Transmission Lines, Etc.

There were no major road or transmission line changes at the Canisteo mine in 1955.

In connection with the development of the Sally mine, plans and estimates are being developed to construct a haul road and a transmission line between the Sally and Canisteo mines in 1956.

c. Miscellaneous General Construction

During the winter of 1954, water was pumped out of the pit and collected in the new tailings pond so that it would be available for the start of the 1955 season. On March 30, 1955, water broke out of the pond in two places, damaging the dykes to the extent that the new pond could not be used at the start of the 1955 season. In July, a cross dyke was constructed so that a portion of the new basin could be used for tailings disposal for the

remainder of the 1955 season. During November and December of 1955, the dykes were repaired and reinforced so that the total area will be available for the 1956 season. Approximately 139,000 cubic yards were hauled from the North Bovey stripping cut to construct the cross dyke and to repair the damage to the main dyke.

To prevent further accidents of this type, return water is now being pumped back to the fresh water basin rather than being allowed to rise and return by gravity.

7. OPEN PIT

a. Stripping

Truck stripping during July and August was conducted intermittently to make material available for dyke construction and repairs.

On October 25, the 3-shift, 5-day schedule was effected and stripping operations were conducted accordingly for the remainder of the year. This was a single-shovel operation for a major portion of the time with seven to nine trucks hauling. Long hauls and a limited number of trucks made it impractical to increase to a two-shovel operation until the latter part of December.

During the year, truck stripping was conducted under two E&A's:

Under E&A No. CC-680, an authorization of $154,000 covered the removal of 460,000 cubic yards of surface, cretaceous, paint rock, and lean ore at a cost of $0.335 per cubic yard. This E&A was depleted with the removal of 452,592 cubic yards at a cost of $0.342 per cubic yard.

Under E&A No. CC-759, an authorization of $72,860 covered the removal of 260,000 cubic yards of surface and taconite at a cost of $0.280 per cubic yard and was set up for stripping after January 1, 1956. However, it was necessary to charge $17,994.67 against this E&A for the removal of 54,347 cubic yards of 1955 stripping at a cost of $0.331 per cubic yard.

A total of 506,939 cubic yards of truck stripping was removed in 1955 at an average rate of 3,357 cubic yards per shift and a cost of $0.355 per cubic yard, for a total expenditure of $179,786.69.

Approximately 84 per cent of the material moved was surface overburden from the North Bovey forties; the remaining 16 per cent was lean ore material from the North Bovey, West Snyder, and Hemmens forties. Almost continuous snowfall and cold weather during November and the first half of December had a very unfavorable effect on stripping operations and costs.

Conveyor-dragline stripping started on May 2 on a 3-shift, 5-day schedule. A 6-day schedule was effected on June 25 and continued until the operation shut down on October 20.

Conveyor stripping during 1955 was covered by two E&A's:

E&A No. CC-634, set up in 1954, had an unexpended balance of $18,394.31 which was used to cover a portion of the stripping costs in May, 1955.

Under E&A No. CC-679, an authorization of $147,000 covered the removal of 700,000 cubic yards of surface overburden at a cost of $0.210 per cubic yard. Before the end of the season, this E&A was exhausted, necessitating a supplemental request for $35,000 to cover the removal of 125,000 cubic yards of surface overburden at $0.280 per cubic yard.

Actual stripping removed during 1955 totalled 611,095 cubic yards at an average rate of 1,539 cubic yards per shift and a cost of $0.324 per cubic yard, for a total expenditure of $197,836.35.

Cost-per-yard on this operation was handicapped by excessive delays entailed by the type of material handled and by frequent breakdown of equipment. Material encountered varied from a heavy blue clay to very rocky hardpan. Downtime caused by equipment failure was due to breakdowns on the dragline and conveying equipment as well as on the screening plant where the chief source of delay was caused by breakdowns of the wobbler feeder. A major breakdown on this feeder made it necessary to shut down the operation completely on October 20. Belt breakage and spillage was also a source of much delay time. Most of the old belting has been run to destruction and will have to be replaced if this operation is to be continued. Another source of delay and increased cost was the wear and tear on drag cables and buckets.

Tentative plans are to idle stripping conveyor equipment during 1956.

Following is a tabulation by leases of stripping moved in 1955:

	Cubic Yards				
Lease	Surface	Cretaceous	Lean Formation	Lean Ore	Total
Bovey	425,339		8,076	4,956	438,371
Snyder	611,095*	19,116			630,211
Hemmens			49,452		49,452
	1,036,434	19,116	57,528	4,956	1,118,034

*Conveyor Stripping

b. Open Pit Mines

The 1955 ore season started on April 25 on a 2-shift, 5-day schedule and increased to a 6-day schedule on June 25 which continued until shutdown of ore operations on October 27.

The pit was operated 292 shifts on ore, producing 2,216,948 tons of gross crude which included 189,599 tons of screen rock. It was necessary to operate an additional 46.5 shifts to remove 206,397 tons of pit rock, cleanup, and lean ore, making a total of 338.5 shifts operated for the removal of 2,423,345 tons of material from the pit at an average rate of 7,159 tons per shift and a cost of $0.207 per ton.

Tonnage removed from the various leases is as follows:

Lease	Tonnage Gross Crude
Bovey	1,052,226
Hemmens	887,270
Snyder	277,452

Included in the above tonnages are 342,131 tons of gross crude ore from the various lean ore dumps in the pit.

A major portion of the Bovey ore came from the North and East Bovey forties and contained a considerable amount of rock but was quite amenable to Heavy-Media treatment and produced a fair grade of concentrates.

Hemmens ore was mined in both the upper and lower horizons. The lean, low grade portion of upper ore continued to be difficult to treat and required mixing with better grades to make a satisfactory concentrate.

Most of the mining in the Snyder lease was conducted in the West Snyder forty where the wash ore continued to be of high grade and was used to absorb leaner material from other areas in the pit.

c. Pumping & Drainage

The automatic pumping equipment installed in 1954 continued to operate satisfactorily.

Mine water was pumped out of the pit in two stages, and water not used in concentrating overflowed to the north and eventually entered Prairie River. Approximately 3,141 gallons per minute were pumped from the pit at a cost of $0.0578 per ton of concentrates.

8. BENEFICIATION

a. Plant Operation

The concentrating plant was operated on the same schedule established for the pit from April 25 to October 27. Crude ore feed to the plant totalled 2,027,349 tons, from which were produced 908,813 tons of concentrates. Of this amount, 17,345 tons were wash concentrates and 891,468 tons retreat concentrates.

The average concentrate production rate was 3,112 tons per shift at a weight recovery of 44.82 per cent on plant crude and 41.00 per cent on pit crude.

Except for periods when wash concentrates were being produced, the Heavy-Media plant operated on the same schedule as the washing plant. Operating 286 shifts, the Heavy-Media plant received 676,518 tons of feed to produce 450,490 tons of Heavy-Media concentrates at a weight recovery of 66.59 per cent. Coarse tailings amounted to 226,028 tons.

In general, Heavy-Media plant operation was quite satisfactory. Feed rate to the plant was increased by approximately 30 per cent and was partially due to the structure of the

material processed in 1955 as compared to the previous year. Plant improvements and additional magnetic separator capacity also contributed to better operating conditions and increased plant capacity.

The fine ore plant was operated two shifts per day on current tailings from the main plant, and a third shift on tailings basin material was started on May 3 and continued until shut-down of operations on October 29.

A total of 106,524 tons of fine ore concentrates was produced at an average rate of 248 tons per shift. Of the total, 66,060 tons were produced from classifier overflows at an average rate of 231 tons per shift and an over-all weight recovery of 8.29 per cent; and 40,464 tons were produced from basin tails at an average rate of 281 tons per shift and an over-all weight recovery of 23.21 per cent.

Except for some difficulties encountered in solids pumping, the fine ore plant operation during 1955 was quite satisfactory. During the first part of the season, considerable trouble was experienced with the cyclone feed pump; however, alterations made on the pump about mid-season appear to have corrected this situation.

A considerable amount of trouble was also experienced in tailings pumping due to the difference in the volume of tailings pumped when treating current tailings and when operating on basin material. It was decided that the most effective solution to this problem was to install an additional tailings pipeline--which was done during the present Winter & Idle period.

Concentration data for the year is as follows:

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Wash Product	Tons	Per Cent Weight Plant	Per Cent Weight Pit	Per Cent Iron	Per Cent Phos	Per Cent Silica	Per Cent Iron Units
Crude to Plant	29,823	100.00	96.22	42.72		34.16	100.00
Pit Rock							
Screen Plant Rock	1,170		3.78	27.46		56.65	
Pit Crude	30,993		100.00	42.14		35.01	
Concentrates Produced	17,056	57.19	55.03	55.16	.063	12.24	73.85
Stockpile Overrun	289	0.97	0.93				
Total Concts Produced & Shipped	17,345	58.16	55.96	55.16	.063	12.24	75.09
Total Fine Tailing (by difference)	12,478	41.84	40.26	25.45		64.62	

Note: Iron Units Recovery Calculated on Plant Basis

Retreat Product	Tons	Per Cent Weight Plant	Per Cent Weight Pit	Per Cent Iron	Per Cent Phos	Per Cent Silica	Per Cent Iron Units
Crude to Plant	1,997,526	100.00	89.58	42.56		31.92	100.00
Pit Rock	43,823		1.97	25.46		59.80	
Screen Plant Rock	188,429		8.45	26.37		58.23	
Pit Crude	2,229,778		100.00	40.86		34.69	
Concentrates Produced	886,425	44.38	39.75	55.79	.077	11.64	57.73
Stockpile Overrun	5,043	0.25	0.23				
Total Concts Produced & Shipped	891,468	44.61	39.98	55.79	.077	11.64	58.03
Heavy-Media Concentrates	450,490	22.55	20.20	56.58		10.45	
Heavy-Media Rejects	226,028	11.32	10.14	44.83		25.53	
Heavy-Media Feed	676,518	33.87	30.34	53.07		15.02	
Total Fine Tailing (by difference)	880,030	44.07	39.46	28.58		54.10	

Fine Ore Plant	Tons	Per Cent Weight Plant	Per Cent Iron	Per Cent Phos	Per Cent Silica	Per Cent Iron Units
Crude to Plant	971,118	100.00	23.94		60.98	100.00
Total Concentrates Produced & Shipped	106,524	10.97	56.55	.046	12.97	25.90
Total Fine Tailing (by difference)	864,594	89.03	19.92		66.90	

During the operating season, it was necessary to stockpile 328,567 tons of concentrates. Of this amount, 261,982 tons were removed from stockpile, leaving a balance in stock of 66,585 tons on January 1, 1956.

Following is a brief classification of delays at the washing and Heavy-Media plants showing time lost and percentage of delay time as compared to total time worked:

Washing Plant

Source of Delay	Hours	Per Cent of Total Hours Worked
Out of Ore	11.50	0.49
Screening Plant Machines	12.75	0.54
Screening Plant Pocket & Rock Chute	20.50	0.88
Electric Power	5.00	0.21
Pumps & Pipelines	26.25	1.12
Washing Plant Machines	13.50	0.58
Conveyors	7.25	0.31
Concentrate Stacker	6.75	0.29
Storm	6.00	0.26
	109.50	4.68

Retreat Plant

Media Circuit	4.50	0.17
Conveyors	3.50	0.14
Electric Power	2.75	0.11
Heavy-Media Plant Machines	8.00	0.31
Concentrate Stacker	6.75	0.26
Pumps & Pipelines	3.00	0.12
Storm	6.00	0.23
	34.50	1.34

9. MAINTENANCE & REPAIRS

Repairs to pit, plant, and stripping conveyor equipment were started on March 1 with a limited number of men recalled to do the necessary repair work for the start of ore and stripping operations.

In addition to normal repair work at the concentrating plant, a 24-inch cyclone and 40-foot thickener were installed to re-circulate Heavy-Media tailings water. This installation was made in order to improve the operation of the fine ore plant by reducing the amount of tailings to be pumped and has worked very satisfactorily.

In order to increase cleaning capacity and improve operation of the plant generally, an additional 24" x 36" drum-type separator was installed in a primary position in the second unit of the Heavy-Media plant and has proven effective.

The wobbler feeder was sent to the National Iron Company shops in Duluth for shaft realignment and other miscellaneous repairs.

A very limited amount of repair work was done on truck and shovel equipment prior to the start of the 1955 season. At the close of ore season, repair work was immediately started on concentrating plant, stripping conveyor, and pit equipment. Repair work at the concentrating plant was kept to a minimum with only the necessary work being done.

Installation of equipment for separate coarse and fines loading was started with completion scheduled before the 1956 operating season.

Since the stripping conveyor will not be operating in 1956, repairs to this equipment were discontinued on November 21.

A limited amount of truck and shovel repairs was conducted on equipment not being used for stripping.

10. COST of PRODUCTION

a. Comparative Mining Costs

Product	1955	1954
Wash Concentrates	17,345	65,004
Retreat Concentrates	891,468	463,654
Fine Ore Concentrates	106,524	
Total Product	1,015,337	528,658
Per Cent Gross Crude Recovery	41.00*	43.31
Average Product Per Shift	3,353	3,014
Tons Per Man Per Day	49.32	40.70
Days Operated	159	88

*Excluding Fine Ore Concentrates

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Costs	Budget 1955	Actual 1955	Actual 1954*
Pit Operating-Total Material	$0.219	$0.207	$0.207
Beneficiation-Net Crude	0.129	0.148	0.135
Fine Ore Concentrating	0.954	0.913	
Loading Stockpile Ore	0.010	0.009	0.017
Sampling & Analysis	0.024	0.029	0.032
Safety & First Aid Supplies	0.001	0.000	0.000
Employees Vacation Pay	0.029	0.038	0.053
Personal Injury Expense	0.008	0.003	0.004
Social Security Taxes	0.016	0.022	0.016
Total Pit & Beneficiation	0.989	0.987	1.083
General Mine Expense	0.101	0.113	0.154
Winter & Idle Expense	0.321	0.312	0.791
Cost of Production	$1.411	$1.412	$2.028
Depreciation			
Plant & Equipment		0.216	0.195
Motorized Equipment		0.046	0.088
Movable Equipment		0.005	0.009
Amortization			
Leasehold		0.126	0.128
Stripping		0.158	0.144
Taxes			
Ad Valorem		0.163	0.308
Occupational		0.543	0.379
Royalty		0.044	0.043
Total Depreciation, Amortization, & Taxes		1.301	1.294
Miscellaneous Expense & Income		0.000	0.000
Total Cost at Mine		$2.698	$3.322
Royalty**		$0.334	

$3.032

* Computation and distribution of 1954 actual costs were adjusted to be in accord with the 1955 cost sheet revision so that a comparison with 1955 costs can be made by the individual items as shown above. Except where noted, all costs are cost-per-ton on total concentrates.

** No figures available on royalty for the 1954 season.

b. Detailed Cost Comparison

Over-all 1955 actual costs were very close to the 1955 budget and considerably lower than 1954 costs, the main reason for the better showing in 1955 being the substantial increase in tonnage. This is particularly reflected in General Mine and Winter & Idle expense. Further, certain economies put into effect tended to decrease the over-all cost. Installation of automatic pit pumping, conversion to oil heat, discontinuance of the night shift on pit cleanup, a notable reduction in mine inventories, a reduction in the number of salaried and hourly employees, a reduction in the amount of repair and maintenance work--all contributed to lower costs in 1955. It should be noted, however, that some of these economies may reflect higher costs in following years, particularly on repair and maintenance costs.

While the recovery on gross crude showed a decrease of over two per cent, the increase in product-per-shift more than compensated for the decrease in recovery. Operation of the fine ore plant in 1955 also had a favorable effect on over-all costs.

Pit operating costs were $0.012 below the budget estimate and identical with 1954 costs when 1954 costs were set on the basis of total material moved as was done in 1955. The use of cheaper explosives was one of the more important savings in pit operating costs during 1955.

Beneficiation costs were $0.019 over the budget and $0.013 over 1954 costs. A larger percentage of the ore mined in 1955 had to be treated by Heavy-Media in order to make an acceptable grade of concentrate. This was an important factor in increased costs over 1954 actual costs. Increased power and repair costs and the charging of E&A's to operating costs account for the increase in costs over the budget.

General Mine costs were $0.012 over the budget but $0.041 below 1954 actual costs when 1954 figures were adjusted on a comparable basis. Increased tonnage and a reduction in overhead costs were the main reason for the decrease.

Winter & Idle expense indicated a saving of $0.009 under the budget; however, the reduction of $0.479 per ton was by far the most apparent reason for the decrease in costs below 1954 actual costs. Here again, an increase in tonnage resulting in a longer operating season was a major factor in bringing about a substantial reduction in costs. Reduction in overhead costs and in the amount of maintenance and repair work also contributed in lowering Winter & Idle costs.

11. EXPLORATION & FUTURE EXPLORATION

The Henry Schultze Company drilled five holes in the West Snyder pit bottom for a total of 344 feet to determine the bottom of the mineable ore in this area for the purpose of proving up barren ground for possible dump expansion. Results indicated that 0-25 feet of a very hard and rocky retreat ore may be available for future mining.

There are two areas of interest requiring additional drilling before possible pit extensions can be definitely established and where a very lean low grade concentrate is indicated: One is along the east side of the pit on the Hemmens and South Bovey forties; the other is the possible pit extension on the North Bovey forties.

12. TAXES

	1955		1954		Increase-Decrease	
	Assessed Value	Taxes	Assessed Value	Taxes	Assessed Value	Taxes
Mineral	$ 788,220	$127,387.81	$ 848,067	$130,147.52	-$59,847	-$2,759.71
Land,Bldgs,Mach.	79,873	13,154.33	79,664	12,457.70	209	696.63
Personal Property						
Equipment	112,444	18,147.34	98,879	15,153.21	13,565	2,994.13
Stockpile	8,356	1,348.57	2,808	430.33	5,548	918.24
Tails Basin S.P.	36,231	5,847.32	36,231	5,552.40		294.92
	$1,025,124	$165,885.37	$1,065,649	$163,741.16	-$40,525	$2,144.21
Average Mill Rate		161.82		153.65		/ 5.32

Mineral valuation decreased by 1954 mining. Personal property equipment increased 10 per cent over our report by State Tax Commissioner. Common stockpile tonnage on hand less in 1955

than 1954. Tailings basin tonnage and value same in 1955 as in 1954. No operation in 1954 to change reserve.

Tax Commission Reserve

	Tons		Increase
	1955	1954	Decrease
May 1	5,110,103	5,658,998	-548,895
Tailings Basin	144,922	144,922	

13. ACCIDENT & PERSONAL INJURY

There were 59 slight accidents at the Canisteo mine during 1955 and 4 lost-time accidents:

Name	Date of Injury	Cause of Accident	Nature of Injury	Days Lost
Ralph Trout	9/25/55	While removing wobbler drive chain case, Trout, standing on large V-belt sheave, wedged leg between sheave and adjacent I-beam when co-worker hit wobbler switch accidentally.	Contusion lateral side of right ankle.	84
Willis Meyer	12/2/55	Slipped down stairway while carrying pins for 8' pans.	Sore back.	21
Walter Simonette	12/6/55	Truck went over dump while dumping	Laceration left face. Bruises left shoulder and chest. Pain and tenderness anterior chest.	9
Carl Paul	11/11/55	Foreign body entered left eye while looking up to pull straws in to fasten sheating.	Foreign body in left eye.	16

14. PROPOSED NEW CONSTRUCTION

The following projects are planned for construction in 1956:

1. A 22,000 and 2,200 volt power line between the Sally and Canisteo mines to be in service when stripping operations are started at the Sally mine in the fall of 1956. Plans have been submitted and the E&A approved. Equipment is being ordered and construction is scheduled for the summer of 1956.

2. A haul road between the Sally and Canisteo mines for hauling Sally ore to the Canisteo plant for concentration. Plans are underway, and construction is to take place during the summer of 1956.

3. Construction of a service garage at the Sally mine is also scheduled for the summer of 1956.

4. Installation of a new track lighting system has been approved, and work is scheduled to start in the spring of 1956.

5. Installation of a 20-foot thickener (on hand) in the Heavy-Media cleaning circuit of the Heavy-Media plant has been approved for installation in April of 1956. This will reduce the amount of water being recirculated by the dirty media pumps and will improve the operation of the Heavy-Media plant.

6. The existing surface water drainage ditch has been cut off by the Oliver stripping between the Canisteo and King mines; as a result, it has been proposed to reverse the flow of this ditch and direct the water into a sump near our return water basin from whence it will be pumped into the return water basin and then overflow to the north. It is planned that the work will be done by Cliffs with the Oliver participating in the cost of construction and pumping.

7. Construction of a cyclone plant for treatment of the classifier product is tentatively scheduled for 1956, to be ready for the 1957 operating season.

15. EQUIPMENT RECEIVED & PROPOSED NEW EQUIPMENT

a. Equipment Received

2 Pickup Trucks
1 Pettibone Mulliken Swing Loader
1 24"x36" Magnetic Separator
1 Oil Burner Unit & Misc. Equipment for Main Shop
1 Oil Burner Unit & Furnace for Office
1 Fuel Oil Storage Tank (10,000 Gallon Capacity)
1 P&H Model 1600 Electric Power Shovel (6-Yard)
1 Motor for Heavy-Media Tailings Disposal (75 hp)

2080 feet of 18-inch spiralweld pipe for tailings line between main plant and fine ore plant.

580 feet of 36-inch belt for replacement on concentrate between main plant and loading bin.

b. Proposed New Equipment

1 Hoist for Washing Plant (7-1/2 Ton)
1 Syntron Vibrator for Crude Ore Pocket
1 Tractor & Blade
2 Pickup Trucks

3200 feet of 14-inch spiralweld pipe for tailings disposal from fine ore plant to tailings basin.