OHIO MINE
ANNUAL REPORT
YEAR 1955

1. INTRODUCTION:

The Ohio Mine production for 1955 was 120,277 tons of concentrate. Cost of production per ton of concentrate was $2.049 whereas total cost at the mine on cars was $2.879 per ton of concentrate. The 1955 cost of production per ton of concentrate ranged from $0.876 to $1.929 lower than any of the past years. The 1955 total cost at the mine was unusually low due to the stripping write off into Sec. 616.

Concentrate production by property was 12,635 tons from the Portland, 2,078 tons from the Webster, 94,238 tons from the Norwood and 11,326 tons from the Beaufort. Shipments amounted to 139,180 tons.

The average grade (dried) for the 1955 output was 53.01% iron, 0.212% phos., 6.97% silica and 0.114% sul.

The Ohio Mine won the 1955 Michigan-Minnesota Open Pit Safety Award Flag. This is the second consecutive year that the Ohio Mine has operated without a compensable accident.

2. PRODUCTION, SHIPMENTS AND INVENTORIES:

a. Operating Schedule:	No. Of Days	Shifts Per Day	Hours Per Shift	Total Shifts
Pit Operating - 1955	66	1, 2 & 3	8	125
Pit Operating - 1954	89	1, 2 & 3	8	170
Pit Operating - 1953	96	1 & 2	8	188
Mill Operating - 1955	74	1, 2 & 3	8	204
Mill Operating - 1954	84	1, 2 & 3	8	230
Mill Operating - 1953	111	1 & 3	8	334

b. Pit:	1955 Tons	1954 Tons	1953 Tons
Webster Crude Ore - Pit to Surge Pile	-	206,739	324,685
Portland Crude Ore - Pit to Surge Pile	38,514	71,398	16,800
Norwood Crude Ore - Pit to Surge pile	149,604	-	-
Beaufort Crude Ore - Pit to Surge Pile	20,286	-	-
Total Crude Ore - Pit to Surge Pile	208,404	278,137	341,485
Average Total Crude Ore Per Day	3,158	3,125	3,557
Average Total Crude Ore Per Shift	1,667	1,636	1,816
Average Total Crude Ore Per Man Day	50.60	52.08	59.79
c. Mill:			
Crude Ore - Surge Pile to Mill	208,404	276,559	342,390
Webster Conc. - Produced	2,078*	76,467	118,481
Portland Conc. - Produced	12,635	25,309	6,134
Norwood Conc. - Produced	94,238	-	-
Beaufort Conc. - Produced	11,326	-	-
Total Ohio Conc. Produced	120,277	101,776	124,615
* Stockpile Overrun			
Average Total Concentrates Per Day	1,625	1,212	1,123
Average Total Conentrates Per Shift	590	442	374
Average Total Concentrates Per Man Day	29.20	20.20	18.42
Percent of Recovery	57.71	36.80	35.63

OHIO MINE WEST PIT (NORWOOD)
Looking West from 8200 W. Coordinate
January 16, 1956

OHIO MINE
ANNUAL REPORT
YEAR 1955

Reject Pile - Looking South

BY: H.W. REMBOLD,
SUPERINTENDENT.

OHIO MINE
ANNUAL REPORT
YEAR 1955

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

d. Shipments: (Gross Tons)

Grade	From Pocket	From Stockpile	Total Year	Remaining Ore in Stock
Webster Concentrates - 1955	-	16,368	16,368	-
Portland Concentrates - 1955	9,093	8,155	17,248	-
Beaufort Concentrates - 1955	11,326	-	11,326	-
Norwood Concentrates - 1955	73,269	20,969	94,238	-
Total - 1955	93,688	45,492	139,180	-
Webster Concentrates - 1954	54,483	7,694	62,177	14,290
Portland Concentrates - 1954	18,623	2,073	20,696	4,613
Total - 1954	73,106	9,767	82,873	18,903
Webster Concentrates - 1953	118,481	-	118,481	-
Portland Concentrates - 1953	6,134	-	6,134	-
Total - 1953	124,615	-	124,615	-

e. Stockpile: (Gross Tons)

	1955 Gross Tons	1954 Gross Tons	1953 Gross Tons
In Stock January 1st	18,903	-	-
Placed in Stockpile	26,589	28,670	-
Total	45,492	28,670	-
Removed from Stockpile During Year	45,492	9,767	-
Stockpile Balance December 31st	-	18,903	-

f. Production by Months:

CRUDE ORE

	1955 Webster	Portland	Norwood	Beaufort	1955 Total	1954 Total	1953 Total
April							4,900
May						37,400	67,640
June						57,007	74,640
July			62,937		62,937	63,541	66,540
August			53,508	20,286	73,794	75,201	58,220
September		26,355	33,159		59,514	44,988	69,545
October		12,159			12,159		
Total Tons		38,514	149,604	20,286	208,404	278,137	341,485

CONCENTRATES

April							880
May						12,441	23,215
June	*2,078	* 671			2,749	20,920	24,196
July			37,312		37,312	25,639	21,833
August			29,874	11,326	41,200	25,839	23,054
September		8,410	27,052		35,462	16,937	31,437
October		3,554			3,554		
Total Tons	2,078	12,635	94,238	11,326	120,277	101,776	124,615

*Stockpile Overrun

OHIO MINE
ANNUAL REPORT
YEAR 1955

3. ANALYSIS:

a. Analysis of Pit Crude Ore:

	Year 1955		Year 1954		Year 1953	
Grade	Tons	Iron	Tons	Iron	Tons	Iron
Webster			206,739	41.66	324,685	41.31
Portland	38,514	42.23	71,398	41.66	16,800	41.31
Norwood	149,604	44.97				
Beaufort	20,286	43.00				
Total	208,404	44.27	278,137	41.66	341,485	41.31

b. Tonnage and Analysis of Concentrates Produced and Shipped:

	Ohio Mine Concentrates						
From	To	Tons	Iron	Phos	Sil	Moist	Sul
	Stockpile	18,980	53.12		7.20		
Pkt.	Presque Isle	86,072	52.98	.211	6.81	6.60	.116
Stkp.	Presque Isle	39,848	51.69	.363	8.85	6.44	.099
Pkt.	Prince Mfg. Co.	59	47.60	.312	20.96	7.50	.013
Stkp.	Prince Mfg. Co.	50	44.10	.280	23.30	7.55	.054
Concentrates Output		120,277	53.01	.212	6.97		.114

4. COST OF OPERATIONS:

a. Combined Budget Costs:

	BUDGET			
	Year 1955	Year 1954	Year 1953	Year 1952
Tons:				
Production - Concentrates (1)	100,000	100,000	116,000	211,000
- Crude Ore (2)	277,800	277,800	387,000	555,000
Cost of Production:				
Pit Operating (2)	$0.363	$0.292	$0.270	$0.437
Total Concentrating (1)	0.844	0.928	1.303	1.200
Total Pit and Conc. (2)	0.640	0.627	0.660	0.882
Total Pit and Conc. (1)	1.779	1.740	2.203	2.320
Loading & Shipping Pocket (1)	0.045	0.050	0.070	0.030
Total Pit and Conc. Plant (1)	1.824	1.790	2.273	2.350
General Mine Expense (1)	0.050	0.511	0.750	0.500
Winter and Idle Expense (1)	0.400	0;650	0.500	0.520
Cost of Production (1)	2.274	2.951	3.523	3.370
Depr'n Amort., and Taxes (1)	1.025	0.910	0.668	1.380
Total Cost on Cars	$3.297	$3.861	$4.191	$4.750

OHIO MINE
ANNUAL REPORT
YEAR 1955

4. COST OF OPERATION: (Cont'd)

b. Combined Operating Costs:

	Year 1955	Year 1954	Year 1953*	Year 1952*
Total Ohio Mine:				
Production - Concentrates	120,277	101,776	124,615	59,507
- Crude Ore	208,404	276,559	341,485	196,680
Cost of Production:				
Pit Expense	$0.579	$1.070	-	-
Crushing & Screening	0.228	0.210	-	-
Milling Expense	0.434	0.562	-	-
Stocking Expense	0.013	0.016	-	-
General Mine Expense	0.346	0.486	-	-
Winter and Idle Expense	0.449	0.581	-	-
Cost of Production	$2.049	$2.925	$3.243	$3.978
Taxes	$0.207	$0.137		
Depletion - Original Cost	0.086	0.060		
Depreciation	0.465	0.405		
Amortization of Stripping	0.000**	0.549		
Shipping Expense	0.072	0.044		
Total Cost at Mine	$2.879	$4.120	$4.093	$4.521

* Cost breakdown not available on basis of the new open pit cost sheets adopted for 1954 and following years.
** 1955 Stripping written off into Sec. 616.

c. Operating Costs by Property:

	Webster	Portland	Norwood	Beaufort
Production - Concentrates	16,368*	12,635	94,238	11,326
- Crude Ore	-	38,514	149,604	20,286
Cost of Production:				
Pit Expense	$0.000	$1.213	$0.520	$0.465
Crushing & Screening	0.000	0.334	0.223	0.202
Milling Expense	0.035	0.691	0.407	0.439
Stocking Expense	0.000	0.021	0.013	0.003
General Mine Expense	0.241	0.832	0.293	0.273
Winter and Idle Expense	1.805	0.408	0.428	0.420
Cost of Production	$2.081	$3.498	$1.884	$1.802
Taxes	$0.000	$0.226	$0.217	$0.146
Depletion - Original Cost	0.000	0.000	0.098	0.097
Depreciation	0.423	0.626	0.446	0.448
Amortization of Stripping	0.000	0.000	0.000	0.000
Shipping Expense	0.368	0.180	0.052	0.059
Total Cost at Mine	$2.872	$4.530	$2.697	$2.552

* On Stockpile as of January 1, 1955.

OHIO MINE
ANNUAL REPORT
YEAR 1955

5. LABOR AND WAGES:

a. Comments:

The labor force at the Ohio was large in 1955 as compared to previous years due to the stripping program carried on in conjunction with the production season.

There were no formal grievances made by the Ohio Mine Union Local. Labor relations remained very good throughout the entire 1955 season.

b. Report of Vacations Paid:

	No. Men	Total Hours	Total Amount	Avg Rate Per Hour	Year
One week - 40 Hrs. - Vacation Paid	47	1,880	$4,655.80	$2.476	1955
One week - 40 Hrs. - Vacation Paid	57	2,280	4,727.10	2.073	1954
One week - 48 Hrs. - Vacation Paid	56	2,688	5,694.84	2.118	1953

c. Comparative Statement of Production and Wages: (Operating - Ore)

	Year 1955	Year 1954	Year 1953	Year 1952
Production - Concentrates	120,277	101,776	124,615	59,507
Number of Days Operated	74	84	111	96
Number of Shifts Operated	204	230	334	291
Average Daily Product (Tons)	1,625	1,212	1,123	620
Average Product Per Shift (Tons)	590	442	374	204
Average Number of Men Employed	60	54½	61	61
Product Per Man Per Day	29.20	22.14	18.14	9.53
Average Wages Per Man Per Day	$18.76	$18.80	$17.96	$15.76
Total Amount Paid for Labor During Operating Season	$108,082.49	$86,405.74	$121,587.24	$92,270.92
Labor Cost Per Ton	$0.732	$0.849	$0.976	$1.551

(No E&A work has been included in the above figures)

d. Annual Statement of Labor:

	Stat. Men	Hours	Amount	Avg. Rate
Mine Payroll:				
Hourly Employees:				
Straight Time	58½	69,272	$150,713.71	$2.176
Overtime	6½	7,813	8,659.76	1.108
Shift Differential - Aft.	17	20,189½	1,280.78	0.063
Shift Differential - Nite	13	15,310½	1,419.72	0.093
Holiday Allowance	1½	1,792	3,906.96	2.180
Sub Total	58½	69,272	165,980.93	2.396
Vacation Pay Accrual	1½	1,880	4,655.80	2.476
Total Hourly Employees	58½	69,272	170,636.73	2.463
Salaried Employees:				
Mine Payroll	1	1,333½	3,745.50	2.811
Total Mine Payroll	59½	70,605¼	174,382.23	2.470
General Payroll:				
Salaried: Straight Time	2¼	2,597½	7,053.78	2.735
" Overtime	-	114	111.38	0.977
Labor from other Mines	4½	5,121	14,644.20	2.860
Grand Total Labor	66¼	78,305-3/4	$196,191.59	$2.505

OHIO MINE
ANNUAL REPORT
YEAR 1955

5. LABOR AND WAGES: (Cont'd)

d. Annual Statement of Labor: (Cont'd)

Distributed as Follows:

	Stat. Men	Hours	Amount	Avg. Rate
Operating Mine	27-3/4	32,950½	$88,080.79	$2.673
Winter and Idle	6½	7,696¼	20,001.70	2.599
Stripping	30¼	35,793-3/4	84,013.62	2.347
Other Mines	1¼	1,409-3/4	3,006.26	2.132
Other Accounts	½	455½	1,089.22	2.391
Grand Total as Above	66¼	78,305-3/4	$196,191.59	$2.505

AVERAGE NUMBER OF MEN

	Hourly	Salaried	General Payroll	Total	Hrly Job Rate
Average Year	57	1	2	60	9.08

	Days Mine Operated	Tons Ore	Cu. Yds. Stripping	Units Per Man Day	Labor Cost Per Unit
Pit Crude Ore	66	208,404		50.60 Tons	
Mill Concentrating	74	120,277		29.20 Tons	$0.732
Stripping	142		413,816	92.49 Cu. Yds.	0.203
Days Total Year	148				

6. OPEN PIT:

a. Stripping Operations:

	E&A CC-631 Portland Lease	E&A CC-698 Norwood Lease	E&A CC-712 Norwood Lease
Total Program to Date:			
No. Days Operating	24	84	54
No. Shifts Operating	33	147	161
Total Estimated Cu Yds:			
Estimate Surface		30,555	70,000
Estimate Rock	64,000	123,333	137,000
Estimate Total	64,000	153,888	207,000
Estimated Cost:			
Estimated Rock	$0.50	$0.50	$0.50
Estimated Surface	0.45	0.45	0.45
Actual Stripping Cu Yds:			
Rock	35,763	105,230	131,997
Surface		81,320	69,919
Total	35,763	186,550	201,916
Average Per Shift	1,083	1,269	1,254

OHIO MINE
ANNUAL REPORT
YEAR 1955

6. OPEN PIT: (Cont'd)

a. Stripping Operations: (Cont'd)

	Portland E&A CC-631		Norwood E&A CC-698		Norwood E&A CC-712	
	Amount	Rate	Amount	Rate	Amount	Rate
Cost:						
Pit Operating	$18,706.80	$0.523	$68,500.17	$0.367	$77,924.37	$0.386
Gen'l Exp.	719.96	0.021	770.80	0.004	487.53	0.002
Depreciation	1,988.60	0.055	9,114.06	0.049	10,871.57	0.054
Equip. Rental Adj.	-	-	-	-	3,027.67	0.015
Total Cost	$21,415.36		$78,385.03		$92,311.14	
Rock	$21,415.36	$0.599	$52,763.98	$0.501	$68,149.53	$0.516*
Surface	-	-	25,621.05	0.315	24,161.61	0.346
Authorized	$32,000.00		$75,416.25		$100,000.00	
Under Expended	10,584.64				10,942.57	
Over Expended			2,968.09			
Date Commenced	May 1954		June 1955		October 1955	
Date Completed	October 1955		September 1955		January 1956	

* Completion of E&A CC-712 in 1956 resulted in rates of $0.363 and $0.553 for surface and rock respectively.

b. Cost Comments:

The E&A CC-631 rock rate is representative for the small yardage moved in conjunction with confined quarters and equipment moves from the West to the East pit.

The E&A CC-698 rates for surface and rock are approximately $0.050 lower than those rates representative of seasonal stripping programs.

E&A CC-712 surface and rock rates as shown in the table above are not representative because this program was not completed until January 1956. Completion of E&A CC-712 has indicated rates of $0.36 and $0.55 for surface and rock respectively in near future estimates.

c. Detail of Stripping:

Portland (East Pit):

Portland stripping ranged between the 3450W and 3100W coordinates. Material moved as stripping was a hanging wall rock grading into a very lean iron formation.

The stripping removed was taken from small localized areas in an endeavor to uncover a crude ore that would respond favorably in the mill.

OHIO MINE
ANNUAL REPORT
YEAR 1955

6. OPEN PIT: (Cont'd)

c. Detail of Stripping: (Cont'd)

Norwood (West Pit):

Norwood stripping for the year totaled 388,466 cubic yards of material. Surface and hanging wall rock was removed from an area between the 7900W and 9250W coordinates.

The late fall stripping program progressed very satisfactorily. The winter months were largely devoted to rock stripping. Contrary to general belief the rock removal was not particularly hindered by cold weather. The freezing weather afforded a particular advantage for fighting pit waters by freezing all surface and near surface runoffs.and improving haul roads which were easy to maintain after freeze-up.

d. Detail of Open Pit Mining:

Pit operations started on June 1st and continued throughout the year. With the exception of mining and stripping in the Portland from September 28th to October 8th all other pit operations were devoted to the West Pit.

Development plans for the West Pit call for mining to depth in the west end of the Norwood followed by mining towards the swamp areas to the east. This plan of mining will give us a minimum amount of dragline work which is more costly than moving the same amount of material with the dipper sticks on a similar shovel.

Obtaining proper fragmentation of the crude ore in blasting near old underground mining areas was very difficult. Secondary blasting was necessary in those instances where the field blasts encountered old drifts and stopes producing big blocky pieces of crude ore.

A backhoe was employed in digging out drainage sumps for dewatering pit areas below the lowest mining elevation.

The following tables outline the details of truck haulage, primary blasting and churn drilling for 1955:

TRUCK HAULAGE:

Season	Shifts	Loads Crude Ore	Loads Stripping	Total Loads	Avg. Loads Per Shift
Total East Pit	38	1,834	1,690	3,524	93
Total West Pit	412	8,090	29,170	37,260	90
Grand Total	450	9,924	30,860	40,784	91

PRIMARY BLASTING: (Tons Calculated in Place)

Date Season	No. of Holes	Tons Ore Broken	Tons Rock Broken	Tons of Mat. Broken Per Lb. of Powder	Powder Cost Per Ton Mat.
Total East Pit	102	75,909	36,100	3.170	0.063
Total West Pit	705	290,954	436,575	2.752	0.063
Total Ohio Mine	807	366,863	472,675	2.640	0.063

OHIO MINE
ANNUAL REPORT
YEAR 1955

6. OPEN PIT: (Cont'd)

d. Detail of Open Pit Mining: (Cont'd)

Total Powder Used (Primary Blasting)

Season	Lb. Tritex	Lb. EP 152	Lb. EP 146	XC-45 Boosters	Plastic Primacord	Plain Primacord
Total	11,100	93,850	213,050	1,553	33,850	21,000
Unit Cost	$10.50c	$17.90c	$16.65c	$50.00c	$36.00M	$32.00M
Total Cost	$1,165.50	$16,799.15	$35,472.83	$776.50	$1,218.60	$672.00

Churn Drilling:

Season	Shifts	Holes Drilled	Footage Drilled	Avg Depth Per Hole	Ft. Per Bits Shift	Bits Used	Feet Per Bit	Cost Per Foot
Total East Pit	74	82	2,861	35.9	38.7	38	75.3	$1.640
Total West Pit	703	734	26,113	35.6	37.1	290	90.0	$1.519
Total Ohio Mine	777	816	28,974	35.5	37.3	328	88.3	$1.531

7. BENEFICIATION:

a. 1955 Plant Production and Analyses:

	Tons	% Wt.	Crude	% Fe.	% P.	% SiO2	% S.
Pit Crude	208,404						
Plant Head	208,404			44.85			
H.M. Concentrate	104,424	60.66	50.12	53.43		6.48	
H.M. Reject	67,710	39.34	32.48	30.00			
H.M. Feed	172,134	100.00	82.60	44.21			
Fines Concentrate	13,104	46.84	6.29	50.09		9.97	
Fines Tailing	14,873	53.16	7.13	40.85			
Fines Feed	27,977	100.00	13.42	45.18			
Hydroseparator O.F.	8,293	100.00	3.98	42.34			
Calculated Plant Head	208,404		100.00	44.27			
Concentrates							
H.M. Concentrate	104,424	88.85	50.12	53.43		6.48	
Classifier Conc.	13,104	11.15	6.29	50.09		9.97	
Calc. Total Conc. (by plant analyses)	117,528	100.00	56.41	53.06		6.87	

OHIO MINE
ANNUAL REPORT
YEAR 1955

7. BENEFICIATION: (Cont'd)

a. 1955 Plant Production and Analyses: (Cont'd)

	Tons	% Wt.	% Moist.	% Fe.	% P.	% SiO2	% Sul.
Total Conc. Shipped from Pocket	93,688	77.89	6.59				
Total Conc. Shipped from Stockpile	26,589	22.11	6.98				
Total Conc. (by car analyses)	120,277	100.00	6.68	53.01	.212	6.97	.114

b. Plant Operations:

The Ohio Mill operated from July 1st through October 8th. The calculated plant production was 117,528 tons of concentrate, of which 105,564 tons were from the West Pit and 11,964 tons were from the East Pit. The Shipping Department's records reveal total concentrates produced as 120,277 tons. Of this total 2,749 tons was a stockpile overrun figure from the 1954 stockpile. The shipping analysis of the overall product was 53.01% Fe., 0.212% Phos., 6.97% SiO2 and 0.114% Sul. The overall weight recovery was 56.41%. The heavy media concentrate assayed 53.43% Fe., 6.48% SiO2 and represented 50.12% of the crude feed. The fines concentrate assayed 50.09% Fe., 9.97% SiO2 and represented 6.29% of the crude feed.

The feed rate to the plant from the surge pile was 127.70 LTPH gross and 149.29 LTPh net. The feed rate to the heavy media circuit was 105.47 LTPH gross and 123.31 LTPH net. Concentrates were produced at the rate of 72.01 LTPH gross and 84.19 LTPH net. The major sources of delay were conveyors, power failures, sump pump, screens, and chutes and boxes. The operating time of the primary section for the 1955 season was 72.11%. The delays in the pit or primary section accounted for 20.72% of the total working hours. The major sources of delay were blasting in the pit, shovel repair, moving of shovel, jamming of the jaw crusher, repairing of the scalping screen, and power failures.

The media loss for the season was .74 pounds of ferrosilicon per ton of heavy media feed and 1.21 pounds of ferrosilicon per ton of heavy media concentrate.

OHIO MINE
ANNUAL REPORT
YEAR 1955

7. BENEFICIATION: (Cont'd)

c. Plant Delays:

Source of Delay	Hours	% Total Delays	% 1632 Working Hours
Conveyors	51.75	21.93	3.17
Power Failures	50.66	21.47	3.11
Sump Pump	19.41	8.23	1.19
Ripl Flo Screen	14.77	6.26	0.91
Fresh Water Pump	12.58	5.33	0.77
Media Pump	12.50	5.30	0.77
Drain Screen	11.30	4.79	0.69
3' x 10' Screen	9.39	3.98	0.58
Stacker Conveyor	8.89	3.77	0.54
Feed from Surge Pile & Tunnel Feeder	8.36	3.54	0.51
Starting Up Plant	7.91	3.35	0.49
Chutes	7.75	3.28	0.48
Cone Crusher	5.92	2.51	0.36
Building up Gravity	4.25	1.80	0.26
Scalping Screen	3.00	1.27	0.18
Magnetic Separators	2.41	1.02	0.15
Shutting Down Plant	1.73	0.73	0.11
Lo Head Screen	0.67	0.29	0.04
Apron Feeder	0.58	0.25	0.03
Tailings Pump	0.50	0.21	0.03
Jig	0.50	0.21	0.03
Symons Crusher	0.50	0.21	0.03
Stocking Truck	0.42	0.18	0.02
Spirals	0.20	0.09	0.01
Total	235.95	100.00	14.46

Operating Time 1955 Season - 85.54%

d. Pit to Surge Pile - Time Distribution:

	Hours	% Total Delays	% 1000 Working Hours
Blasting in Pit	12.50	6.03	1.25
Shovel - Greasing	10.25	4.95	1.03
- Moving in Pit	20.75	10.02	2.08
- Repairing	17.00	8.21	1.70
- Off Tracks	6.50	3.14	0.65
Jaw Crusher	60.00	28.96	6.00
Scalping Screen	27.25	13.15	2.72
Power Failures	30.00	14.48	3.00
No. 1 Conveyor	9.41	4.54	0.94
Ore Feeder	6.00	2.90	0.60
Fines Chute	1.00	0.48	0.10
Pockets	0.50	0.24	0.05
Pit Flooded	6.00	2.90	0.60
Total Delays	207.16	100.00	20.72
Hauling Rock	58.75		5.87
Hauling Rejects	13.00		1.30
Hauling Ore	721.09		72.11
Total Time Distribution	1000.00		100.00

OHIO MINE
ANNUAL REPORT
YEAR 1955

7. BENEFICIATION: (Cont'd)

e. Monthly Heavy Media Loss:

	Lb. FeSi Dumped	Tons H.M. Feed	Tons H.M.Conc.	FeSi Loss Lb/Ton H.M. Feed	FeSi Loss Lb/Ton H.M. Conc.	Percent Recovery
July	43,084	50,345	33,728	0.86	1.28	66.99
August	38,373	63,252	38,948	0.61	0.98	61.58
September	35,616	51,333	29,308	0.69	1.22	57.09
October	9,602	7,204	2,440	1.33	3.94	33.87
Grand Total 1955 Season	126,675	172,134	104,424	0.74	1.21	60.66

f. Heavy Media Loss by Inventory:

		Barrels	Pounds
Ferrosilicon on Hand 7:00 A.M. July 5, 1955	Keokuk	156*	78,936
	Keokuk	3**	1,611
Ferrosilicon received during 1955 Season	Canadian	172*	97,564
	Keokuk	-	-
Ferrosilicon Dumped during 1955 Season	Canadian	114*	63,943
	Keokuk	122*	62,732
Ferrosilicon on Hand 7:00 A.M. November 1, 1955	Candian	58*	33,621
	Keokuk	34*	16,204
	Keokuk	3**	1,611
* 65 Mesh	Total	95	51,436
** 100 Mesh			

g. Fines Circuit:

Product	Tons	% Wt.	% Wt. Crude	% Fe	% SiO2
		Jig Circuit			
Jig Concentrate	3,414	38.98	1.64	51.53	
Jig Tailing	5,344	61.02	2.56	43.86	
Jig Feed	8,758	100.00	4.20	46.85	
		Spiral Circuit			
Spiral Concentrate	4,460	31.88	2.14	51.75	
Spiral Tailing	9,529	68.12	4.57	39.16	
Spiral Feed	13,989	100.00	6.71	43.18	
Classifier Sand	5,230	100.00	2.51	47.73	
Total Fines Feed	27,977	100.00	13.42	45.18	
Total Fines Conc.	13,104	46.84	6.29	50.09	
Total Fines Tailing	14,873	53.16	7.13	40.85	

OHIO MINE
ANNUAL REPORT
YEAR 1955

7. BENEFICIATION: (Cont'd)

h. Structure of Total Concentrates:

Size	% Wt.	Cuml. % Wt.	% Fe	% Phos.	% SiO2	% Sul.
⁄1-1/2"	0.97	0.97	53.56	.188	1.88	.151
⁄1"	13.64	14.61	50.04	.180	9.73	.057
⁄3/4"	19.20	33.81	51.31	.193	7.83	.038
⁄1/2"	19.34	53.15	51.98	.226	6.74	.058
⁄3/8"	12.41	65.56	54.01	.226	5.41	.225
⁄3M.	10.01	75.57	54.15	.218	6.24	.146
⁄6M.	11.23	86.80	52.77	.228	6.96	.192
⁄8M.	2.05	88.85	51.88	.230	7.75	.108
⁄10M.	1.95	90.80	49.95	.231	8.88	.180
⁄14M.	1.16	91.96	49.52	.237	9.11	.164
⁄20M.	1.38	93.34	50.74	.237	7.94	.136
⁄28M.	1.17	94.51	50.77	.238	8.06	.135
⁄35M.	1.08	95.59	50.33	.235	8.51	.159
⁄48M.	1.02	96.61	50.01	.226	9.16	.164
⁄65M.	0.85	97.46	48.83	.237	10.87	.161
⁄100M.	0.83	98.29	49.80	.232	10.00	.176
-100M.	1.71	100.00	51.86	.262	9.19	.184
Total	100.00	-	51.97	.214	7.39	.112

OHIO MINE
ANNUAL REPORT
YEAR 1955

7. BENEFICIATION: (Cont'd)

i. Seasonal Mill Operating Costs:

Preparation	July	August	September	October	1955 Season	Cost Per Ton Feed 1955 Sesn
P. Operating	$.063	$.036	$.016	$.121	$.040	$.023
P. Maintenanee	.025	.062	.146	.083	.074	.042
S. Operating	.060	.061	.052	.125	.058	.033
S. Maintenace	.041	.024	.044	.123	.038	.021
Power	.008	.019	.024	.050	.018	.010
Total	$.197	$.202	$.282	$.502	$.228	$.129
Milling						
Water Supply Operating	$.023	$.018	$.015	$.026	$.019	$.010
Water Supply Maintenace	.020	.017	.013	-	.016	.009
H.M. & Sp. Operating	.225	.209	.193	.593	.221	.125
H.M. & Sp. Maintenace	.054	.040	.037	.267	.044	.025
Mill Supervision	.045	.036	.038	.088	.041	.023
General Mill Exp.	.003	.089	.052	.148	.053	.030
General Mill Maintenace	.046	.006	.007	-	.019	.010
Power	.007	.024	.030	.048	.021	.012
Total	.423	.439	.385	.970	.434	.244
Grand Total	$.620	$.641	$.667	$1.472	$.662	$.373
Feed (L.T.)	62,937	73,794	59,514	12,159	208,404	
Conc. (L.T.)	38,787	42,827	32,809	3,105	117,528	
% Recovery	61.63	58.04	55.13	25.54	56.41	
Cost Per Ton of Feed	.382	.372	.368	.376	.373	
Ratio of Labor to Supplies	.817	1.065	.804	1.036	.910	

Recapitulation No. 1

Preparation	$.189	$.183	$.258	$.452
H.M. & Spiral	.279	.249	.230	.660
Mill Supervision	.045	.036	.038	.088
General Mill	.049	.095	.059	.148
Power	.015	.043	.054	.098
Water	.043	.035	.028	.026
Total	$.620	$.641	$.667	$1.472

Recapitulation No. 2

Operating	$.371	$.324	$.276	$.865
Maintenanee	$.140	$.143	$.240	$.273
Mill Supervision	.045	.636	.038	.088
General Mill	.049	.095	.059	.148
Power	.015	.043	.054	.098
Total	$.620	$.641	$.667	$1.472

OHIO MINE
ANNUAL REPORT
YEAR 1955

7. BENEFICIATION: (Cont'd)

j. Monthly Hourly Operating Rates:

	Pit Crude to Stockpile	Stockpile to Plant	Feed Media Feed	Fines Feed	Concentrates
			Tons Per Hour Gross		
July	207.03	133.34	106.66	20.56	82.17
August	219.63	133.68	114.59	14.43	77.58
September	195.77	121.95	105.19	15.47	67.23
October	217.13	101.33	60.03	22.99	25.87
			Tons Per Hour Net		
July	287.92	149.49	119.58	23.05	92.13
August	289.67	152.23	130.48	16.43	88.35
September	286.47	151.36	130.55	19.20	83.44
October	303.98	125.35	74.27	28.44	32.01

OHIO MINE
ANNUAL REPORT
YEAR 1955

7. BENEFICIATION: (Cont'd)

k. Seasonal Hourly Operating Rates:

	Tons	Gross Hours Operation	Net Hours Operation	LTPH Gross	LTPH Net
Pit Crude to Stockpile:					
1955 Season	208,404	1000.00	721.00	208.40	289.05
1954 Season	278,137	1360.00	1087.00	204.51	255.88
1953 Season	348,831	1920.00	1182.00	181.68	295.12
1952 Season	201,740	1125.00	938.42	179.32	214.98
Stockpile to Plant:					
1955 Season	208,404	1632.00	1395.95	127.70	149.29
1954 Season	276,559	2117.00	1679.00	130.64	164.72
1953 Season	349,751	2728.00	2276.92	128.21	153.61
1952 Season	199,698	2299.50	1655.67	86.84	120.61
Heavy Media Feed:					
1955 Season	172,134	1632.00	1395.95	105.47	123.31
1954 Season	194,669	2117.00	1679.00	91 95	115.94
1953 Season	252,824	2728.00	2276.92	92.68	111.04
1952 Season	128,349	2299.50	1655.67	55.82	77.52
Fines Feed:					
1955 Season	27,977	1632.00	1395.95	17.14	20.04
1954 Season	68,644	2117.00	1679.00	32.43	40.88
1953 Season	81,086	2728.00	2236.00	30.01	36.26
1952 Season	61,051	2299.00	1567.62	26.55	38.95
Concentrates:					
1955 Season	117,528	1632.00	1395.95	72.01	84.19
1954 Season	101,776	2117.00	1679.00	48.08	60.62
1953 Season	124,615	2728.00	2276.92	45.64	54.73
1952 Season	59,507	2299.50	-	25.88	-

Plant Operating Time:

1955 Season 85.54%
1954 Season 79.31 - (90.37% Discounting 259.33 hours lost in April and
1953 Season 83.46% May due to cold weather and breakdown of Conveyor #1)
1952 Season 72.04%

OHIO MINE
ANNUAL REPORT
YEAR 1955

7. BENEFICIATION: (Cont'd)

1. Mill Reject Report

	CRUDE					CONCENTRATE					
Year	Tons	% Fe (dried)	% Moist.	% Fe Natural	Ton-Fe Units (dried iron)	Tons	% Fe (dried)	% Moist.	% Fe Natural	Tons-Fe Units (dried Iron)	Tailings Tons Fe Units
Webster											
1952	199,698	42.79	2.50	41.72	8,545,077	59,507	54.49	9.43	49.35	3,242,536	5,302,541
1953	332,951	42.19	2.50	41.14	14,047,203	118,481	53.39	7.02	49.64	6,325.701	7,721,502
1954	206,739	41.70	2.50	40.66	8,621,016	76,467	51.61	6.23	48.39	3,946,462	4,567,309
1955						2,078*	51.61	5.85	48.59	107,245*	
Total	739,388	42.22	2.50	41.16	31,213,296	256,533	53.10	7.35	49.20	13,621,944	17,591,352
Portland											
1953	16,800	42.19	2.50	41.14	708,792	6,134	53.39	7.02	49.64	327,494	381,298
1954	69,820	41.70	2.50	40.66	2,911,494	25,309	51.61	6.23	48.39	1,306,197	1,605,297
1955	38,514	42.23	2.50	41.17	1,626,446	12,635**	53.40	6.50	49.93	674,709	951,737
Total	125,134	41.93	2.50	40.88	5,246,732	44,078	52.37	6.42	49.01	2,308,400	2,938,332
Norwood											
1955	149,604	44.97	2.50	43.85	6,727,692	94,238	53.00	6.71	49.44	4,994,614	1,733,078
Beaufort											
1955	20,286	43.00	2.50	41.92	872,298	11,326	52.90	6.72	49.35	599,145	273,153
Grand Total	1,034,412	42.64	2.50	41.57	44,060,018	406,175	52.99	7.07	49.24	21,524,103	22,535,915
Total 1952	199,698	42.79	2.50	41.72	8,545,077	59,507	54.49	9.43	49.35	3,242,536	5,302,541
Total 1953	349,751	42.19	2.50	41.14	14,755,995	124,615	53.39	7.02	49.64	6,653,195	8,102,800
Total 1954	276,559	41.70	2.50	40.66	11,532,510	103,854	51.61	6.23	48.39	5,359,904	6,172,606
Total 1955	208,404	44.27	2.50	43.16	9,226,436	118,199**	53.03	6.67	49.50	6,268,468	2,957,968
Grand Total	1,034,412	42.64	2.50	41.57	44,060,018	406,175	52.99	7.07	49.24	21,524,103	22,535,915

* Overrun from 1954
** Includes 671 tons 1954 stockpile overrun
Note: Roughly 23,000 tons of coarse reject tailings should be considered inacessable because of material lost in caving of pile and quantity Used in road building

OHIO MINE
ANNUAL REPORT
YEAR 1955

8. MAINTENANCE, REPAIRS, AND MILL CHANGES:

Only routine repair and maintenace was scheduled for the mill.

There were no mill changes made which altered the flow sheet used during the 1954 season.

9. GENERAL SURFACE:

a. Buildings and Repairs:

There was no new construction for 1955. Repairs and changes in the mill, office and shop buildings were very minor.

b. Roads, Transmission Lines, Etc:

The power transmission lines to the West Pit required some changes and additions. E. W. Edens Company was engaged to effedt these changes which resulted in a more efficient pit operation.

Haul roads from the West Pit were surfaced with the coarse heavy media rejects making an ideal road surface for increasing tire life and reducing the number of trucks on haul.

10. ESTIMATE OF ORE RESERVES:

	*Developed	**Undeveloped	Total
Webster			
Ore Reserves (Tons)	-2,078	-	-2,078
Stripping (Cu. Yds.)	-	-	-
Portland			
Ore Reserves (Tons)	2,365	-	2,365
Stripping (Cu. Yds.)	17,650	-	17,650
Ohio-Norwood			
Ore Reserves (Tons)	252,562	385,000	637,562
Stripping (Cu. Yds.)	760,000	1,178,662	1,938,662
Beaufort			
Ore Reserves (Tons)	32,874	-	32,874
Stripping (Cu. Yds.)	84,872	-	84,872
Total Ohio Mine			
Ore Reserves (Tons)	285,723	385,000	670,723
Stripping (Cu. Yds.)	862,522	1,178,662	2,041,184

* Developed equals proven plus probable ores
** Undeveloped equals prospective ores

(Note: The -2,078 tons of overrun are shown as a negative reserve to give continuity between 1954 reserve figures and 1955 production figures)

OHIO MINE
ANNUAL REPORT
YEAR 1955

10. ESTIMATE OF ORE RESERVES:

Developed Ore - Factors Used:

	Cubic Feet Per Tons of Crude	Rock Deduction
Portland Concentrates	15	
Norwood Concentrates	15	

Estimated Analysis:

	Iron	Phos	Sil.	Sul.	Moist.
Portland Conc. (Dried)	52.00	.400	10.00	.150	-
Portland Conc. (Natural)	48.36	.372	9.30	.140	7.00
Norwood Conc. (Dried)	53.00	.250	7.00	.120	-
Norwood Conc. (Natural)	49.29	.233	6.51	.112	7.00

11. EXPLORATION AND FUTURE EXPLORATION:

Lease No. 111 covering the Titan lands was dropped prior to its December 31, 1955 expiration date. D.D.H. #2, drilled in T45, R31, Sec. 21, approximately 80 feet south of D.D.H. #1, discouraged all hopes of finding crude ore tonnages substantiating any future development.

Drill hole record for D.D.H. #2 is as follows: 0'33' surface, 33'-35' lean cherty and arenaceous iron formation, 35'-105' pyritic graphitic argillite, 105'-121' argillite. The hole was stopped at 121'. Analysis of core taken from the best iron formation cut in the hole rangedfrom 14% Fe to 26% Fe.

12. TAXES:

a. Valuation for 1956:

The valuation for 1956 will be considerably lower than past years. This will be true due to the new Baraga County tax rate of $59.34 for 1955. Baraga County took advantage of State Equalization in 1955 which increased their tax rate from $34.00 to $59.34.

b. Detail of Valuation and Taxes:

	1951	1952	1953	1954	1955	1956 (Estimated)
Value	$17,200	$370,000	$391,350*	$405,800	$415,000	$283,000
Taxes	$715.51	$14652.78	$13438.97	$13935.17	$24908.34	-

* This figure includes $1,350.00 which was the valuation set on the Titan Lease acquired from Ford in 1953.

OHIO MINE
ANNUAL REPORT
YEAR 1955

12. TAXES:

6. Comparative Statement of Taxes for the Years 1955 and 1954:

SPURR TOWNSHIP, BARAGA COUNTY	1955 Valuation	1955 Taxes	1954 Valuation	1954 Taxes
Ohio Mine, includes Webster, etc. Real	$220,600	$13,090.42	$150,800	$5,178.47
Ohio Mine, Personal Property	195,000	11,571.30	255,000	8,756.70
Collection Fee		246.62		
Total Spurr Township	$415,600	$24,908.34	$405,800	$13,935.17
Tax Rate		$59.34		$34.00

13. ACCIDENT AND PERSONAL INJURY:

There were no compensable injuries at the Ohio Mine during 1955 or 1954. The Ohio Mine was the winner of the 1955 and 1954 annual safety award banner for the Minnesota and Michigan open pit properties.

14. PROPOSED NEW CONSTRUCTION:

No new construction has been proposed for the year 1956.

15. EQUIPMENT RECEIVED AND PROPOSED NEW EQUIPMENT:

There were no proposals for 1955 purchases of new equipment for the Ohio Mine.

A recommendation was made to purchase an additional 22 ton Euclid truck for the Ohio. The five 22 ton trucks would be needed for the 1956 season at the Tilden.

16. NATIONALITY REPORT:

Nationality	American Born 1953	1954	1955	Foreign Born 1953	1954	1955	Total 1953	1954	1955
French-German	2	2	2	-	-	-	2	2	2
Irish	2	2	2	-	-	-	2	2	2
English	1	1	1	-	-	-	1	1	1
Swedish	2	2	2	1	1	1	3	3	3
Swedish-French	1	1	1	-	-	-	1	1	1
Norwegian	1	1	1	-	-	-	1	1	1
French	3	3	3	-	-	-	3	3	3
Finnish	35	34	38	3	3	3	38	37	41
English-French	2	2	2	-	-	-	2	2	2
Croatian	1	1	1	-	-	-	1	1	1
German-Swedish	1	1	1	-	-	-	1	1	1
Total	51	50	54	4	4	4	55	54	58

REPUBLIC MINE
ANNUAL REPORT
YEAR 1955

GENERAL

The Republic Mine project reached its final stages of development by the end of 1955. Projects remaining to be completed before production commences early in 1956 consisted of running in and testing of machinery and electrical facilities, installation of certain pulp launders and piping for the mill, completion of the reuse pump house, completion of the oxygen facilities for the jet piercing machine and painting. Based on the original E&A, the project was 96.21% completed and 99.4% committed and expended. Progress during the year was excellent.

Contractors who worked on the project and completed their contracts during the year were: Proksch Construction Company, Milwaukee Bridge Company, John Kielinen & Son, Joseph Hamel, St. Paul Structural Steel Company, Arrowhead Steel Bldgs., Inc., A. Lindberg and Sons, Inc., Pittsburgh-Des Moines Steel Company, E. W. Edens, Hoffer Glass Company and Charles W. Moore. Hennes Trucking Company and Cloverland Contracting Company worked on the project through the year and along with Pajula and Maki, had some work remaining to be completed. Engineering work by Abe W. Mathews was completed in the first quarter and by Ralph Boeck in the second quarter.

The nucleus of a mine crew was formed in April which was gradually increased in size during the year. This crew worked on diking, stripping, grading and miscellaneous projects as required.

Thirteen houses, along with their auxiliary buildings were moved from the vicinity of the mining area. Eight of these houses were relocated at the new townsite south of Republic which was developed during the year.

Expenditures made during 1955 are summarized in Table I; Table II shows a breakdown of expenditures by contracts. Inasmuch as most of the expenditures are related to E&A CC-491, the first part of this report will follow the E&A form.

REPUBLIC MINE
ANNUAL REPORT
YEAR 1955

TABLE I.

EXPENDITURES MADE UNDER E&A CC-491 DURING YEAR 1955

A.	General Expense	$ 82,877.79
B.	General Surface	77,172.80
C.	Shop, Office & Dry Building	55,537.34
D.	Concentrating Plant	
	a. Crushing Section	687,791.50
	b. Concentrator Section	1,095,155.08
	c. Stocking and Shipping Section	110,534.58
	d. Reagent Storage	2,218.07
E.	Power Distribution	67,574.51
F.	Pelletizing Plant	-
G.	Mining Equipment	448,781.03
H.	Water Supply	130,041.27
I.	Tailings Disposal	79,364.26
J.	Republic Plat and 1955 House Moving	170,185.62
	TOTAL	$ 3,007,233.85
	Total Expenditures in Year 1952	48,684.42
	Total Expenditures in Year 1953	807,609.83
	Total Expenditures in Year 1954	2,034,097.16
	Total Expenditures in Year 1955	3,007,233.85
	TOTALS	$ 5,897,625.26

Authorization - Original E&A - $ 6,130,000.00

TABLE II.

PROJECT	CONTRACTOR	CONTRACT AMOUNT	PAID IN 1953	PAID IN 1954	PAID IN 1955
Excavation for Primary Crusher Building and No. 1 Conveyor Tunnel	A. Lindberg & Sons, Inc.	$ 88,719.96	$ 76,681.90	$ 12,038.06	$ -
Construct Shop, Office and Dry Building	Proksch Construction Co.	393,135.93	273,286.46	100,708.77	19,140.70
Excavation, Concrete and Backfill for Crushing and Concentrator Sections	Proksch Construction Co.	362,036.83	44,054.56	296,129.33	21,852.94
Furnish and Erect Structural Steel for Crushing and Concentrator Sections	Milwaukee Bridge Co.	602,540.42	-	346,460.31	231,711.40 *
Mechanical and Electrical Work for Crushing and Concentrator Sections	Cloverland Contracting Co.	602,658.60	4,362.37	254,846.63	317,067.60 *
Clearing and Brushing	A. C. Carlson	9,090.00	5,850.00	3,240.00	-
Sheeting, Roofing, Flashing and Insulation	Arrowhead Steel Bldgs., Inc.	196,065.75	-	71,511.12	124,554.63
Install Storm and Sanitary Sewers; unload and Erect Two Shop Cranes, and Install One 20,000 Gallon Tank	Proksch Construction Co.	19,995.50	-	19,995.50	-
Furnish and Install One Freight Elevator	Otis Elevator Company	12,533.00	-	11,279.70	1,253.30
Miscellaneous Projects	Joseph Hamel	10,590.60	5,677.84	4,912.76	-
Construct Built-up Roof on Mill Building	H. H. Pellow & Sons, Inc.	36,704.00	-	-	36,704.00
Concrete Block Work and Install Wood Nailers and Flooring	Kielinen and Son	9,577.95	-	4,098.60	5,009.40

TABLE II. (CONT'D.)

PROJECT	CONTRACTOR	CONTRACT AMOUNT	PAID IN 1953	PAID IN 1954	PAID IN 1955
Grading Work for New Republic Townsite	A. Lindberg & Sons, Inc.	$ 7,960.00	$ -	$ 7,164.00	$ - *
Furnish and Erect Water Tank	Pittsburgh-Des Moines Steel Co.	35,652.09	-	-	35,652.09
Unload, Store and Install Machinery and Equipment for Plant	John Hennes Trucking Co.	140,808.08	-	1,522.50	110,099.58
Drill Test Holes for Water - Plat	Hakala and Julian	1,822.00	-	1,672.75	149.25
Furnish, Install all Grating, Stair Treads and Pipe Railing for Plant	Milwaukee Bridge Co.	55,145.17	-	8,825.31	37,586.31
Unload and Erect Structural Steel for #10 and #11 Conveyors and Loading Pocket	John Hennes Trucking Co.	8,149.16	-	-	7,334.24 *
Shop Floor Slabs and Conveyor #1 Tunnel Lining Installation	Joseph Hamel	29,962.74	-	-	29,962.74
Move Houses	Charles Moore	27,553.90	-	-	16,532.34
Potable Water Line and Sewer Installation for Townsite	A. Lindberg & Sons	154,556.45	-	-	126,149.13
Glass Installation	Hoffer Glass Company	1,073.00	-	-	1,073.00
No. 11 Conveyor and Railroad Loading Pocket Steel	St. Paul Structural Steel Company	37,500.00	-	-	37,500.00
20" Fresh Water Line	Cherne Company	16,933.95	-	-	16,933.95

TABLE II. (CONT'D.)

PROJECT	CONTRACTOR	CONTRACT AMOUNT	PAID IN 1953	PAID IN 1954	PAID IN 1955
20" Reuse Water Line and Condensate Return Line Between Secondary and Shop	Cherne Company	$ 10,076.80	-	-	$ 10,076.80
Reuse Pump House and First Aid Room	Pajula and Maki	13,014.00	-	-	-
Erect Fence	A. Lindberg & Sons, Inc.	7,000.00	-	-	7,000.00
Pole Lines	E. W. Eden	7,463.70	-	-	7,463.70

*Complete except for retainer, which will be paid as soon as work has been checked.

REPUBLIC MINE
ANNUAL REPORT
YEAR 1955

A. GENERAL EXPENSE

At the end of the year, the Republic Mine staff totaled seven people, including a superintendent, clerk, warehouse clerk, secretary, engineer, surveyor, and a metallurgist.

In June, Mr. K. C. Olson, Assistant Superintendent, was transferred to the Humboldt Mine as Superintendent, and Mr. E. W. Lindroos was transferred from the Humboldt Mine to the Republic Mine as Superintendent. In May, Mr. Joseph Crites, Engineer, was placed in charge of the earth moving operations as Pit Foreman, Mr. R. J. Flynn was named mine engineer and Mr. Charles Cornish was appointed surveyor. Mr. Milo Martell was transferred from the Humboldt Mine to the Republic Mine as warehouse man in October. In December, Mr. Richard Smith was transferred from the Humboldt Mine to the Republic Mine as plant metallurgist. A mechanical engineer and an electrical engineer worked at the mine on a part-time basis.

Engineering work consisted largely of supplying information to the construction trades and checking on the work of the various contractors. Control survey work was provided for the diking, grading and stripping operations. Surveys were completed for pole lines, the 20" fresh water line, the 20" reuse water line, fire lines and the oxygen line. Other projects consisted of laying out the fence line, surveys for the road to the pocket and stocking grounds, miscellaneous drainage controls, survey control on the north and south pit roads and some additional cross-sectioning of the pit.

B. GENERAL SURFACE

A road was constructed south from the primary crusher to the old rock dumps and a temporary haulage road was built north of the primary crusher to the stripping dump during the third quarter. In addition, roads were built from the shops to the primary crusher and from the mill to the stocking area and loading pocket, - the latter in December.

Extensive grading was done in the vicinity of the crusher buildings, mill and shop-office-dry building in September and October. Much of this was done with borrow obtained from the pit area and covered with pit-run gravel obtained from a borrow pit located at the junction of M-95 and the mine access road. A small concentrate stocking area was graded north of the loading pocket in December. Table III. summarizes the yardages of fill placed in the various areas.

The fire protection system in the plant area was completed and miscellaneous culverts, manholes and drains were installed during September and October.

A "non-climbable fence" 7200 ft. long, consisting of four feet of 2" x 4" mesh topped with three strands of barbed wire was installed around two-thirds of the plant and pit area in November.

TABLE III. - GRADING

MONTH	STOCKPILE AREA	ROADS	VICINITY OF SHOPS	MILL	PRIMARY	FINE CRUSHING
January					2,300 *	
August		10,640	15,000		1,200	
September		19,270	18,960	2,800	1,400	3,300
October		10,150				
November		6,820				
December	35,365	5,250				
TOTAL	35,365	52,130	33,960	2,800	4,900	3,300
GRAND TOTAL	132,455 Cu. Yards					

* Backfill around Primary Crushing Building.

REPUBLIC MINE
ANNUAL REPORT
YEAR 1955

C. SHOP-OFFICE-DRY BUILDING

This building was placed into full use during the year. The shop areas were equipped with tools, work benches and the various items of shop equipment that are required for the maintenance of trucks, tractors and other pit equipment. Benches and clothes hooks were installed in the dry. Much of the necessary office equipment was purchased.

Concrete floor slabs were poured in the shop section during the first quarter. Vents were installed in the roof to expedite removal of exhaust fumes.

The bonded roof on the building started to leak after damage by blasting by one of the contractors. To correct this condition, it was necessary to remove nearly all of the insulation and cover, and new materials had to be reapplied. This work was completed by H. H. Pellow and Sons, Inc. in September and paid for by Proksch Construction Company's insurance.

The furnaces were converted for the use of No. 5 fuel oil and a 20,000 gallon storage tank installed.

A contract was let to Pajula and Maki for the construction of a first aid room adjacent to the engineering office. This work was 90% completed by the end of the year.

D. CONCENTRATING PLANT

a. Crushing Section

By the end of the year, the construction of the crushing plants was approximately 99% completed. Projects remaining consisted of some miscellaneous wiring by Cloverland Contracting Company, and installation of two conveyor belts, fastening of grating and running in of machinery by Hennes Trucking Company. In addition, there were projects remaining for Cleveland-Cliffs personnel who will work through the entire circuit to complete work that has not been included in contracts and in making the changes and adjustments that are necessary before operations commence. Painting also remains to be done.

The concreting of No. 1 conveyor tunnel by Joseph Hamel was completed in the first quarter. Hennes Trucking Company completed erection of the structural steel in July and of chutes and hoppers in October. This contractor worked on machinery erection throughout most of the year. The crusher installations were generally completed in the first quarter. Other machinery was placed as soon as steel erection and equipment deliveries permitted.

Installation of nailers and conveyor gallery decking was completed by John Kielinen and Son in August. Arrowhead completed sheeting of the buildings and galleries in August. Cloverland Contracting Company worked on electrical and piping facilities through the year.

REPUBLIC MINE
ANNUAL REPORT
YEAR 1955

D. CONCENTRATING PLANT (CONT'D.)

b. Concentrator Section

Construction of the concentrating section showed excellent progress through the year. About 40% of the structural steel and all of the miscellaneous steel was installed. Cover was completed, machinery erected, piping and plumbing practically completed and the bulk of the electrical installations were made. Projects remaining for completion consisted of painting; several weeks of electrical work and testing of pipe lines by Cloverland Contracting Company; running in of machinery and a few small miscellaneous projects by Hennes; and work on chutes, pulp launders and piping by Cleveland-Cliffs personnel. This latter work was not included in any of the contracts and will therefore be completed by our maintenance personnel. The major part of this work will consist of the installation of piping and launders in the flotation and desliming sections of the plant. In the grinding section, feed chute modifications and charging of initial ball and rod loads into the mills remains to be done.

The stocking and shipping facilities were generally completed except for some work which will be done by Cleveland-Cliffs personnel.

The reagent storage facilities consisting of the reagent storage tanks, pumps and pipe lines were installed.

Following is a brief summary of the completion of the various components of the mill. Structural steel for the mill was 95% completed in the first quarter with the remainder completed during the second quarter. The loading pocket and conveyor gallery steel was completed in September. The miscellaneous steel, including bins, hoppers and chutes was completed in November. Cover and insulation for the mill building was completed in May and for the pocket and galleries in November. Most of the mill machinery was erected in the period from May to September, with adjustments and finishing touches extending to the end of the year. Table IV. shows the quantities of concrete that were poured during the year.

TABLE IV.

CUBIC YARDS OF CONCRETE POURED - 1955

MONTH	#1 CONVEYOR TUNNEL	SHOP FLOORS	MILL FLOORS	FRESH WATER PUMP HOUSE	MISCELLANEOUS *
January	75.00	106.00			
February	277.00	37.00			
March	139.50	61.50			
April					
May					
June			26.00		
July			54.48		
August					
September				8.90	27.0
October				4.70	27.25
November					1.0
December					
TOTALS	491.50	204.50	80.48	13.60	55.25
GRAND TOTAL	845.33				

*Primary Crusher, Tailings Dam Overflows, Electrical Installations and Manholes

REPUBLIC MINE
ANNUAL REPORT
YEAR 1955

E. POWER DISTRIBUTION

The power lines extending to the pit, to the pump houses and to the Driox unit were installed by E. W. Edens during the period from July to September. Most of the remainder of the power distribution system was installed by Cloverland in the last two quarters.

The power line extending from the power plant over the pit areas and to the Village of Republic was re-routed to the west side of the river. This work was done in the last quarter by Upper Peninsula Power Company for the Republic Township with Cleveland-Cliffs contributing to the cost of labor.

A power line was extended from the power plant to the mine substation by Upper Peninsula Power Company.

G. MINING EQUIPMENT

A 3½ yd. diesel shovel No. 85, Model 1201, was transferred from the Wanless Mine to Republic in April for use in diking and stripping operations. Three 34-ton Euclid rental trucks were returned from Humboldt to Republic in June with the fourth one arriving in December. A D-7 tractor angle dozer was purchased for general pit use which was delivered in November.

A Marion 4161 electric shovel No. 101 equipped with a five-yard bucket was ordered in August and delivered to the mine in September. Erection was completed with the installation of the dipper in November. This shovel was equipped with a semi-automatic lubrication system.

The 4½" Gardner-Denver air trac wagon drill and the Ingersoll-Rand 600 CFM diesel compressor were transferred from the Humboldt Mine to the Republic Mine in October.

The JPM-3 jet piercing machine arrived at the mine and was erected in September.

H. WATER SUPPLY

Twenty-inch diameter spiralweld pipe was purchased in June for the fresh water and reuse water lines. The contract for the line extending from Michigamme River to the water tank was let to Cherne Company in May and completed by them in July. The 150,000 gallon fresh water tank from Pittsburgh-Des Moines arrived in June and was erected by the end of August and painted in September. The installation of the reuse water line was awarded to Cherne and completed in September.

The contract for the pump house at Michigamme River was awarded to A. Lindberg and Sons, Inc. Work started in September and was completed in December. The contract for the reuse pump house at Milwaukee Lake was awarded to Pajula and Maki who started work on this project in December.

REPUBLIC MINE
ANNUAL REPORT
YEAR 1955

H. WATER SUPPLY (CONT'D.)

Four Fairbanks-Morse 4-stage 16" Pomona pumps were ordered for fresh water and reuse water pumping. Two pumps were installed by mine personnel in the fresh water pump house to generally complete this installation by the close of the year.

I. TAILINGS DISPOSAL

Dike construction was started in May and continued into August at which time the equipment was moved into the pit area for grading work. In December, diking was resumed with the intention of completing this project in January. Table V. summarizes the yardages of material placed on the various dikes and the print in the back of this report shows the location of the various dikes.

Operations were carried on a two and three shift per day basis, five days per week.

Overflow culverts were placed on the north and southwest sides of the pool area.

Additional lands acquired for tailings disposal facilities consisted of the $SE\frac{1}{4}$ of the $NW\frac{1}{4}$ and $NE\frac{1}{4}$ of the $SW\frac{1}{4}$ of Section 16, which were obtained from Wayne Williams for $2,000.00, and the diagonal $SW\frac{1}{2}$ of the $SW\frac{1}{4}$ of the $SW\frac{1}{4}$ of Section 9, which was obtained from Charles Koski for $1,000.00. These lands are all in T. 46 N., R. 29 W.

TABLE V.

YARDAGE PLACED ON DIKES

MONTH	NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	NO. 6	NO. 7	NO. 8	NO. 9	NO. 10	NO. 11	ROADS
MAY	18,000											
JUNE	33,371	11,740	7,540	17,280								5,260
JULY			18,180	37,000	21,560	15,460						520
AUGUST			20,000	21,620								
DECEMBER									28,000	4,895		
TOTAL	51,371	11,740	45,720	75,900	21,560	15,460			28,000	4,895		5,780

GRAND TOTAL 260,426 cu. yards

REPUBLIC MINE
ANNUAL REPORT
YEAR 1955

J. REPUBLIC PLAT AND 1955 HOUSE MOVING

A. Lindberg and Sons, Inc. was awarded the contract for the installation of the fresh water and sewage facilities for the new townsite which is located two and a half miles south of the Village of Republic along Highway M-95. The work of this contractor included the laying of an 8" transite water line from the mine to the townsite, a water distribution system and sewage system in the townsite and a sedimentation tank along with its auxiliary facilities. Work got under way in August and was generally completed by the end of the year. Considerable delay was encountered in getting this project under way because the approvals which were required from various departments of the local and state government were slow in forthcoming.

Of the thirteen houses that were scheduled for removal in 1955, eight were moved to the new townsite and the others were dismantled. Charles W. Moore obtained the contract for this project in September and the work was practically completed in December. Three houses were removed from Swedetown and the remainder from the Park City area.

REPUBLIC MINE
ANNUAL REPORT
YEAR 1955

TABLE VI.

MAJOR EQUIPMENT ORDERED AND/OR RECEIVED
FOR REPUBLIC PLANT AND PIT
DURING YEAR 1955

ITEM	PLANT MAKE	DATE ORDERED	DATE RECEIVED	REMARKS
Primary Crusher Motor	Westinghouse	4/22/53	2/15/55	Primary
Primary Crusher	Traylor	2/6/53	2/17/55	Primary
Apron Feeder	Pioneer	6/15/54	3/7/55	Primary
Drum Controllers & Starters	Allis-Chalmers	4/22/53	3/8/55	Secondary
Standard 7' Crusher	Nordberg	2/6/53	3/8/55	Secondary
Secondary & Tertiary Driver Motors	Allis-Chalmers	4/22/53	3/21/55	Secondary
Rod & Ball Mill Starters	Westinghouse	3/19/53	4/22/55	Mill
No. 1 Conveyor Belt	Goodrich	2/18/55	5/6/55	Primary
CD41-5 & B41-5 Pumps	Allen-Sherman-Hoff	1/12/55	5/8/55	Mill
2- Rod Mills	Hardinge	2/12/53	4/55	Mill
2- Ball Mills	Hardinge	2/12/53	5/55	Mill
Feeders, Gearmotors, Etc.	Link-Belt	10/15/54	6/3/55	Various
1- Densifier	Colorado Iron Wks.	5/1/53	6/4/55	Mill
2- Sets Dorrclones Comp.	Dorr-Oliver	8/3/53	6/4/55	Mill
2- Thickener Mechanisms	Dorr-Oliver	3/26/53	6/6/55	Mill
2- Hydroscillator	Dorr-Oliver	3/23/53	6/11/55	Mill
3- Nash Vacuum Pumps	Nash	12/15/53	6/11/55	Mill
1- Densifier	Colorado Iron Wks.	5/1/53	6/16/55	Mill
4- Wilfley Pumps	Wilfley	1/12/55	6/16/55	Mill
Denver Flotation Machines	Denver Equip't.	10/25/54	6/21/55	Mill
Worthington Compressor	Worthington	4/10/53	7/2/55	Mill
2- Weightometers	Merrick	11/4/53	7/2/55	Mill & Crusher
Elliott Taconite Motors	Elliott	12/8/53	7/5/55	Mill
3- Filters	Eimco	8/3/53	7/5/55	Mill
Fagergren Float Machines	Western Machinery	10/25/54	7/12/55	Mill
Transportometer	Sintering Mach.	1/26/54	8/4/55	Mill
3- 100 H.P. Elliott Motors	Elliott	12/8/53	8/9/55	Mill
Conveyor Belts	Goodyear	6/9/55	8/30/55	Various
Samplers	Denver Equip't.	2/1/54	8/55	Mill
Reagent Feeders	Clarkson	5/31/55	10/4/55	Mill
Dust Collector	American Air Filter	9/13/55	10/7/55	Secondary
8- Conditioners	Denver Equip't.	5/4/55	10/8/55	Mill
Conveyoflo Meter	Builders-Providence	1/27/54	10/25/55	Mill
Conveyor Equip't.	Link-Belt	9/30/53	1955	Various
Aerotum Dust Collector	Turner & Hawes	Contractor	1955	Secondary
	PIT			
6 Yd. Electric Shovel	Marion	8/12/55	9/20/55	Pit
D-7 Angle Dozer Tractor	Caterpillar	10/11/55	11/4/55	Pit

REPUBLIC MINE
ANNUAL REPORT
YEAR 1955

TABLE VI. (CONT'D.)

MAJOR EQUIPMENT ORDERED AND/OR RECEIVED
FOR REPUBLIC PLANT AND PIT
DURING YEAR 1955

ITEM	PLANT MAKE	DATE ORDERED	DATE RECEIVED	REMARKS
Jet Piercer	Bucyrus-Erie	1/3/55	9/8/55	Pit
2-Ton Service Truck	International	4/20/55	4/29/55	Pit
1/2 Ton Pickup Truck	Chevrolet	10/28/55	11/20/55	Pit
Wagon Drill	Gardner-Denver	4/20/55	8/2/55	Pit
600 CFM Compressor	Worthington	12/16/54	1/13/55	Pit

Proposed New Equipment

Drop Ball Crane
Speed Swing Loader, Pit
Flat Bed Truck
Bucket Loader - Mill Clean-up

REPUBLIC MINE
ANNUAL REPORT
YEAR 1955

MINING OPERATIONS

a. Stripping

E&A No. CC-736 for $70,200.00 for stripping in the last quarter was requested and approved. The work consisted of removing overburden in the pit area due west of the primary crusher and extending north to the old ruins, a distance of 1,000 feet and south approximately 500 feet. Heavier banks of material were loaded with a shovel and a dragline was used for clean-up purposes. The ledge profile was found to be exceedingly rough and irregular and considerably more overburden was encountered than had been anticipated. Table VII. summarizes the yardages that were moved by months. The total amount of material removed was 165,635 cu. yards which was moved at a cost of $0.395 per yard.

b. Mining

For the initial development of the pit, a road was built from the primary crusher to the west, extending to the 1600' bench floor. The development of two faces, one of which will advance to the north and the other to the south, was started with wagon drilling. Drilling with the 4½" GD air trac got under way in November and a total footage of 1867 feet of 3" hole was drilled during November and December, and two blasts were made. The total amount spent on deferred mining during the year was $8,204.96.

REPUBLIC MINE
ANNUAL REPORT
YEAR 1955

TABLE VII.

MONTHLY STRIPPING FIGURES - CUBIC YARDS

MONTH	SHOVEL	DRAGLINE
October	42,080	24,110
November	60,405	23,475
December	12,745	2,820
TOTALS	115,230	50,405

GRAND TOTAL .....165,635 Cu. Yards

REPUBLIC MINE
ANNUAL REPORT
YEAR 1955

LABOR AND WAGES

Report of Men Hired, Transferred and Separated:

	First of Month	Hires	Trans. from Other Mines	Separated	Trans. to Other Mines	End of Month
May	0	1	10		1	10
June	10	5	6		3	18
July	18		2		1	19
August	19	3	1		1	22
September	22	2	1			25
October	25		7	1		31
November	31		9			40
December	40		2			42
TOTAL		11	38	1	6	42

The above table includes hourly and salaried personnel on Republic Mine payroll.

REPUBLIC MINE
ANNUAL REPORT
YEAR 1955

LABOR AND WAGES (CONT'D.)

Annual Statement of Labor:

Hourly Employees	Stat. Men	Hours	Amount	Avg. Rate
Straight Time	16	32,738¼	74,021.16	2.261
Overtime	-	1,393¼	1,606.22	1.153
Shift Diff. - Aft.	-	8,173½	492.61	.060
Shift Diff. - Night	-	2,625	243.27	.093
Holiday Allowance	-	920	2,107.20	2.290
Holiday Worked - Prem. Time Only	-	60	135.66	2.261
Sub Total	16	32,738¼	78,606.12	2.401
Vacation Pay	(6)	240	582.60	2.428
Total Hourly Employees	16	32,738¼	79,188.72	2.419
Salaried Employees				
Mine Payroll - Straight Time	1	1,947¼	6,151.55	3.159
Total Mine Payroll	17	34,685½	85,340.27	2.460
General Payroll				
Salaries - Straight Time	2¼	4,708¼	10,012.15	2.127
Overtime	-	(51)	56.30	1.104
Labor from Other Mines	5¼	10,559¾	28,199.65	2.670
Total Labor	24½	49,953½	123,608.37	2.474

Distributed as Follows:

Stripping	4¼	8,580	22,735.19	2.650
Uncompleted Construction	19	38,697½	93,522.71	2.417
Other Mines	½	1,024½	2,768.19	2.702
Other Accounts	¾	1,651½	4,582.28	2.775
Total as Above	24½	49,953½	123,608.37	2.474

Labor relationships were satisfactory through the year.

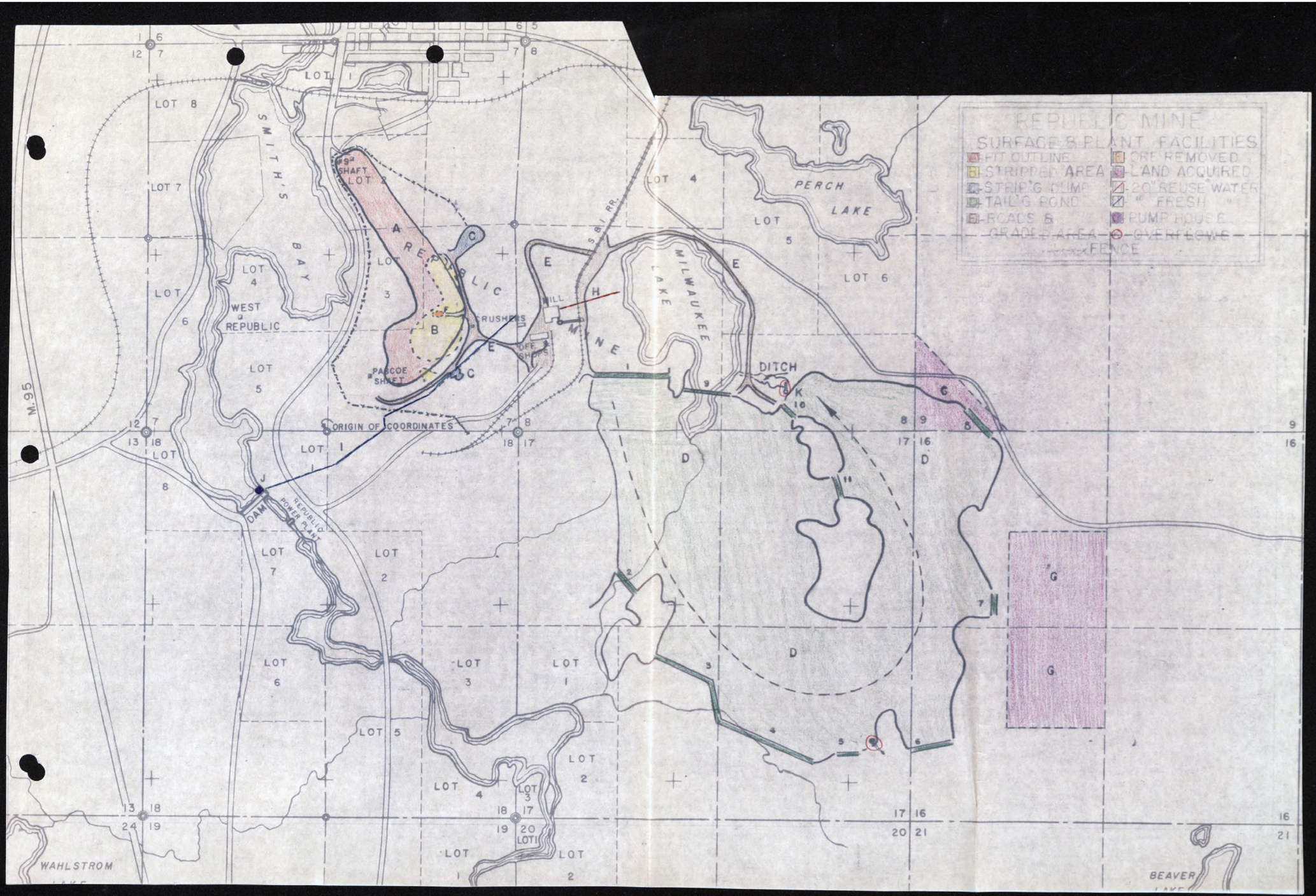
ACCIDENTS

During the year 1955, there were 34,686 man-hours worked with no lost time accidents.

TABLE VIII.

TAXES

DESCRIPTION	1955 VALUATION	1955 TAXES	1954 VALUATION	1954 TAXES
REPUBLIC TOWNSHIP				
Republic Mine, Real Estate	165,000	4,042.50	52,575	1,035.46
Republic Mine, Personal Property	155,000	3,797.50	30,000	590.85
Miscellaneous	-	-	200	3.95
Total		7,840.00		1,630.26
Collection Fee		78.40		
Total Republic Mine	320,000	7,918.40	82,775	1,630.26
Republic Rented Buildings:				
Lot 89, Rep. Iron Co. 2nd Add. (Koivula)	725	17.76	-	-
Lot 102, " " " " " (Erickson)	700	17.15	-	-
Parcel 475, Park City (Lahtinen Est. Pur.)	300	7.35	-	-
Total	1,725	42.26		
Collection Fee		.42		
Total Rented Buildings	1,725	42.68		
Republic Auxiliary Lands	2,850	70.54	4,500	88.64
Standard Mine, NE¼ of Sec. 34, 47-30	1,450	35.88	1,450	28.56
Erie Mine, NE¼ of NW¼, Sec. 28, 47-30	250	6.19	-	-
TOTAL REPUBLIC TOWNSHIP	326,275	8,073.69	88,725	1,747.46
Tax Rate	24.50		19.50	
RICHMOND TOWNSHIP				
135 A. of Sec. 30, 46-26 (Winter purchase)	1,550	42.27	1,550	42.27
EMPIRE MINE				
SW¼ of Sec. 19, 47-26, 160 A.	24,000	654.48	24,000	654.48
BELLEVUE FARM EXPLORATIONS				
NE¼ of SW¼ of Sec. 18, 47-26, 40 A.)				
NW¼ of SW¼ of Sec. 18, " 32.37 A.)	650	17.55	650	17.73
NW¼ of SE¼ of Sec. 18, " 40 A.	275	7.42	275	7.49
Part of E½ of SE¼, 18, " 6.37 A.	125	3.37	125	3.41
Part of NE¼ of SE¼, 18, " 5. A.	125	3.38	125	3.41
Total		31.72		32.04
Collection Fee		.32		
Total Bellevue Farm	1,175	32.04	1,175	32.04
MINERAL LANDS				
Parcel in Secs. 18-19, 47-26 (Kivisaari Pur.)	1,450	39.15	1,450	39.54
N½ of SE¼ of Sec. 28, " 80 A.	270	7.29	270	7.37
Cascade Lease #92 in Sec. 19,20,29 & 32, 47-26	6,175	166.72	13,925	379.72
SW¼ of NE¼ Sec. 27, 47-26, 40 A.	1,050	28.35	1,050	28.63
SE¼ of NW¼ Sec. 27, 47-26, 40 A.	1,150	31.05	1,150	31.36
NW¼ of SE¼ Sec. 27, 47-26, 40 A.	2,100	56.70	2,100	57.27
SW¼ of SE¼ Sec. 27, 47-26, 40 A.	1,935	52.25	1,935	52.78
SW¼ of SW¼ Sec. 26, 47-26	550	14.85	550	15.00
NW¼ of NE¼ Sec. 26, 47-26	175	4.73	175	4.78
NE¼ of NW¼ Sec. 26, 47-26	175	4.72	175	4.78
SW¼ of Sec. 22, 47-26	-	-	1,075	29.32
Und. ½ of NE¼ of NE¼ of Sec. 34, 47-26	275	7.43	275	7.50
Und. 7/16 NW¼ of NE¼ of Sec. 34, 47-26	275	7.42	275	7.50
Und. 7/16 SW¼ of NE¼ of Sec. 34, 47-26	125	3.37	125	3.40
Und. ½ of NE¼ of SW¼ of Sec. 34, 47-26	125	3.38	125	3.41
Und. 7/16 W½ of SW¼ of Sec. 34, 47-26	275	7.43	275	7.49
Total	16,105	434.84	24,930	679.85
Collection Fee		4.35		
Total Mineral Lands	16,105	439.19	24,930	679.85
TOTAL RICHMOND TOWNSHIP	42,830	1,167.98	51,655	1,408.64
Tax Rate	27.00		27.00	


REPUBLIC MINE
SURFACE & PLANT FACILITIES
PIT OUTLINE
STRIPPED AREA
STRIP'G DUMP
TAIL'G POND
ROADS & GRADED AREA
ORE REMOVED
LAND ACQUIRED
20" REUSE WATER
" FRESH "
PUMP HOUSE
OVERFLOW
FENCE
SMITH'S BAY
WEST REPUBLIC
59th SHAFT
PASCOE SHAFT
ORIGIN OF COORDINATES
CRUSHERS
MILL
OFF. SHOPS
MINE
MILWAUKEE LAKE
S&I RR.
PERCH LAKE
DITCH
DAM
REPUBLIC POWER PLANT
M-95
WAHLSTROM LAKE
BEAVER LAKE
LOT 1
LOT 2
LOT 3
LOT 4
LOT 5
LOT 6
LOT 7
LOT 8
A
B
C
D
E
G
H
J
K

TILDEN MINE
ANNUAL REPORT
YEAR 1955

1. INTRODUCTION:

The Tilden production for 1955 was 119,008 tons of Tilden silica with a total cost at the mine of $0.874 per ton. The 1955 total cost at the mine of $0.874 per ton compares very favorably with $1.215, $1.177 and $1.090 for 1953, 1951 and 1950 respectively as shown in the table on page 4.

Total shipments for the season amounted to 101,437 tons of Tilden silica. The dried analysis for the above tonnage ran 40.25% Fe., .040% Phos., 40.85% Silica and .005% Sulphur. Moisture was 2.94%.

2. PRODUCTION, SHIPMENTS AND INVENTORIES:

a. Production by Grades:

	1955	1954	1953	1952	1951
Tilden Silica	119,008	-	138,013	-	86,747
Tilden Low Phos	-	-	40,645	-	16,275
Total	119,008	-	178,658	-	103,022

b. Shipments: (Gross Tons)

Grade	From Pocket	From Stockpile	Total For Year	Remaining Ore in Stock
Tilden Silica	13,816	87,621	101,437	17,571
Tilden Low Phos	-	-	-	18,874
Total	13,816	87,621	101,437	36,445

c. Comparison of Shipments - 8 Year Period: (1948-1955)

Year	Tons Silica	Tons Low Phos	Total Year	Yearly Decrease	Yearly Increase
1948	78,641	43,750	122,391		
1949	69,446	9,373	78,819	43,572	
1950	91,510	23,926	115,436		36,616
1951	78,627	9,959	88,586	26,850	
1952	64,590	15,859	80,449	8,137	
1953	83,896	19,497	103,393		22,944
1954	77,781	-	77,781*	25,612	
1955	101,437	-	101,437		23,656

* Includes 20,838 tons of overrun on Tilden Silica.

d. Ore Statement, December 31st 1955:

	Tilden Silica	Tilden Low Phos	Total
On Hand, January 1st, 1955	-	18,874	18,874
Production for 1955	119,008	-	119,008
Total	119,008	18,874	137,882
Shipments	101,437	-	101,437
Balance on Hand	17,571	18,874	36,445

TILDEN MINE
ANNUAL REPORT
YEAR 1955

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

e. Stockpile Inventories:

Grade	Bal. On Hand Jan. 1, 1955	Stocked 1955	Shipped From Stockpile 1955	Bal. on Hand Dec. 31, 1955
Tilden Silica	-	105,192	87,621	17,571
Tilden Low Phos	18,874	-	-	18,874
Totals	18,874	105,192	87,621	36,445

f. Production Data:

	Days Operated	Shifts Operated	Average Tonnage Per 8 Hour Shift	Total Tons
Total Year	30	56	2,125	119,008

g. Production by Pits:

Production	West Pit Lower Bench	West Pit Upper Bench	East Pit Lower Bench	Summit Pit	Total
Season to Date	84,743	15,932	15,876	2,457	119,008

3. ANALYSIS:

a. Shipping Department Analysis:

Grade	From	To	Tons	Iron	Phos	Sil	Moist	Sul
Silica		Stockpile	105,192	39.95	.037	41.33		.005
"	Pkt.	Presque Isle	13,730	41.04	.044	40.01	2.67	.005
"	Stkp.	Presque Isle	77,363	40.18	.039	41.04	2.97	.006
"	Pkt.	Edison Industries	50	40.20	.034	40.85	1.40	.005
"	Stkp.	Edison Industries	1,283	39.16	.039	42.07	2.78	.007
"	Stkp.	Inland Steel Co.	261	39.65	.037	42.51	2.90	.005
Silica Output			119,008	40.83	.039	41.17		.005

b. Composite Analysis of Shipments:

	Tons	Iron	Phos.	Sil.	Mn.	Al.	Ca.	Mg.	Sul.	Loss By Ig.	Moist
Tilden Silica:											
Natural	-	-	-	-	-	-	-	-	-	-	2.94
Dried	101,437	40.25	.040	40.85	.06	.81	.14	.14	.005	.20	-

c. Analysis of Ore Remaining in Stockpile: (Estimated)

Grade	Tons	Iron	Phos	Sil.	Sul.	Moist
Tilden Silica	17,571	39.95	.039	41.33	.005	
Tilden Low Phos	18,874	36.26	.017	46.57	.011	

TILDEN MINE
ANNUAL REPORT
YEAR 1955

4. COST OF OPERATIONS:

a. Comparative Mining Costs:

	1955	1953	1951	1950
Production	119,008	178,658	103,022	107,465
Operating Cost	$0.424	$0.713	$0.770	$0.732
General Mine Expense	0.162	0.144	0.209	0.184
Stocking Ore	0.033	0.029	0.019	0.010
Cost of Production	$0.619	$0.886	$1.000	$0.926
1952 W & I Deferred	0.000	0.163	0.000	0.000
Depreciation: Movable Equipment	0.009	0.008	0.000	0.001
" Plant and Equipment	0.043	0.070	0.070	0.070
" Motorized Equipment	0.043	0.014	0.007	0.006
Depletion - Original Cost	0.005	0.004	0.003	0.003
Amortization of Development	0.000	0.004	0.003	0.003
Amortization of Stripping	0.054	0.020	0.020	0.020
Taxes	0.040	0.029	0.066	0.057
Lead from Stockpile	0.061	0.017	0.008	0.004
Total Cost at Mine	$0.874	$1.215	$1.177	$1.090
Average Daily Product	3,967	2,881	1,807	1,990
Tons Per Man Per Day	90.71	64.33	57.09	55.05
Number of Days Operated	30	62	57	54
Working Schedule	2/8	2/8	1/8	1/8

b. Cost of Production 1955:

Production - Tons 119,008

PIT OPERATING:	Amount	Rate
Primary Drilling	$5,830.43	$0.049
Primary Blasting	7,290.29	0.061
Secondary Breaking - Drilling	893.61	0.008
Secondary Breading - Blasting	849.09	0.007
Deferred Drilling	8,821.98	0.074
Power Shovels	2,265.73	0.019
Haulage Trucks	3,059.96	0.026
Haulage Trucks - Rental Only	3,059.96	0.026
Tractors	4,181.05	0.035
Pit Roads and Ramps	1,383.14	0.012
Pumping and Drainage	232.41	0.002
Supervision	1,605.83	0.013
General Pit Expense	384.54	0.003
Total Pit Expense	$36,798.07	$0.309

TILDEN MINE
ANNUAL REPORT
YEAR 1955

4. COST OF OPERATIONS: (Cont'd)

b. Cost of Production 1955: (Cont'd)

	Amount	Rate
CRUSHING		
Crushing	$4,540.06	$0.038
General	181.07	0.002
Total Crushing	4,721.13	0.040
Stocking Expense	3,986.62	0.033
General Mine Expense	8,894.29	0.075
Winter and Idle Expense	19,239.53	0.162
Cost of Production	$73,639.64	$0.619
Taxes	4,769.62	0.040
Depletion and Depreciation	18,362.49	0.154
Shipping Expense	7,314.03	0.061
TOTAL COST AT MINE	$104,085.78	$0.874

c. Cost Comments:

The cost of production for 1955 was $0.619 per ton which can be compared to $0.886 per ton in 1953 and $1.00 per ton in 1951. The total cost on cars for the past year was $0.874 per ton compared to $1.215 and $1.177 for 1953 and 1951 respectively.

5. LABOR AND WAGES:

a. Comments:

Six of the former Tilden employees carrying Tilden Unit Seniority agreed to return for the 1955 season. It was necessary to call 39 men from the preferential hiring list to have a two shift operation. Most of Ohio Mine laid off personnel were utilized for the 1955 operation. The crew performed well and labor relations in general were very satisfactory throughout the summer.

There was no scheduled vacation period during the summer because of the short operating season.

TILDEN MINE
ANNUAL REPORT
YEAR 1955

5. LABOR AND WAGES: (Cont'd)

a. Comments: (Cont'd)

3 Men received vacation pay for one week
1 Man received vacation pay for two weeks
1 Man received vacation pay for three weeks
Majority of the men were eligible for vacation pay on the Ohio Roll.

The total amount paid for vacations in 1955 was $621.80

b. Comparative Statement of Wages and Product:

	1955	1954	1953
Product	119,008	-	178,658
Number of Days	30	-	62
Average Number of Men Working	24¼	-	24
Average Hourly Rate	$2.097	-	$2.188
Tons Per Man Per Hour	11.34	-	8.04
Labor Cost Per Ton	$0.234	-	$0.270
Amount Paid for Labor	$35,006.65	-	$102,616.19

c. Annual Statement of Labor:

	Stat Men	Hours	Amount	Average Rate
Hourly Employees				
Straight Time	25¾	13239½	$25,993.93	$1.963
Overtime	¾	392½	378.51	0.964
Afternoon Shift	5½	3778	230.46	0.061
Night Shift	½	216	19.44	0.090
Holiday Allowance	½	256	518.52	2.025
Sub Total	25¾	13239½	$27,140.86	$2.050
Vacation Pay Accrual		320	621.80	1.943
Total Hourly Employees	25¾	13239½	$27,762.66	$2.097
Salaried Employees:				
Mine Payroll, Straight Time	1¾	839¾	2,178.92	2.595
Total Mine Payroll	27½	14079¼	$29,941.58	$2.127
General Payroll:				
Salaries - Straight Time	½	259½	750.00	2.890
Labor from other mines	3¼	1706	4,315.07	2.529
Total Labor	31¼	16044¾	$35,006.65	$2.182
Distributed as Follows:				
Operating Mine	20½	10497	$22,868.38	$2.179
Winter and Idle Expense	4¼	2097¾	5,005.75	2.386
Labor to other mines	¾	448	812.94	1.815
Other Accounts	5¾	3002	6,319.58	2.105
Total as above	31¼	16044¾	$35,006.65	$2.182

TILDEN MINE
ANNUAL REPORT
YEAR 1955

5. LABOR AND WAGES: (Cont'd)

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

MINING DATA

Days Mine Operated	Total Man Days Worked	Production	Tons Per Man Day	Labor Cost Per Unit
30	1,312	119,008	90.71	$0.234

AVERAGE NUMBER OF MEN (Operating Only)

Mine Payroll		General Payroll	Total
Hourly	Salaried		
45	2	1	47

6. OPEN PIT OPERATIONS:

a. Stripping:

There were no stripping operations in the Tilden pit areas.

b. Detail of Open Pit Mining:

Churn drilling of blast holes was started March 15th in anticipation of opening the pit in May. Actual production was underway on April 20th on a one shift basis and was advanced to a two shift operation on April 25th. Production was terminated on May 31st after running for 30 days or 56 shifts and producing 119,008 tons of Tilden silica. 84,743 tons were mined from the West Pit Lower Bench, 15,392 tons from the West Pit Upper Bench, 15,876 tons from the East Pit Lower Bench and 2,457 tons from the Summit Pit.

Production haulage equipment was comprised of two 34-ton Euclid Rental trucks. Loading was effected with one Model 54-B Bucyrus Erie Electric Shovel. One D-8 Caterpillar Tractor was used in the pit and the second one was used on the stockpile. Two 22-ton Euclid trucks were used for stockpiling.

The 1955 production costs would not have been possible without the immediate availability of a D-8 Caterpillar Tractor behind the 54-B shovel. Chunks too large for the crusher were immediately bulldozed off to the side for secondary blasting. The combination of a D-8 operator and shovel oiler as contrasted to the shovel oiler and a rake has increased shovel time immeasurably.

CHURN DRILLING

Location	Shifts	Footage Drilled	Avg. Depth	Feet Per Shift	No. Holes	Bits Used	Feet Per Bit	Cost Per/Ft.
West Pit	80	1876	62.5	23.5	30	89	21.07	$4.90
East Pit	31	539	67	17.4	8	35	15.4	4.567
Total	111	2415	63.5	21.8	38	124	19.48	$4.656

TILDEN MINE
ANNUAL REPORT
YEAR 1955

6. OPEN PIT OPERATIONS: (Cont'd)

b. Detail of Open Pit Mining: (Cont'd)

TRUCK HAULAGE

Location	Material	Loads	Shifts	Loads Per Shift	Type Truck
West Pit L.B. to Plant	Til. Sil.	2722	38	71.6	34-Ton
West Pit U.B. to Plant	Til. Sil.	596	8	74.5	34-Ton
East Pit L.B. to Plant	Til. Sil.	638	8	79.8	34-Ton
Summit Pit to Plant	Til. Sil.	104	2	52	34-Ton
Total Pit to Plant	Til. Sil.	4060	56	72.5	34-Ton
Plant to Stockpile	Til. Sil.	4350	49	88.8	22-Ton

PRIMARY BLASTING

Location	Date	No. of Holes	Tons Ore Broken	Tons Rock Broken	Tons Material Broken Per Lbs. of Powder
W.P. Lower Bench	4-11-55	15	40,000	-	1.95
W.P. Upper Bench	4-28-55	9	15,000	-	1.50
W.P. Lower Bench	5- 5-55	18	50,200	-	2.13
W.P. Lower Bench	5-21-55	1	525	-	1.50
E.P. Lower Bench	5-24-55	8	26,000	-	2.17
Total		51	131,725	-	2.13

Primary blasting was calculated at one pound per powder for each yard of material to be broken. The two tons of ore for each pound of powder ratio produced effective fragmentation.

Total Powder Used:

30,000#	E.P. 152	@ $17.65c	$5,295.00
36,450#	Tritex	@ 10.50c	3,827.25
50	#6 E. B. Caps	@ 13.00c	6.50
75	MS 17 Connectors	@ 45.50c	34.13
125	XC-45 Boosters	@ 35.00c	40.25
15,000	Plain Primacord	@ 32.00m	480.00
6,500	Plastic Primacord	@ 43.50m	282.75
	Total Cost		$9,965.88

Powder cost per ton material broken - $0.076

TILDEN MINE
ANNUAL REPORT
YEAR 1955

7. OPEN PIT OPERATIONS: (Cont'd)

c. Detail of Plant Startup:

136 man hours were used to remove the accumulation of ice under the secondary crushers prior to start up of the plant. Major repair and maintenance work consisted of the following:

Repair and splicing of conveyor belt.
Rebuild the counter weight frame and belt aligning equipment.
Build and install a steel set for the conveyor just ahead of the loading point of the conveyor belt.
Dismantle and re-install 25 H.P. electric motor driving the conveyor belt.
Repair secondary crusher chutes.
Install the 2 motors driving the two secondary crushers.
Repair underground drain pipe from the sump area of the crushing plant.
Dismantle part of the crusher building and revamp dump blocks to accomodate the dumping of the 34 ton Euclid trucks.
Drill, blast and remove rock to the north of the primary crusher to facilitate the longer 34 ton Euclid trucks.
Replacement of a broken dust collar in the west secondary crusher represented the major repair item for the crushing section.

7. EQUIPMENT:

No new equipment was requisitioned for the Tilden Mine.

8. ESTIMATE OF ORE RESERVES:

a. Summary of Estimate of Ore Reserves:

	Proven	Prospective	Total Tons
Ore Reserves as of Jan. 1, 1955	4,457,595	2,735,500	7,193,095
Less 1955 Production and 1954 Overrun of 20,838 tons.	139,846	-	139,846
Ore reserves as of Dec. 21, 1955	4,317,749	2,735,500	7,053,249

b. Expected Average Analysis of Ore Reserves:

	Tons	Iron	Phos	Sil.	Mang.	Sul.	Moist.
Tilden Proven	4,317,749	39.74	.028	43.51	.090	.009	2.50
Tilden Prospective	2,735,500	36.90	.026	42.90	.090	.009	2.50
Total	7,053.249						

TILDEN MINE
ANNUAL REPORT
YEAR 1955

8. ESTIMATE OF ORE RESERVES: (Cont'd)

c. Proven Ore:

1. West Pit - Above Floor at 1430'

Assumption: 13 Cubic Feet Equals One Ton

Proven as of January 1, 1955	1,210,857 Tons
Mined During 1955	100,675 Tons
Total Remaining December 31, 1955	1,110,182 Tons

2. East Pit - Above Floor at 1440'

Assumption: 14 Cubic Feet Equals One Ton

Proven as of January 1, 1955	2,908,238 Tons
Mined During 1955	15,876 Tons
Total Remaining December 31, 1955	2,892,362 Tons

3. Summit Pit - Above Floor at 1620'

Assumption: 14 Cubic Feet Equals One Ton

Proven as of January 1, 1955	338,500 Tons
Mined during 1955	2,457 Tons
Total Remaining December 31, 1955	336,043 Tons

4. Total Proven Ore as of December 31, 1955:

West Pit	1,110,182
East Pit	2,892,362
Summit Pit	336,043
Total all Pits	4,338,587
Less 1954 Overrun	20,838
Total Proven Ore	4,317,749

d. Total Prospective Ore:

1. West Pit:

Balance remaining to be stripped in east half of Upper Bench 500,000 Tons

2. East and Summit Pits:

Total above 1500' lying north and east of the East Pit 2,235,500 Tons

Total Prospective Ore as of December 31, 1955 2,735,500 Tons

TILDEN MINE
ANNUAL REPORT
YEAR 1955

8. ESTIMATE OF ORE RESERVES: (Cont'd)

e. Estimated Analysis of Reserves:

Pit	Iron	Phos	Sil.	Mang.	Alum	Lime	Mag	Sul	Loss	Moist
West Pit:										
Dried	39.17	.050	41.91	.09	.90	.20	.22	.009	.24	
Natural	38.50	.049	41.20	.09	.88	.20	.22	.009	.24	2.90
East Pit:										
Dried	37.00	.020	45.00	.09	.54	.20	.17	.009	.34	
Natural	36.50	.020	44.40	.09	.53	.30	.17	.009	.34	2.50
Summit Pit:										
Dried	36.00	.015	46.00	.09	.54	.20	.17	.009	.34	
Natural	34.50	.015	45.40	.09	.54	.20	.17	.009	.34	

f. Anticipated Grades:

	Iron	Phos	Silica	Sulphur	Moisture
Tilden Silica					
Dried	39.00	.040	42.30	.010	
Natural	38.30	.039	31.59	.010	2.50
Tilden Low Phos					
Dried	36.00	.015	46.90	.010	
Natural	35.50	.015	46.24	.010	2.50

g. Guaranteed Grade 1955:

Grade	Iron	Phos	Sil.	Mang.	Alum	Lime	Mag	Sul	Loss	Moist
Tilden Silica										
Dried	39.00	.040	42.30	.07	.69	.25	.20	.010	.35	
Natural	38.30	.040	41.54	.07	.68	.25	.20	.010	.34	1.80
Tilden Low Phos										
Dried	36.00	.015	46.90	.07	.66	.20	.20	.010	.30	
Natural	35.50	.015	46.24	.07	.65	.20	.20	.010	.30	1.40

9. TAXES:

	1955		1954	
Description	Valuation	Taxes	Valuation	Taxes
Tilden Mine:				
N½ of Sec. 26, 47-27, 320A	$130,000	$2,854.80	$125,000	$2,705.86
Personal Property, Equipment and Supplies	85,000	1,867.60	125,000	2,705.87
Total Tilden Mine		$4,722.40		$5,411.73
Collection Fee		47.22		
Total Tilden Mine	$215,000	$4,769.62	$250,000	$5,411.73

TILDEN MINE
ANNUAL REPORT
YEAR 1955

10. PERSONAL INJURY:

There was one compensable injury at the Tilden Mine during 1955. A total of 12 compensable days were lost as a result of this one accident.

11. GENERAL SURFACE:

a. Buildings and Repairs:

No repairs were made to the office, shop, warehouse and crushing buildings.

b. Roads, Transmission Lines, Etc.:

The Upper Peninsula Power Company extended their power line from the Tilden sub-station to the Hercules Powder Plant. The new power line lies several hundred feet south of the crusher buildings and general stocking area.

c. Stocking Area:

E&A CC-729: was authorized for the increasing of the stocking area for Tilden Silica Grade ore. Plans call for a westerly extension of the present stocking area to increase the stocking capacity to 200,000 tons.

12. MISCELLANEOUS:

The entire 1955 Tilden production was made with the help of one Model 54-B Bucyrus-Erie electric shovel. This is of particular interest in as much as in previous years the production was made by means of a Model 120-B Bucyrus-Erie electric shovel in the West Pit plus a Marion electric shovel in the East Pit.

Larger yearly production tonnages would indicate the advisability of acquiring a second shovel and the use of the 34-ton Euclid Trucks on the production haul. Future stripping programs will call for the use of a second shovel for dragline work. Stripping and shipping operations cannot be carried on simultaneously with a single shovel.

BUNKER HILL MINE
ANNUAL REPORT
YEAR 1955

1. GENERAL:

The operation of the Bunker Hill Mine during 1955 was one of considerable activity. In addition to normal production activity, there was an accelerated program of mining development, coupled with an approximate 100% increase in primary rock development. This resulted from curtailment of such development during the slow year of 1954 and the merger of the Bunker Hill and Maas Mines, which will be effected during 1956.

Production from the Bunker Hill Mine in 1955 totaled 460,958 tons. This is an increase of 4.8% over the 440,000 tons produced in 1954. The increase was the result of the longer period of 5-day operation in 1955 than in 1954. Production was realized from 6th, 7th, 10th, and 12th Levels, with 12th Level producing the major portion.

Shipments during 1955 increased 507,335 tons over the 201,006 tons in 1954 to 708,341 tons in 1955. This was possible due to the large amount of ore on hand as of January 1, 1955.

The Bunker Hill Mine operated on a 4-day, 2-shift schedule from January 1, 1955, through April 17, 1955. During the remainder of the year, the Mine operated on a 5-day, 2-shift basis.

The average dry iron analysis of the product was slightly lower than in 1954. The average dry iron analysis in 1954 was 58.29, and in 1955, it was 58.11. Conversely, the natural iron of shipments was higher in 1955 than in 1954, this being 50.80, against 50.48. This is the result of a lower moisture content in 1955 because of the stock piling of nearly all production, rather than shipping from pocket.

There was a notable reduction in ore reserves in each of the three properties, Athens, Mitchell, and Bunker Hill, as a result of a more accurate delineation of ore outlines brought about by both development and diamond drilling.

Effective July 1, 1955, there was an increase in labor rates of .115 cents per hour, together with an increase of .005 cents in job increments. Again during 1955, there was a marked improvement in the employer-employee relations, as is evidenced by the large decrease in the number of formal grievances processed. During the year, there was an increase of 74 men on the mine payroll, which was necessary due to the considerable expansion in development. These employees consisted either of recalls of those laid off in 1954, or transfers from the Maas Mine.

BUNKER HILL MINE
ANNUAL REPORT
YEAR 1955

1. GENERAL: (Cont'd.)

In addition to the regular surface work, a new heating plant was placed in operation during the year and alterations were made to the change house and shop building in order to accommodate the expanding operation upon the merging of the Maas Mine with the Bunker Hill.

The underground operation saw expansion in the use of steel supports and during the year yielding steel supports were used for the first time and as of the end of the year, it appears that savings can be realized from the use of this type of ground support.

Exploration was confined almost wholly to the central portion of the Bunker Hill south ore body, where the major portion of the Bunker Hill ore body apparently is situated.

Pumping continued on an automatic basis with very satisfactory results.

There was a total of 7 active E & As during the year and a total of $1,590,715 was expended under these capital expenditure authorizations.

For the first time in the history of the Mine, the tons per man per day exceeded 8.0, the actual for this year being 8.32. The cost of production for 1955 showed a decrease of $.425 per ton under that of 1954. Although there was an appreciable increase in the cost of labor and supplies in 1955, it was more than offset by three major factors. The first of these was the experience gained after one year's operation with the Bunker Hill surface facilities. The second factor was the reduced rate of mining development. As a result of the reduced rate of development in 1955, of necessity, an accelerated development program will have to be maintained in the early part of 1956. The third major factor in the decreased cost per ton was the high percentage of ore (95%) produced by block caving methods of mining. In 1954, only 61% of our total production was mined by block cave methods. Block caving has proved successful in areas of very limited ore heights, which previously had been mined by sublevel caving.

The valuation and taxes for the combined Athens-Bunker Hill operation remained essentially unchanged from 1954 to 1955. A decrease in the Athens valuations were offset by an increase in the Bunker Hill.

There was an increase in the number of days lost due to personal injury. The frequency and severity rates for 1955 were 46.36 and 1.161, as compared with 24.34 and .765 in 1954.

There was a slight reduction in the cost of electric power per unit. However, the total money expended for power increased from $125,000 in 1954 to $139,000 in 1955 due to the expanded operation.

BUNKER HILL MINE
ANNUAL REPORT
YEAR 1955

2. PRODUCTION:

a. Production by Grades and Months:

Month	Athens	Mitchell	Bunker Hill	Total	Rock
January	19,020	4,517	6,866	30,403	7,500
February	19,905	5,526	3,643	29,074	6,815
March	25,487	12,865	298	38,650	12,913
April	29,587	5,758	863	36,208	8,795
May	29,602	8,866	167	38,635	12,620
June	32,394	3,163	855	36,412	11,103
July	33,048	1,922	746	35,716	9,305
August	40,216	2,075	2,674	44,965	9,265
September	28,036	4,311	2,967	35,314	12,810
October	26,017	6,677	7,726	40,420	11,180
November	19,379	6,329	9,344	35,052	10,140
December	18,009	3,046	9,845	30,900	11,780
Total	320,700	65,055	45,994	431,749	124,226
Stockpile Overrun	19,671	6,308	3,230	29,209	-------
Total 1955	340,371	71,363	49,224	460,958	124,226
Total 1954	231,998	114,333	93,669	440,000	63,385
Increase	108,373	------	------	20,958	60,841
Decrease	-------	42,970	44,445	------	------

b. Shipments:

Grades:	Pocket	Stockpile	1955 Total	1954 Total
Athens	9,837	483,076	492,913	77,235
Mitchell Lease	4,702	109,395	114,097	89,213
Bunker Hill	2,569	98,762	101,331	34,558
Total	17,108	691,233	708,341	201,006
Total Last Year	102,901	98,105	201,006	-------
Increase in Shipments	-------	593,128	507,335	-------
Decrease in Shipments	85,793	-------	-------	-------

c. Ore Statement:

	Athens	Mitchell Lease	Bunker Hill	1955 Total	1954 Total
On Hand January 1, 1955	208,333	55,132	78,898	342,363	103,369
Product for Year	320,700	65,055	45,994	431,749	440,000
Stockpile Overrun	19,671	6,308	3,230	29,209	-------
Total	548,704	126,495	128,122	803,321	543,369
Shipments	492,913	114,097	101,331	708,341	201,006
Balance on Hand	55,791	12,398	26,791	94,980	342,363
Increase in Output	108,373	------	------	20,958	-------
Decrease in Output	-------	42,970	44,445	------	145,035
Increase in Ore on Hand	-------	------	------	------	238,994
Decrease in Ore on Hand	152,542	42,734	52,107	247,383	-------

Operating Schedule:

Year	Days Per Week Mine Operated
1955	4 days thru April 17th -- 5 days balance of year
1954	5 days January to April 4th -- 4 days April 5th thru December
1953	5 days entire year
1952	6 days thru July -- 5½ days thru November 15th -- 5 days thru December
1951	6 days entire year

BUNKER HILL MINE
ANNUAL REPORT
YEAR 1955

2. PRODUCTION: (Cont'd.)

d. Division of Product by Levels:

	1955		1954	
	Tons	Percent	Tons	Percent
6th Level	123,091	26.7	119,275	27.1
7th Level	50,701	11.0	48,248	11.0
10th Level	7,756	1.7	217,292	49.4
12th Level	279,410	60.6	55,185	12.5
Total	460,958	100.0	440,000	100.0

e. Production Delays:

Date	Hours		Tons Lost
February 18	8	Timber truck rolled off the cage and caused the cage to become wedged in the shaft	1150
October 10	13	Skip dropped from 12th Level to skip pit	1800
	21		2950

3. ANALYSIS:

a. Average Mine Analysis on Output:

	1955					1954				
Grade:	Tons	Iron	Phos.	Sil.	Sul.	Tons	Iron	Phos.	Sil.	Sul.
Athens-Bunker Hill & Mitchell Lease	460,958	58.11	.112	8.74	.006	440,000	58.29	.116	8.93	.006

b. Average Analysis of Shipments:

Grade	Iron	Phos.	Sil.	Mang.	Alum.	Lime	Mag.	Sul.	Loss	Moist.
Athens-Bunker Hill & Mitchell	57.90	.111	9.17	.50	3.58	.41	1.14	.005	1.73	
Natural	50.80	.097	8.04	.44	3.14	.36	1.00	.004	1.52	12.27

c. Average Analysis of Ore In Stock:

Grade	Tons	Iron	Phos.	Sil.	Mang.	Alum.	Lime	Mag.	Sul.	Loss	Moist.
Athens-Bunker Hill at Athens	15,302	58.06	.119	9.90	.45	3.05	.52	1.01	.010	1.60	
Natural		51.03	.105	8.70	.40	2.68	.46	.89	.009	1.41	12.10
Mitchell at Athens Natural											
Athens at Bunker Hill	79,678	57.96	.107	9.34	.50	3.58	.41	1.14	.006	1.73	
Natural		50.85	.094	8.19	.44	3.14	.36	1.00	.005	1.52	12.27

d. There Were No Straight Cargo Shipments.

BUNKER HILL MINE
ANNUAL REPORT
YEAR 1955

4. ESTIMATE AND ANALYSIS OF ORE RESERVES:

Developed Ore:

In the Athens property, of the total reserve, which is based on the figures submitted to the Michigan State Tax Commission, all the reserves above the 10th Level and adjacent to the 2100 and 2300 cross-cuts are considered as developed ore. The remaining ore is considered as undeveloped ore.

In the Bunker Hill, the ore reserves above 10th Level east of the 2900 west coordinate and the ore adjacent to the 2400 cross-cut in the 12th Level are considered developed ore and the remainder is considered undeveloped.

The ore reserves in the following table are based on the figures submitted to the Michigan State Tax Commission.

	Athens	Mitchell Lease	Bunker Hill	Total
Ore Reserves - Dec. 31, 1954	1,257,842	162,916	3,219,563	4,640,321
Ore Production - 1955	340,371	71,363	49,224	460,958
Ore Reserves - Dec. 31, 1955	512,600	40,297	2,928,049	3,480,946
Tonnage Proved in 1955	404,871	51,256	242,290	698,417
-500 Sub to 6th Level	45,455	23,260	-------	68,715
6th Level to 7th Level	11,667	51,160	-------	62,827
9th Level to 10th Level	32,773	------	784,881	817,654
10th Level to 12th Level	533,721	------	1,556,029	2,089,750
12th Level to 14th Level	105,138	------	950,274	1,055,412
Total Gross July 31, 1955	728,754	74,420	3,291,184	4,094,358
Less 10% for Mining & Rock	72,875	7,442	329,118	409,435
Net Total as of July 31, 1955	655,879	66,978	2,962,066	3,684,923
Less Production July 31, 1955 to December 31, 1955	143,279	26,681	34,017	203,977
Net Total As Of Dec. 31, 1955	512,600	40,297	2,928,049	3,480,946

Expected Average Natural Analysis of Ore Reserves:

The following analyses are based on the figures submitted to the Michigan State Tax Commission:

Iron	Phos.	Sil.	Mang.	Alum.	Lime	Mag.	Sul.	Loss	Moist.
50.50	0.100	8.00	0.39	2.75	0.36	0.80	0.011	1.40	13.40

5. LABOR & WAGES:

Labor Relations:

During 1955, there were two grievances settled in Step 3, one in Step 4, and two were arbitrated. Of the two grievances terminated in Step 3, the company settled one on the basis of the grievant's demand, and the other was dropped by mutual agreement. The one grievance settled in Step 4 was dropped by the Union. The two grievances arbitrated were both won by the Company. One of the arbitrations involved a disciplinary lay off for insubordination, and the other involved the discharge of an employee for negligence.

BUNKER HILL MINE
ANNUAL REPORT
YEAR 1955

5. LABOR AND WAGES: (Cont'd.)

Labor Relations: (Cont'd.)

This year showed a definite improvement in labor relations, as can be seen by the large decrease in the number of grievances processed, five in 1955, as compared to thirteen in 1954. It was evident during the latter part of last year that most of the members of the Mine Grievance Committee were becoming more realistic in their viewpoints, and this continued to be the case throughout most of this year.

Employment:

The average number of statistical employees in 1955 was 388, as compared with 312 in 1954. The increase was due to the recalling of men on the preferential hiring list.

There were 34 seperations during the year -- 9 quit, 2 retired, 19 transferred, 2 died, and 1 was discharged. There were 45 men hired and 63 transferred to the Bunker Hill. A very large percentage of the transfers were from the Maas.

Number of Men Beginning of Year	288
Added During Year	108
Separations	34
Total End of Year	362

The following tables give data pertinent to paid vacations and holidays.

Vacations - 1955

	Number of Men	Number of Hours	Amount	Rate Per Hour
one Week	7	280	$ 615.20	$2.197
Two Weeks	117	9360	25,117.60	2.684
Three Weeks	146	17520	43,188.20	2.465
Total	270	27160	$68,921.00	$2.538

Paid Holidays - 1955

	Number of Men	Number of Hours	Amount	Rate Per Hour
New Years Day	253	2024	$ 4,847.04	$2.395
Memorial Day	263	2104	4,956.68	2.356
Fourth of July	267	2136	5,498.49	2.574
Labor Day	292	2336	5,672.00	2.428
Thanksgiving	280	2240	5,392.36	2.407
Christmas Day	298	2384	5,898.36	2.474
Total	275½	13224	$32,264.93	$2.440

Statement of Wages:

Average Wages Per Day	1955	1954	Increase	Decrease
Surface	$19.80	$17.28	$2.52	
Underground	22.56	20.68	1.88	
Total	$21.60	$19.88	$1.72	

5. LABOR AND WAGES: (Cont'd.)

Average Wages Per Month	1955	1954	Increase	Decrease
Surface	$ 415.80	$299.46	$116.34	
Underground	473.76	358.38	115.38	
Total	$ 453.60	$344.52	$109.08	

Average Days Worked Per Month
1955 - 21.00
1954 - 17.33

Tons Per Man Per Day				
Surface	24.01	21.10	2.91	
Underground	12.74	9.71	3.03	
Total	8.32	6.65	1.67	

Labor Cost Per Ton				
Surface	.825	.851		.026
Underground	1.771	2.116		.345
Total	2.596	2.967		.371

6. SURFACE:

Athens Shaft:

The surface buildings and surface area continued to show movement and cracking during the year due to subsidence. In 1954, the underground ventilation system was changed so that the Athens Shaft was downcast and the Bunker Hill Shaft upcast. Consequently, in January, 1955, ice had formed in the upper portion of the Athens Shaft to the point where it greatly restricted the flow of air through the Athens Shaft. To relieve this situation, two oil-fired heating units were installed in the Athens' headframe to heat the air being taken into the Mine.

Bunker Hill Mine:

A new boiler plant, consisting of a concrete block building and three oil-fired boilers, was erected and installed as a result of a study of the old hand-fired, coal-burning units that were servicing the Mine. These old coal-burning units, besides being inefficient and in need of extensive repairs, were adversely located for return lines to the boilers. The new plant also heats the air being taken down the Bunker Hill Shaft during the winter months.

In anticipation of the consolidation of the Bunker Hill and the Maas, the supervisors' portion of the dry building was enlarged to accommodate the personnel from both Mines. Remodeling of the Engine House to make room for the new skip hoist and related equipment was started during the year.

The increased use of mechanical equipment and steel ground support has necessitated the enlargement of the shop facilities for more efficient operation. Construction of an addition to the Shop Building to house a welding shop was started during the year, and will be completed in 1956.

6. SURFACE: (Cont'd.)
Bunker Hill Mine (Cont'd.)

The surface installation of pumps placed in churn drill holes continued to pump water throughout the year. From the favorable pumping results in this area, it is anticipated that the present facilities will be enlarged upon in the very near future to intercept more water before it enters the underground mining areas.

7. UNDERGROUND:

Mining and Development:

The mining operations above the 6th Level were completed by the end of the year. The production from this area was mostly from block caves, except for the extreme east end, which was sub-level caved. Formerly, the entire area was mined by sub-level caving, but after a thorough study, block caving methods were instituted and the very favorable cost and recovery, even with a very limited height of ore, proved very satisfactory.

The development of the remaining block of ore on the 7th Level was completed and undercutting operation started at the end of the year. The development consists of three caving drifts, two of which will be caved as one block, and the third drift will be caved independently. Mining of these three drifts will complete the mining on the 7th Level.

In the Athens property above 10th Level, mining was confined to the block caving of two relatively small areas, one on the east end, and one on the west end of the north ore body. A main level connecting drift was completed between the 1000 and 1500 cross-cuts to replace the original main line drift which was endangered by the 12th Level mining.

The mining on the 10th Level Bunker Hill consisted of the completion of caving in the 1500 and 1600 cross-cut drifts. A development program was started to mine the western extension of the south ore body. The 1700 cross-cut was extended to the west and three top timber drifts were completed. A main level drift, which will be approximately 900 feet in length, was one-half completed at the end of the year. A conveyor belt is to be installed in this drift to convey the ore from the mining area to a raise in the north footwall, which will transfer the ore to the 14th Level conveyor system. This will constitute the first all-conveyor haulage in the Bunker Hill Mine.

In the Athens property above the 12th Level, the mining of the south ore body was completed. This particular area was somewhat difficult to mine because it was complicated by small dikes and irregular bulges in the main Athens' Dike. In the north ore body, 2300 cross-cut, an intensified development and mining program was maintained during the year. In this area, intrusive formations, similar to those of the south ore body, were encountered, which complicated mining operations. The 2200 cross-cut was started during the latter part of the year and will be completed during the early part of 1956.

BUNKER HILL MINE
ANNUAL REPORT
YEAR 1955

7. UNDERGROUND: (Cont'd.)

Mining and Development: (Cont'd.)

On the 12th Level in the Bunker Hill property, the 2400 cross-cut was completed and the south footwall main line drift extended from the 2300 cross-cut to a point beyond the 2400 cross-cut. On the east side of the 2400 cross-cut, one block cave was completely developed and undercut, and development of two other blocks was started.

The 14th Level conveyor drift was completed, as was the main line drift, except for a short piece of tail room drift. The excavation for the loading end of the belt, which houses the screen, crusher, feeders and allied equipment, was started at the end of the year and will be completed in early 1956. A total of 2300 feet of conveyor sections and idlers were installed. The head-end installation was completed, except for the drive motor and the take-up pulley.

In preparation of the Bunker Hill-Maas consolidation, two raises were put up from the 6th Level trenches to the elevation of the Maas 7th Level, and cage and skip plats were excavated at this elevation (Bunker Hill 2nd Level, 200 feet below sea level). A connection drift was driven from the Bunker Hill to the Maas on the Bunker Hill 2nd Level. A combination main level and conveyor drift was started and progressed in a northwesterly direction on the Bunker Hill 6th Level. This conveyor, when completed, will transport all of the Maas Mine production to the Bunker Hill Shaft. A pump room and two sump drifts were driven near the Bunker Hill Shaft on the 2nd Level, from which the Maas water will be pumped up the Bunker Hill Shaft to the 500 foot level. From this point, another set of pumps will be installed to pump the water the remaining distance to the surface.

The following is a resume of the main-level drifting done in 1955:

Level	Ore Drift	Rock Drift	Total
2nd Level		1507	1507
4th Level		240	240
6th Level		1307	1307
10th Level		1863	1863
12th Level	170	1553	1723
14th Level	—	2854	2854
Total	170	9324	9494

Exploration:

Bunker Hill:

The drilling program continued at a slightly increased rate throughout the year. During 1955, 5,382 feet were drilled as compared to 4,325 feet in 1954. This includes 565 feet of drilling in the Arctic Parcel for 1955, and 2,197 feet in 1954. The object of nearly all of the program was to determine the extent and position of the ore structures on 10th and 12th Levels from the 2200-W, to the 3000-W north-south sections. Arctic Hole #5 was drilled due north at -50° as a water hole to connect 10th Level with the Bunker Hill 2500 cross-cut.

BUNKER HILL MINE
ANNUAL REPORT
YEAR 1955

7. UNDERGROUND: (Cont'd.)
Exploration: (Cont'd.)
Bunker Hill: (Cont'd.)

The following table shows the amount of ore cut and the total footage drilled during 1955:

1955 - Hole Numbers	First Class Ore	Footage Drilled
Bunker Hill Holes:		
38	97'	435'
39	66'	526'
40	78'	198'
41	39'	221'
42	107'	254'
43	128'	191'
44	39'	98'
45		105'
46	428'	615'
47	30'	105'
48	92'	126'
49	104'	313'
50	103'	513'
51	31'	169'
52	54'	183'
53	67'	195'
54	No Recovery - Auger	60'
55	130'	195'
56	170'	214'
57	No Recovery	91'
Arctic Holes		
4	17'	305'
5	Water Hole	260'*
	1780'	5112' Footage Drilled for Ore Exploration
		260' Hole #5
		5372' Total Footage Drilled

*Not Included in Footage Drilled For Ore Exploration.

The following is a summary by N-S sections of the drilling program:

2200 W. Section:

Five holes were drilled from this section to explore the south ore body. Holes #38 and #39 were drilled to determine the width of the ore structure and the position of the Athens Dike. Holes #43, #47, and #48 were drilled from the 2400 cross-cut to check for the position of the foot-wall ore contact and the position of the flat-lying intrusive which cuts the south ore body. Arctic Hole #4 was drilled from this section to explore ore structures in this parcel.

BUNKER HILL MINE
ANNUAL REPORT
YEAR 1955

7. UNDERGROUND: (Cont'd.)
Exploration: (Cont'd.)

2600 W. Section:

Exploration from this section was directed toward the outlining of the ore structures above and below the flat-lying intrusive. Holes #40, #41, and #42 were drilled to determine the width of the ore zones, position of the intrusive and hanging wall area above 10th Level. Holes #44, #45, and #46 were drilled to determine the position of the footwall. Hole #49 was drilled to explore the area north of the Bunker Hill Fault. It was stopped in the Athens Dike. The ore structure north of the Bunker Hill Fault was explored at the 12th Level elevation by Hole #50.

2930 W. Section:

Six holes, #51 through #56, were drilled from this section on 10th Level to outline the ore block in this area and to determine the attitude of the flat-lying intrusive.

The results of the drilling program indicate the following:

1. The structure above 10th Level is a relatively flat-lying ore body dipping to the northwest.

2. The ore structure north of the Bunker Hill fault decreases in size.

3. The ore structure for 12th Level between 2500-W and 2800-W will be relatively narrow. Beyond the 2800-W, mining will be in the wide upthrust ore body south of the Bunker Hill Fault.

4. The ore body is considerably reduced by the Bunker Hill Fault. Upthrusting along the fault has created the new structure referred to as the upper 10th Level ore body. Drilling has shown that the displacement along this structure carries the ore to the 12th Level elevation.

Drifting in the 1700 cross-cut extension cut argillite and seams of lean argillaceous ore. The indications are that the strike of the footwall in the 10th Level south ore body is changing more to the southwest. Such a change in strike may have a favorable bearing upon the amount of ore in the area.

Statement of Timber Used:

	Amount - 1955	Amount - 1954
Cribbing	$ 4,549.95	$ 3,700.55
Stulls	11,884.26	13,024.60
Lagging	10,967.16	10,142.01
Poles	6,150.50	6,187.61
Steel Beams	53,606.15	53,184.02
Steel Sets (Circular & Arch)	39,345.01	11,015.35
Total	$126,503.03	$97,254.14

BUNKER HILL MINE
ANNUAL REPORT
YEAR 1955

7. UNDERGROUND (Cont'd.)

Total Cost of Timber, Lagging, Poles, Etc.:

Year	Amount	Per Ton
1955	$126,503.03	.2744
1954	97,254.14	.2210
1953	117,991.28	.1903
1952	69,794.67	.1404
1951	69,080.92	.1097
1950	64,244.24	.1050
1949	68,774.23	.1250
1948	79,243.23	.1564
1947	78,082.59	.1537
1946	53,734.65	.1463

Explosives:

Statement Of Explosives Used During 1955

	1955		1954	
	Quantity	Amount	Quantity	Amount
Total Powder Used	131,037#	$24,693.12	132,576#	$23,620.73
Total Caps, Fuse, etc. Used		19,850.38		15,504.19
Total		$44,543.50		$39,124.92
PRODUCT		460,958		440,000
Pounds Powder Per Ton of Ore		.2843		.3013
Tons of Ore Per Pound of Powder		3.5178		3.3188
Cost Per Ton For Powder		.0536		.0537
Cost Per Ton For Fuse, Caps, etc.		.0430		.0352
Cost Per Ton For All Explosives		.0966		.0889

Pumping:

The following table shows the average number of gallons pumped per minute for the last five years:

Month	1955	1954	1953	1952	1951
January	1124	1115	1341	1788	1423
February	1057	1083	1361	1650	1307
March	1023	1060	1351	1567	1249
April	1002	1150	1395	1509	1288
May	1014	1150	1457	1623	1497
June	1053	1234	1541	1505	1513
July	1053	1191	1583	1488	1598
August	1011	1238	1740	1487	1693
September	999	1091	1598	1282	1693
October	961	1164	1551	1307	1748
November	963	1142	1498	1399	1806
December	880	1129	1526	1306	1758
Average	1012	1146	1495	1493	1539

BUNKER HILL MINE
ANNUAL REPORT
YEAR 1955

7. UNDERGROUND (Cont'd.)
Pumping: (Cont'd.)

The following statement shows the average number of gallons pumped for the past ten years:

Year	Gallons Per Minute
1955	1012
1954	1146
1953	1495
1952	1493
1951	1539
1950	1593
1949	1214
1948	1077
1947	1085
1946	1002

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

There were seven active E & As at the Bunker Hill during 1955: E & A CC-623 - Underground Diamond Drilling; E & A CC-753 - Relocate Compressor, Maas Trestle, and Pave Service Roads; E & A CC-345 - Rehabilitate Negaunee Shaft; E & A CC-619 - Underground Development; E & A CC-684 - Heating and Ventilation Plant; E & A CC-685 - Alterations to Shop Building; E & A CC-662 - Connecting Bunker Hill Shaft to Maas Workings.

Reference	Prior Year Expenditures	1955 Expenditures	Total Expenditures
E & A CC-623	$ 51,823	$ 44,791	$ 96,614
E & A CC-753	------	4,437	4,437
E & A CC-345	3,362,246	26,669	3,388,915
E & A CC-619	464,717	1,076,383	1,541,100
E & A CC-684	-------	87,112	87,112
E & A CC-685	-------	8,762	8,762
E & A CC-662-(Engine House, etc.)	-------	342,561	342,561

Comparative Mining Costs:

	1955	1954	Increase	Decrease
Product	460,958	440,000	20,958	
Underground Costs	2.940	2.994		.054
Surface Costs	.545	.571		.026
General Mine Expense	.694	1.039		.345
Cost of Production	4.179	4.604		.425
Depreciation	.142	.211		.069
Taxes	.051	.041	.010	
Loading & Shipping	.141	.046	.095	
Administration, Cleveland Office, Hoisting Fee, & Pensions	.079	.164		.085
Total Cost at Mine	4.592	5.066		.474

BUNKER HILL MINE
ANNUAL REPORT
YEAR 1955

8. COST OF OPENING, EQUIPPING, DEVELOPING AND OPERATING: (Cont'd.)
Comparative Mining Costs: (Cont'd.)

	1955	1954	Increase	Decrease
Budget: Estimated Cost at Mine	5.142	5.353		.211
Number of Shifts & Hours	30-1/8 Hr. 222-2/8 Hr.	58-1/8 Hr. 179-2/8 Hr.	43	28
Number of Days Operated	252	237	15	
Average Daily Product	1944	2115		171

Proportion of Labor & Supplies:

Cost of Production	1955	Percent	1954	Percent	Increase	Decrease
Labor	2.897	69.32	3.244	70.46		.347
Supplies	1.282	30.68	1.360	29.54		.078
Total	4.179	100.00	4.604	100.00		.425

Detailed Cost Comparison:
Days and Shifts:

Year	Days Mine Operated	Shifts & Hours	Men Employed	Total Shifts Worked
1955	252	30-1/8 Hr. 222-2/8 Hr.	388	474
1954	237	58-1/8 Hr. 179-2/8 Hr.	312	416
Increase	15	43-2/8 Hr.	76	58
Decrease		28-1/8 Hr.		

BUNKER HILL MINE
ANNUAL REPORT
YEAR 1955

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

Detailed Cost Comparison: (Cont'd.)

Cost of Production:

	1955		1954	
Underground Costs:	Amount	Per Ton	Amount	Per Ton
Development	$ 305,904.73	$ .664	$ 152,000.74	$ .346
Mining	414,732.47	.900	481,923.48	1.096
Tramming	228,830.33	.496	273,626.27	.621
Ventilation	28,606.28	.062	35,225.81	.080
Pumping	36,050.17	.078	69,639.52	.158
Compressors and Air Lines	36,330.23	.079	72,431.76	.164
Underground Superintendence	89,774.69	.194	83,543.54	.190
Maint: Pockets and Chutes	2,685.34	.006	5,310.15	.013
" Mining Equipment	51,178.05	.111	74,061.12	.168
" Levels and X-Cuts	35,954.99	.078	50,203.32	.114
" Shaft	13,202.97	.028	19,217.72	.044
Telephones & Safety Devices	22,988.77	.050		
Holiday Pay	27,169.21	.059		
Vacation Pay	62,094.80	.135		
Total Underground Cost	$1,355,503.03	$2.940	$1,317,183.43	$2.994
Surface Costs:				
Hoisting	$ 71,098.44	$ .154	$ 90,656.20	$ .206
Crushing and Screening--Surf.	8,139.09	.017	11,001.72	.025
Stocking	62,917.19	.136	45,961.15	.105
Timber Yard	23,153.30	.050	33,376.27	.076
Dry House	22,336.53	.048	19,846.62	.045
Policing	17,984.70	.039	22,739.02	.051
General Surface	17,996.88	.040	18,245.37	.041
Maint: Headframe Bldg. & Equip.	840.83	.002	2,503.39	.006
" Other Mine Buildings	1,953.08	.005	6,515.55	.015
" Idle & Abandoned Properties			471.20	.001
Telephones & Safety Devices	835.75	.002		
Holiday Pay	6,424.18	.014		
Vacation Pay	17,400.00	.038		
Total Surface Cost	$ 251,079.97	$ .545	$ 251,316.49	$ .571
General Mine Expenses:				
Geological Department	$ 3,129.06	$ .007	$ 3,294.16	$ .008
Mining Engineering Department	21,649.61	.047	26,877.66	.061
Mech. and Elect. Eng. Dept.	17,820.35	.040	22,895.48	.052
Safety Department	5,760.50	.013	5,319.92	.012
Research Laboratory	7,819.46	.016	1,385.33	.002
Analysis & Grading	27,350.86	.059	35,061.22	.079
Telephones & Safety Devices			26,775.98	.060
Welfare - General & Local			3,256.29	.008
Special Expense - Pensions & Allowances	4,685.03	.010	14,620.95	.035
" " - Hygiene Clinic	4,824.01	.011		
" " - Employment Off.	1,026.25	.002		
Ishpeming Office	69,845.08	.152	55,054.33	.125
Mine Office - Supt. & Clerks	49,860.26	.108	58,440.19	.133
Central Warehouse Overhead	17,046.55	.037	18,516.10	.042
Insurance	43,050.47	.092	42,628.01	.096
Personal Injury	10,234.06	.023	9,776.64	.023
Vacation Pay - Current Year			72,242.91	.164
Vacation Pay - Prior Year Adj.			7,502.71	.017
Holiday Allowance			29,468.37	.067
Social Sec. Taxes	35,483.32	.077	39,177.36	.089
Surface Rental	100.00	----		
Total General Mine Expenses	$ 319,684.87	$ .694	$ 457,288.19	$1.039
Cost of Production	$1,926,267.87	$4.179	$2,025,788.11	$4.604

BUNKER HILL MINE
ANNUAL REPORT
YEAR 1955

9. TAXES:

DESCRIPTION	1955 VALUATION	1955 TAXES	1954 VALUATION	1954 TAXES
ATHENS MINE				
Including Stockpiles, Supplies & Equipment as placed by State Tax Commission				
Real Estate	$1,300,000	$55,081.00	$1,270,000	$56,489.60
Personal Property	595,000	25,210.15	800,000	35,584.00
Collection Fee		802.91		920.74
TOTAL ATHENS MINE	$1,895,000	$81,094.06	$2,070,000	$92,994.34
Total Rented Buildings	1,040	44.50	1,040	46.72
TOTAL ATHENS IRON MINING COMPANY	$1,896,040	$81,138.56	$2,071,040	$93,041.06
BUNKER HILL MINE				
Realty as described and assessed by Michigan State Tax Commission 54.01 A.	$ 700,000	$29,659.00	$1,150,000	$51,152.00
Personal Property - State Tax Commission	900,000	38,133.00	155,000	6,894.40
Personal Property - Furnace Houses	5,050	213.96	5,050	224.62
Total	$1,605,050	$68,005.96	$1,310,050	$58,271.02
Collection Fee		680.06		582.71
TOTAL BUNKER HILL MINE	$1,605,050	$68,686.02	$1,310,050	$58,853.73

10. ACCIDENTS AND PERSONAL INJURY:

The following table lists the compensable injuries for 1955:

Fatal	0
Time Lost - Over 4 Months	1
Time Lost - 1 to 4 Months	7
Time Lost - Less than 1 Month	13
Total	21

Acc. No.	Date of Accident	Name	Injury	Days Lost
9	1/13/55	Jerry Westman	Fractured 2nd metatarsal, left	42
10	1/28/55	Bruno Maki	Fracture distal end of right index finger	10
11	1/21/55	Isaac Pentimaki	Laceration - right wrist	8
12	2/ 9/55	John O. Johnson	Contusion - scalp, nose, tongue, left and right thighs and left upper arm. Mild compression fracture 1st and 2nd lumber vertebrae	90
13	2/11/55	Walfred Krantz	Contusion - left hip	41
14	4/ 1/55	Arturo Paulon	Contusion - left shoulder	20
15	5/ 3/55	Edward Parkinen	Chip fracture distal phalanx right ring finger	20
16	5/ 7/55	Arturo Paulon	Contusion of leg, muscle injury	55

BUNKER HILL MINE
ANNUAL REPORT
DATE 1955

10. ACCIDENTS AND PERSONAL INJURY: (Cont'd.)

Acc. No.	Date of Accident	Name	Injury	Days
17	7/ 8/55	Victor A. Wainio	Fracture 1st phalanx, right thumb	42
18	7/14/55	Joseph Bertino	Severe contusion right leg	21
19	8/ 2/55	John E. Ketola	Contusion and abrasion of posterior left thigh - no fracture	23
20	8/16/55	Andrew Nord	Fracture both bones - left ankle	125
21	9/26/55	Jacob Saari	Contusion dorsum - left foot	22
22	10/20/55	Walfred Krantz	Laceration over right eyebrow and over right molar region - foreign bodies in right eye	22
23	11/ 3/55	Raymond Langlois	Simple fracture distal end of 3rd right metacarpal	41
24	11/22/55	John Lahti	Laceration of left thumb - sutured	25
25	12/ 7/55	Clifford Jenkins	Linear fracture external malleolus left leg - no displacement	45
26	12/15/55	Noel Nault	Torn Ligaments - right ankle	11
27	12/24/55	Frederick J. Herman	Large hematoma - lumbar region	15
28	12/28/55	Julius Lahti	Spiral fracture - 3rd metacarpal-right hand -- no displacement	17
29	12/27/55	James Tasson	Contusion - left heel	7
	Total Days Lost			702

11. POWER:

The Cleveland-Cliffs Iron Company Electric Power Department generates the power and the Upper Peninsula Power Company distributes it over their transmission lines. The average cost per kilowatt hour in 1955 was $.00932, as compared to $.00946 in 1954.

The rate per kilowatt hour is determined by dividing the total operating cost of the Cleveland-Cliffs Iron Company Electric Power Department by the total kilowatt hours sold and charging each consumer proportionately. To this is added a wheeling charge by the Upper Peninsula Power Company for distributing the power to the Mine.

BUNKER HILL MINE
ANNUAL REPORT
YEAR 1955

11. POWER: (Cont'd.)

The following table lists the costs of power for 1955:

Hoisting	$ 15,198.24
Compressor	40,381.96
Electric Haulage	12,610.72
Pumping	47,646.05
Ventilation	17,551.44
Dry House	630.53
#31 Power Shovel	975.23
Shops	605.29
Surface	60.33
Stocking	3,670.49
TOTAL	$139,330.28

CAMBRIA-JACKSON MINE
ANNUAL REPORT
YEAR 1955

1. GENERAL:

Production and costs for the year were very good. This was attained in spite of the adverse factors of dimishing mining areas and double tramming most of the ore mined during the year. Production for the year totaled 234,000 tons. The daily hoist averaged 1,000 tons per day. The tons per man per day increased over the previous year from 5.65 to 6.27.

The total cost at mine of $5.054 was $.305 less than in 1954.

The analysis of output was very good for the year. The sulphur content decreased .030% from the previous year due to the increased amount of production in the low-sulphur east deposit.

Average Mine Analysis on Output: (Incl. Stockpile)

Grade	Iron	Phos.	Silica	Sulphur
Jackson	58.03	.088	9.83	.120

The shipping season opened April 13th and closed on November 26th. Shipments from the stockpile and pocket totaled 339,084 tons of Jackson Grade ore. The stockpile was completely loaded out in October.

Average Analysis of Shipments: (Total Average)

Grade	Iron	Phos.	Silica	Sulphur
Jackson	58.20	.089	9.71	.140

The net ore reserves reported to the Tax Commission on December 31, 1955 were 372,121 tons. This shows a decrease of 40,987 tons over the previous year.

With the installation of two 500 G. P. M. vertical centrifugal pumps on the 4th and 7th Levels, the pumping system at the Cambria-Jackson is completely automatic.

No grievances were filed in 1955.

Exploration drilling continued throughout the year in the east deposit. Results of the drilling indicate that this deposit is related to the high-sulphur ore body on the Mather Mine, B Shaft, 5th Level.

CAMBRIA-JACKSON MINE
ANNUAL REPORT
YEAR 1955

2. PRODUCTION SHIPMENTS & INVENTORIES:

a. Production by Grade and Months:

	Jackson	Rock
January	17,299	1,436
February	15,724	1,052
March	17,535	1,012
April	20,572	100
May	22,464	720
June	18,971	1,112
July	17,373	1,096
August	14,476	1,360
September	20,173	444
October	19,112	216
November	22,722	336
December	21,771	332
Total	228,192	9,216
Overrun	5,808	
Total	234,000	

b. Shipments:

	Pocket Tons	Stockpile Tons	Total Tons	Total 1954	Increase or Decrease
Jackson	141,205	197,879	339,084	146,951	192,133

c. Ore Statement:

	1955	1954
On Hand January 1, 1955	130,876	40,127
Output For Year	228,192	237,700
Overrun	5,808	-
Total	364,876	277,827
Shipments	339,084	146,951
Balance on Hand	25,792	130,876
Decrease in Output	9,508	104,903
Decrease in Ore on Hand	105,084	90,749

CAMBRIA-JACKSON MINE
ANNUAL REPORT
YEAR 1955

2. PRODUCTION SHIPMENTS & INVENTORIES:

c. (Cont'd)

Working Schedule:

1955 - Four 2-8 hr. shifts per week from January 1, 1955 to April 18, 1955. Five 2-8 hr. shifts per week from April 18, 1955 to December 31, 1955.

1954 - Five 2-8 hr. shifts per week from January 1, 1954 to April 5, 1954. Four 2-8 hr. shifts per week from April 5, 1954 to December 31, 1954.

1953 - Five 2-8 hr. shifts per week from January 1, 1953 to December 31, 1953.

1952 - Six 2-8 hr. shifts per week from January 1, 1952 to May 1, 1952. Five and one-half 2&3-8 hr. shifts per week from May 1, 1952 to November 15, 1952. Five 2-8 hr. shifts per week from November 17, 1952 to December 31, 1952.

1951 - Six 2-8 hr. shifts per week from January 1, 1951 to December 31, 1951.

d. Division of Product by Levels and by Months:

	7th Level	8th Level	Total
January	5,224	12,075	17,299
February	3,820	11,904	15,724
March	5,040	12,495	17,535
April	5,000	15,572	20,572
May	9,648	12,816	22,464
June	5,360	13,611	18,971
July	2,608	14,765	17,373
August	2,380	12,096	14,476
September	1,260	18,913	20,173
October	-	19,112	19,112
November	-	22,722	22,722
December	-	21,771	21,771
Total	40,340	187,852	228,192
Overrun			5,808
Total			234,000

e. Production Delays:

There were no major production delays in 1955.

CAMBRIA-JACKSON MINE
ANNUAL REPORT
YEAR 1955

3. ANALYSIS:

a. Average Mine Analysis on Output:

Grade	Iron	Phos.	Silica	Sulphur
Jackson	58.03	.088	9.83	.120

b. Average Analysis of Shipments:

Grade	Iron	Phos.	Silica	Sulphur	Moisture	Iron Nat'l.
Jackson	58.20	.089	9.71	.140	11.23	51.66

c. Average Analysis of Ore in Stock:

Grade	Tons	Iron	Phos.	Silica	Mang.	Alum.	Lime	Mag.	Sulph.	Loss	Moist.
Jackson	25,792	57.27	.090	11.14	.27	2.56	.65	.22	.062	2.40	11.23

CAMBRIA-JACKSON MINE
ANNUAL REPORT
YEAR 1955

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

a. Comparative Mining Costs:

	1955	1954
Product	234,000	237,700
Underground	$ 3.438	$ 3.418
Surface Costs	.450	.485
General Mine Expenses	.570	.943
Cost of Production	$ 4.458	$ 4.846
Depletion:		
Original Cost	.075	.003
Depreciation:		
Plant and Equipment	.080	.048
Movable Equipment	.005	.005
Amortization:		
Development	.011	.095
Taxes	.152	.168
Loading and Shipping	.119	.043
Rental of Shaft Facilities	.154	.151
Total Cost at Mine	$ 5.054	$ 5.359
Budget - Estimated Cost Per Ton	$ 5.197	$ 5.409
Number of Shifts and Hours	234 2-8	209 2-8
Total 8 Hr. Operating Shifts	468	418
Number of Operating Days	234	209
Average Daily Product	1,000	1,137

Proportion of Labor and Supplies

	Amount	Per Ton	Per Cent
Labor	$ 836,865.85	$ 3.576	71%
Supplies	345,732.61	1.478	29
Total Cost at Mine	$ 1,182,598.46	$ 5.054	100%

CAMBRIA-JACKSON MINE
ANNUAL REPORT
YEAR 1955

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

b. Detailed Cost Comparison (Operating):

	1955 Amount	1955 Per Ton	1954 Amount	1954 Per Ton
Development	$ 182,173.12	.779	$ 147,194.99	.619
Mining	213,146.13	.911	271,757.60	1.143
Tramming	150,366.86	.642	160,359.14	.675
Auxiliary Hoisting	20,170.76	.086	20,256.42	.085
Ventilation	7,489.34	.032	18,898.53	.080
Pumping	30,583.81	.131	37,594.25	.158
Compressor and Air Lines	31,165.25	.133	28,337.18	.119
Underground Superintendence	64,657.02	.276	64,294.03	.270
Maint: Pockets and Chutes	3,221.56	.014	6,587.37	.028
Mining Equipment	18,161.45	.078	19,132.56	.081
Levels and Cross-cuts	22,403.84	.096	26,114.69	.110
Shaft	5,889.55	.025	11,968.25	.050
Vacation Pay	33,356.70	.143	-	-
Holiday Allowance	12,675.68	.054	-	-
Telephones and Safety Devices	8,958.09	.038	-	-
Total Underground Costs	$ 804,419.16	3.438	$ 812,495.01	3.418
Hoisting	$ 29,141.02	.125	$ 40,100.02	.169
Stocking	18,119.22	.077	20,265.22	.085
Timber Yard	12,065.31	.052	16,237.98	.069
Dry House	9,003.23	.038	9,093.29	.038
Policing	14,009.44	.060	14,058.65	.059
General Surface	9,612.71	.041	9,960.37	.042
Maint: Headframe Building and Equipment	305.11	.001	1,621.27	.007
Other Mine Buildings	950.58	.004	3,838.21	.016
Vacation Pay	8,629.00	.037	-	-
Holiday Allowance	3,238.08	.014	-	-
Telephones and Safety Devices	298.03	.001	-	-
Total Surface Costs	$ 105,371.73	.450	$ 115,175.01	.485
Geological Department	$ 2,475.80	.011	$ 5,261.86	.022
Mining Engineering Department	5,289.81	.022	10,219.93	.043
Mechanical and Electrical Engineering Dept.	2,995.43	.013	4,506.73	.019
Safety Department	2,928.26	.013	3,026.38	.013
Research Laboratory	3,920.18	.017	628.09	.003
Analysis and Grading	15,352.82	.065	16,312.46	.069
Telephones and Safety Devices	-	-	19,280.19	.081
Welfare - General and District	-	-	1,707.24	.008
Special Expenses - Pensions, Etc.	4,843.60	.020	7,910.84	.033
Ishpeming Office	29,456.45	.126	28,863.58	.121
Mine Office	24,439.67	.104	26,882.13	.113
Central Warehouse Overhead	2,763.23	.012	5,789.57	.024
Insurance	12,878.21	.055	19,150.75	.080
Personal Injury	5,374.46	.023	4,797.17	.020
Vacation Pay	-	-	31,811.70	.134
Holiday Allowance	-	-	16,621.80	.070
Taxes - Unemployment Insurance	1,852.86	.008	7,743.56	.033
Taxes - Old Age Benefit	12,871.01	.055	13,619.99	.057
Employees Insurance & Comp.	5,514.66	.024	-	-
Fire Loss	448.21	.002	-	-
Total General Mine Expenses	$ 133,404.66	.570	$ 224,133.97	.943
COST OF PRODUCTION	$ 1,043,195.55	4.458	$ 1,151,803.99	4.846

CAMBRIA-JACKSON MINE
ANNUAL REPORT
YEAR 1955

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

Capital account expenditures for the year amounted to $22,568.13.

E. & A. No. CC-667, Byron Jackson Pump	$ 9,681.86
E. & A. No. CC-703, Pioneer Pan Feeder	12,886.27
Total	$ 22,568.13

CAMBRIA-JACKSON MINE
ANNUAL REPORT
YEAR 1955

5. ESTIMATE AND ANALYSIS OF ORE RESERVES:

The net ore reserves reported to the Tax Commission on December 31, 1955 were 372,121 tons. Even though production for the year totaled 234,000 tons, the net ore reserves decreased 40,987 tons from the previous year. The increase in reserves is due to exploration drilling and development in the East Deposit between the 7th and 8th Levels. All of the ore reserves at the Cambria-Jackson Mine are located in the Jackson Strip.

	Jackson			
	Negaunee		Ishpeming	
	Sulphurous	Standard	Sulphurous	Total
Between 6th and 7th Levels	5,306	93,095	-	98,401
Between 7th and 8th Levels	52,846	321,119	53,460	427,425
Total Gross as of July 31, 1955	58,152	414,214	53,460	525,826
Less Prod. July 31 to Dec. 31, 1955	27,499	60,957	12,666	101,122
Total Gross as of Dec. 31, 1955	30,653	353,257	40,794	424,704
Less 10% for Mining and Rock	5,815	41,422	5,346	52,583
Net Total as of Dec. 31, 1955	24,838	311,835	35,448	372,121

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

Grade	Tons	Iron	Phos.	Sil.	Mang.	Alum.	Lime	Mag.	Sulph.	Loss	Moist.
Jackson	372,121	51.75	.084	8.45	.20	2.07	.63	.27	.151	2.42	10.87

CAMBRIA-JACKSON MINE
ANNUAL REPORT
YEAR 1955

6. LABOR AND WAGES:

a. Comments:

There were no grievances presented in 1955 which demonstrates the excellent labor relations at this property.

In the last quarter 14 contract miners were transferred to the Mather Mine "B" Shaft, because of the shortage of miners at the latter property, and 11 men were rehired from the Cambria-Jackson preferential hiring list.

b. Employment Record:

At the end of the year 154 men were employed at the mine. This represents a net decrease of 9 employees for the year.

Number of Men 1/1/55			163
Losses -	Quit	3	
	Retired	6	
	Transferred to other properties	16	- 25
		25	138
Gains -	Rehired	11	
	Returned service men	5	
		16	+ 16
Total on Payroll 12/31/55			154

c. Vacations and Holidays:

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

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

CAMBRIA-JACKSON MINE
ANNUAL REPORT
YEAR 1955

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	$ 19.60	$ 17.87	$ 1.73
Underground	21.25	20.37	.88
Total	$ 20.87	$ 19.79	$ 1.08
Average Wages Contract Miners:	$ 24.30	$ 23.51	$ .79
Average Wages Per Month:			
Surface	$382.25	$336.87	$45.38
Underground	414.04	360.98	53.06
Total	$406.81	$355.66	$51.15
Tons Per Man Per Day:			
Surface	27.58	24.44	3.14
Underground	8.12	7.35	.77
Total	6.27	5.65	.62
Labor Cost Per Ton:			
Surface	$ .711	$ .731	$ .020
Underground	2.617	2.770	.153
Total	$ 3.328	$ 3.501	$ .173

CAMBRIA-JACKSON MINE
ANNUAL REPORT
YEAR 1955

7. SURFACE:

The north stocking trestle was completely repaired during the year.

Because of the low ore reserves at the Cambria-Jackson Mine surface expenditures have been kept at a minimum.

CAMBRIA-JACKSON MINE
ANNUAL REPORT
YEAR 1955

8. UNDERGROUND:

a. General:

Of the yearly tonnage produced at the Cambria-Jackson Mine 40,340 tons, or 17.68%, was mined from the 7th Level and 187,852 tons, or 82.32%, from the 8th Level.

Mining above the 7th Level was completed in September of 1955, when the last of three crews of miners sub-caved a top-timber transfer drift in the East Deposit.

Under the present system of mining all of the ore is trammed to the 8th Level storage trench and transferred to the 7th Level by a 36-inch conveyor belt. This ore is then trammed from the storage bin to the 7th Level skip pocket at the shaft.

At the start of 1955 there were 13 development and mining contracts, but by December this number was reduced to 10 due to the lack of mining areas to be developed. In order to maintain the budget production a third shift was introduced into four of the major producing contracts.

Main level drifting in 1955 consisted of advancing the 8th Level footwall heading 50 feet to the east and extending the 860 cross-cut 450 feet southward. This cross-cut intersected 300 feet of first-class standard ore which greatly increased the ore reserves of the East Deposit from the previous year. The main reason for this build-up of ore was due to a flattening of the footwall. Exploration drilling from the area indicates that this deposit is related to the Mather Mine "B" Shaft 5th Level ore body.

With the installation of two Byron Jackson 500 G. P. M. vertical centrifugal pumps on the 4th and 7th Levels, the present pumping system is completely automatic. The pumping cost decreased $.09 per ton when the manually-operated plunger-type pump was replaced in August.

Excessive maintenance costs on the Bathke pan feeder, which discharged onto the 8th to 7th Level conveyor system, necessitated its replacement with a 4' x 14½' Pioneer pan feeder. Practically no maintenance work has been necessary on the new feeder since its installation. The feeder was changed during the vacation week in August.

East Deposit:

Development and mining continued in this ore body which is located adjacent to an inferred fault zone. This deposit starts above the 7th Level and plunges to the southeast towards the Mather Mine, "B" Shaft. The sulphur analysis varies throughout the area with the upper portion of the deposit being predominantly standard ore and the lower portion high-sulphur ore. During 1956 the major portion of the Cambria-Jackson production will come from this area.

CAMBRIA-JACKSON MINE
ANNUAL REPORT
YEAR 1955

8. UNDERGROUND: (Cont'd)

a. General: (Cont'd)

Central Deposit:

At the end of the year one crew continued sub-caving the bottom limits of this sulphurous deposit, above the 8th Level. Production from this deposit should be completed in the first quarter of 1956.

West Deposit:

Sub-caving at top-timber height above the 8th Level was continued by two crews of miners. A total of 39,224 tons of sulphurous ore was mined from this area during the year.

CAMBRIA-JACKSON MINE
ANNUAL REPORT
YEAR 1955

8. UNDERGROUND: (Cont'd)

b. Exploration:

The diamond drilling exploration program carried out in 1955 totaled 12 holes and 2,332 feet, compared with 3 holes drilled for a total of 230 feet in 1954.

The drilling program was divided into two phases. Phase 1, which was completed in the first half of 1955, was designed to explore for a possible eastward extension of the ore body below the 7th Level and for a possible ore build-up along the fault plane which cuts through this area at the east end of the 7th Level. Results of drilling 5 holes showed that no mineable ore is present in the area.

Phase 2 of the program was designed to explore and outline the ore body below the Cambria-Jackson 8th Level which extends down dip into the Mather Mine "B" Shaft 5th Level mining area. This drilling indicates that the sulphur content varies from a standard ore above the 8th Level to a high-sulphur ore below the level. A total of 7 holes were drilled from the -180-foot sublevel and from the 8th Level.

The following table summarizes the diamond drilling for 1955.

		Drilled From	Footage Drilled	First Class Ore Drilled	Total Depth
Holes Drilled From 7th Level To Explore For Ore Above 8th Level					
	220	0'	285'	-	285'
	221	0'	75'	35'	75'
	222	0'	140'	-	140'
	223	0'	87'	-	87'
Holes Drilled From 7th Level To Explore 7th Level					
	224	0'	352'	-	352'
Holes Drilled From 8th Level To Explore And Outline Ore Body Below 8th Level					
	225	0'	202'	131'	202'
	226	0'	226'	136'	226'
	227	0'	204'	32'	204'
	228	0'	260'	138'	260'
	229	0'	254'	45'	254'
	230	0'	153'	25'	153'
	231	0'	94'	10'	94'
Totals	12		2,332'	552'	

CAMBRIA-JACKSON MINE
ANNUAL REPORT
YEAR 1955

8. UNDERGROUND: (Cont'd)

c. Timbering:

Statement of Ground Support Material Used Under Development and Mining Accounts

Item	Lineal Feet	Amount	Cost Per Ton
Cribbing	24,236	$ 3,092.39	$ .01322
Stull Timber	25,636	6,196.68	.02648
Lagging	313,867	7,922.09	.03386
Poles	134,755	5,349.71	.02286
Steel	2,573	2,717.82	.01161
Total 1955	501,067	$ 25,278.69	$ .10803

d. Explosives:

Explosives Used in Breaking 234,000 Tons of Ore In Development and Mining Accounts

Item	Amount	Cost Per Ton
60% High-Pressure Gelatin	$ 1,786.01	$ .00763
Gelamite 1X	5,086.31	.02174
Hercomite 2X	21,536.12	.09203
Total Powder	$ 28,408.44	$ .12140
Blasting Supplies	6,909.27	.02953
Grand Total Powder & Blasting Supplies	$ 35,317.71	$ .15093
Pounds of Powder Per Ton of Ore		.698291

CAMBRIA-JACKSON MINE
ANNUAL REPORT
YEAR 1955

8. UNDERGROUND: (Cont'd)

e. Pumping:

Installation of two automatic, Byron Jackson, vertical, centrifugal pumps greatly improved the pumping set-up at the Cambria-Jackson Mine. Since all of the underground water flows towards the shaft, each level has a pump to relay the water to the main pumping station on the 4th Level. During the year the average flow from all of the levels was 303 G. P. M., as compared with 327 G. P. M. in 1954. Because there is a cave to surface the rate of pumping is directly proportional to the climatic conditions. The peak pumping period occurred in May with 393 G. P. M., whereas last year the peak was in the same month with 511 G. P. M.

CAMBRIA-JACKSON MINE
ANNUAL REPORT
YEAR 1955

9. TAXES

	1955		1954	
Cambria Realty	Valuation	Taxes	Valuation	Taxes
S½ of SE¼ of Sec. 35, 48-27) Lots 7&8 of Sec. 35, 48-27) Lots 5,6&7 of Sec.36, 48-27) - 222.09 Acres)	100,000	4,237.00	200,000	8,896.00
Jackson Strip				
N660' of N½ of NW¼ of Sec.1) - 40 Acres)	200,000	8,474.00	300,000	13,344.00
Personal Property				
Stockpiles, Supplies and Equipment	435,000	18,430.95	300,000	13,344.00
Total by Michigan State Tax Commission	735,000	31,141.95	800,000	35,584.00
Collection Fee		311.41		355.84
Total Taxes, Negaunee	735,000	31,453.36	800,000	35,939.84
Division of Payments				
Cambria-Jackson Taxes, Ishp.*	100,000	4,100.00	100,000	3,895.00
Cambria-Jackson Taxes, Neg.	735,000	31,453.36	800,000	35,939.84
TOTAL	835,000	35,553.36	900,000	39,834.84

*Cambria-Jackson Mine-Ishpeming

N660' of NE¼ of NE¼ of Sec. 2) 47-27 - 20 Acres)

Tax Rate per $100 of Valuation	1955	1954
City of Negaunee	4.237	4.448
City of Ishpeming	4.100	3.895

CAMBRIA-JACKSON MINE
ANNUAL REPORT
YEAR 1955

10. ACCIDENTS AND PERSONAL INJURY:

There was only one compensable injury during the year. This accident accounted for 100 lost-time days. There were also four non-compensable injuries which added 14 days lost time, for a grand total of 114 days. This resulted in a severity rate of .394 days lost per thousand man hours and a frequency rate of 17.26 injuries per million man hours, compared with Company averages underground mines of 5.249 and 37.00. The total hours worked were 289,622, as compared with 322,827 for 1954.

Date	Name	Nature of Injury	Days Lost
10-22-55	Toivo Lahti	Amputation of distal 2 phalanges, left little finger	100

CAMBRIA-JACKSON MINE
ANNUAL REPORT
YEAR 1955

11. POWER:

	Consumption K. W. Hours	Cost of Current	Average Price Per K.W. Hour
1955 -	3,408,730	$ 35,000.97	$0.01027
1954 -	3,792,000	$ 36,496.51	$0.00962
1953 -	4,579,200	$ 78,251.09	$0.01709

MAAS MINE
ANNUAL REPORT
YEAR 1955

1. GENERAL

The year 1955 saw a major change in mining methods take place in the latter part of the year. With the consolidation of the Maas and Bunker Hill Mines to take place in the summer of 1956 and the increased rate of production to meet from thereon, it was felt that these conditions could best be met by changing from the sub-level caving method of mining to the block caving and long-hole stoping methods. As a result of this and the lack of mining development in the previous eight months of 1955, a large-scale block development program was instituted in September. It is believed that the combination of these two methods at the Maas Mine will create greater overall efficiency and result in more tons per man per day and lower mining costs.

The mine operated on a 4 day, 2 shift schedule from January 1st to April 18, 1955. At that time, the schedule was increased to a 5 day, 2 shift operating week. In addition, there was a small crew on midnight shift throughout the year to tram ore from the block caving areas to keep the blocks moving properly.

A strike by the hourly rate employees, which started on the midnight shift of June 30th, ended on July 2nd after settlement of wage negotiations. An increase of 11½ cents per hour plus an increase of 1/2 cent in the differential between job classes was agreed on.

The total production for the Maas Mine for the year amounted to 376,774 tons, exceeding the budget estimate by 26,974 tons. The average grade on output was well within the guarantee. The major proportion of production came from the 7th Level with minor amounts coming from 4th, 5th, and 6th Levels. At the end of the year, all the contracts had been moved to 7th Level and the entire Maas production was being hoisted through the winze between 6th and 7th Levels. It is planned that the block development program on 7th Level will be ready to meet the increased production rate at the time of the Maas-Bunker Hill consolidation.

Main level development during 1955 was concentrated on 7th Level. More than half of the total main level drifting was accounted for by the Maas-Bunker Hill connecting drift, which was completed in December.

A diamond-drilling program to delimit the Pioneer and Arctic portion of the Phase I ore body commenced in July. Although the program is not yet complete, it is apparent that the ore body is cut-off along approximately the 1200 S. co-ordinate on the 2400 W. and 2700 W. sections. Further exploration will be carried on in 1956 to determine if sections to the west were also affected by this cut-off.

2. PRODUCTION

a. Production by Grades and Months

Month	Maas	Race Course	City of Negaunee	Total	Rock
January	24,955	3,763	579	29,297	1,105
February	17,206	7,422	-	24,628	1,490
March	26,678	4,863	-	31,541	3,685
April	25,960	5,007	-	30,967	3,100
May	27,056	5,561	620	33,237	3,330
June	26,402	3,043	1,250	30,695	3,580
July	22,734	1,970	3,251	27,955	4,035
August	24,137	1,745	935	26,817	5,000
September	31,030	1,622	-	32,652	4,850
October	31,585	209	-	31,794	4,760
November	29,148	830	-	29,978	5,345
December	21,751	1,980	-	23,731	6,900
Total	308,642	38,015	6,635	353,292	47,180
Stockpile Overrun	18,643	3,735	1,104	23,482	—
1955 Grand Total	327,285	41,750	7,739	376,774	47,180
1954 Grand Total	339,802	48,320	12,995	401,117	26,425

b. Shipments

Grade of Ore	Pocket Tons	Stockpile Tons	Total Tons	Total Last Year
Maas	12,527	522,127	534,654	160,489
Race Course	828	85,007	85,835	5,900
Total	13,355	607,134	620,489	166,389
Total Last Year	63,152	103,237	166,389	- -
Increase		503,897	454,100	
Decrease	49,797			