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8. COST OF OPERATING: (CONT.)

b. Detailed Cost Comparison: (Cont.)

UNDERGROUND COSTS:

1. Exploring in Mine:
Increase due to exploratory drifting.

3. Development in Rock:
Decrease due to less development work in rock.

4. Development in Ore:
Increase due to more development work in connection with the hard ore stopes.

5. Stoping:
Expenditures decreased $140,203.87. In 1944 there were 30,835 shifts worked compared with 45,515 1/4 shifts in 1943. Labor cost decreased $125,049.58 and supply cost decreased $15,154.29. The cost per ton decreased .049. Average tons stoping in 1944 was 23.98 compared with 20.70 in 1943.

6. Timbering:
Expenditures decreased $80,848.97. Labor cost decreased $59,714.02 and supply cost decreased $21,134.95. One HU Utility Hoist, $475.00 charged out in 1944.

7. Tramming:
Expenditures decreased $38,345.50. Decrease due to less tonnage trammed and less shifts worked.

8. Ventilation:
Expenditures increased $5,107.20. Two TM-6 Coppus Fans costing $850.64 and two 4 1/2 FH fan blowers costing $685.44 charged out; electric current increased $1,081.58, also cost of drifting for ventilation.

9. Pumping:
Expenditures decreased $599.51. Electric current decreased $237.61.

Number of gallons pumped - 1944	375,416,897
Number of gallons pumped - 1943	401,074,555
Decrease	25,657,658

Average number of gallons per minute for year 1944 - 713
Average number of gallons per minute for year 1943 - 770
Decrease 57

10. Compressors and Air Pipes:
Expenditures decreased $1,198.88. Electric current increased $1,548.08 account more air compressed. Labor and supplies decreased account of less air piping.

Cubic feet air compressed 1944	1,165,140,000
Cubic feet air compressed 1943	1,137,375,000
Increase	27,765,000

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8. COST OF OPERATING: (CONT.)

b. Detailed Cost Comparison: (Cont.)

(7) Detail of Accounts: (Cont.)

11. Back Filling:
No cost for backfilling in 1944.

12. Underground Superintendence:
Expenditures decreased $1,437.51. Two shift bosses transferred to another mine in October.

14. Compressors and Power Drills:
Expenditures increased $165.14. One CC-60 Paving Breaker $195.75, two Model DA-30 Drifters $1,075.11 and repairs to compressors $407.00 charged out in 1944. In 1943 six RB-12 Jackhammers $1,202.49 and repairs to intercooler $305.67 charged out.

15. Scrapers and Mechanical Loaders:
Expenditures increased $547.86 due to General Shop Charges repairing scraper hoists.

16. Electric Tram Equipment:
Expenditures decreased $3,186.82.

	1944	1943	Increase	Decrease
Locomotives	9411.89	10194.31		782.42
Wiring	1519.33	2421.95		902.62
Tracks	8946.50	8751.02	195.48	
Cars	4290.79	5973.36		1682.57
Generators	396.18	410.87		14.69
Total	24564.69	27751.51		3186.82

17. Pumping Machinery:
Expenditures decreased $602.54. Gear and pinion for 12th Level Aldrich Pump $600.03 and repairs to #2 Well Pump $497.43 charged out. Repairs higher in 1943.

SURFACE COSTS:

18. Hoisting:
Expenditures decreased $7,013.06. Electric current decreased $5,015.05 and labor and supplies decreased account less shifts worked.

19. Stocking Ore:
Expenditures decreased $409.80. Cost of operating tram system decreased, also cost of repairs to portable trestles.

21. Dry House:
Expenditures increased $1,414.69. Increase due to more fuel consumed account cold weather.

22. General Surface Expense:
Expenditures decreased $278.85. Less labor cleaning up and repairing roads.

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8. COST OF OPERATING: (CONT.)

b. Detailed Cost Comparison: (Cont.)

(7) Detail of Accounts: (Cont.)

23. Hoisting Equipment:

Expenditures decreased $2,693.15. In 1944 two hoisting ropes $1,249.00 and two 8' steel lined head sheaves $1,757.00 charged out. In 1943 three hoisting ropes $1,970.46, and cost of rewinding skip motor $1,501.77 charged out; also more expense for repairs to hoisting machinery, skips, cages, and skip roads.

24. Shaft:

Expenditures decreased $699.56. Less repairs in shaft and shaft pockets in 1944.

25. Top Tram Equipment:

Expenditures decreased $1,062.73. Cost of repairing cars and tracks decreased in 1944, also rollers and sheaves.

26. Docks, Trestles and Pockets:

Expenditures increased $2,586.73 due to repairing steel stocking trestles.

27. Mine Buildings:

	1944	1943	Increase	Decrease
Office	124.93	106.94	17.99	
Warehouse		11.69		11.69
Shops	231.13	107.89	123.24	
Shaft House	116.88	232.74		115.86
Engine House	53.32	254.59		201.27
Boiler House	36.70	25.71	10.99	
Dry House	107.55	17.39	90.16	
Coal Dock & Trestle	179.75	135.59	44.16	
Timber Tunnel	207.34	25.80	181.54	
Mine Rescue Room	17.88	3.02	14.86	
Miscellaneous	120.68	422.66		301.98
Total	1196.16	1344.02		147.86

GENERAL MINE EXPENSE:

Employees Vacation Pay:

Expenditures decreased $432.68. In 1944, 319 employees were eligible for vacation pay compared with 327 in 1943; 163 employees with a record of 10 years or more of continuous service were eligible for two weeks' vacation pay, and 156 employees with 3 years or more of continuous service were eligible for one week's vacation pay. Six employees inducted into the armed forces received vacation pay checks. In 1944 employees were paid for 43 hours per week the same as for 1943. All employees worked during the vacation period, receiving their vacation checks with their regular pay checks.

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8. COST OF OPERATING: (CONT.)

b. Detailed Cost Comparison: (Cont.)

(7) Detail of Accounts: (Cont.)

28. Insurance:
Expenditures decreased $1,160.21.

	1944	1943	Decrease
Property	2770.92	3486.62	715.70
Group	1940.93	2192.70	251.77
Catastrophe	554.78	747.52	192.74
Total	5266.63	6426.84	1160.21

29. Mining Engineering:
Expenditures decreased $572.44.

30. Mechanical and Electrical Engineering:
Expenditures decreased $371.18.

31. Analysis and Grading:
Expenditures decreased $3,732.88.

	1944	1943	Increase	Decrease
Ishpeming Laboratory Charges	14205.01	17274.39		3069.38
Shipping Department Expense	3134.69	4098.62		963.93
Mine Sampling	3406.79	3106.36	300.43	
Total	20746.49	24479.37		3732.88

32. Personal Injury:
Expenditures decreased $9,569.59.

	1944	1943	Increase	Decrease
Compensation and Doctors	11544.38	17703.36		6158.98
Compensation Department	721.24	868.40		147.16
Hospital Loss	2795.13	6064.58		3269.45
Mine Charges	11.10	5.10	6.00	
Total	15071.85	24641.44		9569.59

33. Safety Department:
Expenditures decreased $46.27.

34. Telephone and Safety Devices:
Expenditures decreased $1,230.98 due to less shifts worked and less repairs to telephones and main drift lighting.

35. Local and General Welfare:
Expenditures decreased $1,938.23.

	1944	1943	Decrease
General Welfare	3417.19	5024.69	1607.50
Local Welfare	739.48	1070.21	330.73
Total	4156.67	6094.90	1938.23

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8. COST OF OPERATING: (CONT.)

b. Detailed Cost Comparison: (Cont.)

(7) Detail of Accounts: (Cont.)

36. Special Expense, Pensions, and Allowances:
Expenditures decreased $36,206.93.

	1944	1943	Increase	Decrease
Pensions	1184.95	1985.48		800.53
Legal	945.87	895.46	50.41	
Saranac Investigations	2009.60	3027.28		1017.68
Central Employment Office	1020.20	1342.78		322.58
Retirement Expense	2978.59	3521.53		542.94
Other	1788.90	2867.47		1078.57
Wage Adjustment		32495.04		32495.04
Total	9928.11	46135.04		36206.93

37. Ishpeming Office:
Expenditures decreased $486.92.

38. Social Security Taxes:
Expenditures decreased $4,097.09.

	1944	1943	Increase	Decrease
Unemployment Insurance Tax	10671.94	14128.07		3456.13
Old Age Benefit Tax	8209.79	10851.88		2642.09
Group Annuity	2001.13		2001.13	
Total	20882.86	24979.95		4097.09

39. Mine Office:
Expenditures decreased $1,946.52.

	1944	1943	Decrease
Mine Office Expense	12274.22	12674.00	399.78
Supt. & Asst. Supt.	4631.84	5693.17	1061.33
Central Warehouse	4927.14	5412.55	485.41
Total	21833.20	23779.72	1946.52

A donation of $750 was made to the American Red Cross in 1944.

40. Taxes:
Expenditures decreased $18,015.25.

9. EXPLORATIONS AND FUTURE EXPLORATIONS:

The ore reserves of the Negaunee Mine are, for the most part, definitely known. However, some exploration work by drilling as well as drifting is contemplated West of the Negaunee shaft and in the extreme Southwest end of the Main Ore Body. These two areas lie in and are presumably connected by a faulted zone which runs in a Westerly direction from the shaft above the 14th Level elevation. Several years ago the upper portion of the fault zone was explored East of the shaft above the 13th Level. The ore area was found to be high in sulphur with no appreciable lateral extent. During 1945 the central part will be explored by diamond drilling, while the extreme Western portion can be explored by drifting South at an elevation just above the 14th Level.

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9. EXPLORATIONS AND FUTURE EXPLORATIONS: (CONT.)

The small, air operated diamond drill completed exploration work in the central portion of this Southwest ore body and no further diamond drilling is anticipated.

The following drill holes were drilled during 1944:

DD. Hole No.	Location	Dip	Direction	Material	Date Started	Date Stopped
47	∠ 170' Sub	0°	S80W	0 - 30 - Ore 30 - 60 - Jasper 60 - 75 - Ore 75 - 80 - Lean Ore 80 - 155 - Ore 155 - 160 - Lean Ore 160 - 165 - Ore	12/21/43	1/12/44
48	160' Sub	0°	S50E	0 - 70 - Ore 70 - 95 - Slate & Jasper 95 - 100 - Lean Ore 100 - 115 - Jasper 115 - 120 - Slate & Jasper	1/13/44	2/10/44
49	160' Sub	0°	N28W	0 - 5 - Lean Ore 5 - 50 - Ore 50 - 75 - Jasper 75 - 100 - Lean Ore 100 - 110 - Dike	2/16/44	3/ 1/44

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10. TAXES:

A comparison of taxes paid by the Negaunee Mine Company in 1944 and 1943 follows:

	1944		1943	
	Valuation	Taxes	Valuation	Taxes
Realty - 218.07	1,655,000	69,128.03	1,140,000	43,455.89
Pers. Stockpile, Supplies, Equipt.	1,020,000	42,604.58	760,000	28,970.59
Total by Tax Commission	2,675,000	111,732.61	1,900,000	72,426.48
Collection Fees		1,117.32		724.26
Total Negaunee Mine Proper		112,849.93		73,150.74
N 1/6 DSS&A R/W (1)	43,750	1,845.67	165,000	6,352.57
Section 1, Jackson	500,000	21,093.45	470,000	18,095.18
Maas Leased Area (*)			1,382,000	53,207.54
Grand Total	3,218,750	135,789.05	3,917,000	150,806.03
MATHER MINE:				
Realty - Sec. 2, 47-27	1,695,000	61,001.86	1,400,000	47,589.64
Personal Property	105,000	3,778.88	100,000	3,399.26
Total	1,800,000	64,780.74	1,500,000	50,988.90
Collection Fees				509.89
Total Mather Mine		64,780.74		51,498.79
Parcels - Sec. 3, 47-27 (Discharge)	600	21.59	600	20.60
Grand Total Mather Mine	1,800,600	64,802.33	1,500,600	51,519.39
Total Negaunee Mine Co.	5,019,350	200,591.38	5,417,600	202,325.42
Negaunee Rented Buildings	1,140	48.10	1,200	46.21
Jackson Rented Buildings	1,520	64.12		
Grand Total Negaunee Mine Co.	5,022,010	200,703.60	5,418,800	202,371.63
Tax Rate Per $100 of Valuation:				
City of Negaunee		4.17692		3.81192
City of Ishpeming		3.59893		3.39926
Negaunee Mine Company Percent of Taxes:				
City of Negaunee		24.3		27.95
City of Ishpeming		15.2		12.88
Division of Payments:				
City of Negaunee	3,221,410	135,901.27	3,918,200	150,852.24
City of Ishpeming	1,800,600	64,802.33	1,500,600	51,519.39
Total	5,022,010	200,703.60	5,418,800	202,371.63
Distribution by Accounts:				
Operating Negaunee Mine Only	2,718,750	114,695.60	3,447,000	132,710.85
Mather Mine & Jackson	2,300,600	85,895.78	1,970,600	69,614.57
Total Optg. Negaunee Mine	5,019,350	200,591.38	5,417,600	202,325.42
Opt. Negaunee & Jackson Rented Buildings	2,660	112.22	1,200	46.21
Grand Total Negaunee Mine Company	5,022,010	200,703.60	5,418,800	202,371.63

(*) Included with Negaunee Mine Valuations in 1944.

(1) Described as the C.C.I. Co. Adams Strip in 1943.

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11. ACCIDENTS AND PERSONAL INJURY:

The accident record in 1944 and particularly the last six months has been greatly improved as compared with the past five years. This record is based on frequency and severity rate which is the recognized basis on which accidents are comparable. The severity rate in 1944 was 1,32% as compared with 6.93% in 1943; the frequency rate in 1944 was 23.11% as compared with 35.14% in 1943. The slight accident record was reduced by 16% and was considerably lower than the previous year's. Generally speaking the 1944 record is exceptionally good in lieu of the labor turn-over as well as the totally inexperienced available labor at the present time. One of the most frequent accident hazards in the present mining is from falls of ground which occur due to the movement of the timber mat which exerts increasing pressure on the surrounding unmined pillars. This condition is particularly evident when concentrated mining is being carried on on one large sub-level.

In the following statement listing the accidents for the past five years, it will be noted that in 1944 there were 19 compensable accidents, of which 11 were of less than one month's duration. It might also be noted that in the last six months there were but five lost time accidents, of which only one extended over a two-week period.

	1944	1943	1942	1941	1940
Fatal	0	1	1	1	2
Time Lost - Over four months	3	3	5	3	4
" " - One to four months	5	15	5	4	8
" " - Less than one month	11	17	16	8	9
Total Compensable Accidents	19	36	27	16	23
Number of Cases paid compensation for accidents prior to Jan. 1, 1944	8	8	6	4	2
Number of cases being paid difference in wages (Included in above total)	2	1	1	0	0

12. NEW CONSTRUCTION AND PROPOSED NEW CONSTRUCTION:

There was no new construction in 1944, and no proposed new construction.

13. EQUIPMENT AND PROPOSED EQUIPMENT:

The Negaunee Mine steam shovel was moved to the stocking grounds in April and commenced loading ore on April 26th. This was continued intermittently until July. Prior to that time a 120-B Bucyrus-Erie Electric Shovel was purchased by the Negaunee Mine Company for the Mather Mine, but was diverted temporarily to the Negaunee Mine. The shovel was received early in July and was assembled, adjusted and put into service on July 26th. The new shovel has a four yard dipper and is

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13. EQUIPMENT AND PROPOSED EQUIPMENT: (CONT.)

a. Steam Shovels: (Cont.)

capable of loading 100 to 110 cars per eight-hour day. It is operated by a crew of three men which includes the operator, oiler and sampler. The new shovel is a great deal more efficient than the old steam shovel both in speed as well as clean-up width, which is 60 feet as compared with 33 feet.

There was no other major equipment purchased in 1944. However, an order has been placed for the purchase of the three-ton battery locomotive to be used in maintaining and repairing the numerous main level drifts which at the present time carry the ventilation between the 9th and 14th Levels. This motor is small enough to be transferred between levels on the cage and can also be used as a spare in hauling timber on the 14th Level. This locomotive and charging equipment will represent an expenditure of $3,500.00 and its delivery date is set for August, 1945.

b. Stocking Trestles:

Permanent Steel Trestles:

Late in 1944 a considerable amount of reinforcing work was done on the East and West permanent steel stocking trestles. The supports for the box girders from the concrete and steel pillars began to bend under the constant strain with the result that it has been necessary to install four new gusset plates in the box girder joint above the piers as well as tie the four arms together by intermediate members. This work was completed late in November and with the exception of painting, no further maintenance or repair work should be necessary.

Wood Stocking Trestles:

The Northeast wood stocking trestle was dismantled with the shipping of the stocked ore in October. Due to the reduced production this trestle will not be replaced.

The wood trestle which is now being used for rock must be replaced during the coming year. It has been in operation four years and a number of legs are beginning to crack. The new trestle will be erected just North and West of the present rock trestle.

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13. EQUIPMENT AND PROPOSED EQUIPMENT: (CONT.)

c. Scraper Hoists:

Following is a list of scraper hoists at the mine:

Company		Total Machines	1944 Total Cost of Machines Repaired	1944 each Mach. Repaired	1943 Total Cost of Machines Repaired	1943 each Mach. Repaired
Ing.-Rand	10 H.P. Elec.	2			1	$ 419.94
"	15 H.P. "	16	6	$ 274.66	3	348.65
"	20 H.P. "	12	5	307.87	1	299.68
"	25 H.P. "	2				
Sullivan	15 H.P. "	15	7	277.43	10	282.47
"	20 H.P. "	2	1	406.40		
"	25 H.P. "	2				
	Total	51	19		15	
Total Cost repairs all scraper hoists				5,535.73		4,590.27

Scrapped - Two Gardner-Denver 15 H.P. - Worn Out.
No hoists purchased in 1944.

d. Underground Tram Cars:

During the year repairs on haulage equipment, particularly cars, were carried on at the mine. With the abandonment of the 10th and 13th Levels a number of cars were moved to the 14th Level, while three cars were transferred to other mines. With continued age many of the cars require major repairs and are generally overhauled at least once a year. This work included the replacement of work plates, re-riveting or welding the frame and box.

e. Drill Equipment:

In 1944 two DA-30 Ingersoll-Rand Drifters were purchased for use in the mining of the hard ore in the stoping area. These machines have the automatic air feed and have proven very satisfactory in this operation. There no purchases of RB-12 Ingersoll-Rand Jackhammers during the year.

f. Haulage Tracks:

Following is a detailed cost of haulage tracks for years 1944 and 1943:

	1944	1943
40-lb. Rail	326.16	None
Ties & Tie Plates	623.36	224.29
Frogs	None	26.07
Total	949.52	250.36

The large increase in the cost of haulage tracks resulted from the two new crosscuts which were driven on the 14th Level. These drifts were driven in very heavy ground and continuous track repairs were necessary. Throughout the year a number of rails were salvaged from old crosscuts on the idle levels and used in various operations in the mine.

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13. EQUIPMENT AND PROPOSED EQUIPMENT: (CONT.)

g. Timber Hoists:

During the year there were no purchases of timber hoists, and with the slow reduction of mining contracts, additional equipment of this nature will not be necessary.

h. Mine Truck:

The Chevrolet hydraulic dump truck purchased in 1943 operated satisfactorily throughout the year.

14. MAINTENANCE AND REPAIRS:

Expenditures for maintenance and repairs in the accounts listed to underground costs amounted to $52,485.76 in 1944 as compared with $55,562.12 in 1943. The cost per ton was .069 in 1944 as compared with .058 in 1943. The increase of .011 is due to less production and the general aging of equipment.

The following is a list of purchases and repair costs for 1944:

	1944	1943	Increase	Decrease
1 CC-60 Paving Breaker	195.75		195.75	
2 Model DA-30 Drifters	1075.11		1075.11	
1 Cameron Pump	40.00		40.00	
88,345 feet wire rope for scrapers	9034.74	10367.15		1332.41
6 RB-12 Jackhammers		1202.49		1202.49
1 36 cu. ft. rocker dump car		50.00		50.00
1 15 H.P. AC Motor		50.00		50.00
1 3-ton chain hoist		53.55		53.55
Total Purchases	10345.60	11723.19		1377.59
Repairs to Comp. and Air Lines	676.13	579.36	96.77	
Repairs to Scraper Hoists & Scrapers	13894.83	11911.01	1983.82	
Repairs to Generator	396.18	410.87		14.69
" " Loco.	9411.11	10194.31		783.20
" to Trolley Wire	1519.33	2421.95		902.62
" to Tracks	8947.28	8751.02	196.26	
" to Haulage Cars	4290.79	5923.36		1632.57
" to Pumping Mach.	3004.51	3647.05		642.54
Total Repairs	42140.16	43838.93		1698.77
Grand Total Pur. & Rep.	52485.76	55562.12		3076.36

Decrease due to less repairs for locomotives, trolley wire, cars and pumping machinery. There was a new gear and pinion costing $600.03 for repairs for Aldrich Pump purchased in 1944, also a cost of $477.43 repairing pump at #2 Well.

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14. MAINTENANCE AND REPAIRS: (CONT.)

Expenditures for maintenance and repairs in accounts listed under "Surface Costs" amounted to $20,994.79 in 1944 as compared with $23,011.36 in 1943, a decrease of $2,016.57. The cost per ton was .027 in 1944, as compared with .024 in 1943, an increase of .003 per ton.

The following is a list of repair costs for 1944:

	1944	1943	Increase	Decrease
2 New Hoisting Ropes	1249.00	2460.50		1211.50
2 - 8' Head Sheaves	1757.00		1757.00	
Repairs to Elec. Hoists	1333.03	4568.21		3235.18
" to Skips & Cages	3176.46	3364.52		188.06
" to Shaft	4277.73	4977.29		699.56
" to Top Tram Motors	38.84	113.51		74.67
" " " " Tracks & Cars	555.26	1588.45		1033.19
Wire Rope, Sheaves & Rollers	1975.92	1746.20	229.72	
Rep. to Permanent Trestles	4559.39	1743.19	2816.20	
" to Pockets & Chutes	876.00	1105.47		229.47
" to Mine Buildings	1196.16	1344.02		147.86
Total	20994.79	23011.36		2016.57

One less hoisting rope charged out, also decrease in repairs to hoisting machinery, shaft and cars, but two 8' steel lined head sheaves and repairs to steel stocking trestle charged out in 1944.

15. POWER:

Following is a detail of electric current purchased in 1944 and 1943, and the distribution of charges to various accounts and other data:

	1944 - 12 Months Optg.		1943 - 12 Months Optg.	
	Cost	Per Ton	Cost	Per Ton
Stoping	2880.00	.0038	2880.00	.0030
Timbering	120.00	.0002	120.00	.0001
Compressors	37110.57	.0490	33562.49	.0372
Ventilation	6221.99	.0082	5140.41	.0053
Pumping	23586.88	.0311	23824.49	.0250
Hoisting	24931.25	.0329	29946.30	.0313
Stocking Ore	271.52	.0004	281.93	.0003
Dry House Expense	1025.91	.0014	1070.30	.0010
Tel. & Safety Devices	1367.00	.0018	1380.00	.0015
Mine Office Expense	101.63	.0001	116.55	.----
Electric Haulage	9738.10	.0128	9939.82	.0104
Shops	678.37	.0009	502.70	.0005
District Carp. Shop	9.19		17.48	
Surface Lighting	318.36	.0004	481.34	.0004
Total	108360.77	.1430	111200.81	.1160
Main Line Meter - K.W.	8,355,706		8,603,200	
Sep. Meter Readings K.W.	8,070,766		8,334,284	
Line Loss - K.W.	284,940		268,916	
Product - Tons	757,677		954,990	
K.W. Per Ton (INC.LineLoss)	11.03		9.01	
Cost per K.W. (Avg. for yr)	.01402		.01345	
15-min. Demand(Avg. for yr)	1,705		1,645	
Load Factor (Avg. for year)	55%		59%	

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17. CONDITION OF PREMISES:

a. Mine Grounds:

The grounds around the mine were kept in good condition throughout the year. During the winter months there was a considerable amount of work involved in removing the heavy snowfalls in the vicinity of the parking lot, shops and timber yard.

b. Negaunee Houses:

There is only one house owned by The Negaunee Mine Company which is located on the Negaunee Mine lease. In addition there are five houses located on Sections One & Two, one of which is owned by The Negaunee Mine Company and four included in our lease of Sections One & Two from The Cleveland-Cliffs Iron Company. Total revenue from rents in 1944 was $1,237.10; cost of maintenance and repairs amounted to $2,567.70.

18. NATIONALITY OF EMPLOYEES:

The nationality record of employees is submitted in two forms, one as to parentage, the other as to country of birth.

As to Parentage	1944	Percent	1943	Percent
Finnish	158	49.6	207	45.9
English	55	17.3	86	19.1
Italian	38	11.9	59	13.1
French (Canadian)	24	7.5	40	8.9
Swedish	23	7.2	36	6.0
Austrian	10	3.2	9	2.0
Norwegian	3	.9	2	.4
German	1	.3	1	.2
Danish	2	.6	3	.7
Belgian	2	.6	2	.4
Irish	1	.3		
Polish	2	.6	4	.9
Dutch			1	.2
Yugoslavian			1	.2
Total	319	100.0	451	100.0

As to Birth	American Born		Foreign Born	
	1944	1943	1944	1943
Finnish	95	139	63	68
English	44	70	11	16
Italian	19	34	19	25
Swedish	18	29	5	7
French (Canadian)	23	36	1	3
Austrian	8	8	2	1
Norwegian	3	2		
German	1	1		
Danish	2	3		
Belgian	2	2		
Irish	1			
Polish	2	3		1
Dutch		1		
Yugoslavian		1		
Total	218	330	101	121
	68.3%	72.9%	31.7%	27.1%

NORTH JACKSON MINE
ANNUAL REPORT
YEAR 1944

1. GENERAL:

There were no changes at this idle property in 1944. No work has been done at the open pits in the past thirty-six years.

6. SURFACE:

The fences around the open pits were inspected early in the summer and necessary repairs made.

a. Buildings:

The four apartments in the Jackson Mine Office building were occupied throughout the year. The repairs and improvements which incuded interior decorating, cleaning of chimneys, etc., amounted to $214.91. Taxes were $28.05 making a total expense of $242.96. The rental income amounted to $368.80, making a net profit for the year of $125.84.

Early in 1944 the Penhale property, known as House Number 2 and situated in the Western section of Negaunee was purchased. A considerable amount of repairs were necessary both to the interior and exterior. The total repairs for the year amounted to $1,995.82. The taxes were $36.07, making a total expense of $2,031.89. This two-family house was occupied in August and the revenue from the property through December amounted to $261.25. The net difference between the expenses and revenue amounted to $1,770.64.

10. TAXES:

	1944		1943	
	Valuation	Taxes	Valuation	Taxes
47% of realty as described Sec. 1-47-27	$235,000.00	$9,815.76	$220,900.00	$8,420.53
Collection Fees		98.16		84.21
Total	235,000.00	9,913.92	220,900.00	8,504.74
Rented Buildings:				
Old Jackson Office - No. 1	665.00	28.05	700.00	26.94
Penhale Property - No. 2	855.00	36.07		
Grand Total	236,520.00	9,978.04	221,600.00	8,531.68

Taxes increased due to the higher tax rate in the City of Negaunee.

WRA/jl - 3
5/5/45

SOUTH JACKSON MINE
ANNUAL REPORT
YEAR 1944

1. GENERAL:

There was no change in conditions at this idle property during 1944.

4. ESTIMATE OF ORE RESERVES:

a. Available Ore:

Above present pit available by present system of Mining:

On Southwest side	35,000 tons
North of Lucy Pit	5,000 "
South and Southwest of Lucy Pit	3,000 "
Total	43,000 "

Below present pit and above drainage tunnel available by milling:

West of Crusher	186,000 tons
Area below bottom of present pit shown by churn drilling	105,226 "
Total	291,226 "
Grand Total	354,226 "

c. Estimated Analysis:

	Iron	Phos.	Silica	Alum.	Mang.	Lime	Mag.	Sul.	Igni.	Moist.
Natural	34.55	.066	36.00	1.42	2.00	.435	.175	.010	2.00	7.00

6. SURFACE:

The fences around the open pits and shaft were inspected and necessary repairs were made during the year. As mentioned in the 1943 report, the crusher building was dismantled and the surface cleared of old wood and iron.

10. TAXES:

	1944		1943	
	Valuation	Taxes	Valuation	Taxes
53% of realty as described Sec. 1-47-27	$265,000.00	$11,068.84	$249,100.00	$9,495.49
Collection Fees		110.69		94.95
Grand Total	265,000.00	11,179.53	249,100.00	9,590.44

Taxes increased due to the higher tax rate in the City of Negaunee. As noted above, the increase amounts to $3.65 per hundred dollars of valuation.

WRA/jl - 3
5/5/45

ANNUAL REPORT
GWINN DISTRICT GENERAL
YEAR 1944

1. GENERAL

Princeton Mine

The Princeton Mine was the only property operating in the district during the year. An average of 162 men were employed with 43 men on surface work and 119 occupied underground. The majority of mine employees are residents of Gwinn and the locations of Princeton, Austin and New Swanzy. A small number commute from neighboring townships and farming communities.

A production of 216,512 tons of Cambridge grade ore was made and a tonnage of 192,658 shipped.

Maintenance and repair of the water supply system for the town of Gwinn was done by Princeton Mine employees. Snow removal from the immediate vicinity of the fire hydrants was also made during the peak of winter accumulation.

Because of the large number of Princeton Mine employees and their families living in the district the services of a doctor from the Negaunee section of the Company welfare department were obtained at regularly scheduled periods of the week.

Francis Mine

All salvageable material has been removed from the property.

Mackinaw Mine

All buildings except head frame and oil house have been removed. The wooden water tank was dismantled during the summer and material reclaimed where possible.

Stephenson Mine

Inspection of the surface area of the Stephenson shaft indicated that additional steps should be taken to completely cover the shaft opening as a means of obviating possible injury to persons on the immediate site. The actual covering work was done by Princeton Mine employees under contract with the I. Stephenson Company. The use of a tractor and bulldozer and scrap hoisting cable was donated by the Princeton Mine.

Schools

The enrollment of the Gwinn school for 1944 was as follows:

Elementary Grades,	242
Junior and High School,	212
Total,	454

An increase of 9 for 1944. A large school bus transports pupils daily from Wells Township to Gwinn, a distance of over twenty miles.

ANNUAL REPORT
GWINN DISTRICT GENERAL
YEAR 1944

1. GENERAL (Cont.)

Townsite

The streets in the townsite, which are maintained by the Marquette County Road Commission, were re-tarred during the year.

The majority of Company owned houses have been sold and in most cases to Company employees. Insofar as material is available, the owners have remodeled and redecorated the structures improving considerably the general appearance of the townsite.

Red Cross Funds Drive

A total sum of $1,843.69 was obtained in the District and 166 employees of the Princeton Mine subscribed for a total of $419.00 with an average of $2.52 per man.

Armed Forces

The total number of men called to the Armed Services from the township as of December 31, 1944 was 195 of a population of approximately 1,900. This number is equivalent to 9.7% of the total Forsyth township population.

From the Princeton Mine a total of 71 employees are now in the Services. The present working force comprises 154 men which indicates that approximately one-half of the mine employees have been replaced.

House and Lot Sales

The sale of Company owned houses in Gwinn Townsite inaugurated in 1943 was continued during 1944. A total of 110 double houses were offered for sale, with 68 being disposed of in 1943. An additional 26 houses were sold in 1944, leaving a balance unsold of 16 sides. Negotiations are in progress for the disposal of a number of these. It is expected that sales will be somewhat slower inasmuch as these remaining sides are less desirable than the previous sales. To date, however, 86% of the Gwinn structures have been sold.

Late in the summer of 1944 the Company owned houses in the Austin and Princeton locations were also offered for sale. In the case of the Austin houses, an arrangement was made with the Escanaba River Land and Iron Company whereby that company was named co-lessor with the Cleveland-Cliffs Iron Company to maintain the tenant's ground lease when the C.C.I.Co. lease expires in 1950.

Of a total of 41 houses in Austin Location, one was dismantled in 1944 and 38 sold, leaving 2 for sale in 1945. One sale is practically completed, but the remaining structure, an old boarding house, will offer difficulties in disposition.

In the Princeton Location, 9 houses were offered for sale and all immediately disposed of.

A valuation was set on the Gwinn houses in 1943 with a 20% discount offered for a cash sale. The same procedure was followed in the Austin and Princeton houses. All transactions for the year were cash sales.

ANNUAL REPORT
GWINN DISTRICT GENERAL
YEAR 1944

1. GENERAL (Cont.)

House & Lot Sales

Street	House No.	Lot	Block	Name	Amount
Maple	150	14	25	Hjalmer Wallenstein,	$ 568.00
Elm	168	19	23	Matt E. Valimaa,	548.00
"	156	16	23	Telesphore Tousignant,	548.00
Maple	160	17	25	Clyde H. Sarasin,	568.00
"	221	9	26	Theodore Salonen,	548.00
Elm	147	8	24	Arthur A. Dunquist,	548.00
Birch,	107	8	15	Julius C. Fralick,	540.00
Ash,	194	18	26	Julius Koski,	540.00
Iron	171	2	23	Eino Erickson,	548.00
Maple	226	28	27	Albert J. Morin,	548.00
Tamarack	112	20	15	Walter Alto,	540.00
Iron	175	1	23	Nestor Ahlstrom,	528.00
Maple	240	31	27	Martin Granholm,	508.00
Oak	155	6	23	Otterino Catto,	480.00
Maple	219	10	26	Lauri J. Martonen,	568.00
Ash	218	23	26	Lawrence Copley,	500.00
Elm	171	2	24	Noah J. Morin,	508.00
Ash	261	6	31	Elmer Kangas,	600.00
"	265	7	31	" "	600.00
Maple	194	20	27	Eino J. Honkanen,	548.00
"	218	26	27	Archangelo Yannone,	548.00
"	248	33	27	Ernest Niemi,	508.00
Ash	253	9	31	Emilio Vecellio,	540.00
"	208	20	26	Domenic Barbieri,	500.00
"	250	31	26	Frank E. Boggetto,	548.00
Maple	192	19	27	Louis J. Senical,	548.00

Total number double houses, Gwinn Townsite, as of Jan. 1, 1943, 110
Total number of Sales during 1943, 68
42
Total number of Sales during 1944, 26
Total Unsold as of December 31, 1944, 16

All of the above purchases have been for cash, indication that all purchasers took advantage of the Company offer of the 20% discount.

During 1944 the following lots in Gwinn Townsite were sold:

Lot No.	17	of Block No.	6	to Nellie Gimse,	$ 150.00
" "	7	of " "	15	to Victor Maki,	75.00
" "	16	of " "	13	to Max Fralick,	112.50
" "	21	of " "	7	to William Marjomaki,	150.00

As shown on last year's report, there were 41 houses at Austin Loc., 41
During the year of this number 38 have been sold and 1 dismantled, 39
Remaining unsold as of December 31, 1944, 2

ANNUAL REPORT
GWINN DISTRICT GENERAL
YEAR 1944

1. GENERAL (Cont.)

House & Lot Sales (Cont.)

Following is a detail of Austin Location houses sold:

House No.	Name	Amount
1	Mrs. Edward Soyring,	$ 200.00
2	Mrs. Margaret Sarasin,	200.00
3	Ernest Keskimaki,	200.00
4	Mrs. Eli Roos,	200.00
9	William Ontto,	204.00
10	Simon Kroncich,	200.00
12	Arthur Hicks,	200.00
15	Julius King,	200.00
16	J. E. Pelkie,	200.00
17	Albert Mattson,	200.00
18	Matt Sahi,	200.00
19	Matt Ontto,	372.00
20	Mrs. John Martonen,	200.00
21	Andrew Keskimaki,	208.00
22	Carlo Ketola,	200.00
24	Tony Kroncich,	200.00
26	John Ontto,	200.00
28	George Doyen,	208.00
29	Mrs. Floyd DelBello,	208.00
36	Orville Sather,	206.00
37	" "	206.00
40	Vincenzo DeToma,	200.00
41	Guido Della Corte,	208.00
43	Victor Lindberg,	200.00
44	Carl Lindberg,	200.00
45	Louis Sarasin,	200.00
46	Vernon Bailey,	200.00
47	Peter Fonzasin,	200.00
52	Armatti Gerolomo,	204.00
53	Lawrence Armatti,	204.00
13	Battista Armatti,	200.00
14	Peter Dani,	204.00
23	Kenneth Bailey,	208.00
25	Mrs. Charles Erickson,	208.00
27	Marie Martonen,	200.00
32	Frank Bollero,	200.00
33	Gorman Hedstrom,	200.00
42	Adolphus Miron,	200.00
68	Being dismantled. (Scrapped 1944)	

Last year Princeton Location showed 9 houses in location, all of which have been sold during the year as follows:

House No.	Name	Amount
2	Charles Hutchens,	$ 120.00
6	Mrs. Hugo Felizetti,	60.00
9	Mrs. Elma Marjonen,	60.00

ANNUAL REPORT
GWINN DISTRICT GENERAL
YEAR 1944

1. GENERAL (Cont.)

House & Lot Sales (Cont.)

Princeton Location sales.

House No.	Name	Amount
11	Mrs. S. J. Roberts,	$ 60.00
12	Theodore Valeski,	60.00
15	James Felizetti,	96.00
18	Roy Wendt,	80.00
49	Walter Laveau,	40.00
54	Joseph Felizetti,	60.00

a. Statement Showing Total Ore Produced in District By C.C.I.Co., 1903 to 1944 Inclusive.

YEAR	AUSTIN	PRINCETON	STEPHENSON	GWINN	FRANCIS	GARDNER MACKINAW	TOTAL
Total to 1944,	1,589,018	1,896,619	3,835,157	988,665	504,667	1,289,118	10,103,244
1944 Product,		216,512					216,512
To Date,	1,589,018	2,113,131	3,835,157	988,665	504,667	1,289,118	10,319,756

b. Statement Showing Ore Shipments by C.C.I.Co. from 1905 to 1944

YEAR	AUSTIN	PRINCETON	STEPHENSON	GWINN	FRANCIS	GARDNER MACKINAW	TOTAL
Total to 1944,	1,589,018	1,765,351	3,845,027	1,017,334*	502,131	1,326,439	10,045,300
1944		192,658					192,658
To Date,	1,589,018	1,958,009	3,845,027	1,017,334*	502,131	1,326,439	10,237,958

* included in the shipments from Gwinn Mine is 29,009 tons of Foundry Stockpile ore purchased from the Clement Quinn Company and shipped by the C.C.I.Co. in 1942.

c. Ore in Stock at Mines, December 31, 1944

Princeton, 155,162 tons

10. TAXES

The following statement gives the taxes in detail for 1944 and 1943 for all company properties in the district. The mine taxes in the summary show totals only, as the detail for each mine is included in the mine report.

The summary also includes the taxes paid by Cliffs Power and Light Company in order to show the total taxes paid in Forsyth Township by the company, exclusive of those paid by the Land Department.

ANNUAL REPORT
GWINN DISTRICT GENERAL
YEAR 1944

10. TAXES (Cont.)

		1944		1943	
Forsyth Township		Valuation	Taxes	Valuation	Taxes
Mineral Lands, Gwinn					
SW¼ of SW¼ of Sec. 26-45-25,	40 A.	$ 100	$ 2.03	$ 100	$ 2.07
NE¼ of SE¼ of Sec. 28-45-25,	40 A.	100	2.03	100	2.07
N½ of NE¼ of Sec. 34-45-25,	80 A.	200	4.05	200	4.14
SE¼ of NE¼ of Sec. 34-45-25,	40A.	100	2.03	100	2.07
NE¼ of NW¼ of Sec. 34-45-25,	38.05 A.	100	2.03	100	2.07
NE¼ of SE¼ of Sec. 34-45-25,	36.3 A.	100	2.03	100	2.07
NW¼ of Sec. 35-45-25,	160 A.	400	8.10	400	8.27
Lots 1, 2, & 3 of Sec.36-45-25,	53 A.	125	2.53	125	2.60
Lots 7, 8, & 9 of Sec.36-45-25,	98.92 A.	260	5.28	260	5.38
Lot 11 of Sec. 36-45-25,	13.3 A.	25	.51	25	.52
Und.½ of S½ of NE¼ of Sec. 28-45-25,	80 A.	150	3.04	150	3.10
Total,		$ 1,660	$ 33.66	$ 1,660	$ 34.36
Collection Fee,			.34		.34
Total Taxes,			$ 34.00		$ 34.70
Gwinn Townsite - Surface Only					
Lot 2, Sec. 21-45-25,	43.75 A.	100	2.03	100	2.07
NE¼ of SW¼ of Sec. 21-45-25 included in plat,	6 A.	100	2.03	100	2.07
NE¼ of NW¼ of Sec. 21-45-25,	17.54 A.	150	3.04	150	3.10
That part of S½ of NE¼ of Sec. 21-45-25 not included in plat of Gwinn,	25.01 A.	200	4.05	200	4.14
E½ of SE¼ of Sec. 21-45-25,	65.84 A.	150	3.04	150	3.10
Sec. 21-45-25 not included in Plat of Gwinn,	38.80 A.	300	6.08	300	6.20
Gwinn Townsite Plat,		41,160	833.29	81,550	1,685.97
Supt. Res. Part of W½ of SE¼ of Sec. 21,	1.2 A.	1,500	30.38	1,500	31.02
NW¼ of NE¼ of Sec. 21-45-25 except five acres,		100	2.03	100	2.09
Part of S½ of NE¼ of Sec. 21-45-25,	50-88 A.	300	6.08	300	6.20
Total,		$ 44,060	$ 892.05	$ 84,450	$1,745.94
Collection Fee,			8.92		17.46
Total Taxes,			$ 900.97		$1,763.40
Gwinn Townsite Group Divided by Accounts					
From Tax Statement,		$ 44,060	$ 900.97	$ 84,450	$1,763.40
Gwinn Club House, Lot 8, Blk. 17,		500	10.23	500	10.44
Hospital, Lot 9, Block 25,		1,000	20.45	1,000	20.89
Rented Buildings,		28,710	587.19	66,690	1,392.46
Gwinn Townsite, Unsold Lots,		13,850	283.10	16,260	339.61
Total Group as per Statement,		$ 44,060	$ 900.97	$ 84,450	$1,763.40
Gardner Mackinaw	87.35 A.	500			
N½ of NE¼ of Sec. 35-45-25			10.13	500	10.34
Collection Fee,			.10		.10
Total Taxes,			$ 10.23		$ 10.44

ANNUAL REPORT
GWINN DISTRICT GENERAL
YEAR 1944

10. TAXES (Cont.)

	1944		1943	
Machinery in Warehouse	Valuation	Taxes	Valuation	Taxes
Machinery in Warehouse,	$ 900	$ 18.40	$ 900	$ 18.88
Central Water Plant NW¼ of NE¼ of Sec. 28-45-25,	100	2.05	100	2.09
Personal - District Office,	500	10.23	500	10.44
District Crusher, N½ of NE¼ of Sec. 27-45-25,	1,000	20.45	1,000	20.88
Total,	$ 2,500	$ 51.13	$ 2,500	$ 52.29
Austin Location				
Part of Lot 5, SW¼ of NE¼ of Sec. 20-45-25,	$ 3,500	$ 70.87	$ 3,500	$ 72.37
NW¼ of SE¼ of Sec. 20-45-25,	3,500	70.87	3,500	72.37
NE¼ of SW¼ of Sec. 20-45-25,	260	5.27	260	5.38
Total,	$ 7,260	$ 147.01	$ 7,260	$ 150.12
Collection Fee,		1.47		1.50
Total Taxes,		$ 148.48		$ 151.62
Summary				
Machinery in Warehouse,	$ 900	$ 18.41	$ 900	$ 18.80
Stephenson Mine,				
Princeton Mine,	411,260	8,411.02	411,260	8,588.91
Francis Mine,				2.10
Gardner Mackinaw Mine,	2,500	51.13	30,000	626.53
Austin Location,	7,260	148.48	7,260	151.62
Mineral Lands,	1,660	34.00	1,660	34.71
Gwinn Townsite,	44,060	900.97	84,450	1,763.40
Gardner Mackinaw Location,	500	10.23	500	10.44
Central Water Plant,	100	2.05	100	2.09
Personal District Office,	500	10.23	500	10.44
District Crusher,	1,000	20.45	1,000	20.88
Total C.C.I.Co.,	469,740	9,606.97	537,630	11,229.92
Cliffs Power & Light Co.,	148,150	3,030.04	148,130	3,093.68
Total Taxes (Includes 1%)	617,890	12,637.01	685,760	14,323.60
Princeton - Personal Property,	320,000	6,544.48	150,000	3,101.64

Taxes Levied - Forsyth Township	1944	1943	1942	1941
Forsyth Township Valuation,	1,111,835	1,128,030	1,109,870	1,059,625
Rate per #100 of Valuation,	2.02493	2.068	2.077	2.110
Amount of Tax Roll				
County Tax,	6,226.28	6,317.65	6,215.27	5,298.12
County Road,	2,223.67	2,256.30	2,219.74	2,543.14
Township Tax,	2,223.67	2,256.30	2,219.74	2,119.25
Township Debt Service,	2,700.00	2,800.30	2,800.00	2,860.00
School,	6,003.91	6,092.02	5,993.30	5,983.90
School Debt Service,	3,136.41	3,604.87	3,604.48	3,600.00
Rejected Tax,	12.25		14.50	26.36
Total,	22,526.29	23,327.44	23,067.03	22,380.77
Amount Paid by C.C.I.Co.,	9,606.97	11,229.92	10,243.21	12,593.52)
Amount Paid by C.P.& L.Co.	3,030.09	3,093.68	3,107.57	)
Total,	12,637.06	14,323.60	13,350.78	12,593.52
Percent Paid by C.C.I.Co. & C.P.&L.,	56.1%	61.4%	57.9%	56.3%

ANNUAL REPORT
GWINN DISTRICT GENERAL
YEAR 1944

16. WATER SUPPLY - GWINN DISTRICT

The main pumping plant at the Jopling Shaft (Kidder Shaft) and the auxiliary booster plant on the Escanaba River below the Austin Location, operated throughout the year.

Samples of water were sent each month to the Michigan Department of Health Laboratory at Houghton. All samples were satisfactory and showed no contamination.

Following is a comparative cost statement for operating the Pump Station for the years 1944 and 1943:

	1944	1943	Increase	Decrease
General Expense,	$ 66.40	$ 50.49	$ 15.91	
Maintenance,	1,398.36	1,091.07	307.29	
Operating,	566.23	605.79		$ 39.46
Electric Power-Kidder Station,	4,960.27	4,600.10	360.17	
-Booster "	815.48	974.96		159.48
E&A Depreciation,	1,047.01	1,046.74	.27	
Total Cost,	$8,853.75	$8,369.15	$ 484.60	
" Revenue Credit,	4,798.21	4,600.76	287.15	
Deficit,	$4,055.54	$3,768.39		

Increase in the Maintenance Account is due to higher expenditure for water lines, laying of approximately 500 feet of pipe line, and extra time spent repairing water mains at Princeton Location.

The increase in Power Cost is due entirely to the fact that it has been necessary to operate the 1,000 gallons per minute Layne Western Unit throughout the year because the water supply level is beyond the suction depth of the 500 gallons per minute Cameron in use at the inauguration of the present pumping plant. This increase is considerably less, in fact less than one half of the increased power charges of 1943 over 1942. Closer watch for breaks in the old wooden mains has reduced the wasted pumping time to a minimum.

Hydrants

Rental of 40 hydrants in the Gwinn Townsite, Austin and Princeton locations is made by the Company to Forsyth township at the yearly rate of $35.00 per hydrant. Upkeep of hydrants, including painting and repairs to hydrant and box, amounted to $227.41 for the year 1944.

16A. SEWER SYSTEM

Ever since the Townsite was platted, the Cleveland-Cliffs Iron Co. has taken on the maintenance of the sewer system. During the past six years the yearly expenditure for this work was as follows:

1939	$ 722.37
1940	710.69
1941	598.10
1942	336.40
1943	581.06
1944	610.10

ANNUAL REPORT
GWINN DISTRICT GENERAL
YEAR 1944

16A. SEWER SYSTEM (Cont.)

Maintenance work, which is done by Princeton Mine employees, is becoming increasingly more costly. Constriction of the main sewer lines is increasing because of the number of large bordering trees, whose root systems have entered the pipes. Acute shortage of operating personnel for the mine itself makes the sewage problem a very difficult one. This work parallels the water supply maintenance, and emergency work necessary to these systems has serious ultimate effect on the Princeton Mine production.

17. CONDITION OF PREMISES

The rents accrued, collected, and repair expense for the company houses in Gwinn, Austin and Princeton locations follows:

Gwinn Townsite	1944	1943	1942	1941
Number of Houses - 16.				
Rents Accrued,	$ 3,613.97	$10,489.92	$11,576.54	$11,417.03
Repair Expense,	1,043.92	2,308.51	8,032.71	5,320.12
Accrued Rent over repair cost,	$ 2,570.05	$ 8,181.41	$ 3,543.83	$ 6,096.91
Actual rent collected*	4,103.38	10,942.36	11,520.13	11,198.62

* Cash collected for regular running accounts, Year 1944, $ 3,665.40
Cash collected for old charged off accounts, Year 1944, 437.98
Total, $ 4,103.38

During the year 26 houses (sides) were sold as per detail on other sheet. Repairs were small on account of anticipated sales, 16 sides remaining unsold as of December 31, 1944.

Austin Location	1944	1943	1942	1941
Number of Houses - 2.				
Rents accrued,	$ 1,774.04	$ 2,275.83	$ 2,231.00	$ 2,177.08
Repair Expense,	424.59	514.11	417.52	856.35
ACcrued rent over repair cost	1,349.45	$ 1,761.72	$ 1,813.48	$ 1,320.73
Actual rent collection,*	1,865.25	2,316.42	2,449.52	2,152.92

* Cash collected for regular running accounts, Year 1944, $ 1,840.75
Cash collected for old charged off accounts, Year 1944, 24.50
Total, $ 1,865.25

In 1944 38 houses were sold and one dismantled, leaving 2 houses unsold as of December 31, 1944.

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17. CONDITION OF PREMISES (Cont.)

Princeton Location	1944	1943	1942	1941
Number of Houses - 0.				
Rents accrued,	$ 403.36	$ 666.00	$ 677.50	$ 656.50
Repair Expense,	94.71	134.09	307.01	393.04
Accrued Rent over Repair Cost,	$ 308.65	$ 531.91	$ 370.49	$ 263.46
Actual rent collections, *	488.90	636.00	689.00	658.43

* Cash collected for regular running accounts, Year 1944, $ 474.90
Cash collected for old charged off accounts, Year 1944, 14.00
Total, 488.90

All of the Princeton Location houses were sold in 1944.

Statistical Statement of Rented Buildings, 1944

	No. Unsold Dec. 31'44	Cost of Repairs for 1944	Rents Collected
Gwinn Location, (Sides)	16	$ 1,043.92	$ 4,103.38
Austin Location,	2	424.59	1,865.25
Princeton Location,	0	94.71	488.90
	18	$ 1,563.22	$ 6,457.53

Actual cash received, $ 6,457.53 - (includes $476.48 which was credited to old charged off accounts.)

19. GWINN ASSOCIATION

The club is maintained through the financial assistance of the Cleveland-Cliffs Iron Company, the Cliffs Power and Light Company and rental received from the local Board of Education and membership fees from residents of the community.

The average monthly membership was 264, a decrease of 19 over last year; 208 members were employed at the different mines, the remainder were employed elsewhere or held complimentary memberships.

Activities in the building were on a par with last year but were below pre-war periods. Indoor activities included: Bowling leagues for men and women, card playing facilities, a library and reading room, a recreation room with pool, billiard and table tennis tables and other miscellaneous games. Rooms are provided for meetings, socials and Red Cross activities. The gymnasium is fully equipped for class work or recreation, such as, basketball, volleyball, handball, badminton, boxing, wrestling, and is used for dancing. Separate showers and locker rooms are provided for men and women.

Total number of meetings of a business, social, educational or recreational nature for the year was 360; of this number 5 were annual events, Church organizations used the building on 129 occasions, scout troops held 41 meetings, 17 dances were held, 44 meetings by Red Cross groups, federal

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19. GWINN ASSOCIATION (Cont.)

agencies, safety classes, women's organizations, men's Town Club, rehearsals for plays, band and orchestra groups and other events totalled 130. Equipment in club kitchen was used on 93 occasions and equipment loaned for outside events 40 times.

The gymnasium was used 407 periods for supervised class work or recreational activities by high school students and adults. There were 124 scheduled basketball games, including leagues for boys and girls.

Outdoor activities were limited to softball, hardball, touch football and horseshoe pitching. Equipment was furnishedto boys and girls in the different locations to cover the above. The estimated attendance, including participants for all outdoor activities and Bass Lake Camp was 9,100.

During the year equipment and supplies were purchased to keep all departments functioning properly and the usual attention was given to the building to keep it in good repair. Special attention was given to the roof and new type backboards for basketball were installed in the gymnasium. New window shades were placed in the community meeting room, bowling alleys refinished and the gymnasium floor given a coat of sea-o-san.

The building and it's employees were always at the disposal of any project or campaign in the war effort.

Gwinn Hotel

On December 31, 1944 the Gwinn Hotel block, located on Lots 5, 6, 7, and 8 of Block 5, was sold to E. L. Miller, Gwinn, Michigan.

Store Building

Occupied during 1944 by the Red Owl Stores, Inc. Rental received per month, $42.00. This store room is located in Hotel block.

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1. GENERAL

Production from the Princeton Mine for 1944 amounted to 216,512 tons of Cambridge ore. This tonnage was 10,673 tons less than the 1943 product but the 1944 output was accomplished with a reduction of $.073 per ton in the cost of production as against 1943.

The average number of men employed was 11 less than in the previous year, the product per man per day showing an increase in 1944 of 0.3 tons.

The general underground situation improved during the year from the standpoint of a consistent production. An intense mining of the stoping area of the No. 2 orebody from the 7th Level during the first quarter of the year had resulted in early exhaustion of that productive section leaving scattered contracts mining at or immediately above 6th Level elevation in the No. 3 orebody. The meager chute and loading slide storage capacity of the mining contracts, coupled with the necessity of handling all timber, machinery and supplies several times from the bottom of the No. 3 Shaft at 6th Level to the heart of the mine on the 7th Level, placed an over-load congestion on the underground haulage system. The immediate objective became the development of the No. 3 orebody from the 7th Level and this was accomplished to a considerable extent with ore production maintained for current cost purposes.

Mining in the immediate future will be centered mainly in the No. 3 so-called plastic ore body. A 7th Level main haulage drift in the arkose footwall has provided access to mining areas for six contracts. An average of nine contracts can be kept in ore production under the present labor situation with an additional three or four crews developing in advance of mining. Much development work and subsequent cross-cut maintenance is necessary in a flat lying thin orebody such as the Princeton as compared to a steep massive orebody.

The choice of mining methods employed at this property, open stoping or top slicing with local variations, is determined by the nature of the hangingwall. If the hangingwall stays in place the stoping method is used, regardless of the physical characteristics of the ore. A caving hangingwall, however, demands a mining method offering protection to the miners from this sloughing hazard. The jasper hanging in the No. 3 orebody possesses the latter characteristics, necessitating much timber support. In addition to this mining demand for timber, the main haulage ways in the arkose footwall require exceptionally close timbering because of the extremely slabby nature of this type rock.

It is apparent then that with the bulk of future mining to be done in the No. 3 area the problem of timely handling of timber and other supplies in greater quantity than heretofore at the property is of prime importance to economical operation. A direct connection from the No. 3 Supply Shaft to the 7th Level mining area would ease this situation greatly. Much additional benefit would result from this connection through the release of several timber handlers for other needed work and furthermore, the repair of underground equipment would be speeded up by the direct routing of spare parts.

A severe development retardent had been the technical difficulties attendant to raising in the plastic ore with a resultant dearth of volunteer raise miners. The use of a pneumatic clay spade has alleviated to a great extent the ore removal problem and this phase of production is no longer critical.

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No. 3 plastic ore, when dry, handles beautifully. The same ore with the addition of drainage water is comparatively costly to put on the stockpiles. In the mining place the timber supports are forced down into the water softened floor making difficult and frequently impossible the landing of stull timber, and passage of scraper. The sinking of the legs of a timber set is also present in the wet ore cross-cuts which results in high maintenance costs. After blasting, the gumbo-like ore sticks to the scraper, clogs the raise, sticks in the cars, blocks the shaft pocket and later must be blown out of the skip. Furthermore, when dry ore is handled by equipment immediately after its use for wet ore, the dry ore sticks to the moist surfaces like flour to a wet spoon.

A reduction in the amount of drainage water seeping into the orebody would eliminate much of this difficulty and have a benefit far in excess of the reduction in underground pumping costs. Investigations on surface by means of analine dye tracers, test-pitting and churn-drill holes indicated that a strong possibility exists of checking the inflow of a considerable portion of the drainage before it enters the caved area overlying the No. 3 orebody. Prior to freezing weather, three pneumatic pumps were handling a total volume of approximately 45 gallons per minute from the 9" drill holes in this area. A week of continuous pumping lowered the water in the area surrounding the holes and the inflow decreased to approximately 15 gallons per minute. Observation of the holes showed that the water was being carried by a sandstone seam 12-14 feet below surface. The perforation of this seam was limited to the circumference of the 9" holes which, of course, limited the amount of water inflow available to the pumps. A ditch to cut the entire length of this seam in front of the caved area was planned and work started using a bull dozer rented from another C.C.I. Co. property.

This project was halted by the necessity of placing the tractor and bull dozing unit on the stockpile prior to freezing weather to pare down the pile for required stocking space. Onslaught of winter weather, with accompanying snow and removal problems, called for the return of the borrowed tractor. The small 30 H.P. Princeton unit is useless for any project involving the moving of ore or earth. A scraper and hoist was rigged up on the ditching job but little headway was made because of the lack of surface labor to man the equipment.

It is altogether too apparent that the present water drainage to the No. 3 orebody will, if unchecked, jeapordize the economic status of future mining of that area.

The skip factor at the property continued at 2.7 tons through the first part of the year and was raised to 2.95 on June 1st. A further increase was made on July 1st. putting the factor at 3.1 tons per skip which has been maintained since. It had been evident upon resumption of production in 1943, that much difficulty would be encountered in the removal of ore from the skip. Heavy chains were welded at one end inside the skip bottom on the theory that the weight of the chains would cause them to fall when the skip was up-ended in the dump, thereby forcing the ore to drop out also. The stickiness of the damp ore, however, was stronger than the action of the chains, which then became imbedded in the ore at the bottom of the skip. Continued dumping built up the inside of the skip resulting in a constant quantity of ore being carried up and down. Towards the end of a hoisting shift much over-flow from the underground pockets to the shaft bottom resulted because of the reduced skip capacity.

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A remedial measure consisted of stationing a man at the skip dump platform to clean out the skip with a compressed air blow pipe. The benefits of this action have been two fold, a full utilization of the capacity of the skips with subsequent less over-flow ore to be removed daily from the skip pit.

Present so-called skip pit facilities are inadequate consisting solely of an inclined slide across the skipways immediately below the skip loading position. A chute opens into the ladder road where a bucket is used to hoist the pocket overflow to the 7th Level dumping pocket. These methods employ four men up to a half shift of every operating day to maintain clearance for the skip in the loading position. Under present conditions it is not possible to clear the debris from the remainder of the shaft depth to the former 8th Level skip pit.

2. PRODUCTION, SHIPMENTS & INVENTORIES

a. Production by Grades

	PRINCETON		SEC. 19 LEASE		TOTAL	
	1944	1943	1944	1943	1944	1943
Princeport,		3,323		381		3,704
Cambridge,	195,007	196,077	21,507	27,404	216,512	223,481
Total,	195,007	199,400	21,507	27,785	216,512	227,185

b. Shipments

	1944	1943	Decrease	Increase	Total Increase
Princeport,		9,799	9,799		
Cambridge,	192,658	155,934		36,724	
Total,	192,658	165,733	9,799	36,724	26,925

c. Stockpile Inventories

	1944	1943	
Cambridge Sec. 19,	19,117	18,441	Tons
" " 20,	136,045	112,867	"
Total,	155,162	131,308	Tons

e. Production by months

	Sec. 19		Sec. 20		
	Princeport	Cambridge	Princeport	Cambridge	Total
January,	-	2,232	-	15,522	17,754
February,	-	2,085	-	19,534	21,619
March,	-	2,352	-	18,859	21,211
April,	-	2,473	-	13,639	16,112
May,	-	1,307	-	15,201	16,508
June,	-	1,384	-	17,464	18,848
July,	-	1,082	-	15,098	16,180
August,	-	1,533	-	15,862	17,395

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2. PRODUCTION, SHIPMENTS & INVENTORIES (Cont.)

e. Production by months (Cont.)

	Sec. 19		Sec. 20		
	Princeport	Cambridge	Princeport	Cambridge	Total
September,	-	2,548	-	13,189	15,737
October,	-	1,524	-	16,220	17,744
November,	-	1,581	-	18,628	20,209
December,	-	1,406	-	15,789	17,195
Total,	-	21,507	-	195,005	216,512

f. Ore Statement

	Sec. 19		Sec. 20		
	Princeport	Cambridge	Princeport	Cambridge	Total
On hand Jan. 1, 1944,	-	18,441	-	112,867	131,308
Output for year,	-	21,507	-	195,005	216,512
Transfers,	-	20,831	-	20,831	-
Overrun,	-	-	-	-	-
Total,	-	19,117	-	328,703	347,820
Shipments,	-	-	-	192,658	192,658
Balance on hand Dec. 31, 1944,	-	19,117	-	136,045	155,162

1944 - 2-8 hr. shifts, 6 days per week to July 1st.
- 2-8 hr. " , 5 Days " " from July 1st. to end of year.

3. ANALYSIS

a. Stockpile Analysis

Grade	Tons		Iron	Phos.	Sil.	Mang.	Al.	Lime	Mag.	Sul.	Loss	Moist.
Cambridge	155,162	Dry	60.41	.816	3.88	1.00	1.14	4.01	.55	.020	1.88	
		Natl.	51.36	.694	3.29	0.85	.97	3.41	.47	.017	1.70	14.97

The total tonnage in stock consists of 136,045 tons of Cambridge, and 19,117 tons of Cambridge Section 19 ore.

b. Average Analysis - 1944 Shipments

Grade	Tons	Iron	Phos.	Sil.	Mang.	Al.	Lime	Mag.	Sul.	Loss
		60.30	.870	3.90	1.00	1.14	4.01	.55	.020	1.18

4. ESTIMATE OF ORE RESERVES

a. Developed Ore

Assumption: 12 cu. ft. equals 1 ton
10% deducted for rock
10% deducted for loss in mining

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4. ESTIMATE OF ORE RESERVES (Cont.)

a. Developed Ore (Cont.)

Princeport Sec.20	Cambridge Section 20 No. 2 Shaft - No. 3 Shaft		Cambridge Sec. 20 Total	Cambridge Sec. 19	Total
22,552	201,037	632,165	833,202	39,929	895,683

This total tonnage includes 147,567 net estimated tonnage below 7th Level elevation at Nos. 2 and 3 Shafts.

c. Estimated Analysis

Grade	Trade Name	Tons	Iron	Phos.	Sil.	Mang.	Alum	Lime	Mag.	Sul.	Loss	Moist.
Non-Bessemer	Princeport	22,552	50.60	.256	6.57	1.032	.429	1.37	.88	.020	1.90	15.00
Non-Bessemer	Cambridge	873,131	51.36	.694	3.29	.85	.97	3.41	.67	.017	1.70	14.97

d. Estimated Tonnage as Required by State Tax Commission

	Princeport Sec. 20	Cambridge Sec. 20 #2Shaft	- #3 Shaft	Cambridge Sec. 20 Total	Cambridge Sec. 19	Total Tons
Above 5th Level (1921 est.) No. 2 Shaft,	27,842	147,944		147,944		175,786
Above 6th Level,		9,604	104,184	113,788	5,837	119,625
Between 6th & 7th Levels,		84,385	519,838	604,223	45,194	649,417
Below 7th Level,		17,596	164,587	182,183		182,183
Total Gross Nov. 30, 1944,	27,842	259,529	788,609	1,048,138	51,031	1,127,011
Less December Production,	-	9,181	6,608	15,789	1,406	17,195
Total Gross Dec. 31, 1944,	27,842	230,348	782,001	1,032,349	49,625	1,109,816
Less 10% for Rock,	2,784	25,953	78,861	104,814	5,103	112,701
	25,058	224,395	703,140	927,535	44,522	997,115
Less 10% for Mining Loss,	2,506	23,358	70,975	94,333	4,595	101,432
Net Total Dec. 31, 1944,	22,552	201,037	632,165	833,202	39,929	895,683

5. LABOR & WAGES

b. Comparative Statement of Wages and Product

	1944	1943	Increase	Decrease
PRODUCT	216,512	227,185		10,673
Number of Shifts & Hours,	5 2-8 hr.	5 2-8 hr.		
(To 7/1/45),	1 1-8 hr.	1 1-8 hr.		
AVG. NUMBER OF MEN WORKING				
Surface,	43	43		
Underground,	118½	129½		11
Total,	161½	172½		11

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5. LABOR & WAGES (Cont.)

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

	1944	1943	Increase	Decrease
AVG. WAGES PER DAY				
Surface,	6.90	7.16		.26
Underground,	8.18	8.15	.03	
Total,	7.81	7.89		.08
AVG. WAGES PER MONTH OF 24 DAYS				
Surface,	165.60	171.84		6.24
Underground,	196.32	195.60	.72	
Total,	187.44	189.36		1.92
PRODUCT PER MAN PER DAY				
Surface,	18.25	17.69	.56	
Underground,	6.68	6.20	.48	
Total,	4.89	4.59	.30	
LABOR COST PER TON				
Surface,	.378	.405		.027
Underground,	1.225	1.315		.090
Total,	1.603	1.720		.117
AVG. PRODUCT MINING				
Stoping,	158,633	202,526		43,893
Ore Development,	57,879	24,659	33,220	
Total,	216,512	227,185		10,673
AVG. WAGES CONTRACT LABOR	8.97	8.56	.41	
TOTAL NUMBER OF DAYS				
Surface,	11,866¾	12,837¾		971
Underground,	32,408¾	36,641		4,232¼
Total,	44,275½	49,478¾		5,203¼
AMOUNT FOR LABOR				
Surface,	81,916.01	92,045.16		10,129.15
Underground,	265,176.35	298,707.27		33,530.92
Total,	347,092.36	390,752.43		43,660.07

PROPORTION OF SURFACE TO UNDERGROUND MEN
1944 - 1 to 2.75 - 2-8 hr. shifts
1943 - 1 to 3.01 - 2-8 hr. shifts

AVG. WAGES PER MO. BASED ON MEN CARRIED ON MINE PAYROLL				
Surface,	165.60	171.84		6.24
Underground,	196.32	195.60	.72	
Total,	187.44	189.36		1.92

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5. LABOR & WAGES (Cont.)

LABOR

The present labor shortage, occasioned by the drafting of younger men into the armed services, has made operation a problem of constantly shifting men to the most pressing job at hand. Insufficient help is manifested most strongly in the development phase inasmuch as each sub-level opened up is actually, in the initial stage of mining, an exploration to determine the position of the foot and hangingwalls. The extent of the ore at any level is determined by drifting only, for the shallow dip of the ore body makes the extraction operation practically contour mining. To determine well in advance the position of the ore would call for much more development gangs than can be spared from production.

As is the case with other properties on the Marquette range the tramming crews, usually composed of younger men, are constantly changing in personnel. Very frequently it is necessary to man the haulage units with miners drawn from the less productive areas.

6. SURFACE

a. Buildings, Repairs

Throughout the year work was carried on to bring the surface buildings into an efficient state. The press of getting the mine into production had precluded the completion of many tasks necessary to impart a neat appearance to the property, so whenever labor and weather permitted the sprucing program was revived.

Much improvement was made in the disposition of timber at the grounds adjacent to the No. 3 Shaft. A jammer was erected and the piles sorted over to make the timber accessible for use in the order in which it was received. Unfortunately, however, this re-organization of the timber field was late for a high percentage of timber which had lain too long and which of course had to be scrapped in the interests of underground safety. The timber scrapped was charged out as encountered and accounts partly for the increase of $0.016 per ton timber cost in 1944 over that of the previous year.

b. Stockpiles

On the premise that ore production at the property will exceed ore shipments each year by approximately 50,000 tons, the stocking question calls for complete utilization of available stocking space.

To this end, the crest of the northwest pile was levelled off last fall to fill in the valley adjacent to the parallel northeast pile. In addition to providing extra stocking space, the loading shovel will be provided with a constant heavy cut as compared to the light, heavy, light cut on the ordinary triangular cross-section stockpile. Loading costs should be smaller with the solid section.

c. Trestles

One new trestle was erected southwest of the No. 2 Shaft extending through the site of the old Princeton mine stockpile which was loaded out this past season. A second trestle to the south will be necessary early in 1945.

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6. SURFACE (Cont.)

c. Trestles (Cont.)

It will be decidedly advantageous to the stocking phase of the property to take out a rock outcrop in the center of the south stocking grounds as soon as practicable this spring. This will provide space for one additional trestle when needed in the summer of 1945.

7. UNDERGROUND

Mining at the property consists of operations in two ore bodies distinct as to placement and also by the physical characteristics of the ore. Reference will be made in this report to the Nos. 2 and 3 separately and in that order.

No. 2 Shaft

The status of the No. 2 orebody as of the end of the years was one of meager activity. Lying northwest and southeast the flatly dipping orebody extends approximately 25 feet below the 7th Level elevation at the southeast tip and pinches out like a knife blade along the incline to the northwest.

Plastic ore was present in the north end with a hangingwall of rotten jasper necessitating top slicing extraction methods. Towards the southeast the ore changed to a rubbly type having a much stronger jasper hanging permitting the bulk of the ore to be mined by open stoping.

Two top slicing contracts were engaged the greater part of 1944 in the plastic ore. Their work was greatly hampered by water seepage which made handling of the ore extremely difficult. One contract only was working there in December and will continue the mining of the scattered thin ore pillars remaining. Towards the south an average of four stoping contracts produced the bulk of the 1944 production which brought mining down to within 10' above the timber of the 7th Level haulage ways.

A cross-cut was driven along the west ore boundary at 7th Level elevation following the jasper contact to the north of the 7100 cross-cut. The convergence of the foot and hanging, in outline like a flat knife blade, was picked up and two consecutive top timber drifts were extended from the cross-cut to provide a means of recovering the small amounts of ore remaining adjacent to the east. The southeast tip of the orebody has been developed for stoping and may provide a working place for a single contract for several months.

No. 2 Shaft

860' Sub-level

Section 19

Mining by the top slicing method at the 6th Level elevation from Raises No. 7401 and 7502 made possible the recovery of an ore pillar on this sub-level.

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7. UNDERGROUND (Cont.)

No. 2 Shaft (Cont.)

Section 20

A small stope at the extreme southeast tip of the No. 2 orebody was mined at top timber elevation from the 6th Level and extended northeast with the back of the stope at +870.

6th Level

Section 19

One top slicing contract was active on 6th Level during the year but mining in this soft plastic ore was hampered to a serious extent by excessive water drainage.

Section 20

A portion of the ore pillar supporting the single timber transfer raise in this area was mined at the jasper hangingwall contact by stoping methods from a transfer drift driven on the 825' sub-level from Raise #722. The recovery of another portion of the same pillar against the footwall was attempted from the 6th Level but ground movement forced the abandonment of this project.

At the 6th Level elevation small amounts of ore were recovered by stoping in the southeast portion of the orebody by a transfer drift from Raise #700 on the 825' sub-level, and also by driving a small drift down-grade from 6th Level elevation to a convergence of the foot and hanging walls.

835' Sub-level

Section 19

Raise #726 was cut out in the arkose footwall and a mining drift driven 130' southwest to the jasper hangingwall. Arkose was encountered in the floor of this drift and lean ore in jasper along the right rib. Two slices were mined to the east, but excessive amounts of rock to be removed precluded further mining from the raise in this locality. A marked flattening of the arkose footwall indicated a rapid pinching out of the north section of the No. 2 orebody. This indication was substantiated later in the year by the results of mining from Raises No. 7502 and 7401, wherein the arkose was found in the floor of the mining slices.

With the exception of the supporting ore pillar at timber transfer raise #721, practically all of the No. 2 orebody was mined out in this sub-level. The bulk of the ore was recovered by open stope methods.

825' Sub-level

Section 19

As mentioned above, the ore at the No. 2 Shaft recedes rapidly to the southwest. Stoping on this sub-level completed mining in this orebody with

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7. UNDERGROUND (Cont.)

No. 2 Shaft (Cont.)

825' Sub-level, Sec. 19

the exception of a small area at the extreme southwest portion. The arkose footwall has shown a fairly constant shallow dip but extreme irregularities in the dip of the hangingwall has, in many places, actually accounted for a pinching bulk of the ore. The ore outline of the 825' sub-level is an indication of these irregularities.

800' Sub-level

Section 19

Two test raises, one from the 7500 cross-cut and a second from the 7300 cross-cut to this sub-level, revealed that because of the flattening of the footwall no ore extends below the 825' sub-level in Section 19.

Section 20

The bulk of the mining at this sub-level was done by stoping from raises driven from the 7100 cross-cut and the main footwall drift southeast towards No. 3 Shaft. In December a top timber transfer drift was driven on this elevation from a northwest extension of the 7100 cross-cut along the jasper contact on the 6th Level. Small amounts of ore lying in the trough formed by the junction of the foot and hanging walls are expected to be recovered from this transfer above the cross-cut.

As mentioned previously, a small pillar of ore has been developed at the southeast end of the orebody by small sized drifts on this elevation. It is expected, however, that this pillar will be mined in the first quarter of the coming year.

785' Sub-level

Section 20

By means of raises from the 7100 cross-cut the ore to the south of the cross-cut was mined by open stoping. In the small area to the north of the cross-cut the sloughing nature of the hangingwall necessitated top slicing methods of recovery.

7th Level

Section 19 & 20

The 7500 cross-cut was advanced 45' to the southwest and an exploration raise put up to the 825' sub-level, but no ore was found. The same exploration procedure was repeated at the 7300 cross-cut with similar negative results, the reason being, as explained previously, an unforseen flattening of the footwall pinched out the northwest extension of the No. 2 orebody. The 7100 cross-cut was extended for a distance of approximately 250' to the northwest following the jasper contact to the convergence of the foot and hanging walls.

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7. UNDERGROUND (Cont.)

No. 3 Shaft

The bulk of future mining at the property will be done in this area and poses a problem in development from the questions of hangingwall location and water control.

Roughly, the outline of the ore at 6th Level elevation is that of a quarter moon opening northwest, the outside of the moon being the arkose footwall and the inside of the horns filled with jasper hangingwall. This outline continues 85 feet to the 7th Level at a dip of approximately 20°, with the horns of the moon closing in. This 7th Level outline was deduced from vertical diamond drill holes from surface and slope indications from higher levels. A cross-cut on 7th Level through the center of the ore outline substantiated the predicted outline very accurately on encountering the ore and the jasper core. Much drainage water was present at the junction of this cross-cut and jasper core, and inasmuch as development of the south end of the ore body was more pressing, no further advance was made to penetrate the jasper core and reach the ore in the southwest horn.

Later D.D. hole No. 9 was drilled southwest from the 7700 cross-cut, 200 feet to the north of the one mentioned above, and no jasper was found in drilling through to the immediate vicinity of surface D.D. hole No. 24. Apparently the inside core or jasper hangingwall levels off at 7th Level elevation. It is not improbable that the jasper follows the drill hole one foot higher in elevation.

To the south the jasper hangingwall has proven extremely irregular in local rolling but does follow the "core" outline generally. In this area the throw of the ore from the 6th Level northwards down 85' to the 7th Level is approximately 160'. Mining in this south tip extended to within two sub-levels of the 6th Level elevation. Drainage water had forced abandonment of mining because of "mud" runs, consequent timber support failures, and difficulties in handling the soupy material. To reach this same area from the 7th Level would be costly if individual raises were to be brought up from a cross-cut in the arkose. The orebody near the 6th Level is only 25' thick, gradually widening to 60' at D.D. hole No. 24. The productive life of a raise traversing 85' from level to level would be two sub-levels of mining. Should the water drainage feature persist the productive life would not warrant the expense of putting up the raise.

It may prove feasible to establish top timber scraping transfers into the footwall with raises from this point to the ore with feeder scraper drifts driven on the incline following the footwall. This latter method is predicated on a dry mine. Should surface pumping fail to ease the water drainage, economical mining of this south tip in addition to three other areas in the No. 3 orebody will be problematical.

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7. UNDERGROUND (Cont.)

No. 3 Shaft (Cont.)

910 & 900' Sub-levels

Attempts were made at mining from Raise #622 on these sub-levels but a heavy saturation of the ore by drainage water produced a material of mud-like consistency that made further mining an impossibility.

885' Sub-level

Top slicing was continued in a small area at the north end of the orebody from Raise Nos. 6311 and 6352.

875' Sub-level

Raise #708B, at the north end of the orebody, was cut out at the +874 elevation and a mining drift driven 55' south to pick up Raise #709 which had been completed from the 7th Level to this height. The drift was completed to Raise #709 but the work of cutting out around the latter raise was unsuccessful due to water drainage conditions that forced the timber supports down into the softened ore pillar.

Raise #6331: Top slicing from this raise completed the mining of ore at this elevation in the area bounded by a thick center dike to the north and the arkose and jasper to the east and west respectively.

6th Level

Timber transfer raise #701 was completed to the 6th Level elevation in May of this year providing closer access to the 7th Level mining area for supply purposes, and ore pillar at the former timber transfer raise #721 for mining.

Raise #708A: A small area was mined by top slicing methods from this raise at the north end of the orebody.

Raise #711 was completed from the 7th Level to this elevation and mining by the top slicing methods started.

Raise #7901 was brought up from the 7th Level and a small drift connection made to the 6th Level hangingwall drift. Two short exploratory drifts to the north and south from the top of this raise encountered dike and jasper respectively.

835' Sub-level

From Raises #708 and #709 two top slicing contracts completed mining of the ore area served by these raises in the north end of the orebody.

825' Sub-level

From Raise #7801 the ore area to the north and east was mined by top slicing methods to a mining limit set up to provide a supporting pillar for timber transfer raise #701. A traveling and ventilation drift was completed

7. UNDERGROUND (Cont.)

No. 3 Shaft (Cont.)

825' Sub-level (Cont.)

from Raise #7801 to Raise #708, and from the latter raise a transfer drift was driven east to the arkose footwall. From the mining drift a series of short mining slices will be driven to determine the efficacy of the sub-level caving methods of mining in the Princeton No. 3 orebody.

7th Level

Development of the 7th Level for purposes of mining the No. 3 orebody below 6th Level elevation was started this year and considerable progress achieved. Approximately 900' of main level drift in the arkose footwall was accomplished. In addition, 200' of cross-cutting in the footwall was made and 365' of ore cross-cuts completed. Raise development from the 7th Level main haulage drift and cross-cuts consisted of eight raises completed, one being a timber transfer raise, but which will service in the future as a mining raise. Two additional raises were started but were halted short of completion by heavy water drainage making further progress impossible. In the barren area between the Nos. 2 and 3 orebodies, site for a new powder magazine was cut out in the arkose footwall from the 7th Level.

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7. UNDERGROUND (Cont.)

d. Timbering

KIND	LINEAL FT.	AVG. PRICE PER FT.	AMOUNT 1944	AMOUNT 1943
6" x 8" Cribbing Timber	53,073	.0509	$ 2,703.03	$ 2,032.40
8" x 10" Stull "	8,430	.0954	804.46	1,774.95
10" x 12" " "	33,723	.1273	4,294.79	4,363.79
12" x 14" " "	24,395	.1725	4,209.95	3,562.97
14" & Up " "	4,271	.2136	912.39	228.66
Total Timber 1944,	123,892	.1043	$12,924.62	
Total Timber 1943,	131,044	.0913	11,962.77	$11,962.77
		Per 100 Ft.		
7 ' Lagging	576,408	1.3568	7,821.23	6,262.59
9½' Poles	383,741	2.0548	7,885.30	8,100.55
Total 1944,	960,149		$15,706.53	
Total 1943,	1,093,121			$14,363.14
Wire Fencing - Sq. Ft.	-	-	-	82.82
GRAND TOTAL 1944,			$28,631.15	
GRAND TOTAL 1943,				$26,408.73

Product - Tons	216,512	227,185
Feet of timber per ton of ore - Stull & Cribbing	.5722	.5768
" " stull timber only per ton of ore	.3271	.3646
" " lagging per ton of ore	2.6622	2.6936
" " poles " " " "	1.7723	2.1179
" " wire fencing per ton of ore	-	.0036
" " lagging per foot of timber	4.6525	4.6697
" " poles " " " "	3.0973	3.6718
Cost per ton for timber	.0597	.0526
" " " " lagging	.0361	.0275
" " " " wire fencing	-	.0004
" " " " poles	.0364	.0356
" " " " all timber	.1322	.1158
Equivalent of stull timber to board measure	307,761	292,792
Feet of board measure per ton of ore	1.4214	1.2887

Total cost for Timber, Lagging, Poles, etc:

Year	Amount	Cost per Ton
1944	$28,631.15	.1322
1943	26,408.73	.1162

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7. UNDERGROUND (Cont.)

e. Drifting & Raising

The following table lists the development footages:

	Drifting		Raising		
	Ore	Rock	Ore	Rock	Total
1944	5010½'	1627'	867'	333'	7837½'
1943	2287 '	1683'	563'	460'	4993 '
1942	312'	136'	46'	101'	595 '

The major part of the development footages was done at the No. 3 Shaft ore body.

f. Explosives, Drilling and Blasting

Explosive Statement - Year 1944 - Stoping, Slicing & Ore Development

Kind	Quantity Pounds	Average Price	Amount 1944	Amount 1943
1 1/8" 45% Gelax #2	78,563	11.50	$ 9,034.74	$ 9,713.35
1 1/4" 60% Special Gelax				365.70
2x16 40% " "	400	10.50	42.00	
Total Powder - 1944	78,963	11.50	$ 9,076.74	
Total Powder - 1943				$ 10,079.05
Fuse - M. Feet	337,205	5.12	1,727.87	2,026.91
No. 6 Blasting Caps - M. Feet	49,207	12.20	600.29	644.50
Electric Blasting Caps - C	51	10.98	.56	16.02
Powder Bags - large	17	3.45	58.65	50.26
" " - small	5	1.40	7.00	35.91
Tamping Bags - M.	6,668	1.65	11.00	13.75
Fuse Lighters - M.	9,834	6.75	66.40	31.17
#14 Duplex Blasting Wire - M. Feet				8.10
#14 Con. Wire - M.	120	8.41	1.01	
Master Fuse Lighters - M.				.12
Miscellaneous			53.79	36.39
Total Fuse, Caps, etc. 1944			$ 2,526.57	
" " " " 1943				$ 2,863.13
Total All Explosives - 1944			$ 11,603.31	$
" " " - 1943				12,942.18
Product - Tons			216,512	227,185
Pounds Powder Per Ton of Ore			.3647	.3856
Cost Per Ton For Powder			.0419	.0443
Cost Per Ton For Fuse, Caps, etc.			.0116	.0126
Cost Per Ton For Explosives			.0535	.0569

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7. UNDERGROUND (Cont.)

f. Explosives, Drilling and Blasting (Cont.)

	Quantity Pounds	Average Price	Amount 1944	Amount 1943
Rock Development & Filling				
1 11/8" 45% Gelax #2	12,012	11.50	$ 1,381.39	$ 418.49
1 11/4" 60% Special Gelax	7,049	11.50	810.63	907.49
1 11/4" 80% " "				280.00
Total Powder - 1944	19,061	11.50	$ 2,192.02	$
Total Powder - 1943				1,605.49
Fuse - M. Feet	60,423	5.12	309.43	406.72
No. 6 Blasting Caps - M.	8,789	12.20	107.22	127.00
Electric Blasting Caps - C.	68	10.61	7.22	59.85
Powder Bags - large	3	3.45	10.35	13.80
" " - small	3	1.40	4.20	4.17
Tamping Bags, - M.	3,333	1.65	5.50	2.75
Fuse Lighters - M.	3,500	6.75	23.63	24.03
Master Fuse Lighters - M.	48	18.95	.91	
Miscellaneous			41.10	10.43
Total Fuse, Caps, etc. - 1944			$ 509.56	$
" " " " - 1943				648.75
Total All Explosives - 1944			2,701.58	
" " " - 1943				2,254.24
Total Explosives Used At Mine - 1944			$ 14,304.89	$ 15,196.42
" " " " - 1943				15,196.42

i. Ventilation

In April a Buffalo Turbo Conoidal fan obtained from the Cambria-Jackson property was installed in the Princeton Mine. The location of the fan is midway between Nos. 2 & 1 Shafts on the 7th Level.

The proposed system of ventilation was to use the No. 1 Shaft as the fresh air supply and Nos. 2 & 3 for exhaust because of the icing conditions present during the winter months. No control of the water was possible during the year in this shaft, but if the shaft was maintained at exhaust air temperature no ice could form. To this end, numerous ventilation control doors were established to block off No. 2 Shaft and force the bulk of the exhaust up through No. 3 bottomed at 6th Level. This plan did not materialize according to supposition and No. 3 Shaft required much thawing and ice chopping work throughout the entire winter.

Because of difference in elevation the stack effect of No. 2 Shaft plus the extremely low velocity and quantity factor of the fan air stream as it worked its way towards No. 3 Shaft, no upcast could be maintained when atmospheric temperature dropped below mine temperatures.

As a positive source of fresh air the No. 1 Shaft is a poor risk. At no time after the re-opening was the shaft open to the 6th Level elevation, but instead was broken into an adjoining stope from which in turn three raises connected downwards for air routing to the 6th Level. Additional fresh air

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7. UNDERGROUND (Cont.)

i. Ventilation (Cont.)

filtered into inter-connected stopes which apparently feed into the stope adjacent to the shaft. Future caving may enhance the fresh air supply or quite possibly may block it. No control of the caving is possible.

During the winter months, the critical period, it was apparent that despite the blocking off of every unused raise, the bulk of the moving air in the mine was recirculating through old stopes above present working elevation and back into the air stream from the No. 1 Shaft side.

Further work towards improvement of the present ventilation system is contemplated for the coming year with particular emphasis on the No. 3 Shaft.

k. Pumping

Much has been said throughout the year relative to pumping and water drainage at the property. From a cost standpoint the amount of underground drainage water pumped is negligible. The concern is due entirely to the detrimental effects of the drainage water on the physical nature of the ore. As mentioned previously, investigation as to the source and nature of the drainage water was carried on throughout the summer months of 1944.

A comparison of the quantities pumped in 1944 with those of 1943 and the 1944 monthly pumping costs is given below:

	Avg. Gallons Per Min. 1944	Total Cost From Cost Sheet 1944	Avg. Gals. 1943
January,	209	$ 821.50	*
February,	195	908.87	*
March,	176	924.87	187
April,	202	921.59	249
May,	208	891.99	298
June,	224	1,027.29	296
July,	199	927.90	311
August,	211	921.90	277
September,	198	1,155.04	256
October,	187	2,068.72	224
November,	200	1,269.42	203
December,	187	1,534.10	207
Avg. for Year,	198	$ 1,114.43	251

* No records kept prior to March 1943.

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8. COST OF OPERATING

a. Mining Costs

	1944	1943	Increase	Decrease
Product	216,512	227,185		10,673
Underground Costs	1.811	1.851		.040
Surface Costs	.300	.343		.043
General Mine Accounts	.337	.327	.010	
Cost of Production	2.448	2.521		.073
Depreciation - Plant Account	.050	.028	.022	
Depreciation - Development	.001		.001	
Taxes	.039	.038	.001	
Cost on Stockpile	.090	.066	.024	
Loading and Shipping	.097	.089	.008	
TOTAL COST ON CARS	2.635	2.676		.041
Number of Days Operating	283	308		.25
Number of Shifts and Hours	2-8 hr.	2-8 hr.		
Average Daily Product	765	738	27	

Cost of Production

Labor	1.682	1.765		.083
Supplies	.766	.756	.010	
Total	2.448	2.521		.073

b. Detailed Cost

Days per week	5 & 5½	5 & 6		
Shifts and Hours	2-8 hr.	2-8 hr.		
Production	216,512	227,185		10,673
Avg. Daily Product	765	738	27	
Number of Days Worked	283	308		25

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YEAR 1944

8. COST OF OPERATING (Cont.)

b. Detailed Cost (Cont.)

UNDERGROUND COSTS	1944 Amount	1944 Per Ton	1943 Amount	1943 Per Ton	Increase Amount	Increase Per Ton	Decrease Amount	Decrease Per Ton
Exploring in Mine	5329.80	.025	1649.32	.007	3680.48	.018		
Sinking in Shaft	2686.09	.012			2686.09	.012		
Development in Rock	31942.19	.148	33186.64	.146		.002	1244.45	
Development in Ore	56148.72	.259	27830.20	.122	28318.52	.137		
Stoping	80303.68	.371	121915.84	.537			41612.16	.166
Timbering	86069.89	.397	86795.32	.382		.015	725.43	
Tramming	59173.96	.273	77690.50	.343			18516.54	.070
Ventilation	1665.08	.008	1011.00	.004	654.08	.004		
Pumping	10114.86	.047	13258.14	.058			3143.28	.011
Compressors & Air Pipes	6044.95	.028	10322.18	.045			4277.23	.017
Underground Superintendence	12455.77	.058	12064.05	.053	391.72	.005		
Maint. - Compressors and Power Drills	448.34	.002	843.90	.004			395.56	.002
" - Scrapers & Mech. Loaders	18485.63	.085	16080.70	.072	2404.93	.013		
" - Elec. Tram Equip.	17919.25	.083	14814.88	.065	3104.37	.018		
" - Pumping Machinery	3258.42	.015	3040.64	.013	217.78	.002		
Total Underground Costs	392046.63	1.811	420503.31	1.851			28456.68	.040
SURFACE COSTS								
Hoisting	17412.70	.081	20049.21	.088			2636.51	.007
Stocking Ore	18699.90	.086	27437.98	.121			8738.08	.035
Dry House	6552.21	.030	7327.61	.032			775.40	.002
General Surface Expense	11624.82	.054	11203.93	.049	420.89	.005		
Maint. - Hoisting Equip.	4198.31	.019	3932.49	.017	265.82	.002		
" - Shaft	1781.60	.008	1976.89	.009			195.29	.001
" - Top Tram Equip.	2341.84	.011	3040.70	.013			698.86	.002
" - Docks, Tres., & Pockets	268.37	.001	1094.34	.005			825.97	.004
Mine Buildings	2172.36	.010	2075.11	.009	97.25	.001		
Total Surface Costs	65052.11	.300	78138.26	.343			13086.15	.043
GENERAL MINE EXPENSE								
Vacation Expense	6364.35	.029	5595.71	.025	768.64	.004		
Group Annuity Premium	752.86	.003			752.86	.003		
Insurance	1815.20	.008	1513.02	.007	302.18	.001		
Mining Engineering	3803.86	.018	2876.72	.013	927.14	.005		
Mech. & Elec. Engineering	712.46	.003	884.11	.004			171.65	.001
Analysis & Grading	8967.07	.041	12710.58	.056			3743.51	.015
Personal Injury	9220.56	..043	10897.15	.048			1676.59	.005
Safety Department	1005.73	.005	1513.35	.007			507.62	.002
Telephones & Safety Devices	2640.21	.012	3121.60	.014			481.39	.002
Local & General Welfare	1479.25	.007	1848.93	.008			369.68	.001
Spec. Exp. Pensions, Allow.	3654.69	.017	4164.82	.018			510.13	.001
Ishpeming Office	9475.12	.044	9346.85	.041	128.27	.003		
Social Security Taxes	8221.32	.038	8942.39	.039			721.07	.001
Mine Office	14888.42	.069	10735.57	.047	4152.85	.022		
Total Gen. Mine Expense	73001.10	.337	74150.80	.327		.010	1149.70	

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8. COST OF OPERATING (Cont.)

b. Detailed cost (Cont.)

	1944		1943		Increase		Decrease	
	Amount	Per Ton	Amount	Per Ton	Amount	Per Ton	Amount	Per Ton
COST OF PRODUCTION	530099.84	2.448	572792.37	2.521			42692.53	.073
Taxes	8411.02	.039	8588.91	.038		.001	177.89	
TOTAL COST	538510.86	2.487	581381.28	2.559			42870.42	.072
General Supplies	16888.50	.078	15397.04	.067	1491.46	.011		
Iron and Steel	5162.14	.024	5313.67	.023		.001	151.53	
Oil and Grease	1892.62	.009	1707.73	.007	184.89	.002		
Machinery Supplies	4659.57	.022	6233.23	.027			1573.66	.005
Explosives	14523.68	.067	15901.09	.070			1377.41	.003
Lumber and Timber	32727.17	.151	33076.27	.146		.005	349.10	
Fuel	3131.97	.014	3334 .72	.015			202.75	.001
Electric Power	32050.44	.148	34442.64	.152			2392.20	.004
Sundries	16751.98	.077	15877.97	.070	874.01	.007		
Other Mines and Accounts	488.33	.002	540.34	.002	52.01			
Supply Inventory Adj.	106.52	.001	34.82		71.70	.001		
TOTAL COST PER COST SHEET	127406.26	.589	130778.84	.575		.014	3372.58	
Comparative Supply Balance								
General Supplies	6610.48		3129.87		3480.61			
Iron and Steel	1644.07		2527.67				883.60	
Oil and Grease	620.62		326.32		294.30			
Machinery Supplies	1259.78		734.09		525.69			
Explosives	383.78		227.98		155.80			
Lumber and Timber	24299.99		14448.15		9851.84			
Fuel	1381.82		885.68		496.14			
Total	36200.54		22279.76		13920.78			

Im the above detailed cost comparison where the differences are slight in the 1944 and 1943 figures no explanations are offered. The fact that during 1943 the mine worked a straight 6 day week with overtime for the 6th day, as compared with the 5 day week for the greater part of 1944, has a definite weight in most of the slight differences.

The items Nos. 4 and 5, Development in Ore and Stoping respectively, are complimentary for the two years in question. The year 1944 contained much more development in ore work as compared to the previous year and with no additional labor available the stoping work of necessity was cut to provide development crews.

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9. EXPLORATION AND FUTURE EXPLANATION

Diamond drill holes Nos. 6 and 7 were drilled during the middle of the year from the end of the 7300 cross-cut in the 7th Level No. 2 Shaft area. Diamond drill hole No. 6 was drilled horizontally in a southwest direction for a distance of 215'. Diamond drill hole No. 7 was drilled practically due south, also horizontal, and was completed at a distance of 325'. These holes were drilled to determine the extent, if any, of the No. 2 orebody at 7th Level elevation. Arkose was encountered for the entire footage drilled by these holes, indicating that with the exception of a small area immediately southwest of the No. 2 Shaft the orebody pinched out between the 6th and 7th Levels. In the No. 3 ore area the 6th Level elevation Diamond Drill hole No. 8 was drilled due West horizontally from the hangingwall drift from a point approximately midway in the north-south extent of the orebody. Several jasper ceilings encountered in mining operations had offered the possibility of the presence of ore seams in the hangingwall and it was for this reason that the drilling of Diamond Drill hole No. 8 was undertaken. The results in this particular area, however, were negative and the drill hole was completed for a distance of 110' entirely in jasper.

Diamond drill hole No. 9 was drilled from the 7700 cross-cut horizontally on the course of 7.24° West. The assumed outline of the No. 3 orebody at 7th Level elevation was one having the shape of two wings with a core of jasper between. The intent of the drilling was to determine the thickness of these ore and jasper components, inasmuch as the 7800 cross-cut which had been driven from the main level 200' to the south had encountered a jasper core. It appeared decidedly advantageous to gain further information on the extent of the jasper for the intelligent planning of future cross-cuts and mining raises. The drilling hole encountered the ore according to expectation and, with the exception of a 15 foot dike, remained in ore for a distance of 240'. No jasper was encountered by the drilling. It may be, however, that the jasper hangingwall is present at no great height above the drilling. The hole was completed at a depth of 210' because of the fact that it was approaching the location of Diamond Drill hole No. 24, a vertical hole from the surface which had previously indicated ore at the elevation of drilling in Diamond Drill hole No. 9. The 7700 cross-cut will, in the coming year, be advanced southwest and further information can be more easily and economically obtained from the extension.

10. TAXES

	1944		1943	
	Valuation	Taxes	Valuation	Taxes
NE¼ of NE¼ of Sec. 19, 45-25, C & NW Lease #29	10,000	202.49	10,000	206.78
158.27 acres in Sec. 18, 45-25,	15,000	303.74	15,000	310.16
160 acres NW¼ of Sec. 20, 45-25,	65,000	1316.20	235,000	4859.24
NW¼ of NE¼ of Sec. 19, 45-25, Loc. 40 acres	420	8.51	420	8.68
S½ of NE¼ of Sec. 19, 45-25, Loc. 80 acres	840	17.02	840	17.36
Personal Property,	320,000	6479.78	150,000	3101.64
Total,	411,260	8327.74	411,260	8503.86
Fees,		83.28		85.05
TOTAL TAXES,		8411.02		8588.91

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11. ACCIDENTS AND PERSONAL INJURY

Fewer and less severe accidents were sustained this past year than in 1943. Eleven compensable accidents occurred. Of these, eight were underground mishaps. Falls of ground was the cause of two, haulage two, slipping two, scraping one, hoisting one.

The surface accidents were unusual; two truck drivers were injured while loading the truck, and the third was a kink in the back suffered by a timber lander.

Statistical comparison of accidents for 1944 and 1943 is given below:

	Days of Labor	Hours of Labor	Tons of Ore Mined	Number of Compensable Accidents	Fatalities	Days Lost	Frequency Rate	Severity Rate
1944,	45713½	365,708	216,512	11	-	652	30.08	1.78
1943,	51505½	412,028	227,185	25	-	1558	60.61	3.78

15. POWER

The detail of Power used in 1944 and 1943 follows:

	Kilowatt Hours Used			
	1944	1943	Increase	Decrease
Hoist No. 2 Shaft,	207,890	187,760	20,130	
Hoist No. 3 Shaft,	45,680	46,130		450
Compressors,	966,100	1,272,400		306,300
Haulage Set No. 1,	271,000	218,300	52,700	
Haulage Set No. 2,	193,190	208,340		15,150
Pump No. 2 Shaft,	181,000	195,200		14,200
Shops - Power,	12,000	1,830	10,170	
Shops - Light,	6,725	6,408	317	
Lights & Signal System,	20,707	28,711		8,004
Top Tram,	68,300	90,800		22,500
Total,	1,972,592	2,255,879		283,287
In Cash,	$ 32,053.44	$ 34,442.64		$ 2,389.20
Cost Per KWH,	.0162	.0152	.0010	

Decrease in power consumption was due to the fact that a two shift operation was worked the greater part of 1944 as compared to three shifts in 1943.

PRINCETON MINE
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18. NATIONALITY REPORT

As to Parentage	1944	%	1943	%
Finnish,	54	35.1	75	41.7
Italian,	35	22.7	36	19.8
American,	24	15.6	23	12.6
French,	9	5.9	16	8.8
Swedish,	12	7.8	13	7.1
English,	6	3.9	6	3.3
Norwegian,	8	5.2	6	3.3
German,	2	1.3	2	1.1
Belgian,	-	-	2	1.1
Irish,	2	1.3	1	.6
Austrian,	1	.6	1	.6
Polish,	1	.6	-	-
Total,	154	100.0	182	100.0

	Total		American Born		Foreign Born	
As to Birth	1944	1943	1944	1943	1944	1943
Finnish,	54	76	33	55	21	21
Italian,	35	36	20	23	15	13
American,	24	23	24	23	-	-
French,	9	16	7	15	2	1
Swedish,	12	13	8	10	4	3
English,	6	6	5	5	1	1
Norwegian,	8	6	5	3	3	3
German	2	2	2	2	-	-
Beljian,	-	2	-	2	-	-
Irish,	2	1	2	1	-	-
Aus trian,	1	1	-	-	1	1
Polish,	1	-	1	-	-	-
Total,	154	182	107	139	47	43
Percentages,			69.5	76.3	30.5	23.7

SPIES-VIRGIL MINE
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1. GENERAL

The product in 1944 was 67,637 tons as compared with 124,107 tons in the previous year and for the second consecutive year production of Hi-Sulphur grade constituted the major portion of the total product. Early in the year production from the Virgil Lease began to decline rapidly as mining areas were depleted, and in all probability mining operations in the Virgil Lease will be completed early in 1945 due to depleted reserves.

Operation of the mine was continued on a schedule of two shifts per day for five days per week and one shift on Saturdays until July 1st, when the operating schedule was reduced to five days per week on the day shift and five days per week on the night shift. During the latter part of the year some additional exploration drilling was carried on from the 8th Level in the Virgil Lease in an attempt to disclose additional reserves. A study of the geological structure along the North side of the Virgil deposit indicated favorable possibilities for concentration and on the basis of this information an underground drilling program was started to explore this area before operations are completed in the Virgil Lease. Two holes were completed to the North from the Northwest footwall drift on the 8th Level and both holes encountered short runs of Hi-Sulphur ore averaging more than 1% in sulphur content. The ore in one of the holes was encountered a short distance South of the North boundary of the Virgil property and in the other hole the ore was encountered in the C. C. I. Co. fee owned property North of the Virgil Lease. To further explore the extent and quality of the ore encountered in the two holes drilling will be continued early in 1945 from a station along the North side of the main haulage drift on the 8th Level. A program of surface exploration drilling has also been continued throughout the year in Section 24 and Section 19 to the East of the Spies shaft. In the previous year, several very favorable runs of ore were encountered in the drilling near the East boundary of Section 24 and subsequent drilling has disclosed some additional information on the extent and strike of the new orebody.

Drifting operations towards the new deposit were started on the 4th Level early in the year and the surface diamond drilling program has been continued throughout the year to outline the orebody more completely for the underground development. The new deposit was intersected by several additional holes in 1944 which disclosed a relatively narrow width, but a proven length along the strike of about 600'. The extent of the new deposit in depth still remains to be determined, but from the new development on the 4th Level a more favorable location will be provided for exploration drilling to lower elevations.

Development on the 4th Level has comprised the major part of the development during the year. Drifting operations were started in February to the Southeast from the shaft towards the new depsoit upon completion of some preliminary work at the shaft plat. A total of 3710' of rock drift was advanced to the Southeast before the orebody was reached late in November. The main level heading encountered the narrow orebody and late in the year the first crosscut was being driven to the Northeast following along the strike of the deposit. The main drift disclosed a width of 48' of ore with a narrow jasper seam in the center of the deposit and in the first crosscut that was being advanced to the Northeast along the strike 45' of ore was encountered, but late in the year the crosscut was advancing in jasper. In the main heading which crosscut the orebody the grade of the ore indicated an iron content averaging slightly more than 58% and sulphur about .075%, whereas in the crosscut the sulphur content averaged slightly more than .08%. It is planned by means of the first crosscut to the Northeast to explore and develop the Northerly limits of the orebody adjacent to the East boundary of the property where a favorable run of ore was encountered in one of the surface drill holes.

SPIES-VIRGIL MINE
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1. GENERAL - CONT'D.

Development and exploration will also be undertaken to the South of the main drift to determine the extent of the deposit along the strike and above the level. From the development completed in the new deposit by the end of the year indications are that a mass of jasper occurs within the iron formation near the North end, and the ore occurs in two separate narrow stringers divided by the jasper. This factor is very disappointing from a standpoint of reserves but it is quite probable that a more favorable ore extension will be disclosed by the development above the level. The major part of the development on the 4th Level during the year was done under E&A CC-116-A, but upon reaching the orebody E&A CC-138 was authorized to continue the development and exploration on the level and above until operations on this level reach a production basis. Before the main level heading reached the orebody a short crosscut was driven to the Northeast from the main drift at a distance of about 500' West of the new deposit. This crosscut is part of the development for a new ventilation connection that will be put up to surface from the 4th Level.

Work was started under contract with the Layne-Northwest Company on the ventilation shaft from surface. The ventilation shaft is located about 500' West of the new deposit and is Southeast of the Spies shaft. This work similarly as development on the 4th Level is being done under E&A CC-116-A and is part of the program of developing the new deposit for mining. The new ventilation connection will comprise a total of 615' of raising and shaft sinking. The part of this work let on contract includes sinking the shaft through surface material to ledge and drilling a 15" diameter bore hole concentrically from the bottom of the shaft to a total depth of about 550'. At the end of the year work was completed sinking an 8' square shaft to a depth of 95' from surface and work was started drilling the 15" diameter hole starting at the bottom of the shaft. Due to the shortage of labor the raising program from the crosscut on the 4th Level had not been started by the end of the year, but in all probability work on this part of the project will be started early in the coming year.

Mining operations in the Virgil Lease have consisted of recovering the small remaining supporting pillars adjacent to old stopes above the 8th Level. As mentioned previously, Hi-Sulphur ore has constituted the bulk of the product, but from the development in the remaining areas late in the year indications are that the balance of the mining will be mostly in Virgil Grade ore. During the early part of the year production was obtained from three separate areas and as these areas were depleted development of smaller remaining areas was undertaken. A serious decline in production occurred as mining areas were depleted due to the large proportion of development work necessary to recover relatively small tonnages in the remaining pillars. The development work has been confined entirely to sub-level stope development and the major portion of the development work that is necessary to recover the two remaining pillars was nearly completed at the end of the year. Upon completing the recovery of a pillar adjacent to the Sherwood Boundary and also a supporting pillar near the central part of the deposit mining in the Virgil Lease will be completed, and the contracts will be transferred to work in the new Spies orebody.

The cost per ton shows a considerable increase as compared to the previous year due to depletion of reserves and the higher costs of mining resulting from recovering small remaining pillars.

SPIES-VIRGIL MINE
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1. GENERAL - CONT'D.

Ventilation conditions in the mine with several exceptions have been quite satisfactory during the year. Operation of the main fan on surface at the Virgil shaft has been continued throughout the year up-casting the air through this shaft and down-cast in the Spies shaft. Due to the continued burning in the fire area on the 6th Level and above, reversing the direction of the flow of air has not been possible similarly as in the previous year due to foul air and SO^2 gas that is generated. This factor has caused some trouble during the freezing weather due to the formation of ice in the Spies shaft. During the last stages of a stope operation in an area adjacent to the Sherwood Boundary satisfactory ventilation was difficult to maintain on several occasions due to foul air backing up into the stope. By means of a booster fan which was employed here during the operations of the stope it was possible to clear the area of foul air after slight interruptions. It is quite possible that in one of the remaining areas that is being developed in the central part of the deposit similar difficulties may be experienced due to its close proximity to the fire area. Ventilation for the development program on the 4th Level has been provided by means of a 25 H.P. Sturtevant Fan and 14" spiral metal pipe. Fresh air down-casting through the Spies shaft entered the heading and was exhausted by means of the fan and pipe into the old 4th Level drift which connects by means of raises and old levels above to the Virgil shaft.

2. PRODUCTION, SHIPMENTS & INVENTORIES

a. Production by Grades

	1944	1943
Virgil	16,307	25,453
Virgil Hi-Sulphur	51,330	98,654
Total Virgil Lease	67,637	124,107
Spies	797	-
Grand Total	68,434	124,107

Production from the Virgil Lease decreased by 56,470 tons as compared to the previous year due to the depletion of ore reserves. The small production from the Spies deposit was obtained from the 4th Level development.

b. Shipments.

Grade	Pocket	Stockpile	Total	Total Last Year
Virgil	-	21,274	21,274	37,185
Virgil Hi-Sulphur	6,508	74,036	80,544	77,839
Total	6,508	95,310	101,818	115,024
Total Last Year	36,397	78,627	115,024	
Difference		16,683	13,206	

There was a decrease in total shipments from the mine of 13,206 tons, which was due entirely to the smaller shipments of Virgil Grade. Due to the small product during the major portion of the shipping season the bulk of the shipments were made from stockpile. No Virgil Grade was shipped from the pocket and only a small amount of Hi-Sulphur grade was loaded from the pocket.

SPIES-VIRGIL MINE
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2. PRODUCTION, SHIPMENTS & INVENTORIES - CONT'D.

c. Stockpile Inventories

Grade	Tons
Virgil	1,050
Virgil Hi-Sulphur	21,754
Spies	797
Total	23,601

The above stockpile inventory at the end of the year compares with 56,985 tons at the end of the previous year. In addition to the small book figure of Virgil grade in stock an estimate shows more than 20,000 tons of this grade in over-run remaining in stock.

d. Division of Product by Levels

The entire product of both Virgil and Hi-Sulphur grade ore was mined from areas between the 6th and 8th Levels and all the ore similarly as in the previous year was trammed on the 8th Level. Due to the continued burning in the fire area on the 6th Level and above, heat and SO^2 gas is still being generated and it is very unlikely that any further attempt will be made to mine the Virgil grade ore above this level.

e. Production by Months

Month	Days	Virgil Ore	Virgil Hi-Sul. Ore	Spies	Total Ore	Tons per Man per Day	Tons Rock
Jan.	23	--	12,275		12275	7.56	1028
Feb.	20½	460	9,572		10032	7.36	1900
Mar.	25	1560	4,849		6409	4.32	3566
April	22	1078	3,922		5000	3.81	3036
May	24	6003	2,378		8381	6.45	3012
June	24	6609	755		7364	5.61	3320
July	20	-	3,964		3964	3.71	2912
Aug.	23	-	5,144		5144	4.62	3088
Sept.	21	129	4,080		4209	3.78	2572
Oct.	22	-	2,532		2532	2.36	3164
Nov.	22	-	1,252	230	1482	1.37	3070
Dec.	19	1075	-	567	1642	1.08	1988
Total		16914	50,723	797	68434	4.61	32655

The large amount of rock hoisted during the year was obtained almost entirely from development on the 4th Level.

f. Ore Statement

	Virgil	Virgil High-Sulphur	Spies	Total	Total Last Year
On Hand Jan. 1, 1944	6,017	50,968	-	56,985	47,902
Output for Year	16,307	51,330	797	68,434	124,107
Overruns	-	-	-	-	-
Total	22,324	102,298	797	125,419	172,009
Shipments	21,274	80,544	-	101,818	115,024
Balance	1,050	21,754	797	23,601	56,985
Decrease in Output					

SPIES-VIRGIL MINE
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2. PRODUCTION, SHIPMENTS & INVENTORIES - CONT'D.

f. - 1. Operating Schedule.

1940 - 2-8 Hr. Shifts 4 days per week Jan. 1 to Nov. 15 inclusive,
2-8 Hr. Shifts 5 days per week Nov. 16 to Dec. 31 inclusive.

1941 - 2-8 Hr. Shifts 5 days per week Jan. 1 to Dec. 31 inclusive.

1942 - 2-8 Hr. Shifts 5 days per week Jan. 1 to Oct. 16 inclusive,
2-8 Hr. Shifts 5½ days per week Oct. 17 to Dec. 31 inclusive.

1943 - 2-8 Hr. Shifts 5½ days per week Jan. 1 to Dec. 31 inclusive.

1944 - 2-8 Hr. Shifts 5½ days per week Jan. 1, to July 1, effective July 1, 5 days per week, and effective July 10, hoisting operations 1-8 Hr. shift daily and mining 2-8 hr. shifts.

g. Delays

There were three delays of significance that occurred during the year, resulting in some loss in product. The most serious of the delays occurred when a walk-out strike was started by the night shift crew on February 10th. Approximately 1700 men employed in the various mines, including the Spies-Virgil Mine, in the Iron River District staged a district wide walk-out strike in sympathy with Inland Steel Company employees who were out on strike on account of a labor dispute. All the mines in the district were idle on February 11th and 12th on this account and work was resumed on Monday February 14th after agreement was reached by the district C.I.O. officers and representatives to return to work and arbitrate the issues with the Inland Steel Company. This strike was a direct violation of the "no strike or walk-out" pledge by the C.I.O. as contained in the contract agreements with each Company and the occurance of this incident is abhorred. It is not likely that a majority of the employees were in sympathy with the strike action and indications are that a small group of irresponsible officers and representatives of the C.I.O. were responsible for this action. The mine was idle for four regular operating shifts and only several maintenance men, pumpmen, hoisting engineers and firemen were employed. The total loss in product on account of the strike is estimated as 875 tons.

During the night shift operations on January 31st a drive shaft broke on the top tram larry car causing a delay of six hours to hoisting. About 10 days previous to this occurance the motor on a second larry car had burned out and repairs to this motor had not been completed due to a delay in delivery of necessary new parts. No spare car was available, and a delay of eight hours occurred during the day shift operation on February 1st until repairs could be completed in time for the start of the night shift operations. The loss in product on account of this delay is estimated at 500 tons.

During the day shift operation on Monday, September 25th a pulley on the compressor motor drive shaft broke and a delay of eight hours occurred before repairs could be completed. To make up the loss caused by this delay the mine was operated during the day shift on the following Saturday, September 30th.

SPIES-VIRGIL MINE
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3. ANALYSIS

a. Average Mine Analysis on Output.

The average analysis on the output in 1944 shows a substantial increase in the iron content in the Virgil Grade and a slight increase in the iron content in Hi-Sulphur Grade as compared with the previous year. There was also a material reduction in the Silica and Sulphur content in the Virgil Grade. The Silica content in the Hi-Sulphur Grade was decreased also but the Sulphur content shows a slight increase. The average analysis of the Spies ore as indicated is not representative of the true analysis of the orebody. As mentioned previously the Spies ore was obtained from the drifting operations and a seam of jasper was encountered within the ore. The small product of Spies ore was contaminated with some of the lean iron formation and also by the Hi-Sulphur bearing material at the contact between the orebody and the adjacent slate formation.

Grade	Tons	Iron	Phos.	Silica	Sulphur
Virgil	16,307	58.31	.339	5.95	.082
Hi-Sulphur	51,330	56.65	.343	7.73	.180
Spies	797	56.16	.278	8.40	.198

b. Analysis of Ore in Stock December 31, 1944.

Grade	Iron	Phos.	Sil.	Mang.	Alum.	Lime	Mag.	Sul.	Loss	Moist
Virgil Dried	57.02	.357	7.76	.19	1.84	.58	.26	.085	6.86	
Virgil Nat'l	52.81	.331	7.19	.17	1.70	.54	.24	.079	6.35	7.38
Hi-Sul. Dried	57.04	.356	7.49	.19	1.84	.60	.21	.177	6.60	
Hi-Sul. Nat'l	52.17	.326	6.85	.17	1.68	.55	.19	.162	6.04	8.53
Spies Dried	56.16	.278	8.41	.19	1.84	.58	.26	.198	6.86	
Spies Nat'l	51.11	.253	7.65	.17	1.67	.53	.24	.180	6.24	9.00

c. Complete Analysis of Shipments

The average analysis of the 1944 shipments indicates a slight increase in the iron content in both grades with practically no change in the Silica content of the Virgil Grade and a substantial decrease in the Silica content in the Hi-Sulphur Grade. In the Virgil Grade the Sulphur content increased very slightly whereas in the Hi-Sulphur grade a slight decrease occurred.

Grade	Iron	Phos.	Sil.	Mang.	Alum.	Lime	Mag.	Sul.	Loss
Virgil	57.50	.362	6.77	.18	.168	.76	.26	.085	7.08
Hi-Sulphur	57.10	.350	7.56	.18	.167	.82	.26	.173	6.57

There were no straight cargo shipments of either grade in 1944.

d. High-Sulphur Ore.

As mentioned previously both production and shipments were mostly of Hi-Sulphur grade similarly as in the previous year. Throughout most of the year the bulk of the development work and mining has been in Hi-Sulphur areas but late in the year development in the two remaining areas indicated that mainly Virgil Grade will be obtained from the balance of the mining operations.

SPIES-VIRGIL MINE
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3. ANALYSIS - CONT'D.

d. Hi-Sulphur Ore - Cont'd.

During the first half of the year when the highest production was being obtained some Hi-Sulphur ore for mixing purposes was obtained from old caved stopes near the North footwall side and this ore was mixed with the higher grade that was mined during the process of recovering pillars. However, only a relatively small amount of Hi-Sulphur ore was recovered in this manner as compared with previous years when substantially large amounts were obtained. The production of 51,330 tons of Hi-Sulphur ore in 1944 represents 76.2% of the total product and is approximately in the same proportion as in the previous year.

4. ESTIMATE OF ORE RESERVES -

a. Developed Ore

Estimate as of November 30, 1944, using a factor of 12 cu. ft. per ton.

	Virgil Lease			Spies		
	Virgil	Hi-Sul.	Total	Spies	Johnson Lease	Total
Above 6th Level	-	-	-	1,454,167	208,750	1,662,917
Between 6th & 8th Levels						
Southwest Deposit	50,550	-	50,550			
Middle Deposit	-	28,598	28,598			
Gross Estimate	50,550	28,598	79,148	1,454,167	208,750	1,662,917
Less Dec. 1944 Prod.	468	607	1,075	-	-	-
Gross Dec. 31, 1944	50,082	27,991	78,073	1,454,167	208,750	1,662,917
Less 10% Loss in Mining	5,055	2,860	7,915	145,417	20,875	166,292
Total	45,027	25,131	70,158	1,308,750	187,875	1,496,625
Less 10% for Rock	4,549	2,574	7,123	130,875	18,788	149,663
Net Total as of December 31, 1944	40,478	22,557	63,035	1,177,875	169,087	1,346,962

The estimate of the remaining reserves in the Virgil Lease as of December 31, 1944 is comprised of both Virgil and Hi-Sulphur grade. The division of the reserves into two grades is based on the grade of the ore encountered in the development that was done during the latter part of the year preliminary to recovering the remaining pillars. In the central part of the deposit Virgil grade ore has been encountered in the stope development that is being carried on to recover a relatively large supporting pillar adjacent to old stopes. In the Southwest part of the deposit along the Sherwood Boundary both Virgil and Hi-Sulphur ore has been encountered in the development for mining a pillar and due to the spotty nature of the sulphur content here, it is very likely that most of the production from this area will be Hi-Sulphur grade.

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4. ESTIMATE OF ORE RESERVES - CONT'D.

a. Developed Ore - Cont'd.

The extent to which recovery of the ore in the remaining pillars can be accomplished will be determined by the extent of caving and dilution that occurs from old adjacent stopes. In previous years substantial amounts of sub-standard grade ore was recovered from many old caved stopes and mixed with the higher grade being mined, but production from this source has been exhausted. On the basis of known minable reserves remaining in the Virgil Lease operations in this property will be completed early in 1945. Late in the year a drilling program was started and two holes were completed into the area North of the Virgil deposit. A short run of ore with a very Hi-Sulphur content was encountered in each of the holes, but to further explore this area drilling was being continued at the end of the year.

The estimate of reserves in the new Spies orebody is based on the ore encountered in six surface diamond drill holes. At the end of the previous year information from the drilling was insufficient for a basis for an estimate of reserves, but additional holes drilled in 1944 have crosscut the orebody and disclosed a substantial length along the strike. Development on the 4th Level reached the orebody late in the year and the main heading which crosscut the deposit disclosed a width of about 48' of ore. A crosscut to the Northeast following along the strike disclosed a jasper mass in the formation dividing the orebody at the North end into two separate narrow stringers of ore. The development and drilling completed to date in the new orebody indicates a relatively narrow deposit that has nearly a vertical dip for a distance of more than 200' above the 4th Level, and then a flat anticlinal roll to the East results in extending the iron formation to a known height at one point of 180' from surface. Two drill holes have crosscut the orebody at the highest elevation in the Johnson Lease in Section 19. However, the bulk of the estimated reserves on the basis of present information lies in and adjacent to the East boundary of Section 24. The known ore strikes nearly North-South and at the North end due to a sharp change in the direction of the strike to the Northeast the deposit crosses the East boundary of Section 19. A length of 600' along the strike has been proven by the drilling and there are favorable indications of further extensions which have not been determined yet. The limits of the deposit in depth also remains to be explored but a more favorable location for this exploration drilling will be provided from the new development on the 4th Level.

b. Estimated Ore Reserve Analysis

Grade	Iron	Phos.	Sil.	Meng.	Alum.	Lime	Mag.	Sul.	Loss	Moist
Virgil Dried	57.50	.360	7.51	.21	1.90	.58	.32	.081	7.54	
Virgil Nat'l	52.32	.328	6.83	.19	1.73	.53	.29	.074	6.86	9.00
Hi-Sul. Dried	56.50	.360	8.00	.21	1.90	.60	.21	.300	7.25	
Hi-Sul. Nat'l	51.41	.328	7.28	.19	1.73	.55	.19	.273	6.60	9.00
Spies Dried	59.49	.294	4.55	.20	2.11	.24	.37	.040	6.52	
Spies Nat'l	54.73	.270	4.19	.18	1.94	.22	.34	.037	6.00	8.00

SPIES-VIRGIL MINE
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4. ESTIMATE OF ORE RESERVES - CONT'D.

b. Estimated Ore Reserve Analysis - Cont'd.

The estimated analysis of reserves in the new Spies deposit is based on weighted drill hole analysis as the development in ore on the 4th Level is still insufficient to provide a basis for a representative analysis of the ore. However, it is most likely that sulphur content of the ore in the new deposit will average considerably higher than indicated from the drill hole analysis. The small amount of ore obtained from the development late in the year and early in 1945 suggests a sulphur content of about .070% and also a moisture content of about 9.50%.

5. LABOR AND WAGES

a. General

Relations with the men have not been entirely satisfactory during the year. The contract agreement with the Union has been continued in force and provides the basis for settlement of grievances and complaints. A direct violation of this agreement by the employees occurred when a walk-out strike was called on February 10, 1944. As mentioned previously, about 1700 men employed in the various mines in the district staged a walk-out strike in sympathy with the Inland Steel Company employees who were out on strike on account of a labor dispute. All the mines in the district were idle on the 11th and 12th and work was resumed on Monday the 14th, after agreement was reached by the Union officials to return to work and arbitrate the issues with the Inland Steel Company. Hope for improvement and more harmonious relations seems to be dependent on the calibre of men that will be selected by the employees as officers and representatives of their Union.

The number of employees on the payroll at the end of the year was 74, as compared with 82 at the end of the previous year. There was a total labor turn-over during the year of 19 men who left our employ and 11 employees were hired, resulting in a net decrease of 8 men. The largest loss of employees was the result of men quitting to seek work elsewhere, particularly in defense plants, where higher wages are paid and more overtime work obtainable. No serious loss of employees into the armed services occurred during the year due to the fact that occupational deferments have been granted for the men in the age group above 26 years. On the basis of present age limits set by Selective Service on non-deferable employees, no further loss of employees into the service is anticipated, but if the age limits are raised, additional employees will naturally be called. During the year 14 men quit to seek work elsewhere and 3 were drafted into the service. One old employee with long service was retired and there was one fatality underground. A total of 11 men were hired and these men were mostly obtained after seasonal curtailment of local woods operation occurred. The acute shortage of labor has been seriously felt in attempting to carry on the development on the 4th Level, and also the mining in the Virgil Lease at a faster rate. When operations in the Virgil Lease are completed early in 1945, work will be concentrated on development and mining in the new deposit but it is quite apparent that a shortage of labor will still exist to carry on the necessary work at a more desirable rate.

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5. LABOR AND WAGES - CONT'D.

b. Statement of Wages and Product

	1944	1943
PRODUCT	67,637	124,107
NUMBER OF SHIFTS AND HOURS	2-8	2-8
Avge. No. of Men Working		
Surface	20	22
Underground	32	39
Total	52	61
Avge. Wages per Day		
Surface	6.97	7.11
Underground	7.90	8.35
Total	7.55	7.91
Avge. Wages per Month of 22 Days		
Surface	153.34	156.56
Underground	173.80	183.74
Total	166.10	173.96
Product per Man per Day		
Surface	12.11	19.21
Underground	7.44	10.80
Total	4.61	6.91
Labor Cost per Ton		
Surface	.5759	.3705
Underground	1.0615	.7735
Total	1.6374	1.1438
Avge. Product Breaking & Tramming	37.46	37.64
Avge. Wage Contract Miners	8.508	8.904
Total No. of Days		
Surface	5585½	6459
Underground	9084¾	11494¼
Total	14670¼	17953¼
Amount for Labor		
Surface	38950.91	45963.29
Underground	71794.60	95999.10
Total	110745.51	141962.39

Proportion Surface to Underground Men

1944	1 to 1.60
1943	1 to 1.78
1942	1 to 2.16
1941	1 to 2.12
1940	1 to 1.88

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6. SURFACE

a. Buildings, Repairs

Only very minor repairs were made to several surface buildings during the year. With the exception of the engine house the other surface buildings, particularly the office and warehouse and the carpenter shop are badly outmoded and deteriorated and in addition are not of fire-proof construction. The latter two are wood frame structures, which are too small and out of necessity overcrowded conditions have resulted. Early consideration must be given to replacement of these buildings after development and exploration in the new Spies orebody has outlined sufficient reserves to warrant it.

After installation of the former Gardner-Mackinaw Mine cage hoist in the engine house late in 1943 new pipe gaurd railing was installed around the moving parts of the hoist and also around the switch boards. All the machinery and guard railing in the building was painted and the floor was also given a coat of slate gray enamel. Rubberized matting was also laid along the walk-ways and this work has materially added to the appearance and orderliness in the engine house.

b. Stockpiles

The increased shipments of Hi-Sulphur ore from stockpiles as compared with the previous year enabled cleaning out the pile of this grade directly North of the shaft. About 1500 tons of Hi-Sulphur ore that was stocked between old rock piles adjacent to this area was removed by means of the bulldozer, and also loaded out. After the piles were cleaned up the bulldozer was employed to grade a large part of the area, preliminary to erecting new trestle. To widen the area a part of an old rock pile at the South end was removed and to level the sollar to grade a large amount of sand and gravel was moved. Work was completed grading a part of the area at the South end nearest the shaft, so nine bents of trestle could be erected late in the year for stocking Spies ore that was obtained from the development on the 4th Level. The balance of this area will be graded during the summer months in 1945 and it is planned to reserve this entire stocking ground for Spies ore.

Before erecting the new trestle to the North of the shaft, several old bents of permanent trestle approach in this direction were torn down due to their rotted condition. New wood bents were erected and some fir decking and gaurd rails constructed to replace the rotted section.

The product of Hi-Sulphur and Virgil Grades during the year was placed on the piles of this grade to the Northwest of the shaft. Virgil grade shipments were made entirely from stockpile and a large proportion of the Hi-Sulphur pile here was also loaded out. No new trestle was erected in this area, as the bulldozer has been employed extensively widening out the piles as needed. The bulldozer will enable widening both piles to the full capacity of the area here and if shipments permit, this practice will be continued until operations in the Virgil Lease have been completed.

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6. SURFACE - CONT'D

b. Stockpile - Cont'd.

The rock pile to the South of the shaft has also been widened with the bulldozer. This practice is necessary to prevent the Hi-Sulphur bearing slate that is being dumped here from starting to burn as has been experienced in the past.

7. UNDERGROUND

a. Shaft Sinking.

In September, work was started under contract with Layne-Northwest Comapny sinking a small size ventilation shaft from surface Southeast of the Spies shaft in Section 24. The new shaft will be located in footwall slates about 500' West of the new deposit. A new ventilation connection between the 4th Level and surface is part of the program of developing the new deposit for mining so that adequate ventilation can be provided in the mining areas. The part of the work let on contract, includes drilling a churn drill test hole to ledge at the shaft site and sinking a shaft finished to a 7' inside diameter to ledge. Also upon completion of the shaft a 15" diameter bore hole to be drilled concentrically from the bottom of the shaft for a distance of approximately 550' from surface.

In August, the churn drill test hole was completed to a depth of 95', the latter 4' of which was in ledge. The surface material and the slate formation encountered at ledge indicated a favorable location for the shaft at this point. Before shaft sinking operations were started an area surrounding the shaft was graded with the bulldozer. Upon completion of this work shaft sinking was started and completed to a finished depth of 95' early in November. The latter 5' of the shaft was in the slate ledge. A shaft approximately 8'6" square was sunk and the walls supported with 3" hardwood planking. Within the square section a circular steel casing 7' in diameter was installed extending from the ledge to the collar and about 10' of concrete poured at the lower portion around the casing. Before the sections of steel casing were installed steel ladder-ways and stages were placed so that a finished ladderway was available in the shaft when the casing was installed in place. Upon completing the shaft, work was started in December drilling the 15" diameter hole starting at the bottom of the shaft.

At the end of the year drilling had reached a depth of 139' from surface. Some trouble was being experienced maintaining the hole in line and early in 1945 it was decided to drill an 8" diameter pilot hole to the finished depth and then ream the hole to the 15" size. This work is being done under E&A CC-116-A and under contract with Layne-Northwest Company. The balance of the work will be done with Company labor and it is planned to either raise from the 4th Level following along the bore hole or to strip the bore hole starting from surface.

b. Development

The major part of the development program during the year was confined to the 4th Level, where drifting operations were underway during most of the year driving the main level heading to the Southeast towards the new deposit.

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7. UNDERGROUND - CONT'D.

b. Development - Cont'd.

Preliminary to starting the drifting operations loading pockets were constructed at the shaft, and a storage trench excavated at the plat. Two measuring pockets, each having a capacity of one skip were constructed of timber and also concrete and lined with steel plate. The storage trench which leads to the pockets was excavated below the floor level of the plat and the sides and bottom of the trench was lined with concrete. To provide a good scraping bottom in the trench steel rails were laid in the bottom imbedded in the concrete. The trench has a capacity of about 300 tons, and by means of a 25 H.P. scraper hoist the measuring pockets and skips will be loaded. Work on the pockets and trench was completed so that drifting operations could be started early in February. Three - four-man crews were employed on a 3-8 hour schedule in driving the main level heading which was started around a turn to the Southeast from the plat. The heading reached the orebody late in November and the drift was advancing further to the Southeast to cross-cut the ore. Late in the year the first cross-cut to the Northeast was being advanced following along the strike of the deposit. Upon reaching a point with the heading about 500' West of the orebody a cross-cut 105' in length was advanced branching to the Northeast. This cross-cut is part of the development for putting up a new ventilation connection to surface. A total of 4,058' of main level drift was driven in the eleven months during which drifting operations were underway, and the average advance per month was approximately 370'. In addition to the short cross-cut in the slate West of the orebody, three cut-outs along the South side of the main drift were made during the progress of the heading at about 700' intervals to provide a means for switching cars. Slate formations were encountered for the entire distance in the drift before the orebody was reached and due to the hard nature of the slates no timbering was necessary until the orebody was reached. A short distance West of the orebody several water courses were encountered in the slate formation and the large amount of water intercepted hindered operations materially. Additional water was encountered when the orebody was penetrated and also in the first cross-cut that was being advanced to the Northeast following along the strike. The main drift disclosed a width of about 48' of ore and a narrow jasper seam was encountered about midway in the formation. The first cross-cut to the Northeast was started in slate and encountered about 47' of ore around the turn and at the end of the year was advancing in jasper. The development indicates a mass of jasper within the orebody, which divides the deposit into two narrow stringers which strike roughly to the North. Development was being concentrated at the end of the year on driving the cross-cut to the limits of the deposit to the North preliminary to starting raises for development and exploration above the level. The major part of the development on this level was done under E&A CC-116-A and upon reaching the orebody with the heading E&A CC-138 was authorized to carry on the balance of the development that will be necessary to reach a production basis.

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7. Underground - Cont'd.

b. Development - Cont'd.

The following table shows a division and classification of the development footage on the 4th Level:-

	Rock Drift	Ore Drift	Total
Development under E&A CC-116A	3758'	-	3758'
Development under E&A CC-138	205'	95'	300'
Total	3963'	95'	4058'

In the Virgil Lease a small amount of rock work was done on the 8th Level to provide two cut-outs for diamond drill stations and on a sub above the 8th Level some rock drifting and raising was done for ventilation purposes. The balance of the development was confined to various sub-levels between the 6th and 8th Levels, and comprised development for stoping. With the exception of a small amount of rock work the development for stoping was mostly in ore and consisted of a number of transfer drifts from which mill raises and intermediate sub-level connecting drifts were driven for sub-level stope development. As the production indicates, most of the development was in Hi-Sulphur ore, a large proportion of which was mined in recovering pillars along the North footwall side. Along the South footwall side of the deposit several pillars of Hi-Sulphur grade were also developed and recovered by small scram stope operations. During the latter months of the year operations were confined almost entirely to development of two remaining pillars for mining, one adjacent to the Sherwood Boundary, and the other near the central part of the deposit on the footwall side. The development in both areas was in Virgil Grade indicating that during the short remaining life of the property, Virgil Grade will constitute the bulk of the production. It has been impossible with the small number of crews available and shortage of labor to keep development of the small remaining areas abreast of mining operations due to the larger than normal amount of development work necessary to recover comparatively small tonnages. On this account each contract's work has been divided between developing and stoping. The decrease in size of mining areas and the amount of development that has been necessary to recover the remaining pillars is reflected in the large decrease in production in 1944.

c. Stoping

Mining operations have been confined mostly to small scram stopes on various sub-levels above the 8th Level. An average of three contracts have continued operations in the Virgil Lease throughout the year and the work has been divided between mining developing. Mining has been confined mostly in Hi-Sulphur areas near the North footwall side and also along the South footwall side of the deposit. With the exception of a very small amount of Hi-Sulphur ore that can still be recovered along the North footwall side operations in this area have been practically completed. Mining in four separate small stopes in the latter area was completed during the year to the transfer sub-level elevation about 35' above the 8th Level. Along the South footwall side two small stope operations were completed and late in the year a remaining pillar adjacent to the Sherwood Boundary was being developed for mining.

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7. UNDERGROUND - CONT'D.

c. Stoping - Cont'd.

In the central part of the deposit adjacent to the Sherwood Boundary, operations in a relatively large stope was also completed, and most of the Virgil Grade that was produced during the year was obtained from this stope. However, due to the spotty nature of the Sulphur content in this area, most of the product was Hi-Sulphur grade. In contrast to previous years when substantial amounts of ore were recovered from old caved stopes that had caved, the product from this source in 1944 was very small. During the first two months of the year a small amount of ore for mixing purposes was obtained from an old caved stope near the North footwall side, but dilution with slate lowered the grade below a merchantable quality.

The following is a detailed description of stoping operations:-

Subs above the 8th Level.

+ 25' Sub-Level.

In No. 2 Stope adjacent to the Sherwood Boundary an area about 60' x 60' of Hi-Sulphur ore was mined by retreating the original stope further to the South. This mining connected the stope to an old adjacent stope along the East side and extended South to black slates. Mining was completed here early in the year and the contract was transferred to work in developing a pillar along the South footwall side.

00' Sub-Level.

Some mining was carried on in No. 2 Stope adjacent to the Sherwood Boundary at this elevation also before operations in this area were completed. An area about 80' x 60' was mined retreating the stope to the South to join it with two old adjacent stopes. Mining along the West side extended to the Sherwood Boundary. Some Virgil Grade was mined by this stope operation but due to the spotty nature of the Sulphur it was difficult to maintain a grade with a Sulphur content below the established limits.

-25' Sub-Level.

Adjacent to the South footwall side of the deposit No. 6 Contract completed two small scram stope operations to recover two pillars of Hi-Sulphur ore. During the last stages of each stope operation caving from old adjacent stopes occurred filling the stopes with lean footwall material.

Near the central part of the deposit No. 3 Contract was carrying on development at this elevation late in the year preliminary to mining a remaining supporting pillar of ore that extends to the 6th Level elevation. A transfer drift was driven in lean ore and footwall slate for a distance of 120' Northeast of No. 830 Raise. Late in December work was underway cutting out the first mill raise that will be put up into the pillar above.

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7. UNDERGROUND - CONT'D.

c. Stoping - Cont'd.

Subs above the 8th Level-Cont'd.

-50' Sub-Level.

Mining operations were carried on at this elevation also by No. 6 Contract while recovering the two small pillars along the South footwall side. The product from both of these areas was all Hi-Sulphur grade.

In the area adjacent to the Sherwood Boundary near the central part of the deposit No. 2 Contract completed seven additional mills above the transfer to the North and South of No. 840 Raise. The mills extended in height ranging from one to three subs above the transfer and were put up to enable retreating the stope South to join old adjacent stopes. As mentioned previously, mining was completed in this area early in the year.

In December, No. 6 Contract completed a small drift connection from a mill raise that was put up into a remaining pillar adjacent to the Sherwood Boundary North to an old transfer drift. This work is part of the development that will be done to recover a remaining pillar adjacent to old stopes along the Sherwood Boundary. The development indicates that mostly Virgil Grade will be obtained in the recovery of this pillar.

-75' Sub-Level.

No. 6 Contract completed a transfer drift 70' in length to the Southeast of No. 832 Raise. Upon completing the transfer drift one mill was cut out along the Southeast side and two mills were cut out along the Northwest side all of which were put up to a height of 25' above the transfer. A small pillar of Hi-Sulphur ore lying along the South footwall and adjacent to the Sherwood Boundary was recovered by means of a small scram stope developed here.

When stope operations were completed above the Southeast transfer work was started developing another small pillar of Hi-Sulphur ore for mining South of the raise. An old transfer drift in the latter direction was timbered and four mill raises put up from the East side to a height of 50' above the transfer. By means of this development a small scram stope was developed to mine a pillar of Hi-Sulphur ore lying along the South footwall side and recovery of the pillar was completed early in the year.

During the latter part of the year No. 6 Contract completed a transfer 80' in length to the Northwest of No. 832 Raise. After completing the transfer to the Sherwood Boundary two mill raises were cut out along the Northeast side. One of the mills was advanced to a height of 25' and the other to a height of 45' above the transfer. The development here was mostly in Virgil Grade. As mentioned previously, a small drift connection was completed from the highest mill on the -50' Sub-Level to an old transfer drift for travelling purposes.

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7. UNDERGROUND - CONT'D.

c. Stoping - Cont'd.

Subs above the 8th Level - Cont'd.

-100' Sub-Level.

About 150' of drift was advanced in slate to the East of No. 831 Raise and from the end of the drift a small raise was put up for a distance of 85' to connect with a drift on the -25' Sub-Level. This connection was driven for ventilation purposes to replace a portion of the ventilation connection between the 8th and 6th Levels that will be effected by mining operations when recovery of a pillar near the central part of the deposit is undertaken.

In the Hi-Sulphur area along the North footwall side mining at lower elevations induced caving which enabled recovery of several pillars at this elevation. Operations in this area were abandoned about the middle of the year after completing recovery of practically all the available ore.

-115' Sub-Level.

No. 6 Contract mined an area of Hi-Sulphur ore about 60' x 60' by retreating the original stope to the Southeast to the limits of the ore, leaving a narrow pillar adjacent to old stopes. Caving from the back started during the last stages of the stope operation and a small amount of lean ore that was used for mixing purposes with the higher grade ore was also obtained. Adjacent to this stope and to the South No. 10 Contract mined an area 100' x 30' to complete recovery of the available ore between old stopes.

Early in the year a small stope was developed at this elevation by No. 10 Contract to the West of the previous stope. A stope about 20' in diameter was developed in a small pillar adjacent to old stopes leaving a narrow pillar to prevent caving and dilution from an old adjacent stope.

-135' Sub-Level.

No. 6 Contract did a small amount of mining at this elevation in the stope along the North footwall side. An area about 40' x 40' of Hi-Sulphur ore was mined by retreating the original stope further to the Southeast. Similarly as on the sub-level above No. 10 Contract mined an adjoining area of Hi-Sulphur ore to the South. In the latter stope an area about 80' x 40' of Hi-Sulphur ore was mined to complete the operations here.

No. 10 Contract stoped a small area of Hi-Sulphur ore to the West of the previous stopes similarly as on the sub-level above. An area 70' x 40' was mined during the process of recovering a pillar of Hi-Sulphur ore adjacent to an old stope.

-150' Sub-Level.

No. 10 Contract stripped and re-timbered about 70' of the old transfer drift Northwest of No. 809 Raise and then advanced an extension to the transfer about 40' in length in lean ore and slate.

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7. UNDERGROUND - CONT'D.

c. Stoping - Cont'd.

Subs above the 8th Level - Cont'd.

-150' Sub-Level - Cont'd.

A total of six mill raises were put up from the West end of the transfer to a height of about 25' above the transfer. Three of the mills were put up along the North side and three along the South side to enable recovery of a relatively small remaining pillar of Hi-Sulphur ore directly above. Upon completion of operations from the Northwest transfer No. 10 Contract advanced a transfer drift about 90' in length to the Southeast of No. 809 Raise. A portion of this transfer followed along an old travelling connection which extended to No. 807 Raise. Three mill raises were cut out along the North side and four mills along the South side all of which were advanced to a height of 50' above the transfer. This development was all in Hi-Sulphur ore and enabled recovery of a relatively large pillar of this grade of ore adjacent to old stopes directly above. No. 6 Contract put up one additional mill on the transfer drift Northwest of No. 806 Raise. This mill was extended to a height of 50' above the transfer to provide a new travelling connection while stope operations were underway directly above.

About the middle of the year stope operations were completed in this Hi-Sulphur area in the various stopes down to the transfer sub-levation. All the available ore has been recovered in this area with the exception of a narrow pillar lying between the old transfer drifts. To complete recovery of the latter pillar a relatively large amount of development is necessary. Before operations were abandoned here about 110' of transfer drift was advanced between the old transfer to the Northwest of No. 809 Raise. By means of a small scram stope a small amount of Hi-Sulphur ore can still be recovered, but due to the shortage of labor, and the fact that larger pillars along the South footwall side remained to be recovered, operations were concentrated in the latter area.

8th Level.

There was no development work or mining done on the 8th Level during the year. The only work at this elevation consisted of a small amount of rock drift that was driven to provide two diamond drill stations. Along the North side of the Northwest footwall drift about 20' of rock drift was advanced to provide a station for drilling two holes into the area North of the Virgil deposit. In December work was underway driving a short rock drift from the Northwest side of the main haulage drift for the second diamond drill station. About 30' of rock drift was advanced here and this work was completed before the end of the year. Additional holes will be drilled from the latter station to explore the area North of the Virgil orebody.

d. Timbering.

There was a material increase in the consumption of timber as compared to the previous year. This was due to the fact that each of the transfer drifts that were driven for stope development requiring timbering.

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7. UNDERGROUND - CONT'D.

d. Timbering - Cont'd.

Some repairs were also made in the timbered drifts on the 8th Level and also on several sub-level drifts above the 8th Level, that are maintained as travel-ways and for ventilation. Substantial increases were made in the price of timber, poles and lagging and also cribbing timber during the year and this factor together with the increased consumption accounts for the higher cost of timbering.

Kind	Lineal Feet	Avg. Price Per Foot	Amount 1944	Amount 1943
6" to 8" Cribbing	2,675	.0434	116.22	99.49
8" to 10" Stull Timber	2,558	.0980	250.66	102.16
10" to 12" Stull Timber	1,700	.1143	194.38	15.84
Total Timber 1944	6,933	.0810	561.26	
Total Timber 1943	4,584	.0474		217.49
5' Cedar Lagging				168.74
7' Cedar Lagging	60,024	.0116	696.48	46.63
	60,024	.0116	696.48	215.37
Poles (Sprags)	17,156	.0178	305.47	249.54
Total Lagging & Poles			1,001.95	682.40
Product			67,637	124,107
Feet of Timber per Ton of Ore			.0925	.0369
Feet of Lagging per Foot of Timber			8.6577	3.3473
Cost per Ton for Timber			.00830	.00175
Cost per Ton for Lagging			.01029	.00174
Cost per ton for Poles			.00452	.00201
Cost per Ton for Timber, Lagging & Poles			.02311	.00550
Equivalent of Stull Timber to Board Measure			10,254	6,380
Feet of Board Measure per Ton of Ore			.1516	.0514

Cost of Timber, Lagging & Poles 1944	1563.21
Cost of Timber, Lagging & Poles 1943	682.40

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7. UNDERGROUND - CONT'D.

e. Drifting and Raising

The following table shows the 1944 development footage exclusive of the development on the 4th Level, classified as to size and material:-

	Drifting		Raising		
	Ore	Rock	Ore	Rock	Total
Small Size	951'	293'	477'	80'	1801'
Large Size	445'	188'	-	-	633'
Total	1396'	481'	477'	80'	2434'

There was a decrease in the total development footage as compared to the previous year due to a reduction in the extent of operations in the Virgil Lease as the reserves are being depleted. In contrast to the previous year when no rock raising was done a relatively large proportion of the development in 1944 was in rock. The major portion of the rock work was done to provide a new ventilation connection to replace a portion of an old connection that will be effected by mining operations. The balance of the rock development was done as part of the development for small sub-level stopes.

f. Explosives, Drilling and Blasting.

There was an increase in the cost per ton for all explosives used due to a large proportion of the work during the year being confined to development. Due to a decline in operations less explosives were used and the total cost was less but the cost per ton increased due to a large proportion of the work being confined to development. In the rock development on the 4th Level electric blasting was introduced shortly after the start of the drifting operation. Good results were obtained with this method of blasting after the crews became thoroughly familiar with the proper proceedure and electric blasting was still being employed in the development at the end of the year. Gelamite No. 1 powder was used almost exclusively in this work. However, small amounts of gelatine powder of various strength was tried when extremely hard slate formation was encountered. To obtain the proper timing when blasting a round No. 1 to No. 8 delays were used. An approved type blasting switch and a magnetic switch, both of which were always located at a safe distance from the heading were used in firing the rounds. An important advantage in electric blasting over conventional fuse and cap blasting is the smaller amount of smoke created after the blast. This is an important factor from the standpoint of ventilation and also in reducing the time consumed in clearing the breast of smoke and gases after each blast.

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7. UNDERGROUND - CONT'D.

f. Explosives, Drilling and Blasting - Cont'd.

Statement of Explosives Used

Ore Development & Stoping	Quantity	Average Price	Amount 1944	Amount 1943
Total No. 1 Gelamite 60%	31,393	.1150 Lb.	3610.20	6102.93
Fuse (Feet)	82,863	5.15 M	426.35	635.05
#6 Blasting Caps	11,913	12.20 M	145.34	219.81
Hot Wire Lighters	4,100	6.75 M	27.68	36.11
Master Fuse Lighters	500	2.07 C	10.34	21.71
#1 Powder Bags	9	1.40 Ea.	12.60	23.80
Tamping Bags	7,150 66	2.86 M	20.44	29.56
Total Fuse, Caps Etc.,			642.75	966.04
Total Explosives, Ore Devel. & Stoping			4252.95	7068.97
Production, Tons			67,637	124,107
Lbs. Powder per Ton of Ore			.4641	.4276
Cost per Ton for Powder			.0534	.0492
Cost per Ton for All Explosives			.0629	.0570

Rock Development	Quantity	Average Price	Amount 1944	Amount 1943
No. 1 Gelamite Powder-60%	2,674	.1150 Lb.	307.51	-
Fuse - Feet	11,012	5.14 M	56.65	-
#6 Blasting Caps	1,429	12.19 M	17.42	-
Hot Wire Lighters	150	6.80 M	1.02	-
#1 Powder Bags	2	1.40 Ea.	2.80	-
Tamping Bags	600	3.70 M	2.22	-
Total Explosives Rock Devel.			387.62	-
E&A 4th Level Development				
#1 Gelamite Powder - 60%	68,585	.115 Lb.	7887.27	120.41
Gelatine Extra - 40%	600	.105 Lb.	63.00	-
Gelatine Extra - 60%	300	.115 Lb.	34.50	-
Gelatine Extra - 80%	300	.140 Lb.	42.00	-
Total Powder	69,785	.115 Lb.	8026.77	120.41
Fuse Feet	20,585	5.14 M	105.83	23.73
#6 Blasting Caps	2,728	12.21 M	33.30	8.36
Elec. Blasting Caps	14,900	12.23 C	1821.91	-
Hot Wire Lighters	500	6.75 M	3.38	1.02
Powder Bags #1	3	1.40 Ea.	4.20	-
Tamping Bags	250	2.16 M	.54	.54
Tamping Shells	13,500	6.00 M	81.00	-
Duples Wire	250'	18.00 M	4.50	-
Connecting Wire	525 Lbs	.55 Lb.	288.75	-
Total Fuse, Caps, etc.			2343.41	
Total Explosives 4th Level Development			10370.18	154.06
Total All Explosives Used in Mine			15010.75	7223.03

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7. UNDERGROUND - CONT'D.

g. Ventilation

Ventilation conditions in the active working places has been quite satisfactory throughout the year. The main fan on surface at the Virgil shaft has continued in operation up-casting the air through this shaft and down-cast through the Spies shaft. The volume of air delivered by the fan has varied only a small amount during the past several years and an average of about 10,000 c.f.m. is being delivered by this fan. The fire area on the 6th Level and above has continued to burn and generate SO^2 gas and heat. Maintaining the direction of the ventilating air to up-cast through the Virgil shaft permits exhausting the foul air from above the active workings so practically no interference to ventilation has occurred on this account. During the last stages of a stope operation adjacent to the Sherwood Boundary it was difficult to maintain adequate ventilation for a short period due to foul air with low oxygen content backing up from old adjacent stopes. A small booster fan that was connected by means of tubing to a fresh air current was employed to enable operations in the stope to be completed. On the 6th Level two brattices that seal off the fire area were reinforced when signs of foul air leaking through the brattices was detected.

During the latter part of the year extensive repairs were required in a portion of the exhaust airway drift on the 4th Level. Upon inspection, a portion of the drift was found completely crushed in a timbered section and only a small amount of air was passing through. Crews were organized to repair this drift during a week-end early in December. By working continuously over the week-end period this section was re-opened and new timber installed. Work in this drift is done under very difficult conditions due to the high temperature and low oxygen content of the air. On a sub-level above the 8th Level a new rock drift and raise connection were driven for ventilation purposes. A portion of the old airway between the 8th and 6th Levels will be effected by adjacent mining operations and before development for mining was started in the latter area a new rock ventilation connection was driven. Similarly as in the previous year a large proportion of the ventilation connections on the 6th and above are inaccessible due to caving and the presence of foul air. Continued operations of the ventilation system is dependent on the inaccessable airways remaining at least partially open so that operations in the Virgil Lease can be continued until the remaining reserves are depleted.

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8. COST OF OPERATING

a. Comparative Mining Costs

	1944	1943	Incr.	Decr.
Product, Tons	67,637	124,107		56,470
Underground Costs	1.815	1.135	.680	
Surface Costs	.583	.326	.257	
General Mine Expense	.654	.389	.265	
Cost of Production	3.052	1.850	1.202	-
Depreciation & Depletion	.236	.253		.017
Taxes	.157	.033	.124	
Loading & Shipping	.142	.076	.066	
Total Cost at Mine	3.587	2.212	.190	.017
Budget Estimated Cost at Mine	3.028	2.001	1.027	
Number of Operating Days	273	213	60	
Number of Shifts and Hours	150 1-8 Hr. 123 2-8 Hr.	38 1-8 Hr. 175 2-8 Hr.		
Average Daily Product	282	639		357

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8. COST OF OPERATING - CONT'D.

b. Detailed Cost Comparison

		1944		1943	
	Underground Costs	Amount	Per Ton	Amount	Per Ton
1.	Exploring in Mine	8556.31	.127	1286.49	.010
3.	Development in Rock	993.98	.015	-	-
4.	Development in Ore	13383.18	.198	13214.87	.107
5.	Stoping	51640.56	.468	52676.49	.425
6.	Timbering	11013.85	.163	8765.84	.071
7.	Tramming	14094.24	.207	20674.98	.167
8.	Ventilation	4200.97	.062	7108.78	.058
9.	Pumping	12528.23	.185	11966.65	.095
10.	Compressors & Air Pipes	8830.94	.130	9072.00	.073
12.	Underground Supt.	8621.63	.128	9319.35	.075
14.	Maint. Comp. & Power Drills	994.93	.015	307.79	.003
15.	Maint. Electric Scrapers	1319.17	.019	1165.81	.009
16.	Electric Tram Equipt.	3824.73	.057	3018.08	.024
17.	Pumping Machinery	2756.43	.041	2282.82	.018
	Total Underground Costs	122759.15	1.815	140859.95	1.135
	Surface Costs				
18.	Hoisting	9302.07	.138	8566.25	.068
19.	Stocking Ore	4798.76	.071	6319.12	.051
20.	Crushing at Mine	2682.64	.040	3493.79	.028
21.	Dry House	5588.15	.083	5690.13	.046
22.	General Surface Expense	6167.00	.091	9306.21	.075
23.	Maint. Hoisting Equipment	2751.83	.041	1868.40	.015
24.	Shaft	4071.59	.060	3259.01	.026
25.	Top Tram Equipment	2428.05	.036	963.25	.008
26.	Docks, Trestles & Pockets	41.01	.000	289.73	.002
27.	Mine Buildings	1599.50	.023	861.16	.007
	Total Surface Costs	39430.60	.583	40417.05	.326
	General Mine Expenses				
	Vacation Expense	4784.84	.070	3998.20	.032
28.	Insurance	762.47	.011	709.15	.006
29.	Mining Engineering	2262.42	.033	1751.16	.014
30.	Mechanical & Electrical Engr.	220.48	.003	518.91	.004
31.	Analysis and Grading	3355.86	.050	3883.46	.031
32.	Personal Injury	12676.69	.188	10080.02	.081
33.	Safety Department	660.56	.010	1231.23	.010
34.	Telephones & Safety Devices	1012.95	.015	858.73	.007
35.	Local and General Welfare	792.67	.012	963.58	.008
36.	Special Expense, Pensions & Allow.	2099.33	.031	2850.54	.023
37.	Ishpeming Office	3023.94	.045	3403.22	.027
38.	Social Security	2729.33	.041	3214.38	.026
39.	Mine Office	9039.49	.133	9258.59	.075
	Total General Mine Expense	44256.85	.654	42721.17	.344
	COST OF PRODUCTION	206446.60	3.052	223998.17	1.805
40.	Taxes	10647.61	.157	4068.67	.033
	Total Cost	217094.21	3.209	228066.84	1.838
	Budget Estimated Cost		2.623		2.001

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8. COST OF OPERATING - CONT'D.

b. Detailed Cost Comparison - Cont'd.

	1944		1943	
	Amount	Per Ton	Amount	Per Ton
41. General Supplies	4344.43	.064	4672.36	.038
42. Iron and Steel	800.58	.012	1117.60	.009
43. Oil and Grease	1242.79	.018	689.89	.005
44. Machinery Supplies	4822.03	.071	3352.81	.027
45. Explosives	4400.98	.065	7081.02	.057
46. Lumber and Timber	1944.51	.029	1887.81	.015
47. Fuel	4305.55	.064	3741.38	.030
48. Electric Power	26564.11	.390	21775.39	.176
49. Sundries	17034.47	.252	10440.32	.084
50. Michigan Sales Tax	9.92	.000	5.70	.000
Supply Inv. Adjustment	6266.38	.093	1997.63	.016
Total per Cost Sheet	59002.99	.872	52766.65	.425

The following is an explanation of the comparative costs accounts that show significant variations as compared to the previous year.

1. Exploring in Mine

Large increase due to underground drilling program that was started during the latter part of the year.

4. Development in Ore

Increase due to larger development program for stope operations.

5. Stoping

The decrease in total expenditures for this account was due to a decline in mining operations, but increase in cost per ton due to smaller product and higher cost of mining in the recovery of small remaining pillars.

6. Timbering

Large increase in cost due to more timber used in the transfer drifts for stope development. Also substantial increases were made in the price of this material.

7. Tramming
8. Ventilation

Decrease in total expenditures these accounts due to less maintenance and repair expense. Increase in cost per ton due to smaller product.

9. Pumping

Increase due to more mine water encountered and pumped during latter part of the year, resulting in more expense for labor. Also, repairs were made to discharge column and some minor repairs to pumping equipment.

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8. Cost of Operating - Cont'd.

b. Detailed Cost Comparison - Cont'd.

14. Maint: Compressors & Power Drills
15. Scrapers and Mech. Loaders
16. Electric Tram Equipment
17. Pumping Machinery

Increase in these accounts due to more repairs and maintenance required. Most of this equipment has been in service for many years and consequently frequent repairs and replacement of parts is necessary to maintain the equipment in working condition.

18. Hoisting

Increase due to addition of second hoist in engine house for use as cage hoist and additional hoisting engineers required. This was done to convert to a two skip hoisting system preliminary to developing the new deposit for mining.

22. General Surface Expense

Decrease in total expense due to large proportion of work done chargeable to E&A accounts, and increase in cost per ton due to smaller product.

23. Maint: Hoisting Equipment
24. Shaft
25. Top Tram Equipment

Increase in these accounts due to more repairs and improvements made to equipment. One top tram Larry Car was wrecked when it fell off the trestle and required major repairs and overhauling.

40. Taxes

Large increase due to increased valuation based on new ore reserves within Iron River City limits.

9. EXPLORATIONS AND FUTURE EXPLORATIONS

a. Underground

During the latter part of the year an exploration drilling program was started on the 8th Level in the Virgil Lease. Correlation of the geological structure from available data in the area North of the Virgil orebody indicates possibilities of concentration. From the North side of the Northwest footwall drift two holes were drilled to the North, both of which encountered short runs of ore with a very high sulphur content. The first hole encountered the ore in the C.C.I. Co. fee owned land North of the Virgil property. The second hole which was inclined encountered the ore at a lower depth in the Virgil property South of the North boundary. The ore encountered in both holes averaged considerably more than 1% in sulphur content. To further explore the extent of this ore and also the quality of the ore a cutout was being made for another drill station along the North side of the main haulage drift late in the year.

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9. EXPLORATIONS AND FUTURE EXPLORATIONS - CONT'D.

a. Underground - Cont'd.

Development on the 4th Level reached the new deposit late in the year and the main level heading crosscut the ore to disclose a relatively narrow width at this point. The first crosscut to the Northeast following along the strike also encountered some ore but was advancing in Jasper at the end of the year. It is very likely that as the development work progresses a relatively large amount of exploration drifting and also some diamond drilling will be required to determine the extent of the deposit. The preliminary plan of development of the new deposit is based on the ore outline that has been determined from surface drill holes. However, additional exploration will be necessary on the 4th Level and above to outline the orebody more completely for subsequent development and mining.

The following is a log of the underground drilling in the Virgil Lease:-

D. D. H. No. 127
8th Level Dip 0° North

Depth	Material
0' - 68'	High Sulphur Ore
68' - 75'	Lean Hi-Sulphur Ore
75' - 562'	Black and Gray Slates
562' - 568'	Hi-Sulphur Ore
568' - 580'	Slate and Ore
580' - 592'	Hi-Sulphur Ore
592' - 595'	Lean Hi-Sulphur Ore
595' - 650'	Slate

D. D. H. No. 128
8th Level Dip 30° North

Depth	Material
0' - 65'	Hi-Sulphur Ore
65' - 76'	Lean Hi-Sulphur Ore
76' - 82'	Slate
82' - 85'	Lean Hi-Sulphur Ore
85' - 382'	Gray and Black Slate
382' - 402'	Hi-Sulphur Ore
402' - 408'	Lean Hi-Sulphur Ore
408' - 419'	Hi-Sulphur Ore
419' - 565'	Slate

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9. EXPLORATIONS AND FUTURE EXPLORATIONS - CONT'D.

b. Surface

Surface exploration drilling has been continued throughout the year in Section 24, and also in the adjoining Section 19 to the East. The drilling program has been continued to further explore the new deposit that was discovered by drilling in the previous year. After the strike of the new deposit was roughly determined, a number of inclined holes were drilled to crosscut the formation. In Section 19 a total of six inclined holes were drilled, two of which were started in the previous year, and ore was encountered in three of the holes. This drilling disclosed that the new deposit is relatively narrow in width and strikes roughly North and South at the North end. A flat anticlinal roll to the East near the upper part of the deposit results in extending the formation nearly to ledge in Section 19. The drilling has proven up 600' of ore along the strike and in depth ore has been encountered to an elevation of about 100' above the 6th Level. Three additional inclined holes were drilled in Section 24 to explore for extensions of the new deposit. Two of the holes have failed to disclose ore and late in the year drilling was being continued in the third hole.

In December, exploration drilling from surface was started in the N. W. ¼ of the N. W. ¼ of Section 24. Available geological information indicates favorable structure and formation for exploration with relatively short holes from surface. The first hole, D.D.H. No. 72 was being drilled vertically and had reached a depth of 434' at the end of the year, but will be deepened to explore for the structures developed in the adjoining property. The following is a log of the surface drilling:-

D.D.H. No. 2

Depth			Material
Drilled in 1943 -0	-	113'	Surface Material
113	-	131'	" "
131	-	375'	Jas. & L.O.
375	-	404'	Ore
404	-	405'	Slate
405	-	470'	Ore
470	-	475'	Lean Ore
475	-	585'	Ore
585	-	868'	Slate & Jas.
868	-	1230'	Grey Slate

D.D.H. No. 3

Depth			Material
0	-	151') Drilled	Surface Material
151	-	421') in	Slate
421	-	425') 1943	Lean Ore
425	-	445'	Lean Ore
445	-	708'	Slate
708	-	730'	Jasper
730	-	810'	Ore
810	-	825'	Jasper
825	-	860'	Ore
860	-	885'	Lean Ore
		Branch Hole	
830	-	849'	Ore
849	-	879'	L.O. & Jasper
879	-	969'	Slate

D.D.H. No. 4
Section 19 Dip 65° West

0	-	183'	Surface Material
183'	-	655'	Interbedded Slate & Jas.
655	-	1080'	Grey Slate

D.D.H. No. 5
Section 19 Dip 65° East

0	-	150'	Surface Material
150	-	1050'	Grey & Bl. Slate

D.D.H. No. 6
Section 19 Dip 65° East

0	-	138'	Surface Material
138	-	205'	Jasper
205	-	255'	Ore
255	-	625'	Slate

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9. EXPLORATIONS AND FUTURE EXPLORATIONS-CONT'D.

b. Surface - Cont'd.

D.D.H. No. 7.
Section 19 Dip 65° East

Depth	Material
0 - 176'	Surface Material
176 - 755'	Jas. and Slate
755 - 765'	Lean Ore
765 - 790'	Ore
790 - 795'	Lean Ore
795 - 908'	Jasper
908 - 1360'	Jas. & Slate
1360 - 1435'	Slate

D.D.H. No. 68
Section 24 Dip 65° East

Depth	Material
0 - 171'	Surface Material
171 - 207'	Slate

D.D.H. No. 69
Section 24 Dip 90°

Depth	Material
0 - 90'	Surface Material
90 - 95'	Cherty Slate

(Test Hole for Shaft Location)

D.D.H. No. 70
Section 24 Dip 65° South

Depth	Material
0 - 164'	Surface Material
164 - 175'	Slate
175 - 970'	Slate & Iron Carb.

D.D.H. No. 71
Section 24 Dip 60° South

Depth	Material
1 - 248'	Surface Material
248 - 365'	Slate & Iron Carb.

(Not Completed)

D. D. H. No. 72
Section 24 Dip 90°

Depth	Material
0 - 47'	Surface Material
47 - 199'	Slate
199 - 340'	Slate & Iron Carb.
340 - 434'	Slate

(Not Completed)

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10. TAXES

The following tabulation is a complete statement of valuations, taxes and comparison for the years 1944 and 1943:

	1944		1943	
Description	Valuation	Taxes	Valuation	Taxes
Iron County				
Iron River Township				
NE¼ of NW¼ of Sec. 24, 43-35)				
SE¼ of NW¼ of Sec. 24, 43-35)				
Virgil Lease				
SW¼ of NW¼ of Sec. 24, 43-35)	50,000	1,110.00	50,000	857.00
Stockpiles, Supplies & Equipt.	160,000	3,552.00	140,000	2,399.60
Total Spies-Virgil	210,000	4,662.00	190,000	3,256.60
Spies Dwellings	7,500	166.50	7,500	128.55
Total Iron River Twp.	217,500	4,828.50	197,500	3,385.15
Rate		2.220		1.714
Village of Mineral Hills				
Spies Lease				
NE¼ of NW¼ of Sec. 24, 43-35)				
SE¼ of NW¼ of Sec. 24, 43-35)				
Virgil Lease				
SW¼ of NW¼ of Sec. 24, 43-35)	50,000	216.87	50,000	213.70
Stockpile, Supplies & Equipt.	160,000	693.98	140,000	598.37
Total Spies-Virgil	210,000	910.85	190,000	812.07
Spies Dwellings	7,500	32.53	7,500	32.06
Total Village of Mineral Hills	217,500	943.38	197,500	844.13
Total Rate		4.337383		4.2740979
Note - Iron River Township and Village of Mineral Hills are the same valuations.				
Ravenna Prickett Houses (1)				
Inland Steel Co. pays the taxes and bills us			700	24.20
Rate				3.457
City of Iron River				
N½ of NE¼ of Sec. 24, 43-35)	3,600	129.42	3,600	128.52
SE¼ of NE¼ of Sec. 24, 43-35)	70,000	2,516.50	2,000	71.40
NW¼ of NW¼ of Sec. 24, 43-35)	2,000	71.90	2,000	71.40
N½ of SE¼ of Sec. 24, 43-35)	71,600	2,574.02	3,200	114.24
Total	147,200	5,291.84	10,800	385.56
Collection Fees		52.92		8.18
Total Iron River City		5,344.76		393.74
Rate		3.595		3.570
Paid in August 1944		2,973.44		
Payable January 1945		2,371.32		
Total as above		5,344.76		

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10. Taxes - Cont'd.

	1944 Valuation	1944 Taxes	1943 Valuation	1943 Taxes
Additional Mineral Lands, acquired in City of Iron River in 1944				
NE¼ of SW¼ of Sec. 24, 43-35)	1,400	22.33		
Lots 1 to 12 incl. Block 1	60	1.08		
Lots 1 to 9 incl. Block 2 & L's 11 to 24 B 2	115	2.07		
Lots 1 to 8 incl. Block 3	60	1.04		
Lots 1 to 12 incl. Bolck 4	60	1.08		
Lots 1 to 10 incl. Block 5	80	1.38		
Total	1,775	28.98		
Collection Fees		.29		
Total		29.27		
Tax per Ton Produced		.157		.033
Tax per Ton Shipped		.105		.035

(1) Ravenna Pricket houses old in 1943 (7 houses) and lease cancelled on this property as of December 31, 1943.

Larger taxes due to additional valuation on reserves in new Spies Deposit.

11. ACCIDENTS AND PERSONAL INJURY

The accident frequency and severity rate in 1944 was much worse than in the previous year. There was one fatality that occured underground and in addition there were seven lost time compensable accidents as compared with three compensable accidents in 1943. A reduction in the operating schedule effective July 1, from 5½ days to 5 days per week together with the reduced labor force accounts for the decrease in the total man days worked from 24,297 in 1943 to 22,810 in 1944. The number of man days lost on account of the accidents was 7,925. (One fatality, 6,000 days.)

The following table shows a comparision of the accident frequency and severity rates for the past two years.

	Frequency Rate	Severity Rate
1944	43.83	43.42
1943	15.46	37.56

Frequency Rate - Number of accidents per 1,000,000 man hours
Severity Rate - Number of days lost per 1,000 man hours.

The compensable accidents are listed in detail as follows:-

Accident No. 156 - February 24, James Bertino, Miner - Bertino was drilling a bench hole and when the drill stuck he turned the blower on to clean the hole. Mud and water splashed under his goggles into his eyes and caused an ulcer to form over the pupil of right eye. Lost sight in right eye. Lost time 900 days.

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11. ACCIDENTS AND PERSONAL INJURY - CONT'D.

Fatality, Accident No. 158 - March 28, John Puskala, Scraper Operator - Puskala was very seriously injured when he was caught by a fall of ground through a mill raise in a transfer drift. He was passing an open mill at the moment a large mass of ground fell from the side of the stope above. He received multiple injuries and died the following day in the Stambaugh General Hospital. Lost time (6000 days)

Accident No. 159 - March 28, Victor Siedleski, Scraper Operator - Siedleski was working with Puskala when the latter was fatally injured and he was caught by the same fall of ground. Fortunately, Siedleski received only minor bruises when he was caught by the fine material from the fall of ground. Lost time 34 days.

Accident No. 162 - November 7, August Morelli, Miner - While picking loose ground after a blast, a piece of rock flew and struck him in the right eye. Foreign material in cornea, and eye ulcerated. Lost time 8 days.

Accident No. 161 - August 8th, William Kermeen, Miner - While trimming loose ground in a stope a chunk fell, striking him on the right foot. Fractures of 3rd and 5th metatarsal of right foot. Lost time 30 days.

Accident No. 156 - February 23, Charles Kukoski, Machinist - Kukoski was helping to load rails onto the cage at the collar of the shaft and while handling a 30' rail it turned over and struck him on the left foot. Fracture of left great toe. Lost time 12 days.

Accident No. 160 - May 16, Sebastian Taetsch, Blacksmith - Taetsch was working on a piece of rail about 20' in length on the shop floor when it rolled suddenly onto his right foot. Fracture of right great toe. Lost time 17 days.

Accident No. 163 - December 19, Sam Trevarton, C/A Miner - While loading cars at a chute, he attempted to close the disc when it suddenly jammed and his right arm was pressed against the disc handle. Strain of right forearm. Lost time 30 days.

12. NEW CONSTRUCTION AND
PROPOSED NEW CONSTRUCTION

The reconstruction program that was necessary to convert the hoisting system from a single skip to a two skip system was completed late in December in the previous year, preliminary to starting drifting operations to the new Spies orebody. Early in the year two measuring pockets, each having a capacity of one skip, and a storage trench of about 300 tons capacity were constructed on the 4th Level. A large amount of rock stripping was also done to widen the original plat and provide room for the track leading from the cage road and to the loading pockets. When an increase in water occured as a result of the new development, a sump having a capacity of about 30,000 gallons was excavated near the shaft and a 100 G.P.M. centrifugal pump installed to divert a portion of the water to the 3rd Level pump. Due to the large increase in mine water and the likely possibility of a further increase as a result of the new development it is apparent that more pumping capacity will be needed. On this account a 600 G.P.M. pump will be purchased early in 1945 and a large capacity sump and a pump house will be excavated on the 6th Level where the new pump will be installed.

With the exception of erecting a small amount of new stocking trestle, there was little construction work on surface. Some minor improvements were made at the collar of the shaft, where an old plank flooring was replaced with concrete around the cage road side. A small size concrete box was constructed adjacent to the cage side of the shaft to house the electrical switches and junction boxes for the power lines in the shaft. On the crusher landing pipe guard railing with a wire mesh screen was installed around the mouth of the crusher.

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12. NEW CONSTRUCTION AND PROPOSED NEW CONSTRUCTION - CONT'D.

Three fuel pumps with 600 gallon storage tanks were leased from the Standard Oil Company and installed on the premises. One of the pumps is used for dispensing gasoline for the mine truck and another for Diesel fuel for the bulldozer. The third pump was installed adjacent to the shop building and is used for fuel oil for the oil furnaces in the shop. No important new construction is contemplated for 1945.

13. EQUIPMENT AND PROPOSED EQUIPMENT

There was a large amount of new equipment purchased and added to the inventory in 1944. Most of the new equipment was charged to E&A's and is for use in connection with developing the new Spies deposit for mining. For several years prior to discovery of the new deposit, very little new equipment was purchased, and replacement was kept at a minimum, as early depletion of the mine was contemplated. Consequently, a relative large amount of replacement of obsolete and worn out equipment has been necessary. In 1945 several new scraper hoist units and also drill machines will be needed as areas are developed for mining in the new orebody. Also, due to a large increase in mine water, more pumping capacity will be required and one 600 G.P.M. pump will be purchased for installation on the 6th Level. The following is a list of the most important items of new equipment purchased in 1944:-

Item	Number of Items	Cost	
TD-14 International Tractor	1	$ 7,334.00	(1)
Voltmeter and Case	1	79.17	
Lamb Air Mover	2	90.00	(1)
Fire Extinguisher, Dugas No. 15	2	96.00	
Fire Extinguisher, Dugas No. 30	2	189.00	
I.R. Stoper R-48	1	366.18	(1)
100 Amp. Circuit Breaker	1	36.33	
70 Amp. Circuit Breaker	1	35.72	
20 Amp. Circuit Breaker	1	21.05	(1)
Trolley Line Breakers	2	57.98	(1)
" " "	1	12.67	(1)
" " "	1	12.67	(2)
Chain Hoist - 1½ Ton	1	104.41	
Floodlight No. 14	1	52.06	
Electric Motor - 25 H.P. A.C.	1	206.88	(1)
Jackbit Furnace	1	611.95	(3)
Jackrod Furnace	1	313.00	(3)
Coolant Pump - ¼ H.P.	1	68.00	(3)
I. R. Drill Sharpener R-54	1	1,847.00	(3)
Band Saw No. 8	1	360.00	
3-Pole, 60 Amp Switch	2	31.58	
3-Pole, 100 Amp Switch	1	18.51	(1)
Steel Leg Vise	1	43.88	
75 Cu.Ft. Lo-Head Tram Cars	24	19,200.00	

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13. EQUIPMENT AND PROPOSED EQUIPMENT - CONT'D.

Item	Number of Items	Cost	
Camel Back Car Dumper	1	$ 750.00	(1)
Cage Hoist Gear and Pinion	1	3,760.00	(1)
Sturtevant Fan No. 45, 25 H.P. D.C.	1	662.73	(1)

(1) New Equipment Charged to E&A CC-116
(2) " " " E&A CC-138
(3) " " " E&A CC-133

14. MAINTENANCE AND REPAIRS

a. Mine

In spite of the reduced production, maintenance expense in many cases increased over the previous year. More repairs and replacement of parts was necessary to electric scraper hoists to maintain them in working condition. Also the underground locomotives and pumping equipment required more maintenance. A large increase in the amount of underground water occured late in the year as a result of the new development and the main pumps on the 8th Level are operating near full capacity. Maintaining these pumps in good working condition is very essential until additional pumping capacity is available.

Shaft maintenance and repairs have been made during the week-ends, replacing worn out runners in the skip roads where necessary, and nailing hardwood wearing strips on the sides of the runners.

In December, an end piece of a shaft set in the skip roads was pulled out of place by the skip and this set was repaired and reinforced. The practice of making shaft inspections at regular intervals is being continued and is of material advantage in shaft maintenance. Repairs to timbered main level drifts and airways comprised the major part of the underground repair work.

One of the top tram Larry cars was badly wrecked when it was derailed and fell off the trestle. In addition to repairing the damage, the car was completely overhauled and equipped with brakes to put it into good condition. Some electrical circuits in the engine house and also in the shaft house have been revamped and improved to conform with accepted practice.

b. Location

Only a small amount of repairs were made on location dwellings in 1944 and this accounts for the large decrease for location maintenance. In most of the cottage type houses and in the apartments some interior woodwork was painted and also numerous rooms were finished with Muresco. Repairs to the exterior consisted mostly of minor repairs to windows and casings. A number of the doors in the location garage were repaired and a portion of the sills renewed where necessary.

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14. MAINTENANCE AND REPAIRS - CONT'D.

b. Location - Cont'd.

Late in the year sale of the location houses was authorized and all the cottages except one and also the four family apartment house will be put up for sale. Before the end of the year, a recommended sale price was set for each of the nine cottages that will be sold and also the apartment house. The tenants in each of the dwellings will be given first consideration to purchase the house they occupy.

MAINTENANCE EXPENSE	AMOUNT			
	1944			1943
	Labor	Supplies	Total	Total
Interior Decorating & Repairs to houses and garage.	101.58	213.79	315.37	2,556.13

15. ELECTRIC POWER

There were no delays to operations during the year due to lack of electric power, which is purchased from the Wisconsin-Michigan Power Co. The average maximum demand load and total power consumption increased materially due to the larger volume of water pumped. The cost per ton also increased due to the decrease in product.

Year	Average Maximum Demand	Rate Per K. W. H.	Total K.W.H.	Cost Per Ton
1944	470	$ .0137	2,013,233	$ .176
1943	370	.0135	1,575,040	.039

16. WATER SUPPLY

The water supply, which is furnished by the Homer Mine, has been satisfactory throughout the year. A new 4" main was laid late in 1943 to connect with a Village 6" main, and this line provides an adequate water supply for all mine purposes. Water for underground drilling has continued to be obtained from the 3rd Level sump.

17. CONDITION OF PREMISES

Routine cleaning has been done to keep the premises in good condition. During the winter months, the bulldozer has been employed after each snowfall clearing the snow from the roads around the mine and also the parking lot area.

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18. NATIONALITY OF EMPLOYEES

	American Born	Foreign Born	Total	Percent
English	8	9	17	23
Finnish	7	6	13	18
Swedish	7	0	7	10
French	8	0	8	11
Danish	4	0	4	5
Italian	3	7	10	13
Polish	1	4	5	7
Irish	2	0	2	
German	1	2	3	
Austrian	0	2	2	
Welsh	1	0	1	13
Lithuanian	1	0	1	
Belgian	0	1	1	
Total	43	31	74	100

THE CLEVELAND-CLIFFS IRON COMPANY
OPERATING AGENT FOR CANISTEO MINING COMPANY
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1. GENERAL:

Operations, involving stripping and the mining of ore, were continuous throughout the year, except for a four-week period - from March 27th, to April 22nd, when the stripping crews were transferred temporarily to the Holman-Cliffs Mine. This recess was utilized at the Canisteo Mine for overhauling equipment and stockpile loading. Otherwise, employees were granted only one day leaves on the holidays. Working schedules of six days per week were carried for the first eight months and five days per week for the remainder.

Pit equipment was given repairs when necessary, and complete overhauls whenever units could be spared.

Washing plant repairs were carried on from the first of the year to the beginning of the ore season and, again, from the close of the ore season through the end of the year.

Two separate stripping operations were in progress at the beginning of the year, in the East Bovey and the South Bovey Forties. The program in the east area was completed on January 10th, after which, all the equipment was concentrated in the South Bovey area and this program was completed on March 25th.

At the conclusion of the 1944 ore season, stripping operations were resumed on November 1st. The removal of waste material and lean ore was started in an area on the pit bottom, enveloping the southeast corner of the East Snyder and the adjacent Hemmens and South Bovey leases. With the advent of sub-zero weather, operations were discontinued on the wet pit bottom and both shovels were shifted to surface stripping in the north side of the Mid-Snyder forty, where operations were conducted for about a week and a half before the end of the year.

Following a month of clean-up work and shovel repairs, ore operations were started on May 22nd and continued through October 26th. A working schedule of two 8-hour shifts and six days per week was maintained until September 2nd, when the five day week became effective. Ore was mined from all three leases, however, only a small amount was taken from the Hemmens.

The washing plant was operated on the same schedule as that established for the pit. Considering the low weight recovery of the crude ore treated, the plant operated quite satisfactorily, as very few mechanical delays were encountered.

Pumping was carried on continuously throughout the year from the water basin in the east end of the pit.

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1. GENERAL:
(Continued)

Exploratory and sample drilling was conducted for about eleven months of 1944. Exploration holes were drilled in all three leases, while sample drilling was done only in the Snyder and Hemmens forties.

2. PRODUCTION, SHIPMENTS & INVENTORIES:

a. Production by Grades:

Snyder Crude,	519,486	tons
Bovey Crude,	547,693	"
Hemmens Crude,	5,519	"
TOTAL CRUDE ORE,	1,072,698	"
Snyder Non-Bessemer Concentrates,	148,507	"
Snyder Bessemer Concentrates,	117,955	"
Bovey Non-Bessemer Concentrates,	44,949	"
Bovey Bessemer Concentrates,	232,953	"
Hemmens Non-Bessemer Concentrates,	247	"
Hemmens Bessemer Concentrates,	1,875	"
TOTAL PRODUCTION, 1944,	546,486	"

b. Shipments:

Snyder Non-Bessemer Concentrates,	181,937	"
Snyder Bessemer Concentrates,	144,847	"
Bovey Non-Bessemer Concentrates,	44,949	"
Bovey Bessemer Concentrates,	232,953	"
Hemmens Non-Bessemer Concentrates,	247	"
Hemmens Bessemer Concentrates,	1,875	"
TOTAL SHIPMENTS, 1944,	606,808	"

c. Stockpile Inventories:

Snyder Concentrates in Stockpile, January 1,1945,	3,729	"

e. Production by Months:

(1) Crude Ore:

	SNYDER	BOVEY	HEMMENS	TOTAL
May,	60,892	6,473		67,365
June,	120,687	113,646		234,333
July,	114,860	43,637		158,497
August,	89,120	145,014	5,013	239,147
September,	50,107	152,289		202,396
October,	83,820	86,634	506	170,960
TOTAL,	519,486	547,693	5,519	1,072,698

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2. PRODUCTION, SHIPMENTS & INVENTORIES: (Continued)

e. Production by Months: (Continued)
(2) Concentrates:

	SNYDER	BOVEY	HEMMENS	TOTAL
May, ----------	29,901	3,153		33,054
June, ----------	60,913	57,606		118,519
July, ----------	61,164	21,350		82,514
August, ----------	48,174	76,832	1,875	126,881
September, --------	26,200	76,250	-	102,450
October, ----------	40,110	42,711	247	83,068
TOTAL, ----------	266,462	277,902	2,122	546,486

f. Ore Statement:

A book balance of 43,391 tons of Snyder concentrates was shown in stockpile as of January 1st, 1944. The entire stockpile was loaded and shipped in April, for a total of 64,051 tons, reflecting an overrun of 20,660. Empty railroad car shortages, during the pit operations, entailed the restocking of 3,729 tons of Snyder concentrates, which is the balance remaining in stockpile as of January 1st, 1945.

g. Delays:

An accumulation of all delays reported during the ore season amounted to 52 hours and 25 minutes. Largely responsible were the frequent electrical storms, showing a total of 24 hours and 35 minutes in power shortages and delays. Mechanical and electrical failures on the shovels showed a total delay of 21 hours and 45 minutes, which had only a partial effect on production, as very seldom were both shovels down for repairs at the same time. A comparatively low total of 6 hours and five minutes was encountered in operating delays at the washing plant.

3. ANALYSIS:

a. Mine Analysis of Production:

	Tons	Iron	Phos.	Sil.	Mang.	Alu.	Moist.	Fe.Nat.
Snyder N.B. Concts.	148,507	57.25	.063	10.72	.30	.67	8.10	52.61
Snyder Bess. Concts.	117,955	56.71	.034	11.44	.42	.54	7.59	52.41
Bovey N.B. Concts.	44,949	57.17	.052	11.04	.30	.69	8.14	52.52
Bovey Bess. Concts.	232,953	56.46	.031	11.62	.45	.54	7.80	52.06
Hemmens N.B. Concts.	247	55.40	.053	13.41	.16	1.04	6.80	51.63
Hemmens Bess. Concts.	1,875	55.40	.030	13.72	.64	.66	8.06	50.94
TOTAL,	546,486	56.78	.048	11.30	.39	.59	7.86	52.32

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3. ANALYSIS:
(Continued)

b. Mine Analysis of Shipments:

	Tons	Iron	Phos.	Sil.	Mang.	Alu.	Moist.	Fe.Nat.
Snyder N.B. Concts.	181,937	57.38	.062	10.62	.28	.68	7.86	52.87
Snyder Bess. Concts.	144,847	56.93	.035	11.22	.38	.56	7.43	52.70
Bovey N.B. Concts.	44,949	57.17	.052	11.04	.30	.69	8.14	52.52
Bovey Bess. Concts.	232,953	56.46	.031	11.62	.45	.54	7.80	52.06
Hemmens N.B. Concts.	247	55.40	.053	13.41	.16	1.04	6.80	51.63
Hemmens Bess. Concts.	1,875	55.40	.030	13.72	.64	.66	8.06	50.94
TOTAL,	606,808	56.90	.043	11.19	.37	.60	7.76	52.49

c. Mine Analysis of Ore in Stockpile:

	Tons	Iron	Phos.	Sil.	Mang.	Alu.	Moist.	Fe.Nat.
Snyder Concs.	3,729	55.07	.038	12.23	.72	.47	8.07	50.63

d. Average Analysis of Crude Ore Production:

Lease	Tons	Iron	Phos.	Silica
Snyder,	519,486	41.90	.041	34.80
Bovey,	547,693	41.11	.032	35.52
Hemmens,	5,519	39.66	.027	37.83
Total,	1,072,698	41.49	.036	35.18

e. Complete Analysis of Season's Shipments:

	Iron	Phos.	Sil.	Mang.	Alu.	Lime	Mag.	Sul.	Loss
Snyder N.B. Concs.	57.38	.062	10.62	.28	.68	.26	.18	.012	5.71
Snyder Bess. Concs.	56.93	.035	11.22	.38	.56	.27	.19	.011	5.75
Bovey N.B. Concs.	57.17	.052	11.04	.30	.69	.28	.17	.012	5.55
Bovey Bess. Concs.	56.46	.031	11.62	.45	.54	.26	.20	.012	5.94
Hemmens N.B. Concs.	55.40	.053	13.41	.16	1.04	.29	.18	.011	5.54
Hemmens Bess. Concs.	55.40	.030	13.72	.64	.66	.26	.17	.010	5.00

4. ESTIMATE OF ORE RESERVES:

a. Developed Ore:
Factors Used:
All Leases:

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4. ESTIMATE OF ORE RESERVES: (Continued)

a. Developed Ore: (Continued)

Class of Material	Rock Deduction	Cu. Ft. Per Ton	% Recovery
Wash Ore,	10%	14	60%
Lean Wash Ore,	10%	14	50%
Low Grade Wash Ore,	10%	15	60%
Lean Low Grade Wash Ore,	10%	15	50%
Rocky Wash Ore,	20%	14	60%

LEASE	RESERVE JAN.1,1944	MINED 1944	BALANCE	DEVELOPED BY DRILLING	RESERVE JAN.1,1945
Bovey:					
S½-NE- Sec.30,	116,744		116,744		116,744
NW-SE- Sec.30,	235,100		235,100		235,100
NE-SE- Sec.30,	447,898		447,898		447,898
NE-NE- Sec.31,	900,535	277,902	622,633		622,633
Total Bovey,	1,700,277	277,902	1,422,375	-	1,422,375
Hemmens:					
SW-SW- Sec.29,	1,562,912	2,122	1,560,790		1,560,790
Snyder:					
SE-SW- Sec.30,	1,091,685	-	1,091,685		1,091,685
SW-SE- Sec.30,	404,220	36,011	368,209	674,336	1,042,545
SE-SE- Sec.30,	1,329,266	251,111	1,078,155	-	1,078,155
Total Snyder,	2,825,171	287,122	2,538,049	674,336	3,212,385
GRAND TOTAL,	6,088,360	567,146	5,521,214	674,336	6,195,550

Outside of the additional ore developed by drilling in the Mid-Snyder forty, the reserve estimate, as of January 1st,1945, was a net total of the 1944 reserve and the deduction of the season's shipments.

c. Estimated Analyses:

The following tabulation shows the estimated analyses of the reserve ore for the several leases:

Lease	Tons	Iron	Phos.	Sil.	Mang.	Alu.
Bovey:						
Bessemer Concs.	307,799	58.10	.033	9.47	.26	.46
Non-Bess.Concs.	1,114,576	56.71	.078	11.24	.29	.49
Hemmens:						
Bessemer Concs.	642,277	58.44	.034	9.87	.22	.52
Non-Bess.Concs.	918,513	56.78	.053	12.08	.27	.57
Snyder:						
Bess. Concs.	1,252,976	60.54	.039	8.74	.22	.41
Non-Bess.Concs.	1,959,409	58.34	.060	10.15	.30	.46

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4. ESTIMATE OF ORE RESERVES: (Continued)

c. Estimated Analyses: (Continued)

	Tons	Iron	Phos.	Sil.	Mang.	Alu.
Total Bess.Concs.	2,203,052	59.58	.036	9.17	.23	.45
Total N.B.Concs.	3,992,498	57.53	.063	10.90	.29	.49
GRAND TOTAL,	6,195,550	58.26	.053	10.28	.27	.47

5. LABOR AND WAGES:

a. Comments:

(1) Labor:

The labor shortage, experienced during the previous year, prevailed throughout 1944. At times, absenteeism among the employees, impelled by calls for pre-induction examinations and other reasons, necessitated the "doubling out" of some individuals to maintain minimum crews.

No serious difficulties developed between labor and management during the year, except for a few petty grievances presented by the union committee, which were readily settled to the satisfaction of all concerned.

b. Comparative Statement of Wages and Product:

PRODUCTION:	
Direct Shipping Ore,	-
Concentrates Shipped,	606,809 tons
Concentrates in Stock 12-31-44,	3,729 tons
Concentrates in Stock 12-31-43,	43,392 tons
Total Production,	567,146 tons
Number of Days Operated, (125 days, 2 - 8-hour shifts)	125
Average Daily Product,	4,555
Average Wages Paid Per Day,	8.10
Amount Paid for Labor,	$ 132,176.35

6. SURFACE:

a. Buildings, Repairs:

Outside of a small extension to the washing plant by the Minerals Separation people, for experimental work on tailings, nothing but ordinary maintenance work on the mine buildings and dwellings took place during the year.

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6. SURFACE:
(Continued)

c. Roads, Transmission Lines, etc:

Nothing new has been added in road extensions, outside of some fills for short cuts in truck haulage during the course of ore and stripping operations.

About 1,200 feet of transmission line was transferred farther north to permit stripping operations along the north side of the Mid-Snyder area.

7. OPEN PIT:

a. Stripping:

Stripping operations were conducted during 1944 in various areas, in and about the pit, for a total of 112 days. The overburden removed consisted of surface, waste formation and lean ore for a total volume of 747,942 cubic yards, exclusive of the yardage handled during the four-week period of clean-up, just prior to the ore season. Stripping activities in the East Bovey and South Bovey forties, started in the fall and winter of 1943, were completed before the ore season, on schedules of three 8-hour shifts and six days per week. Post-season operations took place in the pit bottom and on the north side of the Mid-Snyder forty, on three shift and five day week schedules. Two Bucyrus-Erie, 3-1/2-yard electric shovels, with eight Euclid trucks were used throughout the stripping program, except during shovel repair periods, when a single shovel and six trucks were in use.

The East Bovey stripping program, which had been started in the fall of 1943, was in its final stages at the beginning of 1944. With the removal of 15,324 cubic yards of surface and 16,763 yards of waste formation, the work was completed on January 10th, and the shovel was moved across the pit, where operations on the south side were also in progress.

The stripping program, which was started several weeks before the first of the year, was continued in the South Bovey forty. Upon completion of the east forty, this work was carried forward with two shovels until March 13th, when one was sent to the shop for its annual overhauling, and the work was finished with single shovel operations. The area stripped extended eastward about 900 feet from the west property line and uncovered a berm of ore of about 100 feet in average width. A stratum of wet blue clay, in the upper layers, presented difficulties in maintaining haulage roads and necessitated the use of pontoons for shovel travel. Similar conditions were encountered in the bottom cretaceous material, where each cut through a trough released flows of underground water. In addition to the retarded truck and shovel movements, the wet material entailed handling difficulties during the sub-zero weather and necessitated the light loading of trucks to prevent spillage over the tail, and when traveling up steep grades.

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7. OPEN PIT:
(Continued)

a. Stripping: (Continued)

The narrow width of the area stripped, with eight to twelve feet of frost along the open slope, resulted in a comparatively large percentage of frost handled. The removal of 284,202 cubic yards of surface and 136,343 of waste formation, or a total of 420,545 cubic yards, completed the South Bovey program, on March 25th.

After the completion of the South Bovey stripping, the operating crew was transferred, temporarily, to the Holman, where they could be kept busy until the clean-up work could be started. In addition to retaining an operating crew, this afforded an excellent opportunity for shovel repairs on one of the machines, while the other was transferred to the stockpile, in anticipation of an early demand for ore shipments. The loading of stocked concentrates was started on April 11th and continued, intermittently, through the 22nd, depending on boat requirements. The entire stockpile was loaded in 16 shifts, for a total of - 64,051 tons of concentrates. The analysis of the shipments checked well with those obtained in stocking, although there was a gain of more than 1% in natural iron, due to a 1.70% loss in moisture since the ore was stocked.

With the return of the stripping crews, a clean-up program was undertaken in the southeast and southwest corners of the East Snyder forty, whereby layers of paintrock and lean ore were removed to make accessible certain underlying limonitic ores required early in ore operations. Single shovel operations were started on April 25th and by May 20th, - 80,134 cubic yards of waste and 9,400 yards of lean ore had been removed.

On November 1st, post-ore season stripping operations were started in the pit bottom, using two shovels. Paintrock and other lean formations were removed from the southeast corner area of the East Snyder forty and the immediate vicinity. In addition to uncovering the underlying ore in this area, a channel was cut through waste formation from the main sump to the old drainage shaft to establish a direct flow of pit run-off. Heavy sleet storms during this period, together with the wet surroundings, presented considerable difficulties in truck haulage over the slippery paintrock and in shovel operations at water elevations. A cold wave of sub-zero temperatures, late in December, brought on the suspension of operations in the wet horizon and the shovels were moved to surface stripping operations on the north side of the pit. A total of 241,531 cubic yards of lean and waste ore material was taken from the pit bottom and placed on the proper disposal pile in the pit, during this period. This consisted of 21,682 yards of lean ore and 143,348 yards of waste ore material from the East Snyder forty; 37,648 yards of lean and 3,085 yards of waste from the South Bovey; and 18,455 yards of lean ore - and 17,313 yards of waste material from the Hemmens.

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7. OPEN PIT:
(Continued)

a. Stripping: (Continued)

Surface stripping operations were in progress on the north side of the pit, in the Mid-Snyder forty, for a week and a half before the close of the year. The overburden from this area was hauled to a waste dump, north of the pit. Some major shovel breakdowns developed during this period, otherwise, operating conditions were quite favorable and a total of 53,779 cubic yards of surface was removed by the end of the year.

The following tabulation shows, by leases, the yardage of the various materials which were stripped from the Canisteo during the year 1944:

LEASE	SURFACE	WASTE	LEAN ORE	TOTAL
Snyder,	53,779	143,348	21,682	218,809
Bovey,	299,526	156,191	37,648	493,365
Hemmens,	-	17,313	18,455	35,768
Total, (Cu.Yds.)	353,305	316,852	77,785	747,942

f. Explosives, Drilling and Blasting:
Statement of Explosives Used:

ORE OPERATIONS:

	QUANTITY	PRICE	AMOUNT
25% duPont Quarry Gel. 5 x 16	53,750#	$10.00	$ 5,375.00
40% duPont R.C. Extra 5 x 14	46,250#	10.00	4,625.00
Total and Average,	100,000#	10.00	$10,000.00
30' duPont #6 E.B. Caps,	250	14.65	36.63
Plain Primacord	22,000'	32.00	704.00
Total Caps, Fuse, etc.			$ 740.63
TOTAL ORE OPERATIONS,			$10,740.63

STRIPPING OPERATIONS:

25% duPont Quarry Gel. 5 x 16	71,250#	10.00	7,125.00
40% duPont R.C. Extra 5 x 14	66,250#	10.00	6,625.00
40% duPont R.C. Extra 7/8 x 8	250#	10.00	25.00
40% duPont R.C. Extra 1¼ x 8	300#	10.00	30.00
Total and Average,	138,050#	10.00	$13,805.00
16' duPont #6 E.B. Caps,	2,000#	8.64	172.80
30' duPont #6 E.B. Caps,	1,250	14.65	183.13
#20 Connecting Wire,	100#	55.00	55.00
Plain Primacord,	9,500'	32.00	304.00
Total Caps, Fuse, etc.			$ 714.93
TOTAL STRIPPING OPERATIONS,			$14,519.93
GRAND TOTAL EXPLOSIVES, 1944,			$25,260.56