

Analysis of Raw Material.

Blairton Ore:

SiO ₂	6.60	} Fe = 55.85.
Fe ₂ O ₃	60.74	
FeO	17.18	
Al ₂ O ₃	1.48	
CaO	2.84	
MgO	5.50	
P ₂ O ₅	0.037	P = 0.016.
S	0.57	
CO ₂ & undet	5.053	

100,000

Charcoal and limestone same as in previous run.

Composition of Charge.

	Pounds.
Ore	400
Charcoal	125
Limestone	25
Sand	6

Analysis of Iron Produced.

Cast No. 80, Grey Iron:

Total carbon	3.73
Si	3.53
S	0.042
P	0.034

Analysis of Slag Produced.

SiO ₂	33.80
Al ₂ O ₃	10.20
CaO	21.78
MgO	30.50
S	2.05
Fe	0.25

$$\frac{\text{Slag } 4892}{\text{Iron } 11989} = 0.41$$

Length of run	65 hours, 30 min.
Mean volts on furnace	36.03
Mean amperes	4987
Power factor	0.919
Pig-iron produced	11989 pounds.
Watts = $36.03 \times 4987 \times 0.919$	165125

$$\text{E. H. P.} = \frac{165125}{746} = 221.34$$

$$\frac{11989 \times 24 \times 1000}{65.5 \times 221.34 \times 2000} = 9.92 \text{ tons.}$$

$$\text{E. H. P. year per ton of pig} = 0.276$$

Run No. 15.

Ore treated	Magnetite from Calabogie.*
Reducing agent	Charcoal and charcoal brace.
Flux	Limestone.

Analysis of Raw Material.

Calabogie Ore:

SiO ₂	3.80	} Fe = 59.38
Fe ₂ O ₃	56.24	
FeO	25.76	
Al ₂ O ₃	3.73	
CaO	2.00	
MgO	3.42	
P ₂ O ₅	0.85	P = 0.371
S	0.20	
CO ₂ & undet	4.00	

100.00

Limestone and charcoal the same as in previous runs. The charcoal brace used was of poor quality, being wet, high in ash and mostly fines.

The composition of the charge, when using charcoal, was:—

	Pounds.
Ore	400
Charcoal	125
Limestone	30

When using charcoal brace, the composition of the charge was:—

	Pounds.
Ore	400
Charcoal brace	145
Limestone	40

During this run the alternator had to be stopped on account of repair of motor. The furnace was then considerably cooled and some time was consumed before it was again in working condition.

First Part of Run.—Analysis of Iron Produced.

Cast No. 89, Grey Iron: Cast No. 90, Grey Iron:

Total carbon	3.53	3.43
Si	0.95	1.17
S	0.024	0.016
P	0.554	0.457

Analysis of Slag Produced.

SiO ₂	24.30
Al ₂ O ₃	27.16
CaO	36.06
MgO	10.74
S	1.67
Fe	0.25

$$\frac{\text{Slag } 1335}{\text{Iron } 4520} = 0.29$$

Length of run	23 hours, 50 min.
Mean volts on furnace	36.16
Mean amperes	5,000
Power factor	0.919
Pig-iron produced	4520 pounds.
Watts = $36.16 \times 5000 \times 0.919$	166155

$$\text{E. H. P.} = \frac{166155}{746} = 222.72$$

$$\text{Output of pig-iron per 1,000 E. H. P. days} = \frac{4520 \times 24 \times 1000}{23.83 \times 222.72 \times 2000} = 10.21 \text{ tons.}$$

$$\text{E. H. P. years per ton of pig} = 0.268.$$

Second Part of Run.—Analysis of Iron Produced.

Cast No. 92, Grey Iron: Cast No. 95, Grey Iron:

Si	0.73	0.95
S	0.011	0.012
Slag	892	
Iron	2722	

$$\frac{\text{Slag } 892}{\text{Iron } 2722} = 0.33$$

Length of run	16 hours, 15 min.
Mean volts on furnace	35.85
Mean amperes	5000
Power factor	0.919
Pig-iron produced	2722 pounds.
Watts = $35.85 \times 5000 \times 0.919$	164730

$$\text{E. H. P.} = \frac{164730}{746} = 220.81$$

$$\text{Output of pig-iron per 1000 E. H. P. days} = \frac{2722 \times 24 \times 1000}{16.25 \times 220.81 \times 2000} = 9.10 \text{ tons.}$$

$$\text{E. H. P. years per ton of pig} = 0.301.$$

Run No. 16.

Ore treated	Magnetite from Calabogie.*
Reducing agent	Charcoal.
Flux	{ Limestone. Quartz.

Analysis of Raw Material.

Calabogie Ore:

SiO ₂	6.06	} Fe = 59.85
Fe ₂ O ₃	58.00	
FeO	24.78	
Al ₂ O ₃	1.00	
CaO	0.40	
MgO	6.00	
P ₂ O ₅	0.046	P = 0.020.
S	0.17	
CO ₂ & undet	3.544	

100.000

Charcoal:

Moisture	2.20
Volatile matter	20.60
Fixed carbon	74.40
Ash	2.80

Limestone same as in previous runs.

Composition of Charge.

	Pounds.
Ore	400
Charcoal	125
Limestone	45
Quartz	5

*Calabogie Mining Company.

*Calabogie Mining Co., Shaft No. 4.