

APPENDIX D

Ausmelt Consumption Rates and Labour Requirements

Note: The concentrate grade and feed rate were altered part way through the study, as requested by Compass Resources. Ausmelt re-designed the smelter to treat dry injected, concentrates produced during years 1 and 2 of operation.

As substantial work had been completed, process data sheets and the process flow diagram were not re-issued by Ausmelt. Consequently, the information presented in the data sheets and process flow diagram do not directly correspond to the final process design presented in Appendix A.

The information presented in this chapter is based on the process design outlined in Appendix A to treat concentrates of the grade, moisture content and feed rate detailed in table A.1.1.

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D.1 LABOUR REQUIREMENTS

The operating labour requirements for the Ausmelt primary smelter are listed in table D.1.1. The Ausmelt primary smelter, which will operate continuously 24 hours per day, requires four rotating shifts of six operators.

Table D.1.1 Ausmelt primary smelter Labour Requirement

Shift Role	Labour Requirement
Furnace	
Shift Supervisors	4
Operators (Control)	4
Tapping and Product Handling	8
Feed Handling / Misc	8
TOTAL (for four rotating shifts)	24

Additional labour will be required to operate the peripheral systems and to provide management, administrative and maintenance support.

D.2 OPERATING CONSUMPTION RATES

Hourly and annual operating consumption rates are summarised in table D.2.1.

D.2.1 Fuel Requirements

The Ausmelt primary smelter will be heated during operation by combusting milled coal at the tip of the Ausmelt lance. Natural gas will be used as fuel for the standby burner.

The fuel consumption rates for the lance and standby burner are estimated at 25,800 kg of coal (dry) and 547,600 Nm³ of natural gas per annum respectively.

D.2.2 Power Requirements

The largest electrical loads for the Ausmelt primary smelter are drawn by the control system UPS and the lance hoist. The UPS and lance hoist will be rated at approximately 10 kW and 40 kW respectively. These are the rated supply requirements.

The annual Ausmelt primary smelter power consumption is estimated at 300MWh.

D.2.3 Reductant Coal Requirements

Reductant coal requirements for the Ausmelt primary smelter are estimated at 3,950 dry tonnes per annum.

D.2.4 Flux Requirements

Quick lime requirements for the Ausmelt primary smelter are estimated at 14,650 dry tonnes per annum.

Haematite requirements for the Ausmelt primary smelter are estimated at 22,990 dry tonnes per annum.

Dolomite requirements for the Ausmelt primary smelter are estimated at 1,700 dry tonnes per annum.

D.2.5 Water Requirements

The Ausmelt primary smelter will require approximately 4,346,900 tonnes per annum of recirculated process water for the tapping block and furnace cooling systems.

The plant will require an additional 80,000 tonnes per annum of make up water to replenish water lost through vaporisation.

D.2.6 Process Air Requirements

The Ausmelt primary smelter will require air for primary lance combustion, fuel coal and concentrate conveying (proportion of combustion air), afterburn combustion and standby burner combustion.

Concentrates will be injected into the bath via a central annulus in the Ausmelt lance. The concentrates will be conveyed down the lance at a loading ratio (mass of concentrates to gas) of 20. Fuel coal will be conveyed down the lance via a second concentric pipe at conveying loading of 10.

The total air consumption rates for the lance and standby burner are estimated at 322,092,200 (includes combustion, carrier and afterburn air) and 5,933,300 Nm³ per annum respectively.

Refer to Appendix B for lance air and oxygen supply pressures at the start of the Ausmelt delivery control trains.

D.2.7 Combustion Oxygen Requirements

The Ausmelt primary smelter will require approximately 31,072,000 Nm³ per annum of oxygen for primary combustion.

D.2.8 Miscellaneous Items

In estimating, an operating cost for the Ausmelt primary smelter an allowance is required for miscellaneous items such as oxygen tapping lances, small incidental items and safety equipment for the plant operators.

Table D.2.1 Hourly and Annual Consumption Rates

Consumable		unit	Hourly Consumption	Annual Consumption
Fuel	Lance (coal)	Tonnes	3.5	25,800
	Standby burner (natural gas)	Nm ³	1,080	547,600
Power		MWh	-	300
Reductant Coal		Tonnes	0.6	3,950
Flux	Quick lime	Tonnes	2.0	14,650
	Haematite		3.1	22,990
	Dolomite		0.2	1,700
Water	Actual (not consumed)	Tonnes	590	4,346,900
	Make-up		10	80,070
Process Gases	Combustion Air	Nm ³	9,900	72,817,300
	Fuel Coal Carrier Air		580	4,300,700
	Concentrate Carrier Air		1,770	12,980,200
	Combustion Oxygen		4,220	31,072,000
	Afterburn Air		31,530	231,993,730
	Standby burner		11,660	5,933,320

D.3 MAINTENANCE

Refractory replacement will be the largest single maintenance cost item for the Ausmelt primary smelter. It is anticipated that the upper wall refractories (shower cooled section only) in the Ausmelt furnace will require replacement once a year and the base refractories every second year. Some minor repairs to the gas offtake may also be required as part of a scheduled maintenance program.

The approximate material requirements for refractory replacement are as follow:

?? Wall (annual) 135 tonnes (45 m³) of high conductivity basic bricks
 12 tonnes (6.5 m³) of high conductivity ram

?? Base (every 2nd year) 50 tonnes (15 m³) of chrome-magnesia bricks
 5 tonnes (1.5 m³) of high density ram