Document: 004-0201 Flow Sheet Barry R4
Date: 17-06-16
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Sheet:

This flowsheet gives an overview of the design flows in and out of the system boundaries

Barry - Biomass No 2

IN

Limestone	136	tonnes/year
Urea 40% solution	2,400	tonnes/year
Hydrated Lime	536	tonnes/year
Activated Carbon	26	tonnes/year
Waste Wood	86,400	tonnes/year
Air		
Nitrogen	0	liter/year
Bed Material	0	tonnes/year
Antiscalant Chemicals	t.b.d.	tonnes/year
Boiler Chems	t.b.d.	tonnes/year
Corrosion Inhibitor	t.b.d.	tonnes/year
Water	39,360	tonnes/year
Salt	4	tonnes/year
Diesel	160	m3/year
Turbine Lubricant	t.b.d.	m3/year
Gearbox Oil	t.b.d.	m3/year
Grease	t.b.d.	m3/year
General Oil	t.b.d.	m3/year

Chemicals storage Flue Gas Treatment

Limestone	5	m^3
Urea Storage	0.476	m^3
Hydrated Lime	20.0	m^3
Activated Carbon	3	m^3

Urea Injection

Consumption Limestone	17	kg/h
Consumption Urea	300	kg/h
Consumption Water	381	l/h

Flue gas treatment

Consumption Hydrated Lime	67	kg/h
Consumption Act. Carb.	3.3	kg/h
Consumption Scrubber Water	1,698	l/h

Fuel Storage

Waste Wood Storage	2,000	m^3
Waste Wood Consuption	10,842	kg/h

Fuel screening

Waste wood oversized	11	kg/h
Oversized bin	10	m^3
Waste wood metal screening	11	kg/h
Metal Bin	10	m^3

Gasifier

Waste Wood consumption	10,820	kg/h
Fuel energy input	42.92	MW
Energy to Steam	36.3	MW

Flue gas cleaning

Output fluegas	83,150	mn3/h
Multicone Ash Output	259	kg/h
Baghouse Particle Output	493	kg/h

Nitrogen Storage

Nitrogen Storage	50	liter
Nitrogen consumption	0	liter/h

Multiclone Ash Storage

Storage volume	212	m^3
Yearly output	2,072	ton/year

Bed Material Storage

Bed Material Storage	20.50	m^3
Consumption	0	kg/h

Baghouse Ash Storage

Storage volume	141	m^3
Yearly output	3,944	ton/year

Boiler Chemicals

Antiscalant Chemicals storage	100	liter
Consumption	t.b.d.	l/h
Boiler Chemicals storage	100	liter
Consumption	t.b.d.	l/h
Caustic storage	100	liter
Consumption	t.b.d.	l/h

Boiler

Steam production	50.0	ton/h
Steam temperature	400	°C
Steam pressure	45	bara
Steam power output	44.5	MW

Turbine

Steam input	50.0	ton/h
Electrical Generation	11,680	kWe
Parasitic Load (total)	1450	kWe
Power Output	10,230	kWe
Bleed steam Dearator	2.971	ton/h
Bleed steam LP preheater	4.923	ton/h

ACC

Steam input	47.0	ton/h
Pressure	0.085	bara
Temperature	42.9	°C
Condensate output	47.0	ton/h

Water Treatment

Storage volume	21	m^3
Salt Storage	1	m^3
Demiwater production	1,000	l/h

Dearator

Condensate input	52.0	ton/h
Steam input	2.971	ton/h
Feedwater output	55.9	ton/h

Water Consumption

Welfare	42	l/h
Cleaning and other	299	l/h
Urea system	381	l/h
Flue gas scrubber	1,698	l/h

Flue gas Treatment

Water Discharge

Blowdown	1,000	l/h
Water Treatment	1,500	l/h
Welfare and other	341	l/h
Steam Traps	1,080	l/h

Maintenance Chemicals Storage

Diesel Storage volume	15	m^3
Turbine Lubricant Storage	t.b.d.	m^3
Gearbox Oil Storage	t.b.d.	m^3
Grease Storage	t.b.d.	m^3
General Oil Storage	t.b.d.	m^3

Maintenance Chemicals Usage

Average Consumption Diesel	20.0	l/h
Yearly consumption Turbine Lubricant	t.b.d.	m3/year
Yearly consumption Gearbox Oil	t.b.d.	m3/year
Yearly consumption Grease	t.b.d.	m3/year
Yearly consumption Oil	t.b.d.	m3/year

OUT

Oversized Particles	88	ton/year
Metals	88	ton/year
Flue gas	851,456	ton/year
Fly ash	2,072	ton/year
Bottom ash	3,944	ton/year
Surface water collection	86,400	ton/year
Electricity	36.83	GWh
Heat to air	24302	MW
Water discharge incl blow down, ejector etc	31,368	ton/year