Appendix A:

CO_2 capture process summary, PFDs and stream data

A.1 CO_2 capture from base case 1

A.1.1 Case 01_01

A.1.1.1 Case 01_01 Summary

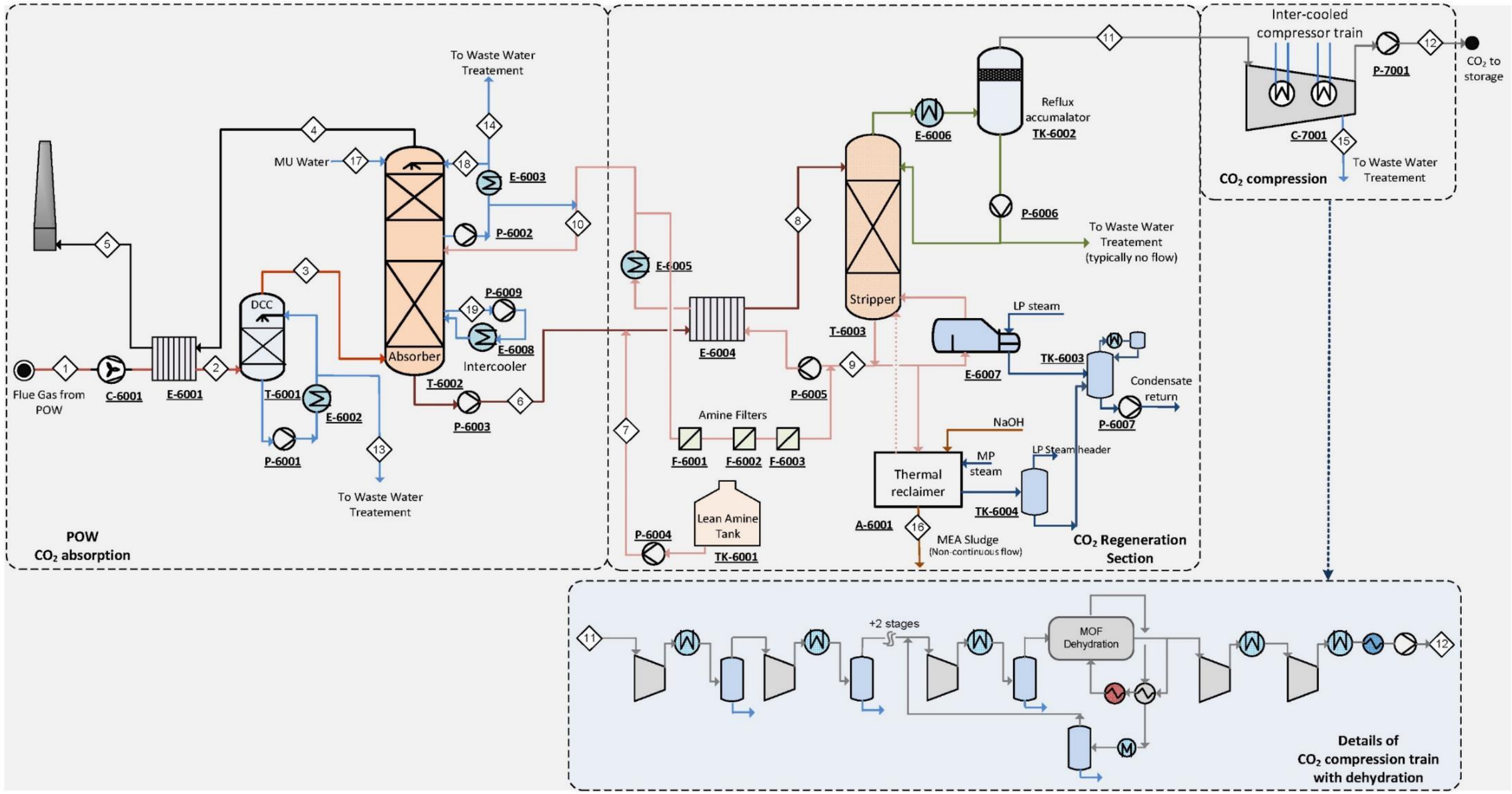
Absorber	POW_T-6002
Flow rate flue gas [tonne/h]	292.4
Molar fraction CO2 in flue gas []	0.09
Amount CO2 removed from the flue gas [tonne/h]	37.58
Fraction CO2 removed from the flue gas []	41.34
Absorber packing diameter [m]	90.00 %
Absorber packing height [m]	6.3
Lean amine temperature [°C]	36
Flow rate lean amine [t / t CO2 captured]	48.5
Rich amine temperature [°C]	13.54
Flow rate rich amine [t / t CO2 captured]	41.90
Lean amine: CO2 loading [mol / mol]	13.73
Rich amine: CO2 loading [mol / mol]	0.181
Electricity demand [kWh / t CO2 captured]	0.513
Cooling water demand [t / t CO2 captured]	51.84

Stripper	T-6003
Flow rate to compression (wet) [tonne/h]	38.58
Stripper packing diameter [m]	3.5
Stripper packing height [m]	21
Flow rate lean amine [t / t CO2 captured]	12.71
Flow rate rich amine [t / t CO2 captured]	13.74
Steam demand [GJ / t captured]	3.66
Reboiler pressure [bar]	1.80
Reboiler temperature [C]	119.7
Electricity demand [kWh / t CO2 captured]	3.04
Cooling water demand [t / t CO2 captured]	35.27

CO2 compression and purification	
Flow rate of CO2 to transportation [t / h]	37.59
Electricity demand [kWh / t CO2 captured]	92.94
Cooling water demand [t / t CO2 captured]	11.13

Other utilities	
Makeup of water [t / t CO2 captured]	0.79
Makeup of MEA [kg / t CO2 captured]	2.28
Waste water to treatment [t / t CO2 captured]	0.75
NaOH to thermal reclaimer [kg / t CO2 captured]	0.13
MEA sludge [kg / t CO2 captured]	5.33

A.1.1.2 Case 01_01 PFD



A.1.1.3 Case 01_01 Stream data

Section	POW absorber section										
Stream	**1**	**2**	**3**	**4**	**5**	**6**	**10**	**13**	**14**	**17**	**19**
Mass flow rate [kg/h]	317 924.1	317 924.1	292 424.4	281 742.7	281 742.7	516 043.8	508 838.1	25 499.7	1 733.1	29 626.5	510 000.0
Pressure [bar]	1.0	1.1	1.1	1.0	1.0	5.7	1.5	4.1	6.0	1.1	1.1
Temperature [°C]	140.0	87.7	40.0	60.7	136.8	42.0	48.5	35.0	40.0	30.0	43.3
CO_2 [mol frac]	0.082	0.082	0.094	0.009	0.009	0.064	0.022	0.000	0.001	0.000	0.061
CO [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
O_2 [mol frac]	0.025	0.025	0.028	0.026	0.026	0.000	0.000	0.000	0.000	0.000	0.000
N_2 [mol frac]	0.711	0.711	0.810	0.762	0.762	0.000	0.000	0.000	0.000	0.000	0.000
Water [mol frac]	0.182	0.182	0.068	0.203	0.203	0.811	0.858	1.000	0.998	1.000	0.814
MEA [mol frac]	0.000	0.000	0.000	0.000	0.000	0.125	0.120	0.000	0.002	0.000	0.125
CO_2 [kg/h]	41 756.2	41 756.2	41 754.5	4 174.4	4 174.4	58 055.0	20 526.9	1.7	2.7	0.0	55 007.0
CO [kg/h]	10.5	10.5	10.5	10.5	10.5	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	31.5	31.5	30.6	0.1	0.1	30.7	0.1	0.9	0.0	0.0	0.5
SO_2 [kg/h]	2.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.2
SO_3 [kg/h]	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	9 063.9	9 063.9	9 063.9	9 061.4	9 061.4	2.5	0.0	0.0	0.0	0.0	2.1
N_2 [kg/h]	229 244.1	229 244.1	229 243.9	229 210.8	229 210.8	33.1	0.3	0.3	0.0	0.0	28.1
Water [kg/h]	37 815.7	37 815.7	12 318.9	39 285.5	39 285.5	300 923.4	331 112.2	25 496.8	1 719.7	29 626.5	299 118.0
MEA [kg/h]	0.0	0.0	0.0	0.0	0.0	156 997.1	157 198.5	0.0	10.6	0.0	155 844.1
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.2	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

Section	Stripper and compression section						
Stream	**7**	**8**	**9**	**11**	**16**	**12**	**15**
Mass flow rate [kg/h]	85.8	516 129.5	477 477.4	38 577.0	200.1	37 593.4	944.8
Pressure [bar]	5.7	2.0	1.8	1.3	1.8	112.0	3.0
Temperature [°C]	30.1	102.3	119.7	40.0	150.0	29.0	40.0
CO_2 [mol frac]	0.000	0.064	0.024	0.940		0.998	0.002
CO [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.001		0.001	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
O_2 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
N_2 [mol frac]	0.000	0.000	0.000	0.001		0.001	0.000
Water [mol frac]	0.000	0.811	0.846	0.057		0.000	0.998
MEA [mol frac]	1.000	0.125	0.131	0.000		0.000	0.000
CO_2 [kg/h]	0.0	58 055.0	20 485.3	37 568.7	0.0	37 526.4	4.4
CO [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	0.0	30.7	0.1	30.5	0.0	29.4	0.6
SO_2 [kg/h]	0.0	2.0	0.0	2.0	0.0	2.0	0.0
SO_3 [kg/h]	0.0	0.1	0.1	0.0	0.0	0.0	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	0.0	2.5	0.0	2.5	0.0	2.4	0.0
N_2 [kg/h]	0.0	33.1	0.0	33.1	0.0	32.8	0.0
Water [kg/h]	0.0	300 923.4	299 978.3	940.3	120.0	0.4	939.8
MEA [kg/h]	85.8	157 082.9	157 025.5	0.0	34.0	0.0	0.0
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	46.0	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

A.1.2 Case 01_02

A.1.2.1 Case 01_02 Summary

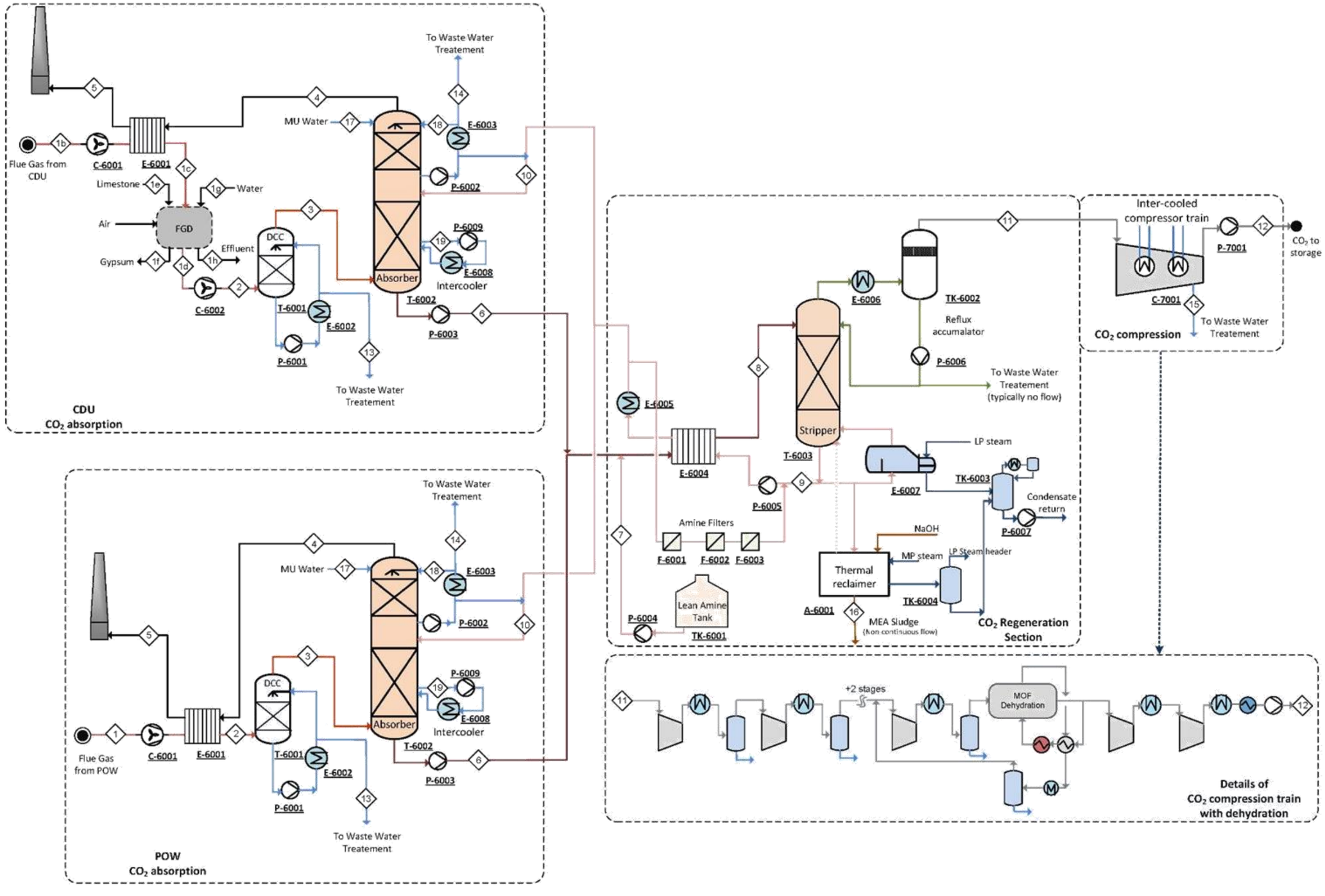
Absorber	POW_T-6002	CDU_T-6002
Flow rate flue gas [tonne/h]	291.5	138.4
Molar fraction CO2 in flue gas []	0.10	0.11
Amount CO2 removed from the flue gas [tonne/h]	38.07	21.25
Design amount of CO2 removed from flue gas [tonne/h]	41.88	23.38
Fraction CO2 removed from the flue gas []	90.02 %	90.14 %
Absorber packing diameter [m]	6.30	4.20
Absorber packing height [m]	36.00	36.00
Lean amine temperature [°C]	51.3	51.5
Flow rate lean amine [t / t CO2 captured]	13.98	13.81
Rich amine temperature [°C]	41.8	41.9
Flow rate rich amine [t / t CO2 captured]	14.14	13.96
Lean amine: CO2 loading [mol / mol]	0.181	0.181
Rich amine: CO2 loading [mol / mol]	0.512	0.516
Electricity demand [kWh / t CO2 captured]	50.92	47.60
Cooling water demand [t / t CO2 captured]	57.11	40.83

Stripper	T-6003
Flow rate to compression (wet) [tonne/h]	60.88
Stripper packing diameter [m]	4.30
Stripper packing height [m]	21.00
Flow rate lean amine [t / t CO2 captured]	13.05
Flow rate rich amine [t / t CO2 captured]	14.09
Steam demand [GJ / t captured]	3.67
Reboiler pressure [bar]	1.80
Reboiler temperature [C]	119.6
Electricity demand [kWh / t CO2 captured]	3.33
Cooling water demand [t / t CO2 captured]	32.10

CO2 compression and purification	
Flow rate of CO2 to transportation [t / h]	59.39
Electricity demand [kWh / t CO2 captured]	93.18
Cooling water demand [t / t CO2 captured]	11.27

Other utilities	
Makeup of water [t / t CO2 captured]	s
Makeup of MEA [kg / t CO2 captured]	2.09
Waste water to treatment [t / t CO2 captured]	0.64
NaOH to thermal reclaimer [kg / t CO2 captured]	0.13
MEA sludge [kg / t CO2 captured]	5.33

A.1.2.2 Case 01_02 PFD



A.1.2.3 Case 01_02 Stream data

Section	POW absorber section											
Stream	**1**	**2**	**3**	**4**	**5**	**6**	**10**	**13**	**14**	**17**	**18**	**19**
Mass flow rate [kg/h]	316 395.6	316 395.6	291 522.9	282 439.3	282 439.3	538 449.4	532 063.3	24 872.7	569.7	31 098.4	32 577.0	532 000.0
Pressure [bar]	1.0	1.1	1.1	1.0	1.0	6.2	1.5	4.0	3.3	1.1	1.1	1.1
Temperature [°C]	135.0	87.2	40.0	61.7	131.6	41.9	51.3	35.0	40.0	30.0	40.0	45.5
CO_2 [mol frac]	0.084	0.084	0.095	0.009	0.009	0.062	0.021	0.000	0.001	0.000	0.001	0.058
CO [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
O_2 [mol frac]	0.025	0.025	0.028	0.026	0.026	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N_2 [mol frac]	0.711	0.711	0.809	0.753	0.753	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Argon [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Water [mol frac]	0.180	0.180	0.068	0.212	0.212	0.818	0.863	1.000	0.998	1.000	0.998	0.821
MEA [mol frac]	0.000	0.000	0.000	0.000	0.000	0.120	0.116	0.000	0.002	0.000	0.002	0.120
CO_2 [kg/h]	42 289.5	42 289.5	42 287.8	4 218.3	4 218.3	58 873.6	20 860.4	1.7	0.8	0.0	44.8	55 161.5
CO [kg/h]	10.5	10.5	10.5	10.5	10.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	31.6	31.6	30.7	4.7	4.7	31.1	5.2	0.9	0.0	0.0	0.1	0.5
SO_2 [kg/h]	1.2	1.2	1.2	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0
SO_3 [kg/h]	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	9 008.9	9 008.9	9 008.9	9 006.4	9 006.4	2.5	0.0	0.0	0.0	0.0	0.0	2.0
N_2 [kg/h]	227 899.4	227 899.4	227 899.1	227 865.9	227 865.9	33.2	0.3	0.3	0.0	0.0	0.3	27.0
Argon [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water [kg/h]	37 154.4	37 154.4	12 284.6	41 333.5	41 333.5	319 973.8	351 458.3	24 869.8	565.5	31 098.4	32 338.9	318 456.9
MEA [kg/h]	0.0	0.0	0.0	0.0	0.0	159 533.9	159 739.0	0.0	3.4	0.0	192.8	158 352.0
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.4	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

Section	CDU absorber section													FGD			
Stream	**1b**	**1c**	**1d**	**2**	**3**	**4**	**5**	**6**	**10**	**13**	**14**	**17**	**18**	**19**	**1e**	**1f**	**1g**	**1h**
Mass flow rate [kg/h]	137 292.1	137 292.1	157 506.0	148 390.2	138 362.2	133 390.8	133 390.8	296 785.9	293 473.6	10 028.0	281.6	16 579.5	17 772.0	293 000.0	119.1	211.7	7 483.5	802.5
Pressure [bar]	1.0	1.1	1.0	1.1	1.1	1.0	1.0	6.2	1.5	3.2	2.9	1.1	1.1	1.1	/	/	/	/
Temperature [°C]	210.0	84.2	56.1	69.8	40.0	64.2	188.9	42.0	51.5	35.0	40.0	30.0	40.1	44.9	30.0	40.0	30.0	40.0

CO_2 [mol frac]	0.113	0.113	0.093	0.101	0.113	0.010	0.010	0.062	0.021	0.000	0.001	0.000	0.001	0.059	0.000	0.000	0.000	0.000
CO [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
O_2 [mol frac]	0.039	0.039	0.031	0.034	0.038	0.035	0.035	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N_2 [mol frac]	0.741	0.741	0.637	0.699	0.781	0.717	0.717	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Argon [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Water [mol frac]	0.106	0.106	0.239	0.166	0.068	0.238	0.238	0.817	0.863	1.000	0.998	1.000	0.998	0.820	0.000	0.000	1.000	/
MEA [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.121	0.116	0.000	0.002	0.000	0.002	0.121	0.000	0.000	0.000	0.000
CO_2 [kg/h]	23 573.1	23 573.1	23 578.5	23 577.7	23 576.8	2 323.9	2 323.9	32 745.1	11 519.5	0.9	0.4	0.0	25.4	30 882.8	0.0	0.0	0.0	0.0
CO [kg/h]	8.8	8.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	39.8	39.8	0.0	0.0	0.0	2.5	2.5	0.3	2.8	0.0	0.0	0.0	0.1	0.3	0.0	0.0	0.0	0.0
SO_2 [kg/h]	71.5	71.5	1.2	1.2	1.2	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SO_3 [kg/h]	2.2	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	5 961.1	5 961.1	5 764.7	5 764.7	5 764.7	5 762.8	5 762.8	1.9	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0	0.0	0.0
N_2 [kg/h]	98 535.5	98 535.5	103 275.9	103 275.8	103 275.7	103 257.7	103 257.7	17.9	0.2	0.1	0.0	0.0	0.2	14.9	0.0	0.0	0.0	0.0
Argon [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water [kg/h]	9 100.1	9 100.1	24 885.8	15 770.8	5 743.8	22 044.0	22 044.0	175 921.3	193 736.9	10 027.0	279.4	16 579.5	17 634.5	174 737.2	0.0	25.4	7483.5	748.3
MEA [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	88 098.2	88 214.2	0.0	1.8	0.0	111.7	87 363.1	0.0	0.0	0.0	0.0
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
$CaCO_3$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	112.0	0.0	0.0	0.1
$CaSO_4.2H_2O$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	186.3	0.0	5.9
Alkali inerts [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
$MgCO_3$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
CaF_2 [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.1
Inerts from limestone [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.1	0.0	0.0	12.6
Cl- [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.6
SO_4-- [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1
Ca++ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7
Mg++ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.4
$CaSO_4$ dissolved [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

Section	Stripper and compression section						
Stream	**7**	**8**	**9**	**11**	**16**	**12**	**15**
Mass flow rate [kg/h]	123.8	835 359.0	774 146.6	60 878.4	315.9	59 387.7	1 491.0
Pressure [bar]	6.2	6.2	1.8	1.3	1.8	112.0	3.0
Temperature [°C]	30.1	109.7	119.5	40.0	150.0	29.1	40.0
CO_2 [mol frac]	0.000	0.999	0.997	0.998		0.998	0.072
CO [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
O_2 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
N_2 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
Argon [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
Water [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
MEA [mol frac]	1.000	0.001	0.003	0.002		0.002	0.928
CO_2 [kg/h]	0.0	91 618.7	32 298.9	59 305.6	0.0	59 299.0	6.9
CO [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	0.0	31.4	0.8	30.9	0.0	30.2	0.6
SO_2 [kg/h]	0.0	2.4	0.0	2.4	0.0	2.4	0.0
SO_3 [kg/h]	0.0	0.1	0.1	0.0	0.0	0.0	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	0.0	4.4	0.0	4.4	0.0	4.4	0.0
N_2 [kg/h]	0.0	51.1	0.0	51.1	0.0	51.1	0.0
Argon [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water [kg/h]	0.0	495 895.1	494 266.2	1 484.0	189.5	0.6	1 483.4
MEA [kg/h]	123.8	247 755.9	247 580.7	0.0	53.7	0.0	0.0
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	72.7	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

A.1.3 Case 01_03

A.1.3.1 Case 01_03 Summary

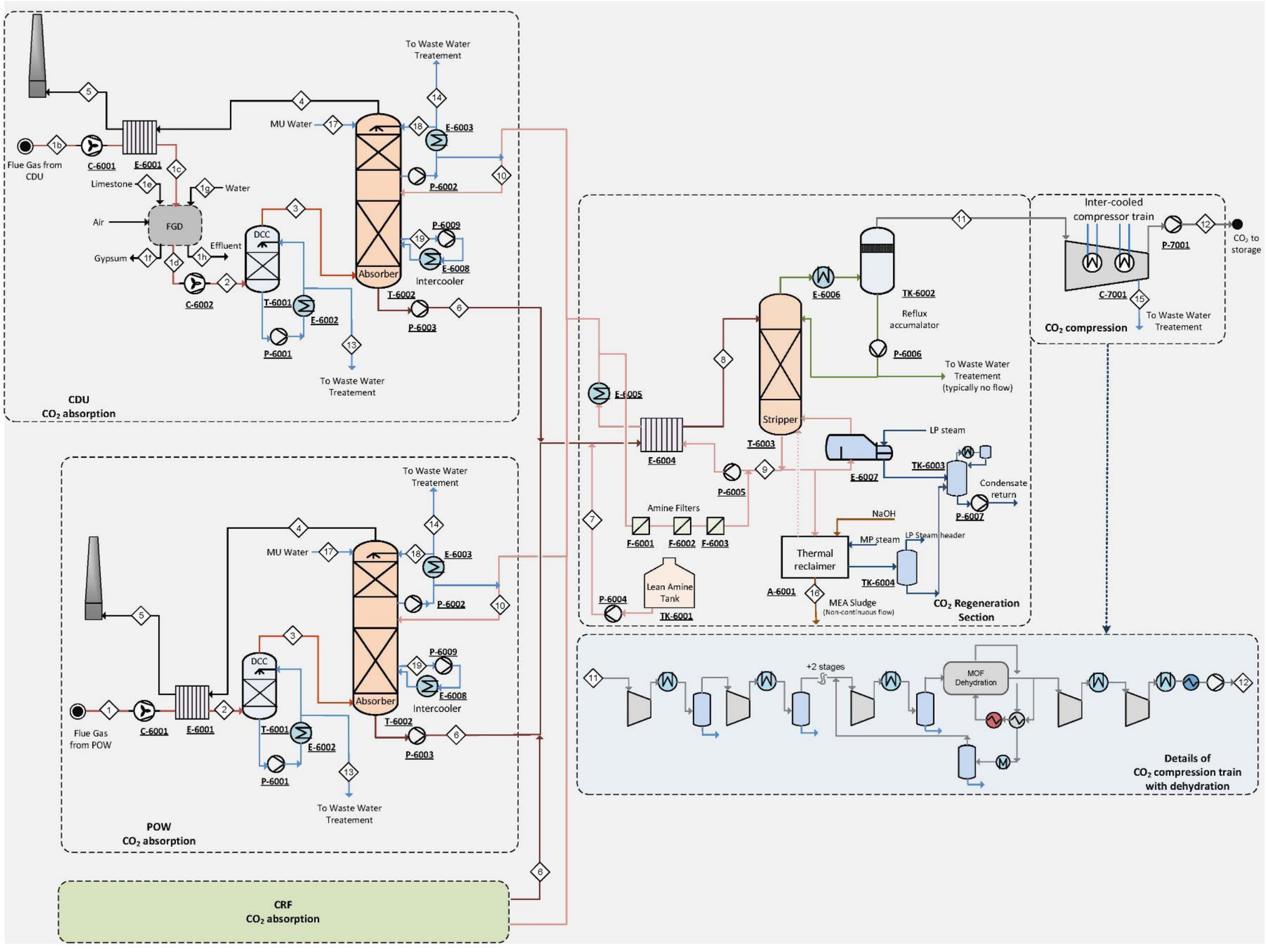
Absorber	CRF_T-6002	POW_T-6002	CDU_T-6002
Flow rate flue gas [tonne/h]	61.3	291.5	138.4
Molar fraction CO2 in flue gas []	0.10	0.10	0.11
Amount CO2 removed from the flue gas [tonne/h]	7.99	38.07	21.25
Design amount of CO2 removed from flue gas [tonne/h]	9.65	41.88	23.38
Fraction CO2 removed from the flue gas []	89.87 %	90.03 %	90.14 %
Absorber packing diameter [m]	3.00	6.00	4.20
Absorber packing height [m]	36.00	36.00	36.00
Lean amine temperature [°C]	51.3	51.3	51.5
Flow rate lean amine [t / t CO2 captured]	13.95	13.98	13.81
Rich amine temperature [°C]	41.7	41.8	41.9
Flow rate rich amine [t / t CO2 captured]	14.12	14.14	13.96
Lean amine: CO2 loading [mol / mol]	0.181	0.181	0.181
Rich amine: CO2 loading [mol / mol]	0.512	0.512	0.516
Electricity demand [kWh / t CO2 captured]	55.85	50.93	47.60
Cooling water demand [t / t CO2 captured]	57.84	57.12	40.83

Stripper	T-6003
Flow rate to compression (wet) [tonne/h]	69.08
Stripper packing diameter [m]	4.65
Stripper packing height [m]	21.00
Flow rate lean amine [t / t CO2 captured]	13.06
Flow rate rich amine [t / t CO2 captured]	14.09
Steam demand [GJ / t captured]	3.67
Reboiler pressure [bar]	1.80
Reboiler temperature [C]	119.55
Electricity demand [kWh / t CO2 captured]	3.34
Cooling water demand [t / t CO2 captured]	32.10

CO2 compression and purification	
Flow rate of CO2 to transportation [t / h]	67.41
Electricity demand [kWh / t CO2 captured]	93.19
Cooling water demand [t / t CO2 captured]	11.27

Other utilities	
Makeup of water [t / t CO2 captured]	0.91
Makeup of MEA [kg / t CO2 captured]	2.09
Waste water to treatment [t / t CO2 captured]	0.65
NaOH to thermal reclaimer [kg / t CO2 captured]	0.13
MEA sludge [kg / t CO2 captured]	5.325

A.1.3.2 Case 01_03 PFD



A.1.3.3 Case 01_03 Stream data

Section	CDU absorber section														FGD			
Stream	**1b**	**1c**	**1d**	**2**	**3**	**4**	**5**	**6**	**10**	**13**	**14**	**17**	**18**	**19**	**1e**	**1f**	**1g**	**1h**
Mass flow rate [kg/h]	137 292.1	137 292.1	157 506.0	148 390.2	138 362.2	133 390.8	133 390.8	296 785.9	293 473.6	10 028.0	281.6	16 579.5	17 772.0	293 000.0	119.1	211.7	7 483.5	802.5
Pressure [bar]	1.0	1.1	1.0	1.1	1.1	1.0	1.0	6.2	1.5	3.2	2.9	1.1	1.1	1.1	/	/	/	/
Temperature [°C]	210.0	84.2	56.1	69.8	40.0	64.2	188.9	42.0	51.5	35.0	40.0	30.0	40.1	44.9	30.0	40.0	30.0	40.0
CO_2 [mol frac]	0.113	0.113	0.093	0.101	0.113	0.010	0.010	0.062	0.021	0.000	0.001	0.0	0.0	0.1	0.000	0.000	0.000	0.000
CO [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0.000	0.000	0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0.000	0.000	0.000	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0.000	0.000	0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0.000	0.000	0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0.000	0.000	0.000	0.000
O_2 [mol frac]	0.039	0.039	0.031	0.034	0.038	0.035	0.035	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0.000	0.000	0.000	0.000
N_2 [mol frac]	0.741	0.741	0.637	0.699	0.781	0.717	0.717	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0.000	0.000	0.000	0.000
Argon [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0.000	0.000	0.000	0.000
Water [mol frac]	0.106	0.106	0.239	0.166	0.068	0.238	0.238	0.817	0.863	1.000	0.998	1.0	1.0	0.8	0.000	0.000	1.000	/
MEA [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.121	0.116	0.000	0.002	0.000	0.002	0.121	0.000	0.000	0.000	0.000
CO_2 [kg/h]	23 573.1	23 573.1	23 578.5	23 577.7	23 576.8	2 323.9	2 323.9	32 745.1	11 519.5	0.9	0.4	0.0	25.4	30882.8	0.0	0.0	0.0	0.0
CO [kg/h]	8.8	8.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	39.8	39.8	0.0	0.0	0.0	2.5	2.5	0.3	2.8	0.0	0.0	0.0	0.1	0.3	0.0	0.0	0.0	0.0
SO_2 [kg/h]	71.5	71.5	1.2	1.2	1.2	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SO_3 [kg/h]	2.2	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	5 961.1	5 961.1	5 764.7	5 764.7	5 764.7	5 762.8	5 762.8	1.9	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0	0.0	0.0
N_2 [kg/h]	98 535.5	98 535.5	103 275.9	103 275.8	103 275.7	103 257.7	103 257.7	17.9	0.2	0.1	0.0	0.0	0.2	14.9	0.0	0.0	0.0	0.0
Argon [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water [kg/h]	9 100.1	9 100.1	24 885.8	15 770.8	5 743.8	22 044.0	22 044.0	175 921.3	193 736.9	10 027.0	279.4	16579.5	17 634.5	174 737.2	0.0	25.4	7483.5	748.3
MEA [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	88 098.2	88 214.2	0.0	1.8	0.0	111.7	87363.1	0.0	0.0	0.0	0.0
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	0.0	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
$CaCO_3$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	112.0	0.0	0.0	0.1
$CaSO_4.2H_2O$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	186.3	0.0	5.9
Alkali inerts [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
$MgCO_3$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
CaF_2 [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.1
Inerts from limestone [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.1	0.0	0.0	12.6
Cl- [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.6
SO_4-- [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1
Ca++ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7

Mg++ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.4
$CaSO_4$ dissolved [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

Section	**CRF absorber section**											
Stream	**1**	**2**	**3**	**4**	**5**	**6**	**10**	**13**	**14**	**17**	**18**	**19**
Mass flow rate [kg/h]	66 490.5	66 490.5	61 254.8	59 406.4	59 406.4	112 755.8	111 446.4	5 235.7	106.5	6 257.2	6 546.5	110 000.0
Pressure [bar]	1.0	1.1	1.1	1.0	1.0	6.2	1.5	2.9	2.7	1.1	1.1	1.1
Temperature [°C]	185.0	91.6	40.0	61.7	183.4	41.8	51.3	35.0	40.0	30.0	40.0	45.3
CO_2 [mol frac]	0.084	0.084	0.096	0.009	0.009	0.062	0.021	0.000	0.001	0.000	0.001	0.059
CO [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
O_2 [mol frac]	0.025	0.025	0.028	0.026	0.026	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N_2 [mol frac]	0.711	0.711	0.809	0.752	0.752	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Argon [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Water [mol frac]	0.180	0.180	0.068	0.213	0.213	0.817	0.863	1.000	0.998	1.000	0.998	0.821
MEA [mol frac]	0.000	0.000	0.000	0.000	0.000	0.121	0.116	0.000	0.002	0.000	0.002	0.121
CO_2 [kg/h]	8 887.1	8 887.1	8 886.8	900.0	900.0	12 364.8	4 380.0	0.4	0.2	0.0	9.6	11 447.3
CO [kg/h]	2.2	2.2	2.2	2.2	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	6.6	6.6	6.5	1.0	1.0	6.5	1.1	0.2	0.0	0.0	0.0	0.1
SO_2 [kg/h]	0.3	0.3	0.3	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
SO_3 [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	1 893.2	1 893.2	1 893.2	1 892.7	1 892.7	0.5	0.0	0.0	0.0	0.0	0.0	0.4
N_2 [kg/h]	47 893.0	47 893.0	47 893.0	47 886.0	47 886.0	7.0	0.1	0.1	0.0	0.0	0.1	5.6
Argon [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water [kg/h]	7 808.0	7 808.0	2 572.9	8 724.5	8 724.5	66 878.6	73 527.7	5 235.1	105.7	6 257.2	6 496.3	65 726.3
MEA [kg/h]	0.0	0.0	0.0	0.0	0.0	33 498.0	33 537.5	0.0	0.7	0.0	40.6	32 820.2
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

Section	Stripper and compression section						
Stream	**7**	**8**	**9**	**11**	**16**	**12**	**15**
Mass flow rate [kg/h]	140.4	948 131.4	878 839.8	69 079.9	358.4	67 406.2	1 691.8
Pressure [bar]	6.2	6.2	1.8	1.3	1.8	112.0	3.0
Temperature [°C]	30.1	109.7	119.6	40.0	150.0	29.1	40.0
CO_2 [mol frac]	0.000	0.062	0.023	0.941		0.998	0.002
CO [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000		0.001	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
O_2 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
N_2 [mol frac]	0.000	0.000	0.000	0.001		0.001	0.000
Argon [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
Water [mol frac]	0.000	0.818	0.851	0.057		0.000	0.998
MEA [mol frac]	1.000	0.121	0.126	0.000		0.000	0.000
CO_2 [kg/h]	0.0	103 983.5	36 689.8	67 293.2	0.0	67 303.3	7.9
CO [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	0.0	37.9	8.9	37.2	0.0	36.6	0.8
SO_2 [kg/h]	0.0	2.7	0.0	2.7	0.0	2.7	0.0
SO_3 [kg/h]	0.0	0.1	0.1	0.0	0.0	0.0	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	0.0	4.9	0.0	4.9	0.0	4.9	0.0
N_2 [kg/h]	0.0	58.1	0.0	58.0	0.0	58.0	0.0
Argon [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water [kg/h]	0.0	562 773.7	560 932.2	1 683.8	215.1	0.7	1 683.2
MEA [kg/h]	140.4	281 270.5	281 208.8	0.0	60.9	0.0	0.0
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	82.4	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
$CaCO_3$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
$CaSO_4.2H_2O$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Alkali inerts [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
$MgCO_3$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaF_2 [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Inerts from limestone [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cl- [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SO_4-- [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca++ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg++ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
$CaSO_4$ dissolved [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

A.2 CO_2 capture from base case 2

A.2.1 Case 02_01

A.2.1.1 Case 02_01 Summary

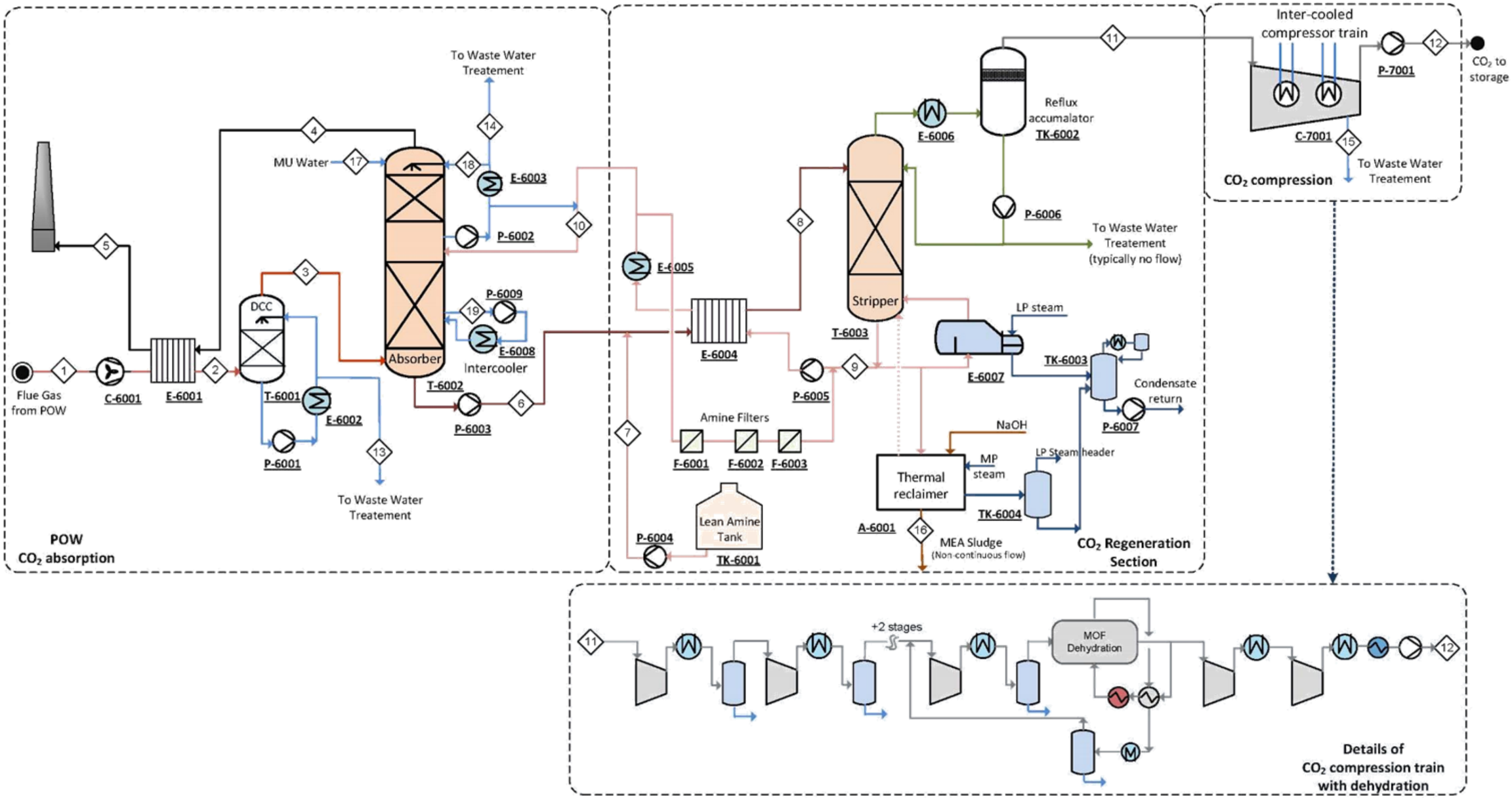
Absorber	POW_T-6002
Flow rate flue gas [tonne/h]	642.2
Molar fraction CO2 in flue gas []	0.09
Amount CO2 removed from the flue gas [tonne/h]	82.80
Design amount of CO2 removed from flue gas [tonne/h]	91.07
Fraction CO2 removed from the flue gas []	89.79 %
Absorber packing diameter [m]	9.25
Absorber packing height [m]	47.00
Lean amine temperature [°C]	51.3
Flow rate lean amine [t / t CO2 captured]	14.00
Rich amine temperature [°C]	41.9
Flow rate rich amine [t / t CO2 captured]	14.17
Lean amine: CO2 loading [mol / mol]	0.181
Rich amine: CO2 loading [mol / mol]	0.512
Electricity demand [kWh / t CO2 captured]	52.33
Cooling water demand [t / t CO2 captured]	57.90

Stripper	T-6003
Flow rate to compression (wet) [tonne/h]	85.03
Stripper packing diameter [m]	5.20
Stripper packing height [m]	22.00
Flow rate lean amine [t / t CO2 captured]	13.13
Flow rate rich amine [t / t CO2 captured]	14.17
Steam demand [GJ / t captured]	3.68
Reboiler pressure [bar]	1.80
Reboiler temperature [C]	119.54
Electricity demand [kWh / t CO2 captured]	3.35
Cooling water demand [t / t CO2 captured]	32.35

CO2 compression and purification	
Flow rate of CO2 to transportation [t / h]	82.95
Electricity demand [kWh / t CO2 captured]	93.19
Cooling water demand [t / t CO2 captured]	11.28

Other utilities	
Makeup of water [t / t CO2 captured]	0.80
Makeup of MEA [kg / t CO2 captured]	2.09
Waste water to treatment [t / t CO2 captured]	0.71
NaOH to thermal reclaimer [kg / t CO2 captured]	0.13
MEA sludge [kg / t CO2 captured]	5.33

A.2.1.2 Case 02_01 PFD



A.2.1.3 Case 02_01 Stream data

Section	POW											
Stream	**1**	**2**	**3**	**4**	**5**	**6**	**10**	**13**	**14**	**17**	**18**	**19**
Mass flow rate [kg/h]	697 530.2	697 530.2	642 245.6	622 669.3	622 669.3	1 173 194.9	1 159 333.5	55 284.6	1 222.3	66 649.5	69 846.6	1 163 000.0
Pressure [bar]	1.0	1.1	1.1	1.0	1.0	6.3	1.5	4.9	3.9	1.1	1.1	1.1
Temperature [°C]	135.0	87.2	40.2	61.6	131.6	42.0	51.3	35.0	40.0	30.0	40.1	45.3
CO_2 [mol frac]	0.083	0.083	0.094	0.009	0.009	0.062	0.021	0.000	0.001	0.000	0.001	0.058
CO [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
O_2 [mol frac]	0.025	0.025	0.028	0.026	0.026	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N_2 [mol frac]	0.711	0.711	0.809	0.754	0.754	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Argon [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Water [mol frac]	0.181	0.181	0.068	0.211	0.211	0.818	0.864	1.000	0.998	1.000	0.998	0.822
MEA [mol frac]	0.000	0.000	0.000	0.000	0.000	0.120	0.115	0.000	0.002	0.000	0.002	0.120
CO_2 [kg/h]	92 215.0	92 215.0	92 211.3	9 416.2	9 416.2	128 099.8	45 372.9	3.8	1.7	0.0	98.7	120 494.7
CO [kg/h]	23.2	23.2	23.2	23.2	23.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	69.5	69.5	67.7	4.1	4.1	67.7	4.6	1.9	0.0	0.0	0.1	0.5
SO_2 [kg/h]	4.0	4.0	4.0	0.0	0.0	4.0	0.0	0.1	0.0	0.0	0.0	0.1
SO_3 [kg/h]	0.2	0.2	0.2	0.1	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.1
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	19 879.1	19 879.1	19 879.0	19 873.7	19 873.7	5.4	0.1	0.0	0.0	0.0	0.1	4.4
N_2 [kg/h]	502 768.3	502 768.3	502 767.7	502 695.6	502 695.6	72.2	0.7	0.6	0.0	0.0	0.7	59.2
Argon [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water [kg/h]	82 570.8	82 570.8	27 292.5	90 656.4	90 656.4	697 902.5	766 513.1	55 278.3	1 213.2	66 649.5	69 326.6	696 831.4
MEA [kg/h]	0.0	0.0	0.0	0.0	0.0	347 043.1	347 441.9	0.0	7.4	0.0	420.3	345 609.7
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.9	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

Section	SMR											
Stream	**1**	**2**	**3**	**4**	**5**	**6**	**10**	**13**	**14**	**17**	**18**	**19**
Mass flow rate [kg/h]	236 210.6	236 217.6	218 287.0	206 639.4	206 639.4	612 808.1	604 916.3	17 930.6	488.3	34 414.6	30 000.0	608 000.0
Pressure [bar]	1.0	1.1	1.1	1.0	1.0	5.2	1.5	3.6	3.1	1.1	1.1	1.1
Temperature [°C]	147.5	92.3	39.9	68.3	144.1	42.3	51.8	35.0	40.0	30.0	40.1	46.3
CO_2 [mol frac]	0.135	0.135	0.153	0.014	0.014	0.063	0.021	0.000	0.001	0.000	0.001	0.060
CO [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
O_2 [mol frac]	0.023	0.023	0.026	0.023	0.023	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N_2 [mol frac]	0.663	0.663	0.753	0.677	0.677	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Argon [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Water [mol frac]	0.179	0.179	0.067	0.285	0.285	0.817	0.863	1.000	0.998	1.000	0.998	0.820
MEA [mol frac]	0.000	0.000	0.000	0.000	0.000	0.120	0.116	0.000	0.002	0.000	0.002	0.120
CO_2 [kg/h]	49 325.0	49 324.2	49 322.2	4 921.5	4 921.5	68 054.9	23 692.6	2.0	0.7	0.0	45.1	64 780.7
CO [kg/h]	7.6	7.6	7.6	7.6	7.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	22.9	22.9	22.3	0.4	0.4	22.4	0.5	0.6	0.0	0.0	0.0	0.3
SO_2 [kg/h]	4.4	4.3	4.3	0.0	0.0	4.3	0.0	0.1	0.0	0.0	0.0	0.1
SO_3 [kg/h]	0.2	0.2	0.1	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	6 086.5	6 088.6	6 088.6	6 085.9	6 085.9	2.7	0.0	0.0	0.0	0.0	0.0	2.2
N_2 [kg/h]	153 962.5	153 963.2	153 963.0	153 926.8	153 926.8	36.2	0.3	0.2	0.0	0.0	0.3	30.5
Argon [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water [kg/h]	26 807.9	26 806.6	8 878.8	41 697.1	41 697.1	363 481.2	399 781.8	17 927.8	484.6	34 414.6	29 776.7	362 577.7
MEA [kg/h]	0.0	0.0	0.0	0.0	0.0	181 206.3	181 440.9	0.0	3.0	0.0	177.9	180 608.4
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

Section	Stripper and compression section						
Stream	**7**	**8**	**9**	**11**	**16**	**12**	**15**
Mass flow rate [kg/h]	173.0	1 173 367.9	1 087 434.1	85 031.9	440.9	82 949.0	2 082.6
Pressure [bar]	6.3	6.3	1.8	1.3	1.8	112.0	3.0
Temperature [°C]	30.1	109.7	119.5	40.0	150.0	29.0	40.0
CO_2 [mol frac]	0.000	0.061	0.023	0.940		0.998	0.002
CO [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.001		0.001	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
O_2 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
N_2 [mol frac]	0.000	0.000	0.000	0.001		0.001	0.000
Argon [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
Water [mol frac]	0.000	0.818	0.852	0.057		0.000	0.998
MEA [mol frac]	1.000	0.120	0.125	0.000		0.000	0.000
CO_2 [kg/h]	0.0	128 099.8	45 272.2	82 811.2	0.0	82 801.4	9.7
CO [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	0.0	67.7	4.6	66.6	0.0	65.2	1.3
SO_2 [kg/h]	0.0	4.0	0.0	4.0	0.0	3.9	0.0
SO_3 [kg/h]	0.0	0.2	0.1	0.1	0.0	0.1	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	0.0	5.4	0.0	5.4	0.0	5.4	0.0
N_2 [kg/h]	0.0	72.2	0.0	72.2	0.0	72.2	0.0
Argon [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water [kg/h]	0.0	697 902.5	695 141.8	2 072.4	264.5	0.8	2 071.6
MEA [kg/h]	173.0	347 216.1	347 015.3	0.0	75.0	0.0	0.0
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	101.4	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

A.2.2 Case 02_02

A.2.2.1 Case 02_02 Summary

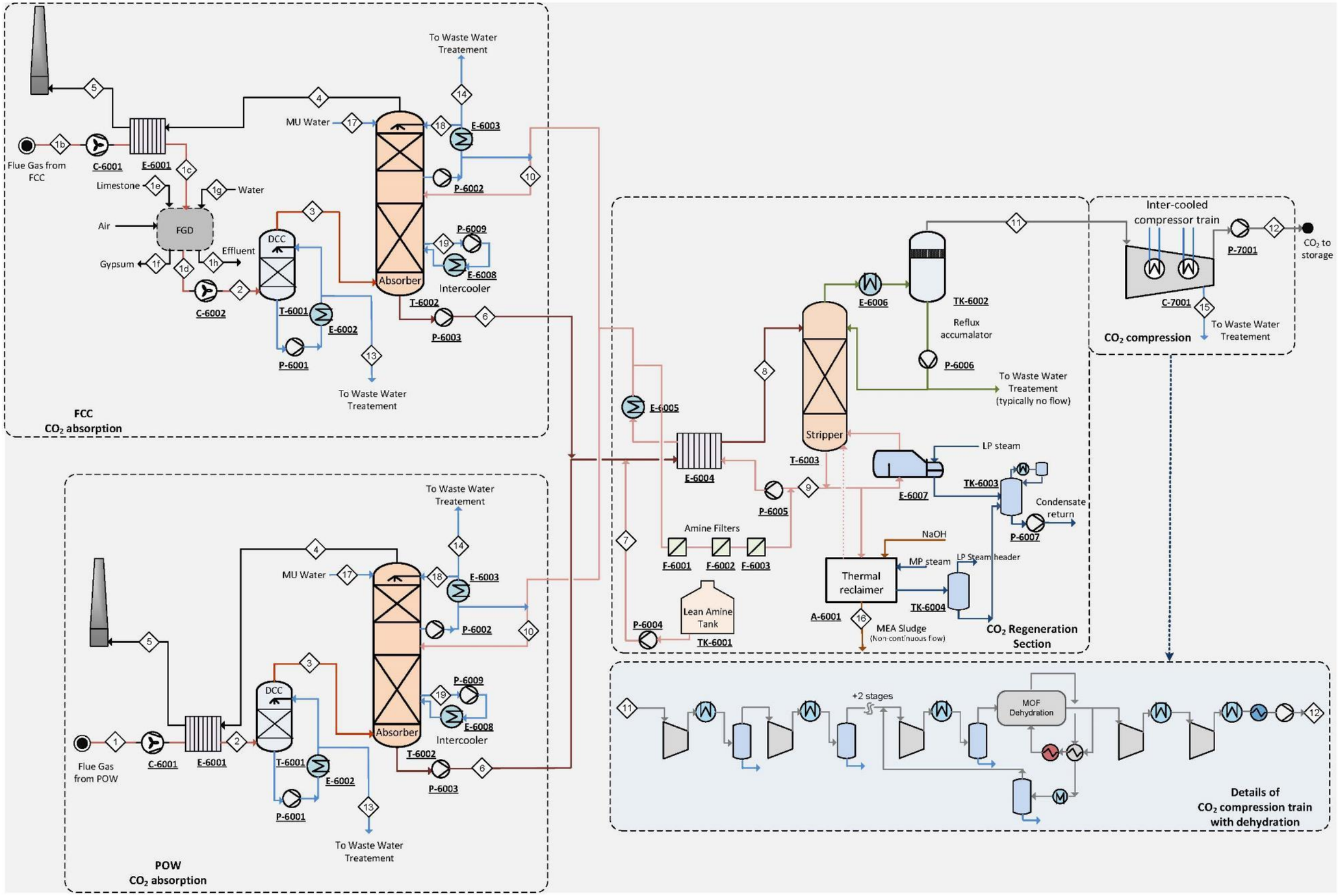
Absorber	POW_T-6002	FCC_T-6002
Flow rate flue gas [tonne/h]	642.2	187.8
Molar fraction CO2 in flue gas []	0.09	0.16
Amount CO2 removed from the flue gas [tonne/h]	82.73	39.83
Design amount of CO2 removed from flue gas [tonne/h]	91.00	43.81
Fraction CO2 removed from the flue gas []	89.72 %	89.98 %
Absorber packing diameter [m]	9.25	5.50
Absorber packing height [m]	47.00	36.00
Lean amine temperature [°C]	51.2	51.8
Flow rate lean amine [t / t CO2 captured]	13.99	13.59
Rich amine temperature [°C]	41.9	42.2
Flow rate rich amine [t / t CO2 captured]	14.16	13.77
Lean amine: CO2 loading [mol / mol]	0.181	0.181
Rich amine: CO2 loading [mol / mol]	0.512	0.522
Electricity demand [kWh / t CO2 captured]	52.37	37.63
Cooling water demand [t / t CO2 captured]	57.92	45.49

Stripper	T-6003
Flow rate to compression (wet) [tonne/h]	125.73
Stripper packing diameter [m]	6.20
Stripper packing height [m]	24.00
Flow rate lean amine [t / t CO2 captured]	13.02
Flow rate rich amine [t / t CO2 captured]	14.05
Steam demand [GJ / t captured]	3.66
Reboiler pressure [bar]	1.80
Reboiler temperature [C]	119.54
Electricity demand [kWh / t CO2 captured]	3.33
Cooling water demand [t / t CO2 captured]	31.73

CO2 compression and purification	
Flow rate of CO2 to transportation [t / h]	122.66
Electricity demand [kWh / t CO2 captured]	93.17
Cooling water demand [t / t CO2 captured]	11.27

Other utilities	
Makeup of water [t / t CO2 captured]	0.95
Makeup of MEA [kg / t CO2 captured]	2.09
Waste water to treatment [t / t CO2 captured]	0.68
NaOH to thermal reclaimer [kg / t CO2 captured]	0.13
MEA sludge [kg / t CO2 captured]	5.33

A.2.2.2 Case 02_02 PFD



A.2.2.3 Case 02_02 Stream data

Section	POW											
Stream	**1**	**2**	**3**	**4**	**5**	**6**	**10**	**13**	**14**	**17**	**18**	**19**
Mass flow rate [kg/h]	697 530.2	697 530.2	642 245.6	622 620.3	622 620.3	1 171 692.2	1 157 805.8	55 284.6	1 226.1	66 840.6	70 076.2	1 163 000.0
Pressure [bar]	1.0	1.1	1.1	1.0	1.0	6.3	1.5	4.9	3.9	1.1	1.1	1.1
Temperature [°C]	135.0	87.2	40.2	61.5	131.6	42.0	51.2	35.0	40.0	30.0	40.1	45.3
CO_2 [mol frac]	0.083	0.083	0.094	0.009	0.009	0.062	0.021	0.000	0.001	0.000	0.001	0.058
CO [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
O_2 [mol frac]	0.025	0.025	0.028	0.026	0.026	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N_2 [mol frac]	0.711	0.711	0.809	0.754	0.754	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Argon [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Water [mol frac]	0.181	0.181	0.068	0.211	0.211	0.818	0.864	1.000	0.998	1.000	0.998	0.822
MEA [mol frac]	0.000	0.000	0.000	0.000	0.000	0.120	0.116	0.000	0.002	0.000	0.002	0.120
CO_2 [kg/h]	92 215.0	92 215.0	92 211.3	9 479.8	9 479.8	127 941.6	45 316.4	3.8	1.7	0.0	98.7	120 532.1
CO [kg/h]	23.2	23.2	23.2	23.2	23.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	69.5	69.5	67.7	0.9	0.9	67.7	1.0	1.9	0.0	0.0	0.0	0.2
SO_2 [kg/h]	4.0	4.0	4.0	0.0	0.0	4.0	0.0	0.1	0.0	0.0	0.0	0.1
SO_3 [kg/h]	0.2	0.2	0.2	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.1
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	19 879.1	19 879.1	19 879.0	19 873.7	19 873.7	5.4	0.1	0.0	0.0	0.0	0.1	4.4
N_2 [kg/h]	502 768.3	502 768.3	502 767.7	502 695.6	502 695.6	72.1	0.7	0.6	0.0	0.0	0.7	59.2
Argon [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water [kg/h]	82 570.8	82 570.8	27 292.5	90 547.1	90 547.1	697 005.2	765 455.2	55 278.3	1 217.0	66 840.6	69 557.9	696 755.8
MEA [kg/h]	0.0	0.0	0.0	0.0	0.0	346 595.8	347 032.4	0.0	7.3	0.0	418.8	345 648.3
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.9	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

Section	FCC														FGD			
Stream	**1b**	**1c**	**1d**	**2**	**3**	**4**	**5**	**6**	**10**	**13**	**14**	**17**	**18**	**19**	**1e**	**1f**	**1g**	**1h**
Mass flow rate [kg/h]	180 229.3	180 229.3	226 541.9	208 679.2	187 846.6	176 834.7	176 834.7	548 604.0	541 323.4	20 832.6	536.1	30 080.1	32 995.9	546 000.0	155.7	276.8	19773.193	2120.40422
Pressure [bar]	1.0	1.1	1.0	1.1	1.1	1.0	1.0	6.3	1.5	3.5	3.0	1.1	1.1	1.1	/	/	/	/
Temperature [°C]	310.0	88.7	61.5	75.1	39.9	68.7	275.1	42.3	51.8	35.0	40.0	30.0	40.0	46.7	30.0	40.0	30.0	40.0
CO_2 [mol frac]	0.166	0.166	0.120	0.136	0.161	0.014	0.014	0.063	0.021	0.000	0.001	0.000	0.001	0.060	0.000	0.000	0.000	0.000
CO [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
O_2 [mol frac]	0.023	0.023	0.017	0.019	0.022	0.020	0.020	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N_2 [mol frac]	0.712	0.712	0.558	0.633	0.750	0.675	0.675	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Argon [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Water [mol frac]	0.098	0.098	0.306	0.213	0.067	0.291	0.291	0.817	0.863	1.000	0.998	1.000	0.998	0.820	0.000	0.000	1.000	/
MEA [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.120	0.116	0.000	0.002	0.000	0.002	0.120	0.000	0.000	0.000	0.000
CO_2 [kg/h]	44 267.1	44 269.9	44 260.9	44 264.1	44 261.9	4 433.5	4 433.5	60 983.7	21 199.4	2.2	0.8	0.0	47.7	58 248.5	0.0	0.0	0.0	0.0
CO [kg/h]	10.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.1	0.5	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
SO_2 [kg/h]	91.1	95.4	1.6	1.8	1.8	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
SO_3 [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	4 466.1	4 466.8	4 485.1	4 485.5	4 485.5	4 483.4	4 483.4	2.1	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	0.0	0.0
N_2 [kg/h]	120 656.7	120 664.7	131 473.1	131 483.7	131 483.5	131 451.1	131 451.1	32.3	0.3	0.2	0.0	0.0	0.3	27.3	0.0	0.0	0.0	0.0
Argon [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water [kg/h]	10 733.4	10 732.5	46 314.0	28 444.1	7 614.0	36 466.3	36 466.3	325 476.0	357 799.3	20 830.1	531.9	30 080.1	32 739.3	325 639.9	0.0	33.2	19773.2	1977.3
MEA [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	162 107.9	162 323.7	0.0	3.4	0.0	208.6	162 082.4	0.0	0.0	0.0	0.0
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
$CaCO_3$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	146.4	0.0	0.0	0.2
$CaSO_4.2H_2O$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	243.6	0.0	15.5
Alkali inerts [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
$MgCO_3$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
CaF_2 [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.2
Inerts from limestone [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.3	0.0	0.0	33.3
Cl- [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	59.6
SO_4-- [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8

Ca++ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.6
Mg++ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.4
$CaSO_4$ dissolved [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

Section	Stripper and compression section						
Stream	**7**	**8**	**9**	**11**	**16**	**12**	**15**
Mass flow rate [kg/h]	255.7	1 720 551.9	1 594 900.1	125 733.2	652.6	122 655.9	3 079.5
Pressure [bar]	6.3	6.3	1.8	1.3	1.8	112.0	3.0
Temperature [°C]	30.1	109.6	119.5	40.0	150.0	29.1	40.0
CO_2 [mol frac]	0.000	0.029	0.010	0.868		0.998	0.002
CO [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000		0.001	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
O_2 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
N_2 [mol frac]	0.000	0.000	0.000	0.002		0.001	0.000
Argon [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
Water [mol frac]	0.000	0.931	0.948	0.130		0.000	0.998
MEA [mol frac]	1.000	0.040	0.041	0.000		0.000	0.000
CO_2 [kg/h]	0.0	0.1	0.0	0.9	0.0	122 472.0	14.3
CO [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	0.0	0.0	0.0	0.0	0.0	65.0	1.3
SO_2 [kg/h]	0.0	0.0	0.0	0.0	0.0	5.7	0.0
SO_3 [kg/h]	0.0	0.0	0.0	0.0	0.0	0.1	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	0.0	0.0	0.0	0.0	0.0	7.4	0.0
N_2 [kg/h]	0.0	0.0	0.0	0.0	0.0	104.4	0.0
Argon [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water [kg/h]	0.0	0.8	0.9	0.1	0.9	1.2	3 063.7
MEA [kg/h]	1.0	0.1	0.1	0.0	0.1	0.0	0.0
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	150.1	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
$CaCO_3$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
$CaSO_4.2H_2O$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Alkali inerts [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
$MgCO_3$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaF_2 [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Inerts from limestone [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cl- [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SO_4-- [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca++ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg++ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
$CaSO_4$ dissolved [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

A.2.3 Case 02_03

A.2.3.1 Case 02_03 Summary

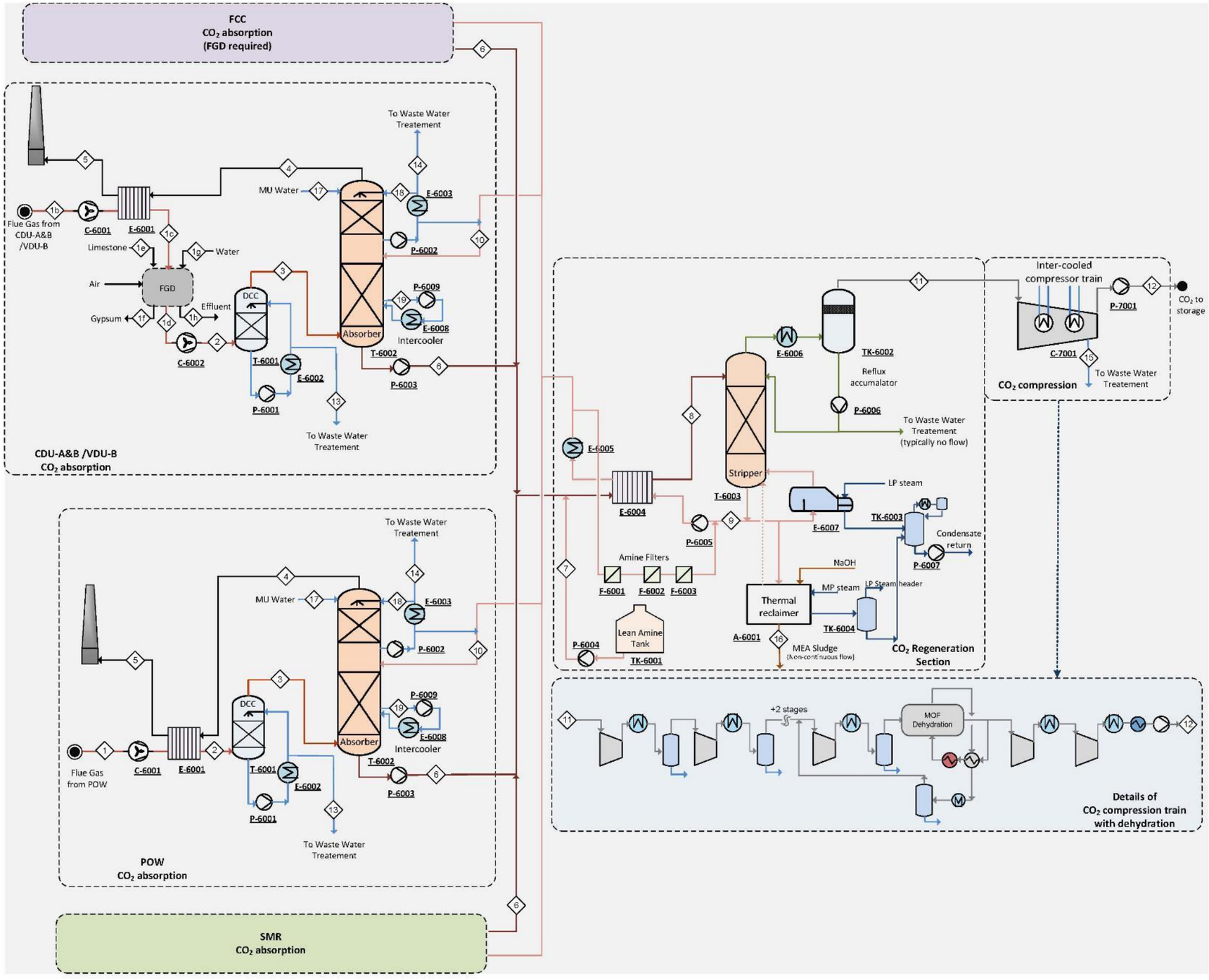
Absorber	POW_T-6002	CV_T-6002	SMR_T-6002	FCC_T-6002
Flow rate flue gas [tonne/h]	642.2	333.8	67.3	187.8
Molar fraction CO2 in flue gas []	0.09	0.11	0.20	0.16
Amount CO2 removed from the flue gas [tonne/h]	82.73	51.21	17.46	39.83
Design amount of CO2 removed from flue gas [tonne/h]	91.00	56.33	21.82	43.81
Fraction CO2 removed from the flue gas []	89.72 %	90.04 %	90.01 %	89.98 %
Absorber packing diameter [m]	9.25	6.70	3.60	5.50
Absorber packing height [m]	47.00	38.00	36.00	36.00
Lean amine temperature [°C]	51.2	51.4	52.1	51.8
Flow rate lean amine [t / t CO2 captured]	14.00	13.88	13.52	13.59
Rich amine temperature [°C]	41.9	41.9	42.3	42.2
Flow rate rich amine [t / t CO2 captured]	14.16	14.06	13.63	13.77
Lean amine: CO2 loading [mol / mol]	0.181	0.181	0.181	0.181
Rich amine: CO2 loading [mol / mol]	0.512	0.515	0.526	0.522
Electricity demand [kWh / t CO2 captured]	29.97 %	29.99 %	29.86 %	29.99 %
Cooling water demand [t / t CO2 captured]	52.37	48.08	25.90	37.63

Stripper	T-6003
Flow rate to compression (wet) [tonne/h]	196.12
Stripper packing diameter [m]	7.80
Stripper packing height [m]	28.00
Flow rate lean amine [t / t CO2 captured]	13.00
Flow rate rich amine [t / t CO2 captured]	14.02
Steam demand [GJ / t captured]	3.65
Reboiler pressure [bar]	1.80
Reboiler temperature [C]	119.53
Electricity demand [kWh / t CO2 captured]	3.32
Cooling water demand [t / t CO2 captured]	31.65

CO2 compression and purification	
Flow rate of CO2 to transportation [t / h]	191.31
Electricity demand [kWh / t CO2 captured]	93.16
Cooling water demand [t / t CO2 captured]	11.27

Other utilities	
Makeup of water [t / t CO2 captured]	0.98
Makeup of MEA [kg / t CO2 captured]	2.09
Waste water to treatment [t / t CO2 captured]	0.61
NaOH to thermal reclaimer [kg / t CO2 captured]	0.13
MEA sludge [kg / t CO2 captured]	5.33

A.2.3.2 Case 02_03 PFD



A.2.3.3 Case 02_03 Stream data

Section	POW											
Stream	**1**	**2**	**3**	**4**	**5**	**6**	**10**	**13**	**14**	**17**	**18**	**19**
Mass flow rate [kg/h]	697 530.2	697 530.2	642 245.6	622 625.9	622 625.9	1 171 692.2	1 157 805.8	55 284.6	1 227.0	66 997.8	70 076.2	1 163 000.0
Pressure [bar]	1.0	1.1	1.1	1.0	1.0	6.3	1.5	4.9	3.9	1.1	1.1	1.1
Temperature [°C]	135.0	87.2	40.2	61.5	131.6	42.0	51.2	35.0	40.0	30.0	40.1	45.3
CO_2 [mol frac]	0.083	0.083	0.094	0.009	0.009	0.062	0.021	0.000	0.001	0.000	0.001	0.058
CO [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
O_2 [mol frac]	0.025	0.025	0.028	0.026	0.026	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N_2 [mol frac]	0.711	0.711	0.809	0.754	0.754	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Argon [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Water [mol frac]	0.181	0.181	0.068	0.211	0.211	0.818	0.864	1.000	0.998	1.000	0.998	0.822
MEA [mol frac]	0.000	0.000	0.000	0.000	0.000	0.120	0.116	0.000	0.002	0.000	0.002	0.120
CO_2 [kg/h]	92 215.0	92 215.0	92 211.3	9 481.5	9 481.5	127 941.6	45 316.4	3.8	1.7	0.0	98.7	120 532.1
CO [kg/h]	23.2	23.2	23.2	23.2	23.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	69.5	69.5	67.7	0.9	0.9	67.7	1.0	1.9	0.0	0.0	0.0	0.2
SO_2 [kg/h]	4.0	4.0	4.0	0.0	0.0	4.0	0.0	0.1	0.0	0.0	0.0	0.1
SO_3 [kg/h]	0.2	0.2	0.2	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.1
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	19 879.1	19 879.1	19 879.0	19 873.7	19 873.7	5.4	0.1	0.0	0.0	0.0	0.1	4.4
N_2 [kg/h]	502 768.3	502 768.3	502 767.7	502 695.6	502 695.6	72.1	0.7	0.6	0.0	0.0	0.7	59.2
Argon [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water [kg/h]	82 570.8	82 570.8	27 292.5	90 551.0	90 551.0	697 005.2	765 455.2	55 278.3	1 217.9	66 997.8	69 557.9	696 755.8
MEA [kg/h]	0.0	0.0	0.0	0.0	0.0	346 595.8	347 032.4	0.0	7.3	0.0	418.8	345 648.3
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.9	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

Section	CDU-A&B/VDU-B																	
Stream	**1b**	**1c**	**1d**	**2**	**3**	**4**	**5**	**6**	**10**	**13**	**14**	**17**	**18**	**19**	**1e**	**1f**	**1g**	**1h**
Mass flow rate [kg/h]	331 104.3	331 104.3	379 957.3	357 953.9	333 804.5	320 876.5	320 876.5	719 971.4	710 838.6	24 149.4	658.1	39 230.7	41 508.7	711 700.0	287.3	510.6	18 044.9	1 935.1
Pressure [bar]	1.0	1.1	1.0	1.1	1.1	1.0	1.0	6.3	1.5	3.8	3.4	1.1	1.1	1.1	/	/	/	/
Temperature [°C]	210.0	83.9	56.1	69.8	40.0	63.9	189.4	42.0	51.4	35.0	40.0	30.0	40.1	46.2	30.0	40.0	30.0	40.0
CO_2 [mol frac]	0.113	0.113	0.093	0.102	0.113	0.010	0.010	0.062	0.021	0.000	0.001	0.000	0.001	0.059	0.000	0.000	0.000	0.000
CO [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
O_2 [mol frac]	0.039	0.039	0.031	0.034	0.038	0.035	0.035	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N_2 [mol frac]	0.741	0.741	0.637	0.699	0.781	0.720	0.720	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Argon [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Water [mol frac]	0.106	0.106	0.239	0.166	0.068	0.235	0.235	0.818	0.863	1.000	0.998	1.000	0.998	0.821	0.000	0.000	1.000	/
MEA [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.120	0.116	0.000	0.002	0.000	0.002	0.120	0.000	0.000	0.000	0.000
CO_2 [kg/h]	56 850.4	56 850.7	56 879.2	56 877.3	56 875.2	5 667.0	5 667.0	78 993.0	27 846.9	2.1	1.0	0.0	61.2	74 148.8	0.0	0.0	0.0	0.0
CO [kg/h]	20.7	21.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	95.9	96.0	0.0	0.0	0.0	0.6	0.6	0.1	0.6	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
SO_2 [kg/h]	172.4	172.4	3.0	2.9	2.9	0.0	0.0	2.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SO_3 [kg/h]	0.0	5.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	14 376.2	14 376.2	13 906.3	13 906.3	13 906.3	13 901.8	13 901.8	4.5	0.0	0.0	0.0	0.0	0.0	3.6	0.0	0.0	0.0	0.0
N_2 [kg/h]	237 633.9	237 635.8	249 136.0	249 135.8	249 135.6	249 092.5	249 092.5	43.1	0.4	0.3	0.0	0.0	0.4	35.0	0.0	0.0	0.0	0.0
Argon [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water [kg/h]	21 949.6	21 946.5	60 032.8	38 031.5	13 884.5	52 214.6	52 214.6	427 991.0	469 780.2	24 147.0	653.0	39 230.7	41 188.5	426 033.6	0.0	61.3	18044.9	1804.5
MEA [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	212 936.7	213 210.3	0.0	4.1	0.0	258.5	211 478.8	0.0	0.0	0.0	0.0
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.1	13.0	0.0	0.0	0.0	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0
$CaCO_3$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	270.1	0.0	0.0	0.2
$CaSO_4.2H_2O$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	449.3	0.0	14.1
Alkali inerts [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
$MgCO_3$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
CaF_2 [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.5
Inerts from limestone [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.2	0.0	0.0	30.4
Cl- [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	54.4
SO_4-- [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6

Ca++ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.2
Mg++ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.1
$CaSO_4$ dissolved [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.6

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

Section	**SMR**											
Stream	**1**	**2**	**3**	**4**	**5**	**6**	**10**	**13**	**14**	**17**	**18**	**19**
Mass flow rate [kg/h]	72 401.2	72 401.2	67 278.8	61 592.3	61 592.3	237 915.2	236 092.8	5 122.4	242.4	13 308.1	15 045.6	238 792.0
Pressure [bar]	1.0	1.1	1.1	1.0	1.0	6.3	1.5	2.9	2.7	1.1	1.1	1.1
Temperature [°C]	147.5	95.0	40.0	71.5	144.0	42.4	52.1	35.0	40.0	30.0	40.0	49.0
CO_2 [mol frac]	0.178	0.178	0.201	0.018	0.018	0.062	0.021	0.000	0.001	0.000	0.001	0.060
CO [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
O_2 [mol frac]	0.022	0.022	0.024	0.022	0.022	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N_2 [mol frac]	0.626	0.626	0.707	0.633	0.633	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Argon [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Water [mol frac]	0.175	0.175	0.068	0.328	0.328	0.819	0.864	1.000	0.998	1.000	0.998	0.821
MEA [mol frac]	0.000	0.000	0.000	0.000	0.000	0.119	0.115	0.000	0.002	0.000	0.002	0.119
CO_2 [kg/h]	19 399.1	19 399.1	19 398.4	1 938.5	1 938.5	26 420.0	9 205.0	0.7	0.3	0.0	20.7	25 493.7
CO [kg/h]	2.3	2.3	2.3	2.3	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	6.9	6.9	6.7	0.2	0.2	6.8	0.2	0.2	0.0	0.0	0.0	0.1
SO_2 [kg/h]	1.7	1.7	1.7	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0
SO_3 [kg/h]	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	1 718.2	1 718.2	1 718.2	1 717.2	1 717.2	1.0	0.0	0.0	0.0	0.0	0.0	0.8
N_2 [kg/h]	43 468.7	43 468.7	43 468.7	43 455.4	43 455.4	13.3	0.1	0.0	0.0	0.0	0.1	11.2
Argon [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water [kg/h]	7 804.3	7 804.3	2 682.8	14 478.9	14 478.9	141 767.2	156 398.0	5 121.5	240.6	13 308.1	14 935.9	142 889.3
MEA [kg/h]	0.0	0.0	0.0	0.0	0.0	69 705.2	70 489.4	0.0	1.5	0.0	88.8	70 397.0
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

Section	FCC														FGD			
Stream	**1b**	**1c**	**1d**	**2**	**3**	**4**	**5**	**6**	**10**	**13**	**14**	**17**	**18**	**19**	**1e**	**1f**	**1g**	**1h**
Mass flow rate [kg/h]	180 229.3	180 229.3	226 541.9	208 679.2	187 846.6	176 827.9	176 827.9	548 603.9	541 323.4	20 832.6	537.4	30 119.8	33 160.4	546 000.0	155.7	276.8	19773.1935	2120.4042
Pressure [bar]	1.0	1.1	1.0	1.1	1.1	1.0	1.0	6.3	1.5	3.5	3.0	1.1	1.1	1.1	/	/	/	/
Temperature [°C]	310.0	88.7	61.5	75.1	39.9	68.7	275.1	42.3	51.8	35.0	40.0	30.0	40.0	46.7	30.0	40.0	30.0	40.0
CO_2 [mol frac]	0.166	0.166	0.120	0.136	0.161	0.014	0.014	0.063	0.021	0.000	0.001	0.000	0.001	0.060	0.000	0.000	0.000	0.000
CO [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
O_2 [mol frac]	0.023	0.023	0.017	0.019	0.022	0.020	0.020	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N_2 [mol frac]	0.712	0.712	0.558	0.633	0.750	0.675	0.675	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Argon [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Water [mol frac]	0.098	0.098	0.306	0.213	0.067	0.291	0.291	0.817	0.863	1.000	0.998	1.000	0.998	0.820	0.000	0.000	1.000	/
MEA [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.120	0.116	0.000	0.002	0.000	0.002	0.120	0.000	0.000	0.000	0.000
CO_2 [kg/h]	44 267.1	44 269.9	44 260.9	44 264.1	44 261.9	4 433.2	4 433.2	60 983.8	21 199.4	2.2	0.8	0.0	47.4	58 248.5	0.0	0.0	0.0	0.0
CO [kg/h]	10.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.1	0.5	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
SO_2 [kg/h]	91.1	95.4	1.6	1.8	1.8	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
SO_3 [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	4 466.1	4 466.8	4 485.1	4 485.5	4 485.5	4 483.4	4 483.4	2.1	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	0.0	0.0
N_2 [kg/h]	120 656.7	120 664.7	131 473.1	131 483.7	131 483.5	131 451.1	131 451.1	32.3	0.3	0.2	0.0	0.0	0.3	27.3	0.0	0.0	0.0	0.0
Argon [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water [kg/h]	10 733.4	10 732.5	46 314.0	28 444.1	7 614.0	36 459.8	36 459.8	325 475.8	357 799.3	20 830.1	533.3	30 119.8	32 905.2	325 639.9	0.0	33.2	19773.2	1977.3
MEA [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	162 107.9	162 323.7	0.0	3.4	0.0	207.5	162 082.4	0.0	0.0	0.0	0.0
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
$CaCO_3$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	146.4	0.0	0.0	0.2
$CaSO_4.2H_2O$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	243.6	0.0	15.5
Alkali inerts [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
$MgCO_3$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
CaF_2 [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.2
Inerts from limestone [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.3	0.0	0.0	33.3
Cl- [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	59.6
SO_4-- [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8
Ca++ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.6
Mg++ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.4

$CaSO_4$ dissolved [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

Section	**Stripper and compression section**						
Stream	**7**	**8**	**9**	**11**	**16**	**12**	**15**
Mass flow rate [kg/h]	398.5	2 678 581.0	2 484 116.1	196 118.8	1 018.3	191 314.8	4 803.1
Pressure [bar]	6.3	6.3	1.8	1.3	1.8	112.0	3.0
Temperature [°C]	30.1	109.7	119.5	40.0	150.0	29.1	40.0
CO_2 [mol frac]	0.000	0.062	0.023	0.941		0.998	0.002
CO [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
O_2 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
N_2 [mol frac]	0.000	0.000	0.000	0.001		0.001	0.000
Argon [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
Water [mol frac]	0.000	0.818	0.852	0.057		0.000	0.998
MEA [mol frac]	1.000	0.120	0.125	0.000		0.000	0.000
CO_2 [kg/h]	0.0	294 338.4	103 324.5	191 080.3	0.0	191 057.2	22.3
CO [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	0.0	74.6	2.2	73.1	0.0	71.6	1.5
SO_2 [kg/h]	0.0	10.4	0.0	10.4	0.0	10.3	0.1
SO_3 [kg/h]	0.0	0.3	0.2	0.1	0.0	0.1	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	0.0	13.0	0.0	13.0	0.0	13.0	0.0
N_2 [kg/h]	0.0	160.8	0.0	160.8	0.0	160.8	0.0
Argon [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water [kg/h]	0.0	1 592 239.2	1 588 768.1	4 781.2	611.0	1.9	4 779.2
MEA [kg/h]	398.5	791 744.2	792 021.0	0.0	173.1	0.0	0.0
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	234.2	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

A.2.4 Case 02_04

A.2.4.1 Case 02_04 Summary

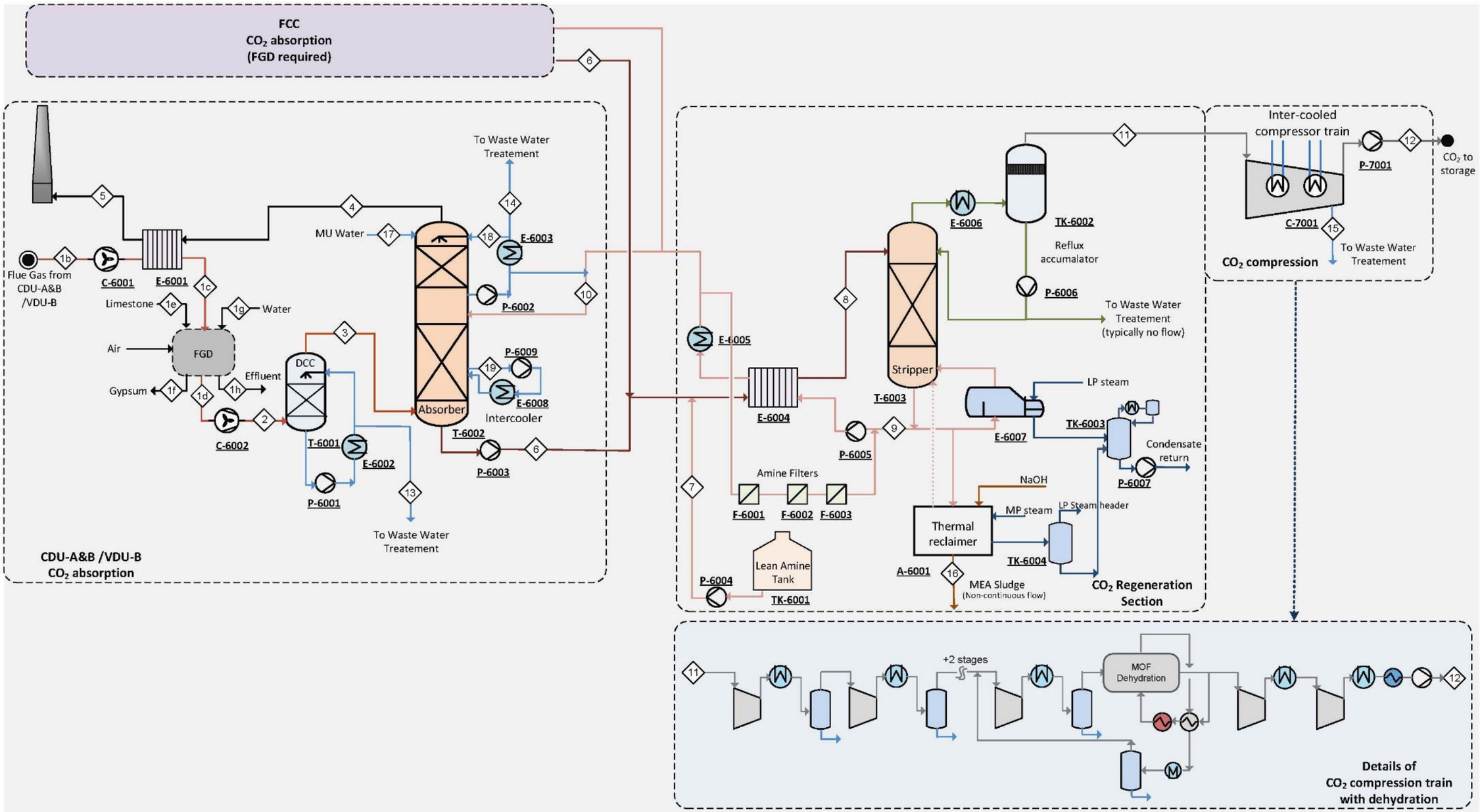
Absorber	CV_T-6002	FCC_T-6002
Flow rate flue gas [tonne/h]	333.8	187.8
Molar fraction CO2 in flue gas []	0.11	0.16
Amount CO2 removed from the flue gas [tonne/h]	51.27	39.75
Design amount of CO2 removed from flue gas [tonne/h]	56.40	43.73
Fraction CO2 removed from the flue gas []	90.15 %	89.81 %
Absorber packing diameter [m]	6.70	5.50
Absorber packing height [m]	38.00	36.00
Lean amine temperature [°C]	51.5	51.9
Flow rate lean amine [t / t CO2 captured]	13.91	13.62
Rich amine temperature [°C]	41.9	42.2
Flow rate rich amine [t / t CO2 captured]	14.09	13.80
Lean amine: CO2 loading [mol / mol]	0.181	0.181
Rich amine: CO2 loading [mol / mol]	0.515	0.522
Electricity demand [kWh / t CO2 captured]	48.03	37.70
Cooling water demand [t / t CO2 captured]	42.30	45.56

Stripper	T-6003
Flow rate to compression (wet) [tonne/h]	93.38
Stripper packing diameter [m]	5.30
Stripper packing height [m]	23.00
Flow rate lean amine [t / t CO2 captured]	12.92
Flow rate rich amine [t / t CO2 captured]	13.97
Steam demand [GJ / t captured]	3.64
Reboiler pressure [bar]	1.80
Reboiler temperature [C]	119.52
Electricity demand [kWh / t CO2 captured]	3.30
Cooling water demand [t / t CO2 captured]	31.60

CO2 compression and purification	
Flow rate of CO2 to transportation [t / h]	91.08
Electricity demand [kWh / t CO2 captured]	93.13
Cooling water demand [t / t CO2 captured]	11.25

Other utilities	
Makeup of water [t / t CO2 captured]	1.19
Makeup of MEA [kg / t CO2 captured]	2.08
Waste water to treatment [t / t CO2 captured]	0.58
NaOH to thermal reclaimer [kg / t CO2 captured]	0.13
MEA sludge [kg / t CO2 captured]	5.33

A.2.4.2 Case 02_04 PFD



A.2.4.3 Case 02_04 Stream data

Section	FCC														FGD			
Stream	**1b**	**1c**	**1d**	**2**	**3**	**4**	**5**	**6**	**10**	**13**	**14**	**17**	**18**	**19**	**1e**	**1f**	**1g**	**1h**
Mass flow rate [kg/h]	180 229.3	180 229.3	226 541.9	208 679.2	187 846.6	176 885.4	176 885.4	548 610.2	541 368.0	20 832.6	535.7	30 197.9	33 139.2	546 000.0	155.7	276.8	19773.1935	2120.4042
Pressure [bar]	1.0	1.1	1.0	1.1	1.1	1.0	1.0	6.3	1.5	3.5	3.0	1.1	1.1	1.1	/	/	/	/
Temperature [°C]	310.0	88.7	61.5	75.1	39.9	68.7	275.1	42.3	51.9	35.0	40.0	30.0	40.0	46.6	30.0	40.0	30.0	40.0
CO_2 [mol frac]	0.166	0.166	0.120	0.136	0.161	0.015	0.015	0.063	0.021	0.000	0.001	0.000	0.001	0.060	0.000	0.000	0.000	0.000
CO [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
O_2 [mol frac]	0.023	0.023	0.017	0.019	0.022	0.020	0.020	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N_2 [mol frac]	0.712	0.712	0.558	0.633	0.750	0.674	0.674	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Argon [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Water [mol frac]	0.098	0.098	0.306	0.213	0.067	0.291	0.291	0.818	0.864	1.000	0.998	1.000	0.998	0.820	0.000	0.000	1.000	/
MEA [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.120	0.115	0.000	0.002	0.000	0.002	0.120	0.000	0.000	0.000	0.000
CO_2 [kg/h]	44 267.1	44 269.9	44 260.9	44 264.1	44 261.9	4 508.3	4 508.3	60 853.8	21 149.9	2.2	0.8	0.0	47.9	58 125.2	0.0	0.0	0.0	0.0
CO [kg/h]	10.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.1	0.5	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
SO_2 [kg/h]	91.1	95.4	1.6	1.8	1.8	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
SO_3 [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	4 466.1	4 466.8	4 485.1	4 485.5	4 485.5	4 483.4	4 483.4	2.1	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	0.0	0.0
N_2 [kg/h]	120 656.7	120 664.7	131 473.1	131 483.7	131 483.5	131 451.2	131 451.2	32.3	0.3	0.2	0.0	0.0	0.3	27.2	0.0	0.0	0.0	0.0
Argon [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water [kg/h]	10 733.4	10 732.5	46 314.0	28 444.1	7 614.0	36 442.1	36 442.1	325 973.3	358 256.0	20 830.1	531.5	30 197.9	32 883.6	326 126.9	0.0	33.2	19773.2	1977.3
MEA [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	161 746.9	161 961.3	0.0	3.4	0.0	207.4	161 718.8	0.0	0.0	0.0	0.0
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
$CaCO_3$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	146.4	0.0	0.0	0.2
$CaSO_4.2H_2O$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	243.6	0.0	15.5
Alkali inerts [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
$MgCO_3$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
CaF_2 [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.2
Inerts from limestone [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.3	0.0	0.0	33.3

Cl- [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	59.6
SO_4-- [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8
Ca++ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.6
Mg++ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.4
$CaSO_4$ dissolved [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

Section	**CDU-A&B/VDU-B**																	**FGD**
Stream	**1b**	**1c**	**1d**	**2**	**3**	**4**	**5**	**6**	**10**	**13**	**14**	**17**	**18**	**19**	**1e**	**1f**	**1g**	**1h**
Mass flow rate [kg/h]	331 104.3	331 104.3	379 957.3	357 953.9	333 804.5	320 748.6	320 748.6	722 591.3	713 450.5	24 149.4	676.8	40 378.0	42 693.8	711 700.0	287.3	510.6	18 044.9	1 935.1
Pressure [bar]	1.0	1.1	1.0	1.1	1.1	1.0	1.0	6.3	1.5	3.8	3.4	1.1	1.1	1.1	/	/	/	/
Temperature [°C]	210.0	83.9	56.1	69.8	40.0	63.9	189.4	42.1	51.5	35.0	40.0	30.0	40.0	46.3	30.0	40.0	30.0	40.0
CO_2 [mol frac]	0.113	0.113	0.093	0.102	0.113	0.010	0.010	0.062	0.021	0.000	0.001	0.000	0.001	0.058	0.000	0.000	0.000	0.000
CO [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
O_2 [mol frac]	0.039	0.039	0.031	0.034	0.038	0.035	0.035	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N_2 [mol frac]	0.741	0.741	0.637	0.699	0.781	0.720	0.720	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Argon [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Water [mol frac]	0.106	0.106	0.239	0.166	0.068	0.234	0.234	0.819	0.864	1.000	0.998	1.000	0.998	0.822	0.000	0.000	1.000	/
MEA [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.120	0.115	0.000	0.002	0.000	0.002	0.120	0.000	0.000	0.000	0.000
CO_2 [kg/h]	56 850.4	56 850.7	56 879.2	56 877.3	56 875.2	5 601.7	5 601.7	79 096.4	27 883.3	2.1	1.0	0.0	58.7	73 957.4	0.0	0.0	0.0	0.0
CO [kg/h]	20.7	21.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	95.9	96.0	0.0	0.0	0.0	0.5	0.5	0.1	0.6	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
SO_2 [kg/h]	172.4	172.4	3.0	2.9	2.9	0.0	0.0	2.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SO_3 [kg/h]	0.0	5.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	14 376.2	14 376.2	13 906.3	13 906.3	13 906.3	13 901.8	13 901.8	4.5	0.0	0.0	0.0	0.0	0.0	3.6	0.0	0.0	0.0	0.0
N_2 [kg/h]	237 633.9	237 635.8	249 136.0	249 135.8	249 135.6	249 092.5	249 092.5	43.1	0.4	0.3	0.0	0.0	0.4	34.9	0.0	0.0	0.0	0.0
Argon [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water [kg/h]	21 949.6	21 946.5	60 032.8	38 031.5	13 884.5	52 152.1	52 152.1	430 183.3	472 038.0	24 147.0	671.7	40 378.0	42 373.7	426 681.4	0.0	61.3	18044.9	1804.5
MEA [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	213 261.1	213 528.0	0.0	4.1	0.0	260.9	211 022.6	0.0	0.0	0.0	0.0
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
$CaCO_3$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	270.1	0.0	0.0	0.2

$CaSO_4.2H_2O$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	449.3	0.0	14.1
Alkali inerts [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
$MgCO_3$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
CaF_2 [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.5
Inerts from limestone [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.2	0.0	0.0	30.4
Cl- [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	54.4
SO_4-- [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6
Ca++ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.2
Mg++ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.1
$CaSO_4$ dissolved [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.6

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

Section	Stripper and compression section						
Stream	**7**	**8**	**9**	**11**	**16**	**12**	**15**
Mass flow rate [kg/h]	398.5	2 678 581.0	2 484 116.1	196 118.8	484.7	91 076.1	2 286.7
Pressure [bar]	6.3	6.3	1.8	1.3	1.8	112.0	3.0
Temperature [°C]	30.1	109.7	119.5	40.0	150.0	29.1	40.0
CO_2 [mol frac]	0.000	0.062	0.023	0.941		0.999	0.002
CO [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
O_2 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
N_2 [mol frac]	0.000	0.000	0.000	0.001		0.001	0.000
Argon [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
Water [mol frac]	0.000	0.818	0.852	0.058		0.000	0.998
MEA [mol frac]	1.000	0.120	0.125	0.000		0.000	0.000
CO_2 [kg/h]	0.0	139 950.1	48 857.5	91 019.6	0.0	90 988.5	10.6
CO [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	0.0	0.1	0.0	0.1	0.0	0.1	0.0
SO_2 [kg/h]	0.0	4.7	0.0	4.7	0.0	4.6	0.0
SO_3 [kg/h]	0.0	0.1	0.0	0.0	0.0	0.0	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	0.0	6.6	0.0	6.6	0.0	6.6	0.0
N_2 [kg/h]	0.0	75.4	0.0	75.4	0.0	75.4	0.0
Argon [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water [kg/h]	0.0	756 156.6	752 442.7	2 277.0	290.8	0.9	2 276.0
MEA [kg/h]	189.5	375 197.5	374 500.1	0.0	82.4	0.0	0.0
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	111.5	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
$CaCO_3$	0.0	0.0	0.0	0.0	0.0	0.0	0.0
$CaSO_4.2H_2O$	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Alkali inerts	0.0	0.0	0.0	0.0	0.0	0.0	0.0
$MgCO_3$	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaF_2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Inerts from limestone	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cl-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SO_4--	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca++	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg++	0.0	0.0	0.0	0.0	0.0	0.0	0.0
$CaSO_4$ dissolved	0.0	0.0	0.0	0.0	0.0	0.0	0.0

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

A.3 CO_2 capture from base case 3

A.3.1 Case 03_01

A.3.1.1 Case 03_01 Summary

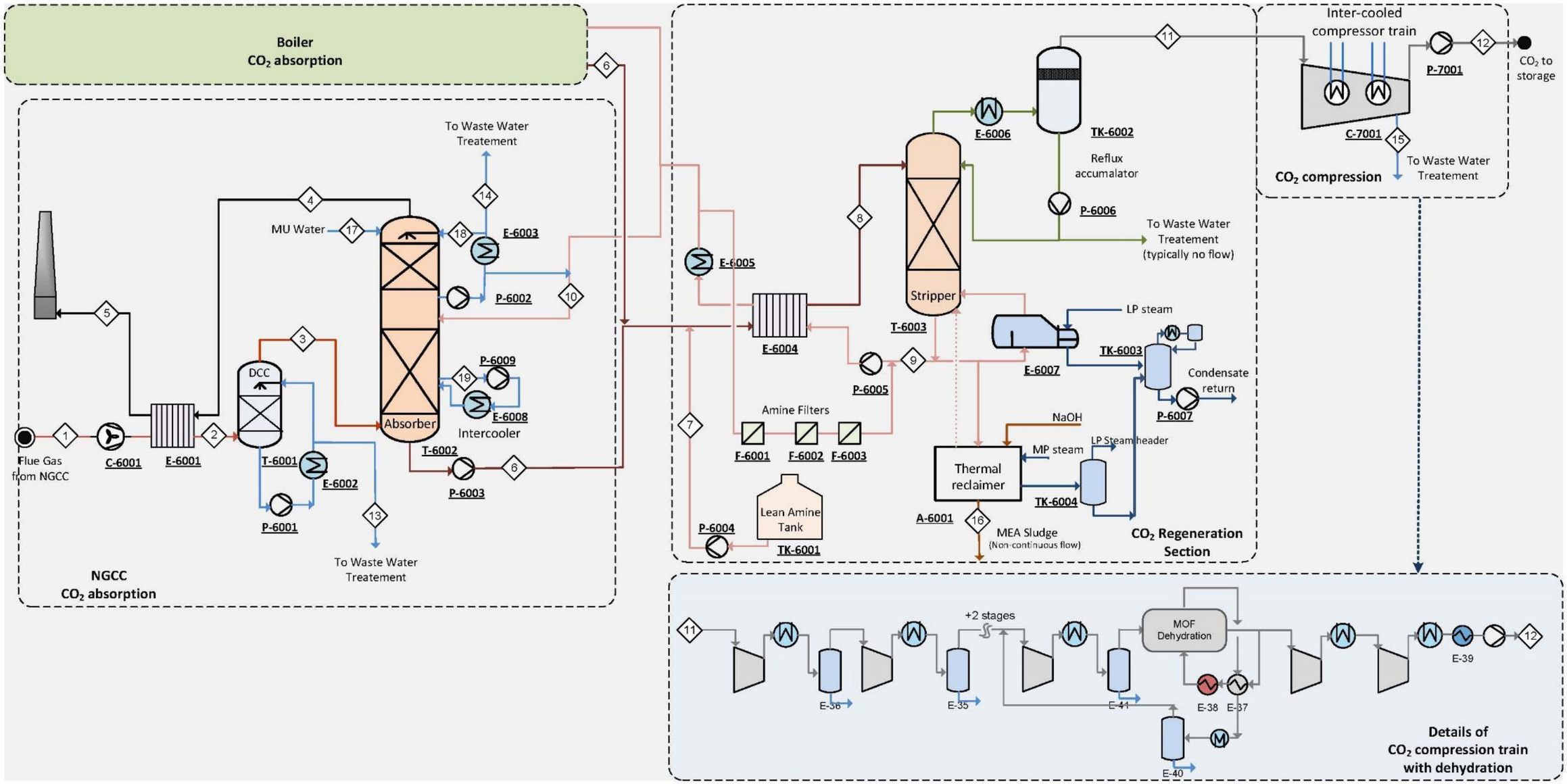
Absorber	Boiler_T-6002	NGCC_T-6002
Flow rate flue gas [tonne/h]	364.8	364.9
Molar fraction CO2 in flue gas []	0.09	0.05
Amount CO2 removed from the flue gas [tonne/h]	46.30	25.16
Design amount of CO2 removed from flue gas [tonne/h]	50.93	27.68
Fraction CO2 removed from the flue gas []	90.02 %	89.72 %
Absorber packing diameter [m]	7.00	6.20
Absorber packing height [m]	38.00	36.00
Lean amine temperature [°C]	51.2	50.6
Flow rate lean amine [t / t CO2 captured]	14.05	14.77
Rich amine temperature [°C]	41.8	41.5
Flow rate rich amine [t / t CO2 captured]	14.23	14.98
Lean amine: CO2 loading [mol / mol]	0.181	0.181
Rich amine: CO2 loading [mol / mol]	0.511	0.494
Electricity demand [kWh / t CO2 captured]	51.31	82.95
Cooling water demand [t / t CO2 captured]	60.26	37.28

Stripper	T-6003
Flow rate to compression (wet) [tonne/h]	73.51
Stripper packing diameter [m]	4.85
Stripper packing height [m]	22.00
Flow rate lean amine [t / t CO2 captured]	13.46
Flow rate rich amine [t / t CO2 captured]	14.49
Steam demand [GJ / t captured]	3.74
Reboiler pressure [bar]	1.80
Reboiler temperature [C]	119.52
Electricity demand [kWh / t CO2 captured]	3.44
Cooling water demand [t / t CO2 captured]	33.06

CO2 compression and purification	
Flow rate of CO2 to transportation [t / h]	71.71
Electricity demand [kWh / t CO2 captured]	93.43
Cooling water demand [t / t CO2 captured]	11.26

Other utilities	
Makeup of water [t / t CO2 captured]	0.80
Makeup of MEA [kg / t CO2 captured]	2.08
Waste water to treatment [t / t CO2 captured]	0.58
NaOH to thermal reclaimer [kg / t CO2 captured]	0.13
MEA sludge [kg / t CO2 captured]	5.33

A.3.1.2 Case 03_01 PFD



A.3.1.3 Case 03_01 Stream data

Section	NGCC											
Stream	**1**	**2**	**3**	**4**	**5**	**6**	**10**	**13**	**14**	**17**	**18**	**19**
Mass flow rate [kg/h]	371 485.1	371 485.1	364 936.4	358 601.8	358 601.8	377 035.5	371 553.7	6 548.7	355.6	20 193.0	20 322.6	369 999.6
Pressure [bar]	1.0	1.1	1.1	1.0	1.0	5.2	1.5	4.0	3.5	1.1	1.1	1.1
Temperature [°C]	127.5	73.7	40.2	53.6	124.3	41.6	50.6	35.0	40.0	30.0	40.0	46.8
CO_2 [mol frac]	0.049	0.049	0.050	0.005	0.005	0.059	0.021	0.000	0.001	0.000	0.001	0.052
CO [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
O_2 [mol frac]	0.098	0.098	0.101	0.097	0.097	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N_2 [mol frac]	0.751	0.751	0.772	0.744	0.744	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Argon [mol frac]	0.009	0.009	0.009	0.008	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Water [mol frac]	0.094	0.094	0.068	0.145	0.145	0.821	0.863	1.000	0.998	1.000	0.998	0.828
MEA [mol frac]	0.000	0.000	0.000	0.000	0.000	0.120	0.116	0.000	0.002	0.000	0.002	0.120
CO_2 [kg/h]	28 047.1	28 047.1	28 046.8	2 884.3	2 884.3	39 733.3	14 606.9	0.3	0.5	0.0	29.8	34 326.3
CO [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	0.0	0.0	0.0	1.2	1.2	0.0	1.2	0.0	0.0	0.0	0.0	0.0
SO_2 [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SO_3 [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	41 012.0	41 012.0	41 011.9	41 006.2	41 006.2	5.7	0.1	0.0	0.0	0.0	0.1	4.3
N_2 [kg/h]	275 716.2	275 716.2	275 716.2	275 695.8	275 695.8	20.4	0.2	0.1	0.0	0.0	0.2	15.4
Argon [kg/h]	4 495.0	4 495.0	4 494.5	4 361.2	4 361.2	133.3	1.2	0.5	0.0	0.0	1.2	93.5
Water [kg/h]	22 214.8	22 214.8	15 667.0	34 653.1	34 653.1	225 603.1	245 084.8	6 547.9	352.9	20 193.0	20 165.4	225 195.3
MEA [kg/h]	0.0	0.0	0.0	0.0	0.0	111 539.7	111 859.2	0.0	2.2	0.0	125.9	110 364.8
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.9	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

Section	Boiler											
Stream	**1**	**2**	**3**	**4**	**5**	**6**	**10**	**13**	**14**	**17**	**18**	**19**
Mass flow rate [kg/h]	397 045.7	397 045.7	364 822.3	353 508.3	353 508.3	658 760.3	650 552.1	32 223.4	628.7	36 629.2	38 660.6	652 300.0
Pressure [bar]	1.0	1.1	1.1	1.0	1.0	5.2	1.5	4.0	3.4	1.1	1.1	1.1
Temperature [°C]	127.5	86.6	40.1	61.2	123.9	41.9	51.2	35.0	40.0	30.0	40.0	45.9
CO_2 [mol frac]	0.081	0.081	0.093	0.009	0.009	0.061	0.021	0.000	0.001	0.000	0.001	0.058
CO [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
O_2 [mol frac]	0.025	0.025	0.028	0.026	0.026	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N_2 [mol frac]	0.710	0.710	0.811	0.757	0.757	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Argon [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Water [mol frac]	0.184	0.184	0.068	0.208	0.208	0.819	0.864	1.000	0.998	1.000	0.998	0.822
MEA [mol frac]	0.000	0.000	0.000	0.000	0.000	0.120	0.115	0.000	0.002	0.000	0.002	0.120
CO_2 [kg/h]	51 433.3	51 433.3	51 431.1	5 134.0	5 134.0	71 684.8	25 446.1	2.1	0.9	0.0	54.4	67 078.7
CO [kg/h]	13.2	13.2	13.2	13.2	13.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	39.5	39.5	38.5	1.7	1.7	38.6	1.9	1.1	0.0	0.0	0.1	0.2
SO_2 [kg/h]	3.6	3.6	3.6	0.0	0.0	3.6	0.0	0.0	0.0	0.0	0.0	0.1
SO_3 [kg/h]	0.2	0.2	0.2	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	11 334.1	11 334.1	11 334.1	11 331.1	11 331.1	3.0	0.0	0.0	0.0	0.0	0.0	2.4
N_2 [kg/h]	286 535.4	286 535.4	286 535.1	286 494.7	286 494.7	40.4	0.4	0.3	0.0	0.0	0.4	32.7
Argon [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water [kg/h]	47 686.3	47 686.3	15 466.6	50 533.5	50 533.5	392 388.3	430 261.9	32 219.8	624.0	36 629.2	38 372.9	391 577.1
MEA [kg/h]	0.0	0.0	0.0	0.0	0.0	194 601.4	194 841.7	0.0	3.8	0.0	232.8	193 608.8
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.8	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

Section	Stripper and compression section						
Stream	**7**	**8**	**9**	**11**	**16**	**12**	**15**
Mass flow rate [kg/h]	148.9	1 035 944.7	961 960.1	73 509.9	380.5	71 709.0	1 800.7
Pressure [bar]	5.2	5.2	1.8	1.3	1.8	112.0	3.0
Temperature [°C]	30.1	109.7	119.5	40.0	150.0	29.1	40.0
CO_2 [mol frac]	0.000	0.060	0.023	0.939		0.996	0.002
CO [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
O_2 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
N_2 [mol frac]	0.000	0.000	0.000	0.001		0.001	0.000
Argon [mol frac]	0.000	0.000	0.000	0.002		0.002	0.000
Water [mol frac]	0.000	0.820	0.852	0.057		0.000	0.998
MEA [mol frac]	1.000	0.120	0.125	0.000		0.000	0.000
CO_2 [kg/h]	0.0	111 418.1	39 931.2	71 473.1	0.0	71 464.6	8.4
CO [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	0.0	38.6	0.6	38.1	0.0	37.3	0.8
SO_2 [kg/h]	0.0	3.6	0.0	3.6	0.0	3.5	0.0
SO_3 [kg/h]	0.0	0.2	0.1	0.1	0.0	0.1	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	0.0	8.7	0.0	8.7	0.0	8.7	0.0
N_2 [kg/h]	0.0	60.8	0.0	60.8	0.0	60.8	0.0
Argon [kg/h]	0.0	133.3	0.0	133.3	0.0	133.3	0.0
Water [kg/h]	0.0	617 991.4	615 986.8	1 792.3	228.3	0.7	1 791.5
MEA [kg/h]	148.9	306 290.1	306 041.4	0.0	64.7	0.0	0.0
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	87.5	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

A.3.2 Case 03_02

A.3.2.1 Case 03_02 Summary

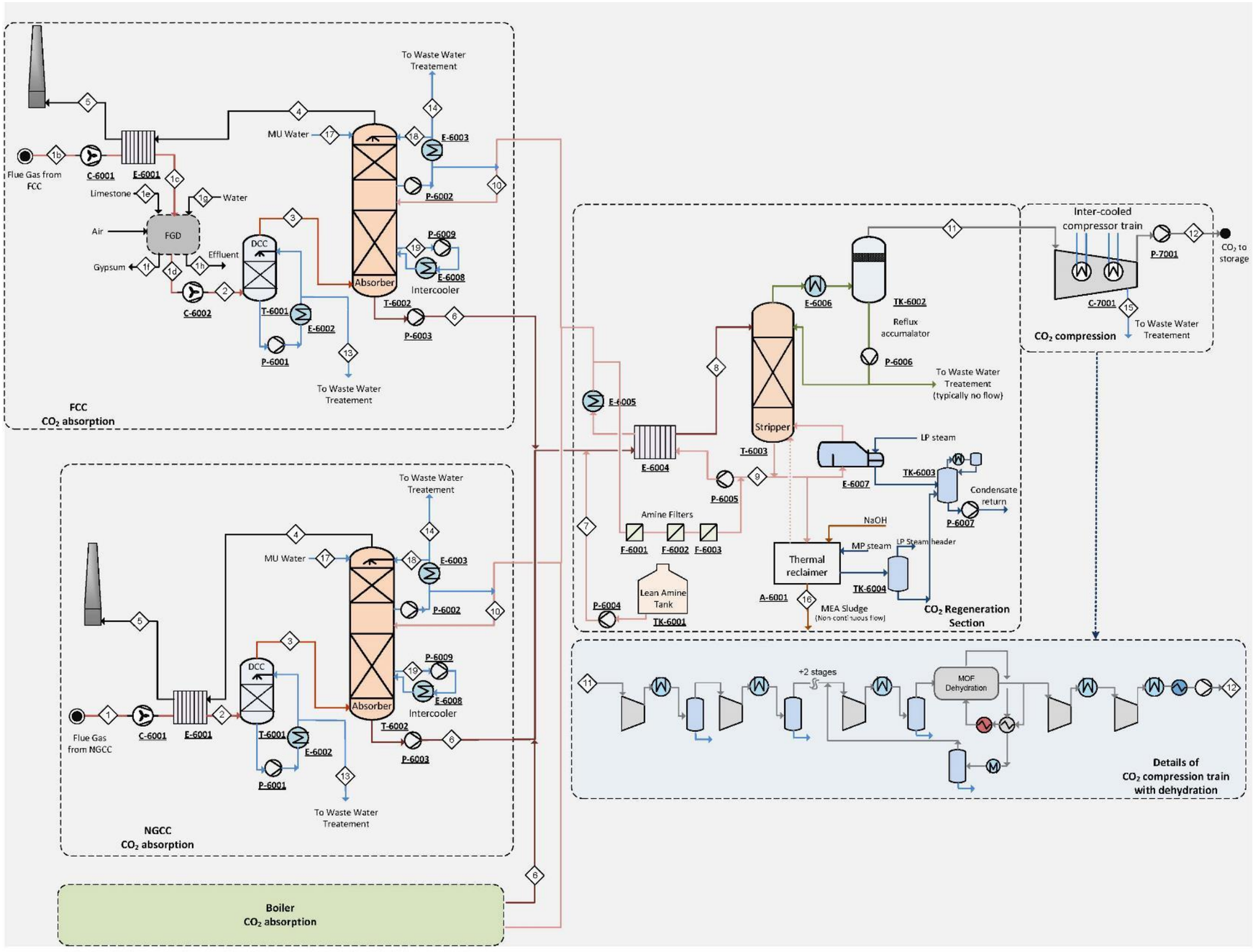
Absorber	NGCC_T-6002	Boiler_T-6002	FCC_T-6002
Flow rate flue gas [tonne/h]	364.9	364.8	225.4
Molar fraction CO2 in flue gas []	0.05	0.09	0.16
Amount CO2 removed from the flue gas [tonne/h]	25.21	46.30	47.73
Design amount of CO2 removed from flue gas [tonne/h]	27.73	50.93	52.50
Fraction CO2 removed from the flue gas []	89.88 %	90.02 %	89.86 %
Absorber packing diameter [m]	6.20	7.00	5.70
Absorber packing height [m]	36.00	38.00	36.00
Lean amine temperature [°C]	50.6	51.2	51.8
Flow rate lean amine [t / t CO2 captured]	14.75	14.05	13.60
Rich amine temperature [°C]	41.5	41.8	42.2
Flow rate rich amine [t / t CO2 captured]	14.97	14.23	13.78
Lean amine: CO2 loading [mol / mol]	0.181	0.181	0.181
Rich amine: CO2 loading [mol / mol]	0.494	0.511	0.522
Electricity demand [kWh / t CO2 captured]	82.87	51.38	37.60
Cooling water demand [t / t CO2 captured]	37.36	60.27	45.47

Stripper	T-6003
Flow rate to compression (wet) [tonne/h]	122.52
Stripper packing diameter [m]	6.00
Stripper packing height [m]	23.00
Flow rate lean amine [t / t CO2 captured]	13.16
Flow rate rich amine [t / t CO2 captured]	14.21
Steam demand [GJ / t captured]	3.69
Reboiler pressure [bar]	1.80
Reboiler temperature [C]	119.53
Electricity demand [kWh / t CO2 captured]	3.36
Cooling water demand [t / t CO2 captured]	32.38

CO2 compression and purification	
Flow rate of CO2 to transportation [t / h]	119.52
Electricity demand [kWh / t CO2 captured]	93.31
Cooling water demand [t / t CO2 captured]	11.26

Other utilities	
Makeup of water [t / t CO2 captured]	0.98
Makeup of MEA [kg / t CO2 captured]	2.08
Waste water to treatment [t / t CO2 captured]	0.60
NaOH to thermal reclaimer [kg / t CO2 captured]	0.13
MEA sludge [kg / t CO2 captured]	5.33

A.3.2.2 Case 03_02 PFD



A.3.2.3 Case 03_02 Stream data

Section	NGCC											
Stream	**1**	**2**	**3**	**4**	**5**	**6**	**10**	**13**	**14**	**17**	**18**	**19**
Mass flow rate [kg/h]	371 485.1	371 485.1	364 936.3	358 533.2	358 533.2	377 461.4	371 922.2	6 548.8	359.4	20 394.7	20 536.9	370 000.0
Pressure [bar]	1.0	1.1	1.1	1.0	1.0	5.3	1.5	4.0	3.5	1.1	1.1	1.1
Temperature [°C]	127.5	73.7	40.2	53.6	124.3	41.6	50.6	35.0	40.0	30.0	40.0	46.9
CO_2 [mol frac]	0.049	0.049	0.050	0.005	0.005	0.059	0.021	0.000	0.001	0.000	0.001	0.052
CO [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
O_2 [mol frac]	0.098	0.098	0.101	0.097	0.097	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N_2 [mol frac]	0.751	0.751	0.772	0.745	0.745	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Argon [mol frac]	0.009	0.009	0.009	0.008	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Water [mol frac]	0.094	0.094	0.068	0.145	0.145	0.821	0.863	1.000	0.998	1.000	0.998	0.828
MEA [mol frac]	0.000	0.000	0.000	0.000	0.000	0.120	0.116	0.000	0.002	0.000	0.002	0.120
CO_2 [kg/h]	28 047.1	28 047.1	28 046.8	2 839.7	2 839.7	39 793.2	14 625.8	0.3	0.5	0.0	29.7	34 219.6
CO [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	0.0	0.0	0.0	0.9	0.9	0.0	0.9	0.0	0.0	0.0	0.0	0.0
SO_2 [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SO_3 [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	41 012.0	41 012.0	41 011.9	41 006.2	41 006.2	5.7	0.1	0.0	0.0	0.0	0.1	4.2
N_2 [kg/h]	275 716.2	275 716.2	275 716.2	275 695.8	275 695.8	20.4	0.2	0.1	0.0	0.0	0.2	15.3
Argon [kg/h]	4 495.0	4 495.0	4 494.5	4 361.2	4 361.2	133.3	1.2	0.5	0.0	0.0	1.2	92.9
Water [kg/h]	22 214.8	22 214.8	15 666.9	34 629.5	34 629.5	225 738.2	245 286.3	6 547.9	356.6	20 394.7	20 379.7	225 271.0
MEA [kg/h]	0.0	0.0	0.0	0.0	0.0	111 770.5	112 007.5	0.0	2.2	0.0	126.1	110 396.9
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.9	0.0	3.6	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

Section	Boiler											
Stream	**1**	**2**	**3**	**4**	**5**	**6**	**10**	**13**	**14**	**17**	**18**	**19**
Mass flow rate [kg/h]	397 045.7	397 045.7	364 822.3	353 472.6	353 472.6	658 760.3	650 552.1	32 223.4	632.6	36 841.7	38 893.6	652 300.0
Pressure [bar]	1.0	1.1	1.1	1.0	1.0	5.3	1.5	4.0	3.4	1.1	1.1	1.1
Temperature [°C]	127.5	86.6	40.1	61.2	123.9	41.9	51.2	35.0	40.0	30.0	40.0	45.9
CO_2 [mol frac]	0.081	0.081	0.093	0.009	0.009	0.061	0.021	0.000	0.001	0.000	0.001	0.058
CO [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
O_2 [mol frac]	0.025	0.025	0.028	0.026	0.026	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N_2 [mol frac]	0.710	0.710	0.811	0.758	0.758	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Argon [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Water [mol frac]	0.184	0.184	0.068	0.208	0.208	0.819	0.864	1.000	0.998	1.000	0.998	0.822
MEA [mol frac]	0.000	0.000	0.000	0.000	0.000	0.120	0.115	0.000	0.002	0.000	0.002	0.120
CO_2 [kg/h]	51 433.3	51 433.3	51 431.1	5 133.1	5 133.1	71 684.8	25 446.1	2.1	0.9	0.0	53.5	67 078.7
CO [kg/h]	13.2	13.2	13.2	13.2	13.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	39.5	39.5	38.5	1.7	1.7	38.6	1.9	1.1	0.0	0.0	0.1	0.2
SO_2 [kg/h]	3.6	3.6	3.6	0.0	0.0	3.6	0.0	0.0	0.0	0.0	0.0	0.1
SO_3 [kg/h]	0.2	0.2	0.2	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	11 334.1	11 334.1	11 334.1	11 331.1	11 331.1	3.0	0.0	0.0	0.0	0.0	0.0	2.4
N_2 [kg/h]	286 535.4	286 535.4	286 535.1	286 494.7	286 494.7	40.4	0.4	0.3	0.0	0.0	0.4	32.7
Argon [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water [kg/h]	47 686.3	47 686.3	15 466.6	50 498.8	50 498.8	392 388.3	430 261.9	32 219.8	627.9	36 841.7	38 606.8	391 577.1
MEA [kg/h]	0.0	0.0	0.0	0.0	0.0	194 601.4	194 841.7	0.0	3.8	0.0	232.9	193 608.8
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.8	0.0	3.6	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

Section	FCC														FGD			
Stream	**1b**	**1c**	**1d**	**2**	**3**	**4**	**5**	**6**	**10**	**13**	**14**	**17**	**18**	**19**	**1e**	**1f**	**1g**	**1h**
Mass flow rate [kg/h]	216 282.5	216 282.5	271 850.2	250 398.2	225 405.1	212 252.5	212 252.5	657 767.4	649 047.1	24 993.1	638.5	35 979.7	39 273.2	652 000.0	186.9	332.2	23 725.8	2 544.3
Pressure [bar]	1.0	1.1	1.0	1.1	1.1	1.0	1.0	5.3	1.5	3.6	3.2	1.1	1.1	1.1	/	/	/	/
Temperature [°C]	310.0	88.7	61.5	75.1	39.9	68.7	275.3	42.3	51.8	35.0	40.0	30.0	40.0	46.6	30.0	40.0	30.0	40.0
CO_2 [mol frac]	0.166	0.166	0.120	0.136	0.161	0.015	0.015	0.063	0.021	0.000	0.001	0.000	0.001	0.060	0.000	0.000	0.000	0.000
CO [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
O_2 [mol frac]	0.023	0.023	0.017	0.019	0.022	0.020	0.020	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N_2 [mol frac]	0.712	0.712	0.558	0.633	0.750	0.674	0.674	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Argon [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Water [mol frac]	0.098	0.098	0.306	0.213	0.067	0.291	0.291	0.817	0.864	1.000	0.998	1.000	0.997	0.820	0.000	0.000	1.000	/
MEA [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.120	0.115	0.000	0.002	0.000	0.002	0.120	0.000	0.000	0.000	0.000
CO_2 [kg/h]	53 123.6	53 123.6	53 113.1	53 112.2	53 109.5	5 382.9	5 382.9	73 104.7	25 395.8	2.7	0.9	0.0	57.2	69 511.9	0.0	0.0	0.0	0.0
CO [kg/h]	13.1	13.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	0.0	0.0	0.0	0.0	0.0	1.3	1.3	0.1	1.6	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0
SO_2 [kg/h]	109.3	109.3	1.9	1.9	1.9	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
SO_3 [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	5 359.6	5 359.6	5 382.1	5 382.2	5 382.2	5 379.7	5 379.7	2.5	0.0	0.0	0.0	0.0	0.0	2.1	0.0	0.0	0.0	0.0
N_2 [kg/h]	144 796.1	144 796.1	157 767.7	157 771.2	157 771.0	157 732.2	157 732.2	38.8	0.4	0.2	0.0	0.0	0.4	32.6	0.0	0.0	0.0	0.0
Argon [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water [kg/h]	12 880.8	12 880.8	55 576.8	34 130.8	9 140.7	43 756.5	43 756.5	390 256.4	429 174.6	24 990.1	633.5	35 979.7	38 964.8	389 055.2	0.0	39.9	23725.8	2372.6
MEA [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	194 363.1	194 474.6	0.0	4.1	0.0	250.9	193 397.9	0.0	0.0	0.0	0.0
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
$CaCO_3$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	175.7	0.0	0.0	0.3
$CaSO_4.2H_2O$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	292.3	0.0	18.6
Alkali inerts [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
$MgCO_3$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5
CaF_2 [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.8
Inerts from limestone [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.2	0.0	0.0	40.0
Cl- [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	71.6
SO_4-- [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4

Ca++ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.5
Mg++ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.3
$CaSO_4$ dissolved [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.7

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

Section	Stripper and compression section						
Stream	**7**	**8**	**9**	**11**	**16**	**12**	**15**
Mass flow rate [kg/h]	248.4	1 694 237.5	1 569 793.2	122 520.3	634.9	119 519.1	3 000.9
Pressure [bar]	5.3	5.3	1.8	1.3	1.8	112.0	3.0
Temperature [°C]	30.1	109.7	119.5	40.0	150.0	29.1	40.0
CO_2 [mol frac]	0.000	0.061	0.023	0.940		1.0	0.0
CO [mol frac]	0.000	0.000	0.000	0.000		0.0	0.0
NO_2 [mol frac]	0.000	0.000	0.000	0.000		0.0	0.0
SO_2 [mol frac]	0.000	0.000	0.000	0.000		0.0	0.0
SO_3 [mol frac]	0.000	0.000	0.000	0.000		0.0	0.0
H_2S [mol frac]	0.000	0.000	0.000	0.000		0.0	0.0
O_2 [mol frac]	0.000	0.000	0.000	0.000		0.0	0.0
N_2 [mol frac]	0.000	0.000	0.000	0.001		0.0	0.0
Argon [mol frac]	0.000	0.000	0.000	0.001		0.0	0.0
Water [mol frac]	0.000	0.819	0.852	0.057		0.0	1.0
MEA [mol frac]	1.000	0.120	0.125	0.000		0.0	0.0
CO_2 [kg/h]	0.0	184 582.7	65 267.4	119 245.2	0.0	119 231.0	13.9
CO [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	0.0	38.7	0.6	38.1	0.0	37.3	0.8
SO_2 [kg/h]	0.0	5.5	0.0	5.5	0.0	5.4	0.0
SO_3 [kg/h]	0.0	0.2	0.2	0.1	0.0	0.1	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	0.0	11.2	0.0	11.2	0.0	11.2	0.0
N_2 [kg/h]	0.0	99.5	0.0	99.5	0.0	99.5	0.0
Argon [kg/h]	0.0	133.3	0.0	133.3	0.0	133.3	0.0
Water [kg/h]	0.0	1 008 382.9	1 004 317.2	2 987.4	380.9	1.2	2 986.1
MEA [kg/h]	248.4	500 983.4	500 207.8	0.0	107.9	0.0	0.0
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	146.0	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

A.3.3 Case 03_03

A.3.3.1 Case 03_03 Summary

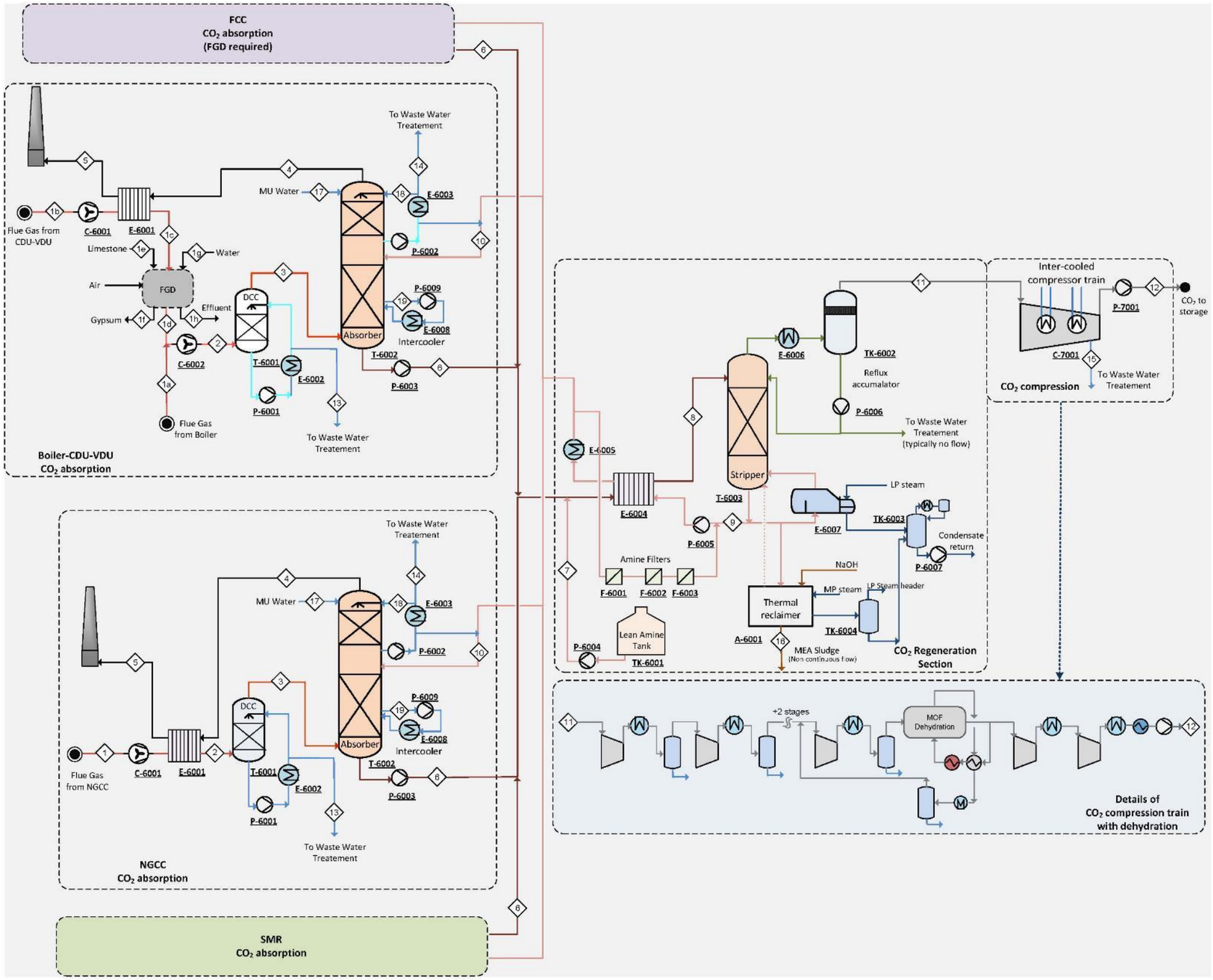
Absorber	NGCC_T-6002	POW/CDU/VDU_T-6002	SMR_T-6002	FCC_T-6002
Flow rate flue gas [tonne/h]	364.9	717.1	108.8	225.4
Molar fraction CO2 in flue gas []	0.05	0.10	0.20	0.16
Amount CO2 removed from the flue gas [tonne/h]	25.22	98.51	28.07	47.80
Design amount of CO2 removed from flue gas [tonne/h]	27.74	108.37	33.93	52.58
Fraction CO2 removed from the flue gas []	89.92 %	90.14 %	89.74 %	90.01 %
Absorber packing diameter [m]	6.20	9.70	4.50	5.70
Absorber packing height [m]	36.00	48.00	36.00	36.00
Lean amine temperature [°C]	50.6	51.3	52.0	51.8
Flow rate lean amine [t / t CO2 captured]	14.74	13.96	13.42	13.59
Rich amine temperature [°C]	41.5	41.9	42.3	42.2
Flow rate rich amine [t / t CO2 captured]	14.96	14.13	13.64	13.78
Lean amine: CO2 loading [mol / mol]	0.181	0.181	0.181	0.181
Rich amine: CO2 loading [mol / mol]	0.494	0.513	0.526	0.522
Electricity demand [kWh / t CO2 captured]	82.93	50.91	25.78	37.63
Cooling water demand [t / t CO2 captured]	37.44	57.27	35.60	45.44

Stripper	T-6003
Flow rate to compression (wet) [tonne/h]	205.12
Stripper packing diameter [m]	8.10
Stripper packing height [m]	30.00
Flow rate lean amine [t / t CO2 captured]	13.05
Flow rate rich amine [t / t CO2 captured]	14.08
Steam demand [GJ / t captured]	3.67
Reboiler pressure [bar]	1.80
Reboiler temperature [C]	119.54
Electricity demand [kWh / t CO2 captured]	3.33
Cooling water demand [t / t CO2 captured]	32.17

CO2 compression and purification	
Flow rate of CO2 to transportation [t / h]	200.10
Electricity demand [kWh / t CO2 captured]	93.28
Cooling water demand [t / t CO2 captured]	11.28

Other utilities	
Makeup of water [t / t CO2 captured]	1.00
Makeup of MEA [kg / t CO2 captured]	2.08
Waste water to treatment [t / t CO2 captured]	0.55
NaOH to thermal reclaimer [kg / t CO2 captured]	0.13
MEA sludge [kg / t CO2 captured]	5.33

A.3.3.2 Case 03_03 PFD



A.3.3.3 Case 03_03 Stream data

Section	NGCC											
Stream	**1**	**2**	**3**	**4**	**5**	**6**	**10**	**13**	**14**	**17**	**18**	**19**
Mass flow rate [kg/h]	371 485.1	371 485.1	364 913.8	358 488.8	358 488.8	377 423.3	371 878.7	6 571.3	361.9	20 529.6	20 684.1	369 999.5
Pressure [bar]	1.0	1.1	1.1	1.0	1.0	5.5	1.5	4.0	3.5	1.1	1.1	1.1
Temperature [°C]	127.5	73.7	40.1	53.6	124.3	41.6	50.6	35.0	40.0	30.0	40.0	46.9
CO_2 [mol frac]	0.049	0.049	0.050	0.005	0.005	0.059	0.021	0.000	0.001	0.000	0.001	0.051
CO [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
O_2 [mol frac]	0.098	0.098	0.101	0.097	0.097	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N_2 [mol frac]	0.751	0.751	0.772	0.745	0.745	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Argon [mol frac]	0.009	0.009	0.009	0.008	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Water [mol frac]	0.094	0.094	0.068	0.145	0.145	0.820	0.863	1.000	0.998	1.000	0.998	0.829
MEA [mol frac]	0.000	0.000	0.000	0.000	0.000	0.120	0.116	0.000	0.002	0.000	0.002	0.120
CO_2 [kg/h]	28 047.1	28 047.1	28 046.8	2 825.9	2 825.9	39 806.5	14 629.5	0.3	0.5	0.0	29.6	34 193.8
CO [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	0.0	0.0	0.0	1.0	1.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0
SO_2 [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SO_3 [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	41 012.0	41 012.0	41 011.9	41 006.2	41 006.2	5.7	0.1	0.0	0.0	0.0	0.1	4.2
N_2 [kg/h]	275 716.2	275 716.2	275 716.2	275 695.8	275 695.8	20.4	0.2	0.1	0.0	0.0	0.2	15.3
Argon [kg/h]	4 495.0	4 495.0	4 494.5	4 361.0	4 361.0	133.4	1.2	0.5	0.0	0.0	1.2	92.8
Water [kg/h]	22 214.8	22 214.8	15 644.4	34 598.9	34 598.9	225 635.4	245 227.5	6 570.4	359.2	20 529.6	20 526.9	225 273.1
MEA [kg/h]	0.0	0.0	0.0	0.0	0.0	111 821.8	112 019.0	0.0	2.2	0.0	126.1	110 420.3
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.9	0.0	3.6	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

Section	SMR											
Stream	**1**	**2**	**3**	**4**	**5**	**6**	**10**	**13**	**14**	**17**	**18**	**19**
Mass flow rate [kg/h]	117 219.6	117 219.6	108 816.7	99 991.6	99 991.6	382 891.9	376 799.2	8 402.9	357.4	20 010.1	21 981.1	378 000.0
Pressure [bar]	1.0	1.1	1.1	1.0	1.0	5.5	1.5	3.1	2.8	1.1	1.1	1.1
Temperature [°C]	147.5	94.9	39.9	71.6	144.0	42.4	52.0	35.0	40.0	30.0	40.0	48.8
CO_2 [mol frac]	0.177	0.177	0.200	0.018	0.018	0.063	0.021	0.000	0.001	0.000	0.001	0.061
CO [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
O_2 [mol frac]	0.022	0.022	0.024	0.022	0.022	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N_2 [mol frac]	0.626	0.626	0.708	0.631	0.631	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Argon [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Water [mol frac]	0.176	0.176	0.067	0.329	0.329	0.817	0.863	1.000	0.997	1.000	0.997	0.819
MEA [mol frac]	0.000	0.000	0.000	0.000	0.000	0.120	0.116	0.000	0.002	0.000	0.002	0.120
CO_2 [kg/h]	31 282.5	31 282.5	31 281.3	3 209.4	3 209.4	42 824.9	14 786.7	1.2	0.5	0.0	34.0	40 642.2
CO [kg/h]	3.7	3.7	3.7	3.7	3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	11.2	11.2	10.9	0.8	0.8	11.1	1.1	0.3	0.0	0.0	0.0	0.3
SO_2 [kg/h]	2.9	2.9	2.9	0.0	0.0	2.9	0.0	0.0	0.0	0.0	0.0	0.1
SO_3 [kg/h]	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	2 784.1	2 784.1	2 784.1	2 782.5	2 782.5	1.6	0.0	0.0	0.0	0.0	0.0	1.3
N_2 [kg/h]	70 421.9	70 421.9	70 421.8	70 400.3	70 400.3	21.6	0.2	0.1	0.0	0.0	0.2	17.9
Argon [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water [kg/h]	12 713.3	12 713.3	4 312.0	23 594.9	23 594.9	226 972.6	248 802.7	8 401.3	354.5	20 010.1	21 805.8	225 207.9
MEA [kg/h]	0.0	0.0	0.0	0.0	0.0	113 057.2	113 208.5	0.0	2.3	0.0	141.2	112 130.4
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.0	3.6	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

Section	CDU/VDU															FGD			
Stream	**1a**	**1b**	**1c**	**1d**	**2**	**3**	**4**	**5**	**6**	**10**	**13**	**14**	**17**	**18**	**19**	**1e**	**1f**	**1g**	**1h**
Mass flow rate [kg/h]	397 045.7	337 636.7	337 636.7	400 838.5	774 861.8	717 133.0	692 944.3	692 944.3	1 391 925.0	1 374 868.2	57 728.8	1 321.6	78 485.1	83 408.0	1 383 000.0	293.0	520.7	19 995.3	2 144.2
Pressure [bar]	1.0	1.0	1.1	1.0	1.1	1.1	1.0	1.0	5.5	1.5	4.8	4.0	1.1	1.1	1.1	/	/	/	/
Temperature [°C]	127.5	210.0	82.4	56.1	108.2	40.1	62.4	123.0	42.0	51.3	35.0	40.0	30.0	40.1	45.7	30.0	40.0	30.0	40.0
CO_2 [mol frac]	0.081	0.113	0.113	0.089	0.089	0.101	0.009	0.009	0.062	0.021	0.000	0.001	0.000	0.001	0.058	0.000	0.000	0.000	0.000
CO [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
O_2 [mol frac]	0.025	0.039	0.039	0.031	0.029	0.033	0.031	0.031	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N_2 [mol frac]	0.710	0.741	0.741	0.641	0.706	0.798	0.741	0.741	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Argon [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Water [mol frac]	0.184	0.106	0.106	0.238	0.175	0.068	0.219	0.219	0.818	0.864	1.000	0.998	1.000	0.998	0.821	0.000	0.000	1.000	/
MEA [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.120	0.116	0.000	0.002	0.000	0.002	0.120	0.000	0.000	0.000	0.000
CO_2 [kg/h]	51 317.6	57 972.9	57 972.9	57 980.1	109 295.8	109 291.7	10 777.5	10 777.5	152 276.0	53 822.9	4.1	1.8	0.0	115.8	143 499.7	0.0	0.0	0.0	0.0
CO [kg/h]	12.7	21.1	21.1	33.8	46.5	46.5	46.5	46.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	38.1	97.7	97.7	101.1	136.9	133.6	3.4	3.4	133.7	3.9	3.4	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0
SO_2 [kg/h]	37.8	175.8	175.8	2.8	40.6	40.1	0.1	0.1	40.0	0.0	0.5	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0
SO_3 [kg/h]	0.2	0.0	0.0	0.0	0.2	0.2	0.1	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	11 335.1	14 660.0	14 660.0	14 665.2	26 000.3	26 000.3	25 992.8	25 992.8	7.5	0.1	0.1	0.0	0.0	0.1	6.1	0.0	0.0	0.0	0.0
N_2 [kg/h]	286 549.4	242 326.2	242 326.2	264 817.2	551 366.4	551 365.8	551 281.1	551 281.1	84.7	0.9	0.6	0.0	0.0	0.9	69.4	0.0	0.0	0.0	0.0
Argon [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water [kg/h]	47 754.8	22 383.0	22 383.0	63 238.3	87 975.1	30 254.9	104 843.0	104 843.0	827 501.6	908 928.4	57 720.2	1 311.8	78 485.1	82 786.0	828 497.4	0.0	62.5	19995.3	1999.5
MEA [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	411 881.3	412 111.9	0.0	8.0	0.0	505.2	410 926.3	0.0	0.0	0.0	0.0
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
$CaCO_3$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	275.4	0.0	0.0	0.2
$CaSO_4.2H_2O$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	458.2	0.0	15.7
Alkali inerts [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
$MgCO_3$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
CaF_2 [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.3
Inerts from limestone [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.6	0.0	0.0	33.7
Cl- [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	60.3
SO_4-- [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8

Ca++ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.7
Mg++ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.6
$CaSO_4$ dissolved [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

Section	**FCC**														**FGD**			
Stream	**1b**	**1c**	**1d**	**2**	**3**	**4**	**5**	**6**	**10**	**13**	**14**	**17**	**18**	**19**	**1e**	**1f**	**1g**	**1h**
Mass flow rate [kg/h]	216 282.5	216 282.5	271 850.2	250 398.2	225 405.1	212 211.9	212 211.9	658 558.1	649 823.4	24 993.1	639.6	36 111.7	36 111.7	36 111.7	186.9	332.2	23 725.8	2 544.3
Pressure [bar]	1.0	1.1	1.0	1.1	1.1	1.0	1.0	5.5	1.5	3.6	3.2	1.1	1.1	1.1	/	/	/	/
Temperature [°C]	310.0	88.8	61.5	75.1	39.9	68.8	275.3	42.3	51.8	35.0	40.0	30.0	40.0	46.7	30.0	40.0	30.0	40.0
CO_2 [mol frac]	0.166	0.166	0.120	0.136	0.161	0.014	0.014	0.063	0.021	0.000	0.001	0.000	0.001	0.060	0.000	0.000	0.000	0.000
CO [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
O_2 [mol frac]	0.023	0.023	0.017	0.019	0.022	0.020	0.020	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N_2 [mol frac]	0.712	0.712	0.558	0.633	0.750	0.674	0.674	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Argon [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Water [mol frac]	0.098	0.098	0.306	0.213	0.067	0.291	0.291	0.817	0.863	1.000	0.998	1.000	0.998	0.820	0.000	0.000	1.000	/
MEA [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.120	0.116	0.000	0.002	0.000	0.002	0.120	0.000	0.000	0.000	0.000
CO_2 [kg/h]	53 123.6	53 123.6	53 113.1	53 112.2	53 109.5	5 307.6	5 307.6	73 190.2	25 448.5	2.7	0.9	0.0	57.3	69 554.5	0.0	0.0	0.0	0.0
CO [kg/h]	13.1	13.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.1	0.6	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
SO_2 [kg/h]	109.3	109.3	1.9	1.9	1.9	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
SO_3 [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	5 359.6	5 359.6	5 382.1	5 382.2	5 382.2	5 379.7	5 379.7	2.5	0.0	0.0	0.0	0.0	0.0	2.1	0.0	0.0	0.0	0.0
N_2 [kg/h]	144 796.1	144 796.1	157 767.7	157 771.2	157 771.0	157 732.2	157 732.2	38.8	0.4	0.2	0.0	0.0	0.4	32.6	0.0	0.0	0.0	0.0
Argon [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water [kg/h]	12 880.8	12 880.8	55 576.8	34 130.8	9 140.7	43 792.0	43 792.0	390 725.7	429 514.8	24 990.1	634.6	36 111.7	39 024.8	388 865.6	0.0	39.9	23725.8	2372.6
MEA [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	194 598.9	194 859.1	0.0	4.1	0.0	250.9	193 545.1	0.0	0.0	0.0	0.0
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
$CaCO_3$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	175.7	0.0	0.0	0.3
$CaSO_4.2H_2O$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	292.3	0.0	18.6
Alkali inerts [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
$MgCO_3$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5
CaF_2 [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.8
Inerts from limestone [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.2	0.0	0.0	40.0
Cl- [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	71.6
SO_4-- [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4
Ca++ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.5
Mg++ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.3
$CaSO_4$ dissolved [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.7

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

Section	Stripper and compression section						
Stream	**7**	**8**	**9**	**11**	**16**	**12**	**15**
Mass flow rate [kg/h]	415.7	2 811 214.0	2 604 916.3	205 123.2	1 062.9	200 098.5	5 024.2
Pressure [bar]	5.5	5.5	1.8	1.3	1.8	112.0	3.0
Temperature [°C]	30.1	109.7	119.5	40.0	150.0	29.1	40.0
CO_2 [mol frac]	0.000	0.062	0.023	0.940		1.0	0.0
CO [mol frac]	0.000	0.000	0.000	0.000		0.0	0.0
NO_2 [mol frac]	0.000	0.000	0.000	0.001		0.0	0.0
SO_2 [mol frac]	0.000	0.000	0.000	0.000		0.0	0.0
SO_3 [mol frac]	0.000	0.000	0.000	0.000		0.0	0.0
H_2S [mol frac]	0.000	0.000	0.000	0.000		0.0	0.0
O_2 [mol frac]	0.000	0.000	0.000	0.000		0.0	0.0
N_2 [mol frac]	0.000	0.000	0.000	0.001		0.0	0.0
Argon [mol frac]	0.000	0.000	0.000	0.001		0.0	0.0
Water [mol frac]	0.000	0.818	0.852	0.057		0.0	1.0
MEA [mol frac]	1.000	0.120	0.125	0.000		0.0	0.0
CO_2 [kg/h]	0.0	308 097.6	108 434.9	199 620.4	0.0	199 596.5	23.4
CO [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	0.0	144.8	7.8	142.1	0.0	139.2	2.9
SO_2 [kg/h]	0.0	44.8	0.1	44.8	0.0	44.4	0.4
SO_3 [kg/h]	0.0	0.4	0.3	0.1	0.0	0.1	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	0.0	17.3	0.0	17.3	0.0	17.3	0.0
N_2 [kg/h]	0.0	165.4	0.0	165.4	0.0	165.4	0.0
Argon [kg/h]	0.0	133.4	0.0	133.4	0.0	133.4	0.0
Water [kg/h]	0.0	1 670 835.3	1 665 418.4	4 999.7	637.8	2.0	4 997.6
MEA [kg/h]	415.7	831 774.9	831 055.0	0.0	180.7	0.0	0.0
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	244.5	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

A.4 CO_2 capture from base case 4

A.4.1 Case 04_01

A.4.1.1 Case 04_01 Summary

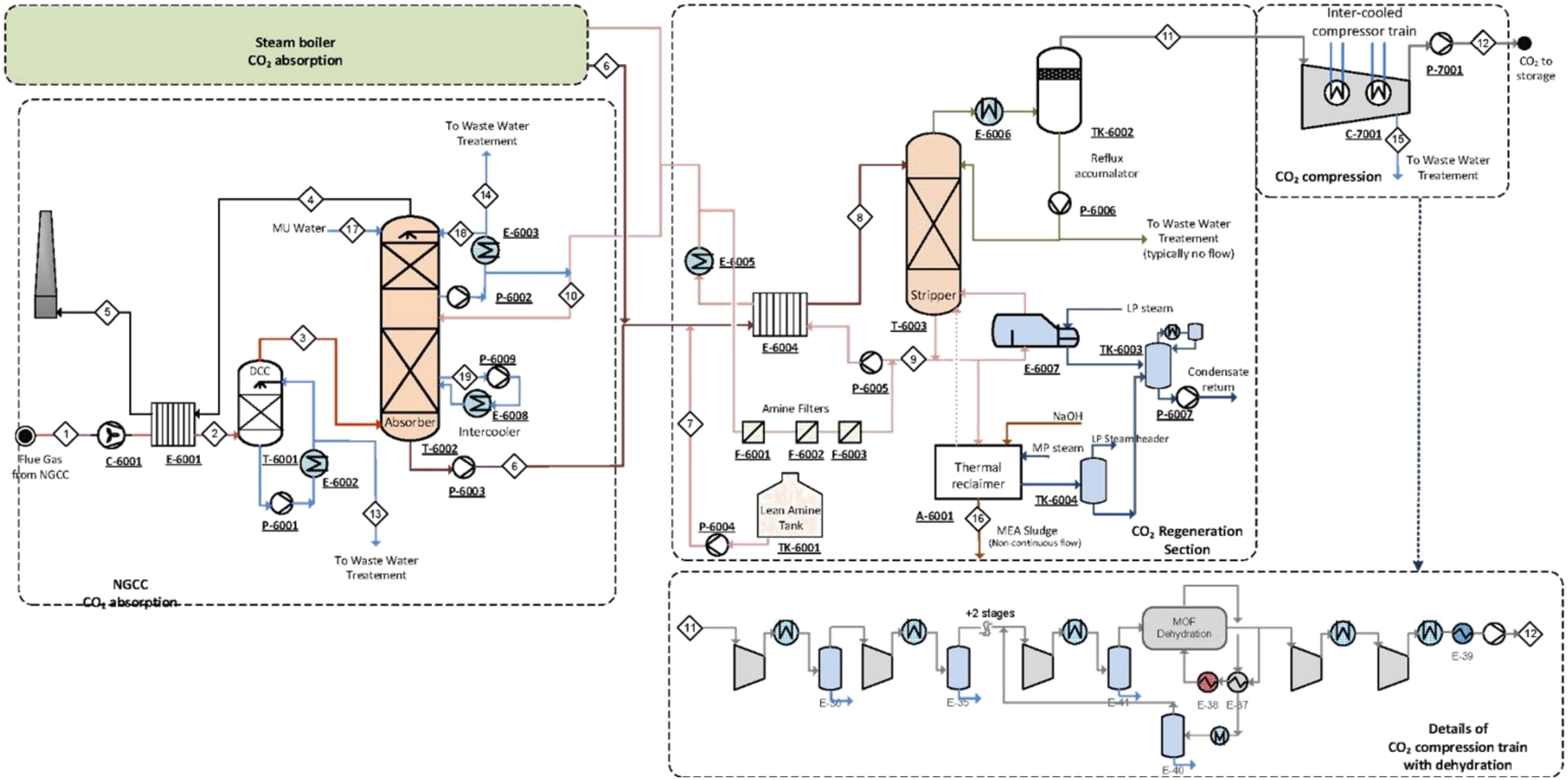
Absorber	NGCC -T-6002	Boiler_T-6002
Flow rate flue gas [tonne/h]	1 149.8	152.0
Molar fraction CO2 in flue gas []	0.04	0.09
Amount CO2 removed from the flue gas [tonne/h]	68.36	19.25
Design amount of CO2 removed from flue gas [tonne/h]	75.19	21.18
Fraction CO2 removed from the flue gas []	89.93 %	89.97 %
Absorber packing diameter [m]	10.60	4.50
Absorber packing height [m]	48.00	32.00
Lean amine temperature [°C]	50.5	51.3
Flow rate lean amine [t / t CO2 captured]	15.03	14.14
Rich amine temperature [°C]	41.3	41.6
Flow rate rich amine [t / t CO2 captured]	15.26	14.31
Lean amine: CO2 loading [mol / mol]	0.181	0.181
Rich amine: CO2 loading [mol / mol]	0.489	0.512
Electricity demand [kWh / t CO2 captured]	95.33	51.16
Cooling water demand [t / t CO2 captured]	33.08	60.77

Stripper	T-6003
Flow rate to compression (wet) [tonne/h]	90.32
Stripper packing diameter [m]	5.10
Stripper packing height [m]	22.00
Flow rate lean amine [t / t CO2 captured]	13.95
Flow rate rich amine [t / t CO2 captured]	15.06
Steam demand [GJ / t captured]	3.85
Reboiler pressure [bar]	1.80
Reboiler temperature [C]	119.5
Electricity demand [kWh / t CO2 captured]	3.63
Cooling water demand [t / t CO2 captured]	34.27

CO2 compression and purification	
Flow rate of CO2 to transportation [t / h]	88.14
Electricity demand [kWh / t CO2 captured]	93.73
Cooling water demand [t / t CO2 captured]	11.23

Other utilities	
Makeup of water [t / t CO2 captured]	0.80
Makeup of MEA [kg / t CO2 captured]	2.09
Waste water to treatment [t / t CO2 captured]	0.32
NaOH to thermal reclaimer [kg / t CO2 captured]	0.13
MEA sludge [kg / t CO2 captured]	5.33

A.4.1.2 Case 04_01 PFD



A.4.1.3 Case 04_01 Stream data

Section	NGCC absorber section											
Stream	**1**	**2**	**3**	**4**	**5**	**6**	**10**	**13**	**14**	**17**	**18**	**19**
Mass flow rate [kg/h]	1 160 523.0	1 160 523.0	1 149 822.9	1 132 337.1	1 132 337.1	1 042 986.6	1 027 204.0	10 700.1	943.1	54 438.5	53 900.6	1 030 000.0
Pressure [bar]	1.0	1.1	1.1	1.0	1.0	5.2	1.5	5.4	4.9	1.1	1.1	1.1
Temperature [°C]	127.5	71.9	39.9	51.9	123.7	41.4	50.5	35.0	40.0	30.0	40.1	47.3
CO_2 [mol frac]	0.042	0.042	0.043	0.004	0.004	0.058	0.021	0.000	0.001	0.000	0.001	0.048
CO [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
O_2 [mol frac]	0.112	0.112	0.114	0.110	0.110	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N_2 [mol frac]	0.756	0.756	0.767	0.744	0.744	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Argon [mol frac]	0.009	0.009	0.009	0.008	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Water [mol frac]	0.081	0.081	0.067	0.134	0.134	0.822	0.863	1.000	0.997	1.000	0.997	0.833
MEA [mol frac]	0.000	0.000	0.000	0.000	0.000	0.119	0.116	0.000	0.002	0.000	0.002	0.119
CO_2 [kg/h]	76 014.3	76 014.3	76 013.8	7 657.8	7 657.8	108 571.1	40 293.6	0.5	1.4	0.0	79.1	88 574.1
CO [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	0.0	0.0	0.0	1.0	1.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0
SO_2 [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SO_3 [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	146 342.0	146 342.0	146 341.9	146 324.5	146 324.5	17.4	0.2	0.0	0.0	0.0	0.2	12.2
N_2 [kg/h]	864 589.6	864 589.6	864 589.5	864 535.0	864 535.0	54.5	0.6	0.1	0.0	0.0	0.6	38.8
Argon [kg/h]	14 158.4	14 158.4	14 157.6	13 798.5	13 798.5	359.0	3.4	0.8	0.1	0.0	3.3	236.5
Water [kg/h]	59 418.8	59 418.8	48 720.1	100 020.2	100 020.2	625 754.0	678 319.6	10 698.7	935.7	54 438.5	53 476.0	634 307.6
MEA [kg/h]	0.0	0.0	0.0	0.0	0.0	308 230.5	308 585.6	0.0	6.0	0.0	341.5	306 830.7
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.7	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

Section	Boiler absorber section											
Stream	**1**	**2**	**3**	**4**	**5**	**6**	**10**	**13**	**14**	**17**	**18**	**19**
Mass flow rate [kg/h]	165 561.6	165 561.6	152 011.9	147 343.3	147 343.3	275 473.0	272 156.3	13 549.7	273.5	16 014.5	16 827.0	272 000.0
Pressure [bar]	1.0	1.1	1.1	1.0	1.0	5.2	1.5	3.6	3.2	1.1	1.1	1.1
Temperature [°C]	127.5	86.6	39.9	61.1	123.9	41.7	51.3	35.0	40.0	30.0	40.1	45.8
CO_2 [mol frac]	0.081	0.081	0.093	0.009	0.009	0.061	0.021	0.000	0.001	0.000	0.001	0.057
CO [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
O_2 [mol frac]	0.025	0.025	0.028	0.026	0.026	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N_2 [mol frac]	0.710	0.710	0.812	0.758	0.758	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Argon [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Water [mol frac]	0.184	0.184	0.067	0.207	0.207	0.820	0.865	1.000	0.998	1.000	0.998	0.824
MEA [mol frac]	0.000	0.000	0.000	0.000	0.000	0.119	0.114	0.000	0.002	0.000	0.002	0.119
CO_2 [kg/h]	21 398.6	21 398.6	21 397.7	2 147.0	2 147.0	29 786.5	10 563.6	0.9	0.4	0.0	22.9	27 788.0
CO [kg/h]	5.3	5.3	5.3	5.3	5.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	15.9	15.9	15.4	0.0	0.0	15.5	0.0	0.4	0.0	0.0	0.0	0.0
SO_2 [kg/h]	15.7	15.7	15.5	0.0	0.0	15.8	0.0	0.2	0.0	0.0	0.0	0.5
SO_3 [kg/h]	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	4 726.6	4 726.6	4 726.6	4 725.3	4 725.3	1.3	0.0	0.0	0.0	0.0	0.0	1.0
N_2 [kg/h]	119 486.4	119 486.4	119 486.3	119 469.5	119 469.5	16.8	0.2	0.1	0.0	0.0	0.2	13.5
Argon [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water [kg/h]	19 913.0	19 913.0	6 365.0	20 996.2	20 996.2	164 811.7	180 692.7	13 548.0	271.6	16 014.5	16 707.4	164 053.4
MEA [kg/h]	0.0	0.0	0.0	0.0	0.0	80 825.3	80 899.7	0.0	1.6	0.0	96.5	80 143.6
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.0	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

Section	Stripper and compression section						
Stream	**7**	**8**	**9**	**11**	**16**	**12**	**15**
Mass flow rate [kg/h]	182.8	1 318 642.4	1 222 133.2	90 320.1	466.5	88 142.4	2 212.7
Pressure [bar]	5.2	5.2	1.8	1.3	1.8	112.0	3.0
Temperature [°C]	30.1	109.6	119.5	40.0	150.0	29.2	40.0
CO_2 [mol frac]	0.000	0.059	0.022	0.937		0.994	0.002
CO [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
O_2 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
N_2 [mol frac]	0.000	0.000	0.000	0.001		0.001	0.000
Argon [mol frac]	0.000	0.000	0.000	0.004		0.004	0.000
Water [mol frac]	0.000	0.822	0.853	0.057		0.000	0.998
MEA [mol frac]	1.000	0.119	0.124	0.000		0.000	0.000
CO_2 [kg/h]	0.0	138 357.6	50 508.4	87 637.5		87 662.1	10.2
CO [kg/h]	0.0	0.0	0.0	0.0		0.0	0.0
NO_2 [kg/h]	0.0	15.5	0.2	15.3		15.0	0.3
SO_2 [kg/h]	0.0	15.8	0.0	15.5		15.4	0.1
SO_3 [kg/h]	0.0	0.1	0.1	0.0		0.0	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0		0.0	0.0
O_2 [kg/h]	0.0	18.6	0.0	18.6		18.6	0.0
N_2 [kg/h]	0.0	71.3	0.0	71.3		71.3	0.0
Argon [kg/h]	0.0	359.0	0.0	359.0		359.0	0.0
Water [kg/h]	0.0	790 565.7	784 458.1	2 202.8	279.9	0.9	2 202.0
MEA [kg/h]	182.8	389 238.7	387 166.5	0.0	79.3	0.0	0.0
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	107.3	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

A.4.2 Case 04_02

A.4.2.1 Case 04_02 Summary

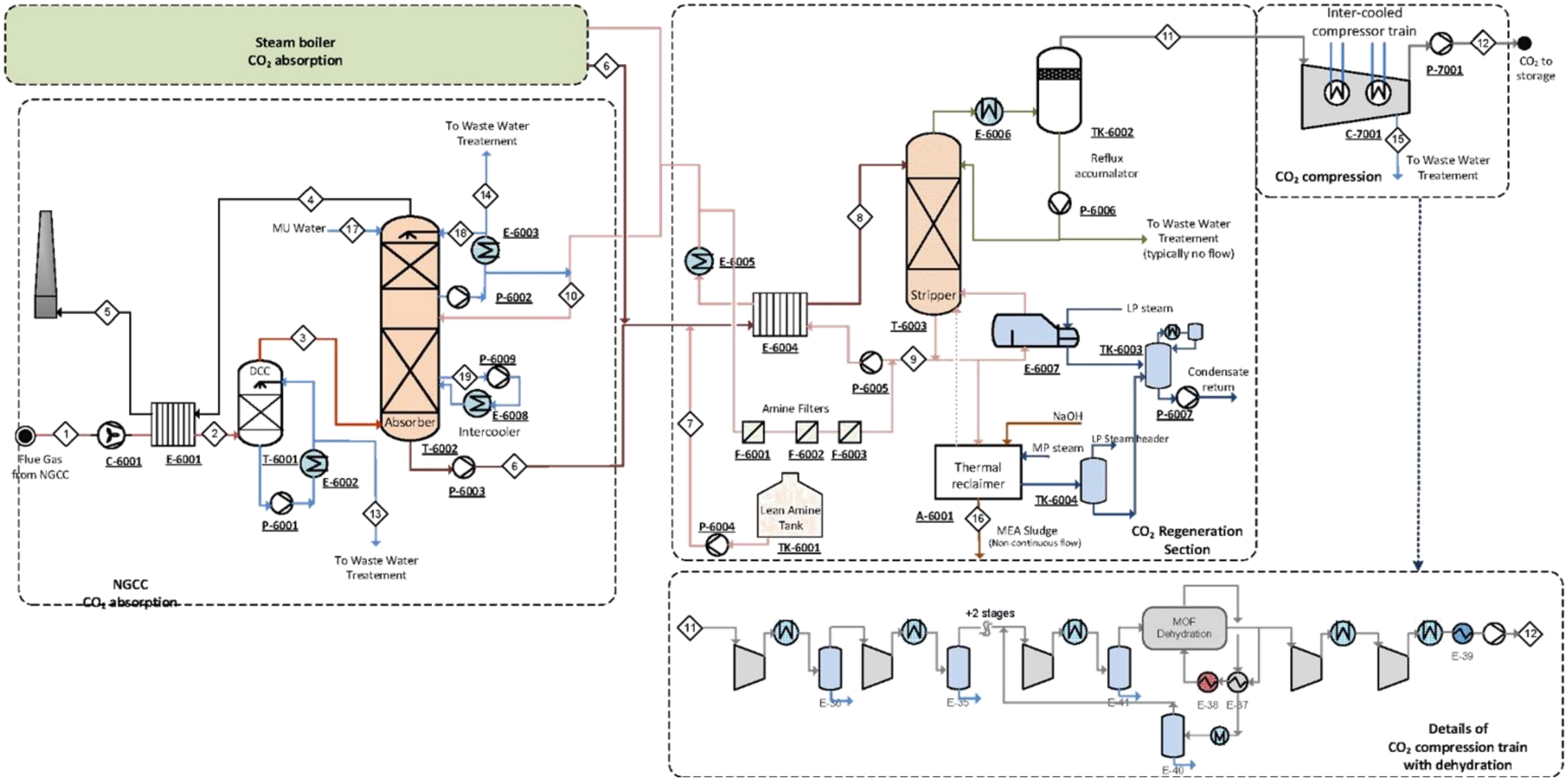
Absorber	NGCC - T-6002	POW/CDU/VDU -T-6002
Flow rate flue gas [tonne/h]	1 149.8	749.1
Molar fraction CO2 in flue gas []	0.04	0.11
Amount CO2 removed from the flue gas [tonne/h]	68.38	107.66
Design amount of CO2 removed from flue gas [tonne/h]	75.22	118.42
Fraction CO2 removed from the flue gas []	89.96 %	89.97 %
Absorber packing diameter [m]	10.60	9.70
Absorber packing height [m]	48.00	48.00
Lean amine temperature [°C]	50.5	51.4
Flow rate lean amine [t / t CO2 captured]	15.02	13.91
Rich amine temperature [°C]	41.3	41.8
Flow rate rich amine [t / t CO2 captured]	15.25	14.09
Lean amine: CO2 loading [mol / mol]	0.181	0.181
Rich amine: CO2 loading [mol / mol]	0.489	0.514
Electricity demand [kWh / t CO2 captured]	95.31	49.96
Cooling water demand [t / t CO2 captured]	33.13	48.69

Stripper	T-6003
Flow rate to compression (wet) [tonne/h]	181.20
Stripper packing diameter [m]	7.30
Stripper packing height [m]	28.00
Flow rate lean amine [t / t CO2 captured]	13.50
Flow rate rich amine [t / t CO2 captured]	14.54
Steam demand [GJ / t captured]	3.76
Reboiler pressure [bar]	1.80
Reboiler temperature [C]	119.5
Electricity demand [kWh / t CO2 captured]	3.32
Cooling water demand [t / t CO2 captured]	33.10

CO2 compression and purification	
Flow rate of CO2 to transportation [t / h]	176.75
Electricity demand [kWh / t CO2 captured]	93.49
Cooling water demand [t / t CO2 captured]	11.27

Other utilities	
Makeup of water [t / t CO2 captured]	0.99
Makeup of MEA [kg / t CO2 captured]	2.09
Waste water to treatment [t / t CO2 captured]	0.44
NaOH to thermal reclaimer [kg / t CO2 captured]	0.13
MEA sludge [kg / t CO2 captured]	5.33

A.4.2.2 Case 04_02 PFD



A.4.2.3 Case 04_02 stream data

Section	NGCC absorber section											
Stream	**1**	**2**	**3**	**4**	**5**	**6**	**10**	**13**	**14**	**17**	**18**	**19**
Mass flow rate [kg/h]	1 160 523.0	1 160 523.0	1 149 816.6	1 132 172.8	1 132 172.8	1 043 120.2	1 027 344.6	10 706.4	983.1	56 558.3	56 172.6	1 030 000.0
Pressure [bar]	1.0	1.1	1.1	1.0	1.0	5.2	1.5	5.4	4.9	1.1	1.1	1.1
Temperature [°C]	127.5	71.9	39.9	51.9	123.8	41.4	50.5	35.0	40.0	30.0	40.1	47.3
CO_2 [mol frac]	0.042	0.042	0.043	0.004	0.004	0.058	0.021	0.000	0.001	0.000	0.001	0.048
CO [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
O_2 [mol frac]	0.112	0.112	0.114	0.110	0.110	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N_2 [mol frac]	0.756	0.756	0.767	0.744	0.744	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Argon [mol frac]	0.009	0.009	0.009	0.008	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Water [mol frac]	0.081	0.081	0.067	0.134	0.134	0.822	0.863	1.000	0.998	1.000	0.998	0.833
MEA [mol frac]	0.000	0.000	0.000	0.000	0.000	0.120	0.116	0.000	0.002	0.000	0.002	0.119
CO_2 [kg/h]	76 014.3	76 014.3	76 013.8	7 634.0	7 634.0	108 623.6	40 327.4	0.5	1.4	0.0	78.2	88 555.6
CO [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	0.0	0.0	0.0	0.9	0.9	0.0	0.9	0.0	0.0	0.0	0.0	0.0
SO_2 [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SO_3 [kg/h]	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	146 342.0	146 342.0	146 341.9	146 324.5	146 324.5	17.4	0.2	0.0	0.0	0.0	0.2	12.2
N_2 [kg/h]	864 589.6	864 589.6	864 589.5	864 535.0	864 535.0	54.5	0.7	0.1	0.0	0.0	0.6	38.8
Argon [kg/h]	14 158.4	14 158.4	14 157.6	13 798.5	13 798.5	359.2	3.7	0.8	0.1	0.0	3.4	236.4
Water [kg/h]	59 418.8	59 418.8	48 713.8	99 879.9	99 879.9	625 667.5	678 255.2	10 705.0	975.7	56 558.3	55 748.0	634 191.4
MEA [kg/h]	0.0	0.0	0.0	0.0	0.0	308 398.0	308 756.4	0.0	6.0	0.0	342.2	306 965.5
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.7	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

Section	POW/CDU/VDU absorber section																		
Stream	**1a**	**1b**	**1c**	**1d**	**2**	**3**	**4**	**5**	**6**	**10**	**13**	**14**	**17**	**18**	**19**	**1e**	**1f**	**1g**	**1h**
Mass flow rate [kg/h]	165 561.6	572 232.8	572 232.8	679 582.3	805 890.9	749 061.0	722 485.2	722 485.2	1 516 439.3	1 497 939.3	56 829.9	1 473.8	83 958.0	93 015.7	1 505 000.0	496.6	882.4	33 916.1	3 637.0
Pressure [bar]	1.0	1.0	1.1	1.0	1.1	1.1	1.0	1.0	5.2	1.5	4.8	4.1	1.1	1.1	1.1	/	/	/	/
Temperature [°C]	127.5	210.0	83.0	56.1	85.3	40.0	63.0	160.6	41.9	51.4	35.0	40.0	30.0	40.1	45.8	30.0	40.0	30.0	40.0
CO_2 [mol frac]	0.081	0.113	0.113	0.089	0.094	0.106	0.010	0.010	0.062	0.021	0.000	0.001	0.000	0.001	0.058	0.000	0.000	0.000	0.000
CO [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
O_2 [mol frac]	0.025	0.039	0.039	0.031	0.032	0.036	0.033	0.033	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N_2 [mol frac]	0.710	0.741	0.741	0.641	0.704	0.790	0.731	0.731	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Argon [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Water [mol frac]	0.184	0.106	0.106	0.238	0.170	0.068	0.225	0.225	0.818	0.863	1.000	0.998	1.000	0.998	0.821	0.000	0.000	1.000	/
MEA [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.120	0.116	0.000	0.002	0.000	0.002	0.120	0.000	0.000	0.000	0.000
CO_2 [kg/h]	21 398.6	98 253.6	98 253.6	98 298.3	119 661.1	119 656.6	11 998.4	11 998.4	166 212.4	58 681.3	4.5	2.1	0.0	134.2	156 637.3	0.0	0.0	0.0	0.0
CO [kg/h]	5.3	35.7	35.7	57.3	62.5	62.5	62.5	62.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	15.9	165.7	165.7	171.3	183.4	178.7	1.2	1.2	178.9	1.4	4.7	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0
SO_2 [kg/h]	15.7	297.9	297.9	4.8	20.5	20.2	0.0	0.0	20.2	0.0	0.2	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0
SO_3 [kg/h]	0.1	0.0	0.0	0.0	0.1	0.2	0.1	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	4 726.6	24 846.1	24 846.1	24 863.2	29 581.4	29 581.4	29 572.4	29 572.4	9.0	0.1	0.1	0.0	0.0	0.1	7.3	0.0	0.0	0.0	0.0
N_2 [kg/h]	119 486.4	410 698.9	410 698.9	448 966.0	568 302.8	568 302.2	568 210.5	568 210.5	91.7	0.9	0.6	0.0	0.0	0.9	75.1	0.0	0.0	0.0	0.0
Argon [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water [kg/h]	19 913.0	37 935.1	37 935.1	107 213.1	88 079.0	31 259.1	112 640.0	112 640.0	901 207.2	989 960.7	56 819.8	1 462.7	83 958.0	92 310.1	900 839.8	0.0	105.9	33 916.1	3 391.6
MEA [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	448 719.7	449 294.8	0.0	9.0	0.0	570.4	447 439.9	0.0	0.0	0.0	0.0
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
$CaCO_3$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	466.8	0.0	0.0	0.4
$CaSO_4.2H_2O$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	776.512	0.0	26.6
Alkali inerts [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.8	0.0	0.0	0.0
$MgCO_3$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7
CaF_2 [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.1
Inerts from limestone	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	57.2

[kg/h]																			
Cl- [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	102.3
SO_4-- [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.8
Ca++ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.9
Mg++ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.7
$CaSO_4$ dissolved [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.8

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

Section	Stripper and compression sections						
Stream	**7**	**8**	**9**	**11**	**16**	**12**	**15**
Mass flow rate [kg/h]	367.2	2 559 926.7	2 376 846.3	181 196.4	937.4	176 754.9	4 439.1
Pressure [bar]	5.2	5.2	1.8	1.3	1.8	112.0	3.0
Temperature [°C]	30.1	109.7	119.5	40.0	150.0	29.1	40.0
CO_2 [mol frac]	0.000	0.060	0.023	0.938		0.995	0.002
CO [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.001		0.001	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
O_2 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
N_2 [mol frac]	0.000	0.000	0.000	0.001		0.001	0.000
Argon [mol frac]	0.000	0.000	0.000	0.002		0.002	0.000
Water [mol frac]	0.000	0.819	0.852	0.057		0.000	0.998
MEA [mol frac]	1.000	0.120	0.125	0.000		0.000	0.000
CO_2 [kg/h]	0.0	274 836.0	98 728.8	176 051.3		176 028.7	20.6
CO [kg/h]	0.0	0.0	0.0	0.0		0.0	0.0
NO_2 [kg/h]	0.0	178.9	6.6	176.5		172.5	3.6
SO_2 [kg/h]	0.0	20.2	0.0	20.2		20.1	0.2
SO_3 [kg/h]	0.0	0.3	0.2	0.1		0.1	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0		0.0	0.0
O_2 [kg/h]	0.0	26.4	0.0	26.4		26.4	0.0
N_2 [kg/h]	0.0	146.2	0.0	146.2		146.2	0.0
Argon [kg/h]	0.0	359.2	0.0	359.2		359.2	0.0
Water [kg/h]	0.0	1 526 874.7	1 521 346.2	4 416.5	562.4	1.8	4 414.7
MEA [kg/h]	367.2	757 484.9	756 764.5	0.0	159.4	0.0	0.0
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	215.6	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

A.4.3 Case 04_03

A.4.3.1 Case 04_03 Summary

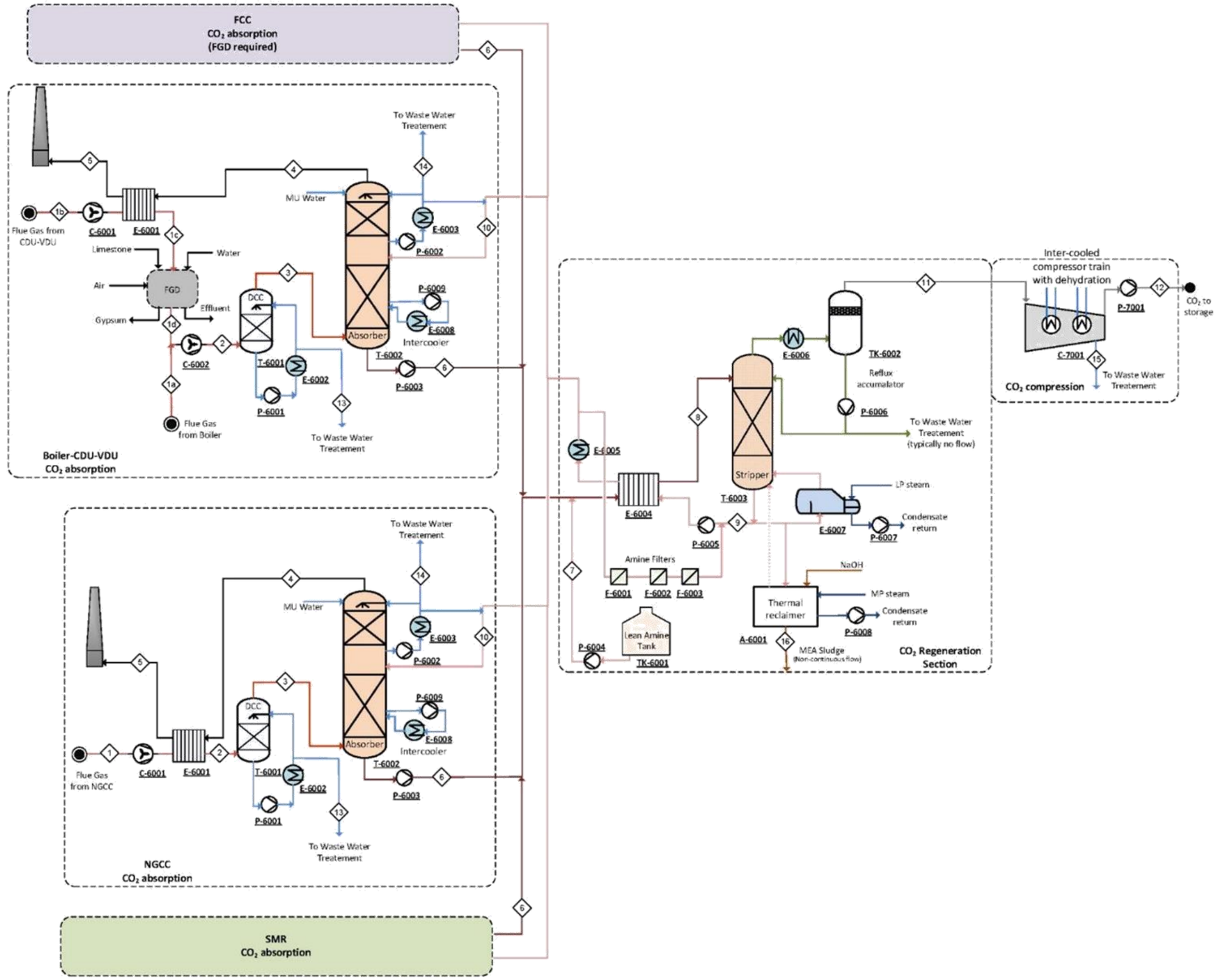
Absorber	NGCC - T-6002	POW/CDU/VDU -T-6002	SMR - T-6002	FCC - T-6002
Flow rate flue gas [tonne/h]	1 149.8	749.1	407.2	225.4
Molar fraction CO2 in flue gas []	0.04	0.11	0.20	0.16
Amount CO2 removed from the flue gas [tonne/h]	68.58	107.67	105.80	47.71
Design amount of CO2 removed from flue gas [tonne/h]	75.44	118.43	132.25	52.48
Fraction CO2 removed from the flue gas []	90.22 %	89.98 %	90.22 %	89.83 %
Absorber diameter [m]	10.60	9.70	8.85	5.85
Absorber height [m]	48.00	48.00	44.00	36.00
Lean amine temperature [°C]	50.5	51.4	51.9	51.8
Flow rate lean amine [t / t CO2 captured]	14.98	13.91	13.41	13.58
Rich amine temperature [°C]	41.2	41.8	42.3	42.2
Flow rate rich amine [t / t CO2 captured]	15.20	14.08	13.63	13.76
Lean amine: CO2 loading [mol / mol]	0.181	0.181	0.181	0.181
Rich amine: CO2 loading [mol / mol]	0.490	0.514	0.526	0.522
Electricity demand [kWh / t CO2 captured]	95.39	49.95	25.91	37.67
Cooling water demand [t / t CO2 captured]	36.02	48.58	35.06	45.39

Stripper	T-6003
Flow rate to compression (wet) [tonne/h]	338.92
Stripper diameter [m]	10.20
Stripper height [m]	38.00
Flow rate lean amine [t / t CO2 captured]	13.10
Flow rate rich amine [t / t CO2 captured]	14.13
Steam demand [GJ / t captured]	3.68
Reboiler pressure [bar]	1.80
Reboiler temperature [C]	119.5
Electricity demand [kWh / t CO2 captured]	3.43
Cooling water demand [t / t CO2 captured]	32.36

CO2 compression and purification	
Flow rate of CO2 to transportation (CO2 captured) [t / h]	330.61
Electricity demand [kWh / t CO2 captured]	93.10
Cooling water demand [t / t CO2 captured]	11.27

Other utilities	
Makeup of water [t / t CO2 captured]	0.95
Makeup of MEA [kg / t CO2 captured]	2.13
Waste water to treatment [t / t CO2 captured]	0.44
NaOH to thermal reclaimer [kg / t CO2 captured]	0.13
MEA sludge [kg / t CO2 captured]	5.33

A.4.3.2 Case 04_03 PFD



A.4.3.3 Case 04_03 Stream data

Section	NGCC absorber section											
Stream	**1**	**2**	**3**	**4**	**5**	**6**	**10**	**13**	**14**	**17**	**18**	**19**
Mass flow rate [kg/h]	1 160 523.0	1 160 523.0	1 149 691.3	1 128 670.7	1 128 670.7	1 042 736.4	1 027 344.6	10 831.7	4 059.6	60 285.1	229 659.9	1 030 000.0
Pressure [bar]	1.0	1.1	1.1	1.0	1.0	5.2	1.5	5.4	4.8	1.1	1.1	1.1
Temperature [°C]	127.5	71.3	39.8	51.3	124.1	41.3	50.5	35.0	40.0	30.0	40.1	47.0
CO_2 [mol frac]	0.042	0.042	0.043	0.004	0.004	0.059	0.021	0.000	0.001	0.000	0.001	0.048
CO [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
O_2 [mol frac]	0.112	0.112	0.114	0.111	0.111	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N_2 [mol frac]	0.756	0.756	0.767	0.747	0.747	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Argon [mol frac]	0.009	0.009	0.009	0.008	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Water [mol frac]	0.081	0.081	0.067	0.130	0.130	0.822	0.863	1.000	0.998	1.000	0.998	0.832
MEA [mol frac]	0.000	0.000	0.000	0.000	0.000	0.120	0.116	0.000	0.002	0.000	0.002	0.119
CO_2 [kg/h]	76 014.3	76 014.3	76 013.8	7 435.0	7 435.0	108 821.3	40 327.4	0.5	5.4	0.0	304.5	90 003.5
CO [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	0.0	0.0	0.0	0.9	0.9	0.0	0.9	0.0	0.0	0.0	0.1	0.0
SO_2 [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SO_3 [kg/h]	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	146 342.0	146 342.0	146 341.9	146 324.4	146 324.4	17.5	0.2	0.0	0.0	0.0	0.8	12.5
N_2 [kg/h]	864 589.6	864 589.6	864 589.5	864 534.6	864 534.6	54.8	0.7	0.1	0.0	0.0	2.5	39.6
Argon [kg/h]	14 158.4	14 158.4	14 157.6	13 795.8	13 795.8	361.6	3.7	0.8	0.2	0.0	14.0	242.1
Water [kg/h]	59 418.8	59 418.8	48 588.5	96 580.0	96 580.0	625 081.1	678 255.2	10 830.2	4 031.7	60 285.1	228 084.1	632 752.2
MEA [kg/h]	0.0	0.0	0.0	0.0	0.0	308 399.9	308 756.4	0.0	22.1	0.0	1 253.9	306 950.0
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.6	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

Section	POW/CDU/VDU absorber section														
Stream	**1a**	**1b**	**1c**	**1d**	**2**	**3**	**4**	**5**	**6**	**10**	**13**	**14**	**17**	**18**	**19**
Mass flow rate [kg/h]	165 561.6	572 232.8	572 232.8	679 582.3	805 890.9	749 061.0	722 780.3	722 780.3	1 516 439.3	1 497 939.3	56 829.9	1 404.8	83 079.0	88 639.7	1 505 000.0
Pressure [bar]	1.0	1.0	1.1	1.0	1.1	1.1	1.0	1.0	5.2	1.5	4.8	4.1	1.1	1.1	1.1
Temperature [°C]	127.5	210.0	83.0	56.1	85.3	40.0	63.0	160.6	41.9	51.4	35.0	40.0	30.0	40.1	45.8
CO_2 [mol frac]	0.081	0.113	0.113	0.089	0.094	0.106	0.010	0.010	0.062	0.021	0.000	0.001	0.000	0.001	0.058
CO [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
O_2 [mol frac]	0.025	0.039	0.039	0.031	0.032	0.036	0.033	0.033	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N_2 [mol frac]	0.710	0.741	0.741	0.641	0.704	0.790	0.731	0.731	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Argon [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Water [mol frac]	0.184	0.106	0.106	0.238	0.170	0.068	0.226	0.226	0.818	0.863	1.000	0.998	1.000	0.998	0.821
MEA [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.120	0.116	0.000	0.002	0.000	0.002	0.120
CO_2 [kg/h]	21 398.6	98 253.6	98 253.6	98 298.3	119 661.1	119 656.6	11 989.4	11 989.4	166 212.4	58 681.3	4.5	2.0	0.0	126.0	156 637.3
CO [kg/h]	5.3	35.7	35.7	57.3	62.5	62.5	62.5	62.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	15.9	165.7	165.7	171.3	183.4	178.7	1.2	1.2	178.9	1.4	4.7	0.0	0.0	0.0	0.3
SO_2 [kg/h]	15.7	297.9	297.9	4.8	20.5	20.2	0.0	0.0	20.2	0.0	0.2	0.0	0.0	0.0	0.3
SO_3 [kg/h]	0.1	0.0	0.0	0.0	0.1	0.2	0.1	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.1
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	4 726.6	24 846.1	24 846.1	24 863.2	29 581.4	29 581.4	29 572.4	29 572.4	9.0	0.1	0.1	0.0	0.0	0.1	7.3
N_2 [kg/h]	119 486.4	410 698.9	410 698.9	448 966.0	568 302.8	568 302.2	568 210.5	568 210.5	91.7	0.9	0.6	0.0	0.0	0.9	75.1
Argon [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water [kg/h]	19 913.0	37 935.1	37 935.1	107 213.1	88 079.0	31 259.1	112 944.1	112 944.1	901 207.2	989 960.7	56 819.8	1 394.0	83 079.0	87 953.8	900 839.8
MEA [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	448 719.7	449 294.8	0.0	8.8	0.0	558.9	447 439.9
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.8	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0
$CaCO_3$	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
$CaSO_4.2H_2O$	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Alkali inerts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
$MgCO_3$	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaF_2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Inerts from limestone	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cl-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SO_4--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca++	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg++	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
$CaSO_4$ dissolved	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

Section	**SMR absorber section**											
Stream	**1**	**2**	**3**	**4**	**5**	**6**	**10**	**13**	**14**	**17**	**18**	**19**
Mass flow rate [kg/h]	438 577.9	438 577.9	407 168.2	374 540.8	374 540.8	1 441 889.8	1 418 436.2	31 409.8	1 065.5	74 371.1	64 937.2	1 429 000.0
Pressure [bar]	1.0	1.1	1.1	1.0	1.0	5.2	1.5	4.1	3.5	1.1	1.1	1.1
Temperature [°C]	147.5	94.9	40.0	71.8	144.0	42.4	51.9	35.0	40.0	30.0	40.1	48.9
CO_2 [mol frac]	0.177	0.177	0.201	0.017	0.017	0.063	0.021	0.000	0.001	0.000	0.001	0.061
CO [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
O_2 [mol frac]	0.022	0.022	0.024	0.022	0.022	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N_2 [mol frac]	0.625	0.625	0.707	0.629	0.629	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Argon [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Water [mol frac]	0.176	0.176	0.068	0.332	0.332	0.817	0.863	1.000	0.997	1.000	0.997	0.819
MEA [mol frac]	0.000	0.000	0.000	0.000	0.000	0.120	0.116	0.000	0.002	0.000	0.002	0.121
CO_2 [kg/h]	117 282.2	117 282.2	117 277.7	11 474.0	11 474.0	161 423.4	55 737.4	4.5	1.6	0.0	98.2	153 726.6
CO [kg/h]	13.8	13.8	13.8	13.8	13.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	41.8	41.8	40.7	1.0	1.0	40.9	1.2	1.1	0.0	0.0	0.0	0.5
SO_2 [kg/h]	10.9	10.9	10.8	0.0	0.0	10.8	0.0	0.1	0.0	0.0	0.0	0.2
SO_3 [kg/h]	0.4	0.4	0.4	0.0	0.0	0.4	0.1	0.1	0.0	0.0	0.0	0.1
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	10 407.6	10 407.6	10 407.6	10 401.6	10 401.6	6.0	0.0	0.0	0.0	0.0	0.0	4.9
N_2 [kg/h]	263 248.2	263 248.2	263 247.9	263 166.8	263 166.8	81.1	0.7	0.3	0.0	0.0	0.6	67.5
Argon [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water [kg/h]	47 573.0	47 573.0	16 169.3	89 483.7	89 483.7	854 046.0	935 850.6	31 403.7	1 056.7	74 371.1	64 398.6	850 741.6
MEA [kg/h]	0.0	0.0	0.0	0.0	0.0	426 281.0	426 846.0	0.0	7.3	0.0	439.8	424 458.6
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.2	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

Section	**FCC absorber section**														
Stream	**1b**	**1c**	**1d**	**2**	**3**	**4**	**5**	**6**	**10**	**13**	**14**	**17**	**18**	**19**	**1e**
Mass flow rate [kg/h]	216 282.5	216 282.5	271 850.2	250 398.2	225 405.1	212 323.6	212 323.6	656 694.3	647 957.2	24 993.1	624.9	35 289.1	38 220.0	649 500.0	186.9
Pressure [bar]	1.0	1.1	1.0	1.1	1.1	1.0	1.0	5.2	1.5	3.6	3.2	1.1	1.1	1.1	/
Temperature [°C]	310.0	88.8	61.5	75.1	39.9	68.8	275.2	42.3	51.8	35.0	40.0	30.0	40.1	46.6	30.0
CO_2 [mol frac]	0.166	0.166	0.120	0.136	0.161	0.015	0.015	0.063	0.021	0.000	0.001	0.000	0.001	0.060	
CO [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
NO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
SO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
SO_3 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
H_2S [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
O_2 [mol frac]	0.023	0.023	0.017	0.019	0.022	0.020	0.020	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
N_2 [mol frac]	0.712	0.712	0.558	0.633	0.750	0.674	0.674	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Argon [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Water [mol frac]	0.098	0.098	0.306	0.213	0.067	0.291	0.291	0.817	0.863	1.000	0.997	1.000	0.997	0.819	
MEA [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.120	0.116	0.000	0.002	0.000	0.002	0.120	
CO_2 [kg/h]	53 123.6	53 123.6	53 113.1	53 112.2	53 109.5	5 401.4	5 401.4	73 046.8	25 396.1	2.7	0.9	0.0	58.8	69 358.7	0.0
CO [kg/h]	13.1	13.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.1	0.6	0.0	0.0	0.0	0.0	0.1	0.0
SO_2 [kg/h]	109.3	109.3	1.9	1.9	1.9	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.0	0.1	0.0
SO_3 [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	5 359.6	5 359.6	5 382.1	5 382.2	5 382.2	5 379.7	5 379.7	2.5	0.0	0.0	0.0	0.0	0.0	2.1	0.0
N_2 [kg/h]	144 796.1	144 796.1	157 767.7	157 771.2	157 771.0	157 732.2	157 732.2	38.7	0.4	0.2	0.0	0.0	0.3	32.5	0.0
Argon [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water [kg/h]	12 880.8	12 880.8	55 576.8	34 130.8	9 140.7	43 809.8	43 809.8	389 397.7	428 094.3	24 990.1	619.9	35 289.1	37 911.0	387 150.1	0.0
MEA [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	194 206.6	194 465.8	0.0	4.1	0.0	249.8	192 956.4	0.0
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.1	0.0	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
$CaCO_3$	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	175.7
$CaSO_4.2H_2O$	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Alkali inerts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.2
$MgCO_3$	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CaF_2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Inerts from limestone	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cl-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SO_4--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ca++	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mg++	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
$CaSO_4$ dissolved	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

Section	**Stripper and compression sections**						
Stream	**7**	**8**	**9**	**11**	**16**	**12**	**15**
Mass flow rate [kg/h]	701.7	4 658 461.5	4 321 234.9	338 925.0	1 756.0	330 606.3	8 301.7
Pressure [bar]	5.2	5.2	1.8	1.3	1.8	112.0	3.0
Temperature [°C]	30.1	109.7	119.5	40.0	150.0	29.1	40.0
CO_2 [mol frac]	0.000	0.062	0.023	0.939		0.997	0.002
CO [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.001		0.001	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
O_2 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
N_2 [mol frac]	0.000	0.000	0.000	0.001		0.001	0.000
Argon [mol frac]	0.000	0.000	0.000	0.001		0.001	0.000
Water [mol frac]	0.000	0.818	0.852	0.057		0.000	0.998
MEA [mol frac]	1.000	0.120	0.125	0.000		0.000	0.000
CO_2 [kg/h]	0.0	509 504.0	179 737.8	329 750.8	0.0	329 695.6	38.6
CO [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	0.0	219.9	3.8	216.1	0.0	211.8	4.4
SO_2 [kg/h]	0.0	32.9	0.0	32.9	0.0	32.6	0.3
SO_3 [kg/h]	0.0	0.7	0.4	0.3	0.0	0.3	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	0.0	35.0	0.0	35.0	0.0	35.0	0.0
N_2 [kg/h]	0.0	266.4	0.0	266.4	0.0	266.4	0.0

Argon [kg/h]	0.0	361.6	0.0	361.6	0.0	361.4	0.0
Water [kg/h]	0.0	2 769 732.0	2 763 735.7	8 261.9	1 053.6	3.3	8 258.5
MEA [kg/h]	701.7	1 378 309.0	1 377 757.2	0.0	298.5	0.0	0.0
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	403.9	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

A.4.4 Case 04_04

A.4.4.1 Case 04_04 Summary

Absorber	T-6002
Flow rate flue gas [tonne/h]	407.2
Molar fraction CO2 in flue gas []	0.20
Amount CO2 removed from the flue gas [tonne/h]	105.80
Design amount CO2 removed from flue gas [tonne/h]	132.25
Fraction CO2 removed from the flue gas []	90.2 %
Absorber diameter [m]	8.85
Absorber height [m]	44.00
Lean amine temperature [°C]	52.08
Flow rate lean amine [t / t CO2 captured]	13.48
Rich amine temperature [°C]	42.31
Flow rate rich amine [t / t CO2 captured]	13.64
Lean amine: CO2 loading [mol / mol]	0.181
Rich amine: CO2 loading [mol / mol]	0.526
Electricity demand [kWh / t CO2 captured]	25.83
Cooling water demand [t / t CO2 captured]	35.33

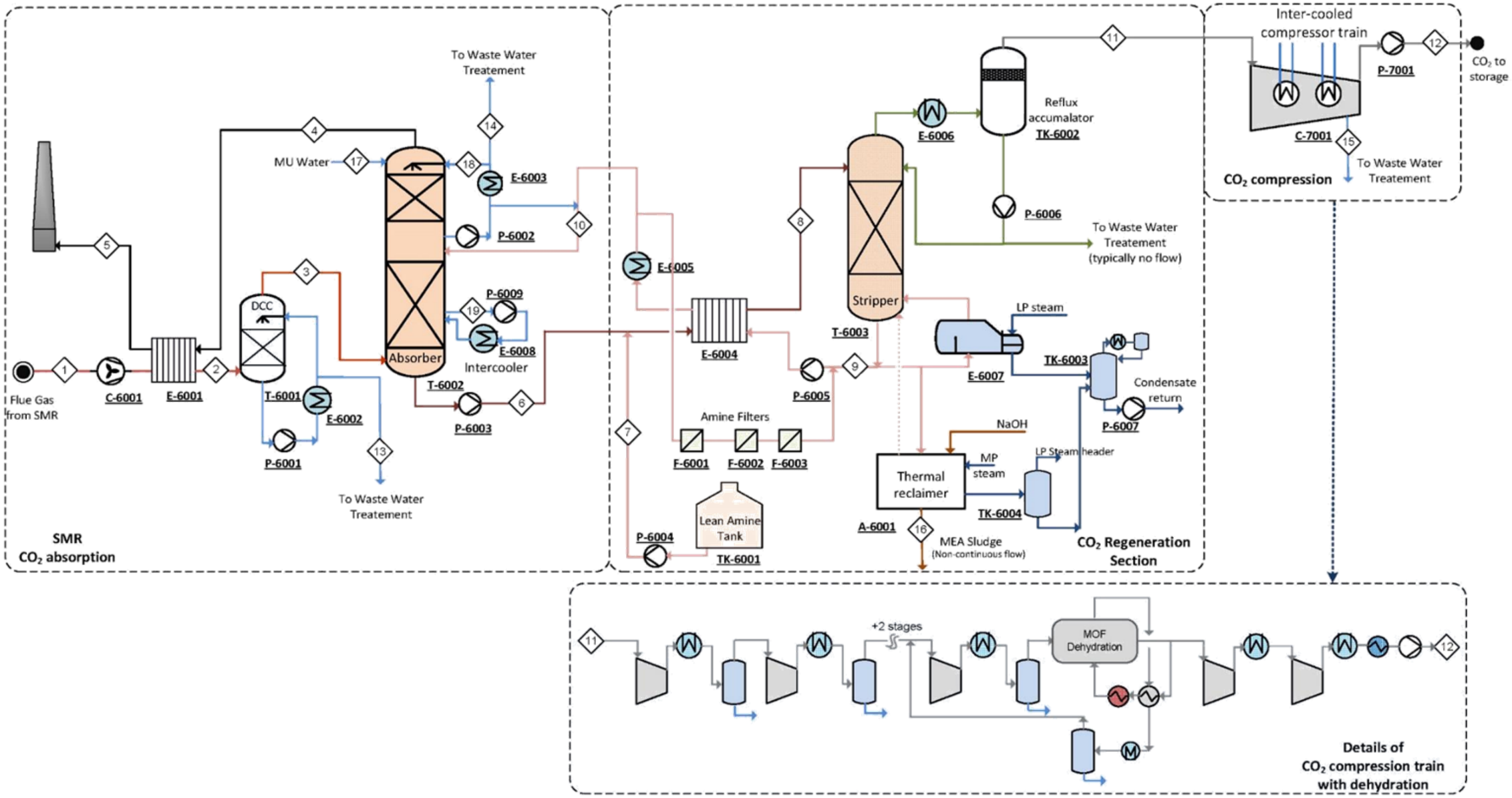
Stripper	T-6003
Flow rate to compression (wet) [tonne/h]	108.08
Stripper diameter [m]	6.15
Stripper height [m]	24.00
Flow rate lean amine [t / t CO2 captured]	12.68
Flow rate rich amine [t / t CO2 captured]	13.70
Steam demand [GJ / t captured]	3.57
Reboiler pressure [bar]	1.80
Reboiler temperature [C]	119.5
Electricity demand [kWh / t CO2 captured]	3.60
Cooling water demand [t / t CO2 captured]	30.66

CO2 compression and purification	
Flow rate of CO2 to transportation (CO2 captured) [t / h]	105.48
Electricity demand [kWh / t CO2 captured]	92.95
Cooling water demand [t / t CO2 captured]	11.27

Other utilities

Makeup of water [t / t CO2 captured]	0.73
Makeup of MEA [kg / t CO2 captured]	2.07
Waste water to treatment [t / t CO2 captured]	0.33
NaOH to thermal reclaimer [kg / t CO2 captured]	0.13
MEA sludge [kg / t CO2 captured]	5.33

A.4.4.2 Case 04_04 PFD



A.4.4.3 Case 04_04 stream data

Section	SMR Absorber											
Stream no	**1**	**2**	**3**	**4**	**5**	**6**	**10**	**13**	**14**	**17**	**18**	**19**
Mass flow rate [kg/h]	438 577.9	438 577.9	407 170.2	374 286.5	374 286.5	1442 669.2	1426 427.2	31 407.7	1 117.6	76 795.2	69 406.8	1436 000.0
Pressure [bar]	1.0	1.1	1.1	1.0	1.0	5.0	1.5	4.1	3.5	1.1	1.1	1.1
Temperature [C]	147.5	95.0	40.0	71.8	144.0	42.4	52.1	35.0	40.0	30.0	40.1	49.0
CO_2 [mol frac]	0.177	0.177	0.201	0.017	0.017	0.063	0.021	0.000	0.001	0.000	0.001	0.060
CO [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
O_2 [mol frac]	0.022	0.022	0.024	0.022	0.022	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N_2 [mol frac]	0.625	0.625	0.707	0.629	0.629	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Water [mol frac]	0.176	0.176	0.068	0.332	0.332	0.818	0.864	1.000	0.997	1.000	0.997	0.820
MEA [mol frac]	0.000	0.000	0.000	0.000	0.000	0.119	0.115	0.000	0.002	0.000	0.002	0.120
CO2 [kg/h]	117 282.2	117 282.2	117 277.7	11 479.9	11 479.9	160 656.0	55 738.1	4.5	1.6	0.0	100.19461	153 627.1
CO [kg/h]	13.8	13.8	13.8	13.8	13.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO2 [kg/h]	41.8	41.8	40.7	1.0	1.0	40.9	1.2	1.1	0.0	0.0	0.0	0.5
SO2 [kg/h]	10.9	10.9	10.8	0.0	0.0	10.8	0.0	0.1	0.0	0.0	0.0	0.2
SO3 [kg/h]	0.4	0.4	0.4	0.0	0.0	0.4	0.1	0.1	0.0	0.0	0.0	0.1
H2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O2 [kg/h]	10 407.6	10 407.6	10 407.6	10 401.6	10 401.6	6.0	0.1	0.0	0.0	0.0	0.0	4.9
N2 [kg/h]	263 248.2	263 248.2	263 247.9	263 166.9	263 166.9	80.7	0.8	0.3	0.0	0.0	0.6	67.3
Water [kg/h]	47 573.0	47 573.0	16 171.3	89 223.3	89 223.3	857 659.6	943 833.6	31 401.6	1 108.7	76 795.2	68857.5	858 051.0
MEA [kg/h]	0.0	0.0	0.0	0.0	0.0	424 214.7	426 853.3	0.0	7.3	0.0	448.5	424 249.0
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.08	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.02	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.01	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.04	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.16	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.02	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.13	0.0	0.0	0.0

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

Section	Stripper and Compression sections						
Stream no	**7**	**8**	**9**	**11**	**16**	**12**	**15**
Mass flow rate [kg/h]	217.9	1442 888.0	1335 716.2	108 083.5	563.4	105 484.6	2 646.8
Pressure [bar]	5.0	2.0	1.8	1.3	1.8	112.0	3.0
Temperature [C]	30.1	101.8	119.5	40.0	150	29.1	40.0
CO_2 [mol frac]	0.000	0.063	0.023	0.941		0.998	0.002
CO [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
O_2 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
N_2 [mol frac]	0.000	0.000	0.000	0.001		0.001	0.000
Water [mol frac]	0.000	0.818	0.853	0.057		0.000	0.998
MEA [mol frac]	1.000	0.119	0.125	0.000		0.000	0.000
CO2 [kg/h]	0.0	160 656.0	55 392.9	105 311.8	0.0	105 347.2	12.3
CO [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO2 [kg/h]	0.0	40.9	6.7	39.6	0.0	38.8	0.8
SO2 [kg/h]	0.0	10.8	0.1	10.8	0.0	10.7	0.1
SO3 [kg/h]	0.0	0.4	0.3	0.2	0.0	0.1	0.0
H2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O2 [kg/h]	0.0	6.0	0.0	6.0	0.0	6.0	0.0
N2 [kg/h]	0.0	80.7	0.0	80.7	0.0	80.7	0.0
Water [kg/h]	0.0	857 659.6	855 732.0	2 634.6	338.0	1.1	2 633.6
MEA [kg/h]	217.9	424 433.6	424 584.3	0.0	95.8	0.0	0.0
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	129.6	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

A.4.5 Case 04_05

A.4.5.1 Case 04_05 Summary

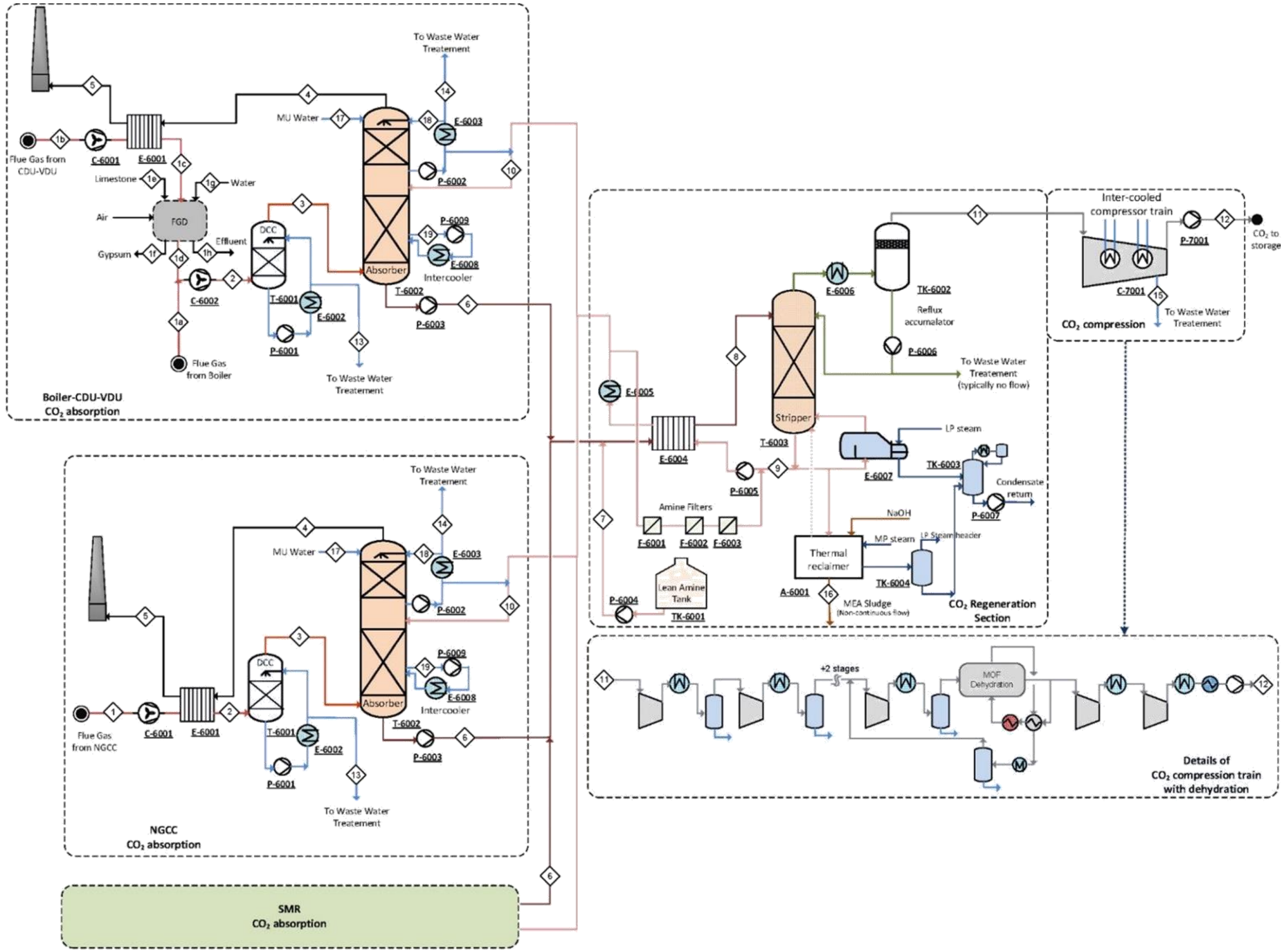
Absorber	NGCC - T-6002	POW/CDU/VDU -T-6002	SMR - T-6002
Flow rate flue gas [tonne/h]	1 149.8	749.1	407.2
Molar fraction CO2 in flue gas []	0.04	0.11	0.20
Amount CO2 removed from the flue gas [tonne/h]	68.58	107.67	105.80
Design amount of CO2 removed from flue gas [tonne/h]	75.44	118.43	132.25
Fraction CO2 removed from the flue gas []	90.22 %	89.98 %	90.22 %
Absorber diameter [m]	10.60	9.70	8.85
Absorber height [m]	48.00	48.00	44.00
Lean amine temperature [°C]	50.5	51.4	51.9
Flow rate lean amine [t / t CO2 captured]	14.98	13.91	13.41
Rich amine temperature [°C]	41.2	41.8	42.3
Flow rate rich amine [t / t CO2 captured]	15.20	14.08	13.63
Lean amine: CO2 loading [mol / mol]	0.181	0.181	0.181
Rich amine: CO2 loading [mol / mol]	0.490	0.514	0.526
Electricity demand [kWh / t CO2 captured]	95.39	49.95	25.91
Cooling water demand [t / t CO2 captured]	35.99	48.58	35.06

Stripper	T-6003
Flow rate to compression (wet) [tonne/h]	289.97
Stripper diameter [m]	9.50
Stripper height [m]	33.00
Flow rate lean amine [t / t CO2 captured]	13.16
Flow rate rich amine [t / t CO2 captured]	14.19
Steam demand [GJ / t captured]	3.69
Reboiler pressure [bar]	1.80
Reboiler temperature [C]	119.5
Electricity demand [kWh / t CO2 captured]	3.14
Cooling water demand [t / t CO2 captured]	32.40

CO2 compression and purification	
Flow rate of CO2 to transportation (CO2 captured) [t / h]	282.86
Electricity demand [kWh / t CO2 captured]	93.36
Cooling water demand [t / t CO2 captured]	11.27

Other utilities	
Makeup of water [t / t CO2 captured]	0.89
Makeup of MEA [kg / t CO2 captured]	2.14
Waste water to treatment [t / t CO2 captured]	0.41
NaOH to thermal reclaimer [kg / t CO2 captured]	0.13
MEA sludge [kg / t CO2 captured]	5.33

A.4.5.2 Case 04_05 PFD



A.4.5.3 Case 04_05 Stream data

Section	NGCC absorber section											
Stream	**1**	**2**	**3**	**4**	**5**	**6**	**10**	**13**	**14**	**17**	**18**	**19**
Mass flow rate [kg/h]	1 160 523.0	1 160 523.0	1 149 687.0	1 128 602.5	1 128 602.5	1 042 733.8	1 027 344.6	10 836.0	4 039.2	59 007.0	229 659.9	1 030 000.0
Pressure [bar]	1.0	1.1	1.1	1.0	1.0	5.2	1.5	5.4	4.8	1.1	1.1	1.1
Temperature [°C]	127.5	71.3	39.8	51.3	124.1	41.3	50.5	35.0	40.0	30.0	40.1	47.0
CO_2 [mol frac]	0.042	0.042	0.043	0.004	0.004	0.059	0.021	0.000	0.001	0.000	0.001	0.048
CO [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
O_2 [mol frac]	0.112	0.112	0.114	0.111	0.111	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N_2 [mol frac]	0.756	0.756	0.767	0.747	0.747	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Argon [mol frac]	0.009	0.009	0.009	0.008	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Water [mol frac]	0.081	0.081	0.067	0.130	0.130	0.822	0.863	1.000	0.998	1.000	0.998	0.832
MEA [mol frac]	0.000	0.000	0.000	0.000	0.000	0.120	0.116	0.000	0.002	0.000	0.002	0.119
CO_2 [kg/h]	76 014.3	76 014.3	76 013.8	7 435.1	7 435.1	108 821.0	40 327.4	0.5	5.4	0.0	304.5	90 003.7
CO [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	0.0	0.0	0.0	0.9	0.9	0.0	0.9	0.0	0.0	0.0	0.1	0.0
SO_2 [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SO_3 [kg/h]	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	146 342.0	146 342.0	146 341.9	146 324.4	146 324.4	17.5	0.2	0.0	0.0	0.0	0.8	12.5
N_2 [kg/h]	864 589.6	864 589.6	864 589.5	864 534.6	864 534.6	54.8	0.7	0.1	0.0	0.0	2.5	39.6
Argon [kg/h]	14 158.4	14 158.4	14 157.6	13 795.8	13 795.8	361.6	3.7	0.8	0.2	0.0	14.0	242.1
Water [kg/h]	59 418.8	59 418.8	48 584.3	96 511.7	96 511.7	625 079.2	678 255.2	10 834.5	4 011.4	59 007.0	228 084.1	632 751.7
MEA [kg/h]	0.0	0.0	0.0	0.0	0.0	308 399.7	308 756.4	0.0	22.1	0.0	1 253.9	306 950.3
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.6	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

Section	POW/CDU/VDU absorber section														
Stream	**1a**	**1b**	**1c**	**1d**	**2**	**3**	**4**	**5**	**6**	**10**	**13**	**14**	**17**	**18**	**19**
Mass flow rate [kg/h]	165 561.6	572 232.8	572 232.8	679 582.3	805 890.9	749 061.0	722 780.3	722 780.3	1 516 439.3	1 497 939.3	56 829.9	1 404.8	83 079.0	88 639.7	1 505 000.
Pressure [bar]	1.0	1.0	1.1	1.0	1.1	1.1	1.0	1.0	5.2	1.5	4.8	4.1	1.1	1.1	1.
Temperature [°C]	127.5	210.0	83.0	56.1	85.3	40.0	63.0	160.6	41.9	51.4	35.0	40.0	30.0	40.1	45.
CO_2 [mol frac]	0.081	0.113	0.113	0.089	0.094	0.106	0.010	0.010	0.062	0.021	0.000	0.001	0.000	0.001	0.05
CO [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
NO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
SO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
SO_3 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
H_2S [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
O_2 [mol frac]	0.025	0.039	0.039	0.031	0.032	0.036	0.033	0.033	0.000	0.000	0.000	0.000	0.000	0.000	0.00
N_2 [mol frac]	0.710	0.741	0.741	0.641	0.704	0.790	0.731	0.731	0.000	0.000	0.000	0.000	0.000	0.000	0.00
Argon [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
Water [mol frac]	0.184	0.106	0.106	0.238	0.170	0.068	0.226	0.226	0.818	0.863	1.000	0.998	1.000	0.998	0.82
MEA [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.120	0.116	0.000	0.002	0.000	0.002	0.12
CO_2 [kg/h]	21 398.6	98 253.6	98 253.6	98 298.3	119 661.1	119 656.6	11 989.4	11 989.4	166 212.4	58 681.3	4.5	2.0	0.0	126.0	156 637.
CO [kg/h]	5.3	35.7	35.7	57.3	62.5	62.5	62.5	62.5	0.0	0.0	0.0	0.0	0.0	0.0	0.
NO_2 [kg/h]	15.9	165.7	165.7	171.3	183.4	178.7	1.2	1.2	178.9	1.4	4.7	0.0	0.0	0.0	0.
SO_2 [kg/h]	15.7	297.9	297.9	4.8	20.5	20.2	0.0	0.0	20.2	0.0	0.2	0.0	0.0	0.0	0.
SO_3 [kg/h]	0.1	0.0	0.0	0.0	0.1	0.2	0.1	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
O_2 [kg/h]	4 726.6	24 846.1	24 846.1	24 863.2	29 581.4	29 581.4	29 572.4	29 572.4	9.0	0.1	0.1	0.0	0.0	0.1	7.
N_2 [kg/h]	119 486.4	410 698.9	410 698.9	448 966.0	568 302.8	568 302.2	568 210.5	568 210.5	91.7	0.9	0.6	0.0	0.0	0.9	75.
Argon [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
Water [kg/h]	19 913.0	37 935.1	37 935.1	107 213.1	88 079.0	31 259.1	112 944.1	112 944.1	901 207.2	989 960.7	56 819.8	1 394.0	83 079.0	87 953.8	900 839.
MEA [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	448 719.7	449 294.8	0.0	8.8	0.0	558.9	447 439.
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.8	0.0	0.0	0.
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.
$CaCO_3$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
$CaSO_4.2H_2O$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
Alkali inerts [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
$MgCO_3$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
CaF_2 [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.

Inerts from limestone [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
Cl- [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
SO_4-- [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
Ca++ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
Mg++ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
$CaSO_4$ dissolved [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

Section	**SMR absorber section**											
Stream	**1**	**2**	**3**	**4**	**5**	**6**	**10**	**13**	**14**	**17**	**18**	**19**
Mass flow rate [kg/h]	438 577.9	438 577.9	407 168.2	374 540.8	374 540.8	1 441 889.8	1 418 436.2	31 409.8	1 065.5	74 371.1	64 937.2	1 429 000.0
Pressure [bar]	1.0	1.1	1.1	1.0	1.0	5.2	1.5	4.1	3.5	1.1	1.1	1.1
Temperature [°C]	147.5	94.9	40.0	71.8	144.0	42.4	51.9	35.0	40.0	30.0	40.1	48.9
CO_2 [mol frac]	0.177	0.177	0.201	0.017	0.017	0.063	0.021	0.000	0.001	0.000	0.001	0.061
CO [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
O_2 [mol frac]	0.022	0.022	0.024	0.022	0.022	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N_2 [mol frac]	0.625	0.625	0.707	0.629	0.629	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Argon [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Water [mol frac]	0.176	0.176	0.068	0.332	0.332	0.817	0.863	1.000	0.997	1.000	0.997	0.819
MEA [mol frac]	0.000	0.000	0.000	0.000	0.000	0.120	0.116	0.000	0.002	0.000	0.002	0.121
CO_2 [kg/h]	117 282.2	117 282.2	117 277.7	11 474.0	11 474.0	161 423.4	55 737.4	4.5	1.6	0.0	98.2	153 726.6
CO [kg/h]	13.8	13.8	13.8	13.8	13.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	41.8	41.8	40.7	1.0	1.0	40.9	1.2	1.1	0.0	0.0	0.0	0.5
SO_2 [kg/h]	10.9	10.9	10.8	0.0	0.0	10.8	0.0	0.1	0.0	0.0	0.0	0.2
SO_3 [kg/h]	0.4	0.4	0.4	0.0	0.0	0.4	0.1	0.1	0.0	0.0	0.0	0.1
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	10 407.6	10 407.6	10 407.6	10 401.6	10 401.6	6.0	0.0	0.0	0.0	0.0	0.0	4.9
N_2 [kg/h]	263 248.2	263 248.2	263 247.9	263 166.8	263 166.8	81.1	0.7	0.3	0.0	0.0	0.6	67.5
Argon [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water [kg/h]	47 573.0	47 573.0	16 169.3	89 483.7	89 483.7	854 046.0	935 850.6	31 403.7	1 056.7	74 371.1	64 398.6	850 741.6
MEA [kg/h]	0.0	0.0	0.0	0.0	0.0	426 281.0	426 846.0	0.0	7.3	0.0	439.8	424 458.6
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.2	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

Section	**Stripper and compression section**						
Stream	**7**	**8**	**9**	**11**	**16**	**12**	**15**
Mass flow rate [kg/h]	602.3	4 001 665.2	3 712 110.0	289 965.1	1 501.9	282 864.1	7 103.0
Pressure [bar]	5.2	5.2	1.8	1.3	1.8	112.0	3.0
Temperature [°C]	30.1	109.7	119.5	40.0	150.0	29.1	40.0
CO_2 [mol frac]	0.000	0.061	0.023	0.939		0.996	0.002
CO [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.001		0.001	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
O_2 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
N_2 [mol frac]	0.000	0.000	0.000	0.001		0.001	0.000
Argon [mol frac]	0.000	0.000	0.000	0.001		0.001	0.000
Water [mol frac]	0.000	0.818	0.852	0.057		0.000	0.998
MEA [mol frac]	1.000	0.120	0.125	0.000		0.000	0.000
CO_2 [kg/h]	0.0	436 456.8	154 401.8	282 027.8	0.0	281 997.0	33.0
CO [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	0.0	219.8	3.3	216.0	0.0	211.4	4.3
SO_2 [kg/h]	0.0	31.0	0.0	31.0	0.0	30.8	0.3
SO_3 [kg/h]	0.0	0.7	0.3	0.2	0.0	0.2	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	0.0	32.5	0.0	32.5	0.0	32.5	0.0
N_2 [kg/h]	0.0	227.7	0.0	227.7	0.0	227.7	0.0
Argon [kg/h]	0.0	361.6	0.0	361.6	0.0	361.6	0.0
Water [kg/h]	0.0	2 380 332.4	2 374 157.2	7 068.2	901.1	2.8	7 065.3
MEA [kg/h]	602.3	1 184 002.6	1 183 547.4	0.0	255.3	0.0	0.0
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	345.4	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

A.4.6 Case 04_06

A.4.6.1 Case 04_06 Summary

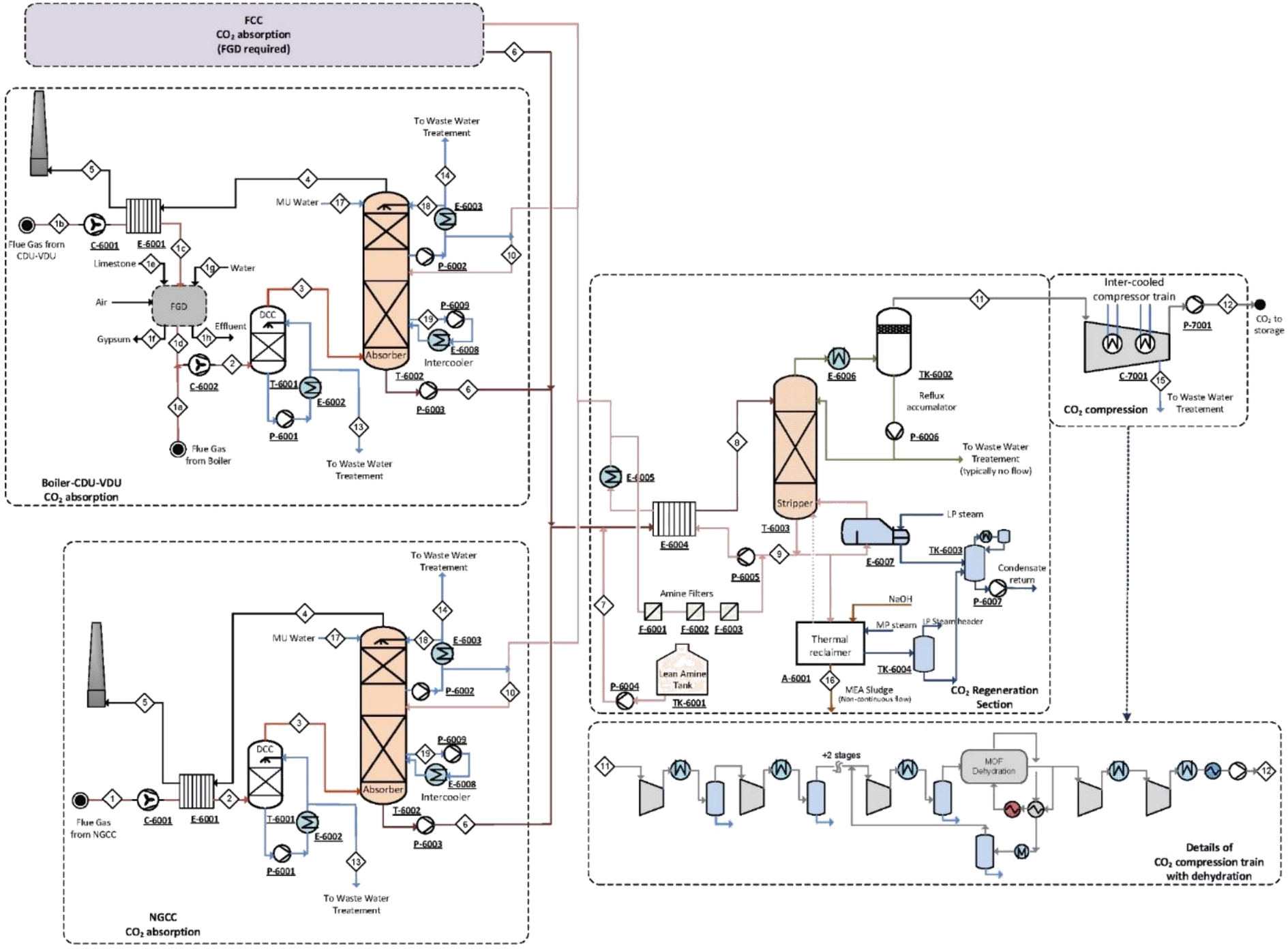
Absorber	NGCC - T-6002	POW/CDU/VDU -T-6002	FCC - T-6002
Flow rate flue gas [tonne/h]	1 149.8	749.1	225.4
Molar fraction CO2 in flue gas []	0.04	0.11	0.16
Amount CO2 removed from the flue gas [tonne/h]	68.38	107.66	47.80
Design amount of CO2 removed from flue gas [tonne/h]	75.22	118.42	52.58
Fraction CO2 removed from the flue gas []	89.96 %	89.97 %	90.01 %
Absorber diameter [m]	10.60	9.70	5.85
Absorber height [m]	48.00	48.00	36.00
Lean amine temperature [°C]	50.5	51.4	51.8
Flow rate lean amine [t / t CO2 captured]	15.02	13.91	13.59
Rich amine temperature [°C]	41.3	41.8	42.2
Flow rate rich amine [t / t CO2 captured]	15.26	14.09	13.78
Lean amine: CO2 loading [mol / mol]	0.181	0.181	0.181
Rich amine: CO2 loading [mol / mol]	0.489	0.514	0.522
Electricity demand [kWh / t CO2 captured]	95.31	49.96	37.61
Cooling water demand [t / t CO2 captured]	33.15	48.69	45.49

Stripper	T-6003
Flow rate to compression (wet) [tonne/h]	230.21
Stripper diameter [m]	8.10
Stripper height [m]	30.00
Flow rate lean amine [t / t CO2 captured]	13.33
Flow rate rich amine [t / t CO2 captured]	14.38
Steam demand [GJ / t captured]	3.72
Reboiler pressure [bar]	1.80
Reboiler temperature [C]	119.53
Electricity demand [kWh / t CO2 captured]	3.23
Cooling water demand [t / t CO2 captured]	32.73

CO2 compression and purification	
Flow rate of CO2 to transportation [t / h]	224.57
Electricity demand [kWh / t CO2 captured]	93.41
Cooling water demand [t / t CO2 captured]	11.27

Other utilities	
Makeup of water [t / t CO2 captured]	1.06
Makeup of MEA [kg / t CO2 captured]	2.09
Waste water to treatment [t / t CO2 captured]	0.48
NaOH to thermal reclaimer [kg / t CO2 captured]	0.13
MEA sludge [kg / t CO2 captured]	5.33

A.4.6.2 Case 04_06 PFD



A.4.6.3 Case 04_06 Stream data

Section	NGCC absorber section											
Stream	**1**	**2**	**3**	**4**	**5**	**6**	**10**	**13**	**14**	**17**	**18**	**19**
Mass flow rate [kg/h]	1 160 523.0	1 160 523.0	1 149 813.4	1 132 091.5	1 132 091.5	1 043 118.5	1 027 344.6	10 709.6	1 004.6	57 695.8	57 408.0	1 030 000.0
Pressure [bar]	1.0	1.1	1.1	1.0	1.0	5.2	1.5	5.4	4.9	1.1	1.1	1.1
Temperature [°C]	127.5	71.8	39.9	51.8	123.8	41.4	50.5	35.0	40.0	30.0	40.1	47.3
CO_2 [mol frac]	0.042	0.042	0.043	0.004	0.004	0.058	0.021	0.000	0.001	0.000	0.001	0.048
CO [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
O_2 [mol frac]	0.112	0.112	0.114	0.110	0.110	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N_2 [mol frac]	0.756	0.756	0.767	0.744	0.744	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Argon [mol frac]	0.009	0.009	0.009	0.008	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Water [mol frac]	0.081	0.081	0.067	0.133	0.133	0.822	0.863	1.000	0.998	1.000	0.998	0.833
MEA [mol frac]	0.000	0.000	0.000	0.000	0.000	0.120	0.116	0.000	0.002	0.000	0.002	0.119
CO_2 [kg/h]	76 014.3	76 014.3	76 013.8	7 635.4	7 635.4	108 624.2	40 327.4	0.5	1.4	0.0	78.3	88 554.8
CO [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	0.0	0.0	0.0	0.9	0.9	0.0	0.9	0.0	0.0	0.0	0.0	0.0
SO_2 [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SO_3 [kg/h]	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	146 342.0	146 342.0	146 341.9	146 324.5	146 324.5	17.4	0.2	0.0	0.0	0.0	0.2	12.2
N_2 [kg/h]	864 589.6	864 589.6	864 589.5	864 535.0	864 535.0	54.5	0.7	0.1	0.0	0.0	0.6	38.8
Argon [kg/h]	14 158.4	14 158.4	14 157.6	13 798.4	13 798.4	359.2	3.7	0.8	0.1	0.0	3.5	236.4
Water [kg/h]	59 418.8	59 418.8	48 710.6	99 797.4	99 797.4	625 665.4	678 255.2	10 708.2	997.2	57 695.8	56 986.0	634 192.1
MEA [kg/h]	0.0	0.0	0.0	0.0	0.0	308 397.8	308 756.4	0.0	6.0	0.0	339.5	306 965.7
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.7	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

Section	CDU/VDU absorber section															FGD			
Stream	**1a**	**1b**	**1c**	**1d**	**2**	**3**	**4**	**5**	**6**	**10**	**13**	**14**	**17**	**18**	**19**	**1e**	**1f**	**1g**	**1h**
Mass flow rate [kg/h]	165 561.6	572 232.8	572 232.8	679 582.3	805 890.9	749 061.0	722 485.2	722 485.2	1 516 439.3	1 497 939.3	56 829.9	1 473.8	83 958.0	93 015.7	1 505 000.0	496.6	882.4	33 916.1	3 637.0
Pressure [bar]	1.0	1.0	1.1	1.0	1.1	1.1	1.0	1.0	5.2	1.5	4.8	4.1	1.1	1.1	1.1	/	/	/	/
Temperature [°C]	127.5	210.0	83.0	56.1	85.3	40.0	63.0	160.6	41.9	51.4	35.0	40.0	30.0	40.1	45.8	30.0	40.0	30.0	40.0
CO_2 [mol frac]	0.081	0.113	0.113	0.089	0.094	0.106	0.010	0.010	0.062	0.021	0.000	0.001	0.000	0.001	0.058	0.000	0.000	0.000	0.000
CO [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
O_2 [mol frac]	0.025	0.039	0.039	0.031	0.032	0.036	0.033	0.033	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N_2 [mol frac]	0.710	0.741	0.741	0.641	0.704	0.790	0.731	0.731	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Argon [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Water [mol frac]	0.184	0.106	0.106	0.238	0.170	0.068	0.225	0.225	0.818	0.863	1.000	0.998	1.000	0.998	0.821	0.000	0.000	1.000	/
MEA [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.120	0.116	0.000	0.002	0.000	0.002	0.120	0.000	0.000	0.000	0.000
CO_2 [kg/h]	21 398.6	98 253.6	98 253.6	98 298.3	119 661.1	119 656.6	11 998.4	11 998.4	166 212.4	58 681.3	4.5	2.1	0.0	134.2	156 637.3	0.0	0.0	0.0	0.0
CO [kg/h]	5.3	35.7	35.7	57.3	62.5	62.5	62.5	62.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	15.9	165.7	165.7	171.3	183.4	178.7	1.2	1.2	178.9	1.4	4.7	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0
SO_2 [kg/h]	15.7	297.9	297.9	4.8	20.5	20.2	0.0	0.0	20.2	0.0	0.2	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0
SO_3 [kg/h]	0.1	0.0	0.0	0.0	0.1	0.2	0.1	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	4 726.6	24 846.1	24 846.1	24 863.2	29 581.4	29 581.4	29 572.4	29 572.4	9.0	0.1	0.1	0.0	0.0	0.1	7.3	0.0	0.0	0.0	0.0
N_2 [kg/h]	119 486.4	410 698.9	410 698.9	448 966.0	568 302.8	568 302.2	568 210.5	568 210.5	91.7	0.9	0.6	0.0	0.0	0.9	75.1	0.0	0.0	0.0	0.0
Argon [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water [kg/h]	19 913.0	37 935.1	37 935.1	107 213.1	88 079.0	31 259.1	112 640.0	112 640.0	901 207.2	989 960.7	56 819.8	1 462.7	83 958.0	92 310.1	900 839.8	0.0	105.9	33 916.1	3 391.6
MEA [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	448 719.7	449 294.8	0.0	9.0	0.0	570.4	447 439.9	0.0	0.0	0.0	0.0
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
$CaCO_3$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	466.8	0.0	0.0	0.4
$CaSO_4.2H_2O$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	776.51 2	0.0	26.6
Alkali inerts [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.8	0.0	0.0	0.0
$MgCO_3$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7
CaF_2 [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.1
Inerts from limestone [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	57.2
Cl- [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	102.3
SO_4-- [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.8

Ca++ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.9
Mg++ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.7
$CaSO_4$ dissolved [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.8

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

Section	**FCC absorber section**														**FGD**			
Stream	**1b**	**1c**	**1d**	**2**	**3**	**4**	**5**	**6**	**10**	**13**	**14**	**17**	**18**	**19**	**1e**	**1f**	**1g**	**1h**
Mass flow rate [kg/h]	216 282.5	216 282.5	271 850.2	250 398.2	225 405.1	212 175.1	212 175.1	658 561.3	649 823.4	24 993.1	647.5	36 374.0	39 821.6	652 000.0	186.9	332.2	23 980.0	2 828.7
Pressure [bar]	1.0	1.1	1.0	1.1	1.1	1.0	1.0	5.2	1.5	3.6	3.2	1.1	1.1	1.1	/	/	/	/
Temperature [°C]	310.0	88.7	61.5	75.1	39.9	68.7	275.4	42.3	51.8	35.0	40.0	30.0	40.1	46.7	30.0	40.0	30.0	40.0
CO_2 [mol frac]	0.166	0.166	0.120	0.136	0.161	0.014	0.014	0.063	0.021	0.000	0.001	0.000	0.001	0.060	0.000	0.000	0.000	0.000
CO [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
O_2 [mol frac]	0.023	0.023	0.017	0.019	0.022	0.020	0.020	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N_2 [mol frac]	0.712	0.712	0.558	0.633	0.750	0.675	0.675	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Argon [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Water [mol frac]	0.098	0.098	0.306	0.213	0.067	0.291	0.291	0.817	0.863	1.000	0.998	1.000	0.998	0.820	0.000	0.000	1.000	/
MEA [mol frac]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.120	0.116	0.000	0.002	0.000	0.002	0.120	0.000	0.000	0.000	0.000
CO_2 [kg/h]	53 123.6	53 123.6	53 113.1	53 112.2	53 109.5	5 305.0	5 305.0	73 185.0	25 448.5	2.7	0.9	0.0	56.5	69 553.4	0.0	0.0	0.0	0.0
CO [kg/h]	13.1	13.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.1	0.6	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
SO_2 [kg/h]	109.3	109.3	1.9	1.9	1.9	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
SO_3 [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	5 359.6	5 359.6	5 382.1	5 382.2	5 382.2	5 379.7	5 379.7	2.5	0.0	0.0	0.0	0.0	0.0	2.1	0.0	0.0	0.0	0.0
N_2 [kg/h]	144 796.1	144 796.1	157 767.7	157 771.2	157 771.0	157 732.1	157 732.1	38.8	0.4	0.2	0.0	0.0	0.4	32.6	0.0	0.0	0.0	0.0
Argon [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water [kg/h]	12 880.8	12 880.8	55 576.8	34 130.8	9 140.7	43 757.8	43 757.8	390 740.4	429 514.8	24 990.1	642.5	36 374.0	39 517.3	388 867.7	0.0	39.9	23 980.0	2 637.8
MEA [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	194 592.6	194 859.1	0.0	4.1	0.0	247.4	193 544.0	0.0	0.0	0.0	0.0
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0

$CaCO_3$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	175.7	0.0	0.0	0.3
$CaSO_4.2H_2O$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	292.336	0.0	20.6
Alkali inerts [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.2	0.0	0.0	0.0
$MgCO_3$ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6
CaF_2 [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.9
Inerts from limestone [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	44.5
Cl- [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	79.6
SO_4-- [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.7
Ca++ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.2
Mg++ [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.2
$CaSO_4$ dissolved [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.3

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.

Section	Stripper and compression section						
Stream	**7**	**8**	**9**	**11**	**16**	**12**	**15**
Mass flow rate [kg/h]	466.7	3 218 585.9	2 984 502.4	230 214.4	1 192.0	224 574.3	5 639.5
Pressure [bar]	5.2	5.2	1.8	1.3	1.8	112.0	3.0
Temperature [°C]	30.1	109.7	119.5	40.0	150.0	29.1	40.0
CO_2 [mol frac]	0.000	0.061	0.023	0.939		0.996	0.002
CO [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
NO_2 [mol frac]	0.000	0.000	0.000	0.001		0.001	0.000
SO_2 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
SO_3 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
H_2S [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
O_2 [mol frac]	0.000	0.000	0.000	0.000		0.000	0.000
N_2 [mol frac]	0.000	0.000	0.000	0.001		0.001	0.000
Argon [mol frac]	0.000	0.000	0.000	0.002		0.002	0.000
Water [mol frac]	0.000	0.819	0.852	0.057		0.000	0.998
MEA [mol frac]	1.000	0.120	0.125	0.000		0.000	0.000
CO_2 [kg/h]	0.0	348 021.6	124 043.8	223 831.0	0.0	223 804.4	26.2
CO [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO_2 [kg/h]	0.0	178.9	4.4	176.3	0.0	172.6	3.6
SO_2 [kg/h]	0.0	22.1	0.0	22.1	0.0	21.9	0.2
SO_3 [kg/h]	0.0	0.3	0.2	0.1	0.0	0.1	0.0
H_2S [kg/h]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O_2 [kg/h]	0.0	28.9	0.0	28.9	0.0	28.9	0.0
N_2 [kg/h]	0.0	185.0	0.0	185.0	0.0	185.0	0.0
Argon [kg/h]	0.0	359.2	0.0	359.2	0.0	359.2	0.0
Water [kg/h]	0.0	1 917 613.0	1 909 754.3	5 611.9	715.2	2.2	5 609.6
MEA [kg/h]	466.7	952 176.9	950 699.6	0.0	202.6	0.0	0.0
HSS-Na+ [kg/h]*	0.0	0.0	0.0	0.0	274.1	0.0	0.0
DEA [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetaldehyde [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetone [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ammonia [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Methylamine [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acetamide [kg/h]*	0.0	0.0	0.0	0.0	0.0	0.0	0.0

*Note: These components have not been included as part of the process simulation. They have been calculated based on references from literature.