

CONFIDENTIAL

LAKE CHARLES REFINERY PARTICULATE EMISSIONS (tons per year)

EQ No.	Unit	1976	1977	1978	1979	1980	1981- 1983*	1984
1	No. 1 CTU, H-1	8.5	6.8	9.2	3.9	down	down	
2	Thermal Cracker, H-2	2.2	2.3	10.0	5.0	2.7	17.6	17.6
3	Thermal Cracker, H-3	2.4	2.6	2.6	2.5	1.7	4.5	4.5
4	No. 2 CTU, H-4	4.6	7.7	9.6	7.1	2.7	13.6	13.6
5	No. 2 CTU, H-5	4.6	7.7	9.6	7.1	8.5	13.6	13.6
6	FCC, H-6	3.9	6.6	7.0	5.8	3.0	7.0	7.0
7	No. 2 TCC, H-7	8.6	7.7	8.5	7.2	1.9	down	down
8	Heating Oil Belt, H-9	4.7	5.5	20.9	10.1	6.1	16.3	16.3
9	Heating Oil Belt, H-10	spare	spare	spare	spare	spare	spare	spare
10	No. 1 CRU, H-11	1.1	1.2	1.0	0.9	0.7	1.8	1.8
11	No. 1 CRU, H-12	1.1	1.2	1.0	0.9	0.7	1.8	1.8
12	No. 1 CRU, H-13	1.7	1.4	1.5	1.8	1.1	1.1	1.1
13	Premium Coker, H-18	7.3	8.0	8.3	7.8	4.9	6.1	6.1
14	No. 2 CRU, H-21	4.0	3.9	4.0	4.1	3.9	4.4	4.4
15	No. 2 CRU, H-22	2.9	2.8	2.8	3.0	2.8	3.2	3.2
16	No. 2 CRU, H-23	1.3	1.3	1.3	1.4	1.3	1.5	1.5
17	Naphtha Desulfurizer, H-24	2.1	2.1	1.9	1.6	1.8	2.4	2.4
18	Low Pressure Boiler, B-1	3.2	3.8	4.4	2.1	3.3	spare	spare
19	Low Pressure Boiler, B-2	5.2	3.4	1.1	0.0	0.0	spare	spare
20	Low Pressure Boiler, B-3	2.6	4.6	5.6	2.9	3.0	spare	spare
21	Low Pressure Boiler, B-4	4.1	4.3	6.8	3.6	3.4	spare	spare
22	High Pressure Boiler, B-5	10.2	10.8	14.1	9.4	10.7	24.6	24.6
23	High Pressure Boiler, B-6	10.5	8.8	16.6	9.2	0.0	24.6	24.6
24-29	No. 1 and No. 2 TCC	508.0	599.4	483.6	522.3	down	down	down
30	Calcliner Waste Heat Boiler, B-7	431.13	397.8	389.4	367.0	325.6	455.2	455.2
31-33	Flare and Blowdowns	neg	neg	neg	neg	neg	neg	neg
34	Gasoline Tanks							
35	Crude Tanks							
36	Fugitive Hydrocarbon Emissions							
37	New Crude Unit Heater						91.4	91.4
38	New Vacuum Unit Heater						14.0	14.0
39	New Distillate Desulfurizer Heater						1.4	1.4
40	New Gas Oil Desulfurizer Heater						1.4	1.4
41	New FCC Regenerator					36.7	87.6	87.6
42	New Sulfuric Acid Plant						0.9	0.9
43	Feedstock Tankage							
44	New Regular Coker							87.6
45	New Flare Facilities							
46	Sulfuric Acid Air Heater						0.2	0.2
47	Alkylation Unit Compressor, C-2	neg	neg	neg	neg	neg	neg	neg
48	Alkylation Unit Compressor, C-4	neg	neg	neg	neg	neg	neg	neg
49	Alkylation Unit Compressor, C-59	neg	neg	neg	neg	neg	neg	neg
50	No. 1 CRU Compressor, C-80	neg	neg	neg	neg	neg	neg	neg
51	No. 1 CRU Compressor, C-81	neg	neg	neg	neg	neg	neg	neg
52	No. 1 CRU Compressor, C-82	neg	neg	neg	neg	neg	neg	neg
53	CD HDS Heater							0.6
54	HVGO HDS Heater							0.6
55	Sulfur Plant							0.4
56	New Premium Coker Heater							2.6
TOTAL		1035.9	1101.7	1020.8	988.8	430.4	796.2	888.0

* For each of three years

MCD 000002097

LAKE CHARLES REFINERY

SO₂ EMISSIONS
(tons per year)

EQ No.	Unit	1976	1977	1978	1979	1980	1981- 1983*	1984
1	No. 1 CTU, H-1	440.4	355.6	371.8	307.8	192.6	down	down
2	Thermal Cracker, H-2	114.7	118.2	205.7	147.9	96.5	190.9	190.9
3	Thermal Cracker, H-3	125.6	133.1	135.6	128.0	88.9	7.1	7.1
4	No. 2 CTU, H-4	337.6	343.3	295.4	293.4	32.2	147.6	147.6
5	No. 2 CTU, H-5	337.6	343.3	295.4	293.4	334.5	147.6	147.6
6	FCC, H-6	199.5	290.2	213.1	228.2	157.8	76.3	76.3
7	No. 2 TCC, H-7	445.5	393.5	351.4	360.5	99.0	down	down
8	Heating Oil Belt, H-9	242.4	219.8	309.2	325.9	192.2	168.6	168.6
9	Heating Oil Belt, H-10	spare	spare	spare	spare	spare	spare	spare
10	No. 1 CRU, H-11	55.3	60.3	50.5	48.8	34.7	2.9	2.9
11	No. 1 CRU, H-12	55.3	60.3	50.5	48.8	34.7	2.9	2.9
12	No. 1 CRU, H-13	87.5	71.5	79.5	91.7	59.0	1.7	1.7
13	Premium Coker, H-18	380.8	416.1	430.4	404.2	256.4	9.5	9.5
14	No. 2 CRU, H-21	207.8	202.8	206.0	214.3	203.7	6.9	6.9
15	No. 2 CRU, H-22	148.4	144.8	147.2	153.1	145.5	5.0	5.0
16	No. 2 CRU, H-23	67.8	66.2	67.3	70.0	66.5	2.3	2.3
17	Naphtha Desulfurizer, H-24	109.7	109.6	97.5	85.4	95.4	3.8	3.8
18	Low Pressure Boiler, B-1	168.8	171.9	148.4	108.5	173.3	spare	spare
19	Low Pressure Boiler, B-2	269.1	147.9	41.9	1.4	0.0	spare	spare
20	Low Pressure Boiler, B-3	135.1	183.8	166.5	139.1	154.2	spare	spare
21	Low Pressure Boiler, B-4	211.3	189.0	176.3	146.1	178.1	spare	spare
22	High Pressure Boiler, B-5	528.5	561.6	488.1	484.6	554.9	254.5	254.5
23	High Pressure Boiler, B-6	544.7	456.8	423.7	428.4	0.0	254.5	254.5
24-29	No. 1 and No. 2 TCC	525.4	564.0	481.7	493.8	down	down	down
30	Calciner Waste Heat Boiler, B-7	1325.9	1244.3	1185.5	1067.5	989.1	1207.7	1207.7
31-33	Flare and Blowdowns	1789.8	2045.8	1710.4	1817.5	303.4	797.8	797.8
34	Gasoline Tanks							
35	Crude Tanks							
36	Fugitive Hydrocarbon Emissions							
37	New Crude Unit Heater						529.6	529.6
38	New Vacuum Unit Heater						81.7	81.7
39	New Distillate Desulfurizer Heater						3.4	3.4
40	New Gas Oil Desulfurizer Heater						3.4	3.4
41	New FCC Regenerator					942.7	2698.0	2698.0
42	New Sulfuric Acid Plant						182.5	182.5
43	Feedstock Tankage							
44	New Regular Coker							515.3
45	New Flare Facilities							
46	Sulfuric Acid Air Heater						0.5	0.5
47	Alkylation Unit Compressor, C-2	0.1	0.4	0.3	0.4	0.2	0.5	0.5
48	Alkylation Unit Compressor, C-4	0.1	0.4	0.3	0.4	0.2	0.5	0.5
49	Alkylation Unit Compressor, C-59	0.4	0.4	0.4	0.5	0.3	0.6	0.6
50	No. 1 CRU Compressor, C-80	0.3	0.3	0.3	0.4	0.2	0.2	0.2
51	No. 1 CRU Compressor, C-81	0.3	0.3	0.3	0.4	0.2	0.2	0.2
52	No. 1 CRU Compressor, C-82	0.3	0.3	0.3	0.4	0.2	0.2	0.2
53	CD HDS Heater							1.6
54	HVGO HDS Heater							1.5
55	Sulfur Plant							100.4
56	New Premium Coker Heater							6.0
TOTAL		8856.0	8895.8	8130.9	7890.8	5386.6	6788.9	7413.7

* For each of three years

MCD 000002098

LAKE CHARLES REFINERY

NO₂ EMISSIONS
(tons per year)

EQ No.	Unit	1976	1977	1978	1979	1980	1981- 1983*	1984
1	No. 1 CTU, H-1	130.0	105.0	112.6	91.0	57.1	down	down
2	Thermal Cracker, H-2	33.9	34.9	69.0	46.6	29.7	103.0	103.0
3	Thermal Cracker, H-3	37.1	39.3	40.0	37.8	26.2	69.4	69.4
4	No. 2 CTU, H-4	99.8	102.8	92.6	88.6	101.5	80.0	80.0
5	No. 2 CTU, H-5	99.8	102.8	92.6	88.6	101.5	80.0	80.0
6	FCC, H-6	58.9	87.1	66.8	69.3	46.6	41.3	41.3
7	No. 2 TCC, H-7	131.5	116.3	105.3	106.7	29.2	down	down
8	Heating Oil Belt, H-9	71.6	66.6	111.7	101.4	60.0	103.9	103.9
9	Heating Oil Belt, H-10	spare	spare	spare	spare	spare	spare	spare
10	No. 1 CRU, H-11	16.3	17.8	14.9	14.4	10.3	28.4	28.4
11	No. 1 CRU, H-12	16.3	17.8	14.9	14.4	10.3	28.4	28.4
12	No. 1 CRU, H-13	25.8	21.1	23.5	27.1	17.4	16.6	16.6
13	Premium Coker, H-18	112.4	122.8	127.0	119.3	75.7	93.9	93.9
14	No. 2 CRU, H-21	61.3	59.8	60.8	63.2	60.1	67.5	67.5
15	No. 2 CRU, H-22	43.8	42.8	43.4	45.2	43.0	48.9	48.9
16	No. 2 CRU, H-23	20.0	19.5	19.9	20.6	19.6	22.5	22.5
17	Naphtha Desulfurizer, H-24	32.4	32.4	28.8	25.2	28.2	37.2	37.2
18	Low Pressure Boiler, B-1	49.8	51.4	45.9	32.1	51.1	spare	spare
19	Low Pressure Boiler, B-2	79.4	44.4	12.8	0.4	0.0	spare	spare
20	Low Pressure Boiler, B-3	39.9	55.7	52.5	41.3	45.5	spare	spare
21	Low Pressure Boiler, B-4	62.4	56.6	56.7	44.2	52.6	spare	spare
22	High Pressure Boiler, B-5	156.0	165.8	150.5	143.1	163.8	156.5	156.5
23	High Pressure Boiler, B-6	160.8	134.8	136.7	127.8	0.0	156.5	156.5
24-29	No. 1 and No. 2 TCC	81.8	79.8	72.4	70.3	down	down	down
30	Calciner Waste Heat Boiler, B-7	340.0	319.9	303.5	271.2	253.1	349.6	349.6
31-33	Flare and Blowdowns	298.0	303.3	287.8	288.8	213.2	560.5	560.5
34	Gasoline Tanks							
35	Crude Tanks							
36	Fugitive Hydrocarbon Emissions							
37	New Crude Unit Heater						301.2	301.2
38	New Vacuum Unit Heater						45.4	45.4
39	New Distillate Desulfurizer Heater						24.5	24.5
40	New Gas Oil Desulfurizer Heater						24.5	24.5
41	New FCC Regenerator					135.8	388.6	388.6
42	New Sulfuric Acid Plant						0.0	0.0
43	Feedstock Tankage							
44	New Regular Coker							260.4
45	New Flare Facilities							
46	Sulfuric Acid Air Heater						3.8	3.8
47	Alkylation Unit Compressor, C-2	35.9	47.9	34.9	49.6	26.2	57.8	57.8
48	Alkylation Unit Compressor, C-4	35.9	47.9	34.9	49.6	26.2	57.8	57.8
49	Alkylation Unit Compressor, C-59	44.0	58.7	42.8	60.8	32.1	72.3	72.3
50	No. 1 CRU Compressor, C-80	38.5	36.8	34.2	48.8	24.8	28.9	28.9
51	No. 1 CRU Compressor, C-81	38.5	36.8	34.2	48.8	24.8	28.9	28.9
52	No. 1 CRU Compressor, C-82	38.5	36.8	34.2	48.8	24.8	28.9	28.9
53	CD HDS Heater							12.1
54	HVGO HDS Heater							11.2
55	Sulfur Plant							7.2
56	New Premium Coker Heater							44.6
TOTAL		2490.3	2465.4	2357.8	2285.0	1790.4	3106.7	3442.2

* For each of three years

MCD 000002099

LAKE CHARLES REFINERY

HC EMISSIONS
(tons per year)

EIQ No.	Unit	1976	1977	1978	1979	1980	1981-1983*	1984
1	No. 1 CTU, H-1	1.7	1.4	1.5	1.2	0.8	down	down
2	Thermal Cracker, H-2	0.4	0.4	1.0	0.6	0.4	1.6	1.6
3	Thermal Cracker, H-3	0.5	0.5	0.5	0.5	0.3	0.9	0.9
4	No. 2 CTU, H-4	1.3	1.4	1.3	1.2	1.4	1.2	1.2
5	No. 2 CTU, H-5	1.3	1.4	1.3	1.2	1.4	1.2	1.2
6	FCC, H-6	0.8	1.2	0.9	0.9	0.6	0.7	0.7
7	No. 2 TCC, H-7	1.7	1.5	1.4	1.4	0.4	down	down
8	Heating Oil Belt, H-9	0.9	0.9	1.8	1.4	0.8	1.5	1.5
9	Heating Oil Belt, H-10	spare	spare	spare	spare	spare	spare	spare
10	No. 1 CRU, H-11	0.2	0.2	0.2	0.2	0.1	0.4	0.4
11	No. 1 CRU, H-12	0.2	0.2	0.2	0.2	0.1	0.4	0.4
12	No. 1 CRU, H-13	0.3	0.3	0.3	0.4	0.2	0.2	0.2
13	Premium Coker, H-18	1.5	1.6	1.7	1.6	1.0	1.2	1.2
14	No. 2 CRU, H-21	0.8	0.8	0.8	0.8	0.8	0.9	0.9
15	No. 2 CRU, H-22	0.6	0.6	0.6	0.6	0.6	0.6	0.6
16	No. 2 CRU, H-23	0.3	0.2	0.3	0.3	0.3	0.3	0.3
17	Naphtha Desulfurizer, H-24	0.4	0.4	0.4	0.3	0.4	0.5	0.5
18	Low Pressure Boiler, B-1	0.6	0.7	0.6	0.4	0.7	spare	spare
19	Low Pressure Boiler, B-2	1.0	0.6	0.2	<0.1	0.0	spare	spare
20	Low Pressure Boiler, B-3	0.5	0.8	0.7	0.5	0.6	spare	spare
21	Low Pressure Boiler, B-4	0.8	0.8	0.8	0.6	0.7	spare	spare
22	High Pressure Boiler, B-5	2.0	2.2	2.1	1.9	2.1	2.4	2.4
23	High Pressure Boiler, B-6	2.1	1.8	2.0	1.7	0.0	2.4	2.4
24-29	No. 1 and No. 2 TCC	283.6	335.0	270.1	291.9	down	down	down
30	Calciner Waste Heat Boiler, B-7	5.5	5.1	4.9	4.4	4.1	5.6	5.6
31-33	Flare and Blowdowns	12.6	12.8	12.2	12.2	9.0	23.7	23.7
34	Gasoline Tanks							
35	Crude Tanks							
36	Fugitive Hydrocarbon Emissions							
37	New Crude Unit Heater						5.1	5.1
38	New Vacuum Unit Heater						0.8	0.8
39	New Distillate Desulfurizer Heater						0.4	0.4
40	New Gas Oil Desulfurizer Heater						0.4	0.4
41	New FCC Regenerator				neg	neg	neg	
42	New Sulfuric Acid Plant						0.0	0.0
43	Feedstock Tankage							
44	New Regular Coker							4.4
45	New Flare Facilities							
46	Sulfuric Acid Air Heater						0.1	0.1
47	Alkylation Unit Compressor, C-2	14.8	19.7	14.4	20.4	10.8	23.8	23.8
48	Alkylation Unit Compressor, C-4	14.8	19.7	14.4	20.4	10.8	23.8	23.8
49	Alkylation Unit Compressor, C-59	18.1	24.2	17.6	25.0	13.2	29.8	29.8
50	No. 1 CRU Compressor, C-80	15.8	15.2	14.1	20.1	10.2	11.9	11.9
51	No. 1 CRU Compressor, C-81	15.8	15.2	14.1	20.1	10.2	11.9	11.9
52	No. 1 CRU Compressor, C-82	15.8	15.2	14.1	20.1	10.2	11.9	11.9
53	CD HDS Heater							0.2
54	HVGO HDS Heater							0.2
55	Sulfur Plant							0.1
56	New Premium Coker Heater							0.8
TOTAL		416.7	482.0	396.5	452.5	92.2	165.6	171.3

* For each of three years

MCD 000002100

LAKE CHARLES REFINERY

CO EMISSIONS
(tons per year)

EQ No.	Unit	1976	1977	1978	1979	1980	1981- 1983*	1984
1	No. 1 CTU, H-1	9.6	7.7	8.4	6.7	4.5	down	down
2	Thermal Cracker, H-2	2.5	2.6	5.4	3.6	2.2	8.3	8.3
3	Thermal Cracker, H-3	2.7	2.9	3.0	2.8	1.9	5.1	5.1
4	No. 2 CTU, H-4	7.4	7.7	7.1	6.6	7.6	6.4	6.4
5	No. 2 CTU, H-5	7.4	7.7	7.1	6.6	7.6	6.4	6.4
6	FCC, H-6	4.4	6.5	5.1	4.8	3.4	3.3	3.3
7	No. 2 TCC, H-7	9.7	8.6	7.8	7.9	2.2	down	down
8	Heating Oil Belt, H-9	5.3	5.0	9.1	7.7	4.6	8.2	8.2
9	Heating Oil Belt, H-10	spare	spare	spare	spare	spare	spare	spare
10	No. 1 CRU, H-11	1.2	1.3	1.1	1.1	0.8	2.1	2.1
11	No. 1 CRU, H-12	1.2	1.3	1.1	1.1	0.8	2.1	2.1
12	No. 1 CRU, H-13	1.9	1.6	1.7	2.0	1.3	1.2	1.2
13	Premium Coker, H-18	8.3	9.1	9.4	8.8	5.6	6.9	6.9
14	No. 2 CRU, H-21	4.5	4.4	4.5	4.7	4.4	5.0	5.0
15	No. 2 CRU, H-22	3.2	3.2	3.2	3.3	3.2	3.6	3.6
16	No. 2 CRU, H-23	1.5	1.4	1.5	1.5	1.4	1.7	1.7
17	Naphtha Desulfurizer, H-24	2.4	2.4	2.1	1.9	2.1	2.7	2.7
18	Low Pressure Boiler, B-1	3.7	3.8	3.5	2.4	3.8	spare	spare
19	Low Pressure Boiler, B-2	5.9	3.3	1.0	<0.1	0.0	spare	spare
20	Low Pressure Boiler, B-3	3.0	4.2	4.0	3.1	3.4	spare	spare
21	Low Pressure Boiler, B-4	4.6	4.2	4.4	3.3	3.9	spare	spare
22	High Pressure Boiler, B-5	11.5	12.2	11.4	10.6	12.1	12.5	12.5
23	High Pressure Boiler, B-6	11.9	10.0	10.6	9.5	0.0	12.5	12.5
24-29	No. 1 and No. 2 TCC	12353.3	14601.0	11769.0	12721.8	down	down	down
30	Calciner Waste Heat Boiler, B-7	19.9	18.8	17.7	15.6	14.8	20.3	20.3
31-33	Flare and Blowdowns	67.8	69.0	65.5	65.7	48.5	127.5	127.5
34	Gasoline Tanks							
35	Crude Tanks							
36	Fugitive Hydrocarbon Emissions							
37	New Crude Unit Heater						26.5	26.5
38	New Vacuum Unit Heater						3.9	3.9
39	New Distillate Desulfurizer Heater						2.4	2.4
40	New Gas Oil Desulfurizer Heater						2.4	2.4
41	New FCC Regenerator					neg	neg	neg
42	New Sulfuric Acid Plant						0.0	0.0
43	Feedstock Tankage							
44	New Regular Coker							22.6
45	New Flare Facilities							
46	Sulfuric Acid Air Heater						0.4	0.4
47	Alkylation Unit Compressor, C-2	4.5	6.0	4.4	6.3	3.3	7.3	7.3
48	Alkylation Unit Compressor, C-4	4.5	6.0	4.4	6.3	3.3	7.3	7.3
49	Alkylation Unit Compressor, C-59	5.6	7.4	5.4	7.7	4.1	9.1	9.1
50	No. 1 CRU Compressor, C-80	4.9	4.6	4.3	6.2	3.1	3.7	3.7
51	No. 1 CRU Compressor, C-81	4.9	4.6	4.3	6.2	3.1	3.7	3.7
52	No. 1 CRU Compressor, C-82	4.9	4.6	4.3	6.2	3.1	3.7	3.7
53	CD HDS Heater							1.2
54	HVGO HDS Heater							1.1
55	Sulfur Plant							0.7
56	New Premium Coker Heater							4.3
TOTAL		12584.1	14833.1	11991.8	12942.0	160.1	306.2	336.1

* For each of three years

MCD 000002101