

ภาคผนวก ง

ใบรับรองผลการตรวจวัดคุณภาพสิ่งแวดล้อม

ใบรับรองผลการตรวจวัดคุณภาพอากาศในบรรยากาศ



Ambient Air Monitoring Results : Sulfur dioxide MTR-SPRC PLC-Refinery

Location : With in the Refinery Plant, North Monitor Period : 18-25 Apr 2022
Analyzer Model : API 100A Station No : SS2-09
Serial No : 347 Site Operator : Mr.Supakit Tamooka

Calibrator Model : Teledyne 700E Serial No : 587
Calibration Gas Cylinder I.D.: EB0108319
Certified Date : 13 Jan 2022 Cal Concentration (ppb) : 0,100,200,400
Expire Date : 12 Jan 2023

Time	SO2 Concentration (ppb)						
	18-19 Apr 2022	19-20 Apr 2022	20-21 Apr 2022	21-22 Apr 2022	22-23 Apr 2022	23-24 Apr 2022	24-25 Apr 2022
09:00 - 10:00	3.3	2.5	1.2	2.8	1.2	1.6	3.5
10:00 - 11:00	6.9	1.9	1.9	2.1	1.5	1.2	1.4
11:00 - 12:00	6.7	1.5	2.6	4.4	1.1	1.4	3.3
12:00 - 13:00	6.9	2.6	2.9	2.4	1.3	1.5	1.2
13:00 - 14:00	6.2	2.4	1.8	2.2	1.4	1.5	1.3
14:00 - 15:00	5.8	3.0	2.0	2.9	1.6	1.4	2.1
15:00 - 16:00	0.3	3.7	2.1	2.8	2.3	1.0	1.9
16:00 - 17:00	2.7	3.3	2.3	4.1	0.9	0.2	2.4
17:00 - 18:00	2.6	3.6	1.5	2.3	1.5	1.8	4.0
18:00 - 19:00	1.7	3.1	0.8	1.6	2.4	1.3	0.8
19:00 - 20:00	1.2	2.5	0.5	2.5	1.3	0.1	1.6
20:00 - 21:00	1.5	4.1	0.4	2.0	0.9	1.5	1.5
21:00 - 22:00	2.7	2.9	0.1	2.3	2.0	0.8	2.6
22:00 - 23:00	1.2	3.2	0.9	1.2	0.6	0.5	2.4
23:00 - 00:00	3.5	5.6	0.7	0.1	0.5	1.0	2.3
00:00 - 01:00	0.7	0.8	1.2	1.7	0.9	1.1	1.4
01:00 - 02:00	1.3	2.1	0.3	1.1	1.1	0.7	0.3
02:00 - 03:00	1.4	0.3	2.7	0.1	1.1	0.5	0.4
03:00 - 04:00	0.2	4.8	0.7	1.5	0.3	0.4	4.5
04:00 - 05:00	2.6	4.6	0.4	1.2	0.8	0.7	0.2
05:00 - 06:00	5.0	4.5	0.6	0.7	0.4	0.3	1.4
06:00 - 07:00	2.4	5.3	0.7	1.1	0.5	1.7	5.8
07:00 - 08:00	2.1	4.6	0.4	1.3	0.8	0.6	0.1
08:00 - 09:00	2.9	4.2	0.6	1.3	1.0	2.4	2.2
Average-24Hr*	3.0	3.2	1.2	1.9	1.1	1.1	2.0
Max-1Hr	6.9	5.6	2.9	4.4	2.4	2.4	5.8
Min-1Hr	0.2	0.3	0.1	0.1	0.3	0.1	0.1
Standard-1Hr	300 ppb(780 ug/cu.m)						
Standard-24Hr	120 ppb(300 ug/cu.m)						

Remark : * Average time between 09:00-09:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

Preeda S.
(Miss Preeda Somjai)
Technical Management Team



Ambient Air Monitoring Results : Sulfur dioxide MTR-SPRC PLC-Refinery

Location : Map Ta Phut New Town Monitor Period : 18-25 Apr 2022
Analyzer Model : API 100A Station No : SS2-01
Serial No : 382 Site Operator : Mr.Supakit Tamooka

Calibrator Model : Teledyne 700E Serial No : 587
Calibration Gas Cylinder I.D.: EB0108319
Certified Date : 13 Jan 2022 Cal Concentration (ppb) : 0,100,200,400
Expire Date : 12 Jan 2023

Time	SO2 Concentration (ppb)						
	18-19 Apr 2022	19-20 Apr 2022	20-21 Apr 2022	21-22 Apr 2022	22-23 Apr 2022	23-24 Apr 2022	24-25 Apr 2022
13:00 - 14:00	3.6	1.3	3.2	3.5	1.7	3.9	1.6
14:00 - 15:00	1.6	0.1	3.3	4.7	3.7	4.0	2.3
15:00 - 16:00	0.3	1.3	3.1	2.1	2.8	3.6	2.9
16:00 - 17:00	0.7	2.2	3.1	4.3	2.0	3.2	2.0
17:00 - 18:00	0.3	1.7	4.3	1.8	2.3	3.1	2.5
18:00 - 19:00	0.9	1.7	2.0	2.2	2.2	2.6	2.5
19:00 - 20:00	0.4	1.8	1.8	1.6	2.1	2.2	2.6
20:00 - 21:00	0.3	1.8	1.1	1.7	2.1	3.5	2.3
21:00 - 22:00	0.6	2.2	1.1	1.8	1.0	4.0	4.6
22:00 - 23:00	0.6	2.2	1.0	1.3	1.4	3.3	0.1
23:00 - 00:00	0.4	2.1	0.9	3.3	0.8	3.2	0.4
00:00 - 01:00	1.5	1.9	0.5	3.3	1.0	2.2	2.8
01:00 - 02:00	2.4	2.3	0.6	3.6	1.5	1.7	2.9
02:00 - 03:00	1.8	2.5	0.8	3.5	1.0	1.7	2.2
03:00 - 04:00	2.2	2.6	0.9	2.2	1.1	1.8	3.5
04:00 - 05:00	1.6	2.6	1.0	1.7	1.4	1.8	2.7
05:00 - 06:00	1.7	3.3	1.1	1.7	0.9	3.8	2.2
06:00 - 07:00	1.8	3.0	1.3	1.8	0.2	3.7	2.1
07:00 - 08:00	1.3	2.6	1.4	1.8	3.3	3.4	1.6
08:00 - 09:00	3.3	2.6	1.2	3.8	2.2	3.2	2.7
09:00 - 10:00	3.3	2.8	1.3	3.7	2.0	3.7	3.3
10:00 - 11:00	3.6	3.3	4.4	3.4	3.5	0.2	2.9
11:00 - 12:00	1.7	3.1	2.4	3.2	2.8	0.1	3.1
12:00 - 13:00	2.1	2.8	1.6	2.3	3.2	0.0	3.1
Average-24Hr*	1.6	2.2	1.8	2.7	1.9	2.7	2.5
Max-1Hr	3.6	3.3	4.4	4.7	3.7	4.0	4.6
Min-1Hr	0.3	0.1	0.5	1.3	0.2	0.0	0.1
Standard-1Hr	300 ppb(780 ug/cu.m)						
Standard-24Hr	120 ppb(300 ug/cu.m)						

Remark : * Average time between 13:00-13:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

Preeda S.
(Miss Preeda Somjai)
Technical Management Team



Ambient Air Monitoring Results : Sulfur dioxide MTR-SPRC PLC-Refinery

Location : Ban Pong Community Monitor Period : 18-25 Apr 2022
Analyzer Model : Teledyne T100 Station No : 16
Serial No : 2010 Site Operator : Mr.Supakit Tamooka

Calibrator Model : Teledyne 700E Serial No : 587
Calibration Gas Cylinder I.D.: EB0108319
Certified Date : 13 Jan 2022 Cal Concentration (ppb) : 0,100,200,400
Expire Date : 12 Jan 2023

Time	SO2 Concentration (ppb)						
	18-19 Apr 2022	19-20 Apr 2022	20-21 Apr 2022	21-22 Apr 2022	22-23 Apr 2022	23-24 Apr 2022	24-25 Apr 2022
13:00 - 14:00	2.5	1.9	0.3	2.9	4.3	0.4	1.7
14:00 - 15:00	2.0	1.7	0.6	2.7	2.5	0.2	1.5
15:00 - 16:00	1.2	1.8	1.3	2.5	1.4	0.2	1.5
16:00 - 17:00	0.7	3.0	1.4	2.5	2.5	0.3	0.6
17:00 - 18:00	0.3	2.9	1.9	2.5	2.5	0.2	0.2
18:00 - 19:00	0.6	2.7	2.9	3.0	2.5	0.3	1.6
19:00 - 20:00	1.3	2.5	2.6	4.9	2.5	0.4	0.4
20:00 - 21:00	1.4	2.5	3.5	3.5	3.0	0.3	1.4
21:00 - 22:00	1.9	2.5	1.2	2.2	2.5	0.5	1.2
22:00 - 23:00	2.9	3.0	1.4	2.5	2.2	0.5	2.7
23:00 - 00:00	2.6	3.5	2.5	2.0	2.4	0.6	2.5
00:00 - 01:00	3.5	3.4	2.9	1.2	2.1	2.8	1.4
01:00 - 02:00	1.2	2.6	5.6	0.7	2.0	0.5	1.9
02:00 - 03:00	2.6	3.4	3.4	0.3	2.0	1.0	2.5
03:00 - 04:00	3.7	6.1	4.0	0.6	1.7	2.6	2.1
04:00 - 05:00	4.3	5.1	3.8	1.3	1.5	2.5	3.5
05:00 - 06:00	2.5	5.9	1.9	1.4	1.5	2.5	2.2
06:00 - 07:00	1.4	2.7	1.8	1.9	2.5	3.1	2.2
07:00 - 08:00	2.5	2.3	1.7	2.9	2.5	4.3	1.3
08:00 - 09:00	1.8	2.2	1.8	2.6	2.6	2.4	1.9
09:00 - 10:00	1.9	2.5	1.9	3.5	3.0	3.6	1.2
10:00 - 11:00	1.8	2.0	2.2	1.2	1.1	4.0	1.4
11:00 - 12:00	1.7	1.2	2.4	2.6	0.2	2.6	0.3
12:00 - 13:00	1.8	0.7	3.0	3.7	0.2	2.0	0.2
Average-24Hr*	2.0	2.8	2.3	2.3	2.1	1.6	1.6
Max-1Hr	4.3	6.1	5.6	4.9	4.3	4.3	3.5
Min-1Hr	0.3	0.7	0.3	0.3	0.2	0.2	0.2
Standard-1Hr	300 ppb(780 ug/cu.m)						
Standard-24Hr	120 ppb(300 ug/cu.m)						

Remark : * Average time between 13:00-13:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

Preeda S.
(Miss Preeda Somjai)
Technical Management Team



Ambient Air Monitoring Results : Nitrogen dioxide MTR-SPRC PLC-Refinery

Location : With in the Refinery Plant, North Monitor Period : 18-25 Apr 2022
Analyzer Model : API 200A Station No : SS2-09
Serial No : 1523 Site Operator : Mr.Supakit Tamooka

Calibrator Model : Teledyne 700E Serial No : 587
Calibration Gas Cylinder I.D.: EB0108319
Certified Date : 13 Jan 2022 Cal Concentration (ppb) : 0,100,200,400
Expire Date : 12 Jan 2023

Time	NO2 Concentration (ppb)						
	18-19 Apr 2022	19-20 Apr 2022	20-21 Apr 2022	21-22 Apr 2022	22-23 Apr 2022	23-24 Apr 2022	24-25 Apr 2022
09:00 - 10:00	3.6	5.0	3.8	3.7	3.2	4.0	3.4
10:00 - 11:00	3.4	10.6	5.5	2.8	3.0	3.7	3.5
11:00 - 12:00	3.2	3.5	4.2	1.1	4.8	3.8	6.3
12:00 - 13:00	3.4	3.4	8.6	0.7	1.8	5.2	7.2
13:00 - 14:00	3.5	4.7	7.4	1.6	2.6	2.6	6.2
14:00 - 15:00	2.2	1.6	1.1	2.5	4.0	1.9	10.5
15:00 - 16:00	1.6	0.9	1.1	3.3	3.4	2.0	9.4
16:00 - 17:00	1.6	8.8	1.2	1.1	2.9	2.3	5.2
17:00 - 18:00	3.0	9.3	1.3	3.2	2.3	3.2	4.7
18:00 - 19:00	2.1	2.8	2.1	1.7	4.6	2.9	5.6
19:00 - 20:00	3.2	1.9	1.9	0.8	6.8	2.6	2.1
20:00 - 21:00	2.6	2.1	1.5	3.7	3.9	6.3	3.5
21:00 - 22:00	2.8	5.4	2.7	2.9	3.7	5.2	7.9
22:00 - 23:00	3.3	1.4	1.8	6.7	3.6	4.8	4.2
23:00 - 00:00	3.1	1.4	2.7	2.1	4.6	3.5	5.2
00:00 - 01:00	4.3	1.5	2.2	0.9	5.0	2.8	7.4
01:00 - 02:00	2.7	0.9	1.9	2.9	3.7	1.9	6.9
02:00 - 03:00	2.4	0.9	1.3	2.9	3.7	2.3	7.4
03:00 - 04:00	2.0	2.5	1.4	2.2	4.2	2.1	6.2
04:00 - 05:00	6.6	1.2	1.2	1.9	3.7	7.3	6.3
05:00 - 06:00	1.5	1.9	1.5	1.3	3.9	5.2	7.5
06:00 - 07:00	2.2	2.4	1.9	2.1	3.6	9.5	8.8
07:00 - 08:00	2.4	4.5	1.9	1.9	3.5	4.2	6.3
08:00 - 09:00	8.2	2.5	5.6	1.5	3.6	4.7	6.1
Average-24Hr*	3.1	3.4	2.7	2.3	3.8	3.9	6.2
Max-1Hr	8.2	10.6	8.6	6.7	6.8	9.5	10.5
Min-1Hr	1.5	0.9	1.1	0.7	1.8	1.9	2.1
Standard-1Hr	170 ppb(320 ug/cu.m)						
Standard-24Hr							

Remark : * Average time between 09:00-09:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

Preeda S.
(Miss Preeda Somjai)
Technical Management Team



Ambient Air Monitoring Results : Nitrogen dioxide MTR-SPRC PLC-Refinery

Location : Map Ta Phut New Town Monitor Period : 18-25 Apr 2022
Analyzer Model : API 200A Station No : SS2-01
Serial No : 074 Site Operator : Mr.Supakit Tamooka

Calibrator Model : Teledyne 700E Serial No : 587
Calibration Gas Cylinder I.D.: EB0108319
Certified Date : 13 Jan 2022 Cal Concentration (ppb) : 0,100,200,400
Expire Date : 12 Jan 2023

Time	NO2 Concentration (ppb)						
	18-19 Apr 2022	19-20 Apr 2022	20-21 Apr 2022	21-22 Apr 2022	22-23 Apr 2022	23-24 Apr 2022	24-25 Apr 2022
13:00 - 14:00	14.5	7.9	7.6	18.5	14.6	8.1	4.9
14:00 - 15:00	13.6	8.4	8.2	17.4	8.6	8.4	4.8
15:00 - 16:00	16.8	9.7	17.4	6.0	9.3	8.8	5.0
16:00 - 17:00	18.6	18.5	14.2	6.1	18.5	9.4	7.4
17:00 - 18:00	17.6	11.8	16.8	4.6	6.4	9.9	11.1
18:00 - 19:00	15.8	9.6	18.6	5.2	6.5	9.5	14.4
19:00 - 20:00	13.5	8.5	18.4	6.1	8.6	9.4	13.6
20:00 - 21:00	12.8	7.4	7.0	8.2	8.6	7.7	5.1
21:00 - 22:00	11.7	7.3	6.5	5.1	6.8	7.1	3.8
22:00 - 23:00	11.0	6.3	6.4	3.8	5.1	6.0	2.8
23:00 - 00:00	8.9	4.0	5.8	2.8	3.6	6.0	2.2
00:00 - 01:00	11.0	6.3	5.9	2.2	4.3	6.7	3.3
01:00 - 02:00	8.6	4.2	8.1	3.3	5.4	6.8	5.6
02:00 - 03:00	8.3	4.7	7.4	5.6	6.9	6.0	6.3
03:00 - 04:00	8.2	6.8	5.3	6.3	5.4	5.7	7.7
04:00 - 05:00	8.6	5.3	4.9	7.7	6.7	6.0	6.7
05:00 - 06:00	9.3	6.4	4.3	9.2	7.9	6.0	6.8
06:00 - 07:00	10.1	5.2	5.7	11.3	7.0	7.0	6.0
07:00 - 08:00	10.5	5.7	3.4	7.1	5.9	4.7	5.7
08:00 - 09:00	10.8	7.5	3.1	8.0	7.5	7.9	7.9
09:00 - 10:00	11.2	15.3	6.8	9.4	10.0	13.7	9.1
10:00 - 11:00	5.1	20.4	8.2	17.9	10.2	10.8	9.3
11:00 - 12:00	9.4	11.2	12.3	19.3	8.1	6.9	10.9
12:00 - 13:00	8.6	14.9	14.6	15.3	7.7	5.5	9.4
Average-24Hr*	11.4	8.9	9.0	8.6	7.9	7.7	7.1
Max-1Hr	18.6	20.4	18.5	19.3	18.5	13.7	14.4
Min-1Hr	5.1	4.0	3.1	2.2	3.6	4.7	2.2
Standard-1Hr	170 ppb(320 ug/cu.m)						
Standard-24Hr							

Remark : * Average time between 13:00-13:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

(Miss Preeda Somjai)
Technical Management Team



Ambient Air Monitoring Results : Nitrogen dioxide MTR-SPRC PLC-Refinery

Location : Ban Plong Community Monitor Period : 18-25 Apr 2022
Analyzer Model : API 200A Station No : 16
Serial No : 2385 Site Operator : Mr.Supakit Tamooka

Calibrator Model : Teledyne 700E Serial No : 587
Calibration Gas Cylinder I.D.: EB0108319
Certified Date : 13 Jan 2022 Cal Concentration (ppb) : 0,100,200,400
Expire Date : 12 Jan 2023

Time	NO2 Concentration (ppb)						
	18-19 Apr 2022	19-20 Apr 2022	20-21 Apr 2022	21-22 Apr 2022	22-23 Apr 2022	23-24 Apr 2022	24-25 Apr 2022
13:00 - 14:00	16.9	11.3	18.5	19.1	11.7	21.5	14.0
14:00 - 15:00	14.4	12.2	23.5	19.6	10.6	19.7	17.6
15:00 - 16:00	16.0	12.6	18.0	23.8	8.1	15.3	10.1
16:00 - 17:00	12.4	12.2	17.6	19.5	8.4	11.6	10.9
17:00 - 18:00	5.8	9.9	23.0	24.4	9.2	24.4	9.5
18:00 - 19:00	13.9	10.8	19.8	16.5	9.0	12.9	12.1
19:00 - 20:00	18.8	13.6	24.0	20.8	9.4	14.4	12.5
20:00 - 21:00	10.6	13.5	17.2	15.5	11.4	26.0	12.5
21:00 - 22:00	11.5	6.5	11.3	11.7	9.9	21.5	5.4
22:00 - 23:00	8.5	5.0	10.5	21.5	5.6	10.5	6.9
23:00 - 00:00	6.8	8.0	11.9	8.5	4.8	4.6	5.7
00:00 - 01:00	1.7	7.0	9.8	9.4	5.3	3.6	7.6
01:00 - 02:00	2.3	2.6	10.5	5.5	6.1	4.9	5.9
02:00 - 03:00	4.9	6.8	6.8	6.9	6.3	7.8	5.5
03:00 - 04:00	5.7	5.1	8.9	5.0	6.4	9.5	5.6
04:00 - 05:00	9.4	11.5	11.7	8.4	6.4	19.6	10.9
05:00 - 06:00	9.2	12.4	10.8	16.1	4.4	12.5	19.8
06:00 - 07:00	10.4	22.7	13.2	11.1	9.7	8.6	23.3
07:00 - 08:00	10.9	21.3	11.7	11.3	10.3	19.9	14.9
08:00 - 09:00	16.6	13.0	10.8	11.0	19.3	13.7	11.8
09:00 - 10:00	7.0	17.1	13.2	20.1	21.9	27.0	10.9
10:00 - 11:00	17.1	18.4	21.9	17.5	18.8	21.9	10.3
11:00 - 12:00	15.5	13.3	18.8	18.2	19.7	19.6	10.4
12:00 - 13:00	12.2	11.7	19.7	13.7	19.5	17.4	12.0
Average-24Hr*	10.8	11.6	15.1	14.8	10.5	15.4	11.1
Max-1Hr	18.8	22.7	24.0	24.4	21.9	27.0	23.3
Min-1Hr	1.7	2.6	6.8	5.0	4.4	3.6	5.4
Standard-1Hr	170 ppb(320 ug/cu.m)						
Standard-24Hr							

Remark : * Average time between 13:00-13:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

(Miss Preeda Somjai)
Technical Management Team



Ambient Air Monitoring Results : Carbon monoxide MTR-SPRC PLC-Refinery

Location : With in the Refinery Plant, North
Analyzer Model : Teledyne 300E
Serial No : 924

Monitor Period : 18-25 Apr 2022
Station No : SS2-09
Site Operator : Mr.Supakit Tamooka

Calibrator Model : Teledyne 700E
Calibration Gas Cylinder I.D.: EB0108319
Certified Date : 13 Jan 2022
Expire Date : 12 Jan 2023

Serial No : 587
Cal Concentration (ppb) : 0,100,200,400

Time	CO Concentration (ppm)						
	18-19 Apr 2022	19-20 Apr 2022	20-21 Apr 2022	21-22 Apr 2022	22-23 Apr 2022	23-24 Apr 2022	24-25 Apr 2022
09:00 - 10:00	1.4	1.3	0.3	0.5	0.6	0.5	0.6
10:00 - 11:00	1.6	0.4	0.6	0.6	1.1	0.8	0.6
11:00 - 12:00	1.7	0.6	0.3	0.3	0.8	1.1	1.5
12:00 - 13:00	1.2	0.2	0.2	0.1	0.7	1.1	1.4
13:00 - 14:00	0.3	0.6	1.6	0.3	0.5	1.3	0.7
14:00 - 15:00	0.6	0.5	1.4	0.8	0.8	0.5	0.5
15:00 - 16:00	0.1	0.3	1.2	1.2	1.1	1.3	1.4
16:00 - 17:00	0.6	0.2	1.6	1.3	0.7	1.2	0.5
17:00 - 18:00	0.4	1.2	2.5	1.6	1.2	1.1	0.7
18:00 - 19:00	0.1	1.6	2.3	1.5	0.9	0.9	1.3
19:00 - 20:00	0.3	1.7	2.1	1.4	0.7	1.2	1.4
20:00 - 21:00	1.6	1.9	0.3	1.4	0.6	1.1	1.4
21:00 - 22:00	2.6	0.2	1.3	0.6	0.5	0.9	0.6
22:00 - 23:00	1.2	1.2	1.6	1.4	0.8	0.9	1.4
23:00 - 00:00	2.5	1.5	0.2	1.3	0.9	0.7	1.3
00:00 - 01:00	1.2	1.3	0.6	1.3	0.7	1.1	1.5
01:00 - 02:00	1.5	1.7	0.1	1.5	1.1	1.1	1.2
02:00 - 03:00	0.3	1.5	1.2	0.5	0.6	0.9	0.4
03:00 - 04:00	0.3	1.6	1.5	0.4	0.8	1.2	0.6
04:00 - 05:00	0.6	0.1	1.8	1.3	0.5	1.1	0.1
05:00 - 06:00	0.1	0.5	0.2	1.4	0.5	0.7	0.3
06:00 - 07:00	0.7	0.2	0.5	0.7	0.8	1.6	0.8
07:00 - 08:00	1.3	0.8	0.2	0.3	0.4	1.5	0.9
08:00 - 09:00	1.6	0.6	0.1	0.2	0.7	0.7	0.5
Average-24Hr*	1.0	0.9	1.0	0.9	0.8	1.0	0.9
Max-1Hr	2.6	1.9	2.5	1.6	1.2	1.6	1.5
Min-1Hr	0.1	0.1	0.1	0.1	0.4	0.5	0.1
Standard-1Hr	30 ppm(34.2 mg/cu.m)						
Standard-24Hr	-						

Remark : * Average time between 09:00-09:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

Preeda S.
(Miss Preeda Somjai)
Technical Management Team



Ambient Air Monitoring Results : Carbon monoxide MTR-SPRC PLC-Refinery

Location : Map Ta Phut New Town
Analyzer Model : API 300A
Serial No : Po216292

Monitor Period : 18-25 Apr 2022
Station No : SS2-01
Site Operator : Mr.Supakit Tamooka

Calibrator Model : Teledyne 700E
Calibration Gas Cylinder I.D.: EB0108319
Certified Date : 13 Jan 2022
Expire Date : 12 Jan 2023

Serial No : 587
Cal Concentration (ppb) : 0,100,200,400

Time	CO Concentration (ppm)						
	18-19 Apr 2022	19-20 Apr 2022	20-21 Apr 2022	21-22 Apr 2022	22-23 Apr 2022	23-24 Apr 2022	24-25 Apr 2022
13:00 - 14:00	1.1	0.8	1.1	0.2	0.2	1.0	0.7
14:00 - 15:00	1.2	1.1	0.6	0.1	0.3	1.3	1.0
15:00 - 16:00	1.1	0.9	0.3	0.5	0.8	1.1	0.9
16:00 - 17:00	1.2	0.8	1.3	0.3	0.2	1.0	0.7
17:00 - 18:00	0.7	0.8	0.7	0.7	1.2	1.0	0.8
18:00 - 19:00	0.7	0.6	0.1	0.3	1.6	1.2	1.0
19:00 - 20:00	1.1	0.5	1.6	1.3	0.3	0.9	0.8
20:00 - 21:00	1.1	0.8	2.4	1.7	0.6	0.9	1.0
21:00 - 22:00	0.8	0.7	1.2	0.5	0.2	0.5	0.7
22:00 - 23:00	0.7	0.8	1.6	0.3	1.4	0.4	0.8
23:00 - 00:00	0.6	0.9	1.3	0.6	0.8	1.0	0.5
00:00 - 01:00	0.8	0.8	0.4	0.7	1.3	0.7	0.5
01:00 - 02:00	0.8	1.2	0.3	0.3	1.2	1.2	0.4
02:00 - 03:00	0.5	1.6	0.7	0.2	0.8	1.6	0.5
03:00 - 04:00	0.4	1.4	0.2	0.7	0.5	1.3	0.7
04:00 - 05:00	0.8	1.3	0.2	0.3	0.8	0.2	0.7
05:00 - 06:00	0.4	1.1	0.3	1.2	1.2	0.6	0.4
06:00 - 07:00	0.8	1.3	0.7	1.2	0.8	0.3	0.8
07:00 - 08:00	0.6	1.4	1.2	1.4	1.1	0.8	0.9
08:00 - 09:00	0.9	1.3	1.7	1.7	0.9	1.2	1.3
09:00 - 10:00	0.7	0.2	1.9	1.6	0.8	1.4	1.2
10:00 - 11:00	0.7	1.2	1.7	0.5	0.2	1.2	1.1
11:00 - 12:00	0.5	1.6	1.6	0.4	1.1	1.6	1.3
12:00 - 13:00	0.9	1.4	0.3	0.7	1.1	0.7	1.2
Average-24Hr*	0.8	1.0	1.0	0.7	0.8	1.0	0.8
Max-1Hr	1.2	1.6	2.4	1.7	1.6	1.6	1.3
Min-1Hr	0.4	0.2	0.1	0.1	0.2	0.2	0.4
Standard-1Hr	30 ppm(34.2 mg/cu.m)						
Standard-24Hr	-						

Remark : * Average time between 13:00-13:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

Preeda S.
(Miss Preeda Somjai)
Technical Management Team



Ambient Air Monitoring Results : Carbon monoxide MTR-SPRC PLC-Refinery

Location : Ban Plong Community		Monitor Period : 18-25 Apr 2022					
Analyzer Model : Thermo 48C		Station No : 16					
Serial No : 0412106045		Site Operator : Mr.Supakit Tamooka					
Calibrator Model : Teledyne 700E		Serial No : 587					
Calibration Gas Cylinder I.D.: EB0108319							
Certified Date : 13 Jan 2022		Cal Concentration (ppb) : 0,100,200,400					
Expire Date : 12 Jan 2023							
Time	CO Concentration (ppm)						
	18-19 Apr 2022	19-20 Apr 2022	20-21 Apr 2022	21-22 Apr 2022	22-23 Apr 2022	23-24 Apr 2022	24-25 Apr 2022
13:00 - 14:00	2.1	2.4	2.2	2.2	2.5	3.1	1.9
14:00 - 15:00	2.3	2.3	1.8	1.9	2.4	2.8	2.2
15:00 - 16:00	2.2	2.5	1.9	1.8	3.0	2.4	2.4
16:00 - 17:00	1.9	2.4	2.0	2.1	2.8	2.9	2.5
17:00 - 18:00	2.0	2.5	2.4	2.2	2.6	3.0	2.6
18:00 - 19:00	1.8	2.6	2.0	2.3	2.0	2.8	1.7
19:00 - 20:00	2.4	2.1	1.8	1.8	1.9	2.4	1.6
20:00 - 21:00	1.5	2.2	1.7	1.6	1.5	2.0	1.8
21:00 - 22:00	1.5	1.8	1.9	1.6	2.0	1.5	2.0
22:00 - 23:00	1.6	1.7	1.4	1.1	1.8	1.2	1.2
23:00 - 00:00	1.4	1.7	1.2	1.2	1.7	1.7	1.1
00:00 - 01:00	1.2	1.5	1.0	1.3	1.1	1.2	1.4
01:00 - 02:00	1.2	1.5	1.1	1.2	1.2	1.1	1.0
02:00 - 03:00	1.1	1.2	1.2	1.5	1.1	1.3	1.1
03:00 - 04:00	1.1	1.2	1.1	1.1	1.0	1.4	1.0
04:00 - 05:00	1.0	1.1	1.3	1.2	1.0	1.1	1.4
05:00 - 06:00	1.1	1.1	1.4	1.7	1.5	1.0	1.2
06:00 - 07:00	1.2	1.0	1.3	1.6	1.2	1.7	1.4
07:00 - 08:00	1.3	1.1	1.7	1.8	1.4	1.6	1.9
08:00 - 09:00	1.3	1.8	1.6	2.0	2.0	2.0	2.4
09:00 - 10:00	1.5	1.9	1.1	2.2	2.1	2.1	2.6
10:00 - 11:00	2.0	2.0	1.0	2.3	2.9	1.8	2.5
11:00 - 12:00	2.1	2.1	2.0	2.1	2.8	1.6	2.1
12:00 - 13:00	2.4	2.2	2.1	2.4	3.0	1.5	1.9
Average-24Hr*	1.6	1.8	1.6	1.8	1.9	1.9	1.8
Max-1Hr	2.4	2.6	2.4	2.4	3.0	3.1	2.6
Min-1Hr	1.0	1.0	1.0	1.1	1.0	1.0	1.0
Standard-1Hr	30 ppm(34.2 mg/cu.m)						
Standard-24Hr							

Remark : * Average time between 13:00-13:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

Preeda S.
(Miss Preeda Somjai)
Technical Management Team



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AMBIENT AIR QUALITY ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: SPRC-222003-COA-Amb/H ₂ S
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING DATE	: 20-22/04/2022
RECEIVE DATE	: 23/04/2022	ANALYTICAL DATE	: 29/04/2022
REPORT DATE	: 05/05/2022	SAMPLE CONDITION	: Normal
INSTRUMENT	: Impingment Absorption	SITE OPERATOR	: Mr. Sittichai Sawangwongchai
CALIBRATOR MODEL	: Defender 520-H	SERIAL NO.	: 114069
STATION DESCRIPTION	1. Within the Refinery Plant 2. Map Ta Phut New Town 3. Ban Plong Community		

PARAMETER	SAMPLING DATE	UNIT	ND (Non-detectable)	RESULTS			REFERENCE METHODS
				1	2	3	
Hydrogen Sulfide	20/04/2022	ppm	<0.001	ND	ND	ND	Intersociety Committee
(1 hr)	21/04/2022	ppm	<0.001	ND	ND	ND	Method 701
	22/04/2022	ppm	<0.001	ND	ND	ND	

Phatchara Samanchan
(Miss Phatchara Samanchan)
Analyst

Naris Poowasanetch
(Miss Narisa Poowasanetch)
Technical Management Team

Remark : 1. Reported analysis refers to submitted sample only.

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AMBIENT AIR QUALITY ANALYSIS REPORT

CLIENT NAME : Star Petroleum Refining Public Co., Ltd. REF. NO. : SPRC-222003-COA-Amb/TSP
SAMPLING BY : SECOT Co., Ltd. SAMPLING DATE : 18-25/04/2022
RECEIVED DATE : 27/04/2022 ANALYTICAL DATE : 27-29/04/2022
REPORT DATE : 05/05/2022 SAMPLE CONDITION : Normal
OPERATOR : Mr. Sittichai Sawangwongchai
STATION DESCRIPTION : 1. Within the Refinery Plant 2. Map Ta Phut New Town
3. Ban Plong Community

PARAMETER	SAMPLING DATE	UNITS	RESULTS			STANDARD*	REFERENCE METHODS
			1	2	3		
TSP (24 hr.)	18-19/04/2022	mg/m ³	0.036	0.099	0.057	0.330	High Volume
	19-20/04/2022	mg/m ³	0.055	0.104	0.098		Air Sampler/
	20-21/04/2022	mg/m ³	0.059	0.066	0.100		Gravimetric
	21-22/04/2022	mg/m ³	0.025	0.059	0.058		Method
	22-23/04/2022	mg/m ³	0.032	0.070	0.054		
	23-24/04/2022	mg/m ³	0.044	0.073	0.058		
	24-25/04/2022	mg/m ³	0.033	0.037	0.048		

Phatchara Samanchan

(Miss Phatchara Samanchan)

Analyst

Narisa Poowasanpetch

(Miss Narisa Poowasanpetch)

Technical Management Team

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3. * Notification of the National Environment Board, No.24, B.E.2547.



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AMBIENT AIR QUALITY ANALYSIS REPORT

CLIENT NAME : Star Petroleum Refining Public Co., Ltd. REF. NO. : SPRC-221003-COA-Amb/PM10
SAMPLING BY : SECOT Co., Ltd. SAMPLING DATE : 18-25/04/2022
RECEIVED DATE : 27/04/2022 ANALYTICAL DATE : 27-29/04/2022
REPORT DATE : 05/05/2022 SAMPLE CONDITION : Normal
OPERATOR : Mr. Sittichai Sawangwongchai
STATION DESCRIPTION : 1. Within the Refinery Plant 2. Map Ta Phut New Town
3. Ban Plong Community

PARAMETER	SAMPLING DATE	UNITS	RESULTS			STANDARD*	REFERENCE METHODS
			1	2	3		
PM-10 (24 hr.)	18-19/04/2022	mg/m ³	0.027	0.035	0.040	0.120	High Volume
	19-20/04/2022	mg/m ³	0.043	0.049	0.056		Air Sampler
	20-21/04/2022	mg/m ³	0.045	0.045	0.059		(Hi-Vol PM-10
	21-22/04/2022	mg/m ³	0.011	0.029	0.041		Size Selective Inlet)
	22-23/04/2022	mg/m ³	0.019	0.024	0.038		Gravimetric
	23-24/04/2022	mg/m ³	0.023	0.032	0.040		Method
	24-25/04/2022	mg/m ³	0.023	0.024	0.033		

Phatchara Samanchan

(Miss Phatchara Samanchan)

Analyst

Narisa Poowasanpetch

(Miss Narisa Poowasanpetch)

Technical Management Team

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AMBIENT AIR QUALITY ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Company Limited	REQUEST SERVICE No.	: 0030/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 05-06/01/2022	ANALYTICAL DATE	: 11/01/2022
SAMPLING TIME	: 16:55-15:55	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 07/01/2022	FILE CODE	: 222003_TO-15_January
REPORT DATE	: 14/01/2022		

Compound	Non Detection		SAMPLING LOCATION		STANDARD* (µg/m ³)
			Map Ta Phut New Town		
	ppbv	µg/m ³	ppbv	µg/m ³	
Benzene	0.004	0.013	0.64	2.04	7.6

Methods for the Determination of Toxic Organic Compound in Ambient Air, 3rd : EPA Methods TO-15, 1999

Siriwan Chimsa-nga

(Miss Siriwan Chimsa-nga)

Analyst

MR

(Mrs. Araya Tipparuk)

Technical Management Team

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AMBIENT AIR QUALITY ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Company Limited	REQUEST SERVICE No.	: 0030/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 05-06/01/2022	ANALYTICAL DATE	: 11/01/2022
SAMPLING TIME	: 15:35-14:40	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 07/01/2022	FILE CODE	: 222003_TO-15_January
REPORT DATE	: 14/01/2022		

Compound	Non Detection		SAMPLING LOCATION		STANDARD* (µg/m ³)
			Ban Pong Community		
	ppbv	µg/m ³	ppbv	µg/m ³	
Benzene	0.004	0.013	0.76	2.43	7.6

Methods for the Determination of Toxic Organic Compound in Ambient Air, 3rd : EPA Methods TO-15, 1999

Siriwan Chimsa-nga

(Miss Siriwan Chimsa-nga)

Analyst

MR

(Mrs. Araya Tipparuk)

Technical Management Team

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AMBIENT AIR QUALITY ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0218/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 04-05/02/2022	ANALYTICAL DATE	: 10/02/2022
SAMPLING TIME	: 13:40-13:11	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 06/02/2022	FILE CODE	: 222003_TO-15_February
REPORT DATE	: 19/02/2022		

Compound	Non Detection		SAMPLING LOCATION		STANDARD*
	ppbv	µg/m ³	Map Ta Phut New Town	µg/m ³	
Benzene	0.004	0.013	1.00	3.19	7.6

Methods for the Determination of Toxic Organic Compounds in Ambient Air, 2nd : EPA Methods TO-15, 1999

Siriwan Chimsa-nga
(Miss Siriwan Chimsa-nga)
Analyst

AR
(Mrs. Araya Tipparuk)
Technical Management Team

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AMBIENT AIR QUALITY ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0218/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 04-05/02/2022	ANALYTICAL DATE	: 10/02/2022
SAMPLING TIME	: 14:44-14:40	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 06/02/2022	FILE CODE	: 222003_TO-15_February
REPORT DATE	: 19/02/2022		

Compound	Non Detection		SAMPLING LOCATION		STANDARD*
	ppbv	µg/m ³	Ban Pong Community	µg/m ³	
Benzene	0.004	0.013	1.10	3.52	7.6

Methods for the Determination of Toxic Organic Compounds in Ambient Air, 2nd : EPA Methods TO-15, 1999

Siriwan Chimsa-nga
(Miss Siriwan Chimsa-nga)
Analyst

AR
(Mrs. Araya Tipparuk)
Technical Management Team

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AMBIENT AIR QUALITY ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0459/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 03-04/03/2022	ANALYTICAL DATE	: 11/03/2022
SAMPLING TIME	: 10:51-10:30	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 05/03/2022	FILE CODE	: 222003_TO-15_March
REPORT DATE	: 14/03/2022		

Compound	SAMPLING LOCATION				STANDARD* ($\mu\text{g}/\text{m}^3$)
	Non Detection		Map Ta Phut New Town		
	ppbv	$\mu\text{g}/\text{m}^3$	ppbv	$\mu\text{g}/\text{m}^3$	
Benzene	0.004	0.013	0.98	3.13	7.6

Method for the Determination of Toxic Organic Compound in Ambient Air, 3rd : EPA Method TO-15, 1999

Jutarat Jaemruen

(Miss Jutarat Jaemruen)

Analyst

M. Araya Tipparuk

(Mrs. Araya Tipparuk)

Technical Management Team

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3. * Notification of the Pollution Control Department, dated December 18,B.E.2551(2008).



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TEL. (662) 959-3600 FAX (662) 959-3535 Website : secot.co.th E-mail : envserv@secot.co.th

AMBIENT AIR QUALITY ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0459/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 03-04/03/2022	ANALYTICAL DATE	: 11/03/2022
SAMPLING TIME	: 12:47-11:50	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 05/03/2022	FILE CODE	: 222003_TO-15_March
REPORT DATE	: 14/03/2022		

Compound	SAMPLING LOCATION				STANDARD* (µg/m ³)
	Non Detection		Ban Pong Community		
	ppbv	µg/m ³	ppbv	µg/m ³	
Benzene	0.004	0.013	1.06	3.39	7.6

Method for the Determination of Toxic Organic Compound in Ambient Air, 3rd : EPA Method TO-15, 1999

Jutarat Jaemruen

(Miss Jutarat Jaemruen)

Analyst

M. Araya Tipparuk

(Mrs. Araya Tipparuk)

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AMBIENT AIR QUALITY ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0731/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 04-05/04/2022	ANALYTICAL DATE	: 08/04/2022
SAMPLING TIME	: 09:43-09:25	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 06/04/2022	FILE CODE	: 222003_TO-15_April
REPORT DATE	: 12/04/2022		

Compound	Non Detection		SAMPLING LOCATION		STANDARD*
	ppbv	µg/m ³	Map Ta Phut New Town	µg/m ³	
Benzene	0.004	0.013	0.55	1.76	7.6

Methods for the Determination of Toxic Organic Compound in Ambient Air, 2nd : EPA Methods TO-15, 1999

Jutarat Jaemruen

(Miss Jutarat Jaemruen)

Analyst

Araya Tipparuk

(Mrs. Araya Tipparuk)

Technical Management Team

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AMBIENT AIR QUALITY ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0731/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 04-05/04/2022	ANALYTICAL DATE	: 08/04/2022
SAMPLING TIME	: 10:46-10:47	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 06/04/2022	FILE CODE	: 222003_TO-15_April
REPORT DATE	: 12/04/2022		

Compound	Non Detection		SAMPLING LOCATION		STANDARD*
	ppbv	µg/m ³	Ban Pong Community	µg/m ³	
Benzene	0.004	0.013	1.29	4.12	7.6

Methods for the Determination of Toxic Organic Compound in Ambient Air, 2nd : EPA Methods TO-15, 1999

Jutarat Jaemruen

(Miss Jutarat Jaemruen)

Analyst

Araya Tipparuk

(Mrs. Araya Tipparuk)

Technical Management Team

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AMBIENT AIR QUALITY ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0958/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 05-06/05/2022	ANALYTICAL DATE	: 09-10/05/2022
SAMPLING TIME	: 09:55-09:50	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 07/05/2022	FILE CODE	: 222003_TJ-15_May
REPORT DATE	: 12/05/2022		

Compound	SAMPLING LOCATION				STANDARD* ($\mu\text{g}/\text{m}^3$)
	Non Detection		Map Ta Phut New Town		
	ppbv	$\mu\text{g}/\text{m}^3$	ppbv	$\mu\text{g}/\text{m}^3$	
Benzene	0.004	0.013	0.61	1.95	7.6

Methods for the Determination of Toxic Organic Compound in Ambient Air, 2nd : EPA Methods TO-15,1999

Siriwan Chimsa-nga
(Miss Siriwan Chimsa-nga)

Analyst

AR
(Mrs. Araya Tipparuk)

Technical Management Team

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AMBIENT AIR QUALITY ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0963/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 05-06/05/2022	ANALYTICAL DATE	: 09-10/05/2022
SAMPLING TIME	: 11:00-11:30	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 07/05/2022	FILE CODE	: 222003_TO-15_May
REPORT DATE	: 12/05/2022		

Compound	Non Detection		SAMPLING LOCATION		STANDARD* ($\mu\text{g}/\text{m}^3$)
			Ban Pong Community		
	ppbv	$\mu\text{g}/\text{m}^3$	ppbv	$\mu\text{g}/\text{m}^3$	
Benzene	0.004	0.013	0.76	2.43	7.6

Methods for the Determination of Toxic Organic Compound in Ambient Air, 2nd : EPA Methods TO-15,1999

Siriwan Chimsa-nga
(Miss Siriwan Chimsa-nga)

Analyst

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(Mrs. Araya Tipparuk)

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AMBIENT AIR QUALITY ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1213/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 04-05/06/2022	ANALYTICAL DATE	: 13-14/06/2022
SAMPLING TIME	: 11:30-10:30	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 06/06/2022	FILE CODE	: 222003_TO-15_June
REPORT DATE	: 16/06/2022		

Compound	Non Detection		SAMPLING LOCATION		STANDARD*
	ppbv	µg/m ³	Map Ta Phut New Town	µg/m ³	
Benzene	0.004	0.013	0.36	1.15	7.6

Methods for the Determination of Toxic Organic Compound in Ambient Air, 2nd : EPA Methods TO-15.1999

Siriwan Chimsa-nga

(Miss Siriwan Chimsa-nga)

Analyst

AR

(Mrs. Araya Tipparuk)

Technical Management Team

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AMBIENT AIR QUALITY ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1258/65
SAMPLING BY	: SECOT Co., Ltd.	ANALYTICAL DATE	: 15/06/2022
SAMPLING DATE	: 07-08/06/2022	SAMPLE CONDITION	: Normal
SAMPLING TIME	: 12:55-12:04	FILE CODE	: 222006_TO-15_June
RECEIVED DATE	: 09/06/2022		
REPORT DATE	: 20/06/2022		

Compound	Non Detection		SAMPLING LOCATION		STANDARD*
	ppbv	µg/m ³	Ban Pong Community	µg/m ³	
Benzene	0.004	0.013	1.34	4.26	7.6

Methods for the Determination of Toxic Organic Compound in Ambient Air, 2nd : EPA Methods TO-15.1999

Siriwan Chimsa-nga

(Miss Siriwan Chimsa-nga)

Analyst

AR

(Mrs. Araya Tipparuk)

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STACK EMISSION ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: Refinery-222003-COA-Stk/PM
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING DATE	: 20/04/2022
RECEIVED DATE	: 22/04/2022	ANALYTICAL DATE	: 22-23/04/2022
REPORT DATE	: 26/04/2022	SAMPLE CONDITION	: Normal
STACK LOCATION	: RFCCU Stack	OPERATOR	: Mr. Song Hengchwankun
SOURCE DESCRIPTION	: Combustion	FUEL TYPE	: Natural Gas + Refinery Fuel Gas

STACK DESCRIPTION

Height	: 70	m	Gas Velocity	: 17.5	m/s
Diameter	: 3.2	m	Flow rate ⁽¹⁾	: 4,097	Ncu.m/min
Temperature	: 272.8	°C	Excess Oxygen	: 4.0	%

PARAMETER	UNIT	RESULTS ⁽¹⁾		ASSIGNED VALUE ⁽²⁾	STANDARD ⁽³⁾	REFERENCE METHODS
		4.0 % O ₂	7 % O ₂			
Particulate Matter	mg/Ncu.m	91.2	75.0	240	320	US EPA Method 5

Phatchara Samanchon

(Miss Phatchara Samanchon)

Analyst

REG.NO.7-239-ก-8183

Narisa Poowasanpetch

(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO.7-239-ก-6419

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3. ⁽¹⁾ At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.

4. ⁽²⁾ Assigned value in EIA Report Expasion 3 of Refinery Plant, B.E. 2561 (2018).

5. ⁽³⁾ Notification of the Ministry of Natural Resources and Environment B.E.2554 (2011).



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STACK EMISSION ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: Refinery-222003-COA-Stk/HM
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING DATE	: 20/04/2022
RECEIVED DATE	: 22/04/2022	ANALYTICAL DATE	: 22-26/04/2022
REPORT DATE	: 04/05/2022	SAMPLE CONDITION	: Normal
STACK LOCATION	: RFCCU Stack	OPERATOR	: Mr. Song Hengchwankun
SOURCE DESCRIPTION	: Combustion	FUEL TYPE	: Natural Gas + Refinery Fuel Gas

STACK DESCRIPTION

Height	: 70	m	Gas Velocity	: 17.5	m/s
Diameter	: 3.2	m	Flow rate ⁽¹⁾	: 4,097	Ncu.m/min
Temperature	: 272.8	°C	Excess Oxygen	: 4.0	%

PARAMETER	UNIT	RESULTS ⁽¹⁾		ASSIGNED VALUE ⁽²⁾	STANDARD ⁽³⁾	REFERENCE METHODS
		4.0 % O ₂	7 % O ₂			
Mercury	mg/Ncu.m	<0.0003	<0.0002	2.4	2.4	US EPA Method 29
Lead	mg/Ncu.m	<0.02	<0.02	5.0	5.0	US EPA Method 29

Krisana Chanthoom

(Miss Krisana Chanthoom)

Analyst

REG.NO.7-239-ก-7802

Narisa Poowasanpetch

(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO.7-239-ก-6419

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4. ⁽²⁾ Assigned value in EIA Report Expasion 3 of Refinery Plant, B.E. 2561 (2018).

5. ⁽³⁾ Notification of the Ministry of Natural Resources and Environment B.E.2554 (2011).

The Monitoring Result of Emission Concentration
RFCCU
STAR PETROLEUM REFINING PUBLIC CO., LTD.
April 20, 2022

Run Number	Oxygen content (%)		Oxide of Nitrogen (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	4.05	4.01	109.24	109.28	89.93
2	4.03	3.99	108.17	108.20	88.94
3	4.04	4.01	108.50	108.54	89.33
Average	4.04	4.00	108.64	108.67	89.40

Run Number	Oxygen content (%)		Sulfur dioxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	4.05	4.01	712.73	713.37	587.08
2	4.03	3.99	692.55	693.17	569.78
3	4.04	4.01	681.19	681.80	561.10
Average	4.04	4.00	695.49	696.11	572.66

Run Number	Oxygen content (%)		Carbonmonoxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	4.05	4.01	209.77	209.94	172.77
2	4.03	3.99	209.93	210.09	172.69
3	4.04	4.01	208.29	208.44	171.54
Average	4.04	4.00	209.33	209.49	172.34

STAR PETROLEUM REFINING PUBLIC CO., LTD.
EMISSION TEST RESULT

Date: April 20, 2022
Start time: 10:10 AM
O₂ instrument Model: AMI 70
NO_x instrument Model: TELEDYNE 200 EM
SO₂ instrument Model: API 100 AH
CO instrument Model: THERMO 48 C
Fuel Type : Fuel Gas

Run # : 1
Location : RFCCU
Finish time : 10:30 AM
Serial No.: 111117-2
Serial No.: 435
Serial No.: 058
Serial No.: 365
Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
10:10 AM	4.08	108.71	746.14	214.17
10:11 AM	4.17	108.89	733.92	213.31
10:12 AM	4.20	108.44	722.73	217.37
10:13 AM	4.14	108.22	719.44	212.51
10:14 AM	4.12	108.15	722.94	210.03
10:15 AM	4.04	108.25	728.65	207.49
10:16 AM	4.08	110.07	734.00	209.62
10:17 AM	4.02	112.99	720.11	201.91
10:18 AM	3.94	113.88	705.61	211.50
10:19 AM	3.93	112.60	702.00	198.78
10:20 AM	3.99	110.63	702.55	217.58
10:21 AM	4.00	108.69	708.20	211.45
10:22 AM	4.00	108.08	705.89	206.97
10:23 AM	4.02	108.28	701.20	198.80
10:24 AM	4.00	108.47	694.98	213.21
10:25 AM	4.04	108.42	705.50	209.35
10:26 AM	4.00	108.54	708.23	211.01
10:27 AM	4.04	108.86	691.61	204.10
10:28 AM	4.04	108.18	701.52	219.77
10:29 AM	4.04	107.66	709.06	203.01
10:30 AM	4.08	107.93	703.10	213.33
Average	4.05	109.24	712.73	209.77

Signature 
 Miss Katesarin Vorradetwittaya
 Environmental Scientist

STAR PETROLEUM REFINING PUBLIC CO., LTD. EMISSION TEST RESULT

Run # : 2
Date: April 20, 2022
Location : RFCCU
Start time: 10:31 AM
Finish time : 10:51 AM
O₂ instrument Model: AMI 70
Serial No.: 111117-2
NO_x instrument Model: TELEDYNE 200 EM
Serial No.: 435
SO₂ instrument Model: API 100 AH
Serial No.: 058
CO instrument Model: THERMO 48 C
Serial No.: 365
Fuel Type : Fuel Gas
Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
10:31 AM	4.05	107.45	702.08	206.32
10:32 AM	3.99	106.79	691.38	210.52
10:33 AM	4.04	107.29	693.48	206.27
10:34 AM	3.99	107.87	701.27	201.71
10:35 AM	4.05	108.12	694.52	208.93
10:36 AM	4.13	108.19	703.51	208.13
10:37 AM	4.10	108.02	706.99	210.64
10:38 AM	4.05	108.46	698.86	220.21
10:39 AM	4.07	110.07	695.60	218.47
10:40 AM	4.18	110.77	691.57	216.46
10:41 AM	4.25	109.30	691.12	216.80
10:42 AM	4.25	107.83	712.82	212.47
10:43 AM	4.13	107.23	710.82	214.13
10:44 AM	4.01	106.94	706.27	204.72
10:45 AM	4.03	107.31	686.44	211.16
10:46 AM	4.00	107.89	683.51	200.01
10:47 AM	3.96	108.24	691.56	201.93
10:48 AM	3.82	108.83	687.51	206.06
10:49 AM	3.81	108.90	672.57	207.19
10:50 AM	3.85	108.29	663.52	213.32
10:51 AM	3.95	107.78	658.06	213.16
Average	4.03	108.17	692.55	209.93

Signature



Miss Katesarin Vorradetwittaya

Environmental Scientist

STAR PETROLEUM REFINING PUBLIC CO., LTD. EMISSION TEST RESULT

Run # : 3
Date: April 20, 2022
Location : RFCCU
Start time: 10:52 AM
Finish time : 11:12 AM
O₂ instrument Model: AMI 70
Serial No.: 111117-2
NO_x instrument Model: TELEDYNE 200 EM
Serial No.: 435
SO₂ instrument Model: API 100 AH
Serial No.: 058
CO instrument Model: THERMO 48 C
Serial No.: 365
Fuel Type : Fuel Gas
Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
10:52 AM	4.03	107.41	661.42	214.27
10:53 AM	4.07	107.47	673.84	213.41
10:54 AM	4.12	107.71	670.67	203.56
10:55 AM	4.10	107.51	674.72	207.85
10:56 AM	4.04	107.42	669.53	213.46
10:57 AM	4.05	108.17	674.39	210.19
10:58 AM	4.03	108.51	672.16	206.37
10:59 AM	4.01	107.89	671.72	206.41
11:00 AM	3.99	107.11	684.82	209.25
11:01 AM	4.03	107.20	702.50	213.76
11:02 AM	4.02	108.56	691.40	209.17
11:03 AM	4.08	110.93	680.35	204.73
11:04 AM	4.09	111.69	682.38	213.11
11:05 AM	4.03	110.64	683.89	212.17
11:06 AM	4.05	109.84	679.86	204.85
11:07 AM	4.11	108.98	693.21	205.32
11:08 AM	4.20	108.46	692.93	180.30
11:09 AM	4.04	108.32	691.51	210.73
11:10 AM	3.91	107.87	691.34	223.71
11:11 AM	3.92	108.10	680.24	207.15
11:12 AM	3.99	108.75	682.06	204.31
Average	4.04	108.50	681.19	208.29

Signature



Miss Katesarin Vorradetwittaya

Environmental Scientist



บริษัท ซีคอต จำกัด
SECOT CO., LTD.

239 ถนนริมคลองประปา แขวงบางซื่อ กรุงเทพฯ 10800

239 RIMKLONGPRAPA ROAD, BANGSUE, BANGKOK 10800, THAILAND

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STACK EMISSION ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: Refinery-222003-COA-Stk/PM
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING DATE	: 20/04/2022
RECEIVED DATE	: 22/04/2022	ANALYTICAL DATE	: 22-23/04/2022
REPORT DATE	: 26/04/2022	SAMPLE CONDITION	: Normal
STACK LOCATION	: CDU Stack	OPERATOR	: Mr. Song Hengchwankun
SOURCE DESCRIPTION	: Combustion	FUEL TYPE	: Natural Gas + Refinery Fuel Gas

STACK DESCRIPTION

Height	: 63.2	m	Gas Velocity	: 10.3	m/s
Diameter	: 3.0	m	Flow rate ⁽¹⁾	: 2,552	Ncu.m/min
Temperature	: 185.0	°C	Excess Oxygen	: 3.9	%

PARAMETER	UNIT	RESULTS ⁽¹⁾		ASSIGNED VALUE ⁽²⁾	STANDARD ⁽³⁾	REFERENCE METHODS
		3.9 % O ₂	7 % O ₂			
Particulate Matter	mg/Ncu.m	1.9	1.6	60	60	US EPA Method 5

Phatchara Samanchan

(Miss Phatchara Samanchan)

Analyst

REG.NO. 2-239-ก-8183

Narisa Poowasanpetch

(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO. 2-239-ก-6419

Remark : 1. Reported analysis refers to submitted sample only.

2. This report shall not be reproduced, except in full, without official approval.

3. ⁽¹⁾ At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.

4. ⁽²⁾ Assigned value in EIA Report Expasion 3 of Refinery Plant, B.E. 2561 (2018).

5. ⁽³⁾ Notification of the Ministry of Natural Resources and Environment B.E.2554 (2011).

The Monitoring Result of Emission Concentration CDU

STAR PETROLEUM REFINING PUBLIC CO., LTD.

April 20, 2022

Run Number	Oxygen content (%)		Oxide of Nitrogen (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	3.96	3.96	18.85	18.87	15.48
2	3.84	3.84	19.29	19.28	15.71
3	3.77	3.77	19.06	19.02	15.43
Average	3.86	3.86	19.07	19.06	15.54

Run Number	Oxygen content (%)		Sulfur dioxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	3.96	3.96	4.68	4.64	3.81
2	3.84	3.84	6.42	6.39	5.21
3	3.77	3.77	6.87	6.84	5.55
Average	3.86	3.86	5.99	5.96	4.86

Run Number	Oxygen content (%)		Carbonmonoxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	3.96	3.96	0.61	0.60	0.49
2	3.84	3.84	0.15	0.14	0.11
3	3.77	3.77	0.13	0.12	0.10
Average	3.86	3.86	0.30	0.29	0.23

STAR PETROLEUM REFINING PUBLIC CO., LTD. EMISSION TEST RESULT

Run # : 1
Date: April 20, 2022
Location : CDU
Start time: 10:30 AM
Finish time : 10:50 AM
O₂ instrument Model: AMI 70
Serial No.: 121121-10
NO_x instrument Model: TELEDYNE 200 EM
Serial No.: 433
SO₂ instrument Model: API 100 AH
Serial No.: 132
CO instrument Model: API 300 A
Serial No.: 1070
Fuel Type : Natural Gas
Test Operator : Kittipong T.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
10:30 AM	4.15	18.68	3.28	0.10
10:31 AM	4.19	18.93	3.49	1.01
10:32 AM	4.17	18.86	3.52	1.94
10:33 AM	4.19	18.81	3.68	1.84
10:34 AM	4.08	18.94	4.11	1.48
10:35 AM	4.05	19.02	4.35	1.02
10:36 AM	3.99	19.04	4.45	0.78
10:37 AM	3.95	18.89	4.50	0.63
10:38 AM	3.87	18.90	4.60	0.50
10:39 AM	3.85	18.97	4.62	0.58
10:40 AM	3.88	18.80	4.73	0.42
10:41 AM	3.85	18.59	4.88	0.35
10:42 AM	3.92	18.75	4.93	0.33
10:43 AM	3.86	18.87	5.07	0.29
10:44 AM	3.91	18.84	5.15	0.27
10:45 AM	3.95	19.07	5.17	0.25
10:46 AM	3.91	19.20	5.29	0.23
10:47 AM	3.86	18.91	5.38	0.22
10:48 AM	3.87	18.58	5.56	0.21
10:49 AM	3.85	18.51	5.63	0.20
10:50 AM	3.81	18.71	5.80	0.19
Average	3.96	18.85	4.68	0.61

Signature



Miss Katesarin Vorradetwittaya
Environmental Scientist

STAR PETROLEUM REFINING PUBLIC CO., LTD. EMISSION TEST RESULT

Run # : 2
Date: April 20, 2022
Location : CDU
Start time: 10:51 AM
Finish time : 11:11 AM
O₂ instrument Model: AMI 70
Serial No.: 121121-10
NO_x instrument Model: TELEDYNE 200 EM
Serial No.: 433
SO₂ instrument Model: API 100 AH
Serial No.: 132
CO instrument Model: API 300 A
Serial No.: 1070
Fuel Type : Natural Gas
Test Operator : Kittipong T.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
10:51 AM	3.83	19.14	5.88	0.18
10:52 AM	3.79	19.26	5.93	0.17
10:53 AM	3.75	19.06	5.98	0.17
10:54 AM	3.84	19.12	6.12	0.16
10:55 AM	3.92	19.17	6.22	0.16
10:56 AM	3.94	19.21	6.22	0.15
10:57 AM	3.93	19.29	6.29	0.15
10:58 AM	3.95	19.36	6.26	0.15
10:59 AM	3.81	19.54	6.41	0.15
11:00 AM	3.87	19.76	6.44	0.15
11:01 AM	3.84	19.83	6.49	0.14
11:02 AM	3.84	19.70	6.55	0.14
11:03 AM	3.91	19.62	6.54	0.14
11:04 AM	3.86	19.27	6.56	0.14
11:05 AM	3.78	18.85	6.60	0.14
11:06 AM	3.77	18.97	6.72	0.13
11:07 AM	3.72	19.27	6.69	0.14
11:08 AM	3.82	19.58	6.79	0.14
11:09 AM	3.80	19.39	6.75	0.14
11:10 AM	3.84	18.92	6.72	0.14
11:11 AM	3.81	18.81	6.73	0.14
Average	3.84	19.29	6.42	0.15

Signature



Miss Katesarin Vorradetwittaya
Environmental Scientist

STAR PETROLEUM REFINING PUBLIC CO., LTD.

EMISSION TEST RESULT

Run #: 3

Date: April 20, 2022 Location: CDU

Start time: 11:12 AM Finish time: 11:32 AM

O₂ instrument Model: AMI 70 Serial No.: 121121-10

NO_x instrument Model: TELEDYNE 200 EM Serial No.: 433

SO₂ instrument Model: API 100 AH Serial No.: 132

CO instrument Model: API 300 A Serial No.: 1070

Fuel Type: Natural Gas Test Operator: Kittipong T.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
11:12 AM	3.84	19.03	6.75	0.13
11:13 AM	3.84	19.28	6.74	0.13
11:14 AM	3.85	19.23	6.77	0.13
11:15 AM	3.79	19.07	6.77	0.13
11:16 AM	3.82	18.94	6.81	0.13
11:17 AM	3.73	18.94	6.79	0.13
11:18 AM	3.72	19.20	6.86	0.13
11:19 AM	3.75	19.52	6.89	0.13
11:20 AM	3.71	19.56	6.86	0.13
11:21 AM	3.79	19.54	6.96	0.13
11:22 AM	3.77	19.30	6.92	0.12
11:23 AM	3.79	18.99	6.93	0.16
11:24 AM	3.79	18.98	6.97	0.15
11:25 AM	3.86	19.12	6.92	0.13
11:26 AM	3.80	18.88	6.93	0.13
11:27 AM	3.80	18.66	6.94	0.13
11:28 AM	3.71	18.63	6.91	0.13
11:29 AM	3.63	18.57	6.93	0.13
11:30 AM	3.74	18.93	6.86	0.12
11:31 AM	3.74	19.10	6.88	0.12
11:32 AM	3.75	18.88	6.87	0.12
Average	3.77	19.06	6.87	0.13

Signature

Miss Katesarin Vorradetwittaya

Environmental Scientist



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STACK EMISSION ANALYSIS REPORT

CLIENT NAME : Star Petroleum Refining Public Co., Ltd. REFERENCE NO. : Refinery-222003-COA-Stk/PM

SAMPLING BY : SECOT Co., Ltd. SAMPLING DATE : 18/04/2022

RECEIVED DATE : 22/04/2022 ANALYTICAL DATE : 22-23/04/2022

REPORT DATE : 26/04/2022 SAMPLE CONDITION : Normal

STACK LOCATION : VDU Stack OPERATOR : Mr. Song Hengchwankun

SOURCE DESCRIPTION : Combustion FUEL TYPE : Natural Gas + Refinery Fuel Gas

STACK DESCRIPTION

Height : 54.0 m Gas Velocity : 8.4 m/s

Diameter : 2.0 m Flow rate⁽¹⁾ : 904 Ncu.m/min

Temperature : 186.8 °C Excess Oxygen : 5.1 %

PARAMETER	UNIT	RESULTS ⁽¹⁾		ASSIGNED VALUE ⁽²⁾	STANDARD ⁽³⁾	REFERENCE METHODS
		5.1 % O ₂	7 % O ₂			
Particulate Matter	mg/Ncu.m	2.3	2.0	60	60	US EPA Method 5

Phatchara Samanchan

(Miss Phatchara Samanchan)

Analyst

REG.NO. 3-239-ก-8183

Naim Poowanapetch

(Miss Narisa Poowanapetch)

Technical Management Team

REG.NO. 3-239-ก-6419

Remark : 1. Reported analysis refers to submitted sample only.

2. This report shall not be reproduced, except in full, without official approval.

3. ⁽¹⁾ At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.4. ⁽²⁾ Assigned value in EIA Report Expansion 3 of Refinery Plant, B.E. 2561 (2018).5. ⁽³⁾ Notification of the Ministry of Natural Resources and Environment B.E.2554 (2011).

The Monitoring Result of Emission Concentration
VDU
STAR PETROLEUM REFINING PUBLIC CO., LTD.
April 18, 2022

Run Number	Oxygen content (%)		Oxide of Nitrogen (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	5.20	5.19	19.57	19.55	17.30
2	5.00	4.99	19.57	19.54	17.07
3	5.14	5.13	19.53	19.50	17.19
Average	5.11	5.10	19.55	19.53	17.19

Run Number	Oxygen content (%)		Sulfur dioxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	5.20	5.19	5.18	5.17	4.57
2	5.00	4.99	5.81	5.79	5.06
3	5.14	5.13	5.59	5.56	4.90
Average	5.11	5.10	5.53	5.51	4.85

Run Number	Oxygen content (%)		Carbonmonoxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	5.20	5.19	0.30	0.29	0.26
2	5.00	4.99	0.33	0.32	0.28
3	5.14	5.13	0.33	0.31	0.27
Average	5.11	5.10	0.32	0.31	0.27

STAR PETROLEUM REFINING PUBLIC CO., LTD.
EMISSION TEST RESULT

Run # : 1
Date: April 18, 2022
Location : VDU
Start time: 1:55 PM
Finish time: 2:15 PM
O₂ instrument Model: AMI 70
Serial No.: 121121-10
NO_x instrument Model: TELEDYNE 200 EM
Serial No.: 433
SO₂ instrument Model: API 100 AH
Serial No.: 132
CO instrument Model: API 300 A
Serial No.: 1070
Fuel Type : Natural Gas
Test Operator : Kittipong T.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
1:55 PM	5.58	19.07	4.10	0.28
1:56 PM	5.57	19.21	4.62	0.28
1:57 PM	5.54	19.20	4.78	0.28
1:58 PM	5.53	19.32	4.95	0.28
1:59 PM	5.44	19.25	4.94	0.27
2:00 PM	5.28	19.27	5.07	0.26
2:01 PM	5.27	19.35	5.04	0.27
2:02 PM	5.37	19.27	5.04	0.33
2:03 PM	5.24	19.53	5.02	0.32
2:04 PM	5.11	19.91	5.07	0.31
2:05 PM	5.09	19.94	5.27	0.31
2:06 PM	5.03	19.88	5.30	0.31
2:07 PM	5.04	19.76	5.38	0.31
2:08 PM	5.05	19.72	5.38	0.31
2:09 PM	5.03	19.69	5.45	0.31
2:10 PM	4.99	19.69	5.54	0.31
2:11 PM	4.96	19.77	5.53	0.31
2:12 PM	5.03	19.75	5.55	0.31
2:13 PM	5.05	19.76	5.54	0.31
2:14 PM	5.00	19.85	5.62	0.31
2:15 PM	4.99	19.72	5.65	0.32
Average	5.20	19.57	5.18	0.30

Signature


Miss Katesarin Vorradetwittaya
Environmental Scientist

STAR PETROLEUM REFINING PUBLIC CO., LTD. EMISSION TEST RESULT

Date: April 18, 2022
Start time: 2:16 PM
O₂ instrument Model: AMI 70
NO_x instrument Model: TELEDYNE 200 EM
SO₂ instrument Model: API 100 AH
CO instrument Model: API 300 A
Fuel Type : Natural Gas

Run # : 2
Location : VDU
Finish time : 2:36 PM
Serial No.: 121121-10
Serial No.: 433
Serial No.: 132
Serial No.: 1070
Test Operator : Kittipong T.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
2:16 PM	4.97	19.63	5.66	0.32
2:17 PM	4.98	19.67	5.79	0.32
2:18 PM	5.00	19.75	5.76	0.32
2:19 PM	5.03	19.64	5.74	0.32
2:20 PM	5.01	19.55	5.80	0.32
2:21 PM	5.01	19.47	5.86	0.32
2:22 PM	4.97	19.46	5.87	0.35
2:23 PM	4.96	19.53	5.88	0.35
2:24 PM	5.01	19.56	5.91	0.35
2:25 PM	5.00	19.58	5.87	0.37
2:26 PM	5.03	19.57	5.82	0.32
2:27 PM	5.00	19.56	5.80	0.32
2:28 PM	5.00	19.53	5.86	0.32
2:29 PM	5.01	19.48	5.82	0.32
2:30 PM	5.02	19.43	5.85	0.33
2:31 PM	5.00	19.52	5.87	0.33
2:32 PM	5.04	19.61	5.81	0.33
2:33 PM	5.01	19.61	5.76	0.33
2:34 PM	5.02	19.61	5.74	0.33
2:35 PM	5.01	19.55	5.75	0.33
2:36 PM	4.98	19.60	5.76	0.32
Average	5.00	19.57	5.81	0.33

Signature



Miss Katesarin Vorradetwittaya

Environmental Scientist

STAR PETROLEUM REFINING PUBLIC CO., LTD. EMISSION TEST RESULT

Date: April 18, 2022
Start time: 2:37 PM
O₂ instrument Model: AMI 70
NO_x instrument Model: TELEDYNE 200 EM
SO₂ instrument Model: API 100 AH
CO instrument Model: API 300 A
Fuel Type : Natural Gas

Run # : 3
Location : VDU
Finish time : 2:57 PM
Serial No.: 121121-10
Serial No.: 433
Serial No.: 132
Serial No.: 1070
Test Operator : Kittipong T.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
2:37 PM	4.99	19.64	5.76	0.32
2:38 PM	4.99	19.65	5.76	0.33
2:39 PM	5.00	19.59	5.77	0.32
2:40 PM	4.96	19.53	5.62	0.30
2:41 PM	4.97	19.51	5.70	0.31
2:42 PM	4.99	19.54	5.76	0.31
2:43 PM	5.01	19.59	5.76	0.33
2:44 PM	5.00	19.57	5.73	0.32
2:45 PM	5.09	19.51	5.60	0.33
2:46 PM	5.12	19.61	5.53	0.34
2:47 PM	5.10	19.58	5.54	0.34
2:48 PM	5.07	19.52	5.51	0.33
2:49 PM	5.07	19.50	5.55	0.33
2:50 PM	5.06	19.55	5.65	0.33
2:51 PM	5.26	19.53	5.67	0.33
2:52 PM	5.41	19.51	5.47	0.33
2:53 PM	5.42	19.44	5.33	0.31
2:54 PM	5.35	19.41	5.37	0.33
2:55 PM	5.36	19.41	5.50	0.33
2:56 PM	5.37	19.43	5.61	0.33
2:57 PM	5.39	19.47	5.17	0.33
Average	5.14	19.53	5.59	0.33

Signature



Miss Katesarin Vorradetwittaya

Environmental Scientist



บริษัท ซีคอต จำกัด
SECOT CO., LTD.

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TEL : +66(0) 2959-3600 FAX : +66(0) 2959-3535 E-mail : envserv@secot.co.th

STACK EMISSION ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: Refinery-222003-COA-Stk/PM
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING DATE	: 18/04/2022
RECEIVED DATE	: 22/04/2022	ANALYTICAL DATE	: 22-23/04/2022
REPORT DATE	: 26/04/2022	SAMPLE CONDITION	: Normal
STACK LOCATION	: NHTU/CCRU Stack	OPERATOR	: Mr. Song Hengchwankun
SOURCE DESCRIPTION	: Combustion	FUEL TYPE	: Natural Gas + Refinery Fuel Gas
STACK DESCRIPTION			

Height	: 65.0	m	Gas Velocity	: 10.3	m/s
Diameter	: 3.1	m	Flow rate ⁽¹⁾	: 2,553	Ncu,m/min
Temperature	: 214.5	°C	Excess Oxygen	: 4.4	%

PARAMETER	UNIT	RESULTS ⁽¹⁾		ASSIGNED VALUE ⁽²⁾	STANDARD ⁽³⁾	REFERENCE METHODS
		4.4 % O ₂	7 % O ₂			
Particulate Matter	mg/Ncu.m	1.7	1.4	60	60	US EPA Method 5

Phatchara Samanchan

(Miss Phatchara Samanchan)

Analyst

REG.NO. 2-239-ก-8183

Narisa Poowasanpetch

(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO. 2-239-ก-6419

Remark : 1. Reported analysis refers to submitted sample only.

2. This report shall not be reproduced, except in full, without official approval.

3. ⁽¹⁾ At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.

4. ⁽²⁾ Assigned value in EIA Report Expansion 3 of Refinery Plant, B.E. 2561 (2018).

5. ⁽³⁾ Notification of the Ministry of Natural Resources and Environment B.E.2554 (2011).

The Monitoring Result of Emission Concentration
NHTU
STAR PETROLEUM REFINING PUBLIC CO., LTD.
April 18, 2022

Run Number	Oxygen content (%)		Oxide of Nitrogen (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O ₂	Corrected Gas Conc @7% O ₂
1	4.47	4.46	30.72	30.69	25.95
2	4.32	4.31	31.15	31.12	26.07
3	4.36	4.34	31.64	31.61	26.53
Average	4.38	4.37	31.17	31.14	26.19

Run Number	Oxygen content (%)		Sulfur dioxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O ₂	Corrected Gas Conc @7% O ₂
1	4.47	4.46	4.04	4.01	3.39
2	4.32	4.31	5.19	5.16	4.32
3	4.36	4.34	5.90	5.86	4.92
Average	4.38	4.37	5.04	5.01	4.21

Run Number	Oxygen content (%)		Carbonmonoxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O ₂	Corrected Gas Conc @7% O ₂
1	4.47	4.46	0.74	0.72	0.61
2	4.32	4.31	0.80	0.78	0.65
3	4.36	4.34	0.82	0.81	0.68
Average	4.38	4.37	0.79	0.77	0.65

STAR PETROLEUM REFINING PUBLIC CO., LTD. EMISSION TEST RESULT

Date: April 18, 2022
Start time: 4:30 PM
O₂ instrument Model: AMI 70
NO_x instrument Model: TELEDYNE 200 EM
SO₂ instrument Model: API 100 AH
CO instrument Model: API 300 A
Fuel Type : Natural Gas

Run # : 1
Location : NHTU
Finish time : 4:50 PM
Serial No.: 121121-10
Serial No.: 435
Serial No.: 132
Serial No.: 1070
Test Operator : Kittipong T.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
4:30 PM	4.61	30.18	2.35	0.54
4:31 PM	4.50	30.37	2.52	0.71
4:32 PM	4.47	30.46	2.92	0.72
4:33 PM	4.60	30.46	3.20	0.70
4:34 PM	4.55	30.59	3.51	0.71
4:35 PM	4.48	30.70	3.68	0.71
4:36 PM	4.48	30.69	3.85	0.76
4:37 PM	4.51	30.68	3.96	0.76
4:38 PM	4.52	30.71	4.05	0.76
4:39 PM	4.52	30.75	4.16	0.76
4:40 PM	4.48	30.86	4.23	0.76
4:41 PM	4.39	30.92	4.28	0.76
4:42 PM	4.33	30.75	4.40	0.76
4:43 PM	4.33	30.59	4.50	0.76
4:44 PM	4.42	30.65	4.63	0.76
4:45 PM	4.46	30.79	4.68	0.76
4:46 PM	4.45	30.89	4.69	0.77
4:47 PM	4.41	31.02	4.76	0.77
4:48 PM	4.43	31.02	4.78	0.77
4:49 PM	4.46	31.02	4.81	0.77
4:50 PM	4.45	31.06	4.88	0.77
Average	4.47	30.72	4.04	0.74

Signature



Miss Katesarin Vorradetwittaya
Environmental Scientist

STAR PETROLEUM REFINING PUBLIC CO., LTD. EMISSION TEST RESULT

Date: April 18, 2022
Start time: 4:51 PM
O₂ instrument Model: AMI 70
NO_x instrument Model: TELEDYNE 200 EM
SO₂ instrument Model: API 100 AH
CO instrument Model: API 300 A
Fuel Type : Natural Gas

Run # : 2
Location : NHTU
Finish time : 5:11 PM
Serial No.: 121121-10
Serial No.: 435
Serial No.: 132
Serial No.: 1070
Test Operator : Kittipong T.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
4:51 PM	4.48	31.08	4.84	0.80
4:52 PM	4.46	31.07	4.84	0.83
4:53 PM	4.44	30.97	4.90	0.83
4:54 PM	4.44	30.98	4.98	0.82
4:55 PM	4.38	31.02	5.00	0.77
4:56 PM	4.36	31.04	4.98	0.77
4:57 PM	4.26	31.06	4.99	0.77
4:58 PM	4.26	31.08	5.01	0.77
4:59 PM	4.30	31.13	5.00	0.77
5:00 PM	4.28	31.19	5.06	0.77
5:01 PM	4.27	31.18	5.06	0.77
5:02 PM	4.27	31.17	5.11	0.77
5:03 PM	4.34	31.28	5.09	0.81
5:04 PM	4.31	31.34	5.21	0.83
5:05 PM	4.35	31.35	5.37	0.83
5:06 PM	4.35	31.29	5.47	0.83
5:07 PM	4.26	31.24	5.50	0.83
5:08 PM	4.20	31.21	5.59	0.83
5:09 PM	4.24	31.17	5.59	0.83
5:10 PM	4.22	31.17	5.69	0.83
5:11 PM	4.20	31.23	5.77	0.83
Average	4.32	31.15	5.19	0.80

Signature



Miss Katesarin Vorradetwittaya
Environmental Scientist

STAR PETROLEUM REFINING PUBLIC CO., LTD. EMISSION TEST RESULT

Run # : 3

Date: April 18, 2022 Location : NHTU

Start time: 5:12 PM Finish time: 5:32 PM

O₂ instrument Model: AMI 70 Serial No.: 121121-10

NO_x instrument Model: TELEDYNE 200 EM Serial No.: 435

SO₂ instrument Model: API 100 AH Serial No.: 132

CO instrument Model: API 300 A Serial No.: 1070

Fuel Type : Natural Gas Test Operator : Kittipong T.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
5:12 PM	4.15	31.41	5.78	0.83
5:13 PM	4.18	31.47	5.81	0.83
5:14 PM	4.26	31.42	5.81	0.83
5:15 PM	4.28	31.44	5.74	0.83
5:16 PM	4.25	31.53	5.62	0.83
5:17 PM	4.30	31.53	5.70	0.83
5:18 PM	4.33	31.57	5.79	0.83
5:19 PM	4.34	31.68	5.76	0.83
5:20 PM	4.37	31.77	5.77	0.83
5:21 PM	4.39	31.88	5.85	0.83
5:22 PM	4.36	31.90	5.91	0.83
5:23 PM	4.44	31.77	5.96	0.83
5:24 PM	4.32	31.72	5.92	0.83
5:25 PM	4.37	31.70	6.10	0.82
5:26 PM	4.36	31.60	6.04	0.82
5:27 PM	4.45	31.57	6.06	0.83
5:28 PM	4.49	31.56	6.13	0.83
5:29 PM	4.44	31.57	6.06	0.82
5:30 PM	4.45	31.54	6.04	0.82
5:31 PM	4.47	31.61	6.03	0.77
5:32 PM	4.64	32.14	5.94	0.82
Average	4.36	31.64	5.90	0.82

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Miss Katesarin Vorradetwittaya
Environmental Scientist



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STACK EMISSION ANALYSIS REPORT

CLIENT NAME : Star Petroleum Refining Public Co., Ltd. REFERENCE NO. : Refinery-222003-COA-Stk/PM

SAMPLING BY : SECOT Co., Ltd. SAMPLING DATE : 19/04/2022

RECEIVED DATE : 22/04/2022 ANALYTICAL DATE : 22-23/04/2022

REPORT DATE : 26/04/2022 SAMPLE CONDITION : Normal

STACK LOCATION : DHTU Stack OPERATOR : Mr. Song Hengchwankun

SOURCE DESCRIPTION : Combustion FUEL TYPE : Natural Gas + Refinery Fuel Gas

STACK DESCRIPTION

Height : 36.2 m Gas Velocity : 10.2 m/s

Diameter : 1.6 m Flow rate ⁽¹⁾ : 472 Ncu.m/min

Temperature : 413.3 °C Excess Oxygen : 5.2 %

PARAMETER	UNIT	RESULTS ⁽¹⁾		ASSIGNED VALUE ⁽²⁾	STANDARD ⁽³⁾	REFERENCE METHODS
		5.2 % O ₂	7 % O ₂			
Particulate Matter	mg/Ncu.m	3.1	2.7	60	60	US EPA Method 5

Phatchara Samanchan

(Miss Phatchara Samanchan)

Analyst

REG.NO. 3-239-ก-8183

Narisa Poowasanpetch

(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO. 3-239-ก-6419

Remark : 1. Reported analysis refers to submitted sample only.

2. This report shall not be reproduced, except in full, without official approval.

3. ⁽¹⁾ At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.4. ⁽²⁾ Assigned value in EIA Report Expasion 3 of Refinery Plant, B.E. 2561 (2018).5. ⁽³⁾ Notification of the Ministry of Natural Resources and Environment B.E.2554 (2011).

**The Monitoring Result of Emission Concentration
DHTU
STAR PETROLEUM REFINING PUBLIC CO., LTD.
April 19, 2022**

Run Number	Oxygen content (%)		Oxide of Nitrogen (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	5.20	5.17	29.67	29.66	26.21
2	5.17	5.14	30.36	30.35	26.77
3	5.18	5.15	30.56	30.56	26.97
Average	5.18	5.15	30.20	30.19	26.65

Run Number	Oxygen content (%)		Sulfur dioxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	5.20	5.17	0.55	0.50	0.44
2	5.17	5.14	0.40	0.35	0.31
3	5.18	5.15	1.09	1.05	0.93
Average	5.18	5.15	0.68	0.63	0.56

Run Number	Oxygen content (%)		Carbonmonoxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	5.20	5.17	2.69	2.66	2.35
2	5.17	5.14	4.08	4.05	3.57
3	5.18	5.15	5.76	5.73	5.06
Average	5.18	5.15	4.18	4.15	3.66

**STAR PETROLEUM REFINING PUBLIC CO., LTD.
EMISSION TEST RESULT**

Date: April 19, 2022
Start time: 12:10 PM
O₂ instrument Model: AMI 70
NO_x instrument Model: TELEDYNE 200 EM
SO₂ instrument Model: API 100 AH
CO instrument Model: THERMO 48 C
Fuel Type : Natural Gas

Run # : 1
Location : DHTU
Finish time : 12:30 PM
Serial No.: 111117-2
Serial No.: 435
Serial No.: 058
Serial No.: 365
Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
12:10 PM	5.63	29.81	0.44	3.74
12:11 PM	5.50	29.08	0.12	3.94
12:12 PM	5.33	29.54	0.21	3.74
12:13 PM	5.05	29.40	0.32	3.81
12:14 PM	5.33	29.35	0.43	2.79
12:15 PM	5.38	29.46	1.42	3.54
12:16 PM	5.19	30.05	1.68	2.15
12:17 PM	5.22	29.95	1.77	3.47
12:18 PM	5.31	30.01	1.37	3.38
12:19 PM	5.39	30.63	0.20	1.34
12:20 PM	5.10	29.65	0.42	1.67
12:21 PM	4.99	30.54	0.36	1.12
12:22 PM	4.83	30.17	0.15	4.27
12:23 PM	4.86	30.65	0.26	2.80
12:24 PM	4.96	29.65	0.22	2.63
12:25 PM	4.98	29.71	0.23	2.33
12:26 PM	4.95	29.82	0.31	1.60
12:27 PM	5.01	28.04	0.32	0.93
12:28 PM	5.23	29.84	0.14	1.88
12:29 PM	5.49	29.05	1.00	2.36
12:30 PM	5.38	28.73	0.28	3.07
Average	5.20	29.67	0.55	2.69

Signature


 Miss Katesarin Vorradetwittaya
 Environmental Scientist

STAR PETROLEUM REFINING PUBLIC CO., LTD. EMISSION TEST RESULT

Run # : 2

Date: April 19, 2022 Location : DHTU

Start time: 12:31 PM Finish time : 12:51 PM

O₂ instrument Model: AMI 70 Serial No.: 111117-2

NO_x instrument Model: TELEDYNE 200 EM Serial No.: 435

SO₂ instrument Model: API 100 AH Serial No.: 058

CO instrument Model: THERMO 48 C Serial No.: 365

Fuel Type : Natural Gas Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
12:31 PM	5.26	30.10	0.26	4.70
12:32 PM	5.26	30.30	0.18	1.80
12:33 PM	5.19	30.61	0.26	3.03
12:34 PM	5.23	30.77	0.13	3.90
12:35 PM	5.22	30.67	0.12	3.37
12:36 PM	5.21	30.46	0.31	3.97
12:37 PM	5.25	30.23	0.18	4.50
12:38 PM	5.18	29.91	0.11	3.20
12:39 PM	5.22	29.75	0.28	3.13
12:40 PM	5.17	29.91	0.14	2.22
12:41 PM	5.09	30.16	0.46	3.25
12:42 PM	5.16	30.16	0.42	4.45
12:43 PM	5.13	30.15	0.58	3.77
12:44 PM	5.14	30.29	0.54	5.80
12:45 PM	5.11	30.32	0.55	4.05
12:46 PM	5.06	30.44	0.64	4.93
12:47 PM	5.14	30.49	0.58	6.24
12:48 PM	5.16	30.44	0.63	5.55
12:49 PM	5.15	30.66	0.64	4.22
12:50 PM	5.11	30.89	0.67	4.58
12:51 PM	5.09	30.90	0.68	4.95
Average	5.17	30.36	0.40	4.08

Signature



Miss Katesarin Vorradetwittaya
Environmental Scientist

STAR PETROLEUM REFINING PUBLIC CO., LTD. EMISSION TEST RESULT

Run # : 3

Date: April 19, 2022 Location : DHTU

Start time: 12:52 PM Finish time : 1:12 PM

O₂ instrument Model: AMI 70 Serial No.: 111117-2

NO_x instrument Model: TELEDYNE 200 EM Serial No.: 435

SO₂ instrument Model: API 100 AH Serial No.: 058

CO instrument Model: THERMO 48 C Serial No.: 365

Fuel Type : Natural Gas Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
12:52 PM	5.10	30.82	0.87	6.65
12:53 PM	5.14	30.70	0.75	6.07
12:54 PM	5.12	30.75	0.69	4.69
12:55 PM	5.16	30.83	0.88	6.45
12:56 PM	5.24	30.94	0.66	5.04
12:57 PM	5.13	30.83	0.78	4.72
12:58 PM	5.11	30.44	0.85	6.85
12:59 PM	5.08	30.37	0.93	6.30
1:00 PM	5.08	30.52	0.93	5.39
1:01 PM	5.12	30.56	0.99	5.59
1:02 PM	5.15	30.47	1.00	6.32
1:03 PM	5.20	30.43	1.12	6.52
1:04 PM	5.22	30.55	1.02	6.22
1:05 PM	5.21	30.72	1.24	6.60
1:06 PM	5.23	30.61	1.39	4.97
1:07 PM	5.17	30.52	1.38	5.52
1:08 PM	5.20	30.52	1.41	4.39
1:09 PM	5.27	30.41	1.51	4.67
1:10 PM	5.32	30.34	1.43	5.87
1:11 PM	5.30	30.30	1.51	6.52
1:12 PM	5.21	30.16	1.49	5.64
Average	5.18	30.56	1.09	5.76

Signature



Miss Katesarin Vorradetwittaya
Environmental Scientist



บริษัท ซีคอต จำกัด
SECOT CO., LTD.

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STACK EMISSION ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: Refinery-222003-COA-Stk/PM
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING DATE	: 19/04/2022
RECEIVED DATE	: 22/04/2022	ANALYTICAL DATE	: 22-23/04/2022
REPORT DATE	: 26/04/2022	SAMPLE CONDITION	: Normal
STACK LOCATION	: HVGO-HTU Stack	OPERATOR	: Mr. Song Hengchwankun
SOURCE DESCRIPTION	: Combustion	FUEL TYPE	: Natural Gas + Refinery Fuel Gas

STACK DESCRIPTION

Height	: 36.2	m	Gas Velocity	: 7.6	m/s
Diameter	: 1.6	m	Flow rate ⁽¹⁾	: 372	Ncu.m/min
Temperature	: 379.5	°C	Excess Oxygen	: 5.5	%

PARAMETER	UNIT	RESULTS ⁽¹⁾		ASSIGNED VALUE ⁽²⁾	STANDARD ⁽³⁾	REFERENCE METHODS
		5.5 % O ₂	7 % O ₂			
Particulate Matter	mg/Ncu.m	1.3	1.2	60	60	US EPA Method 5

Phatchara Samanchan

(Miss Phatchara Samanchan)

Analyst

REG.NO. 7-239-8-8183

Narisa Poowasanpetch

(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO. 7-239-8-6419

Remark : 1. Reported analysis refers to submitted sample only.

2. This report shall not be reproduced, except in full, without official approval.

3. ⁽¹⁾ At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.

4. ⁽²⁾ Assigned value in EIA Report Expasion 3 of Refinery Plant, B.E. 2561 (2018).

5. ⁽³⁾ Notification of the Ministry of Natural Resources and Environment B.E.2554 (2011).

The Monitoring Result of Emission Concentration
HVGO
STAR PETROLEUM REFINING PUBLIC CO., LTD.
April 19, 2022

Run Number	Oxygen content (%)		Oxide of Nitrogen (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O ₂	Corrected Gas Conc @7% O ₂
1	5.65	5.64	52.22	52.23	47.58
2	5.46	5.45	54.14	54.15	48.72
3	5.38	5.36	54.10	54.11	48.40
Average	5.50	5.48	53.49	53.50	48.23

Run Number	Oxygen content (%)		Sulfur dioxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O ₂	Corrected Gas Conc @7% O ₂
1	5.65	5.64	2.05	2.01	1.83
2	5.46	5.45	0.71	0.67	0.60
3	5.38	5.36	0.68	0.63	0.56
Average	5.50	5.48	1.15	1.10	0.99

Run Number	Oxygen content (%)		Carbonmonoxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O ₂	Corrected Gas Conc @7% O ₂
1	5.65	5.64	0.59	0.57	0.52
2	5.46	5.45	1.01	0.99	0.89
3	5.38	5.36	0.55	0.52	0.47
Average	5.50	5.48	0.71	0.69	0.63

STAR PETROLEUM REFINING PUBLIC CO., LTD. EMISSION TEST RESULT

Run # : 1
Date: April 19, 2022
Location : HVGO
Start time: 10:20 AM
Finish time : 10:40 AM
O₂ instrument Model: AMI 70
Serial No.: 111117-2
NO_x instrument Model: TELEDYNE 200 EM
Serial No.: 435
SO₂ instrument Model: API 100 AH
Serial No.: 058
CO instrument Model: THERMO 48 C
Serial No.: 365
Fuel Type : Natural Gas
Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
10:20 AM	5.66	51.83	2.51	0.37
10:21 AM	5.68	52.14	2.51	0.53
10:22 AM	5.67	52.03	2.58	0.86
10:23 AM	5.64	52.07	2.45	0.58
10:24 AM	5.69	52.03	2.45	0.48
10:25 AM	5.69	51.80	2.55	0.48
10:26 AM	5.61	51.84	2.65	0.39
10:27 AM	5.62	51.83	2.56	0.61
10:28 AM	5.60	52.05	2.51	0.64
10:29 AM	5.64	51.68	2.45	0.59
10:30 AM	5.71	51.63	2.19	0.56
10:31 AM	5.71	51.75	2.20	0.63
10:32 AM	5.67	51.79	2.06	0.61
10:33 AM	5.67	51.68	1.94	0.48
10:34 AM	5.66	51.66	1.68	0.54
10:35 AM	5.67	51.83	1.54	0.64
10:36 AM	5.60	52.46	1.46	0.83
10:37 AM	5.60	53.08	1.40	0.74
10:38 AM	5.64	53.60	1.11	0.56
10:39 AM	5.67	53.94	1.05	0.54
10:40 AM	5.65	53.92	1.15	0.74
Average	5.65	52.22	2.05	0.59

Signature



Miss Katesarin Vorradetwittaya

Environmental Scientist

STAR PETROLEUM REFINING PUBLIC CO., LTD. EMISSION TEST RESULT

Run # : 2
Date: April 19, 2022
Location : HVGO
Start time: 10:41 AM
Finish time : 11:01 AM
O₂ instrument Model: AMI 70
Serial No.: 111117-2
NO_x instrument Model: TELEDYNE 200 EM
Serial No.: 435
SO₂ instrument Model: API 100 AH
Serial No.: 058
CO instrument Model: THERMO 48 C
Serial No.: 365
Fuel Type : Natural Gas
Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
10:41 AM	5.61	53.93	1.04	0.89
10:42 AM	5.62	53.91	1.05	0.81
10:43 AM	5.61	53.91	0.92	0.66
10:44 AM	5.65	53.92	0.95	0.72
10:45 AM	5.63	54.03	1.04	0.98
10:46 AM	5.58	54.19	0.93	0.76
10:47 AM	5.55	54.20	0.88	0.99
10:48 AM	5.51	54.07	0.84	0.87
10:49 AM	5.49	54.00	0.86	1.54
10:50 AM	5.47	54.05	0.80	1.28
10:51 AM	5.48	54.18	0.72	1.27
10:52 AM	5.41	54.38	0.66	1.53
10:53 AM	5.40	54.11	0.57	0.76
10:54 AM	5.42	54.32	0.52	1.09
10:55 AM	5.34	54.61	0.48	1.02
10:56 AM	5.36	54.14	0.50	0.86
10:57 AM	5.37	54.24	0.44	1.88
10:58 AM	5.28	54.46	0.52	0.96
10:59 AM	5.28	54.28	0.42	0.74
11:00 AM	5.33	54.01	0.41	0.74
11:01 AM	5.33	54.05	0.38	0.76
Average	5.46	54.14	0.71	1.01

Signature



Miss Katesarin Vorradetwittaya

Environmental Scientist

STAR PETROLEUM REFINING PUBLIC CO., LTD.

EMISSION TEST RESULT



บริษัท ซีคอต จำกัด

SECOT CO., LTD.

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Run # : 3

Date: April 19, 2022 Location: HVGO

Start time: 11:02 AM Finish time: 11:22 AM

O₂ instrument Model: AMI 70 Serial No.: 111117-2

NO_x instrument Model: TELEDYNE 200 EM Serial No.: 435

SO₂ instrument Model: API 100 AH Serial No.: 058

CO instrument Model: THERMO 48 C Serial No.: 365

Fuel Type: Natural Gas Test Operator: Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
11:02 AM	5.37	54.31	0.52	0.36
11:03 AM	5.36	54.29	0.57	0.65
11:04 AM	5.38	54.18	0.61	0.36
11:05 AM	5.33	54.13	0.63	0.67
11:06 AM	5.32	54.21	0.70	0.76
11:07 AM	5.32	53.94	0.63	0.26
11:08 AM	5.37	54.00	0.67	0.65
11:09 AM	5.34	54.17	0.73	0.52
11:10 AM	5.36	54.13	0.68	0.27
11:11 AM	5.44	54.07	0.85	0.44
11:12 AM	5.43	53.82	0.64	0.54
11:13 AM	5.47	53.85	0.78	0.73
11:14 AM	5.45	53.86	0.65	0.67
11:15 AM	5.41	54.11	0.66	0.65
11:16 AM	5.36	54.30	0.64	0.27
11:17 AM	5.36	54.19	0.62	0.66
11:18 AM	5.42	54.08	0.66	0.37
11:19 AM	5.46	53.95	0.65	0.36
11:20 AM	5.46	54.13	0.76	0.52
11:21 AM	5.39	54.24	0.79	0.81
11:22 AM	5.28	54.15	0.83	0.94
Average	5.38	54.10	0.68	0.55

Signature

Miss Katesarin Vorradetwittaya

Environmental Scientist

STACK EMISSION ANALYSIS REPORT

CLIENT NAME : Star Petroleum Refining Public Co., Ltd. REFERENCE NO. : Refinery-222003-COA-Srk/PM

SAMPLING BY : SECOT Co., Ltd. SAMPLING DATE : 19/04/2022

RECEIVED DATE : 22/04/2022 ANALYTICAL DATE : 22-23/04/2022

REPORT DATE : 26/04/2022 SAMPLE CONDITION : Normal

STACK LOCATION : WCN-HTU Stack OPERATOR : Mr. Song Hengchwankun

SOURCE DESCRIPTION : Combustion FUEL TYPE : Natural Gas + Refinery Fuel Gas

STACK DESCRIPTION

Height : 32.5 m Gas Velocity : 5.3 m/s

Diameter : 0.86 m Flow rate⁽¹⁾ : 88.6 Ncu.m/min

Temperature : 279.2 °C Excess Oxygen : 7.8 %

PARAMETER	UNIT	RESULTS ⁽¹⁾		ASSIGNED VALUE ⁽²⁾	STANDARD ⁽³⁾	REFERENCE METHODS
		7.8 % O ₂	7 % O ₂			
Particulate Matter	mg/Ncu.m	1.5	1.6	35	60	US EPA Method 5

Phatchara Samanchan

(Miss Phatchara Samanchan)

Analyst

REG.NO. 2-239-ก-8183

Naim Poowasanpetk

(Miss Narisa Poowasanpetk)

Technical Management Team

REG.NO. 2-239-ก-6419

Remark : 1. Reported analysis refers to submitted sample only.

2. This report shall not be reproduced, except in full, without official approval.

3. ⁽¹⁾ At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.4. ⁽²⁾ Assigned value in EIA Report Expansion 3 of Refinery Plant, B.E. 2561 (2018).5. ⁽³⁾ Notification of the Ministry of Natural Resources and Environment B.E.2554 (2011).

The Monitoring Result of Emission Concentration
WCN-HTU
STAR PETROLEUM REFINING PUBLIC CO., LTD.
April 19, 2022

Run Number	Oxygen content (%)		Oxide of Nitrogen (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	7.75	7.72	18.73	18.72	19.74
2	7.90	7.87	18.86	18.84	20.10
3	7.92	7.89	18.81	18.79	20.08
Average	7.86	7.83	18.80	18.78	19.97

Run Number	Oxygen content (%)		Sulfur dioxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	7.75	7.72	3.73	3.69	3.89
2	7.90	7.87	3.42	3.39	3.62
3	7.92	7.89	2.74	2.71	2.90
Average	7.86	7.83	3.29	3.26	3.47

Run Number	Oxygen content (%)		Carbonmonoxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	7.75	7.72	0.43	0.40	0.42
2	7.90	7.87	0.44	0.41	0.44
3	7.92	7.89	0.44	0.42	0.45
Average	7.86	7.83	0.43	0.41	0.44

STAR PETROLEUM REFINING PUBLIC CO., LTD.
EMISSION TEST RESULT

Run # : 1
 Date: April 19, 2022
 Location : WCN-HTU
 Start time: 2:30 PM
 Finish time : 2:50 PM
 O₂ instrument Model: AMI 70
 Serial No.: 111117-2
 NO_x instrument Model: TELEDYNE 200 EM
 Serial No.: 435
 SO₂ instrument Model: API 100 AH
 Serial No.: 058
 CO instrument Model: THERMO 48 C
 Serial No.: 365
 Fuel Type : Natural Gas
 Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
2:30 PM	7.68	18.73	3.24	0.44
2:31 PM	7.67	18.82	3.32	0.44
2:32 PM	7.68	19.21	3.35	0.38
2:33 PM	7.68	18.01	3.10	0.43
2:34 PM	7.59	18.21	3.54	0.44
2:35 PM	7.83	18.37	3.21	0.44
2:36 PM	7.89	18.56	3.61	0.36
2:37 PM	7.77	18.73	3.85	0.37
2:38 PM	7.74	18.70	3.76	0.37
2:39 PM	7.71	18.66	4.08	0.38
2:40 PM	7.62	18.76	4.06	0.54
2:41 PM	7.73	18.75	4.11	0.30
2:42 PM	7.80	18.79	4.01	0.63
2:43 PM	7.63	18.85	4.02	0.33
2:44 PM	7.77	18.90	3.94	0.44
2:45 PM	7.77	18.96	3.97	0.44
2:46 PM	7.69	18.97	3.86	0.43
2:47 PM	7.77	18.85	3.86	0.47
2:48 PM	7.89	18.76	3.90	0.45
2:49 PM	7.88	18.88	3.84	0.44
2:50 PM	7.90	18.92	3.72	0.45
Average	7.75	18.73	3.73	0.43

Signature



Miss Katesarin Vorradetwittaya

Environmental Scientist

STAR PETROLEUM REFINING PUBLIC CO., LTD. EMISSION TEST RESULT

Run # : 2
Date: April 19, 2022
Location : WCN-HTU
Start time: 2:51 PM
Finish time : 3:11 PM
O₂ instrument Model: AMI 70
Serial No.: 111117-2
NO_x instrument Model: TELEDYNE 200 EM
Serial No.: 435
SO₂ instrument Model: API 100 AH
Serial No.: 058
CO instrument Model: THERMO 48 C
Serial No.: 365
Fuel Type : Natural Gas
Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
2:51 PM	8.00	18.87	3.74	0.40
2:52 PM	7.86	18.87	3.69	0.44
2:53 PM	7.78	18.87	3.69	0.44
2:54 PM	7.92	18.84	3.61	0.44
2:55 PM	7.91	18.79	3.57	0.44
2:56 PM	7.88	18.88	3.53	0.44
2:57 PM	7.85	18.95	3.53	0.44
2:58 PM	7.80	18.87	3.58	0.44
2:59 PM	7.86	18.82	3.55	0.44
3:00 PM	7.95	18.84	3.45	0.44
3:01 PM	7.93	18.90	3.44	0.44
3:02 PM	7.82	18.88	3.44	0.44
3:03 PM	7.85	18.77	3.46	0.44
3:04 PM	7.93	18.75	3.32	0.44
3:05 PM	7.87	18.76	3.33	0.44
3:06 PM	7.99	18.84	3.23	0.44
3:07 PM	7.85	18.94	3.19	0.44
3:08 PM	7.94	18.94	3.15	0.44
3:09 PM	7.92	18.90	3.16	0.44
3:10 PM	7.93	18.83	3.03	0.44
3:11 PM	8.00	18.87	3.03	0.46
Average	7.90	18.86	3.42	0.44

Signature



Miss Katesarin Vorradetwittaya

Environmental Scientist

STAR PETROLEUM REFINING PUBLIC CO., LTD. EMISSION TEST RESULT

Run # : 3
Date: April 19, 2022
Location : WCN-HTU
Start time: 3:12 PM
Finish time : 3:32 PM
O₂ instrument Model: AMI 70
Serial No.: 111117-2
NO_x instrument Model: TELEDYNE 200 EM
Serial No.: 435
SO₂ instrument Model: API 100 AH
Serial No.: 058
CO instrument Model: THERMO 48 C
Serial No.: 365
Fuel Type : Natural Gas
Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
3:12 PM	7.94	18.98	2.99	0.42
3:13 PM	7.90	18.95	2.93	0.33
3:14 PM	7.99	18.92	2.83	0.46
3:15 PM	7.91	18.90	2.89	0.44
3:16 PM	7.93	18.89	2.90	0.46
3:17 PM	7.84	18.78	2.93	0.46
3:18 PM	7.87	18.69	2.83	0.43
3:19 PM	7.90	18.75	2.94	0.43
3:20 PM	8.03	18.89	2.91	0.43
3:21 PM	7.98	18.94	2.93	0.43
3:22 PM	8.01	18.93	2.82	0.43
3:23 PM	7.97	18.79	2.73	0.44
3:24 PM	7.91	18.67	2.72	0.44
3:25 PM	7.93	18.68	2.74	0.44
3:26 PM	7.96	18.71	2.64	0.46
3:27 PM	7.90	18.82	2.69	0.46
3:28 PM	7.87	18.86	2.52	0.44
3:29 PM	7.95	18.78	2.40	0.44
3:30 PM	7.85	18.66	2.39	0.47
3:31 PM	7.84	18.68	2.43	0.44
3:32 PM	7.89	18.80	2.31	0.44
Average	7.92	18.81	2.74	0.44

Signature



Miss Katesarin Vorradetwittaya

Environmental Scientist



บริษัท ซีคอต จำกัด
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STACK EMISSION ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: Refinery-222003-COA-Stk/PM
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING DATE	: 21/04/2022
RECEIVED DATE	: 22/04/2022	ANALYTICAL DATE	: 22-23/04/2022
REPORT DATE	: 26/04/2022	SAMPLE CONDITION	: Normal
STACK LOCATION	: Boiler#3 Stack	OPERATOR	: Mr. Song Hengchwankun
SOURCE DESCRIPTION	: Combustion	FUEL TYPE	: Natural Gas + Refinery Fuel Gas
STACK DESCRIPTION			

Height	: 32.4	m	Gas Velocity	: 9.4	m/s
Diameter	: 1.5	m	Flow rate ⁽¹⁾	: 615	Ncu.m/min
Temperature	: 161.0	°C	Excess Oxygen	: 4.7	%

PARAMETER	UNIT	RESULTS ⁽¹⁾		ASSIGNED VALUE ⁽²⁾	STANDARD ⁽³⁾	REFERENCE METHODS
		4.7 % O ₂	7 % O ₂			
Particulate Matter	mg/Ncu.m	1.3	1.1	20	60	US EPA Method 5

Phatchara Samanchan

(Miss Phatchara Samanchan)

Analyst

REG.NO. 7-239-8-8183

Maim Poowasanpetch

(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO. 7-239-8-6419

Remark : 1. Reported analysis refers to submitted sample only.

2. This report shall not be reproduced, except in full, without official approval.

3. ⁽¹⁾ At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.

4. ⁽²⁾ Assigned value in EIA Report Expasion 3 of Refinery Plant, B.E. 2561 (2018).

5. ⁽³⁾ Notification of the Ministry of Natural Resources and Environment B.E.2554 (2011).

The Monitoring Result of Emission Concentration Boiler 3 STAR PETROLEUM REFINING PUBLIC CO., LTD. April 21, 2022

Run Number	Oxygen content (%)		Oxide of Nitrogen (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	4.80	4.78	33.31	33.10	28.54
2	4.87	4.85	33.05	32.80	28.41
3	4.54	4.52	33.37	33.07	28.06
Average	4.74	4.72	33.24	32.99	28.34

Run Number	Oxygen content (%)		Sulfur dioxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	4.80	4.78	0.44	0.42	0.36
2	4.87	4.85	0.64	0.62	0.54
3	4.54	4.52	0.81	0.79	0.67
Average	4.74	4.72	0.63	0.61	0.52

Run Number	Oxygen content (%)		Carbonmonoxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	4.80	4.78	0.93	0.92	0.79
2	4.87	4.85	0.94	0.93	0.81
3	4.54	4.52	0.94	0.93	0.79
Average	4.74	4.72	0.94	0.93	0.80

STAR PETROLEUM REFINING PUBLIC CO., LTD. EMISSION TEST RESULT

Date: April 21, 2022
Start time: 1:00 PM
O₂ instrument Model: AMI 70
NO_x instrument Model: API 200 AH
SO₂ instrument Model: API 100 AH
CO instrument Model: API 300 A
Fuel Type : Natural Gas

Run # : 1
Location : Boiler 3
Finish time : 1:20 PM
Serial No.: 121121-10
Serial No.: 342
Serial No.: 083
Serial No.: 1070
Test Operator : Kittipong T.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
1:00 PM	4.42	33.88	0.36	0.89
1:01 PM	4.35	34.14	0.37	0.91
1:02 PM	4.52	33.86	0.37	0.92
1:03 PM	4.60	33.45	0.39	0.94
1:04 PM	4.66	33.62	0.36	0.94
1:05 PM	4.58	33.78	0.40	0.94
1:06 PM	4.70	33.63	0.41	0.94
1:07 PM	4.80	33.39	0.35	0.94
1:08 PM	4.87	33.36	0.40	0.94
1:09 PM	5.01	33.07	0.39	0.94
1:10 PM	4.92	32.79	0.43	0.94
1:11 PM	4.91	32.83	0.48	0.91
1:12 PM	4.67	33.35	0.51	0.91
1:13 PM	4.94	33.37	0.47	0.89
1:14 PM	4.99	32.86	0.49	0.94
1:15 PM	4.93	32.80	0.50	0.94
1:16 PM	4.88	33.06	0.49	0.95
1:17 PM	5.14	33.03	0.45	0.95
1:18 PM	5.10	32.87	0.50	0.95
1:19 PM	4.93	33.13	0.52	0.95
1:20 PM	4.85	33.24	0.56	0.94
Average	4.80	33.31	0.44	0.93

Signature 
 Miss Katesarin Vorradetwittaya
 Environmental Scientist

STAR PETROLEUM REFINING PUBLIC CO., LTD. EMISSION TEST RESULT

Date: April 21, 2022
Start time: 1:21 PM
O₂ instrument Model: AMI 70
NO_x instrument Model: API 200 AH
SO₂ instrument Model: API 100 AH
CO instrument Model: API 300 A
Fuel Type : Natural Gas

Run # : 2
Location : Boiler 3
Finish time : 1:41 PM
Serial No.: 121121-10
Serial No.: 342
Serial No.: 083
Serial No.: 1070
Test Operator : Kittipong T.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
1:21 PM	5.11	32.85	0.52	0.89
1:22 PM	5.18	32.94	0.52	0.89
1:23 PM	5.21	33.12	0.55	0.89
1:24 PM	5.35	32.90	0.57	0.89
1:25 PM	5.20	32.75	0.53	0.93
1:26 PM	4.83	33.21	0.55	0.94
1:27 PM	4.75	33.46	0.63	0.95
1:28 PM	4.93	33.36	0.60	0.94
1:29 PM	4.82	33.12	0.62	0.95
1:30 PM	4.83	33.12	0.63	0.95
1:31 PM	4.88	33.02	0.67	0.95
1:32 PM	4.88	32.84	0.66	0.95
1:33 PM	4.67	32.79	0.68	0.95
1:34 PM	4.54	32.85	0.68	0.95
1:35 PM	4.71	32.75	0.67	0.95
1:36 PM	4.90	32.82	0.69	0.95
1:37 PM	4.49	33.31	0.71	0.95
1:38 PM	4.67	33.50	0.77	0.95
1:39 PM	4.79	33.15	0.75	0.95
1:40 PM	4.91	32.99	0.70	0.95
1:41 PM	4.70	33.25	0.74	0.95
Average	4.87	33.05	0.64	0.94

Signature 
 Miss Katesarin Vorradetwittaya
 Environmental Scientist

STAR PETROLEUM REFINING PUBLIC CO., LTD.

EMISSION TEST RESULT

Run # : 3

Date: April 21, 2022

Location : Boiler 3

Start time: 1:42 PM

Finish time: 2:02 PM

O₂ instrument Model: AMI 70

Serial No.: 121121-10

NO_x instrument Model: API 200 AH

Serial No.: 342

SO₂ instrument Model: API 100 AH

Serial No.: 083

CO instrument Model: API 300 A

Serial No.: 1070

Fuel Type : Natural Gas

Test Operator : Kittipong T.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
1:42 PM	4.77	33.35	0.73	0.95
1:43 PM	4.71	33.00	0.75	0.95
1:44 PM	4.62	33.58	0.74	0.95
1:45 PM	4.41	33.80	0.74	0.95
1:46 PM	4.55	33.78	0.75	0.95
1:47 PM	4.52	33.53	0.75	0.94
1:48 PM	4.59	33.22	0.78	0.94
1:49 PM	4.64	33.08	0.77	0.94
1:50 PM	4.56	33.36	0.76	0.95
1:51 PM	4.43	33.35	0.77	0.94
1:52 PM	4.46	33.55	0.82	0.94
1:53 PM	4.65	33.29	0.84	0.94
1:54 PM	4.72	32.80	0.80	0.94
1:55 PM	4.69	32.63	0.82	0.94
1:56 PM	4.62	32.85	0.87	0.94
1:57 PM	4.60	32.90	0.83	0.94
1:58 PM	4.39	33.06	0.85	0.94
1:59 PM	4.28	33.64	0.87	0.94
2:00 PM	4.30	34.08	0.87	0.94
2:01 PM	4.21	34.08	0.91	0.94
2:02 PM	4.64	33.76	0.92	0.93
Average	4.54	33.37	0.81	0.94

Signature

Miss Katesarin Vorradetwittaya
Environmental Scientist



บริษัท ซีคอต จำกัด

SECOT CO., LTD.

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STACK EMISSION ANALYSIS REPORT

CLIENT NAME : Star Petroleum Refining Public Co., Ltd. REFERENCE NO. : Refinery-222003-COA-Stk/PM

SAMPLING BY : SECOT Co., Ltd. SAMPLING DATE : 18/04/2022

RECEIVED DATE : 22/04/2022 ANALYTICAL DATE : 22-23/04/2022

REPORT DATE : 26/04/2022 SAMPLE CONDITION : Normal

STACK LOCATION : SRU/TGTU Stack OPERATOR : Mr. Song Hengchwankun

SOURCE DESCRIPTION : Combustion FUEL TYPE : Natural Gas + Refinery Fuel Gas

STACK DESCRIPTION

Height : 70.1 m Gas Velocity : 4.2 m/s

Diameter : 2.2 m Flow rate ⁽¹⁾ : 335 Ncu.m/min

Temperature : 494.1 °C Excess Oxygen : 4.0 %

PARAMETER	UNIT	RESULTS ⁽¹⁾		ASSIGNED VALUE ⁽²⁾	STANDARD ⁽³⁾	REFERENCE METHODS
		4.0 % O ₂	7 % O ₂			
Particulate Matter	mg/Ncu.m	2.5	2.1	60	—	US EPA Method 5

Phatchara Samanchan

(Miss Phatchara Samanchan)

Analyst

REG.NO. 2-239-ก-8183

Naris Poowasanpetch

(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO. 2-239-ก-6419

Remark : 1. Reported analysis refers to submitted sample only.

2. This report shall not be reproduced, except in full, without official approval.

3. ⁽¹⁾ At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.4. ⁽²⁾ Assigned value in EIA Report Expasion 3 of Refinery Plant, B.E. 2561 (2018).5. ⁽³⁾ Notification of the Ministry of Natural Resources and Environment B.E.2554 (2011).



บริษัท ซีคอต จำกัด
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STACK EMISSION ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: Refinery-222003-COA-Stk/H2S
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING DATE	: 18/04/2022
RECEIVED DATE	: 20/04/2022	ANALYTICAL DATE	: 23/04/2022
REPORT DATE	: 03/05/2022	SAMPLE CONDITION	: Normal
STACK LOCATION	: SRU Stack	OPERATOR	: Mr, Song Hengchwankun
SOURCE DESCRIPTION	: Combustion	FUEL TYPE	: Natural Gas + Refinery Fuel Gas

STACK DESCRIPTION

Height	: 70.1	m	Gas Velocity	: 4.2	m/s
Diameter	: 2.2	m	Flow rate ⁽¹⁾	: 335.1	Ncu.m/min
Temperature	: 494.1	°C	Excess Oxygen	: 4.0	%

PARAMETER	UNIT	RESULTS ⁽¹⁾		ASSIGNED VALUE ⁽²⁾	STANDARD	REFERENCE METHODS
		4.0 % O ₂	7 % O ₂			
Hydrogen Sulfide	ppm	<0.3	<0.2	60	-	US EPA Method 16

Sudaporn Soonthorn

(Miss Sudaporn Soonthorn)

Analyst

Narisa Poowasanpetch

(Miss Narisa Poowasanpetch)

Technical Management Team

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3. ⁽¹⁾ At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.

4. ⁽²⁾ Assigned value in EIA Report Expasion 3 of Refinery Plant, B.E. 2561 (2018).

The Monitoring Result of Emission Concentration
SRU

STAR PETROLEUM REFINING PUBLIC CO., LTD.

April 18, 2022

Run Number	Oxygen content (%)		Oxide of Nitrogen (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	3.98	3.96	10.49	10.46	8.58
2	3.97	3.95	10.82	10.79	8.85
3	4.03	4.01	11.00	10.97	9.03
Average	3.99	3.97	10.77	10.74	8.82

Run Number	Oxygen content (%)		Sulfur dioxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	3.98	3.96	254.59	254.84	209.11
2	3.97	3.95	252.35	252.60	207.15
3	4.03	4.01	250.67	250.91	206.49
Average	3.99	3.97	252.54	252.78	207.58

Run Number	Oxygen content (%)		Carbonmonoxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	3.98	3.96	302.94	303.26	248.84
2	3.97	3.95	310.60	310.92	254.97
3	4.03	4.01	306.45	306.75	252.45
Average	3.99	3.97	306.66	306.98	252.09

STAR PETROLEUM REFINING PUBLIC CO., LTD. EMISSION TEST RESULT

Run # : 1

Date: April 18, 2022 Location : SRU

Start time: 2:10 PM Finish time: 2:30 PM

O₂ instrument Model: AMI 70 Serial No.: 111117-2

NO_x instrument Model: TELEDYNE 200 EH Serial No.: 435

SO₂ instrument Model: API 100 AH Serial No.: 058

CO instrument Model: THERMO 48 C Serial No.: 365

Fuel Type : Natural Gas Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
2:10 PM	4.21	10.26	253.14	298.86
2:11 PM	4.11	10.05	252.54	301.47
2:12 PM	4.03	10.08	252.93	310.54
2:13 PM	4.02	10.09	252.88	304.27
2:14 PM	4.12	10.19	251.03	317.12
2:15 PM	4.05	10.24	253.50	307.27
2:16 PM	3.95	10.36	262.32	289.34
2:17 PM	3.93	10.47	259.78	214.78
2:18 PM	3.85	10.48	253.92	289.39
2:19 PM	3.93	10.50	258.13	327.59
2:20 PM	3.91	10.53	262.48	309.44
2:21 PM	3.92	10.59	258.38	309.37
2:22 PM	3.94	10.68	252.41	314.58
2:23 PM	3.97	10.71	255.46	297.33
2:24 PM	3.98	10.71	256.73	308.71
2:25 PM	3.95	10.73	256.25	310.24
2:26 PM	3.93	10.68	254.62	307.40
2:27 PM	3.93	10.64	245.51	311.57
2:28 PM	3.95	10.72	245.80	311.57
2:29 PM	4.03	10.80	251.83	311.64
2:30 PM	3.95	10.73	256.77	309.17
Average	3.98	10.49	254.59	302.94

Signature



Miss Katesarin Vorradetwittaya

Environmental Scientist

STAR PETROLEUM REFINING PUBLIC CO., LTD. EMISSION TEST RESULT

Run # : 2

Date: April 18, 2022 Location : SRU

Start time: 2:31 PM Finish time: 2:51 PM

O₂ instrument Model: AMI 70 Serial No.: 111117-2

NO_x instrument Model: TELEDYNE 200 EH Serial No.: 435

SO₂ instrument Model: API 100 AH Serial No.: 058

CO instrument Model: THERMO 48 C Serial No.: 365

Fuel Type : Natural Gas Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
2:31 PM	3.95	10.67	257.60	280.51
2:32 PM	3.95	10.69	256.72	307.83
2:33 PM	3.97	10.69	260.09	314.51
2:34 PM	3.99	10.79	260.85	311.97
2:35 PM	3.99	10.82	264.66	311.11
2:36 PM	3.98	10.89	258.11	311.67
2:37 PM	3.97	10.97	254.64	312.54
2:38 PM	3.92	10.95	252.99	312.64
2:39 PM	3.93	10.92	249.74	311.44
2:40 PM	3.99	10.88	249.91	309.37
2:41 PM	3.95	10.87	248.53	308.50
2:42 PM	4.00	10.85	249.26	313.30
2:43 PM	3.97	10.76	249.75	313.34
2:44 PM	3.96	10.76	251.17	311.64
2:45 PM	3.93	10.82	248.71	311.74
2:46 PM	3.97	10.81	248.13	313.64
2:47 PM	3.94	10.76	248.42	313.97
2:48 PM	3.95	10.77	249.07	315.41
2:49 PM	3.98	10.84	248.24	313.37
2:50 PM	3.97	10.84	247.13	312.64
2:51 PM	4.01	10.88	245.71	311.47
Average	3.97	10.82	252.35	310.60

Signature



Miss Katesarin Vorradetwittaya

Environmental Scientist

STAR PETROLEUM REFINING PUBLIC CO., LTD.

EMISSION TEST RESULT



บริษัท ซีคอต จำกัด

SECOT CO., LTD.

239 ถนนริมคลองประปา แขวงบางซื่อ เขตบางซื่อ กรุงเทพฯ 10800

239 RIMKLONGPRAPA ROAD, BANGSUE, BANGKOK 10800, THAILAND

TEL : +66(0) 2959-3600 FAX : +66(0) 2959-3535 E-mail : envserv@secot.co.th

Run # : 3

Date: April 18, 2022 Location : SRU

Start time: 2:52 PM Finish time: 3:12 PM

O₂ instrument Model: AMI 70 Serial No.: 111117-2

NO_x instrument Model: TELEDYNE 200 EH Serial No.: 435

SO₂ instrument Model: API 100 AH Serial No.: 058

CO instrument Model: THERMO 48 C Serial No.: 365

Fuel Type : Natural Gas Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
2:52 PM	3.96	10.92	248.56	311.41
2:53 PM	4.03	10.93	249.88	310.87
2:54 PM	3.99	10.96	246.20	309.91
2:55 PM	4.00	11.06	246.93	309.17
2:56 PM	4.04	11.10	251.57	310.84
2:57 PM	4.06	11.03	252.98	309.13
2:58 PM	4.02	10.95	255.77	310.34
2:59 PM	4.01	10.90	255.86	311.90
3:00 PM	3.97	10.89	253.93	310.90
3:01 PM	3.96	10.95	254.14	307.43
3:02 PM	4.01	10.96	253.26	309.30
3:03 PM	4.04	10.88	253.85	310.40
3:04 PM	3.99	10.97	252.97	307.83
3:05 PM	3.97	11.02	250.49	304.83
3:06 PM	4.01	10.94	247.93	304.90
3:07 PM	4.07	10.96	247.60	301.23
3:08 PM	4.11	11.06	248.98	301.03
3:09 PM	4.18	11.10	250.03	300.03
3:10 PM	4.08	11.12	248.55	298.06
3:11 PM	4.07	11.08	247.96	298.09
3:12 PM	4.10	11.13	246.73	297.76
Average	4.03	11.00	250.67	306.45

Signature

Miss Katesarin Vorradetwittaya

Environmental Scientist

STACK EMISSION ANALYSIS REPORT

CLIENT NAME : Star Petroleum Refining Public Co., Ltd. REFERENCE NO. : Refinery-222003-COA-Stk/PM

SAMPLING BY : SECOT Co., Ltd. SAMPLING DATE : 21/04/2022

RECEIVED DATE : 22/04/2022 ANALYTICAL DATE : 22-23/04/2022

REPORT DATE : 26/04/2022 SAMPLE CONDITION : Normal

STACK LOCATION : Boiler#1 Stack OPERATOR : Mr. Song Hengchwankun

SOURCE DESCRIPTION : Combustion FUEL TYPE : Natural Gas + Refinery Fuel Gas

STACK DESCRIPTION

Height : 32.4 m Gas Velocity : 10.0 m/s

Diameter : 1.5 m Flow rate⁽¹⁾ : 627 Ncu.m/min

Temperature : 175.0 °C Excess Oxygen : 4.6 %

PARAMETER	UNIT	RESULTS ⁽¹⁾		ASSIGNED VALUE ⁽²⁾	STANDARD ⁽³⁾	REFERENCE METHODS
		4.6 % O ₂	7 % O ₂			
Particulate Matter	mg/Ncu.m	2.4	2.0	60	60	US EPA Method 5

Pattchara Samanchan

(Miss Pattchara Samanchan)

Analyst

REG.NO. 2-239-ท-8183

Main Poowasanpetch

(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO. 2-239-ท-6419

Remark : 1. Reported analysis refers to submitted sample only.

2. This report shall not be reproduced, except in full, without official approval.

3. ⁽¹⁾ At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.4. ⁽²⁾ Assigned value in EIA Report Expansion 3 of Refinery Plant, B.E. 2561 (2018).5. ⁽³⁾ Notification of the Ministry of Natural Resources and Environment B.E.2554 (2011).

The Monitoring Result of Emission Concentration
Boiler 1
STAR PETROLEUM REFINING PUBLIC CO., LTD.
April 21, 2022

Run Number	Oxygen content (%)		Oxide of Nitrogen (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	4.65	4.63	64.24	64.25	54.89
2	4.61	4.59	64.33	64.34	54.83
3	4.67	4.65	63.65	63.66	54.45
Average	4.64	4.62	64.07	64.08	54.73

Run Number	Oxygen content (%)		Sulfur dioxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	4.65	4.63	1.42	1.40	1.20
2	4.61	4.59	1.74	1.72	1.47
3	4.67	4.65	1.87	1.85	1.58
Average	4.64	4.62	1.68	1.66	1.41

Run Number	Oxygen content (%)		Carbonmonoxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O2	Corrected Gas Conc @7% O2
1	4.65	4.63	1.99	1.98	1.69
2	4.61	4.59	1.67	1.66	1.41
3	4.67	4.65	1.11	1.10	0.94
Average	4.64	4.62	1.59	1.58	1.35

STAR PETROLEUM REFINING PUBLIC CO., LTD.
EMISSION TEST RESULT

Run # : 1
Date: April 21, 2022
Start time: 11:20 AM
O₂ instrument Model: AMI 70
NO_x instrument Model: TELEDYNE 200 EM
SO₂ instrument Model: API 100 AH
CO instrument Model: API 300 A
Fuel Type : Natural Gas

Location : Boiler 1
Finish time : 11:40 AM
Serial No.: 121121-10
Serial No.: 433
Serial No.: 132
Serial No.: 1070
Test Operator : Kittipong T.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
11:20 AM	4.64	64.76	1.05	0.89
11:21 AM	4.76	64.74	1.11	1.19
11:22 AM	5.08	64.09	1.16	1.62
11:23 AM	4.89	63.35	1.18	1.42
11:24 AM	4.39	63.85	1.28	1.49
11:25 AM	4.39	64.59	1.32	1.93
11:26 AM	4.97	64.16	1.34	2.44
11:27 AM	4.57	63.69	1.40	2.55
11:28 AM	4.29	64.49	1.43	2.33
11:29 AM	4.78	64.99	1.43	2.51
11:30 AM	4.70	64.05	1.45	2.35
11:31 AM	4.27	64.18	1.50	2.72
11:32 AM	4.50	64.70	1.52	2.77
11:33 AM	5.02	63.87	1.53	2.20
11:34 AM	4.45	63.44	1.55	2.07
11:35 AM	4.34	64.46	1.53	2.21
11:36 AM	4.43	65.14	1.58	2.02
11:37 AM	4.92	64.49	1.58	2.25
11:38 AM	4.70	63.69	1.58	2.02
11:39 AM	4.38	64.09	1.63	1.47
11:40 AM	5.08	64.17	1.58	1.30
Average	4.65	64.24	1.42	1.99

Signature



Miss Katesarin Vorradetwittaya

Environmental Scientist

STAR PETROLEUM REFINING PUBLIC CO., LTD. EMISSION TEST RESULT

Run # : 2
Date: April 21, 2022
Start time: 11:41 AM
O₂ instrument Model: AMI 70
NO_x instrument Model: TELEDYNE 200 EM
SO₂ instrument Model: API 100 AH
CO instrument Model: API 300 A
Fuel Type : Natural Gas
Location : Boiler 1
Finish time : 12:01 PM
Serial No.: 121121-10
Serial No.: 433
Serial No.: 132
Serial No.: 1070
Test Operator : Kittipong T.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
11:41 AM	4.59	63.69	1.62	1.00
11:42 AM	4.38	64.38	1.66	1.40
11:43 AM	4.65	64.83	1.67	1.51
11:44 AM	4.83	64.06	1.68	1.30
11:45 AM	4.34	63.97	1.67	1.27
11:46 AM	4.24	65.00	1.71	5.60
11:47 AM	4.91	64.98	1.66	3.43
11:48 AM	5.01	63.52	1.68	1.82
11:49 AM	4.91	62.79	1.69	1.08
11:50 AM	4.40	63.58	1.68	0.64
11:51 AM	4.51	64.75	1.69	0.73
11:52 AM	4.66	64.92	1.68	0.95
11:53 AM	4.85	64.43	1.71	1.12
11:54 AM	4.75	64.22	1.75	0.65
11:55 AM	4.58	64.57	1.82	0.10
11:56 AM	4.37	65.02	1.87	0.10
11:57 AM	4.05	65.53	1.87	4.14
11:58 AM	4.58	65.58	1.85	4.41
11:59 AM	4.88	64.31	1.84	1.86
12:00 PM	4.88	63.30	1.85	1.25
12:01 PM	4.53	63.53	1.87	0.62
Average	4.61	64.33	1.74	1.67

Signature 
 Miss Katesarin Vorradetwittaya
 Environmental Scientist

STAR PETROLEUM REFINING PUBLIC CO., LTD. EMISSION TEST RESULT

Run # : 3
Date: April 21, 2022
Start time: 12:02 PM
O₂ instrument Model: AMI 70
NO_x instrument Model: TELEDYNE 200 EM
SO₂ instrument Model: API 100 AH
CO instrument Model: API 300 A
Fuel Type : Natural Gas
Location : Boiler 1
Finish time : 12:22 PM
Serial No.: 121121-10
Serial No.: 433
Serial No.: 132
Serial No.: 1070
Test Operator : Kittipong T.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
12:02 PM	4.29	64.31	1.93	0.59
12:03 PM	4.84	64.22	1.86	1.33
12:04 PM	4.85	63.39	1.81	1.56
12:05 PM	4.35	63.60	1.81	1.88
12:06 PM	4.58	64.24	1.80	2.01
12:07 PM	4.95	63.77	1.81	1.59
12:08 PM	4.90	62.78	1.79	1.43
12:09 PM	4.30	63.37	1.90	1.07
12:10 PM	4.77	64.21	1.88	0.84
12:11 PM	4.77	63.71	1.88	0.78
12:12 PM	4.74	63.37	1.90	0.79
12:13 PM	4.55	63.52	1.93	0.42
12:14 PM	4.29	64.01	1.92	0.28
12:15 PM	4.88	64.05	1.87	0.86
12:16 PM	5.10	62.85	1.87	0.99
12:17 PM	4.62	62.45	1.88	0.94
12:18 PM	4.30	64.19	1.89	0.86
12:19 PM	4.45	65.10	1.93	1.21
12:20 PM	4.87	64.21	1.88	1.54
12:21 PM	5.10	62.87	1.92	1.46
12:22 PM	4.56	62.41	1.91	0.90
Average	4.67	63.65	1.87	1.11

Signature 
 Miss Katesarin Vorradetwittaya
 Environmental Scientist



บริษัท ซีคอต จำกัด
SECOT CO., LTD.

239 ถนนริมคลองประปา แขวงบางซื่อ เขตบางซื่อ กรุงเทพฯ 10800

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TEL : +66(0) 2959-3600 FAX : +66(0) 2959-3535 E-mail : envserv@secot.co.th

STACK EMISSION ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: Refinery-222003-COA-Stk/PM
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING DATE	: 19/04/2022
RECEIVED DATE	: 22/04/2022	ANALYTICAL DATE	: 22-23/04/2022
REPORT DATE	: 26/04/2022	SAMPLE CONDITION	: Normal
STACK LOCATION	: HRSG#1 Stack	OPERATOR	: Mr. Song Hengchwankun
SOURCE DESCRIPTION	: Combustion	FUEL TYPE	: Natural Gas + Refinery Fuel Gas
STACK DESCRIPTION			

Height	: 21.7	m	Gas Velocity	: 14.9	m/s
Diameter	: 3.0	m	Flow rate ⁽¹⁾	: 3,550	Ncu.m/min
Temperature	: 201.2	°C	Excess Oxygen	: 14.3	%

PARAMETER	UNIT	RESULTS ⁽¹⁾		ASSIGNED VALUE ⁽²⁾	STANDARD ⁽³⁾	REFERENCE METHODS
		14.3 % O ₂	7 % O ₂			
Particulate Matter	mg/Ncu.m	0.9	1.9	60	60	US EPA Method 5

Phatchara Samanchan

(Miss Phatchara Samanchan)

Analyst

REG.NO. 2-239-ก-8183

Naris Poowasanpetch

(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO. 2-239-ก-6419

Remark : 1. Reported analysis refers to submitted sample only.

2. This report shall not be reproduced, except in full, without official approval.

3. ⁽¹⁾ At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.

4. ⁽²⁾ Assigned value in EIA Report Expansion 3 of Refinery Plant, B.E. 2561 (2018).

5. ⁽³⁾ Notification of the Ministry of Natural Resources and Environment B.E.2554 (2011).

The Monitoring Result of Emission Concentration
HRSG 1
STAR PETROLEUM REFINING PUBLIC CO., LTD.
April 19, 2022

Run Number	Oxygen content (%)		Oxide of Nitrogen (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O ₂	Corrected Gas Conc @7% O ₂
1	14.26	14.26	42.53	42.31	88.57
2	14.28	14.28	41.60	41.39	86.91
3	14.25	14.25	43.02	42.81	89.48
Average	14.27	14.26	42.38	42.17	88.32

Run Number	Oxygen content (%)		Sulfur dioxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O ₂	Corrected Gas Conc @7% O ₂
1	14.26	14.26	0.71	0.69	1.44
2	14.28	14.28	0.82	0.80	1.68
3	14.25	14.25	0.93	0.91	1.90
Average	14.27	14.26	0.82	0.80	1.68

Run Number	Oxygen content (%)		Carbonmonoxide (ppm)		
	RM Stack Gas Conc	Corrected Gas Conc	RM Stack Gas Conc	Corrected Gas Conc @Actual O ₂	Corrected Gas Conc @7% O ₂
1	14.26	14.26	3.96	3.95	8.27
2	14.28	14.28	3.76	3.75	7.87
3	14.25	14.25	3.75	3.75	7.84
Average	14.27	14.26	3.82	3.82	7.99

STAR PETROLEUM REFINING PUBLIC CO., LTD. EMISSION TEST RESULT

Run # : 1
Date: April 19, 2022
Start time: 11:20 AM
O₂ instrument Model: AMI 70
NO_x instrument Model: TELEDYNE 200 EM
SO₂ instrument Model: API 100 AH
CO instrument Model: API 300 A
Fuel Type : Natural Gas
Location : HRSG 1
Finish time : 11:40 AM
Serial No.: 121121-10
Serial No.: 433
Serial No.: 132
Serial No.: 1070
Test Operator : Kittipong T.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
11:20 AM	14.27	41.68	0.66	4.66
11:21 AM	14.24	41.53	0.69	4.47
11:22 AM	14.23	41.77	0.70	4.33
11:23 AM	14.21	42.03	0.71	4.20
11:24 AM	14.19	42.59	0.71	4.11
11:25 AM	14.20	42.64	0.67	4.05
11:26 AM	14.21	42.44	0.64	3.99
11:27 AM	14.29	42.47	0.60	3.96
11:28 AM	14.30	41.78	0.63	3.91
11:29 AM	14.28	41.37	0.61	3.87
11:30 AM	14.27	42.30	0.65	3.83
11:31 AM	14.27	43.24	0.70	3.82
11:32 AM	14.29	43.16	0.72	3.80
11:33 AM	14.27	43.08	0.77	3.77
11:34 AM	14.27	43.18	0.77	3.76
11:35 AM	14.26	42.79	0.77	3.76
11:36 AM	14.26	42.78	0.81	3.76
11:37 AM	14.26	42.94	0.77	3.76
11:38 AM	14.26	42.96	0.80	3.76
11:39 AM	14.29	43.16	0.73	3.76
11:40 AM	14.42	43.15	0.71	3.76
Average	14.26	42.53	0.71	3.96

Signature



Miss Katesarin Vorradetwittaya
Environmental Scientist

STAR PETROLEUM REFINING PUBLIC CO., LTD. EMISSION TEST RESULT

Run # : 2
Date: April 19, 2022
Start time: 11:41 AM
O₂ instrument Model: AMI 70
NO_x instrument Model: TELEDYNE 200 EM
SO₂ instrument Model: API 100 AH
CO instrument Model: API 300 A
Fuel Type : Natural Gas
Location : HRSG 1
Finish time : 12:01 PM
Serial No.: 121121-10
Serial No.: 433
Serial No.: 132
Serial No.: 1070
Test Operator : Kittipong T.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
11:41 AM	14.46	43.12	0.70	3.76
11:42 AM	14.35	42.66	0.70	3.76
11:43 AM	14.30	42.47	0.73	3.76
11:44 AM	14.27	42.34	0.79	3.76
11:45 AM	14.27	42.29	0.81	3.76
11:46 AM	14.26	42.69	0.83	3.76
11:47 AM	14.27	43.27	0.83	3.76
11:48 AM	14.26	43.41	0.84	3.76
11:49 AM	14.32	41.26	0.87	3.76
11:50 AM	14.25	40.49	0.87	3.76
11:51 AM	14.25	40.82	0.89	3.76
11:52 AM	14.26	40.86	0.85	3.76
11:53 AM	14.29	40.86	0.77	3.76
11:54 AM	14.31	40.64	0.77	3.76
11:55 AM	14.29	40.28	0.80	3.76
11:56 AM	14.27	40.46	0.82	3.76
11:57 AM	14.26	40.62	0.83	3.75
11:58 AM	14.26	40.87	0.87	3.75
11:59 AM	14.25	41.29	0.89	3.74
12:00 PM	14.25	41.28	0.87	3.74
12:01 PM	14.25	41.53	0.92	3.74
Average	14.28	41.60	0.82	3.76

Signature



Miss Katesarin Vorradetwittaya
Environmental Scientist

STAR PETROLEUM REFINING PUBLIC CO., LTD.

EMISSION TEST RESULT

Run # : 3

Date: April 19, 2022 Location : HRSG 1

Start time: 12:02 PM Finish time: 12:22 PM

O₂ instrument Model: AMI 70 Serial No.: 121121-10

NO_x instrument Model: TELEDYNE 200 EM Serial No.: 433

SO₂ instrument Model: API 100 AH Serial No.: 132

CO instrument Model: API 300 A Serial No.: 1070

Fuel Type : Natural Gas Test Operator : Kittipong T.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
12:02 PM	14.25	41.77	0.92	3.74
12:03 PM	14.25	41.81	0.90	3.74
12:04 PM	14.25	41.97	0.95	3.75
12:05 PM	14.25	41.95	0.95	3.74
12:06 PM	14.25	41.92	0.95	3.74
12:07 PM	14.25	42.07	0.92	3.75
12:08 PM	14.26	42.57	0.85	3.76
12:09 PM	14.27	43.56	0.83	3.76
12:10 PM	14.26	43.81	0.84	3.76
12:11 PM	14.28	43.49	0.89	3.75
12:12 PM	14.25	43.37	0.91	3.75
12:13 PM	14.26	43.37	0.91	3.76
12:14 PM	14.25	43.30	0.95	3.76
12:15 PM	14.25	43.71	0.97	3.76
12:16 PM	14.25	44.32	0.95	3.76
12:17 PM	14.25	43.88	0.95	3.76
12:18 PM	14.25	43.41	0.95	3.76
12:19 PM	14.27	43.39	0.95	3.76
12:20 PM	14.25	43.22	1.01	3.76
12:21 PM	14.25	43.15	1.00	3.76
12:22 PM	14.24	43.35	1.00	3.76
Average	14.25	43.02	0.93	3.75

Signature



Miss Katesarin Vorradetwittaya
Environmental Scientist



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STACK EMISSION ANALYSIS REPORT

CLIENT NAME : Star Petroleum Refining Public Co., Ltd. REF. NO. : Refinery-222003-COA-Stk/TVOC

SAMPLING BY : SECOT Co., Ltd. SAMPLING DATE : 20/04/2022

RECEIVED DATE : 22/04/2022 ANALYTICAL DATE : 22/04/2022

REPORT DATE : 04/05/2022 SAMPLE CONDITION : Normal

STACK LOCATION : VRU Stack OPERATOR : Mr. Song Hengchwankun

SOURCE DESCRIPTION : Process FUEL TYPE : -

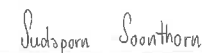
STACK DESCRIPTION

Height : 10.0 m. Velocity⁽¹⁾ : 3.48 m/s

Diameter : 0.25 m. Flow Rate⁽¹⁾ : 9.84 Nm³/min

Temperature⁽¹⁾ : 34.0 °C Excess Oxygen⁽¹⁾ : 20.9 %

PARAMETER	UNIT	RESULTS		ASSIGN VALUE ⁽²⁾	STANDARD ⁽³⁾	REFERENCE METHODS
		INLET	OUTLET			
TVOCs	ppm	50,406	296	-	-	US EPA Method 25A
	mg/l	90.7	0.53	15	17	
	g/s	-	0.087	1.212	-	



(Miss Sudaporn Soonthorn)

Analyst



(Miss Narisa Poowasanpetch)

Technical Management Team

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3. ⁽¹⁾ The data from VRU Outlet.
4. ⁽²⁾ Assigned value in EIA Report Expansion 3 of Refinery Plant, B.E. 2561 (2018).
5. ⁽³⁾ Notification of the Ministry of Natural Resources and Environment B.E.2553 (2010).



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STACK EMISSION ANALYSIS REPORT

CLIENT NAME : Star Petroleum Refining Public Co., Ltd. REF. NO. : Refinery-222003-COA-Stk/Bz
SAMPLING BY : SECOT Co., Ltd. SAMPLING DATE : 20/04/2022
RECEIVED DATE : 22/04/2022 ANALYTICAL DATE : 26-27/04/2022
REPORT DATE : 04/05/2022 SAMPLE CONDITION : Normal
STACK LOCATION : VRU Stack OPERATOR : Mr. Song Hengchwankun
SOURCE DESCRIPTION : Process FUEL TYPE : -

STACK DESCRIPTION

Height : 10.0 m. Velocity⁽¹⁾ : 3.5 m/s
Diameter : 0.25 m. Flow Rate⁽¹⁾ : 9.8 Nm³/min
Temperature⁽¹⁾ : 34.0 °C Excess Oxygen⁽¹⁾ : 20.9 %

PARAMETER	UNIT	RESULTS		ASSIGN VALUE ⁽²⁾	STANDARD	REFERENCE METHODS
		INLET	OUTLET			
Benzene	ppm	182.5	1.48	-	-	US EPA Method 18
	mg/l	0.58	0.005	0.21	-	
	g/s	-	0.001	0.017	-	

Sudaporn Soonthorn
(Miss Sudaporn Soonthorn)

Analyst

Narisa Poowasanpetch
(Miss Narisa Poowasanpetch)

Technical Management Team

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4. ⁽²⁾ Assigned value in EIA Report Expansion 3 of Refinery Plant, B.E. 2561 (2018).

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0068/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 13/01/2022	SAMPLING TIME	: 09.30
RECEIVED DATE	: 14/01/2022	ANALYTICAL DATE	: 14-20/01/2022
REPORT DATE	: 20/01/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_WW_January

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION Near the refinery outfall	STANDARD ^{1/}
Temperature	°C	2550 B	< 0.5	32.1	≤ 40
pH	-	4500-H ⁺ B	< 0.10	7.91	5.5-9.0
Total Dissolved Solids	mg/l	2540 C	< 50	960	≤ 3,000
Total Suspended Solids	mg/l	2540 D	< 5	9	≤ 50
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	0.21	-
Sulfide	mg/l	4500-S ²⁻ F	< 0.20	ND	≤ 1
Fat Oil & Grease	mg/l	5520 B	< 0.50	ND	≤ 5
Phenols	mg/l	5530 B,C	< 0.001	ND	≤ 1
BOD ₅	mg/l	5210 B	< 1.0	<1.0	≤ 20
COD	mg/l	5220 D	< 40.00	45.71	≤ 120
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND	≤ 0.25
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	ND	≤ 0.75
Mercury (Hg)	mg/l	3112 B	< 0.0005	ND	≤ 0.005

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 21st ED. 2017 (AWWA,APHA, WEF)

Khemchuda Insorn

(Miss Khemchuda Insorn)

Analyst

REG. NO. 7-239-ก-5976

Araya Tipparuk

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 7-239-ก-5863

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3. ^{1/} Notification of the Ministry of Industry, B.E.2560 (2017).

4. - Not available.



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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0293/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 15/02/2022	SAMPLING TIME	: 09.00
RECEIVED DATE	: 16/02/2022	ANALYTICAL DATE	: 16-23/02/2022
REPORT DATE	: 24/02/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_WW_February

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION Near the refinery outfall	STANDARD ^{1/}
Temperature	°C	2550 B	< 0.5	29.0	≤ 40
pH	-	4500-H ⁺ B	< 0.10	7.69	5.5-9.0
Total Dissolved Solids	mg/l	2540 C	< 50	924	≤ 3,000
Total Suspended Solids	mg/l	2540 D	< 5	5	≤ 50
Ammonia Nitrogen	mg/l	Method 350.2	< 0.02	0.14	-
Sulfide	mg/l	4500-S ²⁻ F	< 0.20	ND	≤ 1
Fat Oil & Grease	mg/l	5520 B	< 0.50	ND	≤ 5
Phenols	mg/l	5530 B,C	< 0.001	ND	≤ 1
BOD ₅	mg/l	5210 B	< 1.0	1.2	≤ 20
COD	mg/l	5220 D	< 40.00	< 40.00	≤ 120
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND	≤ 0.25
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	ND	≤ 0.75
Mercury (Hg)	mg/l	3112 B	< 0.0005	ND	≤ 0.005

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 21st ED. 2017 (AWWA,APHA, WEF)

Khemchuda Insorn

(Miss Khemchuda Insorn)

Analyst

REG. NO. 7-239-ก-5976

Araya Tipparuk

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 7-239-ก-5863

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0508/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 10/03/2022	SAMPLING TIME	: 09.41
RECEIVED DATE	: 11/03/2022	ANALYTICAL DATE	: 11-16/03/2022
REPORT DATE	: 17/03/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_WW_March

PARAMETER	UNIT	ANALYSIS METHODS	ND	STATION	STANDARD ^{1/}
			(non-detectable)	Near the refinery outfall	
Temperature	°C	2550 B	< 0.5	33.3	≤ 40
pH	-	4500-H ⁺ B	< 0.10	7.83	5.5-9.0
Total Dissolved Solids	mg/l	2540 C	< 50	1,334	≤ 3,000
Total Suspended Solids	mg/l	2540 D	< 5	6	≤ 50
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	0.25	-
Sulfide	mg/l	4500-S ²⁻ F	< 0.20	ND	≤ 1
Fat Oil & Grease	mg/l	5520 B	< 0.50	ND	≤ 5
Phenols	mg/l	5530 B,C	< 0.001	ND	≤ 1
BOD ₅	mg/l	5210 B	< 1.0	1.9	≤ 20
COD	mg/l	5220 D	< 40.00	46.04	≤ 120
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND	≤ 0.25
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	0.002	≤ 0.75
Mercury (Hg)	mg/l	3112 B	< 0.0005	ND	≤ 0.005

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 21st ED. 2017 (AWWA, APHA, WEF)

Khemchuda Insorn

(Miss Khemchuda Insorn)

Analyst

REG. NO. 7-239-ก-5976

Araya Tipparuk

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Technical Management Team

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0701/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 04/04/2022	SAMPLING TIME	: 11.30
RECEIVED DATE	: 05/04/2022	ANALYTICAL DATE	: 05-12/04/2022
REPORT DATE	: 18/04/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_WW_April

PARAMETER	UNIT	ANALYSIS METHODS	ND	STATION	STANDARD ^{1/}
			(non-detectable)	Near the refinery outfall	
Temperature	°C	2550 B	< 0.5	29.7	≤ 40
pH	-	4500-H ⁺ B	< 0.10	8.42	5.5-9.0
Total Dissolved Solids	mg/l	2540 C	< 50	896	≤ 3,000
Total Suspended Solids	mg/l	2540 D	< 5	7	≤ 50
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	0.11	-
Sulfide	mg/l	4500-S ²⁻ F	< 0.20	ND	≤ 1
Fat Oil & Grease	mg/l	5520 B	< 0.50	ND	≤ 5
Phenols	mg/l	5530 B,C	< 0.001	ND	≤ 1
BOD ₅	mg/l	5210 B	< 1.0	1.4	≤ 20
COD	mg/l	5220 D	< 40.00	< 40.00	≤ 120
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND	≤ 0.25
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	0.001	≤ 0.75
Mercury (Hg)	mg/l	3112 B	< 0.0005	0.0005	≤ 0.005

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 21st ED. 2017 (AWWA, APHA, WEF)

Khemchuda Insorn

(Miss Khemchuda Insorn)

Analyst

REG. NO. 7-239-ก-5976

Araya Tipparuk

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 7-239-ก-5863

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0984/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 09/05/2022	SAMPLING TIME	: 10.15
RECEIVED DATE	: 10/05/2022	ANALYTICAL DATE	: 10-18/05/2022
REPORT DATE	: 18/05/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_WW_May

PARAMETER	UNIT	ANALYSIS METHODS	ND	STATION	STANDARD ^{1/}
			(non-detectable)	Near the refinery outfall	
Temperature	°C	2550 B	< 0.5	33.1	≤ 40
pH		4500-H ⁺ B	< 0.10	7.53	5.5-9.0
Total Dissolved Solids	mg/l	2540 C	< 50	801	≤ 3,000
Total Suspended Solids	mg/l	2540 D	< 5	< 5	≤ 50
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	0.33	
Sulfide	mg/l	4500-S ²⁻ F	< 0.20	ND	≤ 1
Fat Oil & Grease	mg/l	5520 B	< 0.50	ND	≤ 5
Phenols	mg/l	5530 B,C	< 0.001	ND	≤ 1
BOD ₅	mg/l	5210 B	< 1.0	1.6	≤ 20
COD	mg/l	5220 D	< 40.00	44.08	≤ 120
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND	≤ 0.25
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	0.003	≤ 0.75
Mercury (Hg)	mg/l	3112 B	< 0.0005	ND	≤ 0.005

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 21st ED. 2017 (AWWA, APHA, WEF)

Khemchuda Insorn

(Miss Khemchuda Insorn)

Analyst

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REG. NO. 2-239-ก-5863

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 4. - Not available.



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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1224/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 06/06/2022	SAMPLING TIME	: 09.51
RECEIVED DATE	: 07/06/2022	ANALYTICAL DATE	: 07-15/06/2022
REPORT DATE	: 15/06/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_WW_June

PARAMETER	UNIT	ANALYSIS METHODS	ND	STATION	STANDARD ^{1/}
			(non-detectable)	Near the refinery outfall	
Temperature	°C	2550 B	< 0.5	31.7	≤ 40
pH		4500-H ⁺ B	< 0.10	8.42	5.5-9.0
Total Dissolved Solids	mg/l	2540 C	< 50	1,220	≤ 3,000
Total Suspended Solids	mg/l	2540 D	< 5	6	≤ 50
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	0.08	
Sulfide	mg/l	4500-S ²⁻ F	< 0.20	ND	≤ 1
Fat Oil & Grease	mg/l	5520 B	< 0.50	ND	≤ 5
Phenols	mg/l	5530 B,C	< 0.001	ND	≤ 1
BOD ₅	mg/l	5210 B	< 1.0	1.6	≤ 20
COD	mg/l	5220 D	< 40.00	< 40.00	≤ 120
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND	≤ 0.25
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	0.011	≤ 0.75
Mercury (Hg)	mg/l	3112 B	< 0.0005	ND	≤ 0.005

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 21st ED. 2017 (AWWA, APHA, WEF)

Khemchuda Insorn

(Miss Khemchuda Insorn)

Analyst

REG. NO. 2-239-ก-5976

Araya Tipparuk

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 2-239-ก-5863

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0069/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 13/01/2022	SAMPLING TIME	: 10.30-11.20
RECEIVED DATE	: 14/01/2022	ANALYTICAL DATE	: 14-20/01/2022
REPORT DATE	: 20/01/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_SW_January
SAMPLE DESCRIPTION	1 = Within IEAT drainage channel upstream from refinery outfall 2 = Within IEAT drainage channel downstream from refinery outfall		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD ^{1/}
				1	2	
Temperature	°C	2550 B	< 0.5	32.1	32.5	n ¹
pH	-	4500-H ⁺ B	< 0.10	9.42	9.31	5 - 9
Total Dissolved Solids	mg/l	2540 C	< 50	5,392	4,728	-
Suspended Solids	mg/l	2540 D	< 5	85	23	-
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	1.6	1.7	≤ 0.5
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	ND	ND	-
Fat Oil & Grease	mg/l	5520 B	< 0.50	ND	ND	-
Phenols	mg/l	5530 B,C	< 0.001	ND	ND	≤ 0.005
BOD ₅	mg/l	5210 B	< 1.0	4.2	3.6	≤ 4.0
COD	mg/l	5220 D	< 40.00	58.76	62.03	-
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND	ND	≤ 0.05
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	0.006	0.005	-
Mercury (Hg)	mg/l	3112 B	< 0.0005	ND	ND	≤ 0.002

REFERENCE: STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 21st ED. 2017 (AWWA, APHA, WEF)

Khemchuda Insorn

(Miss Khemchuda Insorn)

Analyst

Araya Tipparuk

(Mrs. Araya Tipparuk)

Technical Management Team

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0294/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 15/02/2022	SAMPLING TIME	: 10.12-10.40
RECEIVED DATE	: 16/02/2022	ANALYTICAL DATE	: 16-23/02/2022
REPORT DATE	: 24/02/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_SW_February
SAMPLE DESCRIPTION	1 = Within IEAT drainage channel upstream from refinery outfall 2 = Within IEAT drainage channel downstream from refinery outfall		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD ^{1/}
				1	2	
Temperature	°C	2550 B	< 0.5	31.2	30.8	n ¹
pH	-	4500-H ⁺ B	< 0.10	8.52	8.29	5 - 9
Total Dissolved Solids	mg/l	2540 C	< 50	5,236	4,928	-
Suspended Solids	mg/l	2540 D	< 5	21	14	-
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	1.3	1.8	≤ 0.5
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	ND	ND	-
Fat Oil & Grease	mg/l	5520 B	< 0.50	ND	ND	-
Phenols	mg/l	5530 B,C	< 0.001	ND	ND	≤ 0.005
BOD ₅	mg/l	5210 B	< 1.0	5.9	5.5	≤ 4.0
COD	mg/l	5220 D	< 40.00	40.57	43.95	-
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND	ND	≤ 0.05
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	0.008	0.005	-
Mercury (Hg)	mg/l	3112 B	< 0.0005	ND	ND	≤ 0.002

REFERENCE: STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 21st ED. 2017 (AWWA, APHA, WEF)

Khemchuda Insorn

(Miss Khemchuda Insorn)

Analyst

Araya Tipparuk

(Mrs. Araya Tipparuk)

Technical Management Team

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0509/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 10/03/2022	SAMPLING TIME	: 10.30-11.28
RECEIVED DATE	: 11/03/2022	ANALYTICAL DATE	: 11-16/03/2022
REPORT DATE	: 17/03/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_SW_March
SAMPLE DESCRIPTION	1 = Within IEAT drainage channel upstream from refinery outfall 2 = Within IEAT drainage channel downstream from refinery outfall		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD ^{1/}
				1	2	
Temperature	°C	2550 B	< 0.5	34.0	33.3	n ¹
pH		4500-H ⁺ B	< 0.10	8.58	8.22	5 - 9
Total Dissolved Solids	mg/l	2540 C	< 50	4,908	3,312	-
Suspended Solids	mg/l	2540 D	< 5	74	13	-
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	1.1	0.66	≤ 0.5
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	ND	ND	-
Fat Oil & Grease	mg/l	5520 B	< 0.50	ND	ND	-
Phenols	mg/l	5530 B,C	< 0.001	ND	ND	≤ 0.005
BOD ₅	mg/l	5210 B	< 1.0	6.6	3.6	≤ 4.0
COD	mg/l	5220 D	< 40.00	65.77	46.04	-
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND	ND	≤ 0.05
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	0.011	0.005	-
Mercury (Hg)	mg/l	3112 B	< 0.0005	ND	ND	≤ 0.002

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 21ST ED. 2017 (AWWA, APHA, WEF)

Khemchuda Insorn

(Miss Khemchuda Insorn)

Analyst

Araya Tipparuk

(Mrs. Araya Tipparuk)

Technical Management Team

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0702/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 04/04/2022	SAMPLING TIME	: 12.18-12.23
RECEIVED DATE	: 05/04/2022	ANALYTICAL DATE	: 05-12/04/2022
REPORT DATE	: 18/04/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_SW_April
SAMPLE DESCRIPTION	1 = Within IEAT drainage channel upstream from refinery outfall 2 = Within IEAT drainage channel downstream from refinery outfall		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD ^{1/}
				1	2	
Temperature	°C	2550 B	< 0.5	34.1	33.3	n ¹
pH		4500-H ⁺ B	< 0.10	8.81	8.60	5 - 9
Total Dissolved Solids	mg/l	2540 C	< 50	6,296	5,056	-
Suspended Solids	mg/l	2540 D	< 5	32	25	-
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	0.38	0.32	≤ 0.5
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	ND	ND	-
Fat Oil & Grease	mg/l	5520 B	< 0.50	ND	ND	-
Phenols	mg/l	5530 B,C	< 0.001	ND	ND	≤ 0.005
BOD ₅	mg/l	5210 B	< 1.0	2.6	2.0	≤ 4.0
COD	mg/l	5220 D	< 40.00	< 40.00	< 40.00	-
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND	ND	≤ 0.05
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	0.007	0.006	-
Mercury (Hg)	mg/l	3112 B	< 0.0005	ND	ND	≤ 0.002

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 21ST ED. 2017 (AWWA, APHA, WEF)

Khemchuda Insorn

(Miss Khemchuda Insorn)

Analyst

Araya Tipparuk

(Mrs. Araya Tipparuk)

Technical Management Team

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0985/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 09/05/2022	SAMPLING TIME	: 12.01-12.15
RECEIVED DATE	: 10/05/2022	ANALYTICAL DATE	: 10-18/05/2022
REPORT DATE	: 18/05/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_SW_May
SAMPLE DESCRIPTION	: 1 = Within IEAT drainage channel upstream from refinery outfall 2 = Within IEAT drainage channel downstream from refinery outfall		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD ^{1/}
				1	2	
Temperature	°C	2550 B	< 0.5	35.8	36.0	n ¹
pH		4500-H ⁺ B	< 0.10	7.88	8.59	5 - 9
Total Dissolved Solids	mg/l	2540 C	< 50	4,976	4,196	-
Suspended Solids	mg/l	2540 D	< 5	30	22	-
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	1.2	1.3	≤ 0.5
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	ND	ND	-
Fat Oil & Grease	mg/l	5520 B	< 0.50	ND	ND	-
Phenols	mg/l	5530 B,C	< 0.001	ND	ND	≤ 0.005
BOD ₅	mg/l	5210 B	< 1.0	3.4	2.5	≤ 4.0
COD	mg/l	5220 D	< 40.00	64.43	47.47	-
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND	ND	≤ 0.05
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	0.008	0.011	-
Mercury (Hg)	mg/l	3112 B	< 0.0005	ND	ND	≤ 0.002

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 21st ED. 2017 (AWWA, APHA, WEF)

Khemchuda Insorn

(Miss Khemchuda Insorn)

Analyst

(Mrs. Araya Tipparuk)

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1225/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 06/06/2022	SAMPLING TIME	: 11.22-11.43
RECEIVED DATE	: 07/06/2022	ANALYTICAL DATE	: 07-15/06/2022
REPORT DATE	: 15/06/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_SW_June
SAMPLE DESCRIPTION	: 1 = Within IEAT drainage channel upstream from refinery outfall 2 = Within IEAT drainage channel downstream from refinery outfall		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD ^{1/}
				1	2	
Temperature	°C	2550 B	< 0.5	34.8	36.7	n ¹
pH		4500-H ⁺ B	< 0.10	8.62	8.71	5 - 9
Total Dissolved Solids	mg/l	2540 C	< 50	5,068	5,220	-
Suspended Solids	mg/l	2540 D	< 5	22	31	-
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	0.87	0.76	≤ 0.5
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	ND	ND	-
Fat Oil & Grease	mg/l	5520 B	< 0.50	ND	ND	-
Phenols	mg/l	5530 B,C	< 0.001	ND	ND	≤ 0.005
BOD ₅	mg/l	5210 B	< 1.0	3.4	3.7	≤ 4.0
COD	mg/l	5220 D	< 40.00	< 40.00	< 40.00	-
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND	ND	≤ 0.05
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	0.013	0.010	-
Mercury (Hg)	mg/l	3112 B	< 0.0005	ND	ND	≤ 0.002

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 21st ED. 2017 (AWWA, APHA, WEF)

Khemchuda Insorn

(Miss Khemchuda Insorn)

Analyst

(Mrs. Araya Tipparuk)

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	0070/65
SAMPLING BY	SECOT Co., Ltd.	SAMPLING METHOD	Grab
SAMPLING DATE	13/01/2022	SAMPLING TIME	09.40-10.00
RECEIVED DATE	14/01/2022	ANALYTICAL DATE	14-20/01/2022
REPORT DATE	20/01/2022	SITE OPERATOR	Mr. Aniwat Pimwanna
SAMPLE CONDITION	Normal	FILE CODE	222003_WW_January
SAMPLE DESCRIPTION	1 = API Separator Effluent 2 = IAF Unit Effluent 3 = Equalization Tank Effluent 4 = Biological Treatment Effluent		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION			
				1	2	3	4
Temperature	°C	2550 B	< 0.5	34.6	34.6	34.1	32.8
pH	-	4500-H ⁺ B	< 0.10	7.64	9.42	9.96	7.81
Total Dissolved Solids	mg/l	2540 C	< 50	534	656	1,038	1,082
Suspended Solids	mg/l	2540 D	< 5	101	6	11	< 5
Fat Oil & Grease	mg/l	5520 B	< 0.50	23.9	1.6	5.9	ND
Phenols	mg/l	5530 B,C* / B,D	< 0.001*, < 0.10	1.3	0.85	2.1	ND*
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	6.0	2.7	13.5	ND
BOD ₅	mg/l	5210 B	< 1.0	73.0	31.8	74.6	1.0
COD	mg/l	5220 D	< 40.00	374	137	240	55.50
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C/Method 350.2*	< 0.02	4.2	4.6	6.3	0.48
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	0.004	0.002	ND	ND
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND	ND	ND	ND
Mercury (Hg)	mg/l	3112 B	< 0.0005	0.0806	0.0011	0.0055	0.0009

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 21st ED. 2012 (AWWA APHA WEF)

REFERENCE : US EPA, 1983, Method for Chemical Analysis of Water and Waste, USEPA, EPA 600/4-79/020, Method 350.2

Khemchuda Insom

(Miss Khemchuda Insom)

Analyst

REG. NO. 2-239-ก-5976

Araya Tipparuk

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 2-239-ก-5863

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	0295/65
SAMPLING BY	SECOT Co., Ltd.	SAMPLING METHOD	Grab
SAMPLING DATE	15/02/2022	SAMPLING TIME	09.17-09.42
RECEIVED DATE	16/02/2022	ANALYTICAL DATE	16-23/02/2022
REPORT DATE	24/02/2022	SITE OPERATOR	Mr. Aniwat Pimwanna
SAMPLE CONDITION	Normal	FILE CODE	222003_WW_February
SAMPLE DESCRIPTION	1 = IAF Unit Effluent 2 = Equalization Tank Effluent 3 = Biological Treatment Effluent		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		
				1	2	3
Temperature	°C	2550 B	< 0.5	31.5	31.3	31.5
pH	-	4500-H ⁺ B	< 0.10	8.93	9.76	7.64
Total Dissolved Solids	mg/l	2540 C	< 50	1,104	1,048	954
Suspended Solids	mg/l	2540 D	< 5	15	24	< 5
Fat Oil & Grease	mg/l	5520 B	< 0.50	ND	3.9	ND
Phenols	mg/l	5530 B,C* / B,D	< 0.001*, < 0.10	0.64	2.5	ND*
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	3.1	13.2	ND
BOD ₅	mg/l	5210 B	< 1.0	34.6	75.2	< 1.0
COD	mg/l	5220 D	< 40.00	162	246	40.57
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C/Method 350.2*	< 0.02	3.5	7.1	0.13*
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	0.003	ND	ND
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND	ND	ND
Mercury (Hg)	mg/l	3112 B	< 0.0005	0.0009	0.0042	ND

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 21st ED. 2012 (AWWA APHA WEF)

REFERENCE : US EPA, 1983, Method for Chemical Analysis of Water and Waste, USEPA, EPA 600/4-79/020, Method 350.2

Khemchuda Insom

(Miss Khemchuda Insom)

Analyst

REG. NO. 2-239-ก-5976

Araya Tipparuk

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 2-239-ก-5863

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0510/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 10/03/2022	SAMPLING TIME	: 09.48-10.05
RECEIVED DATE	: 11/03/2022	ANALYTICAL DATE	: 11-16/03/2022
REPORT DATE	: 17/03/2022	SITE OPERATOR	: Mr. Aniwat Pimwanna
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_WW_March
SAMPLE DESCRIPTION	1 = IAF Unit Effluent 2 = Equalization Tank Effluent 3 = Biological Treatment Effluent		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		
				1	2	3
Temperature	°C	2550 B	< 0.5	34.6	34.7	33.4
pH		4500-H ⁺ B	< 0.10	8.09	10.00	7.68
Total Dissolved Solids	mg/l	2540 C	< 50	1,592	1,040	1,062
Suspended Solids	mg/l	2540 D	< 5	9	31	< 5
Fat Oil & Grease	mg/l	5520 B	< 0.50	2.7	2.6	ND
Phenols	mg/l	5530 B,C* / B,D	< 0.001*, < 0.10	0.67	3.0	ND*
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	ND	10.9	ND
BOD ₅	mg/l	5210 B	< 1.0	40.5	80.8	2.0
COD	mg/l	5220 D	< 40.00	181	266	< 40.00
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C/Method 350.2*	< 0.02	7.8	5.9	0.27
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	0.007	0.003	ND
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND	ND	ND
Mercury (Hg)	mg/l	3112 B	< 0.0005	0.0096	0.0068	ND

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 19th ED. 2017 (AWWA, APHA, WEF)

REFERENCE : US EPA, 1983, Method for Chemical Analysis of Water and Waste, USEPA, EPA 600/4-79/020, Method 350.7

Khemchuda Insorn

(Miss Khemchuda Insorn)

Analyst

REG. NO. 2-239-ก-5976

(Mrs. Araya Tipparuk)

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 2-239-ก-5863

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0703/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 04/04/2022	SAMPLING TIME	: 10.20-11.05
RECEIVED DATE	: 05/04/2022	ANALYTICAL DATE	: 05-12/04/2022
REPORT DATE	: 18/04/2022	SITE OPERATOR	: Mr. Aniwat Pimwanna
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_WW_April
SAMPLE DESCRIPTION	1 = API Separator Effluent 2 = IAF Unit Effluent 3 = Biological Treatment Effluent		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		
				1	2	3
Temperature	°C	2550 B	< 0.5	32.2	33.4	32.7
pH		4500-H ⁺ B	< 0.10	7.30	8.74	7.46
Total Dissolved Solids	mg/l	2540 C	< 50	596	658	806
Suspended Solids	mg/l	2540 D	< 5	13	12	< 5
Fat Oil & Grease	mg/l	5520 B	< 0.50	3.5	ND	ND
Phenols	mg/l	5530 B,C* / B,D	< 0.001*, < 0.10	1.2	1.0	ND*
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	0.94	1.4	ND
BOD ₅	mg/l	5210 B	< 1.0	54.5	37.7	< 1.0
COD	mg/l	5220 D	< 40.00	141	146	< 40.00
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C/Method 350.2*	< 0.02	3.8	4.0	0.14
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	ND	ND	ND
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND	ND	ND
Mercury (Hg)	mg/l	3112 B	< 0.0005	0.0031	ND	0.0008

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 19th ED. 2017 (AWWA, APHA, WEF)

REFERENCE : US EPA, 1983, Method for Chemical Analysis of Water and Waste, USEPA, EPA 600/4-79/020, Method 350.7

Khemchuda Insorn

(Miss Khemchuda Insorn)

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Technical Management Team

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME : Star Petroleum Refining Public Co., Ltd. REQUEST SERVICE No. : 0986/65
SAMPLING BY : SECOT Co., Ltd. SAMPLING METHOD : Grab
SAMPLING DATE : 09/05/2022 SAMPLING TIME : 10.25-10.37
RECEIVED DATE : 10/05/2022 ANALYTICAL DATE : 10-18/05/2022
REPORT DATE : 18/05/2022 SITE OPERATOR : Mr. Aniwat Pimwanna
SAMPLE CONDITION : Normal FILE CODE : 222003_WW_May
SAMPLE DESCRIPTION : 1 = API Separator Effluent 3 = Biological Treatment Effluent
2 = IAF Unit Effluent

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		
				1	2	3
Temperature	°C	2550 B	< 0.5	35.6	37.6	34.6
pH		4500-H ⁺ B	< 0.10	8.95	9.03	7.64
Total Dissolved Solids	mg/l	2540 C	< 50	662	724	890
Suspended Solids	mg/l	2540 D	< 5	32	< 5	< 5
Fat Oil & Grease	mg/l	5520 B	< 0.50	11.2	1.9	ND
Phenols	mg/l	5530 B,C* / B,D	< 0.001*, < 0.10	1.0	0.77	ND*
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	2.3	1.5	ND
BOD ₅	mg/l	5210 B	< 1.0	61.3	32.4	1.5
COD	mg/l	5220 D	< 40.00	227	94.95	< 40.00
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C/Method 350.2*	< 0.02	28.6	26.9	2.6
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	0.003	0.004	0.007
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND	ND	ND
Mercury (Hg)	mg/l	3112 B	< 0.0005	0.0057	0.0006	ND

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 21ST ED. 2017 (AWWA, APHA, WEF)

REFERENCE : US EPA, 1983, Method for Chemical Analysis of Water and Waste, USEPA, EPA 600/4-79-020, Method 350.2

Khernchuda Insorn

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME : Star Petroleum Refining Public Co., Ltd. REQUEST SERVICE No. : 1222/65
SAMPLING BY : SECOT Co., Ltd. SAMPLING METHOD : Grab
SAMPLING DATE : 06/06/2022 SAMPLING TIME : 10.07-10.30
RECEIVED DATE : 07/06/2022 ANALYTICAL DATE : 07-15/06/2022
REPORT DATE : 15/06/2022 SITE OPERATOR : Mr. Aniwat Pimwanna
SAMPLE CONDITION : Normal FILE CODE : 222003_WW_June
SAMPLE DESCRIPTION : 1 = API Separator Effluent 3 = Biological Treatment Effluent
2 = IAF Unit Effluent

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		
				1	2	3
Temperature	°C	2550 B	< 0.5	34.2	34.9	33.7
pH		4500-H ⁺ B	< 0.10	7.33	8.19	7.77
Total Dissolved Solids	mg/l	2540 C	< 50	1,632	1,486	1,544
Suspended Solids	mg/l	2540 D	< 5	69	18	< 5
Fat Oil & Grease	mg/l	5520 B	< 0.50	2.9	1.1	ND
Phenols	mg/l	5530 B,C* / B,D	< 0.001*, < 0.10	0.90	0.56	ND*
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	1.9	0.71	ND
BOD ₅	mg/l	5210 B	< 1.0	67.6	42.3	1.2
COD	mg/l	5220 D	< 40.00	197	137	< 40.00
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C/Method 350.2*	< 0.02	5.4	6.0	0.22*
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	0.006	0.005	0.007
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND	ND	ND
Mercury (Hg)	mg/l	3112 B	< 0.0005	0.0035	0.0006	0.0006

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 21ST ED. 2017 (AWWA, APHA, WEF)

REFERENCE : US EPA, 1983, Method for Chemical Analysis of Water and Waste, USEPA, EPA 600/4-79-020, Method 350.2

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(Miss Khernchuda Insorn)

Analyst

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Araya Tipparuk

(Mrs. Araya Tipparuk)

Technical Management Team

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1053/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Integrate
SAMPLING DATE	: 17/05/2022	SAMPLING TIME	: 12.02
RECEIVED DATE	: 18/05/2022	ANALYTICAL DATE	: 18-30/05/2022
REPORT DATE	: 31/05/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_CW_May

PARAMETER	UNITS	ANALYSIS METHODS	ND (non-detectable)	SATATION Ko Saket	STANDARD ^{1/}
Depth	m.	Measurement	-	1.9	-
Temperature	°C	2550 B	< 0.5	32.3	$\Delta \leq 1$
pH	-	4500-H ⁺ B	< 0.10	7.92	7.0-8.5
Transparency	m.	Secchi Disc	-	1.1	$\Delta \leq 10 \%$
Fat Oil & Grease	mg/l	5520 B	< 0.50	ND	-
Fat Oil & Grease	-	Visual Testing	-	NV	NV
Suspended Solid (SS)	mg/l	2540 D	2.5	6.40	^{2/}
Ammonia Nitrogen	µg/l	4500-NH ₃ F	< 10.0	ND	-
Phenols	mg/l	5530 B-C	< 0.001	ND	≤ 0.03
Dissolved Oxygen	mg/l	4500-O G	< 0.10	6.9	≥ 4
BOD ₅	mg/l	5210 B	< 1.0	1.2	-
Salinity	ppt	2520 B	< 0.10	29.4	$\Delta \leq 10 \%$
Total Petroleum Hydrocarbon	µg/l	IOC/GGE(MSI)-III/3	< 0.25	ND	≤ 1.0
TOC	mg/l	5310 B	< 0.01	1.69	-
Chromium Trivalent (Cr ³⁺)	µg/l	3113 B / Calculation	< 1.0	ND	-
Chromium Hexavalent (Cr ⁶⁺)	µg/l	3113 B	< 1.0	ND	≤ 50
Mercury (Hg)	µg/l	3112 B	< 0.05	ND	≤ 0.1

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 21st ED. 2017 (AWWA/APHA-WEF)

REFERENCE : Intergovernmental Oceanographic Commission of UNESCO (IOC) 1981

Khemchuda Insorn

(Miss Khemchuda Insorn)

Analyst

Araya Tipparuk

(Mrs. Araya Tipparuk)

Technical Management Team

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Daily average was calculated from hourly measurement or at least 5 samples taken at equal time interval within one day.

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1053/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Integrate
SAMPLING DATE	: 17/05/2022	SAMPLING TIME	: 12.16
RECEIVED DATE	: 18/05/2022	ANALYTICAL DATE	: 18-30/05/2022
REPORT DATE	: 31/05/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_CW_May

PARAMETER	UNITS	ANALYSIS METHODS	ND (non-detectable)	SATATION Had Sai Thong Beach	STANDARD ^{1/}
Depth	m.	Measurement	-	2.3	-
Temperature	°C	2550 B	< 0.5	33.6	$\Delta \leq 1$
Transparency	m.	Secchi Disc	-	1.5	$\Delta \leq 10 \%$
pH	-	4500-H ⁺ B	< 0.10	7.92	7.0-8.5
Fat Oil & Grease	mg/l	5520 B	< 0.50	ND	-
Fat Oil & Grease	-	Visual Testing	-	NV	NV
Suspended Solid (SS)	mg/l	2540 D	2.5	9.12	^{2/}
Ammonia Nitrogen	µg/l	4500-NH ₃ F	< 10.0	72.2	-
Phenols	mg/l	5530 B-C	< 0.001	ND	≤ 0.03
Dissolved Oxygen	mg/l	4500-O G	< 0.10	6.9	≥ 4
BOD ₅	mg/l	5210 B	< 1.0	1.2	-
Salinity	ppt	2520 B	< 0.10	27.7	$\Delta \leq 10 \%$
Total Petroleum Hydrocarbon	µg/l	IOC/GGE(MSI)-III/3	< 0.25	ND	≤ 1.0
TOC	mg/l	5310 B	< 0.01	2.28	-
Chromium Trivalent (Cr ³⁺)	µg/l	3113 B / Calculation	< 1.0	ND	-
Chromium Hexavalent (Cr ⁶⁺)	µg/l	3113 B	< 1.0	ND	≤ 50
Mercury (Hg)	µg/l	3112 B	< 0.05	ND	≤ 0.1

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 21st ED. 2017 (AWWA/APHA-WEF)

REFERENCE : Intergovernmental Oceanographic Commission of UNESCO (IOC) 1981

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Analyst

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Technical Management Team

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1053/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Integrate
SAMPLING DATE	: 17/05/2022	SAMPLING TIME	: 11.47
RECEIVED DATE	: 18/05/2022	ANALYTICAL DATE	: 18-30/05/2022
REPORT DATE	: 31/05/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_CW_May

PARAMETER	UNITS	ANALYSIS METHODS	ND (non-detectable)	SATATION	STANDARD ^{1/}
				Wastewater Discharge Point of Refinery (IEAT)	
Depth	m.	Measurement	-	1.4	-
Temperature	°C	2550 B	< 0.5	34.5	$\Delta \leq 2$
Transparency	m.	Secchi Disc	-	0.4	$\Delta \leq 10 \%$
pH	-	4500-H ⁺ B	< 0.10	7.74	7.0-8.5
Fat Oil & Grease	mg/l	5520 B	< 0.50	ND	-
Fat Oil & Grease	-	Visual Testing	-	NV	NV
Suspended Solid (SS)	mg/l	2540 D	2.5	29.60	^{2/}
Ammonia Nitrogen	µg/l	4500-NH ₃ F	< 10.0	227	-
Phenols	mg/l	5530 B-C	< 0.001	ND	≤ 0.03
Dissolved Oxygen	mg/l	4500-O G	< 0.10	6.9	≥ 4
BOD ₅	mg/l	5210 B	< 1.0	4.1	-
Salinity	ppt	2520 B	< 0.10	11.3	$\Delta \leq 10 \%$
Chromium Trivalent (Cr ³⁺)	µg/l	3113 B / Calculation	< 1.0	ND	-
Chromium Hexavalent (Cr ⁶⁺)	µg/l	3113 B	< 1.0	ND	≤ 50
Mercury (Hg)	µg/l	3112 B	< 0.05	ND	≤ 0.1

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 21st ED. 2017 (AWWA, APHA, WEF)

REFERENCE : Intergovernmental Oceanographic Commission of UNESCO (IOC) 1981

Khemchuda Insorn

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Analyst

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(Mrs. Araya Tipparuk)
Technical Management Team

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1053/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Integrate
SAMPLING DATE	: 17/05/2022	SAMPLING TIME	: 12.08
RECEIVED DATE	: 18/05/2022	ANALYTICAL DATE	: 18-30/05/2022
REPORT DATE	: 31/05/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_CW_May

PARAMETER	UNITS	ANALYSIS METHODS	ND (non-detectable)	SATATION	STANDARD ^{1/}
				Open Coastal Water	
Depth	m.	Measurement	-	3.5	-
Temperature	°C	2550 B	< 0.5	32.2	$\Delta \leq 1$
Transparency	m.	Secchi Disc	< 0.10	1.8	$\Delta \leq 10 \%$
pH	-	4500-H ⁺ B	-	7.97	7.0-8.5
Fat Oil & Grease	mg/l	5520 B	< 0.50	ND	-
Fat Oil & Grease	-	Visual Testing	-	NV	NV
Suspended Solid (SS)	mg/l	2540 D	2.5	4.25	^{2/}
Ammonia Nitrogen	µg/l	4500-NH ₃ F	< 10.0	ND	-
Phenols	mg/l	5530 B-C	< 0.001	ND	≤ 0.03
Dissolved Oxygen	mg/l	4500-O G	< 0.10	6.4	≥ 4
BOD ₅	mg/l	5210 B	< 1.0	< 1.0	-
Salinity	ppt	2520 B	< 0.10	28.2	$\Delta \leq 10 \%$
Total Petroleum Hydrocarbon	µg/l	IOC/GGE(MSI)-III/3	< 0.25	ND	≤ 1.0
TOC	mg/l	5310 B	< 0.01	1.47	-
Chromium Trivalent (Cr ³⁺)	µg/l	3113 B / Calculation	< 1.0	ND	-
Chromium Hexavalent (Cr ⁶⁺)	µg/l	3113 B	< 1.0	ND	≤ 50
Mercury (Hg)	µg/l	3112 B	< 0.05	ND	≤ 0.1

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 21st ED. 2017 (AWWA, APHA, WEF)

REFERENCE : Intergovernmental Oceanographic Commission of UNESCO (IOC) 1981

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Technical Management Team

Remark : 1. Reported analysis refers to submitted sample only.

2. This report shall not be reproduced, except in full, without official approval.

3. ^{1/} Notification of the National Environmental Board B.E.2564 (2021) (Class 3).

Δ : Change from natural condition, \leq : Not more than, NV : Not visible, \geq : Not less than.

^{2/} The results should not be changed by more than the sum of daily average and the standard deviation.

Daily average was calculated from hourly measurement or at least 5 samples taken at equal time interval within one day.

4. - Not available.

ใบรับรองผลการตรวจวัดระดับเสียง



Noise Monitoring Result : Community Noise

MTR-SPRC PLC-Refinery

Location : Main office complex				Monitor Period : 06-13 May 2022			
SLM Model : Cirrus CR161B				Serial No : G302737			
Site Operator : Mr. Sittichai Sawangwongchai							
Calibrator Model : Cirrus CR:515				Serial No : 94296			
Calibration Ref dB(A) : 94.0				Certified Date : 24 Dec 2021			
SLM Reading / Adjust dB(A) : 93.7/0.0				Expire Date : 23 Dec 2022			
Cal Sheet No.: CR-515-2022-011							
Time	Equivalent Sound Pressure Level (dB(A))						
	06-07 May 2022	07-08 May 2022	08-09 May 2022	09-10 May 2022	10-11 May 2022	11-12 May 2022	12-13 May 2022
11:00 - 12:00	58.2	54.9	52.7	57.4	57.0	54.5	58.8
12:00 - 13:00	56.6	57.9	56.7	59.0	57.3	54.5	58.6
13:00 - 14:00	55.1	51.8	54.6	58.7	56.7	55.6	55.9
14:00 - 15:00	54.8	50.5	51.8	56.8	57.5	53.3	55.6
15:00 - 16:00	57.0	53.8	54.5	56.9	57.7	54.1	56.8
16:00 - 17:00	56.7	54.3	54.1	55.2	54.9	54.5	55.8
17:00 - 18:00	56.5	53.9	53.3	55.1	54.2	54.5	54.5
18:00 - 19:00	55.1	53.5	52.4	54.0	52.3	53.1	52.6
19:00 - 20:00	52.8	49.6	47.7	57.3	49.6	51.3	50.5
20:00 - 21:00	50.1	49.8	48.4	50.8	49.7	50.7	50.7
21:00 - 22:00	46.2	48.9	49.1	49.2	48.8	51.1	50.4
22:00 - 23:00	46.4	61.7	49.7	47.4	48.4	51.9	50.1
23:00 - 00:00	47.3	59.5	49.0	48.4	48.4	51.2	50.2
00:00 - 01:00	46.0	48.9	48.3	49.1	48.4	51.0	50.2
01:00 - 02:00	47.0	50.6	48.7	49.7	49.7	51.7	51.8
02:00 - 03:00	49.8	50.8	47.9	48.8	49.9	51.9	52.0
03:00 - 04:00	48.0	52.2	47.4	62.3	54.5	51.4	51.4
04:00 - 05:00	48.8	50.7	49.5	58.2	50.8	52.5	50.8
05:00 - 06:00	52.5	52.8	52.0	53.2	50.8	53.2	52.4
06:00 - 07:00	54.5	53.0	54.4	53.8	54.4	54.7	54.6
07:00 - 08:00	55.7	54.9	56.1	56.3	56.5	58.6	56.4
08:00 - 09:00	57.2	56.1	57.4	56.7	55.9	58.0	55.0
09:00 - 10:00	56.3	56.6	56.1	56.3	55.0	58.3	55.7
10:00 - 11:00	56.4	57.3	57.1	55.7	54.8	58.4	56.4
Leq(24)*	54.3	54.9	53.2	56.0	54.2	54.5	54.5
Ldn	57.8	62.0	57.5	62.0	58.5	59.3	59.0
Lmax **	79.9	87.6	74.8	86.9	74.4	74.3	75.3
Standard-24Hr	70 dB(A)						
Standard-Max	115 dB(A)						

Remark : * Average time between 11:00-11:00

** Maximum Sound Pressure Level between 11:00-11:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

Preeda S.
(Miss Preeda Somjai)
Technical Management Team



Noise Monitoring Result : Background Noise

MTR-SPRC PLC-Refinery

Location : Main office complex				Monitor Period : 06-13 May 2022			
SLM Model : Cirrus CR161B				Serial No : G302737			
Site Operator : Mr. Sittichai Sawangwongchai							
Calibrator Model : Cirrus CR:515				Serial No : 94296			
Calibration Ref dB(A) : 94.0				Certified Date : 24 Dec 2021			
SLM Reading / Adjust dB(A) : 93.7/0.0				Expire Date : 23 Dec 2022			
Cal Sheet No.: CR-515-2022-011							
Time	L90 (dB(A))						
	06-07 May 2022	07-08 May 2022	08-09 May 2022	09-10 May 2022	10-11 May 2022	11-12 May 2022	12-13 May 2022
11:00 ~ 12:00	56.0	53.7	47.3	55.0	54.0	52.1	57.2
12:00 ~ 13:00	54.8	54.8	55.4	56.3	55.3	53.0	56.5
13:00 ~ 14:00	53.8	49.2	50.6	55.3	54.2	53.2	53.8
14:00 ~ 15:00	53.3	48.3	48.6	54.6	55.4	51.2	52.8
15:00 ~ 16:00	54.8	52.3	53.0	54.4	54.9	52.8	54.8
16:00 ~ 17:00	54.9	52.1	52.5	52.9	51.5	52.4	53.6
17:00 ~ 18:00	54.5	52.0	51.5	53.0	51.3	52.4	53.0
18:00 ~ 19:00	51.6	48.0	46.4	50.1	48.7	50.2	50.0
19:00 ~ 20:00	50.8	48.3	45.7	49.8	47.9	49.5	48.7
20:00 ~ 21:00	45.9	48.4	47.1	48.3	48.0	49.2	49.2
21:00 ~ 22:00	44.2	47.0	47.7	47.4	46.7	49.5	48.9
22:00 ~ 23:00	44.4	48.2	45.7	46.2	46.8	50.8	48.8
23:00 ~ 00:00	44.8	47.3	47.3	46.6	46.7	50.0	48.3
00:00 ~ 01:00	44.8	47.0	47.0	48.1	47.0	49.7	48.4
01:00 ~ 02:00	44.9	49.5	46.3	48.1	48.6	50.3	50.7
02:00 ~ 03:00	45.6	48.8	45.3	43.1	48.9	50.7	50.6
03:00 ~ 04:00	46.6	48.7	46.0	42.4	49.4	50.5	50.1
04:00 ~ 05:00	45.5	48.4	46.7	49.5	47.3	50.7	49.7
05:00 ~ 06:00	47.6	49.4	47.3	49.4	47.2	51.1	50.1
06:00 ~ 07:00	49.3	49.6	49.1	48.2	49.3	51.9	50.7
07:00 ~ 08:00	53.0	52.9	52.9	53.6	52.9	56.1	53.6
08:00 ~ 09:00	56.1	54.5	55.4	55.2	54.2	55.9	53.2
09:00 ~ 10:00	54.0	55.1	52.9	55.3	53.5	56.0	53.3
10:00 ~ 11:00	53.8	54.6	55.1	54.3	53.3	56.5	55.0
L90(avg)*	52.1	51.2	50.7	52.2	51.6	52.5	52.5

Remark : * Average time between 11:00-11:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

Preeda S.
(Miss Preeda Somjai)
Technical Management Team



Noise Monitoring Result : Community Noise

MTR-SPRC PLC-Refinery

Location : Central Control Building				Monitor Period : 06-13 May 2022			
SLM Model : Cirrus CR161B				Serial No : G302733			
Site Operator : Mr. Sittichai Sawangwongchai							
Calibrator Model : Cirrus CR:515				Serial No : 94296			
Calibration Ref dB(A) : 94.0				Certified Date : 24 Dec 2021			
SLM Reading / Adjust dB(A) : 93.7/0.0				Expire Date : 23 Dec 2022			
Cal Sheet No.: CR-515-2022-011							
Time	Equivalent Sound Pressure Level (dB(A))						
	06-07 May 2022	07-08 May 2022	08-09 May 2022	09-10 May 2022	10-11 May 2022	11-12 May 2022	12-13 May 2022
10:00 - 11:00	68.0	67.6	65.8	65.9	67.6	66.6	67.6
11:00 - 12:00	67.3	66.5	66.2	66.1	67.8	66.6	67.5
12:00 - 13:00	67.6	66.5	65.9	66.1	68.1	66.7	67.4
13:00 - 14:00	67.8	66.4	66.3	66.3	68.0	69.9	67.4
14:00 - 15:00	67.6	66.1	66.2	66.4	67.9	66.7	67.5
15:00 - 16:00	67.7	65.9	66.0	66.4	67.8	66.8	67.3
16:00 - 17:00	67.7	66.1	65.8	66.5	66.6	66.5	66.7
17:00 - 18:00	67.7	65.8	65.8	66.4	66.3	66.4	66.2
18:00 - 19:00	67.8	66.2	65.9	66.4	66.5	66.5	66.3
19:00 - 20:00	67.6	66.1	66.0	66.9	66.1	66.5	66.0
20:00 - 21:00	67.2	66.1	66.3	66.4	66.0	66.5	66.2
21:00 - 22:00	66.3	66.1	66.3	66.5	66.3	66.6	66.1
22:00 - 23:00	66.4	67.0	66.2	66.7	66.5	66.5	66.1
23:00 - 00:00	66.4	67.1	66.6	66.7	66.6	66.5	66.4
00:00 - 01:00	66.1	66.4	66.4	66.6	66.5	66.1	66.5
01:00 - 02:00	66.0	66.4	66.2	66.5	66.6	66.0	66.6
02:00 - 03:00	66.0	66.6	66.1	66.1	66.5	66.2	66.4
03:00 - 04:00	66.1	66.6	66.2	68.0	66.9	66.2	66.3
04:00 - 05:00	66.2	66.6	66.3	67.5	66.9	66.5	66.3
05:00 - 06:00	66.3	66.5	66.2	67.1	66.7	66.5	66.3
06:00 - 07:00	66.1	66.5	66.0	67.0	66.7	66.4	66.2
07:00 - 08:00	69.7	68.8	68.9	69.5	68.1	67.3	66.3
08:00 - 09:00	66.4	66.0	66.2	68.0	67.1	67.5	66.3
09:00 - 10:00	66.6	66.2	66.1	68.0	66.5	67.4	66.4
Leq(24)*	67.1	66.6	66.3	66.9	67.0	66.8	66.6
Ldn	72.8	73.0	72.7	73.3	73.1	72.8	72.8
Lmax **	93.2	93.3	92.5	92.2	89.7	93.2	81.0
Standard-24Hr	70 dB(A)						
Standard-Max	115 dB(A)						

Remark : * Average time between 10:00-10:00

** Maximum Sound Pressure Level between 10:00-10:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

(Miss Preeda Somjai)
Technical Management Team



Noise Monitoring Result : Background Noise

MTR-SPRC PLC-Refinery

Location : Central Control Building				Monitor Period : 06-13 May 2022			
SLM Model : Cirrus CR161B				Serial No : G302733			
Site Operator : Mr. Sittichai Sawangwongchai							
Calibrator Model : Cirrus CR:515				Serial No : 94296			
Calibration Ref dB(A) : 94.0				Certified Date : 24 Dec 2021			
SLM Reading / Adjust dB(A) : 93.7/0.0				Expire Date : 23 Dec 2022			
Cal Sheet No.: CR-515-2022-011							
Time	L90 (dB(A))						
	06-07 May 2022	07-08 May 2022	08-09 May 2022	09-10 May 2022	10-11 May 2022	11-12 May 2022	12-13 May 2022
10:00 – 11:00	66.5	66.1	64.9	65.2	66.6	66.0	66.6
11:00 – 12:00	66.5	65.8	65.6	65.4	66.8	66.1	66.7
12:00 – 13:00	66.8	66.0	65.3	65.3	67.3	66.2	66.5
13:00 – 14:00	66.9	65.8	65.7	65.5	67.2	66.1	66.5
14:00 – 15:00	66.8	65.5	65.7	65.7	67.2	66.2	66.7
15:00 – 16:00	66.9	65.4	65.5	65.8	66.7	66.2	66.5
16:00 – 17:00	66.9	65.3	65.3	65.8	65.9	66.0	65.8
17:00 – 18:00	66.8	65.4	65.4	65.9	65.8	66.0	65.7
18:00 – 19:00	67.1	65.7	65.4	65.8	66.1	66.0	65.8
19:00 – 20:00	67.1	65.6	65.6	66.1	65.7	66.0	65.6
20:00 – 21:00	66.0	65.6	65.8	66.0	65.6	66.1	65.7
21:00 – 22:00	65.9	65.6	65.8	66.1	65.8	66.1	65.6
22:00 – 23:00	66.0	65.7	65.6	66.3	66.0	66.0	65.6
23:00 – 00:00	65.8	65.9	66.1	66.2	66.1	66.0	65.8
00:00 – 01:00	65.5	66.0	65.9	66.1	66.1	65.6	66.0
01:00 – 02:00	65.5	66.0	65.8	66.0	66.2	65.5	66.1
02:00 – 03:00	65.5	66.1	65.7	65.6	66.1	65.6	65.9
03:00 – 04:00	65.6	66.2	65.8	66.0	66.3	65.6	65.8
04:00 – 05:00	65.7	66.2	65.7	66.6	66.4	65.9	65.9
05:00 – 06:00	65.8	66.1	65.7	66.6	66.3	65.9	65.8
06:00 – 07:00	65.6	66.0	65.5	66.5	66.2	65.8	65.7
07:00 – 08:00	65.4	65.6	65.4	66.8	66.1	66.6	65.8
08:00 – 09:00	65.4	65.4	65.2	67.0	66.3	66.6	65.8
09:00 – 10:00	65.3	65.5	65.1	66.9	66.0	66.6	65.9
L90(avg)*	66.2	65.8	65.6	66.1	66.3	66.0	66.0

Remark : * Average time between 10:00-10:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

(Miss Preeda Somjai)
Technical Management Team



Noise Monitoring Result : Community Noise

MTR-SPRC PLC -Refinery

Location : Northern Refinery Boundary 1				Monitor Period : 06-13 May 2022			
SLM Model : Cirrus CR161B				Serial No : G302741			
Site Operator : Mr. Sittichai Sawangwongchai							
Calibrator Model : Cirrus CR:515				Serial No : 94296			
Calibration Ref dB(A) : 94.0				Certified Date : 24 Dec 2021			
SLM Reading / Adjust dB(A) : 94.0/0.0				Expire Date : 23 Dec 2022			
Cal Sheet No.: CR-515-2022-011							
Time	Equivalent Sound Pressure Level (dB(A))						
	06-07 May 2022	07-08 May 2022	08-09 May 2022	09-10 May 2022	10-11 May 2022	11-12 May 2022	12-13 May 2022
11:00 - 12:00	63.7	57.9	56.7	57.9	63.7	47.6	58.5
12:00 - 13:00	63.6	57.8	57.6	58.8	63.9	50.6	58.9
13:00 - 14:00	63.9	58.7	57.8	62.0	63.5	52.1	58.8
14:00 - 15:00	63.5	61.1	57.3	62.1	63.7	51.8	59.2
15:00 - 16:00	63.6	56.9	58.1	63.4	64.1	51.9	59.4
16:00 - 17:00	64.1	56.2	57.6	61.7	64.7	52.1	59.2
17:00 - 18:00	64.7	55.4	57.6	64.0	65.5	52.2	62.1
18:00 - 19:00	65.4	55.8	61.3	60.5	64.8	52.1	58.9
19:00 - 20:00	64.8	57.0	65.7	59.3	62.8	52.1	58.6
20:00 - 21:00	63.0	56.6	65.8	58.6	58.1	53.2	58.4
21:00 - 22:00	58.2	56.3	64.4	61.9	57.5	52.6	58.6
22:00 - 23:00	57.6	58.2	63.2	60.4	57.5	51.9	58.4
23:00 - 00:00	57.5	59.5	62.8	57.8	55.5	52.1	58.3
00:00 - 01:00	55.5	60.7	61.9	59.5	56.2	53.6	59.1
01:00 - 02:00	56.1	61.8	58.6	64.9	57.1	52.4	60.5
02:00 - 03:00	57.2	60.0	55.8	63.3	55.6	50.9	57.8
03:00 - 04:00	55.6	59.8	55.6	63.6	55.4	50.3	57.8
04:00 - 05:00	55.3	59.5	55.9	63.7	55.7	51.2	58.4
05:00 - 06:00	55.7	60.7	57.7	64.7	56.3	60.7	57.6
06:00 - 07:00	56.3	56.1	57.5	64.3	54.4	64.2	62.3
07:00 - 08:00	56.1	58.0	57.7	64.3	55.5	63.7	61.0
08:00 - 09:00	55.8	54.3	57.9	65.1	49.3	64.3	61.1
09:00 - 10:00	54.9	54.2	57.2	63.1	48.3	64.6	62.1
10:00 - 11:00	57.4	54.1	57.8	62.2	47.7	61.3	60.5
Leq(24)*	61.2	58.3	60.4	62.5	60.8	58.2	59.6
Ldn	64.5	65.9	66.3	69.3	64.1	64.0	65.7
Lmax**	79.2	83.0	73.0	87.9	79.2	77.1	81.7
Standard-24Hr	70 dB(A)						
Standard-Max	115 dB(A)						

Remark : * Average time between 11:00-11:00

** Maximum Sound Pressure Level between 11:00-11:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

(Miss Preeda Somjai)
Technical Management Team



Noise Monitoring Result : Background Noise

MTR-SPRC PLC -Refinery

Location : Northern Refinery Boundary 1				Monitor Period : 06-13 May 2022			
SLM Model : Cirrus CR161B				Serial No : G302741			
Site Operator : Mr. Sittichai Sawangwongchai							
Calibrator Model : Cirrus CR:515				Serial No : 94296			
Calibration Ref dB(A) : 94.0				Certified Date : 24 Dec 2021			
SLM Reading / Adjust dB(A) : 94.0/0.0				Expire Date : 23 Dec 2022			
Cal Sheet No.: CR-515-2022-011							
Time	L90 (dB(A))						
	06-07 May 2022	07-08 May 2022	08-09 May 2022	09-10 May 2022	10-11 May 2022	11-12 May 2022	12-13 May 2022
11:00 - 12:00	60.5	56.3	53.5	56.5	60.6	43.7	57.1
12:00 - 13:00	60.6	56.2	56.0	56.7	60.6	47.1	57.4
13:00 - 14:00	60.6	56.1	56.5	59.8	60.3	51.3	57.6
14:00 - 15:00	60.3	55.1	56.0	60.3	60.3	51.2	57.8
15:00 - 16:00	60.3	54.9	56.4	61.5	60.4	51.4	58.0
16:00 - 17:00	60.4	53.5	56.2	59.5	61.0	51.3	57.8
17:00 - 18:00	61.0	53.4	56.0	59.9	62.4	51.3	58.1
18:00 - 19:00	62.3	54.0	56.6	57.9	62.5	51.1	57.6
19:00 - 20:00	62.5	55.0	63.7	57.2	58.5	51.3	57.3
20:00 - 21:00	58.6	54.9	62.7	55.9	56.8	51.4	57.2
21:00 - 22:00	56.8	55.0	60.0	54.1	55.8	51.5	57.2
22:00 - 23:00	55.8	55.2	57.2	56.9	54.6	51.1	57.1
23:00 - 00:00	54.7	56.2	58.0	55.6	54.1	51.4	57.1
00:00 - 01:00	54.1	58.6	57.0	56.4	54.2	51.8	57.2
01:00 - 02:00	54.1	58.1	54.8	57.9	55.3	50.8	57.1
02:00 - 03:00	55.4	56.5	54.4	59.3	54.3	47.8	55.8
03:00 - 04:00	54.4	57.5	54.3	59.7	54.0	47.2	55.5
04:00 - 05:00	54.0	56.7	54.6	60.8	54.5	49.2	56.1
05:00 - 06:00	54.5	55.2	55.0	61.2	54.5	50.4	56.2
06:00 - 07:00	54.5	54.3	55.7	60.4	45.6	60.7	57.4
07:00 - 08:00	54.0	53.3	56.0	60.7	52.2	60.4	58.3
08:00 - 09:00	52.9	52.0	56.2	61.2	44.6	60.8	58.3
09:00 - 10:00	52.3	51.9	55.7	57.5	41.9	60.9	58.3
10:00 - 11:00	55.2	51.5	56.2	56.9	43.7	57.2	57.3
L90(avg)*	58.3	55.4	57.5	59.0	57.8	54.9	57.3

Remark : * Average time between 11:00-11:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

(Miss Preeda Somjai)
Technical Management Team



Noise Monitoring Result : Community Noise

MTR-SPRC PLC-Refinery

Location : Northern Refinery Boundary 2
SLM Model : Cirrus CR161B
Site Operator : Mr. Sittichai Sawangwongchai

Monitor Period : 06-13 May 2022
Serial No : G302743

Calibrator Model : Cirrus CR:515
Calibration Ref dB(A) : 94.0
SLM Reading / Adjust dB(A) : 93.7/0.1
Cal Sheet No.: CR-515-2022-011

Serial No : 94296
Certified Date : 24 Dec 2021
Expire Date : 23 Dec 2022

Time	Equivalent Sound Pressure Level (dB(A))							
	06-07 May 2022	07-08 May 2022	08-09 May 2022	09-10 May 2022	10-11 May 2022	11-12 May 2022	12-13 May 2022	
11:00 - 12:00	54.2	53.1	55.6	54.5	57.5	54.7	58.1	
12:00 - 13:00	54.5	54.3	56.4	53.0	58.1	54.7	58.0	
13:00 - 14:00	59.7	54.3	55.2	54.1	58.6	58.4	57.8	
14:00 - 15:00	64.5	53.0	55.7	54.0	59.6	56.0	57.4	
15:00 - 16:00	55.6	52.6	56.9	54.4	57.1	54.8	58.1	
16:00 - 17:00	57.1	53.5	54.6	57.7	54.5	55.4	57.2	
17:00 - 18:00	55.4	51.8	53.4	71.5	53.2	54.6	54.9	
18:00 - 19:00	56.7	56.8	55.7	58.1	58.4	57.7	61.6	
19:00 - 20:00	53.7	51.7	52.0	60.0	53.3	54.9	53.9	
20:00 - 21:00	51.9	52.8	52.8	54.4	53.3	54.3	54.4	
21:00 - 22:00	49.6	51.8	51.5	53.9	52.4	54.4	55.0	
22:00 - 23:00	51.1	67.1	53.1	53.9	54.1	55.0	54.6	
23:00 - 00:00	48.9	62.7	51.3	55.4	54.3	57.0	58.5	
00:00 - 01:00	49.9	54.2	52.1	54.8	54.4	53.8	53.5	
01:00 - 02:00	48.7	54.3	50.1	54.3	56.1	55.4	55.7	
02:00 - 03:00	51.0	54.1	49.8	53.6	55.4	54.4	55.5	
03:00 - 04:00	50.2	52.1	50.4	64.2	56.4	54.1	54.5	
04:00 - 05:00	49.4	51.4	50.2	62.4	53.2	54.2	54.3	
05:00 - 06:00	55.1	57.4	57.6	60.3	57.6	58.4	57.3	
06:00 - 07:00	55.0	53.2	55.2	56.7	55.8	56.2	55.3	
07:00 - 08:00	54.1	54.3	54.8	56.0	55.6	58.1	55.6	
08:00 - 09:00	52.0	54.0	51.2	54.0	56.3	58.4	53.4	
09:00 - 10:00	51.6	52.0	53.7	53.4	55.3	59.1	53.9	
10:00 - 11:00	56.2	53.1	53.0	55.5	56.2	57.3	54.4	
Leq(24)*	55.6	57.1	54.0	60.5	56.1	56.2	56.5	
Ldn	59.4	65.8	59.7	65.9	62.0	62.2	62.3	
Lmax **	82.0	81.7	78.3	86.8	80.4	78.7	78.8	
Standard-24Hr	70 dB(A)							
Standard-Max	115 dB(A)							

Remark : * Average time between 11:00-11:00

** Maximum Sound Pressure Level between 11:00-11:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

(Miss Preeda Somjai)
Technical Management Team



Noise Monitoring Result : Background Noise

MTR-SPRC PLC-Refinery

Location : Northern Refinery Boundary 2
SLM Model : Cirrus CR161B
Site Operator : Mr. Sittichai Sawangwongchai

Monitor Period : 06-13 May 2022
Serial No : G302743

Calibrator Model : Cirrus CR:515
Calibration Ref dB(A) : 94.0
SLM Reading / Adjust dB(A) : 93.7/0.1
Cal Sheet No.: CR-515-2022-011

Serial No : 94296
Certified Date : 24 Dec 2021
Expire Date : 23 Dec 2022

Time	L90 (dB(A))							
	06-07 May 2022	07-08 May 2022	08-09 May 2022	09-10 May 2022	10-11 May 2022	11-12 May 2022	12-13 May 2022	
11:00 - 12:00	51.5	51.6	51.6	50.8	54.4	52.7	55.8	
12:00 - 13:00	52.4	52.1	51.0	51.1	55.5	53.0	55.7	
13:00 - 14:00	53.5	52.7	52.0	51.5	55.8	53.4	55.6	
14:00 - 15:00	53.6	51.2	52.3	51.3	56.3	54.1	55.4	
15:00 - 16:00	54.0	50.4	52.5	52.4	53.9	53.2	55.9	
16:00 - 17:00	54.2	50.0	50.9	53.0	52.1	53.1	54.6	
17:00 - 18:00	53.7	49.2	50.1	53.3	51.6	53.1	53.5	
18:00 - 19:00	52.9	50.1	50.4	52.5	52.8	53.4	53.2	
19:00 - 20:00	52.2	50.2	49.1	53.4	51.5	53.1	52.3	
20:00 - 21:00	50.2	50.7	48.9	53.0	51.4	52.8	52.7	
21:00 - 22:00	48.4	49.6	49.8	52.8	50.2	52.8	52.1	
22:00 - 23:00	48.2	50.9	48.4	52.4	52.2	52.9	51.8	
23:00 - 00:00	47.8	52.3	49.7	52.3	52.7	52.7	52.4	
00:00 - 01:00	47.4	49.9	49.5	53.0	53.3	52.4	52.1	
01:00 - 02:00	47.5	52.6	48.6	52.6	52.9	53.2	53.5	
02:00 - 03:00	48.6	52.1	48.1	48.9	53.1	53.2	53.7	
03:00 - 04:00	49.0	50.7	49.4	47.6	53.2	53.0	53.4	
04:00 - 05:00	48.0	49.9	49.0	53.9	50.4	53.2	52.8	
05:00 - 06:00	50.1	50.0	50.2	54.2	49.4	53.6	52.5	
06:00 - 07:00	51.0	50.8	51.7	53.5	52.5	54.1	53.2	
07:00 - 08:00	50.6	49.9	49.9	51.9	52.1	55.7	52.7	
08:00 - 09:00	50.0	50.4	49.1	51.3	53.4	56.0	51.1	
09:00 - 10:00	49.8	49.1	49.8	51.4	53.3	55.6	51.2	
10:00 - 11:00	50.7	48.6	51.0	52.9	53.3	55.0	52.7	
L90(avg)*	51.2	50.8	50.3	52.3	53.1	53.7	53.6	

Remark : * Average time between 11:00-11:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

(Miss Preeda Somjai)
Technical Management Team



Noise Monitoring Result : Community Noise

MTR-SPRC PLC-Refinery

Location : Northern Refinery Boundary 3
SLM Model : Cirrus CR162B
Site Operator : Mr. Sittichai Sawangwongchai

Monitor Period : 06-13 May 2022
Serial No : G301014

Calibrator Model : Cirrus CR:515
Calibration Ref dB(A) : 94.0
SLM Reading / Adjust dB(A) : 93.7/0.1
Cal Sheet No.: CR-515-2022-011

Serial No : 94296
Certified Date : 24 Dec 2021
Expire Date : 23 Dec 2022

Time	Equivalent Sound Pressure Level (dB(A))						
	06-07 May 2022	07-08 May 2022	08-09 May 2022	09-10 May 2022	10-11 May 2022	11-12 May 2022	12-13 May 2022
11:00 - 12:00	55.9	49.6	50.1	54.5	55.2	53.9	55.2
12:00 - 13:00	53.6	56.3	55.9	58.7	57.6	57.8	58.3
13:00 - 14:00	52.8	54.1	53.9	57.7	57.8	57.3	57.5
14:00 - 15:00	51.0	55.1	53.3	57.8	57.0	57.6	58.0
15:00 - 16:00	52.3	50.4	52.2	56.8	55.2	56.9	57.0
16:00 - 17:00	57.5	50.2	52.4	53.2	57.8	56.6	58.7
17:00 - 18:00	56.1	49.3	51.0	55.3	57.0	54.7	55.3
18:00 - 19:00	51.9	58.1	49.9	55.6	53.5	54.0	51.7
19:00 - 20:00	51.4	57.1	49.4	53.6	52.4	52.1	51.9
20:00 - 21:00	54.5	47.9	49.1	55.5	51.7	52.5	50.4
21:00 - 22:00	59.0	51.8	51.9	54.5	52.2	52.6	52.3
22:00 - 23:00	58.0	52.9	52.7	51.4	52.2	52.2	52.7
23:00 - 00:00	57.3	53.5	52.0	58.0	53.6	52.4	52.1
00:00 - 01:00	56.5	55.1	51.6	55.8	49.8	51.9	54.0
01:00 - 02:00	53.7	51.5	51.0	53.0	51.3	53.6	53.0
02:00 - 03:00	55.6	52.9	57.6	57.5	59.5	58.0	56.7
03:00 - 04:00	51.9	53.3	57.5	59.7	61.3	60.8	60.3
04:00 - 05:00	52.8	49.5	53.4	56.7	57.0	57.3	55.6
05:00 - 06:00	56.0	48.8	51.2	53.1	53.7	59.7	52.7
06:00 - 07:00	59.6	49.8	52.1	53.1	53.4	54.9	52.9
07:00 - 08:00	52.7	51.7	56.5	56.2	55.5	57.2	56.3
08:00 - 09:00	52.9	49.9	53.1	55.3	54.6	55.9	55.4
09:00 - 10:00	51.6	50.0	54.5	55.7	55.0	55.3	54.6
10:00 - 11:00	50.1	50.3	50.8	55.4	53.5	55.3	54.4
Leq(24)*	55.2	53.0	53.3	56.0	55.8	56.2	55.6
L _{dn}	62.5	58.9	60.3	62.5	62.6	63.1	61.8
L _{max} **	79.9	78.8	80.6	85.7	86.3	83.0	83.9
Standard-24Hr	70 dB(A)						
Standard-Max	115 dB(A)						

Remark : * Average time between 11:00-11:00

** Maximum Sound Pressure Level between 11:00-11:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

Preeda S.
(Miss Preeda Somjai)
Technical Management Team



Noise Monitoring Result : Background Noise

MTR-SPRC PLC-Refinery

Location : Northern Refinery Boundary 3
SLM Model : Cirrus CR162B
Site Operator : Mr. Sittichai Sawangwongchai

Monitor Period : 06-13 May 2022
Serial No : G301014

Calibrator Model : Cirrus CR:515
Calibration Ref dB(A) : 94.0
SLM Reading / Adjust dB(A) : 93.7/0.1
Cal Sheet No.: CR-515-2022-011

Serial No : 94296
Certified Date : 24 Dec 2021
Expire Date : 23 Dec 2022

Time	L90 (dB(A))						
	06-07 May 2022	07-08 May 2022	08-09 May 2022	09-10 May 2022	10-11 May 2022	11-12 May 2022	12-13 May 2022
11:00 - 12:00	48.3	43.5	46.4	48.5	51.3	49.2	52.0
12:00 - 13:00	47.5	43.3	46.5	48.7	47.6	49.2	51.3
13:00 - 14:00	46.7	44.0	45.5	50.1	47.3	49.4	50.4
14:00 - 15:00	46.9	45.3	45.1	49.6	48.5	50.7	50.5
15:00 - 16:00	47.7	45.6	46.0	50.2	49.2	51.1	51.0
16:00 - 17:00	49.0	48.2	51.2	49.0	55.9	54.1	57.4
17:00 - 18:00	48.1	45.0	48.4	54.7	55.9	53.3	53.4
18:00 - 19:00	47.3	46.2	48.2	54.7	50.7	51.3	50.6
19:00 - 20:00	46.7	47.9	48.2	50.4	47.7	51.0	50.0
20:00 - 21:00	48.5	46.3	47.1	54.0	48.1	50.9	48.9
21:00 - 22:00	49.3	46.4	46.7	53.9	51.3	51.6	51.0
22:00 - 23:00	50.0	45.9	52.0	45.8	51.4	50.3	51.3
23:00 - 00:00	49.9	46.1	45.9	42.7	50.3	51.5	50.6
00:00 - 01:00	49.8	54.6	45.0	48.1	47.0	50.5	50.6
01:00 - 02:00	49.1	47.0	45.4	48.5	48.1	50.9	49.7
02:00 - 03:00	54.9	46.7	47.4	48.2	49.8	51.9	50.6
03:00 - 04:00	46.8	45.2	46.2	49.9	50.6	53.8	50.7
04:00 - 05:00	47.3	43.3	43.4	46.9	49.8	52.5	48.7
05:00 - 06:00	48.4	42.3	43.9	46.7	48.3	52.5	47.9
06:00 - 07:00	49.4	42.3	45.7	47.7	48.2	52.1	48.2
07:00 - 08:00	46.6	43.5	46.4	49.4	48.7	53.1	48.5
08:00 - 09:00	47.1	45.2	47.3	51.4	48.9	52.5	47.4
09:00 - 10:00	46.8	46.4	47.6	51.6	48.8	51.4	48.1
10:00 - 11:00	44.1	46.6	46.6	52.3	48.9	51.9	48.0
L90(avg)*	48.7	46.7	47.2	50.6	50.4	51.7	50.9

Remark : * Average time between 11:00-11:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

Preeda S.
(Miss Preeda Somjai)
Technical Management Team



Noise Monitoring Result : Community Noise

MTR-SPRC PLC-Refinery

Location : Eastern Refinery Boundary 1
SLM Model : Cirrus CR161B
Site Operator : Mr. Sittichai Sawangwongchai

Monitor Period : 06-13 May 2022
Serial No : G302630

Calibrator Model : Cirrus CR:515
Calibration Ref dB(A) : 94.0
SLM Reading / Adjust dB(A) : 93.7/0.1
Cal Sheet No.: CR-515-2022-011

Serial No : 94296
Certified Date : 24 Dec 2021
Expire Date : 23 Dec 2022

Time	Equivalent Sound Pressure Level (dB(A))						
	06-07 May 2022	07-08 May 2022	08-09 May 2022	09-10 May 2022	10-11 May 2022	11-12 May 2022	12-13 May 2022
10:00 - 11:00	63.2	61.5	62.3	60.7	61.4	62.5	64.6
11:00 - 12:00	62.3	62.2	62.3	62.3	63.1	61.0	65.8
12:00 - 13:00	61.7	60.8	62.2	62.8	61.6	61.8	60.8
13:00 - 14:00	60.9	61.3	61.8	61.6	61.1	63.1	63.4
14:00 - 15:00	60.4	59.9	63.0	60.7	62.3	65.0	64.7
15:00 - 16:00	61.0	61.3	62.1	61.5	61.7	64.2	65.3
16:00 - 17:00	61.5	63.7	64.4	62.6	63.2	63.2	63.2
17:00 - 18:00	64.4	64.9	65.1	65.1	65.1	64.0	62.9
18:00 - 19:00	65.8	64.7	62.3	64.5	66.9	61.8	60.3
19:00 - 20:00	63.1	63.1	62.9	64.8	63.0	59.5	59.1
20:00 - 21:00	64.4	62.2	61.9	63.1	62.8	57.1	55.6
21:00 - 22:00	60.8	59.7	62.3	58.2	59.9	55.3	56.1
22:00 - 23:00	57.9	63.1	60.9	58.1	58.5	53.7	55.1
23:00 - 00:00	55.4	62.4	59.1	56.7	57.1	53.1	52.7
00:00 - 01:00	60.4	56.2	58.1	54.5	55.5	53.7	53.6
01:00 - 02:00	57.9	54.7	53.5	53.6	53.6	56.5	54.7
02:00 - 03:00	54.7	55.6	53.2	52.6	52.8	58.8	58.7
03:00 - 04:00	54.3	54.5	53.6	62.2	56.6	64.9	64.6
04:00 - 05:00	53.8	55.8	55.6	59.3	55.9	66.3	65.5
05:00 - 06:00	58.3	57.7	60.6	59.7	61.7	62.1	62.5
06:00 - 07:00	65.4	64.1	65.6	65.1	65.0	61.7	61.9
07:00 - 08:00	65.3	64.5	66.3	66.2	65.6	61.5	60.6
08:00 - 09:00	62.2	61.8	62.6	63.9	65.7	63.1	62.1
09:00 - 10:00	60.9	61.9	61.4	64.0	62.7	63.4	62.9
Leq(24)*	61.8	61.7	62.1	62.2	62.3	62.0	62.1
Ldn	66.4	66.8	66.8	66.9	66.6	67.9	67.8
Lmax **	89.9	89.1	90.0	88.4	93.1	87.4	92.1
Standard-24Hr	70 dB(A)						
Standard-Max	115 dB(A)						

Remark : * Average time between 10:00-10:00

** Maximum Sound Pressure Level between 10:00-10:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

Preeda S.
(Miss Preeda Somjai)
Technical Management Team



Noise Monitoring Result : Background Noise

MTR-SPRC PLC-Refinery

Location : Eastern Refinery Boundary 1
SLM Model : Cirrus CR161B
Site Operator : Mr. Sittichai Sawangwongchai

Monitor Period : 06-13 May 2022
Serial No : G302630

Calibrator Model : Cirrus CR:515
Calibration Ref dB(A) : 94.0
SLM Reading / Adjust dB(A) : 93.7/0.1
Cal Sheet No.: CR-515-2022-011

Serial No : 94296
Certified Date : 24 Dec 2021
Expire Date : 23 Dec 2022

Time	L90 (dB(A))						
	06-07 May 2022	07-08 May 2022	08-09 May 2022	09-10 May 2022	10-11 May 2022	11-12 May 2022	12-13 May 2022
10:00 - 11:00	50.9	49.8	49.5	51.3	52.3	52.1	55.0
11:00 - 12:00	53.7	52.6	51.4	52.5	54.4	52.5	53.4
12:00 - 13:00	52.9	51.7	50.4	53.6	52.7	52.0	52.0
13:00 - 14:00	51.6	49.4	51.1	51.3	50.9	54.4	54.6
14:00 - 15:00	50.1	48.7	51.6	50.4	52.5	57.2	57.1
15:00 - 16:00	50.9	49.0	51.5	52.8	51.4	56.1	55.8
16:00 - 17:00	52.9	51.4	55.7	54.5	53.2	53.6	53.6
17:00 - 18:00	56.9	53.4	54.7	57.9	57.4	52.4	51.3
18:00 - 19:00	55.5	55.0	52.6	56.7	56.5	50.0	47.8
19:00 - 20:00	53.7	51.8	52.0	55.0	53.9	49.9	46.6
20:00 - 21:00	51.2	49.9	51.7	51.9	51.5	47.7	46.1
21:00 - 22:00	48.1	47.8	50.5	48.5	48.9	47.2	46.3
22:00 - 23:00	46.9	50.2	47.9	45.3	46.6	47.1	47.0
23:00 - 00:00	44.3	49.3	48.0	45.5	46.4	47.2	46.5
00:00 - 01:00	43.8	47.8	46.2	46.6	46.6	47.0	46.2
01:00 - 02:00	43.4	47.8	44.8	46.5	46.5	47.1	45.9
02:00 - 03:00	43.9	47.3	47.0	43.8	47.1	49.0	46.8
03:00 - 04:00	44.5	47.3	46.0	43.9	48.0	56.5	55.6
04:00 - 05:00	44.7	47.6	46.1	51.0	45.4	58.1	57.9
05:00 - 06:00	46.6	48.5	48.8	50.3	49.1	53.0	52.8
06:00 - 07:00	55.5	54.6	56.8	56.5	57.1	51.0	50.6
07:00 - 08:00	55.0	53.0	56.7	59.0	56.7	51.6	50.7
08:00 - 09:00	50.2	50.0	51.7	54.0	55.0	54.5	51.8
09:00 - 10:00	48.2	49.3	51.1	51.2	52.3	52.8	53.2
L90(avg)*	51.6	50.8	51.8	53.1	52.8	53.0	52.6

Remark : * Average time between 10:00-10:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

Preeda S.
(Miss Preeda Somjai)
Technical Management Team



Noise Monitoring Result : Community Noise

MTR-SPRC PLC-Refinery

Location : Southern Refinery Boundary 1
SLM Model : Cirrus CR161B
Site Operator : Mr. Sittichai Sawangwongchai

Monitor Period : 06-13 May 2022

Serial No : G302740

Calibrator Model : Cirrus CR:515

Serial No : 94296

Calibration Ref dB(A) : 94.0

Certified Date : 24 Dec 2021

SLM Reading / Adjust dB(A) : 93.7/0.0

Expire Date : 23 Dec 2022

Cal Sheet No.: CR-515-2022-011

Time	Equivalent Sound Pressure Level (dB(A))						
	06-07 May 2022	07-08 May 2022	08-09 May 2022	09-10 May 2022	10-11 May 2022	11-12 May 2022	12-13 May 2022
10:00 - 11:00	64.6	62.2	62.4	61.4	62.1	63.1	62.3
11:00 - 12:00	63.8	63.0	63.2	66.3	64.1	64.0	63.7
12:00 - 13:00	62.3	60.7	62.0	62.1	62.4	62.2	62.2
13:00 - 14:00	61.5	60.1	61.9	64.7	61.6	64.3	62.0
14:00 - 15:00	61.6	59.6	63.1	62.8	63.0	65.8	62.3
15:00 - 16:00	62.0	60.9	63.5	66.6	65.8	64.9	63.4
16:00 - 17:00	63.9	64.0	64.2	65.3	67.5	66.2	64.5
17:00 - 18:00	65.8	63.6	64.8	62.5	62.4	66.6	64.2
18:00 - 19:00	64.3	64.3	65.5	66.2	65.9	65.3	65.3
19:00 - 20:00	62.8	62.4	64.5	62.3	63.6	64.3	64.7
20:00 - 21:00	61.9	62.0	62.2	63.7	63.2	63.9	64.1
21:00 - 22:00	60.3	60.3	61.1	59.9	60.7	61.2	61.9
22:00 - 23:00	57.7	59.0	58.9	58.6	59.0	59.5	59.9
23:00 - 00:00	58.8	60.1	58.7	57.9	58.0	58.2	58.3
00:00 - 01:00	57.9	58.6	56.9	57.2	57.9	58.4	58.5
01:00 - 02:00	56.5	57.5	56.8	55.5	56.0	56.0	57.0
02:00 - 03:00	56.2	57.5	57.4	54.4	54.8	55.9	57.1
03:00 - 04:00	57.2	57.6	58.4	63.3	56.5	55.8	56.6
04:00 - 05:00	57.6	58.2	58.5	60.9	57.3	56.7	56.7
05:00 - 06:00	61.1	61.9	61.6	62.6	59.5	58.9	59.6
06:00 - 07:00	61.5	62.2	64.8	63.7	63.0	64.1	63.4
07:00 - 08:00	62.0	62.6	63.5	63.3	64.3	65.5	64.2
08:00 - 09:00	62.0	61.1	62.2	61.9	67.5	63.7	63.0
09:00 - 10:00	65.0	59.0	65.5	61.0	66.3	62.1	65.7
Leq(24)*	62.0	61.2	62.5	62.8	63.1	63.1	62.5
Ldn	66.1	66.4	67.1	67.5	66.6	66.8	66.6
Lmax **	82.9	86.0	88.6	90.8	84.6	86.9	88.6

Standard-24Hr

70 dB(A)

Standard-Max

115 dB(A)

Remark : * Average time between 10:00-10:00

** Maximum Sound Pressure Level between 10:00-10:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

(Miss Preeda Somjai)
Technical Management Team



Noise Monitoring Result : Background Noise

MTR-SPRC PLC-Refinery

Location : Southern Refinery Boundary 1
SLM Model : Cirrus CR161B
Site Operator : Mr. Sittichai Sawangwongchai

Monitor Period : 06-13 May 2022

Serial No : G302740

Calibrator Model : Cirrus CR:515

Serial No : 94296

Calibration Ref dB(A) : 94.0

Certified Date : 24 Dec 2021

SLM Reading / Adjust dB(A) : 93.7/0.0

Expire Date : 23 Dec 2022

Cal Sheet No.: CR-515-2022-011

Time	L90 (dB(A))						
	06-07 May 2022	07-08 May 2022	08-09 May 2022	09-10 May 2022	10-11 May 2022	11-12 May 2022	12-13 May 2022
10:00 - 11:00	59.2	55.6	56.4	55.5	57.0	57.3	56.9
11:00 - 12:00	57.6	55.8	56.9	59.3	58.6	57.7	57.9
12:00 - 13:00	56.0	54.8	56.5	55.9	58.0	56.1	56.5
13:00 - 14:00	54.9	55.3	56.4	58.2	57.6	59.5	56.1
14:00 - 15:00	54.9	53.6	56.8	56.6	57.1	61.1	56.7
15:00 - 16:00	56.1	55.2	58.3	58.8	59.7	58.9	57.4
16:00 - 17:00	57.8	57.4	58.4	61.1	61.4	60.0	58.9
17:00 - 18:00	60.6	57.7	59.8	57.3	57.5	61.8	58.5
18:00 - 19:00	59.4	58.7	60.6	60.3	59.5	60.4	60.5
19:00 - 20:00	57.0	56.4	57.4	56.3	58.7	58.8	58.8
20:00 - 21:00	55.3	55.7	54.8	57.4	56.7	57.0	56.9
21:00 - 22:00	53.3	54.5	54.1	54.4	54.7	55.2	54.5
22:00 - 23:00	53.8	54.7	53.2	53.8	54.9	54.2	53.8
23:00 - 00:00	54.6	54.6	53.6	53.8	54.2	53.6	53.1
00:00 - 01:00	54.1	56.1	54.5	52.7	54.4	53.3	54.0
01:00 - 02:00	53.8	55.9	54.9	52.4	54.1	53.6	54.7
02:00 - 03:00	54.2	56.3	54.1	52.2	53.0	54.4	55.2
03:00 - 04:00	55.4	56.5	54.0	51.9	53.6	54.0	55.4
04:00 - 05:00	55.3	56.9	55.0	57.3	55.0	54.5	54.7
05:00 - 06:00	55.9	57.5	57.4	57.2	56.3	54.9	55.7
06:00 - 07:00	57.7	58.4	59.5	59.2	59.0	59.6	59.4
07:00 - 08:00	57.3	57.5	58.3	58.7	59.8	60.2	58.9
08:00 - 09:00	57.0	54.8	55.3	56.2	60.5	57.9	56.6
09:00 - 10:00	57.3	53.6	57.7	56.4	59.3	55.9	56.2
L90(avg)*	56.6	56.2	56.9	57.1	57.7	57.9	57.0

Remark : * Average time between 10:00-10:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

(Miss Preeda Somjai)
Technical Management Team



Noise Monitoring Result : Community Noise MTR-SPRC PLC-Refinery

Location : Southern Refinery Boundary 2 Monitor Period : 06-13 May 2022
SLM Model : Cirrus CR161B Serial No : G302738
Site Operator : Mr. Sittichai Sawangwongchai

Calibrator Model : Cirrus CR:515 Serial No : 94296
Calibration Ref dB(A) : 94.0 Certified Date : 24 Dec 2021
SLM Reading / Adjust dB(A) : 93.7/0.0 Expire Date : 23 Dec 2022
Cal Sheet No.: CR-515-2022-011

Time	Equivalent Sound Pressure Level (dB(A))						
	06-07 May 2022	07-08 May 2022	08-09 May 2022	09-10 May 2022	10-11 May 2022	11-12 May 2022	12-13 May 2022
10:00 - 11:00	65.2	62.1	68.5	61.5	63.2	61.5	62.2
11:00 - 12:00	63.8	63.7	68.3	63.8	64.6	63.6	63.7
12:00 - 13:00	61.9	61.5	61.3	62.4	63.2	62.8	62.0
13:00 - 14:00	62.8	61.3	61.3	61.9	63.0	61.5	61.9
14:00 - 15:00	63.4	61.1	60.8	61.1	62.9	62.1	62.9
15:00 - 16:00	63.2	62.2	61.9	62.0	62.9	62.8	63.1
16:00 - 17:00	64.1	64.0	64.4	64.1	64.7	64.5	65.0
17:00 - 18:00	64.5	63.8	63.2	64.8	64.6	65.4	64.5
18:00 - 19:00	64.8	63.9	63.2	65.2	65.4	65.2	64.5
19:00 - 20:00	63.2	62.7	62.5	65.0	64.7	64.2	64.2
20:00 - 21:00	62.8	62.0	61.1	64.4	64.5	63.7	63.4
21:00 - 22:00	60.4	60.7	60.0	59.4	62.1	61.7	61.4
22:00 - 23:00	59.4	61.9	59.0	59.7	60.1	60.6	60.1
23:00 - 00:00	60.9	61.5	58.9	58.8	58.8	59.0	58.1
00:00 - 01:00	60.1	59.3	58.8	58.3	58.8	58.9	59.0
01:00 - 02:00	59.3	58.7	58.2	56.5	57.5	56.6	58.1
02:00 - 03:00	59.1	58.3	58.0	55.9	56.4	56.9	57.8
03:00 - 04:00	60.1	57.9	57.8	65.6	58.3	56.9	57.5
04:00 - 05:00	61.0	58.5	57.7	60.2	57.5	57.7	57.5
05:00 - 06:00	59.9	60.0	59.9	59.6	59.5	59.3	59.7
06:00 - 07:00	62.8	62.7	63.2	64.6	63.9	64.1	63.5
07:00 - 08:00	63.1	63.2	64.4	65.3	64.8	65.0	63.9
08:00 - 09:00	61.8	67.9	63.5	64.1	64.6	63.9	64.2
09:00 - 10:00	60.2	69.0	61.9	62.5	61.6	62.0	64.2
Leq(24)*	62.4	62.9	62.7	62.7	62.7	62.4	62.4
Ldn	67.4	67.4	66.8	68.0	66.9	66.8	66.8
Lmax **	84.2	84.1	83.1	90.8	86.8	86.6	83.0

Standard-24Hr 70 dB(A)
Standard-Max 115 dB(A)

Remark : * Average time between 10:00-10:00

** Maximum Sound Pressure Level between 10:00-10:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

Preeda S.
(Miss Preeda Somjai)
Technical Management Team



Noise Monitoring Result : Background Noise MTR-SPRC PLC-Refinery

Location : Southern Refinery Boundary 2 Monitor Period : 06-13 May 2022
SLM Model : Cirrus CR161B Serial No : G302738
Site Operator : Mr. Sittichai Sawangwongchai

Calibrator Model : Cirrus CR:515 Serial No : 94296
Calibration Ref dB(A) : 94.0 Certified Date : 24 Dec 2021
SLM Reading / Adjust dB(A) : 93.7/0.0 Expire Date : 23 Dec 2022
Cal Sheet No.: CR-515-2022-011

Time	L90 (dB(A))						
	06-07 May 2022	07-08 May 2022	08-09 May 2022	09-10 May 2022	10-11 May 2022	11-12 May 2022	12-13 May 2022
10:00 - 11:00	57.8	56.4	67.5	55.3	58.9	56.3	57.9
11:00 - 12:00	57.8	57.4	66.6	57.4	60.1	57.5	59.1
12:00 - 13:00	56.3	57.0	54.7	55.7	59.7	57.1	57.0
13:00 - 14:00	57.2	57.7	55.4	56.4	59.7	56.5	57.8
14:00 - 15:00	57.8	57.1	56.2	54.7	59.6	56.4	58.3
15:00 - 16:00	58.4	57.7	57.2	56.1	58.9	56.8	57.7
16:00 - 17:00	59.7	59.1	57.9	58.1	60.3	58.7	60.7
17:00 - 18:00	59.0	59.3	56.0	60.3	60.0	59.4	59.2
18:00 - 19:00	59.9	60.1	56.8	60.4	61.2	59.8	59.9
19:00 - 20:00	57.5	58.4	56.5	59.2	60.5	58.9	58.7
20:00 - 21:00	56.6	57.4	56.4	57.0	59.6	57.0	56.6
21:00 - 22:00	55.4	56.5	56.6	54.5	57.3	55.9	54.8
22:00 - 23:00	56.0	56.5	55.2	55.5	56.7	55.4	54.1
23:00 - 00:00	58.0	56.8	56.5	55.2	56.0	55.5	54.0
00:00 - 01:00	57.8	57.2	56.9	53.9	55.2	54.4	55.8
01:00 - 02:00	57.5	57.4	56.6	53.8	54.9	54.7	56.3
02:00 - 03:00	57.6	57.2	56.8	54.0	54.4	55.7	56.4
03:00 - 04:00	58.0	56.9	56.7	54.1	55.4	55.4	56.3
04:00 - 05:00	58.7	57.4	56.3	55.9	55.2	55.7	56.0
05:00 - 06:00	58.3	57.9	57.5	56.7	56.8	56.1	57.0
06:00 - 07:00	59.6	59.5	60.1	59.8	60.0	59.9	59.8
07:00 - 08:00	59.5	59.2	60.1	61.4	60.3	60.7	60.3
08:00 - 09:00	57.0	59.7	58.4	59.4	57.8	58.9	60.3
09:00 - 10:00	55.8	68.0	57.5	58.2	56.8	57.4	60.5
L90(avg)*	58.0	59.4	59.5	57.4	58.6	57.5	58.1

Remark : * Average time between 10:00-10:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

Preeda S.
(Miss Preeda Somjai)
Technical Management Team



Noise Monitoring Result : Community Noise

MTR-SPRC PLC-Refinery

Location : Map Ta Phut New Town				Monitor Period : 06-13 May 2022			
SLM Model : Cirrus CR161B				Serial No : G302742			
Site Operator : Mr. Sittichai Sawangwongchai							
Calibrator Model : Cirrus CR:515				Serial No : 94296			
Calibration Ref dB(A) : 94.0				Certified Date : 24 Dec 2021			
SLM Reading / Adjust dB(A) : 93.7/0.0				Expire Date : 23 Dec 2022			
Cal Sheet No.: CR-515-2022-011							
Time	Equivalent Sound Pressure Level (dB(A))						
	06-07 May 2022	07-08 May 2022	08-09 May 2022	09-10 May 2022	10-11 May 2022	11-12 May 2022	12-13 May 2022
15:00 - 16:00	65.5	44.2	52.8	52.7	52.6	53.0	53.5
16:00 - 17:00	48.4	47.4	52.9	52.8	49.8	50.2	50.4
17:00 - 18:00	48.2	48.5	53.3	52.9	49.7	50.9	52.3
18:00 - 19:00	48.4	46.4	55.6	53.3	45.1	49.4	50.1
19:00 - 20:00	46.0	45.4	53.7	55.6	48.2	53.7	48.9
20:00 - 21:00	46.3	46.8	56.6	53.8	47.4	48.9	49.2
21:00 - 22:00	44.1	47.9	56.1	56.6	47.5	49.8	46.1
22:00 - 23:00	45.0	63.1	52.2	55.9	47.2	48.0	50.4
23:00 - 00:00	41.0	64.5	47.4	52.2	54.1	48.5	49.4
00:00 - 01:00	39.1	52.3	44.3	47.3	64.6	47.6	49.6
01:00 - 02:00	39.7	55.2	41.0	44.2	48.4	48.5	53.8
02:00 - 03:00	47.1	55.0	35.9	41.1	50.2	56.2	52.3
03:00 - 04:00	44.9	46.3	44.6	35.3	48.8	51.9	51.8
04:00 - 05:00	43.1	45.4	40.9	44.6	52.2	52.3	52.2
05:00 - 06:00	50.4	45.1	45.7	41.3	55.1	55.9	52.7
06:00 - 07:00	50.0	46.5	47.7	45.8	50.3	50.7	50.1
07:00 - 08:00	49.2	44.2	47.9	47.7	50.6	50.8	50.9
08:00 - 09:00	48.3	48.3	53.5	48.0	50.5	50.6	50.9
09:00 - 10:00	47.5	44.1	55.3	53.4	50.3	51.9	50.1
10:00 - 11:00	49.4	44.6	52.2	56.0	50.3	49.7	50.3
11:00 - 12:00	47.1	45.3	47.7	50.4	53.1	49.7	49.9
12:00 - 13:00	47.8	54.2	47.9	47.8	52.4	51.7	51.4
13:00 - 14:00	47.3	52.4	51.8	47.8	51.4	52.2	51.5
14:00 - 15:00	44.5	52.7	52.6	54.4	54.4	53.8	52.1
Leq(24)*	52.9	54.6	51.9	52.0	53.9	51.7	51.1
Ldn	55.3	63.9	54.8	56.4	62.5	58.5	57.9
Lmax **	93.1	93.5	83.1	83.1	78.3	80.7	82.0
Standard-24Hr	70 dB(A)						
Standard-Max	115 dB(A)						

Remark : * Average time between 15:00-15:00

** Maximum Sound Pressure Level between 15:00-15:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

(Miss Preeda Somjai)
Technical Management Team



Noise Monitoring Result : Background Noise

MTR-SPRC PLC-Refinery

Location : Map Ta Phut New Town

Monitor Period : 06-13 May 2022

SLM Model : Cirrus CR161B

Serial No : G302742

Site Operator : Mr. Sittichai Sawangwongchai

Calibrator Model : Cirrus CR:515

Serial No : 94296

Calibration Ref dB(A) : 94.0

Certified Date : 24 Dec 2021

SLM Reading / Adjust dB(A) : 93.7/0.0

Expire Date : 23 Dec 2022

Cal Sheet No.: CR-515-2022-011

Time	L90 (dB(A))						
	06-07 May 2022	07-08 May 2022	08-09 May 2022	09-10 May 2022	10-11 May 2022	11-12 May 2022	12-13 May 2022
15:00 - 16:00	42.9	39.4	50.0	49.4	45.4	45.6	49.0
16:00 - 17:00	42.8	41.8	51.2	50.0	44.1	44.8	46.6
17:00 - 18:00	43.6	41.1	51.5	51.2	43.1	44.4	46.8
18:00 - 19:00	42.3	41.0	51.1	51.5	41.8	45.3	45.8
19:00 - 20:00	41.9	42.7	51.3	51.1	43.6	45.3	46.0
20:00 - 21:00	41.3	42.6	52.9	51.5	43.7	46.1	44.2
21:00 - 22:00	39.8	42.4	47.6	52.8	44.0	45.0	43.7
22:00 - 23:00	38.4	41.0	45.1	46.9	43.2	45.9	47.2
23:00 - 00:00	37.2	52.4	39.3	45.2	43.5	46.5	47.3
00:00 - 01:00	36.6	43.7	38.1	39.3	44.2	45.5	47.2
01:00 - 02:00	36.2	53.8	34.3	38.0	43.1	46.1	46.0
02:00 - 03:00	36.3	51.8	33.2	34.1	41.1	46.5	45.6
03:00 - 04:00	36.2	40.3	34.9	33.2	43.6	47.2	47.7
04:00 - 05:00	34.7	36.6	35.3	34.9	45.6	48.5	47.5
05:00 - 06:00	38.5	36.4	36.6	35.4	47.7	48.9	46.4
06:00 - 07:00	41.7	39.4	40.0	36.7	46.3	47.0	45.2
07:00 - 08:00	42.0	39.6	41.2	40.2	45.0	46.4	46.9
08:00 - 09:00	42.4	39.2	42.2	41.2	44.7	47.7	46.4
09:00 - 10:00	41.7	38.7	43.5	42.0	45.3	48.2	46.6
10:00 - 11:00	41.2	39.7	43.5	43.8	46.4	46.3	46.3
11:00 - 12:00	42.4	39.3	43.6	43.5	47.1	47.0	45.6
12:00 - 13:00	43.5	46.4	44.6	43.6	46.4	47.6	45.9
13:00 - 14:00	42.4	47.0	45.9	44.6	45.8	48.0	46.9
14:00 - 15:00	39.7	49.3	47.3	44.4	45.9	48.3	46.8
L90(avg)*	41.0	46.0	46.9	47.0	44.9	46.8	46.5

Remark : * Average time between 15:00-15:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

(Miss Preeda Somjai)
Technical Management Team



Noise Monitoring Result : Community Noise

MTR-SPRC PLC-Refinery

Location : Soi Ruam Patana Community Monitor Period : 06-13 May 2022
 SLM Model : Cirrus CR162B Serial No : G301027
 Site Operator : Mr. Sittichai Sawangwongchai

Calibrator Model : Cirrus CR:515 Serial No : 94296
 Calibration Ref dB(A) : 94.0 Certified Date : 24 Dec 2021
 SLM Reading / Adjust dB(A) : 93.7/0.0 Expire Date : 23 Dec 2022
 Cal Sheet No.: CR-515-2022-011

Time	Equivalent Sound Pressure Level (dB(A))							
	06-07 May 2022	07-08 May 2022	08-09 May 2022	09-10 May 2022	10-11 May 2022	11-12 May 2022	12-13 May 2022	
14:00 - 15:00	64.2	59.3	55.1	58.0	56.9	59.3	56.6	
15:00 - 16:00	52.2	58.8	57.0	58.8	52.2	57.2	55.2	
16:00 - 17:00	54.8	57.8	56.2	60.5	51.9	56.7	56.3	
17:00 - 18:00	54.9	57.1	56.1	57.9	54.2	56.7	54.5	
18:00 - 19:00	54.7	58.5	53.9	50.9	55.6	56.8	49.8	
19:00 - 20:00	52.4	56.9	57.0	45.1	56.8	53.9	58.7	
20:00 - 21:00	52.3	54.0	50.3	44.4	54.2	50.0	48.2	
21:00 - 22:00	52.3	50.1	58.7	43.7	57.0	49.2	48.9	
22:00 - 23:00	45.3	49.3	47.5	51.1	50.5	48.4	45.8	
23:00 - 00:00	50.0	48.5	43.6	46.1	58.8	48.0	44.9	
00:00 - 01:00	45.2	47.8	51.0	64.6	47.9	48.2	45.3	
01:00 - 02:00	47.3	48.4	45.9	62.3	47.0	51.4	46.2	
02:00 - 03:00	51.3	50.5	47.9	58.7	49.4	51.9	49.8	
03:00 - 04:00	52.2	52.5	66.1	58.0	45.4	59.0	58.8	
04:00 - 05:00	52.1	59.0	59.9	60.4	43.8	54.9	54.4	
05:00 - 06:00	46.4	54.1	58.4	54.9	46.5	51.6	55.0	
06:00 - 07:00	50.5	52.4	56.0	55.3	48.3	55.4	53.2	
07:00 - 08:00	55.9	55.6	60.3	57.5	57.2	52.2	51.4	
08:00 - 09:00	53.6	52.2	56.1	51.8	56.5	51.2	50.3	
09:00 - 10:00	53.3	51.2	53.0	55.4	54.7	51.9	51.3	
10:00 - 11:00	53.8	54.6	51.2	52.4	54.8	56.8	53.7	
11:00 - 12:00	54.1	53.5	52.1	53.6	54.3	53.2	54.6	
12:00 - 13:00	52.0	54.0	52.3	52.4	54.1	49.5	53.5	
13:00 - 14:00	55.7	55.8	57.5	57.5	59.3	56.1	57.4	
Leq(24)*	54.6	55.0	57.1	57.5	54.6	54.6	53.9	
Ldn	57.8	60.0	64.7	65.5	58.8	60.3	59.7	
Lmax **	90.4	90.2	93.1	89.7	93.1	90.2	93.1	
Standard-24Hr	70 dB(A)							
Standard-Max	115 dB(A)							

Remark : * Average time between 14:00-14:00

** Maximum Sound Pressure Level between 14:00-14:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

Preeda S.
(Miss Preeda Somjai)
Technical Management Team



Noise Monitoring Result : Background Noise

MTR-SPRC PLC-Refinery

Location : Soi Ruam Patana Community Monitor Period : 06-13 May 2022
 SLM Model : Cirrus CR162B Serial No : G301027
 Site Operator : Mr. Sittichai Sawangwongchai

Calibrator Model : Cirrus CR:515 Serial No : 94296
 Calibration Ref dB(A) : 94.0 Certified Date : 24 Dec 2021
 SLM Reading / Adjust dB(A) : 93.7/0.0 Expire Date : 23 Dec 2022
 Cal Sheet No.: CR-515-2022-011

Time	L90 (dB(A))							
	06-07 May 2022	07-08 May 2022	08-09 May 2022	09-10 May 2022	10-11 May 2022	11-12 May 2022	12-13 May 2022	
14:00 - 15:00	40.0	45.3	41.0	45.3	41.5	43.0	43.7	
15:00 - 16:00	39.2	42.9	42.7	48.2	41.2	47.7	45.3	
16:00 - 17:00	40.2	47.2	43.4	48.5	40.6	50.9	46.0	
17:00 - 18:00	41.2	51.1	46.9	46.1	41.2	49.8	46.1	
18:00 - 19:00	43.5	49.8	46.0	44.4	44.3	49.1	45.8	
19:00 - 20:00	43.7	49.2	46.3	41.9	44.2	48.5	42.6	
20:00 - 21:00	43.7	48.5	45.9	41.6	46.0	48.1	42.7	
21:00 - 22:00	43.1	48.1	44.5	40.0	46.3	47.9	41.3	
22:00 - 23:00	42.2	48.3	41.8	42.6	46.0	46.4	44.3	
23:00 - 00:00	42.2	46.5	40.8	39.3	44.7	45.5	42.8	
00:00 - 01:00	41.2	45.5	40.3	40.4	41.9	40.6	42.2	
01:00 - 02:00	40.4	40.6	40.2	55.1	41.6	43.9	40.6	
02:00 - 03:00	43.7	43.7	39.3	52.0	42.9	44.7	42.6	
03:00 - 04:00	43.5	44.6	53.5	46.2	43.8	44.1	44.5	
04:00 - 05:00	42.7	44.4	56.0	45.4	41.0	42.7	42.9	
05:00 - 06:00	42.1	42.7	46.4	43.9	41.7	40.8	42.6	
06:00 - 07:00	42.2	41.3	45.7	44.4	40.5	38.9	40.9	
07:00 - 08:00	44.0	38.9	44.9	43.8	44.6	39.5	42.3	
08:00 - 09:00	42.8	39.3	44.1	44.5	43.1	42.9	40.9	
09:00 - 10:00	42.8	42.8	44.3	43.8	43.5	40.8	42.7	
10:00 - 11:00	41.9	42.8	43.0	41.6	40.9	41.6	39.5	
11:00 - 12:00	42.8	42.1	44.1	41.9	42.6	40.7	42.3	
12:00 - 13:00	42.7	41.5	45.3	41.9	43.9	40.8	43.4	
13:00 - 14:00	43.4	41.7	46.4	43.0	45.2	42.3	45.1	
L90(avg)*	42.5	45.8	47.1	46.5	43.4	45.6	43.4	

Remark : * Average time between 14:00-14:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

Preeda S.
(Miss Preeda Somjai)
Technical Management Team



Noise Monitoring Result : Community Noise

MTR-SPRC PLC-Refinery

Location : Wat Sopphon Community Monitor Period : 06-13 May 2022
 SLM Model : Cirrus CR162B Serial No : G300833
 Site Operator : Mr. Sittichai Sawangwongchai

Calibrator Model : Cirrus CR:515 Serial No : 94296
 Calibration Ref dB(A) : 94.0 Certified Date : 24 Dec 2021
 SLM Reading / Adjust dB(A) : 93.7/0.0 Expire Date : 23 Dec 2022
 Cal Sheet No.: CR-515-2022-011

Time	Equivalent Sound Pressure Level (dB(A))						
	06-07 May 2022	07-08 May 2022	08-09 May 2022	09-10 May 2022	10-11 May 2022	11-12 May 2022	12-13 May 2022
14:00 - 15:00	76.0	58.5	53.5	53.4	53.0	52.7	53.6
15:00 - 16:00	63.7	54.1	52.6	56.2	52.1	52.6	59.5
16:00 - 17:00	61.0	54.6	53.2	53.2	48.1	50.4	59.5
17:00 - 18:00	53.8	53.8	53.6	57.2	51.6	56.4	50.0
18:00 - 19:00	57.6	59.8	65.4	62.1	49.5	47.8	59.7
19:00 - 20:00	51.8	52.4	51.0	60.8	51.0	58.5	47.0
20:00 - 21:00	50.2	49.9	50.0	51.5	45.0	48.0	57.3
21:00 - 22:00	47.6	48.1	50.2	46.6	53.9	57.6	48.6
22:00 - 23:00	45.2	61.8	50.6	47.8	55.9	48.5	48.9
23:00 - 00:00	44.4	61.8	47.4	48.3	46.3	48.2	48.4
00:00 - 01:00	45.4	48.7	47.4	45.9	65.0	63.8	64.5
01:00 - 02:00	45.5	52.7	42.9	52.4	55.4	55.9	56.0
02:00 - 03:00	46.2	52.3	50.6	46.4	60.5	59.1	59.0
03:00 - 04:00	44.9	47.1	43.9	48.5	59.1	59.7	56.4
04:00 - 05:00	44.3	46.3	46.9	45.4	55.3	53.7	54.3
05:00 - 06:00	58.0	60.5	59.5	50.4	53.6	55.0	55.9
06:00 - 07:00	53.9	54.7	55.6	57.9	54.5	54.3	54.6
07:00 - 08:00	54.7	55.4	56.7	53.9	65.1	66.4	62.4
08:00 - 09:00	53.9	52.8	56.3	55.9	52.6	52.3	53.3
09:00 - 10:00	53.7	54.5	54.1	53.5	53.6	52.0	54.2
10:00 - 11:00	61.9	53.1	55.7	55.1	52.8	54.4	54.0
11:00 - 12:00	54.7	54.5	55.0	57.2	65.7	66.5	58.6
12:00 - 13:00	52.8	65.8	62.1	54.8	54.7	54.8	54.8
13:00 - 14:00	52.9	52.5	56.4	61.2	65.0	61.2	62.7

Leq(24)*	63.1	57.3	56.3	55.7	58.9	59.0	57.8
Ldn	63.9	63.8	60.2	59.2	65.2	64.5	64.3
Lmax **	97.5	80.4	77.8	86.3	79.4	77.1	76.3

Standard-24Hr 70 dB(A)
 Standard-Max 115 dB(A)

Remark : * Average time between 14:00-14:00

** Maximum Sound Pressure Level between 14:00-14:00

(Miss Katesarin Vorradetwittaya)
 Environmental Scientist

Preeda S.
 (Miss Preeda Somjai)
 Technical Management Team



Noise Monitoring Result : Background Noise

MTR-SPRC PLC-Refinery

Location : Wat Sopphon Community Monitor Period : 06-13 May 2022
 SLM Model : Cirrus CR162B Serial No : G300833
 Site Operator : Mr. Sittichai Sawangwongchai

Calibrator Model : Cirrus CR:515 Serial No : 94296
 Calibration Ref dB(A) : 94.0 Certified Date : 24 Dec 2021
 SLM Reading / Adjust dB(A) : 93.7/0.0 Expire Date : 23 Dec 2022
 Cal Sheet No.: CR-515-2022-011

Time	L90 (dB(A))						
	06-07 May 2022	07-08 May 2022	08-09 May 2022	09-10 May 2022	10-11 May 2022	11-12 May 2022	12-13 May 2022
14:00 - 15:00	46.7	45.8	45.7	47.6	47.5	46.5	47.5
15:00 - 16:00	44.8	47.4	45.3	48.0	45.3	46.1	46.4
16:00 - 17:00	46.0	47.5	46.6	47.7	41.9	44.4	44.1
17:00 - 18:00	46.5	45.3	46.1	47.4	43.1	44.6	44.3
18:00 - 19:00	45.9	45.3	45.6	48.1	42.8	44.2	43.4
19:00 - 20:00	43.2	44.3	43.5	47.1	42.6	44.0	43.3
20:00 - 21:00	42.6	44.5	44.2	44.2	42.6	44.7	45.7
21:00 - 22:00	39.0	42.6	43.2	41.0	43.1	44.5	46.1
22:00 - 23:00	38.8	43.4	43.9	40.6	44.3	44.4	45.6
23:00 - 00:00	38.3	48.2	41.9	40.9	41.7	44.8	45.2
00:00 - 01:00	36.8	41.3	41.6	41.9	41.0	46.4	45.8
01:00 - 02:00	36.7	50.3	38.7	42.5	48.3	49.4	48.9
02:00 - 03:00	37.8	48.8	37.4	41.4	49.4	51.1	50.3
03:00 - 04:00	39.4	43.2	39.2	42.3	48.8	48.9	46.7
04:00 - 05:00	38.8	42.1	40.4	40.8	47.7	47.7	46.7
05:00 - 06:00	41.3	42.5	42.4	40.6	47.4	47.6	46.5
06:00 - 07:00	46.4	46.6	48.5	51.8	47.8	49.5	47.7
07:00 - 08:00	46.5	46.6	48.4	48.2	48.0	51.6	49.6
08:00 - 09:00	44.0	45.0	47.0	48.2	46.8	46.9	47.5
09:00 - 10:00	44.8	46.3	46.8	47.3	46.7	46.4	46.4
10:00 - 11:00	45.2	45.8	46.7	47.7	47.3	47.9	47.2
11:00 - 12:00	47.7	46.0	47.7	47.3	47.3	50.9	48.0
12:00 - 13:00	46.4	49.2	52.7	47.8	48.2	48.4	47.1
13:00 - 14:00	45.6	47.9	50.5	48.8	48.3	48.9	47.2
L90(avg)*	44.1	46.3	46.2	46.6	46.4	47.7	46.9

Remark : * Average time between 14:00-14:00

(Miss Katesarin Vorradetwittaya)
 Environmental Scientist

Preeda S.
 (Miss Preeda Somjai)
 Technical Management Team

ใบรับรองผลการตรวจวัดทรัพยากรทางน้ำ



สถานีวิจัยประมงศรีราชา

101/12 หมู่ 9 ต.บางพระ

อ.ศรีราชา จ.ชลบุรี 20110

โทร./โทรสาร. (038) 311379

รายงานผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์

ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 17 พฤษภาคม 2565)

กลุ่ม/สกุลของแพลงก์ตอน	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
แพลงก์ตอนพืช				
Division Cyanophyta				
Class Cyanophyceae				
Order Nostocales				
Family Oscillatoriaceae				
<i>Oscillatoria</i> sp.	-	-	126,000	-
<i>Oscillatoria tenuis</i>	588,000	9,000	-	851,000
Family Nostocaceae				
<i>Pseudanabaena</i> sp.	64,000	27,000	95,000	37,000
<i>Richelia inteacellularis</i>	-	-	-	18,000
Division Chlorophyta				
Class Chlorophyceae				
Order Chlorococcales				
Family Scenedesmaceae				
<i>Scenedesmus opoliensis</i>	-	-	63,000	-
Order Zygnematales				
Family Desmidiaceae				
<i>Closterium gracile</i>	-	-	8,000	-

ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 17 พฤษภาคม 2565)

(ต่อ)

กลุ่ม/สกุลของแพลงก์ตอน	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
Division Chromophyta				
Class Bacillariophyceae				
Order Biddulphales				
Suborder Coscinodiscineae				
Family Thalassiosiraceae				
<i>Cyclotella striata</i>	539,000	579,000	4,171,000	119,000
<i>Skeletonema costatum</i>	61,719,000	113,632,000	333,119,000	10,678,000
<i>Thalassiosira eccentrica</i>	-	-	916,000	64,000
<i>Thalassiosira subtilis</i>	314,000	109,000	1,201,000	-
Family Melosiraceae				
<i>Paralia sulcata</i>	32,000	-	-	-
Family Coscinodiscaceae				
<i>Coscinodiscus granii</i>	8,000	9,000	-	-
<i>Coscinodiscus nodulifer</i>	-	-	40,000	-
<i>Coscinodiscus</i> sp.	97,000	27,000	63,000	-
Suborder Rhizosoleniineae				
Family Rhizosoleniaceae				
<i>Dactyliosolen fragillissima</i>	8,000	-	-	9,000
<i>Guinardia striata</i>	129,000	-	-	183,000
<i>Proboscia alata</i>	24,000	-	-	18,000
<i>Pseudosolenia calcar-avis</i>	8,000	-	-	-
<i>Rhizosolenia acuminata</i>	16,000	45,000	-	92,000
<i>Rhizosolenia formosa</i>	-	-	-	9,000
<i>Rhizosolenia setigera</i>	16,000	-	-	18,000
Suborder Biddulphiineae				
Family Hemiaulaceae				
<i>Cerataulina bicornis</i>	32,000	-	-	-

ตาราง ตาราง ผลการวิเคราะห์แฟล่งก์ตอนพืชและแฟล่งก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 17 พฤษภาคม 2565)

(ต่อ)

กลุ่ม/สกุลของแฟล่งก์ตอน	ปริมาณแฟล่งก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
<i>Cerataulina pelagica</i>	201,000	18,000	-	9,000
<i>Eucampia cornuta</i>	-	-	-	55,000
<i>Hemiaulus hauckii</i>	-	-	-	73,000
<i>Hemiaulus indicus</i>	-	-	-	92,000
Family Biddulphiaceae				
<i>Biddulphia</i> sp.	16,000	-	-	-
Family Chaetoceraceae				
<i>Bacteriastrum delicatulum</i>	24,000	72,000	-	366,000
<i>Bacteriastrum elongatum</i>	-	-	-	55,000
<i>Bacteriastrum furcatum</i>	427,000	81,000	32,000	476,000
<i>Bacteriastrum</i> sp.	266,000	36,000	40,000	458,000
<i>Chaetoceros affinis</i>	403,000	9,000	-	1,281,000
<i>Chaetoceros compressus</i>	378,000	-	-	2,379,000
<i>Chaetoceros costatus</i>	242,000	18,000	-	915,000
<i>Chaetoceros curvisetus</i>	13,419,000	869,000	-	25,254,000
<i>Chaetoceros didymus</i>	861,000	54,000	-	1,007,000
<i>Chaetoceros diversus</i>	-	-	24,000	302,000
<i>Chaetoceros laciniosus</i>	56,000	-	-	1,373,000
<i>Chaetoceros lorenzianus</i>	145,000	-	-	485,000
<i>Chaetoceros mitra</i>	217,000	9,000	-	229,000
<i>Chaetoceros peruvianus</i>	-	-	-	165,000
<i>Chaetoceros pseudocurvisetus</i>	749,000	290,000	-	2,562,000
<i>Chaetoceros rostratus</i>	-	-	-	82,000
<i>Chaetoceros</i> sp.	322,000	109,000	79,000	2,745,000
Family Lithodesmaceae				
<i>Helicotheca tamesis</i>	-	-	-	37,000
Family Eupodiscaceae				
<i>Odontella aurita</i>	-	-	8,000	-

ตาราง ผลการวิเคราะห์แฟล่งก์ตอนพืชและแฟล่งก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 17 พฤษภาคม 2565)

(ต่อ)

กลุ่ม/สกุลของแฟล่งก์ตอน	ปริมาณแฟล่งก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
<i>Triceratium favus</i>	-	-	-	9,000
Order Bacillariales				
Suborder Fragilariineae				
Family Thalassionemataceae				
<i>Thalassionema frauenfeldii</i>	105,000	-	16,000	275,000
<i>Thalassionema nitzschioides</i>	-	63,000	158,000	46,000
<i>Thalassionema</i> sp.	48,000	-	-	-
<i>Thalassiothrix</i> sp.	-	-	8,000	-
Family Striatellaceae				
<i>Grammatophora undulata</i>	-	-	-	82,000
Suborder Bacillariineae				
Family Lyrellaceae				
<i>Lyrella lyra</i>	16,000	-	-	-
Family Naviculaceae				
<i>Amphora exigua</i>	-	-	-	9,000
<i>Amphora robusta</i>	40,000	27,000	-	110,000
<i>Diploneis smithii</i>	16,000	-	-	-
<i>Pinnularia viridis</i>	8,000	-	-	-
<i>Pleurosigma angulatum</i>	-	18,000	-	-
<i>Pleurosigma narmanii</i>	8,000	9,000	-	101,000
<i>Pleurosigma</i> sp.	89,000	-	-	-
Family Bacillariaceae				
<i>Cylindrotheca closterium</i>	8,000	9,000	-	-
<i>Nitzschia lorenziana</i>	16,000	-	-	37,000
<i>Pseudo-nitzschia</i> sp.	-	54,000	-	-
Family Surirellaceae				
<i>Surirella ovata</i>	-	-	-	55,000

ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 17 พฤษภาคม 2565)

กลุ่ม/สกุลของแพลงก์ตอน	(ต่อ)			
	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
Class Dinophyceae				
Order Prorocentrales				
Family Prorocentraceae				
<i>Prorocentrum micans</i>	-	-	-	9,000
<i>Prorocentrum sigmoides</i>	8,000	9,000	-	27,000
Order Dinophysiales				
Family Dinophysiaceae				
<i>Phalacroma rudgei</i>	-	-	-	9,000
Order Gonyaulacalea				
Family Ceratiaceae				
<i>Ceratium deflexum</i>	-	-	-	9,000
<i>Ceratium furca</i>	40,000	-	-	64,000
<i>Ceratium fusus</i>	72,000	-	-	-
<i>Ceratium macroceros</i>	16,000	-	-	-
<i>Ceratium trichoceros</i>	-	-	8,000	9,000
Family Gonyaulacaceae				
<i>Gonyaulax</i> sp.	81,000	36,000	-	64,000
Family Pyrophacaceae				
<i>Pyrophacus horologium</i>	8,000	9,000	-	18,000
Order Peridinales				
Family Peridiniaceae				
<i>Peridinium quinquecorne</i>	-	18,000	-	-
Family Protoperidiniaceae				
<i>Protoperidinium abei</i>	8,000	-	-	-
<i>Protoperidinium curtipes</i>	24,000	-	-	18,000
<i>Protoperidinium curvipes</i>	-	-	-	9,000
<i>Protoperidinium depressum</i>	-	-	-	27,000
<i>Protoperidinium latispinum</i>	32,000	-	-	-

ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 17 พฤษภาคม 2565)

กลุ่ม/สกุลของแพลงก์ตอน	(ต่อ)			
	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
<i>Protoperidinium punctulatum</i>	-	-	-	9,000
<i>Protoperidinium</i> sp.	161,000	362,000	-	64,000
<i>Protoperidinium spinulosum</i>	-	-	-	9,000
แพลงก์ตอนสัตว์				
Phylum Protozoa				
Subphylum Plasmodroma				
Class Sarcodina				
Subclass Actinopoda				
Order Radiolarida				
Suborder Acantharia				
<i>Acanthometron pellucidum</i>	-	-	8,000	-
Subphylum Ciliophora				
Class Ciliata				
Subclass Holotricha				
Order Hymenostomatida				
<i>Paramecium</i> sp.	-	-	8,000	-
Subclass Spirotricha				
Order Tintinnida				
Family Tintinnididae				
<i>Leprotintinnus nordquisti</i>	-	-	-	9,000
Family Codonellidae				
<i>Tintinnopsis beroidea</i>	64,000	9,000	-	18,000
<i>Tintinnopsis brasiliensis</i>	16,000	-	-	-
<i>Tintinnopsis cylindrica</i>	-	-	-	18,000
<i>Tintinnopsis meunieriqa</i>	-	-	87,000	-
<i>Tintinnopsis tocaninensis</i>	8,000	9,000	-	-
<i>Tintinnopsis turbo</i>	48,000	-	-	-

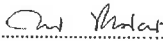
ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 17 พฤษภาคม 2565)


กลุ่ม/สกุลของแพลงก์ตอน	(ต่อ)			
	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
Family Codonellopsidae				
Stenosemella nivalis	-	-	-	18,000
Subclass Peritricha				
Order Peritrichida				
Zoothamnium sp.	-	-	32,000	-
Phylum Rotifera				
Class Monogononta				
Order Ploima				
Family Lecanidae				
Lecane imbricata	-	-	8,000	-
Phylum Arthropoda				
Class Crustacea				
Subclass Copepoda				
Copepod nauplii	32,000	72,000	32,000	27,000
Order Cyclopoida				
Cyclopoid copepod	8,000	-	-	-
Order Harpacticoida				
Family Ectinosomidae				
Microsetella norvegica	8,000	-	-	-
Phylum Mollusca				
Class Bivalvia				
Pelecypod larvae	-	9,000	-	-
Phylum Chordata				
Subphylum Urochordata				
Class Larvacea				
Family Oikopleuridae				
Oikopleura sp.	24,000	-	-	9,000

ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 17 พฤษภาคม 2565)

กลุ่ม/สกุลของแพลงก์ตอน	(ต่อ)			
	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
ชนิดของแพลงก์ตอนพืช	50	30	19	57
ชนิดของแพลงก์ตอนสัตว์	8	4	6	6
ชนิดแพลงก์ตอนรวม	58	34	25	63
ปริมาณแพลงก์ตอนพืช	82,124,000	116,616,000	340,175,000	53,565,000
ปริมาณแพลงก์ตอนสัตว์	208,000	99,000	175,000	99,000
ปริมาณแพลงก์ตอนรวม	82,332,000	116,715,000	340,350,000	53,664,000
ค่าดัชนีความหลากหลายแพลงก์ตอนพืช	0.9858	0.1799	0.1294	1.9833
ค่าดัชนีความหลากหลายแพลงก์ตอนสัตว์	1.8114	0.8856	1.3919	1.7202
ค่าดัชนีความสม่ำเสมอแพลงก์ตอนพืช	0.2520	0.0529	0.0439	0.4905
ค่าดัชนีความสม่ำเสมอแพลงก์ตอนสัตว์	0.8711	0.6388	0.7768	0.9601

- หมายเหตุ :
- 1. สถานี S1 : เกาะสะเก็ด
 - 2. สถานี S2 : หาดทรายทอง
 - 3. สถานี S3 : จุดระบายน้ำทิ้งของโรงกลั่นน้ำมันลงทะเล
 - 4. สถานี S4 : ทะเลเปิด


(นางสาวกนกวรรณ ขาวด่อน)
ผู้วิเคราะห์


(นายอลงกต อินทรชาติ)
หัวหน้าสถานีวิจัยประมงศรีราชา



สถานีวิจัยประมงศรีราชา

101/12 หมู่ 9 ต. บางพระ

อ. ศรีราชา จ. ชลบุรี 20110

โทร./โทรสาร. (038) 311379

รายงานผลการวิเคราะห์สัตว์หน้าดิน

ตาราง ผลการวิเคราะห์สัตว์หน้าดิน (เก็บตัวอย่างวันที่ 17 พฤษภาคม 2565)

ชนิดสัตว์หน้าดิน	ปริมาณสัตว์หน้าดิน (ตัวต่อตารางเมตร)			
	S1	S2	S3	S4
Phylum Annelida				
Class Polychaeta				
Order Eunicida				
Family Eunicidae				
<i>Murphysa</i> sp. (ไส้เดือนทะเล)	-	-	-	30
Order Opheliida				
Family Opheliidae				
<i>Ophelina</i> sp. (ไส้เดือนทะเล)	15	75	-	-
Order Orbiniida				
Family Orbiniidae				
<i>Scoloplos</i> sp. (ไส้เดือนทะเล)	60	45	-	-
Order Phyllodocida				
Family Glyceridae				
<i>Glycera</i> sp. (ไส้เดือนทะเล)	15	-	-	-
Family Nephtyidae				
<i>Nephtys</i> sp. (ไส้เดือนทะเล)	30	-	-	-

ตาราง ผลการวิเคราะห์สัตว์หน้าดิน (เก็บตัวอย่างวันที่ 17 พฤษภาคม 2565) (ต่อ)

ชนิดสัตว์หน้าดิน	ปริมาณสัตว์หน้าดิน (ตัวต่อตารางเมตร)			
	S1	S2	S3	S4
Phylum Arthropoda				
Class Malacostraca				
Order Decapoda				
Family Galenidae				
<i>Galene</i> sp. (ปูก้ามขาว)	-	-	-	15
Phylum Mollusca				
Class Gastropoda				
Order Neogastropoda				
Family Nassariidae				
<i>Nassarius</i> sp. (หอยปากกระเจาด)	30	-	-	-
Class Bivalvia				
Order Cardiida				
Family Tellinidae				
<i>Tellina</i> sp. (หอยสองฝาชนิดหนึ่ง)	30	-	-	-
Phylum Echinodermata				
Class Ophiuroidea				
Order Ophiacanthida				
Family Ophiocomidae				
<i>Ophiocoma</i> sp. (ดาวเปราะ)	-	15	-	-
Phylum Chordata				
Class Leptocardii				
Order Amphioxiformes				
Family Branchiostomidae				
<i>Branchiostoma</i> sp. (แอมฟิออกซัส)	60	-	-	297
ชนิดสัตว์หน้าดิน	7	3	-	3
ปริมาณสัตว์หน้าดิน	240	135	-	342
ค่าดัชนีความหลากหลายสัตว์หน้าดิน	1.8195	0.9369	-	0.4731

- หมายเหตุ :
1. สถานี S1 : เกาะสะเก็ด
 2. สถานี S2 : หาดทรายทอง
 3. สถานี S3 : จุดระบายน้ำทิ้งของโรงกลั่นน้ำมันลงทะเล
 4. สถานี S4 : ทะเลเปิด

.....
สมฤกษ์ กันทะวงศ์

(นายอรรถวุฒิ กันทะวงศ์)

ผู้วิเคราะห์

.....
อ. อินทราธิ

(นายอลงกต อินทราธิ)

หัวหน้าสถานีวิจัยประมงศรีราชา

ใบรับรองผลการตรวจวัดคุณภาพน้ำใต้ดิน



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TEL. (662) 959-3600 FAX (662) 959-3535 Website : secot.co.th E-mail : envserv@secot.co.th

GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0687/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING DATE	: 29-31/03/2022	SAMPLING TIME	: 09.26-10.03, 10.11-10.17, 09.47-10.30
RECEIVED DATE	: 03/04/2022	ANALYTICAL DATE	: 05-06/04/2022
REPORT DATE	: 21/04/2022	SITE OPERATOR	: Mr. Aniwat Pimwhanna
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_GW_March

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION					STANDARD ^{1/}
				MW-101B	MW-102A	MW-103A	MW-104A	MW-105B	
Chromium (Cr)	mg/l	3120 B	< 0.001	ND	ND	< 0.01	< 0.01	< 0.01	≤ 6.0
Manganese (Mn)	mg/l	3120 B	< 0.001	0.02	0.13	0.01	0.10	2.30	≤ 33
Mercury (Hg)	mg/l	3112 B	< 0.0001	ND	ND	ND	ND	ND	≤ 0.7
Nickel (Ni)	mg/l	3120 B	< 0.002	ND	ND	ND	ND	ND	≤ 5.0

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 21st ED. 2017 (AWWA APHA WEF)

(Miss Krisana Chanthoom)

Analyst

REG. NO. 2-239-9-7802

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 2-239-ก-5863

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SAMPLE CONDITION	: Normal	FILE CODE	: 222003_GW_March

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION					STANDARD ^{1/}
				MW-101B	MW-102A	MW-103A	MW-104A	MW-105B	
Benzene	mg/l	6200 B	< 0.0002	ND	ND	ND	ND	ND	< 0.2
Ethylbenzene	mg/l	6200 B	< 0.0002	ND	ND	ND	ND	ND	< 2.0
Toluene	mg/l	6200 B	< 0.0002	ND	ND	ND	ND	ND	< 5.0
m-Xylene	mg/l	6200 B	< 0.0002	ND	ND	ND	ND	ND	≤ 24
o-Xylene	mg/l	6200 B	< 0.0002	ND	ND	ND	ND	ND	≤ 24
p-Xylene	mg/l	6200 B	< 0.0002	ND	ND	ND	ND	ND	≤ 24
Total Xylenes	mg/l	6200 B	< 0.0006	ND	ND	ND	ND	ND	≤ 24

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 21st ED. 2017 (AWWA APHA WEF)

(Miss Natsiri Lertterapipat)

Analyst

REG. NO. 2-239-ก-0001

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 2-239-ก-5863

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RECEIVED DATE	: 03/04/2022	ANALYTICAL DATE	: 09-12/04/2022
REPORT DATE	: 21/04/2022	SITE OPERATOR	: Mr. Aniwat Pimwhanna
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_GW_March

PARAMETER	UNIT	ANALYSIS	ND	STATION					STANDARD ^U
		METHODS	(non-detectable)	MW-101B	MW-102A	MW-103A	MW-104A	MW-105B	
Total Petroleum Hydrocarbons									
- TPH (C ₇ - C ₉)	mg/l	5030 C/8260 D	< 0.003	ND	ND	ND	ND	ND	≤ 1.4
- Pentane									
- Benzene									
- Toluene									
- m,p-Xylene									
- o-Xylene									
- Ethylbenzene									
- TPH (C ₁₀ - C ₁₆)	mg/l	3510 C/8015 D	< 0.025	0.238	ND	ND	ND	ND	≤ 1.7
- n-Nonane									
- n-Decane									
- n-Dodecane									
- n-Tetradecane									
- n-Hexadecane									
- TPH (C ₁₆ - C ₃₂)	mg/l	3510 C/8015 D	< 0.050	ND	ND	ND	ND	ND	≤ 0.1
- n-Octadecane									
- n-Eicosane									
- n-Doocosane									
- n-Tetracosane									
- n-Hexacosane									
- n-Octacosane									
- n-Triacontane									
- n-Dotriacontane									
- n-Tetratriacontane									
- Pentatriacontane									

REFERENCE: US EPA SW 846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE, 3rd ED. 2020.

(Miss Narisa Poowasanpetch)

Analyst

REG. NO. 7-239-N-6419

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 7-239-N-5863

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GROUND WATER ANALYSIS REPORT

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SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING DATE	: 29-30/03/2022, 01-02/04/2022	SAMPLING TIME	: 10.29-13.15, 14.07-14.13, 14.44-14.50, 10.43-10.48
RECEIVED DATE	: 03/04/2022	ANALYTICAL DATE	: 05-06/04/2022
REPORT DATE	: 21/04/2022	SITE OPERATOR	: Mr. Aniwat Pimwhanna
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_GW_March

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION					STANDARD ^U
				MW-106B	MW-107C	MW-108B	MW-109A	MW-111A	
Chromium (Cr)	mg/l	3120 B	< 0.001	< 0.01	< 0.01	< 0.01	ND	< 0.01	≤ 6.0
Manganese (Mn)	mg/l	3120 B	< 0.001	0.22	0.41	0.14	0.08	0.04	≤ 33
Mercury (Hg)	mg/l	3112 B	< 0.0001	ND	0.0003	ND	ND	ND	≤ 0.7
Nickel (Ni)	mg/l	3120 B	< 0.002	ND	< 0.01	< 0.01	ND	ND	≤ 5.0

REFERENCE: STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER, 21st ED. 2017 (AWWA APHA, WEF)

(Miss Krisana Chanthoom)

Analyst

REG. NO. 7-239-N-7802

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 7-239-N-5863

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REPORT DATE : 21/04/2022 SITE OPERATOR : Mr. Aniwat Pimwhanna
SAMPLE CONDITION : Normal FILE CODE : 222003_GW_March

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION					STANDARD ^{1/}
				MW-106B	MW-107C	MW-108B	MW-109A	MW-111A	
Benzene	mg/l	6200 B	< 0.0002	ND	ND	ND	ND	ND	< 0.2
Ethylbenzene	mg/l	6200 B	< 0.0002	ND	ND	ND	ND	ND	< 2.0
Toluene	mg/l	6200 B	< 0.0002	ND	ND	ND	ND	ND	< 5.0
m-Xylene	mg/l	6200 B	< 0.0002	ND	ND	ND	ND	ND	≤ 24
o-Xylene	mg/l	6200 B	< 0.0002	ND	ND	ND	ND	ND	≤ 24
p-Xylene	mg/l	6200 B	< 0.0002	ND	ND	ND	ND	ND	≤ 24
Total Xylenes	mg/l	6200 B	< 0.0006	ND	ND	ND	ND	ND	≤ 24

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 19th ED. 2012 (AWWA APHA WEF)

Natsiri L.

(Miss Natsiri Lettterapipat)

Analyst

REG. NO. 7-239-ก-0001

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 7-239-ก-5863

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RECEIVED DATE : 03/04/2022 ANALYTICAL DATE : 09-12/04/2022
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SAMPLE CONDITION : Normal FILE CODE : 222003_GW_March

PARAMETER	UNIT	ANALYSIS	ND	STATION					STANDARD ^{1/}
		METHODS	(non-detectable)	MW-106B	MW-107C	MW-108B	MW-109A	MW-111A	
Total Petroleum Hydrocarbons									
- TPH (C ₂ - C ₉)	mg/l	5030 C/8260 D	< 0.003	ND	ND	ND	ND	ND	≤ 1.4
- Pentane									
- Benzene									
- Toluene									
- m,p-Xylene									
- o-Xylene									
- Ethylbenzene									
- TPH (C ₈ - C ₁₆)	mg/l	3510 C/8015 D	< 0.025	0.117	0.180	0.076	0.182	0.295	≤ 1.7
- n-Nonane									
- n-Decane									
- n-Dodecane									
- n-Tetradecane									
- n-Hexadecane									
- TPH (C ₁₆ - C ₃₂)	mg/l	3510 C/8015 D	< 0.050	ND	ND	ND	ND	ND	≤ 0.1
- n-Octadecane									
- n-Eicosane									
- n-Docosane									
- n-Tetracosane									
- n-Hexacosane									
- n-Octacosane									
- n-Triacontane									
- n-Dotriacontane									
- n-Tetracontane									
- n-Pentatriacontane									

REFERENCE : US EPA SW 846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE 1st ED. 2020

Narisa Poowasanpetch
(Miss Narisa Poowasanpetch)

Analyst

REG. NO. 7-239-ก-6419

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 7-239-ก-5863

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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0687/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING DATE	: 31/03/2022, 01-02/04/2022	SAMPLING TIME	: 10.52-10.56, 10.46-14.07, 10.14-10.19
RECEIVED DATE	: 03/04/2022	ANALYTICAL DATE	: 05-06/04/2022
REPORT DATE	: 21/04/2022	SITE OPERATOR	: Mr. Aniwat Pimwhanna
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_GW_March

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION				STANDARD ^{1/}
				MW-112A	MW-113A	MW-114A	MW-115A	
Chromium (Cr)	mg/l	3120 B	< 0.001	ND	ND	ND	< 0.01	≤ 6.0
Manganese (Mn)	mg/l	3120 B	< 0.001	0.04	0.02	0.06	0.52	≤ 33
Mercury (Hg)	mg/l	3112 B	< 0.0001	ND	ND	ND	ND	≤ 0.7
Nickel (Ni)	mg/l	3120 B	< 0.002	ND	ND	ND	0.02	≤ 5.0

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 21st ED. 2017 (AWWA APHA WEF)

Krisana Chanthoom
(Miss Krisana Chanthoom)

Analyst

REG. NO. 7-239-ก-7802

Araya Tipparuk
(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 7-239-ก-5863

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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0687/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING DATE	: 31/03/2022, 01-02/04/2022	SAMPLING TIME	: 10.52-10.56, 10.46-14.07, 10.14-10.19
RECEIVED DATE	: 03/04/2022	ANALYTICAL DATE	: 09/04/2022
REPORT DATE	: 21/04/2022	SITE OPERATOR	: Mr. Aniwat Pimwhanna
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_GW_March

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION				STANDARD ^{1/}
				MW-112A	MW-113A	MW-114A	MW-115A	
Benzene	mg/l	6200 B	< 0.0002	ND	ND	ND	ND	< 0.2
Ethylbenzene	mg/l	6200 B	< 0.0002	ND	ND	ND	ND	< 2.0
Toluene	mg/l	6200 B	< 0.0002	ND	ND	ND	ND	< 5.0
m-Xylene	mg/l	6200 B	< 0.0002	ND	ND	ND	ND	≤ 24
o-Xylene	mg/l	6200 B	< 0.0002	ND	ND	ND	ND	≤ 24
p-Xylene	mg/l	6200 B	< 0.0002	ND	ND	ND	ND	≤ 24
Total Xylenes	mg/l	6200 B	< 0.0006	ND	ND	ND	ND	≤ 24

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 21st ED. 2017 (AWWA APHA WEF)

Natsiri L.
(Miss Natsiri Lerterapipat)

Analyst

REG. NO. 7-239-ก-0001

Araya Tipparuk
(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 7-239-ก-5863

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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0687/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING DATE	: 31/03/2022, 01-02/04/2022	SAMPLING TIME	: 10.52-10.56, 10.46-14.07, 10.14-10.19
RECEIVED DATE	: 03/04/2022	ANALYTICAL DATE	: 09-12/04/2022
REPORT DATE	: 21/04/2022	SITE OPERATOR	: Mr. Aniwat Pimwhanna
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_GW_March

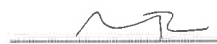
PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION				STANDARD ^U
				MW-112A	MW-113A	MW-114A	MW-115A	
<u>Total Petroleum Hydrocarbons</u>								
- TPH (C ₅ - C ₉)	mg/l	5030 C/8260 D	< 0.003	ND	ND	ND	ND	≤ 1.4
- Pentane								
- Benzene								
- Toluene								
- m,p-Xylene								
- o-Xylene								
- Ethylbenzene								
- TPH (C ₉ - C ₁₆)	mg/l	3510 C/8015 D	< 0.025	0.445	0.297	0.447	0.692	≤ 1.7
- n-Nonane								
- n-Decane								
- n-Dodecane								
- n-Tetradecane								
- n-Hexadecane								
- TPH (C ₁₆ - C ₃₃)	mg/l	3510 C/8015 D	< 0.050	ND	ND	ND	ND	≤ 0.1
- n-Octadecane								
- n-Eicosane								
- n-Docosane								
- n-Tetracosane								
- n-Hexacosane								
- n-Octacosane								
- n-Triacontane								
- n-Dotriacontane								
- n-Tetracontane								
- Pentatriacontane								

REFERENCE : US EPA SW 846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE, 3rd ED. 2020.


(Miss Narisa Poowasanpetch)

Analyst

REG. NO. 2-239-ก-6419


(Mrs. Araya Tipparak)

Technical Management Team

REG. NO. 2-239-ก-5863

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SOIL SAMPLES ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0662/64
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Hand Auger
SAMPLING DATE	: 22/24/03/2021	SAMPLING TIME	: 10.20-10.40 , 09.30-09.50
RECEIVED DATE	: 27/03/2021	ANALYTICAL DATE	: 02/04/2021
REPORT DATE	: 08/04/2021	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 221003_Soil_March

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD ^U
				MW-101 B	MW-102 A	
Naphthalene	mg/kg	3540 C / 8270 D	< 0.005	ND	ND	≤ 1,000
Hexane	mg/kg	5035 A / 8260 D	< 0.001	ND	ND	≤ 1,000
Benzene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 15
Toluene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 520
m-Xylene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 210
o-Xylene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 210
p-Xylene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 210
Total Xylenes	mg/kg	5035 A / 8260 D	< 0.00075	ND	ND	≤ 210

REFERENCE : US EPA SW 846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE 3rd ED., 2009

Natsiri L.

(Miss Natsiri Leritarpipat)

Analyst

REG. NO. 7-239-9-6423

Araya Tipparuk

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 7-239-9-5863

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SOIL SAMPLES ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0662/64
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Hand Auger
SAMPLING DATE	: 22/24/03/2021	SAMPLING TIME	: 10.20-10.40 , 09.30-09.50
RECEIVED DATE	: 27/03/2021	ANALYTICAL DATE	: 30/03/2021-02/04/2021
REPORT DATE	: 08/04/2021	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 221003_Soil_March

PARAMETER	UNIT	ANALYSIS	ND	STATION		STANDARD ^U
		METHODS	(non-detectable)	MW-101 B	MW-102 A	
Total Petroleum Hydrocarbons						
- TPH (C ₃ - C ₁₀)	mg/kg	5035A /8260 D	< 0.003	ND	ND	≤ 25
- Pentane						
- Benzene						
- Toluene						
- m,p-Xylene						
- o-Xylene						
- Ethylbenzene						
- TPH (C ₉ - C ₁₀)	mg/kg	3540C/8015 D	< 0.25	ND	ND	≤ 25
- n-Nonane						
- n-Decane						
- n-Dodecane						
- n-Tetradecane						
- n-Hexadecane						
- TPH (C ₁₄ - C ₁₉)	mg/kg	3540C/8015 D	< 1.85	ND	ND	≤ 8
- n-Octadecane						
- n-Eicosane						
- n-Docosane						
- n-Tetracosane						
- n-Hexacosane						
- n-Octacosane						
- n-Triacontane						
- n-Dotriacontane						
- n-Tetracontane						
- n-Pentatriacontane						

REFERENCE : US EPA SW 846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE 3rd ED., 2009

Kesvarin Sinsueg

(Miss Kesvarin Sinsueg)

Analyst

REG. NO. 7-239-9-6424

Araya Tipparuk

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 7-239-9-5863

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SOIL SAMPLES ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0662/64
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Hand Auger
SAMPLING DATE	: 22-23/03/2021	SAMPLING TIME	: 10.50-11.10 ,09.40-09.53
RECEIVED DATE	: 27/03/2021	ANALYTICAL DATE	: 02/04/2021
REPORT DATE	: 08/04/2021	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 221003_Soil_March

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD ^{1/}
				MW-103 A	MW-104 A	
Naphthalene	mg/kg	3540 C / 8270 D	< 0.005	ND	ND	≤ 1,000
Hexane	mg/kg	5035 A / 8260 D	< 0.001	ND	ND	≤ 1,000
Benzene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 15
Toluene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 520
m-Xylene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 210
o-Xylene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 210
p-Xylene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 210
Total Xylenes	mg/kg	5035 A / 8260 D	< 0.00075	ND	ND	≤ 210

REFERENCE: US EPA SW-846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE 3rd ED., 2016

Natsiri L.

(Miss Natsiri Lertterapipat)

Analyst

REG. NO. 7-239-9-6423

(Signature)

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 7-239-9-5863

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SOIL SAMPLES ANALYSIS REPORT

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SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Hand Auger
SAMPLING DATE	: 22-23/03/2021	SAMPLING TIME	: 10.50-11.10 ,09.40-09.53
RECEIVED DATE	: 27/03/2021	ANALYTICAL DATE	: 30/03/2021-02/04/2021
REPORT DATE	: 08/04/2021	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 221003_Soil_March

PARAMETER	UNIT	ANALYSIS	ND	STATION		STANDARD
		METHODS	(non-detectable)	MW-103 A	MW-104 A	
Total Petroleum Hydrocarbons						
- TPH (C ₅ - C ₁₆)	mg/kg	5035A /8260 D	< 0.003	ND	ND	≤ 25
- Pentane	mg/kg					
- Benzene	mg/kg					
- Toluene	mg/kg					
- m,p-Xylene	mg/kg					
- o-Xylene	mg/kg					
- Ethylbenzene	mg/kg					
- TPH (C ₉ - C ₁₆)	mg/kg	3540C/8015 D	< 0.25	ND	ND	≤ 25
- n-Nonane	mg/kg					
- n-Decane	mg/kg					
- n-Dodecane	mg/kg					
- n-Tetradecane	mg/kg					
- n-Hexadecane	mg/kg					
- TPH (C ₁₆ - C ₃₃)	mg/kg	3540C/8015 D	< 1.85	ND	ND	≤ 8
- n-Octadecane	mg/kg					
- n-Eicosane	mg/kg					
- n-Docosane	mg/kg					
- n-Tetracosane	mg/kg					
- n-Hexacosane	mg/kg					
- n-Octacosane	mg/kg					
- n-Triacontane	mg/kg					
- n-Dotriacontane	mg/kg					
- n-Tetracontane	mg/kg					
- Pentatriacontane	mg/kg					

REFERENCE: US EPA SW-846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE 3rd ED., 2016

(Signature)

(Miss Kesvarin Sinsueg)

Analyst

REG. NO. 7-239-9-6424

(Signature)

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 7-239-9-5863

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SOIL SAMPLES ANALYSIS REPORT

CLIENT NAME : Star Petroleum Refining Public Co., Ltd. REQUEST SERVICE No. : 0662/64
SAMPLING BY : SECOT Co., Ltd. SAMPLING METHOD : Hand Auger
SAMPLING DATE : 23/03/2021 SAMPLING TIME : 10.15-10.30, 11.00-11.15
RECEIVED DATE : 27/03/2021 ANALYTICAL DATE : 02/04/2021
REPORT DATE : 08/04/2021 SITE OPERATOR : Mr. Baworn Deechaiya
SAMPLE CONDITION : Normal FILE CODE : 221003_Soil_Maroh

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD ^{1/}
				MW-105 B	MW-106 B	
Naphthalene	mg/kg	3540 C / 8270 D	< 0.005	ND	ND	≤ 1,000
Hexane	mg/kg	5035 A / 8260 D	< 0.001	ND	ND	≤ 1,000
Benzene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 15
Toluene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 520
m-Xylene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 210
o-Xylene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 210
p-Xylene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 210
Total Xylenes	mg/kg	5035 A / 8260 D	< 0.00075	ND	ND	≤ 210

REFERENCE : US EPA SW 846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE 1st ED., 2000

Natsiri L.

(Miss Natsiri Lertterapipat)

Analyst

REG. NO. 7-239-9-6423

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 7-239-9-5863

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SOIL SAMPLES ANALYSIS REPORT

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RECEIVED DATE : 27/03/2021 ANALYTICAL DATE : 30/03/2021-02/04/2021
REPORT DATE : 08/04/2021 SITE OPERATOR : Mr. Baworn Deechaiya
SAMPLE CONDITION : Normal FILE CODE : 221003_Soil_Maroh

PARAMETER	UNIT	ANALYSIS	ND	STATION		STANDARD ^{1/}
		METHODS	(non-detectable)	MW-105 B	MW-106 B	
Total Petroleum Hydrocarbons						
- TPH (C ₅ - C ₁₀)	mg/kg	5035A / 8260 D	< 0.003	ND	ND	≤ 25
- Pentane						
- Benzene						
- Toluene						
- m,p-Xylene						
- o-Xylene						
- Ethylbenzene						
- TPH (C ₁₁ - C ₁₆)	mg/kg	3540C/8015 D	< 0.25	ND	ND	≤ 25
- n-Nonane						
- n-Decane						
- n-Dodecane						
- n-Tetradecane						
- n-Hexadecane						
- TPH (C ₁₇ - C ₃₁)	mg/kg	3540C/8015 D	< 1.85	ND	ND	≤ 8
- n-Octadecane						
- n-Eicosane						
- n-Docosane						
- n-Tetracosane						
- n-Hexacosane						
- n-Octacosane						
- n-Triacontane						
- n-Dotriacontane						
- n-Tetratriacontane						
- Pentatriacontane						

REFERENCE : US EPA SW 846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE 1st ED., 2000

Kesvarin Sinsueg

(Miss Kesvarin Sinsueg)

Analyst

REG. NO. 7-239-9-6424

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 7-239-9-5863

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SOIL SAMPLES ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0662/64
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Hand Auger
SAMPLING DATE	: 23.26/03/2021	SAMPLING TIME	: 14.15-14.30, 09.30-09.50
RECEIVED DATE	: 27/03/2021	ANALYTICAL DATE	: 02/04/2021
REPORT DATE	: 08/04/2021	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 221003_Soil_March

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD ^{1/}
				MW-108 B	MW-109 A	
Naphthalene	mg/kg	3540 C / 8270 D	< 0.005	ND	ND	≤ 1,000
Hexane	mg/kg	5035 A / 8260 D	< 0.001	ND	ND	≤ 1,000
Benzene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 15
Toluene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 520
m-Xylene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 210
o-Xylene	mg/kg	5035 A / 8260 D	< 0.00025	ND	0.00556	≤ 210
p-Xylene	mg/kg	5035 A / 8260 D	< 0.00025	ND	0.05908	≤ 210
Total Xylenes	mg/kg	5035 A / 8260 D	< 0.00075	ND	0.06464	≤ 210

REFERENCE : USEPA SW-846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE, 3rd ED., 2020

Natsiri L.

(Miss Natsiri Lertlerapipat)

Analyst

REG. NO. 7-239-9-6423

AR

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 7-239-9-5863

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 3. ^{1/} Notification of the Ministry of Industry, B.E.2559 (2016).
 4. - Not available.



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SOIL SAMPLES ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0662/64
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Hand Auger
SAMPLING DATE	: 23.26/03/2021	SAMPLING TIME	: 14.15-14.30, 09.30-09.50
RECEIVED DATE	: 27/03/2021	ANALYTICAL DATE	: 30/03/2021-02/04/2021
REPORT DATE	: 08/04/2021	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 221003_Soil_March

PARAMETER	UNIT	ANALYSIS	ND	STATION		STANDARD
		METHODS	(non-detectable)	MW-108 B	MW-109 A	
Total Petroleum Hydrocarbons						
- TPH (C ₉ - C ₁₆)	mg/kg	5035A / 8260 D	< 0.003	ND	0.14	≤ 25
- Pentane						
- Benzene						
- Toluene						
- m,p-Xylene						
- o-Xylene						
- Ethylbenzene						
- TPH (C ₉ - C ₁₆)	mg/kg	3540C/8015 D	≤ 0.25	ND	ND	≤ 25
- n-Nonane						
- n-Decane						
- n-Dodecane						
- n-Tetradecane						
- n-Hexadecane						
- TPH (C ₁₆ - C ₃₅)	mg/kg	3540C/8015 D	< 1.85	ND	ND	≤ 8
- n-Octadecane						
- n-Eicosane						
- n-Docosane						
- n-Tetracosane						
- n-Hexacosane						
- n-Octacosane						
- n-Triacontane						
- n-Dotriacontane						
- n-Tetratriacontane						
- Pentatriacontane						

REFERENCE : USEPA SW-846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE, 3rd ED., 2020

Kesvarin Sinsueg
(Miss Kesvarin Sinsueg)

Analyst

REG. NO. 7-239-9-6424

AR
(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 7-239-9-5863

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 4. - Not available.



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SOIL SAMPLES ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0662/64
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Hand Auger
SAMPLING DATE	: 24-25/03/2021	SAMPLING TIME	: 08.35-08.55 ,09.20-09.40
RECEIVED DATE	: 27/03/2021	ANALYTICAL DATE	: 02/04/2021
REPORT DATE	: 08/04/2021	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 221003_Soil_March

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD ¹⁾
				MW-112 A	MW-113 A	
Naphthalene	mg/kg	3540 C / 8270 D	< 0.005	ND	ND	≤ 1,000
Hexane	mg/kg	5035 A / 8260 D	< 0.001	ND	ND	≤ 1,000
Benzene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 15
Toluene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 520
m-Xylene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 210
o-Xylene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 210
p-Xylene	mg/kg	5035 A / 8260 D	< 0.00025	ND	ND	≤ 210
Total Xylenes	mg/kg	5035 A / 8260 D	< 0.00075	ND	ND	≤ 210

REFERENCE : US EPA SW 846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE, 3rd ED., 2020

Natsiri L.

(Miss Natsiri Lerterapipat)

Analyst

REG. NO. 7-239-ก-6423

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 7-239-ก-5863

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SOIL SAMPLES ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0662/64
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Hand Auger
SAMPLING DATE	: 24-25/03/2021	SAMPLING TIME	: 08.35-08.55 ,09.20-09.40
RECEIVED DATE	: 27/03/2021	ANALYTICAL DATE	: 30/03/2021-02/04/2021
REPORT DATE	: 08/04/2021	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 221003_Soil_March

PARAMETER	UNIT	ANALYSIS	ND	STATION		STANDARD
		METHODS	(non-detectable)	MW-112 A	MW-113 A	
Total Petroleum Hydrocarbons						
- TPH (C ₃ - C ₉)	mg/kg	5035A /8260 D	< 0.003	ND	ND	≤ 25
- Pentane						
- Benzene						
- Toluene						
- m,p-Xylene						
- o-Xylene						
- Ethylbenzene						
- TPH (C ₉ - C ₁₆)	mg/kg	3540C/8015 D	≤ 0.25	ND	ND	≤ 25
- n-Nonane						
- n-Decane						
- n-Dodecane						
- n-Tetradecane						
- n-Hexadecane						
- TPH (C ₁₆ - C ₂₅)	mg/kg	3540C/8015 D	< 1.85	ND	ND	≤ 8
- n-Octadecane						
- n-Eicosane						
- n-Docosane						
- n-Tetracosane						
- n-Hexacosane						
- n-Octacosane						
- n-Triacontane						
- n-Dotriacontane						
- n-Tetracontane						
- n-Pentatriacontane						

REFERENCE : US EPA SW 846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE, 3rd ED., 2020

Kesvarin Sinsueg
(Miss Kesvarin Sinsueg)

Analyst

REG. NO. 7-239-ก-6424

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 7-239-ก-5863

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ใบรับรองผลการตรวจวัดระดับเสียงภายในสถานประกอบการ



Noise Monitoring Result : Working Noise

MTR-SPRC PLC-Refinery

Location : CDU (NEAR 02GM102A)		Monitor Period : Feb 15, 2022	
SLM Model : CASELLA CEL-246		Serial No : 3173243	
Site Operator : Mr.Natchapon Kadu			
Calibrator Model : CASELLA CEL120/2		Serial No : 2839225	
Calibration Ref dB(A) : 114.0		Certified Date : Dec 24, 2021	
SLM Reading / Adjust dB(A) : 113.9/0.1		Expire Date : Dec 23, 2022	
Cal Sheet No.: CEL120/2-2022-009			
Time	Equivalent Sound Pressure Level (dB(A))		
	Feb 15, 2022		
00:00 - 01:00			
01:00 - 02:00			
02:00 - 03:00			
03:00 - 04:00			
04:00 - 05:00			
05:00 - 06:00			
06:00 - 07:00			
07:00 - 08:00			
08:00 - 09:00	87.2		
09:00 - 10:00	87.3		
10:00 - 11:00	87.2		
11:00 - 12:00	87.2		
12:00 - 13:00	87.3		
13:00 - 14:00	87.4		
14:00 - 15:00	87.4		
15:00 - 16:00	87.4		
16:00 - 17:00			
17:00 - 18:00			
18:00 - 19:00			
19:00 - 20:00			
20:00 - 21:00			
21:00 - 22:00			
22:00 - 23:00			
23:00 - 24:00			
Leq(8)*	87.3		
Lmax **	89.0		
Standard-8Hr	90 dB(A)		
Standard-Max	140 dB(A)		

Remark : * Average time between 08:00-16:00

** Maximum Sound Pressure Level between 08:00-16:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

(Miss Sununta Sirawuttinanon)
Technical Management Team



Noise Monitoring Result : Working Noise

MTR-SPRC PLC-Refinery

Location : NHTU (Near 08G102AB)		Monitor Period : Feb 15, 2022	
SLM Model : CASELLA CEL-246		Serial No : 3173324	
Site Operator : Mr.Natchapon Kadu			
Calibrator Model : CASELLA CEL120/2		Serial No : 2839225	
Calibration Ref dB(A) : 114.0		Certified Date : Dec 24, 2021	
SLM Reading / Adjust dB(A) : 113.9/0.1		Expire Date : Dec 23, 2022	
Cal Sheet No.: CEL120/2-2022-009			
Time	Equivalent Sound Pressure Level (dB(A))		
	Feb 15, 2022		
00:00 - 01:00			
01:00 - 02:00			
02:00 - 03:00			
03:00 - 04:00			
04:00 - 05:00			
05:00 - 06:00			
06:00 - 07:00			
07:00 - 08:00			
08:00 - 09:00	85.1		
09:00 - 10:00	85.0		
10:00 - 11:00	85.3		
11:00 - 12:00	85.2		
12:00 - 13:00	85.0		
13:00 - 14:00	85.3		
14:00 - 15:00	85.3		
15:00 - 16:00	85.2		
16:00 - 17:00			
17:00 - 18:00			
18:00 - 19:00			
19:00 - 20:00			
20:00 - 21:00			
21:00 - 22:00			
22:00 - 23:00			
23:00 - 24:00			
Leq(8)*	85.2		
Lmax **	86.9		
Standard-8Hr	90 dB(A)		
Standard-Max	140 dB(A)		

Remark : * Average time between 08:00-16:00

** Maximum Sound Pressure Level between 08:00-16:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

(Miss Sununta Sirawuttinanon)
Technical Management Team



Noise Monitoring Result : Working Noise MTR-SPRC PLC-Refinery

Location : Amine SRU (Near 33K101)		Monitor Period : Feb 15, 2022	
SLM Model : CASELLA CEL-246		Serial No : 3173350	
Site Operator : Mr.Natchapon Kadu			
Calibrator Model : CASELLA CEL120/2		Serial No : 2839225	
Calibration Ref dB(A) : 114.0		Certified Date : Dec 24, 2021	
SLM Reading / Adjust dB(A) : 113.9/0.1		Expire Date : Dec 23, 2022	
Cal Sheet No.: CEL120/2-2022-009			
Time	Equivalent Sound Pressure Level (dB(A))		
	Feb 15, 2022		
00:00 – 01:00			
01:00 – 02:00			
02:00 – 03:00			
03:00 – 04:00			
04:00 – 05:00			
05:00 – 06:00			
06:00 – 07:00			
07:00 – 08:00			
08:00 – 09:00	90.2		
09:00 – 10:00	90.3		
10:00 – 11:00	90.0		
11:00 – 12:00	90.2		
12:00 – 13:00	90.4		
13:00 – 14:00	90.2		
14:00 – 15:00	90.1		
15:00 – 16:00	89.9		
16:00 – 17:00			
17:00 – 18:00			
18:00 – 19:00			
19:00 – 20:00			
20:00 – 21:00			
21:00 – 22:00			
22:00 – 23:00			
23:00 – 24:00			
Leq(8)*	90.2		
Lmax **	92.5		
Standard-8Hr	90 dB(A)		
Standard-Max	140 dB(A)		

Remark : * Average time between 08:00-16:00
 ** Maximum Sound Pressure Level between 08:00-16:00

(Miss Katesarin Vorradetwittaya)
 Environmental Scientist

(Miss Sununta Sirawuttinanon)
 Technical Management Team



Noise Monitoring Result : Working Noise MTR-SPRC PLC-Refinery

Location : RFCCU (Near 17GM102AB)		Monitor Period : Feb 15, 2022	
SLM Model : CASELLA CEL-246		Serial No : 3173339	
Site Operator : Mr.Natchapon Kadu			

Calibrator Model : CASELLA CEL120/2		Serial No : 2839225	
Calibration Ref dB(A) : 114.0		Certified Date : Dec 24, 2021	
SLM Reading / Adjust dB(A) : 114.0/0.0		Expire Date : Dec 23, 2022	
Cal Sheet No.: CEL120/2-2022-009			

Time	Equivalent Sound Pressure Level (dB(A))	
	Feb 15, 2022	
00:00 - 01:00		
01:00 - 02:00		
02:00 - 03:00		
03:00 - 04:00		
04:00 - 05:00		
05:00 - 06:00		
06:00 - 07:00		
07:00 - 08:00		
08:00 - 09:00		88.9
09:00 - 10:00		89.0
10:00 - 11:00		88.8
11:00 - 12:00		88.8
12:00 - 13:00		88.8
13:00 - 14:00		88.7
14:00 - 15:00		88.5
15:00 - 16:00		88.4
16:00 - 17:00		
17:00 - 18:00		
18:00 - 19:00		
19:00 - 20:00		
20:00 - 21:00		
21:00 - 22:00		
22:00 - 23:00		
23:00 - 24:00		

Leq(8)*	88.7
Lmax **	89.6

Standard-8Hr	90 dB(A)
Standard-Max	140 dB(A)

Remark : * Average time between 08:00-16:00
 ** Maximum Sound Pressure Level between 08:00-16:00

(Miss Katesarin Vorradetwittaya)
 Environmental Scientist

(Miss Sununta Sirawuttinanon)
 Technical Management Team



Noise Monitoring Result : Working Noise

MTR-SPRC PLC-Refinery

Location : CDU (Near 02GM102A) Monitor Period : May 25, 2022
 SLM Model : CASELLA CEL-246 Serial No : 3173161
 Site Operator : Mr. Watcharakan Pramakhate

Calibrator Model : CASELLA CEL120/2 Serial No : 2839225
 Calibration Ref dB(A) : 114.0 Certified Date : Dec 24, 2021
 SLM Reading / Adjust dB(A) : 113.9/0.1 Expire Date : Dec 23, 2022
 Cal Sheet No.: CEL120/2-2022-066

Time	Equivalent Sound Pressure Level (dB(A))	
	May 25, 2022	
00:00 - 01:00		
01:00 - 02:00		
02:00 - 03:00		
03:00 - 04:00		
04:00 - 05:00		
05:00 - 06:00		
06:00 - 07:00		
07:00 - 08:00		
08:00 - 09:00	86.9	
09:00 - 10:00	86.9	
10:00 - 11:00	87.0	
11:00 - 12:00	86.9	
12:00 - 13:00	87.1	
13:00 - 14:00	87.3	
14:00 - 15:00	87.0	
15:00 - 16:00	86.8	
16:00 - 17:00		
17:00 - 18:00		
18:00 - 19:00		
19:00 - 20:00		
20:00 - 21:00		
21:00 - 22:00		
22:00 - 23:00		
23:00 - 24:00		
Leq(8)*	87.0	
Lmax **	90.1	
Standard-8Hr	90 dB(A)	
Standard-Max	140 dB(A)	

Remark : * Average time between 08:00-16:00

** Maximum Sound Pressure Level between 08:00-16:00

(Miss Katesarin Vorradetwittaya)
 Environmental Scientist

(Miss Sununta Sirawuttinanon)
 Technical Management Team



Noise Monitoring Result : Working Noise

MTR-SPRC PLC-Refinery

Location : NHTU (Near 08G102A-B) Monitor Period : May 25, 2022
 SLM Model : CASELLA CEL-246 Serial No : 3173312
 Site Operator : Mr. Watcharakan Pramakhate

Calibrator Model : CASELLA CEL120/2 Serial No : 2839225
 Calibration Ref dB(A) : 114.0 Certified Date : Dec 24, 2021
 SLM Reading / Adjust dB(A) : 113.7/0.3 Expire Date : Dec 23, 2022
 Cal Sheet No.: CEL120/2-2022-066

Time	Equivalent Sound Pressure Level (dB(A))	
	May 25, 2022	
00:00 - 01:00		
01:00 - 02:00		
02:00 - 03:00		
03:00 - 04:00		
04:00 - 05:00		
05:00 - 06:00		
06:00 - 07:00		
07:00 - 08:00		
08:00 - 09:00	86.0	
09:00 - 10:00	86.2	
10:00 - 11:00	85.9	
11:00 - 12:00	85.8	
12:00 - 13:00	85.7	
13:00 - 14:00	85.9	
14:00 - 15:00	85.7	
15:00 - 16:00	85.7	
16:00 - 17:00		
17:00 - 18:00		
18:00 - 19:00		
19:00 - 20:00		
20:00 - 21:00		
21:00 - 22:00		
22:00 - 23:00		
23:00 - 24:00		
Leq(8)*	85.9	
Lmax **	97.3	
Standard-8Hr	90 dB(A)	
Standard-Max	140 dB(A)	

Remark : * Average time between 08:00-16:00

** Maximum Sound Pressure Level between 08:00-16:00

(Miss Katesarin Vorradetwittaya)
 Environmental Scientist

(Miss Sununta Sirawuttinanon)
 Technical Management Team



Noise Monitoring Result : Working Noise MTR-SPRC PLC-Refinery

Location : Utility (During 41G103A-B)		Monitor Period : May 25, 2022	
SLM Model : CASELLA CEL-246		Serial No : 3173306	
Site Operator : Mr. Watcharakan Pramakhate			
Calibrator Model : CASELLA CEL120/2		Serial No : 2839225	
Calibration Ref dB(A) : 114.0		Certified Date : Dec 24, 2021	
SLM Reading / Adjust dB(A) : 113.8/0.2		Expire Date : Dec 23, 2022	
Cal Sheet No.: CEL120/2-2022-066			
Time	Equivalent Sound Pressure Level (dB(A))		
	May 25, 2022		
00:00 - 01:00			
01:00 - 02:00			
02:00 - 03:00			
03:00 - 04:00			
04:00 - 05:00			
05:00 - 06:00			
06:00 - 07:00			
07:00 - 08:00			
08:00 - 09:00			
09:00 - 10:00	88.0		
10:00 - 11:00	87.9		
11:00 - 12:00	87.9		
12:00 - 13:00	87.9		
13:00 - 14:00	87.8		
14:00 - 15:00	87.9		
15:00 - 16:00	87.9		
16:00 - 17:00	87.9		
17:00 - 18:00			
18:00 - 19:00			
19:00 - 20:00			
20:00 - 21:00			
21:00 - 22:00			
22:00 - 23:00			
23:00 - 24:00			
Leq(8)*	87.9		
Lmax **	90.5		
Standard-8Hr	90 dB(A)		
Standard-Max	140 dB(A)		

Remark : * Average time between 09:00-17:00
 ** Maximum Sound Pressure Level between 09:00-17:00

(Miss Katesarin Vorradetwittaya)
 Environmental Scientist

(Miss Sununta Sirawuttinanon)
 Technical Management Team



Noise Monitoring Result : Working Noise MTR-SPRC PLC-Refinery

Location : RFCCU (Near 17GM102A-B)		Monitor Period : May 25, 2022	
SLM Model : CASELLA CEL-246		Serial No : 3173243	
Site Operator : Mr. Watcharakan Pramakhate			
Calibrator Model : CASELLA CEL120/2		Serial No : 2839225	
Calibration Ref dB(A) : 114.0		Certified Date : Dec 24, 2021	
SLM Reading / Adjust dB(A) : 113.9/0.1		Expire Date : Dec 23, 2022	
Cal Sheet No.: CEL120/2-2022-066			
Time	Equivalent Sound Pressure Level (dB(A))		
	May 25, 2022		
00:00 - 01:00			
01:00 - 02:00			
02:00 - 03:00			
03:00 - 04:00			
04:00 - 05:00			
05:00 - 06:00			
06:00 - 07:00			
07:00 - 08:00			
08:00 - 09:00	86.6		
09:00 - 10:00	86.5		
10:00 - 11:00	87.0		
11:00 - 12:00	86.5		
12:00 - 13:00	86.7		
13:00 - 14:00	86.8		
14:00 - 15:00	86.9		
15:00 - 16:00	87.0		
16:00 - 17:00			
17:00 - 18:00			
18:00 - 19:00			
19:00 - 20:00			
20:00 - 21:00			
21:00 - 22:00			
22:00 - 23:00			
23:00 - 24:00			
Leq(8)*	86.8		
Lmax **	104.9		
Standard-8Hr	90 dB(A)		
Standard-Max	140 dB(A)		

Remark : * Average time between 08:00-16:00
 ** Maximum Sound Pressure Level between 08:00-16:00

(Miss Katesarin Vorradetwittaya)
 Environmental Scientist

(Miss Sununta Sirawuttinanon)
 Technical Management Team



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NOISE MEASUREMENT REPORT : NOISE DOSE

CLIENT NAME : Star Petroleum Refining Public Co., Ltd. REFERENCE NO. : SPRC IH-222005_Ns Dose (Cert)
MEASUREMENT BY : SECOT Co., Ltd. INSTRUMENT : Noise Dosimeter
MEASUREMENT DATE : 15/02/2022 CALIBRATOR TYPE : Cirrus RC 110A
MEASUREMENT LOCATION : Process area SERIAL NO. : 46826
SITE OPERATOR : Mr. Natchapol Kadu CALIBRATOR REF. : 1,000 Hz, 114 dB

USER NAME	AREA/PLANT	TIME	%DOSE	SOUND PRESSURE LEVEL (dBA)	
				TWA (12-hr)	STANDARD*
Operator ID#110547	Area 1	07.00-19.00	71.3	81.8	83.0
	(CDU/VDU)				
Operator ID#110772	Area 2	07.00-19.00	49.5	80.2	83.0
	(NHTU, DHTU, WCN, BSU)				
Operator ID#110787	Area 3	07.00-19.00	60.9	81.1	83.0
	(SRU, Utility)				

(Miss Katesarin Vorradetwittaya)

Environmental Scientist

(Miss Sununta Sirawuttinanon)

Technical Management Team

- Remark :**
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 2. This report shall not be reproduced, except in full, without official approval.
 3. *Notification of the Department of Labour Protection and Welfare, B.E.2561 (2018).
 4. TWA means Time Weighted Average.



บริษัท ซีคอต จำกัด
SECOT CO., LTD.

239 ถนนริมคลองประปา แขวงบางซื่อ เขตบางซื่อ กรุงเทพฯ 10800
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TEL : +66(0) 2959-3600 FAX : +66(0) 2959-3535 E-mail : envserv@secot.co.th

NOISE MEASUREMENT REPORT : NOISE DOSE

CLIENT NAME : Star Petroleum Refining Public Co., Ltd. REFERENCE NO. : SPRC IH-222005_Ns Dose (Cert)
MEASUREMENT BY : SECOT Co., Ltd. INSTRUMENT : Noise Dosimeter
MEASUREMENT DATE : 02/03/2022 CALIBRATOR TYPE : Cirrus RC 110A
MEASUREMENT LOCATION : Process area SERIAL NO. : 95173
SITE OPERATOR : Mr. Watcharakan Pramakhate CALIBRATOR REF. : 1,000 Hz, 114 dB

USER NAME	AREA/PLANT	TIME	%DOSE	SOUND PRESSURE LEVEL (dBA)	
				TWA (12-hr)	STANDARD*
Operator ID#110681	Area 4	07.19-19.18	42.5	79.5	83.0
	(RFCCU)				

(Miss Katesarin Vorradetwittaya)

Environmental Scientist

(Miss Sununta Sirawuttinanon)

Technical Management Team

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TEL : +66(0) 2959-3600 FAX : +66(0) 2959-3535 E-mail : envserv@secot.co.th

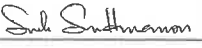
NOISE MEASUREMENT REPORT : NOISE DOSE

CLIENT NAME : Star Petroleum Refining Public Co., Ltd. REFERENCE NO. : SPRC IH-222005_Ns Dose (Cert)
MEASUREMENT BY : SECOT Co., Ltd. INSTRUMENT : Noise Dosimeter
MEASUREMENT DATE : 25/05/2022 CALIBRATOR TYPE : Cirrus RC 110A
MEASUREMENT LOCATION : Process area SERIAL NO. : 95168
SITE OPERATOR : Mr. Watcharakan P. CALIBRATOR REF. : 1,000 Hz, 114 dB

USER NAME	AREA/PLANT	TIME	%DOSE	SOUND PRESSURE LEVEL (dBA)	
				TWA (12-hr)	STANDARD*
Operator ID#110309	Area 2	07.03-19.00	33.7	78.5	83.0
(NHTU, DHTU, WCN, BSU)					


(Miss Katesarin Vorradetwittaya)

Environmental Scientist


(Miss Sununta Sirawuttinanon)

Technical Management Team

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SECOT CO., LTD.

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TEL : +66(0) 2959-3600 FAX : +66(0) 2959-3535 E-mail : envserv@secot.co.th

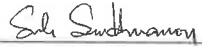
NOISE MEASUREMENT REPORT : NOISE DOSE

CLIENT NAME : Star Petroleum Refining Public Co., Ltd. REFERENCE NO. : SPRC IH-222005_Ns Dose (Cert)
MEASUREMENT BY : SECOT Co., Ltd. INSTRUMENT : Noise Dosimeter
MEASUREMENT DATE : 25/05/2022 CALIBRATOR TYPE : Cirrus RC 110A
MEASUREMENT LOCATION : Process area SERIAL NO. : 95168
SITE OPERATOR : Mr. Watcharakan P. CALIBRATOR REF. : 1,000 Hz, 114 dB

USER NAME	AREA/PLANT	TIME	%DOSE	SOUND PRESSURE LEVEL (dBA)	
				TWA (12-hr)	STANDARD*
Operator ID#110544	Area 4	07.03-19.00	162.8	85.4	83.0
(RFCCU)					


(Miss Katesarin Vorradetwittaya)

Environmental Scientist


(Miss Sununta Sirawuttinanon)

Technical Management Team

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TEL : +66(0) 2959-3600 FAX : +66(0) 2959-3535 E-mail : envserv@secot.co.th

NOISE MEASUREMENT REPORT : NOISE DOSE

CLIENT NAME : Star Petroleum Refining Public Co., Ltd. REFERENCE NO. : SPRC IH-222005_Ns Dose (Cert)
MEASUREMENT BY : SECOT Co., Ltd. INSTRUMENT : Noise Dosimeter
MEASUREMENT DATE : 21/06/2022 CALIBRATOR TYPE : Cirrus RC 110A
MEASUREMENT LOCATION : Process area SERIAL NO. : 95168
SITE OPERATOR : Mr. Phakphum T. CALIBRATOR REF. : 1,000 Hz, 114 dB

USER NAME	AREA/PLANT	TIME	%DOSE	SOUND PRESSURE LEVEL (dBA)	
				TWA (12-hr)	STANDARD*
Operator ID#110780	Area 1	07.01-18.57	42.6	79.6	83.0
	(CDU/VDU)				
Operator ID#110491	Area 3	07.01-18.57	73.9	81.9	83.0
	(SRU, Utility)				


(Miss Katesarin Vorradetwittaya)

Environmental Scientist


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ภาคผนวก จ

ข้อมูลการตรวจเทียบเครื่องมือ
(Calibration Data Sheets)



CONTROL UNIT CALIBRATION

(Metric units, mm)

Date 25 Jan 22

Initial Final Average
Barometric press, Pb 758 758 758 mmHg

Dry Gas Meter Data

Console No. M50-06

Metering System ID

DGM Number 333249

DGM Model ES-110

Calibrated by : Montri P.

Reference Dry Gas Meter Data

Serial No. 358794

Model S110

Correction factor (Yr) 0.9966

Last Calibration Date 8 Jan 22

Orifice manometer setting, ΔH mm H2O	Ref. DGM Volume V _r , Liters	DGM Volume V _m Liters	Temperature (°C)				Time Θ min	DGM Correction factor (Y)	ΔH@ mm
			Ref DGM T _r	Dry Gas Meter					
				Inlet T _i	Outlet T _o	Avg T _m			
12.5	100.1	100.6	24	24	23	23.5	8.58	0.9887	42.5446
25.0	100.2	100.2	24	24	23	23.5	6.00	0.9921	41.5532
50.0	100.1	99.7	24	24	23	23.5	4.32	0.9941	43.1019
76.0	100.1	100.9	24	24	23	23.5	3.52	0.9805	43.4295
100.0	100.2	99.6	24	24	23	23.5	3.52	0.9904	42.9584
150.0	100.2	100.5	24	24	23	23.5	2.47	0.9784	42.0708
Average								0.9874	42.6097

Approved by :
(Miss Katesarin Vorradetwittaya)



CONTROL UNIT CALIBRATION

(Metric units, mm)

Date 14 Jan 22

Initial Final Average
Barometric press, Pb 758 758 758 mmHg

Dry Gas Meter Data

Console No. M50-09

Metering System ID

DGM Number 333249

DGM Model ES-110

Calibrated by : Montri P.

Reference Dry Gas Meter Data

Serial No. 358794

Model S110

Correction factor (Yr) 0.9966

Last Calibration Date 8 Jan 22

Orifice manometer setting, ΔH mm H2O	Ref. DGM Volume V _r , Liters	DGM Volume V _m Liters	Temperature (°C)				Time ⊙ min	DGM Correction factor (Y)	ΔH@ mm
			Ref DGM T _r	Dry Gas Meter					
				Inlet T _i	Outlet T _o	Avg T _m			
12.5	100.2	99.3	23	23	22	22.5	8.37	1.0022	40.2319
25.0	100.0	99.7	23	23	22	22.5	6.05	0.9955	42.2417
50.0	100.0	99.5	23	23	22	22.5	4.22	0.9953	41.0228
76.0	100.1	99.7	23	23	22	22.5	3.62	0.9918	45.7804
100.0	100.0	99.0	23	23	22	22.5	3.62	0.9953	46.8262
150.0	100.1	99.1	23	23	22	22.5	2.60	0.9900	46.7154
Average								0.9950	43.8031

Approved by :
(Miss Katesarin Vorradetwittaya)



CONTROL UNIT CALIBRATION

(Metric units, mm)

Date 13 Jan 22

Barometric press, Pb

Initial	Final	Average
759	759	759

 mmHg

Dry Gas Meter Data

Console No. M50-08

Metering System ID

DGM Number 971415

DGM Model ES-110

Calibrated by : Montri P.

Reference Dry Gas Meter Data

Serial No. 358794

Model S110

Correction factor (Yr) 0.9966

Last Calibration Date 8 Jan 22

Orifice manometer setting, ΔH mm H2O	Ref. DGM Volume V _r , Liters	DGM Volume V _m Liters	Temperature (°C)				Time ⊕ min	DGM Correction factor (Y)	ΔH@ mm
			Ref DGM T _r	Dry Gas Meter					
				Inlet T _i	Outlet T _o	Avg T _m			
12.5	100.0	101.7	23	23	22	22.5	9.23	0.9771	49.1298
25.0	100.1	100.9	23	23	22	22.5	6.73	0.9847	52.1391
50.0	100.0	100.0	23	23	22	22.5	4.88	0.9902	55.0134
76.0	100.0	98.8	23	23	22	22.5	3.93	0.9997	54.2067
100.0	100.0	99.1	23	23	22	22.5	3.93	0.9945	52.8042
150.0	100.2	97.3	23	23	22	22.5	2.82	1.0099	54.6989
Average								0.9927	52.9987

Approved by :

(Miss Katesarin Vorradetwittaya)



PITOT TUBE CALIBRATION

Calibration Location: SECOT

Calibrated duct No.: 1

Calibration Standard Pitot tube data

Pitot No.: Std-01

Type S Pitot No.: PS20-01

Calibration Date : 14/01/2022

Coefficient (Cp) : 1

Calibrated by : Mr. Montri P.

A Side Calibration

Run No.	ΔPstd (mm H ₂ O)	ΔPs (mm H ₂ O)	Cp(s)	Deviation, δ Cp(s) - Cp(A)
1	7.55	10.50	0.8480	0.0066
2	7.55	10.75	0.8380	-0.0033
3	7.55	10.75	0.8380	-0.0033

C_{P(A)} avg 0.8414

B Side Calibration

Run No.	ΔPstd (mm H ₂ O)	ΔPs (mm H ₂ O)	Cp(s)	Deviation, δ Cp(s) - Cp(B)
1	7.55	10.75	0.8380	-0.0033
2	7.55	10.75	0.8380	-0.0033
3	7.55	10.50	0.8480	0.0066

C_{P(B)} avg 0.8414

|CP(A)-CP(B)| = 0.0000

C_{P(Avg)} = 0.8414

Approved by :

(Miss Katesarin Vorradetwittaya)

*** δ must be ≤ 0.01 for the test to be acceptable ***
*** |Cp(A)-Cp(B)| must also be < 0.01 if average of Cp(A) and Cp(B) is not used ***

Sheet No. : CAL-PI-PS25-01/2022



PITOT TUBE CALIBRATION

Calibration Location: SECOT

Calibration Date : 14/01/2022

Calibrated duct No.: 1

Calibration Standard Pitot tube data

Pitot No. : Std-01

Coefficient (Cp) : 1

Type S Pitot No. : PS25-01

Calibrated by : Mr. Montri P.

A Side Calibration

Run No.	ΔP_{std} (mm H ₂ O)	ΔP_s (mm H ₂ O)	Cp(s)	Deviation, δ Cp(s) - Cp(A)
1	7.55	10.50	0.8480	0.0033
2	7.55	10.75	0.8380	-0.0066
3	7.55	10.50	0.8480	0.0033

C_{P(A),avg} 0.8447

B Side Calibration

Run No.	ΔP_{std} (mm H ₂ O)	ΔP_s (mm H ₂ O)	Cp(s)	Deviation, δ Cp(s) - Cp(B)
1	7.55	10.50	0.8480	0.0098
2	7.55	11.00	0.8285	-0.0097
3	7.55	10.75	0.8380	-0.0001

C_{P(B),avg} 0.8382

|CP(A)-CP(B)| = 0.0065

C_{P(Avg)} = 0.8414
 Approved by :
 (Miss Katesarin Vorradetwittaya)

 *** δ must be ≤ 0.01 for the test to be acceptable ***
 *** |CP(A)-CP(B)| must also be < 0.01 if average of Cp(A) and Cp(B) is to be used ***

 SECOT CO., LTD.
 239 Rimklongprapa Rd. Bangsue, Bangkok, 10800, THAILAND
 Tel: (662) 9591600 Fax: (662) 9591535
 E-Mail: cncs@secot.co.th

Certificate Of Analysis
Special Gases Mixture

Customer Details

Name:

SECOT CO., LTD.

Address:

House number.239 Rimklongprapa Rd,Bangsue
Bang Su Bangkok 10800

Customer Tag No.:

Certificate Details

Number:	0303/19	Date of Issue:	4-Feb-2019	Expired date:	3-Feb-2023
Material Details					
Production Order:	90152418	Material Code:	478100-j-62	Cylinder No.:	85432
Gas content:	6.52 M ³ (nominal)	Filling pressure:	145 bar (g)	Valve:	CGA 590 BRASS
Cylinder Owner:	LINDE	Cylinder Material:	STEEL	Cylinder Size:	47 L

Laboratory Report

Component	Normal Concentration	Analysis Result ¹	Uncertainty ²	Method of Analysis ³
Oxygen	8.00%	8.07%	$\pm 2\%$ relative	(1) SG-O-01
Nitrogen	Balance			

Recommend usage condition

Minimum utilization: 5% of actual content or before expire date whichever comes first.

Storage condition: Keep in well ventilation and secure area.

Comments

Note:

1. All results expressed in this report are on mole/mole basis, unless otherwise specified.
2. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The measurement of this material is traceable to the SI through the reference gas standard which is traceable to Swiss National Standard of Mass or other recognised national metrology institutes.
3. (1) Gas Chromatography, (2) Paramagnetic Oxygen Analyzer, (3) Electrochemical Oxygen Analyzer, (4) Electrochemical Moisture Analyzer, (5) Total Hydrocarbon Analyzer, (6) Other - Specified

 Sukanya Parinyasontorn
 Signatory for and on behalf of Linde (Thailand) Co., Ltd.

PB-002/F004

Iss:H/2, 01 March 2018

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วันที่ 15 มกราคม 2562 ถึง 2/3 มี.ค. 14 กุมภาพันธ์ 2562 ณ 6.5 มกราคม

สำนักงาน กรุงเทพมหานคร 10540 โทรศัพท์ (66) 2338-6100 โทรสาร (66) 2338-6333

โทรสาร (66) 2338-6333 โทรสาร (66) 2338-6333

โทรสาร (66) 38.570-479-93

โทรสาร (66) 38.570-323

Linde (Thailand) Public Company Limited

P.O. Box 111, Moo 14, Bangsue, Bangkok 10800

 15th Floor, Bangsue Tower A, 2/3 Moo 14, Bangsue Trid Km. 6.5 Road, Bangkok

Bangsue, Samutprakarn 10540, Tel (66) 2338-6100 Fax (66) 2338-6333

Wellgrow Plant: 105 Moo 5, T.Bangsamak, A.Bangsue, Chachoengsao 24180

Thailand, Tel (66) 38.570-479-93

Fax (66) 38.570-323

THE LINDE GROUP

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Certificate Of Analysis
Special Gases Mixture

Customer Details					
Name:		Address:		Customer Tag No.:	
Secot Co.,Ltd.		239, Rimklongprapa Rd., Bangsue, Bangkok 10800			
Certificate Details					
Number: 2946/21		Date of issue: 13-Jul-2021		Expiry date: 13-Jul-2023	
Material Details					
Production Order: 90166595		Material Code: 640300-SK-44		Cylinder No.: A00753SK	
Gas content: 5.52 M ³		Filling pressure: 145.0 bar		Valve: CGA 660 SS	
Cylinder Owner: LINDE		Cylinder Material: Spectra seal		Cylinder Size: 40 L	
Laboratory Report					

Laboratory Report

Analytical Result

Component	Normal Concentration	Analysis Result ¹	Uncertainty ²	Method of Analysis ³	Assay Date
Nitric Oxide	40.0 ppm	39.4 ppm	± 1% relative	(6) I-PB-352	6-Jul & 13-Jul-21
Other NOx impurity In Nitrogen		Less than 1.9 ppm			

Reference Standard used in Assay

Reference Standard	Cylinder number	Concentration	Expiry date:
Nitric Oxide In Nitrogen	2660645G	25.65 ± 0.26 ppm	6-Aug-2021

Analytical Instruments used in Assay

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
FTIR Spectrometers Nicolet iS50	FTIR-NO	24-Jun-2021

Recommend usage condition

Minimum utilization: 5% of actual content or before expire date whichever comes first.

Storage condition: Keep in well ventilation and secure area.

Comments

When reordering, please quote the material number

Note:

1. All results expressed in this report are on mole/mole basis, unless otherwise specified. The Assay of this Standard has been performed in accordance with the EPA Traceability Protocol EPA-600/R-12/531 for the Assay and Certification of Gaseous Calibration Standards using procedure G1.
2. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The measurement of this material is traceable to the SI through the reference gas standard which is traceable to Swiss National Standard of Mass or other recognised national metrology institutes.
3. (1) Gas Chromatography, (2) Paramagnetic Oxygen Analyzer, (3) Electrochemical Oxygen Analyzer, (4) Electrochemical Moisture Analyzer, (5) Total Hydrocarbon Analyzer, (6) Other - Specified

Sukanya Parinyasontorn

Signatory for and on behalf of Linde (Thailand) Co., Ltd.

Linde (Thailand) Public Company Limited

P.O. Box 10540, Bangkok 10540

15th Floor, Bangna Tower A, 2/3 Moo 14, Bangna Trad KM. 6.5 Road, Bangnaew

Bangplee, Samutprakarn 10540, Tel (66) 2338-6100 Fax (66) 2338-6333

Wellgrow Plant: 105 Moo 5, 1 Bangsamak, A.Bangpakong, Chachoengsao 24180

Thailand, Tel (66) 38-570-479-93 Fax (66) 38-570-323

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ต.บางนาเขตสมุทรปราการ 10540 โทรศัพท์ (66) 2338-6100 โทรสาร (66) 2338-6333

โรงงานผลิต: 105 หมู่ 5 ตำบลบางสมัค อ.บางปะกง จ.ฉะเชิงเทรา 24180

โทรศัพท์ (66) 38-570-479-93 โทรสาร (66) 38-570-323

THE LINDE GROUP

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Certificate Of Analysis
Special Gases Mixture

Customer Details						
Name:		Address:		Customer Tag No.:		
Secot Co.,Ltd.		239, Rimklongprapa Rd., Bangsue, Bangkok 10800				
Certificate Details						
Number:		2972/20	Date of Issue:	18-Jul-2020	Expiry date	18-Jul-2024
Material Details						
Production Order:		90159708	Material Code:	608400-SK-44	Cylinder No.:	95078
Gas content:		5.52 M ³	Filling pressure	145.0 bar	Valve:	CGA 660 SS
Cylinder Owner:		LINDE	Cylinder Material:	Spectra seal	Cylinder Size:	40 L
Laboratory Report						

Laboratory Report

Analytical Result

Component	Normal Concentration	Analysis Result ¹	Uncertainty ²	Method of Analysis ³	Assay Date
Sulphur Dioxide In Nitrogen	40.0 ppm	41.7 ppm	± 1% relative	(6) I-PB-352	11-Jul & 18-Jul-20

Reference Standard used in Assay

Reference Standard	Cylinder number	Concentration	Expiry date:
Sulphur Dioxide In Nitrogen	7662075G	51.18 ± 0.41 ppm	17-Apr-2021

Analytical Instruments used in Assay

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
FTIR Spectrometers Nicolet iS50	FTIR-SO2	16-Jun & 17-Jul-20

Recommend usage condition

Minimum utilization: 5% of actual content or before expire date whichever comes first.

Storage condition: Keep in well ventilation and secure area.

Comments

When reordering, please quote the material number

Note:

1. All results expressed in this report are on mole/mole basis, unless otherwise specified. The Assay of this Standard has been performed in accordance with the EPA Traceability Protocol EPA-600/R-12/531 for the Assay and Certification of Gaseous Calibration Standards using procedure G1.
2. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The measurement of this material is traceable to the SI through the reference gas standard which is traceable to Swiss National Standard of Mass or other recognised national metrology institutes.
3. (1) Gas Chromatography, (2) Paramagnetic Oxygen Analyzer, (3) Electrochemical Oxygen Analyzer, (4) Electrochemical Moisture Analyzer, (5) Total Hydrocarbon Analyzer, (6) Other - Specified

Sukanya Parinyasontorn

Signatory for and on behalf of Linde (Thailand) Co., Ltd.

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โทร 15 กรุงเทพมหานคร 2/3 หมู่ 14 ถนนบางนา-ตราด กม. 6.5 แขวงบางนา

ต.บางนาเขตสมุทรปราการ 10540 โทรศัพท์ (66) 2338-6100 โทรสาร (66) 2338-6333

โรงงานผลิต: 105 หมู่ 5 ตำบลบางสมัค อ.บางปะกง จ.ฉะเชิงเทรา 24180

โทรศัพท์ (66) 38-570-479-93 โทรสาร (66) 38-570-323

Linde (Thailand) Public Company Limited

P.O. Box 10540, Bangkok 10540

15th Floor, Bangna Tower A, 2/3 Moo 14, Bangna Trad KM. 6.5 Road, Bangnaew

Bangplee, Samutprakarn 10540, Tel (66) 2338-6100 Fax (66) 2338-6333

Wellgrow Plant: 105 Moo 5, 1 Bangsamak, A.Bangpakong, Chachoengsao 24180

Thailand, Tel (66) 38-570-479-93 Fax (66) 38-570-323

CERTIFICATE OF ANALYSIS

Customer Detail: Secot Co., Ltd.		Production Order Number: 90133629 Material Number: 433000-AL-44 Certification Date: 10-Feb-2016 Expiry Date: 10-Feb-2024	
Cylinder Description: Aluminium 50 L		<p>The measurement of this reference material is traceable to SF through the reference standard which is traceable to Swiss National Standard of Mass. The Assay of this Standard has been performed in accordance with the EPA Traceability Protocol EPA-600/R-12/531 for the Assay and Certification of Gaseous Calibration Standards using procedure G1. The results are expressed on a mole/mole basis, unless otherwise specified. The reported uncertainty is based on a standard uncertainty multiplied by coverage factor k=2, providing a level of confidence of approximately 95%.</p>	
Certificate Number: 0349/16	Analyst: THITIRAT LOYRAT		
Cylinder Number: D595101	Approve: SUKANYA KAMUTHARAT		
Nominal Cylinder Content: 6.900 M ³	To Re-Order Please Quote: 433000-AL-44		
Nominal Pressure: 145.0 Bar			
Valve Outlet: CGA 350 Brass			
Comment:	<ul style="list-style-type: none"> It is recommended that this product be not used below 5% of actual contents or should not be used when its gas pressure is below 150psig. Other impurities that detect by analytical condition of this mixture shall be report if it is more than 10% of minimum minor component. Keep and use in well-ventilated and secure area. 		

CERTIFICATE OF ANALYSIS

Analytical Result					
Component	Request Concentration	Certified Concentration	Certified Uncertainty	Method	Assay Date
Carbon Monoxide In Nitrogen	40.0 ppm	40.1 ppm	± 1 % relative	(6) I-PB-352	09-Feb-2016
Reference Standard used in Assay					
Reference Standard	Cylinder No.	Concentration	Expired Date		
Carbon Monoxide In Nitrogen	103090SG	50.02 ± 0.25 ppm	26-Nov-2019		
Analytical Instruments used in Assay					
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration			
Digi LAB Excalibur HE Series	FTIR-CO	25-Jan-2016			
Method of Analysis 1. Gas Chromatograph 2. Paramagnetic Oxygen Analyser 3. Electrochemical Oxygen Analyser 4. Electrochemical Moisture Analyser 5. Total Hydrocarbon Analyser 6. Other specified					
Cylinder Number D595101 Production Order Number 90133629				Certification Date: 10-Feb-2016 Expiration Date: 10-Feb-2024	

Certificate Of Analysis

Special Gases Mixture

Customer Details

Name: Secot Co., Ltd. Address: 239, Rimklongprapa Rd., Bangsue, Bangkok 10800 Customer Tag No.:

Certificate Details

Number: 0225/22 Date of issue: 31-Jan-2022 Expiry date: 31-Jan-2024
Material Details
Production Order: 90169721 Material Code: 614500-SK-44 Cylinder No.: A00932SK
Gas content: 5.52 M³ Filling pressure: 145.0 bar Valve: CGA 660 SS
Cylinder Owner: LINDE Cylinder Material: Spectra seal Cylinder Size: 40 L

Laboratory Report

Analytical Result

Component	Normal Concentration	Analysis Result ¹	Uncertainty ²	Method of Analysis ³	Assay Date
Nitric Oxide	80.0 ppm	83.3 ppm	± 1% relative	(6) I-PB-352	24-Jan & 31-Jan-22
Other NO _x impurity in Nitrogen		Less than 4.1 ppm			

Reference Standard used in Assay

Reference Standard	Cylinder number	Concentration	Expiry date:
Nitric Oxide in Nitrogen	122820SG	50.87 ± 0.25 ppm	6-May-2023

Analytical Instruments used in Assay

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
FTIR Spectrometers Nicolet iS50	FTIR-NO	10-Jan-2022

Recommend usage condition

Minimum utilization: 5% of actual content or before expire date whichever comes first.
Storage condition: Keep in well ventilation and secure area.

Comments

When reordering, please quote the material number

Note:

1. All results expressed in this report are on mole/mole basis, unless otherwise specified. The Assay of this Standard has been performed in accordance with the EPA Traceability Protocol EPA-600/R-12/531 for the Assay and Certification of Gaseous Calibration Standards using procedure G1
2. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The measurement of this material is traceable to the SI through the reference gas standard which is traceable to Swiss National Standard of Mass or other recognised national metrology institutes.
3. (1) Gas Chromatography, (2) Paramagnetic Oxygen Analyzer, (3) Electrochemical Oxygen Analyzer, (4) Electrochemical Moisture Analyzer, (5) Total Hydrocarbon Analyzer, (6) Other - Specified

Sukanya Parinyasoonorn

Signatory for and on behalf of Linde (Thailand) Co., Ltd.

Linde (Thailand) Public Company Limited

PLC Registration no. 010/012/000015

15th Floor, Bangna Tower A, 2/3 Moo 14, Bangna Trad KM. 6.5 Road, Bangkaew

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Wellgrow Plant: 105 Moo 5, T.Bangsamak, A.Bangpakong, Chachoengsao 24180

Thailand, Tel (66) 38.570-479-93

Fax (66) 38.570-323

PB-002/F006

Iss:K/2, 15 Oct 2021

Certificate Of Analysis

Special Gases Mixture

Customer Details

Name: Secot Co., Ltd. Address: 239, Rimklongprapa Rd., Bangsue, Bangkok 10800 Customer Tag No.:

Certificate Details

Number: 2926/21 Date of Issue: 13-Jul-2021 Expiry date: 13-Jul-2029
Material Details
Production Order: 90166593 Material Code: 445100-SK-44 Cylinder No.: A00925SK
Gas content: 5.52 M³ Filling pressure: 145.0 bar Valve: CGA 660 SS
Cylinder Owner: LINDE Cylinder Material: Spectra seal Cylinder Size: 40 L

Laboratory Report

Analytical Result

Component	Normal Concentration	Analysis Result ¹	Uncertainty ²	Method of Analysis ³	Assay Date
Sulphur Dioxide in Nitrogen	80.0 ppm	81.4 ppm	± 1% relative	(6) I-PB-352	5-Jul & 12-Jul-21

Reference Standard used in Assay

Reference Standard	Cylinder number	Concentration	Expiry date:
Sulphur Dioxide in Nitrogen	1331885G	50.50 ± 0.40 ppm	16-Oct-2021

Analytical Instruments used in Assay

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
FTIR Spectrometers Nicolet iS50	FTIR-SO2	7-Jun & 10-Jul-21

Recommend usage condition

Minimum utilization: 5% of actual content or before expire date whichever comes first.
Storage condition: Keep in well ventilation and secure area.

Comments

When reordering, please quote the material number

Note:

1. All results expressed in this report are on mole/mole basis, unless otherwise specified. The Assay of this Standard has been performed in accordance with the EPA Traceability Protocol EPA-600/R-12/531 for the Assay and Certification of Gaseous Calibration Standards using procedure G1
2. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The measurement of this material is traceable to the SI through the reference gas standard which is traceable to Swiss National Standard of Mass or other recognised national metrology institutes.
3. (1) Gas Chromatography, (2) Paramagnetic Oxygen Analyzer, (3) Electrochemical Oxygen Analyzer, (4) Electrochemical Moisture Analyzer, (5) Total Hydrocarbon Analyzer, (6) Other - Specified

Sukanya Parinyasoonorn

Signatory for and on behalf of Linde (Thailand) Co., Ltd.

Linde (Thailand) Public Company Limited

PLC Registration no. 010/012/000015

15th Floor, Bangna Tower A, 2/3 Moo 14, Bangna Trad KM. 6.5 Road, Bangkaew

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PB-002/F006

Iss:K/1, 01 July 2021

Certificate Of Analysis

Name: SECOT CO.,LTD. Address: House number.239 Rimklongprapa Rd,Bangsue, Bang Su Bangkok 10800 Customer Tag No.:

Number:	0304/19	Date of Issue:	4-Feb-2019	Expired date:	3-Feb-2023
Material Details					
Production Order:	90152418	Material Code:	478100-J-62	Cylinder No.:	5484
Gas content:	6.52 M ³ (nominal)	Filling pressure:	145 bar (g)	Valve:	CGA 590 BRASS
Cylinder Owner:	LINDF	Cylinder Material:	STEEL	Cylinder Size:	47 L

Component	Normal Concentration	Analysis Result ¹	Uncertainty ²	Method of Analysis ³
Oxygen	8.00%	8.02%	± 2% relative	(1) SG-C-01
Nitrogen	Balance			

Minimum utilization: 5% of actual content or before expire date whichever comes first.
Storage condition: Keep in well ventilation and secure area.

1. All results expressed in this report are on mole/mole basis, unless otherwise specified.
2. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a level of confidence of approximately 95%. The measurement of this material is traceable to the SI through the reference gas standard which is traceable to Swiss National Standard of Mass or other recognised national metrology institutes.
3. (1) Gas Chromatography, (2) Paramagnetic Oxygen Analyzer, (3) Electrochemical Oxygen Analyzer,
- (4) Electrochemical Moisture Analyzer, (5) Total Hydrocarbon Analyzer, (6) Other - Specified

Sukanya Parinyasoonorn
Signatory for and on behalf of Linde (Thailand) Co., Ltd.

PB-002/F004
Iss:H/2. 01 March 2018

Linde (Thailand) Public Company Limited

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Wellgrow Plant : 105 Moo 5, T.Bangsamak, A.Bangpakong, Chachoengsao 24180
Thailand, Tel (66) 38.570-479-93 Fax (66) 38.570-323

Certificate Of Analysis

Special Gases Mixture

Name: Secot Co., Ltd. Address: 239, Rimklongprapa Rd., Bangsue, Bangkok 10800 Customer Tag No.:

Number:	2947/21	Date of Issue:	13-Jul-2021	Expiry date:	13-Jul-2023
Material Details					
Production Order:	90166595	Material Code:	640300-SK-44	Cylinder No.:	A00861SK
Gas content:	5.52 M ³	Filling pressure:	145.0 bar	Valve:	CGA 660 SS
Cylinder Owner:	LINDE	Cylinder Material:	Spectra seal	Cylinder Size:	40 L

Component	Normal Concentration	Analysis Result ¹	Uncertainty ²	Method of Analysis ³	Assay Date
Nitric Oxide	40.0 ppm	39.5 ppm	± 1% relative	(6) 1-PB-352	6-Jul-8 & 13-Jul-21
Other NOx impurity in Nitrogen		Less than 1.9 ppm			

Reference Standard	Cylinder number	Concentration	Expiry date:
Nitric Oxide In Nitrogen	2660645G	25.65 ± 0.26 ppm	6-Aug-2021

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
FTIR Spectrometers Nicolet i550	FTIR-NO	24-Jun-2021

Minimum utilization: 5% of actual content or before expire date whichever comes first.
Storage condition: Keep in well ventilation and secure area.

When reordering, please quote the material number

1. All results expressed in this report are on mole/mole basis, unless otherwise specified. The Assay of this Standard has been performed in accordance with the EPA Toxicology Protocol EPA-600/R-12/321 for the Assay and Certification of Gaseous Calibration Standards using procedure G1.

2. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a level of confidence of approximately 95%.

3. The measurement of this material is traceable to the SI through the reference gas standard which is traceable to Swiss National Standard of Mass or other recognized national metrology institutes.

4. (1) Gas Chromatography, (2) Paramagnetic Oxygen Analyzer, (3) Electrochemical Oxygen Analyzer, (4) Electrochemical Moisture Analyzer, (5) Total Hydrocarbon Analyzer, (6) Other - specified

Sukanya Parinyasoonorn
Signatory for and on behalf of Linde (Thailand) Co., Ltd

ISS:K/1, 01 July 2021

Linde (Thailand) Public Company Limited

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Thailand, Tel (66) 38 570-479-93 Fax (66) 38.570.5210

THE LINDE GROUP

Linde

Certificate Of Analysis

Special Gases Mixture

Customer Details

Name: Secot Co., Ltd. Address: 239 Rimklongprapa Rd., Bangsue, Bang Su, Bangkok 10800 Customer Tag No.:

Certificate Details

Number: 0710/19 Date of Issue: 12-Mar-2019 Expired date: 12-Mar-2023
Material Details
Production Order: 90152849 Material Code: 608400-SK-44 Cylinder No.: D636003
Gas content: 5.520 M³ Filling pressure: 145.0 Bar Valve: CGA 660 SS
Cylinder Owner: LINDE Cylinder Material: Spectra seal Cylinder Size: 40 L

Laboratory Report

Analytical Result

Component	Normal Concentration	Analysis Result ¹	Uncertainty ²	Method of Analysis ³	Assay Date
Sulphur Dioxide In Nitrogen	40.0 ppm	39.4 ppm	± 1% relative	(6) I-PB-352	26-11- Mar-19

Reference Standard used in Assay

Reference Standard	Cylinder number	Concentration	Expired date
Sulphur Dioxide In Nitrogen	256241SG	52.86± 0.42 ppm	1-May-2020

Analytical Instruments used in Assay

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
FTIR Spectrometers Nicolet iS50	FTIR-SO2	23-Feb-2019

Recommend usage condition

Minimum utilization: 5% of actual content or before expire date whichever comes first.

Storage condition: Keep in well ventilation and secure area.

Comments

When reordering, please quote the material number

Note:

1. All results expressed in this report are on mole/mole basis, unless otherwise specified. The Assay of this Standard has been performed in accordance with the EPA Traceability Protocol EPA-600/R-12/531 for the Assay and Certification of Gaseous Calibration Standards using procedure G1
2. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The measurement of this material is traceable to the SI through the reference gas standard which is traceable to Swiss National Standard of Mass or other recognised national metrology institutes.
3. (1) Gas Chromatography, (2) Paramagnetic Oxygen Analyzer, (3) Electrochemical Oxygen Analyzer, (4) Electrochemical Moisture Analyzer, (5) Total Hydrocarbon Analyzer, (6) Other - Specified

Sukanya Parinyasoonorn

Signatory for and on behalf of Linde (Thailand) Co., Ltd.

Page 1 of 1

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PB-002/F006

Iss: H/2, 01 March 2018

บริษัท ลินด์ (ประเทศไทย) จำกัด (มหาชน)

เลขที่จดทะเบียนการค้า: 0107531700015

ชั้น 15 อาคารทาวเวอร์ เอ 2/3 หมู่ 14 ถนนรามคำแหง-ตราด กม. 6.5 ถนนรามคำแหง

บางพลี, สมุทรปราการ 10540 โทรศัพท์ (66) 2338-6100 โทรสาร (66) 2338-6333

โรงงานผลิต: 105 หมู่ 5 ตำบลบางพลีใหญ่ อำเภอบางพลี จังหวัดสมุทรปราการ 24180

โทรศัพท์ (66) 38.570-479-93

โทรสาร (66) 38.570-323

Linde (Thailand) Public Company Limited

P.L.C. Registration no. 0107531700015

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Thailand, Tel (66) 38.570-479-93

Fax (66) 38.570-323

THE LINDE GROUP

Linde

Certificate Of Analysis

Special Gases Mixture

Customer Details

Name: Secot Co., Ltd. Address: 239, Rimklongprapa Rd., Bangsue, Bangkok 10800 Customer Tag No.:

Certificate Details

Number: 2954/21 Date of Issue: 17-Jul-2021 Expiry date: 17-Jul-2023
Material Details
Production Order: 90166594 Material Code: 614500-SK-44 Cylinder No.: A00871SK
Gas content: 5.52 M³ Filling pressure: 145.0 bar Valve: CGA 660 SS
Cylinder Owner: LINDE Cylinder Material: Spectra seal Cylinder Size: 40 L

Laboratory Report

Analytical Result

Component	Normal Concentration	Analysis Result ¹	Uncertainty ²	Method of Analysis ³	Assay Date
Nitric Oxide Other NOx impurity In Nitrogen	80.0 ppm	78.8 ppm Less than 3.9 ppm	± 1% relative	(6) I-PB-352	10-Jul & 17-Jul-21

Reference Standard used in Assay

Reference Standard	Cylinder number	Concentration	Expired date
Nitric Oxide In Nitrogen	278811SG	51.58 ± 0.41 ppm	29-Oct-2022

Analytical Instruments used in Assay

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
FTIR Spectrometers Nicolet iS50	FTIR-NO	24-Jun-2021

Recommend usage condition

Minimum utilization: 5% of actual content or before expire date whichever comes first.

Storage condition: Keep in well ventilation and secure area.

Comments

When reordering, please quote the material number

Note:

1. All results expressed in this report are on mole/mole basis, unless otherwise specified. The Assay of this Standard has been performed in accordance with the EPA Traceability Protocol EPA-600/R-12/531 for the Assay and Certification of Gaseous Calibration Standards using procedure G1
2. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The measurement of this material is traceable to the SI through the reference gas standard which is traceable to Swiss National Standard of Mass or other recognised national metrology institutes.
3. (1) Gas Chromatography, (2) Paramagnetic Oxygen Analyzer, (3) Electrochemical Oxygen Analyzer, (4) Electrochemical Moisture Analyzer, (5) Total Hydrocarbon Analyzer, (6) Other - Specified

Sukanya Parinyasoonorn

Signatory for and on behalf of Linde (Thailand) Co., Ltd.

Page 1 of 1

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PB-002/F006

บริษัท ลินด์ (ประเทศไทย) จำกัด (มหาชน)

เลขที่จดทะเบียนการค้า: 0107531700015

ชั้น 15 อาคารทาวเวอร์ เอ 2/3 หมู่ 14 ถนนรามคำแหง-ตราด กม. 6.5 ถนนรามคำแหง

บางพลี, สมุทรปราการ 10540 โทรศัพท์ (66) 2338-6100 โทรสาร (66) 2338-6333

โรงงานผลิต: 105 หมู่ 5 ตำบลบางพลีใหญ่ อำเภอบางพลี จังหวัดสมุทรปราการ 24180

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โทรสาร (66) 38.570-323

Linde (Thailand) Public Company Limited Iss: K/1, 01 July 2021

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Wellgrow Plant: 105 Moo 5, T.Bangsamak, A.Bangpakong, Chachoengsao 24180

Thailand, Tel (66) 38.570-479-93

Fax (66) 38.570-323

THE LINDE GROUP

Linde

Certificate Of Analysis
Special Gases Mixture

Customer Details

Name: Secot Co., Ltd. Address: 239, Rimklongprapa Rd., Bangsue, Bangkok 10800 Customer Tag No.:

Certificate Details

Number: 2186/20 Date of Issue: 23-May-2020 Expiry date: 22-May-2028
Material Details
Production Order: 90160268 Material Code: 445100-SV-44 Cylinder No.: D878383
Gas content: 1.38 M³ Filling pressure: 145.0 bar Valve: CGA 660 SS
Cylinder Owner: LINDE Cylinder Material: Spectra seal Cylinder Size: 10 L

Laboratory Report

Analytical Result

Component	Normal Concentration	Analysis Result ¹	Uncertainty ²	Method of Analysis ³	Assay Date
Sulphur Dioxide in Nitrogen	80.0 ppm	79.6 ppm	± 1% relative	(6) I-PB-352	16-May & 23-May-20

Reference Standard used in Assay

Reference Standard	Cylinder number	Concentration	Expiry date:
Sulphur Dioxide in Nitrogen	1331885G	50.50 ± 0.40 ppm	16-Oct-2021

Analytical Instruments used in Assay

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
FTIR Spectrometers Nicolet i550	FTIR-SO2	15-May-2020

Recommend usage condition

Minimum utilization: 5% of actual content or before expire date whichever comes first.
Storage condition: Keep in well ventilation and secure area.

Comments

When reordering, please quote the material number

Note:

1. All results expressed in this report are on mole/mole basis, unless otherwise specified. The assay of this Standard has been performed in accordance with the EPA Traceability Protocol EPA-600/R-12/531 for the Assay and Certification of Gaseous Calibration Standards using procedure G1.
2. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The measurement of this material is traceable to the SI through the reference gas standard which is traceable to Swiss National Standard of Mass or other recognised national metrology institutes.
3. (1) Gas Chromatography, (2) Paramagnetic Oxygen Analyzer, (3) Electrochemical Oxygen Analyzer, (4) Electrochemical Moisture Analyzer, (5) Total Hydrocarbon Analyzer, (6) Other - Specified

Page 1 of 1

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บริษัท ลินด์ (ประเทศไทย) จำกัด (มหาชน)

ชั้น 15 อาคารตึก 2/3 หมู่ 14 ถนนบางนา-ตราด กม. 6.5 บางนา กรุงเทพมหานคร 10540 โทรศัพท์ (66) 2338-6100 โทรสาร (66) 2338-6333
โรงงานผลิต: 105 หมู่ 5 ตำบลบางนา อำเภอบางนา จังหวัดชลบุรี 24180
โทรศัพท์ (66) 38,570-479-93 โทรสาร (66) 38,570-323

Sukanya Parinyasontorn
Signatory for and on behalf of Linde (Thailand) Co., Ltd.

PB-002/F006

Linde (Thailand) Public Company Limited 1/1, 01 October 2019
P.L. Registration no. 010337000715
15th floor, Bangna Tower A, 2/3 Moo 14, Bangna Trad Km. 6.5 Road, Bangnaew Bangkok, Samutprakan 10540, Tel (66) 2338-6100 Fax (66) 2338-6333
Wellgrow Plant: 105 Moo 5, T.Bangsamak, A.Bangsakong, Chachoengsao 24180 Thailand, Tel (66) 38,570-479-93 Fax (66) 38,570-323

THE LINDE GROUP

Linde

Certificate Of Analysis
Special Gases Mixture

Customer Details

Name: Secot Co., Ltd. Address: House No.239, Rimklongprapa Rd, Bang Sue, Bangkok 10800 Customer Tag No.:

Certificate Details

Number: 0334/19 Date of Issue: 5-Feb-2019 Expired date: 5-Feb-2027
Material Details
Production Order: 90152421 Material Code: 533100-AL-44 Cylinder No.: D339457
Gas content: 6.900 M³ Filling pressure: 145.0 Bar Valve: CGA 350 BRASS
Cylinder Owner: LINDE Cylinder Material: Aluminum Cylinder Size: 50 L

Laboratory Report

Analytical Result

Component	Normal Concentration	Analysis Result ¹	Uncertainty ²	Method of Analysis ³	Assay Date
Carbon Monoxide in Nitrogen	80.0 ppm Balance	80.3 ppm	± 1% relative	(6) I-PB-352	4-Feb-2019

Reference Standard used in Assay

Reference Standard	Cylinder number	Concentration	Expired date
Carbon Monoxide in Nitrogen	2580015G	99.5 ± 0.8 ppm	20-Aug-2020

Analytical Instruments used in Assay

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
FTIR Spectrometers Nicolet i550	FTIR-CO	4-Feb-2019

Recommend usage condition

Minimum utilization: 5% of actual content or before expire date whichever comes first.
Storage condition: Keep in well ventilation and secure area.

Comments

When reordering, please quote the material number

Note:

1. All results expressed in this report are on mole/mole basis, unless otherwise specified. The Assay of this Standard has been performed in accordance with the EPA Traceability Protocol EPA-600/R-12/531 for the Assay and Certification of Gaseous Calibration Standards using procedure G1.
2. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The measurement of this material is traceable to the SI through the reference gas standard which is traceable to Swiss National Standard of Mass or other recognised national metrology institutes.
3. (1) Gas Chromatography, (2) Paramagnetic Oxygen Analyzer, (3) Electrochemical Oxygen Analyzer, (4) Electrochemical Moisture Analyzer, (5) Total Hydrocarbon Analyzer, (6) Other - Specified

Sukanya Parinyasontorn
Signatory for and on behalf of Linde (Thailand) Co., Ltd.

Page 1 of 1

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PB-002/F006

Iss: H/2, 01 March 2018

บริษัท ลินด์ (ประเทศไทย) จำกัด (มหาชน)

P.L. Registration no. 010337000715

ชั้น 15 อาคารตึก 2/3 หมู่ 14 ถนนบางนา-ตราด กม. 6.5 บางนา

กรุงเทพมหานคร 10540 โทรศัพท์ (66) 2338-6100 โทรสาร (66) 2338-6333

โรงงานผลิต: 105 หมู่ 5 ตำบลบางนา อำเภอบางนา จังหวัดชลบุรี 24180

โทรศัพท์ (66) 38,570-479-93

โทรสาร (66) 38,570-323

Linde (Thailand) Public Company Limited

P.L. Registration no. 010337000715

15th floor, Bangna Tower A, 2/3 Moo 14, Bangna Trad Km. 6.5 Road, Bangnaew

Bangkok, Samutprakan 10540, Tel (66) 2338-6100 Fax (66) 2338-6333

Wellgrow Plant: 105 Moo 5, T.Bangsamak, A.Bangsakong, Chachoengsao 24180

Thailand, Tel (66) 38,570-479-93

Fax (66) 38,570-323

CERTIFICATE OF ANALYSIS

Customer Detail: Secot Co., Ltd.		Production Order Number: 90145140 Material Number: 533100-AL-44 Certification Date: 23-Nov-2017 Expiry Date: 23-Nov-2025	
Cylinder Description: Aluminum 80 L			
The measurement of this reference material is traceable to SI through the reference standard which is traceable to International Standards of Mass. The Assay of this standard has been performed in accordance with the EPA Specificity Protocol EPA-600-R-2-331 for the assay and certification of Gasway Calibration Standards using procedure (1). The results are expressed as a multiple basis, unless otherwise specified. The reported uncertainty is based on a standard uncertainty multiplied by coverage factor k=2, providing a level of confidence of approximately 95%.			
Certificate Number: 3785/17	Analyst: ARISARA THONGNIRI		
Cylinder Number: 290206	Approve: SUKANYA KAMUTIRAJAK		
Nominal Cylinder Content: 6.900 M ³	To Re-Order Please Quote: 533100-AL-44		
Nominal Pressure: 145.0 Bar			
Valve Outlet: CGA 350 BRASS			
Comments:	<ul style="list-style-type: none"> It is recommended that this product be not used below 5% of actual contents or should not be used when its gas pressure is below 150psig. Other impurities that detect by analytical condition of this mixture shall be report if it is more than 10% of minimum minor components. Keep and use in well-ventilated and secure area. 		

CERTIFICATE OF ANALYSIS

Analytical Result					
Component	Request Concentration	Certified Concentration	Certified Uncertainty	Method	Assay Date
Carbon Monoxide In Nitrogen	80.0 ppm	80.1 ppm	± 1 %relative	(6) I-PB-352	21-Nov-2017
Reference Standard used in Assay					
Reference Standard	Cylinder No.	Concentration	Expired Date		
Carbon Monoxide In Nitrogen	184194SG	98.72 ± 0.39 ppm	08-Sep-2016		
Analytical Instruments used in Assay					
Instrument Make/Model	Analytical Principle	Last Calibration			
Digi LAB Excelibur HE Series	FTIR-CO	25-Oct-2017			
Method of Analysis: 1. Gas Chromatography 2. Purge and Trap Analysis 3. Electrochemical Oxygen Analyzer 4. Electrochemical Moisture Analyzer 5. Thermal Conductivity Analyzer 6. Other specified					
Cylinder Number: 290206 Production Order Number 90145140			Certification Date: 23-Nov-2017 Expiration Date: 23-Nov-2025		

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CERTIFICATE OF ANALYSIS

Customer Detail:
Secot Co., Ltd.Production Order Number: 90145139
Material Number: 433000-AL-44
Certification Date: 23-Nov-2017
Expiry Date: 23-Nov-2025Cylinder Description:
Aluminum 50 L

The measurement of this reference material is traceable to SI through the reference standard which is traceable to the National Standard of Mass. The Assay of this Standard has been performed in accordance with the NIST Traceability Protocol ET-A-800 (Rev. 12/2011) for the Assay and Certification of Various Calibration Standards using gravimetric GL. The results are expressed on a net-in-side basis, unless otherwise specified. The reported uncertainty is based on a standard uncertainty multiplied by coverage factor k=2, providing a level of confidence of approximately 95%.

Certificate Number:
3728/T7

Analyst:

Cylinder Number:
D400467Anissara T.
ARINSARA THONGNURINominal Cylinder Content:
6.900 M³

Approver:

Nominal Pressure:
145.0 Bar

SUKANYA KAMOTJARAT

Valve Outlet:
CGA 350 BRASSTo Re-Order Please Quote:
433000-AL-44

Comment:

- It is recommended that this product be not used below 5% of actual contents or should not be used when its gas pressure is below 150psig.
- Other impurities that detect by analytical condition of this mixture shall be report if it is more than 10% of minimum major component.
- Keep and use in well-ventilated and secure area.

Page 1 of 2

บริษัท ลินด์ (ประเทศไทย) จำกัด (มหาชน)

Linde (Thailand) Public Company Limited

เลขที่ 15 ถนนพหลโยธิน แขวง 2/2 หมู่ 14 แขวงบางพลีใหญ่ เขต ด.5 กรุงเทพมหานคร

โทรศัพท์ (กรุงเทพฯ) 02-574-4700 โทรสาร (กรุงเทพฯ) 02-574-4701

โทรสาร (กรุงเทพฯ) 02-574-4702 โทรสาร (กรุงเทพฯ) 02-574-4703

โทรสาร (กรุงเทพฯ) 02-574-4704 โทรสาร (กรุงเทพฯ) 02-574-4705

โทรสาร (กรุงเทพฯ) 02-574-4706

โทรสาร (กรุงเทพฯ) 02-574-4707

Linde (Thailand) Public Company Limited

Linde (Thailand) Public Company Limited

เลขที่ 15 ถนนพหลโยธิน แขวง 2/2 หมู่ 14 แขวงบางพลีใหญ่ เขต ด.5 กรุงเทพมหานคร

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โทรสาร (กรุงเทพฯ) 02-574-4704 โทรสาร (กรุงเทพฯ) 02-574-4705

โทรสาร (กรุงเทพฯ) 02-574-4706

โทรสาร (กรุงเทพฯ) 02-574-4707

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CERTIFICATE OF ANALYSIS

Analytical Result

Component	Request Concentration	Certified Concentration	Certified Uncertainty	Method	Assay Date
Carbon Monoxide In Nitrogen	40.0 ppm	42.0 ppm	± 1 %relative	(6) I-PB-352	21-Nov-2017

Reference Standard used in Assay

Reference Standard	Cylinder No.	Concentration	Expiry Date
Carbon Monoxide In Nitrogen	184194SG	98.72 ± 0.39 ppm	08-Sep-2018

Analytical Instruments used in Assay

Instrument Make/Model	Analytical Principle	Last Multistage Calibration
Digi LAB Excalibur BE Series	FIR-CO	25-Oct-2017

Method of Analysis

1. Gas Chromatograph
2. Paramagnetic Oxygen Analyzer
3. Electrochemical Oxygen Analyzer
4. Electrochemical Moisture Analyzer
5. Total Gasification Analyzer
6. Other specified

Cylinder Number: D400467
Production Order Number 90145139Certification Date: 23-Nov-2017
Expiration Date: 23-Nov-2025

Page 2 of 2

บริษัท ลินด์ (ประเทศไทย) จำกัด (มหาชน)

Linde (Thailand) Public Company Limited

เลขที่ 15 ถนนพหลโยธิน แขวง 2/2 หมู่ 14 แขวงบางพลีใหญ่ เขต ด.5 กรุงเทพมหานคร

โทรศัพท์ (กรุงเทพฯ) 02-574-4700 โทรสาร (กรุงเทพฯ) 02-574-4701

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โทรสาร (กรุงเทพฯ) 02-574-4706

โทรสาร (กรุงเทพฯ) 02-574-4707

Linde (Thailand) Public Company Limited

Linde (Thailand) Public Company Limited

เลขที่ 15 ถนนพหลโยธิน แขวง 2/2 หมู่ 14 แขวงบางพลีใหญ่ เขต ด.5 กรุงเทพมหานคร

โทรศัพท์ (กรุงเทพฯ) 02-574-4700 โทรสาร (กรุงเทพฯ) 02-574-4701

โทรสาร (กรุงเทพฯ) 02-574-4702 โทรสาร (กรุงเทพฯ) 02-574-4703

โทรสาร (กรุงเทพฯ) 02-574-4704 โทรสาร (กรุงเทพฯ) 02-574-4705

โทรสาร (กรุงเทพฯ) 02-574-4706

โทรสาร (กรุงเทพฯ) 02-574-4707



High Volume TSP & PM-10 Calibration Data Sheet

Calibration Location : SECOT Co.,Ltd. Calibration Date : Jan 13, 2022
 Hi-Vol Pump No. : BH-007 Indicator No. : CM-01
 Amb. Temp (°C) : 25 Press (mmHg) : 760
 Calibration by : Mr.Punkawin K.

Plate	Indicate (X) (cm.)	True H ₂ O (in.)	Actual Flow (Y) (cfm)	XY	X ²	Remark
18	18.20	12.50	58.84	1,070.89	331.24	
13	15.00	10.00	52.94	794.10	225.00	
10	11.80	7.80	46.90	553.42	139.24	
7	7.60	5.00	37.81	287.36	57.76	
5	4.40	3.00	29.58	130.15	19.36	
Sum	57.00	38.30	226.07	2,835.92	772.60	

Calibrated by : Punkawin Approved by : Mr. Panyan K.



High Volume TSP & PM-10 Calibration Data Sheet

Calibration Location : SECOT Co.,Ltd. Calibration Date : Feb 3, 2022
 Hi-Vol Pump No. : BH-014 Indicator No. : CM-01
 Amb. Temp (°C) : 25 Press (mmHg) : 760
 Calibration by : Mr.Punkawin K.

Plate	Indicate (X) (cm.)	True H ₂ O (in.)	Actual Flow (Y) (cfm)	XY	X ²	Remark
18	17.60	12.60	59.07	1,039.70	309.80	
13	14.00	10.20	53.45	748.30	196.00	
10	11.20	7.80	46.90	525.30	125.40	
7	7.20	5.20	38.50	277.40	51.80	
5	4.00	3.10	30.04	120.20	16.00	
Sum	54.00	38.90	227.96	2,710.90	699.00	

Calibrated by : Punkawin Approved by : Mr. Panyan K.



High Volume TSP & PM-10 Calibration Data Sheet

Calibration Location : SECOT Co.,Ltd. Calibration Date : Jan 13, 2022
 Hi-Vol Pump No. : BH-021 Indicator No. : CM-01
 Amb. Temp (°C) : 25 Press (mmHg) : 760
 Calibration by : Mr.Punkawin K.

Plate	Indicate (X) (cm.)	True H ₂ O (in.)	Actual Flow (Y) (cfm)	XY	X ²	Remark
18	19.80	12.50	58.84	1,165.03	392.04	
13	16.00	10.00	52.94	847.04	256.00	
10	12.40	7.80	46.90	581.56	153.76	
7	8.00	5.10	38.17	305.36	64.00	
5	4.80	3.10	30.04	144.19	23.04	
Sum	61.00	38.50	226.89	3,043.18	888.84	

Calibrated by : Punkawin Approved by : W. Haya K.



High Volume TSP & PM-10 Calibration Data Sheet

Calibration Location : SECOT Co.,Ltd. Calibration Date : Jan 14, 2022
 Hi-Vol Pump No. : BH-026 Indicator No. : CM-01
 Amb. Temp (°C) : 25 Press (mmHg) : 760
 Calibration by : Mr.Punkawin K.

Plate	Indicate (X) (cm.)	True H ₂ O (in.)	Actual Flow (Y) (cfm)	XY	X ²	Remark
18	17.40	12.60	59.07	1,027.82	302.76	
13	14.20	10.00	52.94	751.75	201.64	
10	11.00	7.70	46.61	512.71	121.00	
7	7.20	5.00	37.81	272.23	51.84	
5	4.00	3.00	29.58	118.32	16.00	
Sum	53.80	38.30	226.01	2,682.83	693.24	

Calibrated by : Punkawin Approved by : W. Haya K.



High Volume TSP & PM-10 Calibration Data Sheet

Calibration Location : SECOT Co.,Ltd. Calibration Date : Feb 3, 2022
 Hi-Vol Pump No. : BH-030 Indicator No. : CM-01
 Amb. Temp (°C) : 25 Press (mmHg) : 760
 Calibration by : Mr.Punkawin K.

Plate	Indicate (X) (cm.)	True H ₂ O (in.)	Actual Flow (Y) (cfm)	XY	X ²	Remark
18	19.60	12.40	58.61	1,148.80	384.16	
13	16.20	10.20	53.45	865.90	262.40	
10	12.80	8.00	47.48	607.80	163.80	
7	8.20	5.20	38.53	316.00	67.20	
5	4.80	3.20	30.50	146.40	23.00	
Sum	61.60	39.00	228.57	3,084.90	900.56	

Calibrated by : R. Pankawin Approved by : W. Haya K.



High Volume TSP & PM-10 Calibration Data Sheet

Calibration Location : SECOT Co.,Ltd. Calibration Date : Feb 3, 2022
 Hi-Vol Pump No. : BH-033 Indicator No. : CM-01
 Amb. Temp (°C) : 25 Press (mmHg) : 760
 Calibration by : Mr.Punkawin K.

Plate	Indicate (X) (cm.)	True H ₂ O (in.)	Actual Flow (Y) (cfm)	XY	X ²	Remark
18	16.80	12.60	59.07	945.20	256.00	
13	14.00	10.20	53.45	748.30	196.00	
10	11.70	7.90	47.19	528.60	125.40	
7	7.20	5.10	38.17	274.80	51.80	
5	4.00	3.10	30.04	120.20	16.00	
Sum	53.70	38.90	227.92	2,617.10	645.20	

Calibrated by : R. Pankawin Approved by : W. Haya K.



THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Mechanical Engineering Standards Laboratory Soi 1, Bangpoo Industrial Estate, Muang, Samutprakan 10280, Thailand.

Request No.23-65/0223

MTC.No.23-65/0223-01

Number of page(s) 2

CALIBRATION CERTIFICATE

Nomenclature : DRYCAL

Manufacturer : Mesa Labs

Serial No.: 114069

Model : Defender 520-H

Scale range : 300 ml/min to 30,000 ml/min

Subdivision : (0.0001, 0.001) L/min

Submitted by : SECOT CO.,LTD.

239, Rimklongprapa Road, Bangsue,

Bangkok 10800, Thailand.

Received date : 26 January 2022

Condition of measured item : Normal

Calibration date : 2 February 2022

Standard :

Standard	Certificate No.	Date due	Traceability
RTD Thermometer	PSL-T 336/63	6-Apr-22	TISTR
Molbox/Pressure Transducer/UpStream	MP-0013-21	25-Jan-23	NIMT
Primary Flow Calibrator S/N 119521	MW-0012-21	31-Mar-23	NIMT
Primary Flow Calibrator S/N 119216	MW-0013-21	25-Mar-23	NIMT

Calibrated by :

Terasak Panna

(Mr.Terasak Panna)

Approved by :

(Ms.Kirana Chanchitran)

Director

Mechanical Engineering Standards Laboratory

Ref. 2013265012600367001

Issued Date 2 February 2022

The results relate only to the items tested/calibrated or value assigned.

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FM.BL.MTC.002 Rev.4

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Mechanical Engineering Standards Laboratory Soi 1, Bangpoo Industrial Estate, Muang, Samutprakan 10280, Thailand.

Request No.23-65/0223

2/2

MTC.No.23-65/0223-01

Calibration point : (1.5, 5.0, 10, 15, 25) L/min

Ambient condition : Temperature (23 ± 3) °C , Relative humidity (55 ± 15) %

Atmospheric pressure (1010 ± 13) hPa

Calibration method : The flowmeter (UUC) was calibrated by comparison method with standard flowmeter according to CP-370.01.

The reported value is the value that converted to value at reference condition within pressure and temperature of the actual gas entering the UUC

Measurement data :

UUC Value (L/min)	Standard Value (L/min)	Temperature (°C)	Pressure (hPa)	Deviation (%)	Uncertainty (%)
1.4960	1.4724	24.974	1010.11	+1.60	0.86
5.0027	4.9459	24.949	1010.43	+1.15	0.87
9.9986	9.9044	24.909	1011.29	+0.95	0.96
15.020	14.900	24.892	112.50	+0.80	0.96
25.117	24.876	25.120	1016.35	+0.97	0.96

The reported expanded uncertainties are based on standard uncertainties multiplied by a coverage factor $k=2$, which provides a level of confidence of approximately 95%.

The end of calibration certificate.

Ts

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ELECTRICAL AND ELECTRONICS INSTITUTE
FOUNDATION FOR INDUSTRIAL DEVELOPMENT

975 Moo 4, Bangpoo Industrial Estate, Soi 8, Sukhumvit Road km 37,

Phraek Sa, Mueang Samut Prakan, Samut Prakan 10280

Tel: +66 2709 4860-8 Fax: +66 2324 0917-8



Certificate No.: CP20210098EA
Operation No.: CP2021120019

Certificate of Calibration

Equipment: Sound Calibrator
Manufacturer: Cirrus Research Plc
Model/Type: CR:515
Serial No.: 94296
ID No.:
Customer: SECOT Co.,Ltd.
Address: 239 Rimklongprapa Rd., Bangsue,
Bangkok 10800 Thailand
Received Date: 21 December 2021
Calibrated Date: 24 December 2021
Issued Date: 28 December 2021
Calibrated by: Ms. Juntaporn Kunhakom

Approved by: _____

(Mr. Sittichai Swaksuriyawong)
Group Manager

This report was prepared electronically using applicable electronic signature. Printing or copy of file are considered as a copy of the document.

The reported uncertainty of measurement was based on standard uncertainty multiplied by a coverage factor $k = 2.00$, providing a level of confidence of approximately 95%. This certificate may not be reproduced other than in full except with the prior written approval of the Electrical and Electronics Institute, Foundation for Industrial Development.



ELECTRICAL AND ELECTRONICS INSTITUTE
FOUNDATION FOR INDUSTRIAL DEVELOPMENT

Certificate No.: CP20210098EA

Calibration Report

Equipment: Sound Calibrator
Manufacturer: Cirrus Research Plc
Model/Type: CR:515
Serial No.: 94296
ID No.:
Ambient Temperature: (23 ± 2) °C
Relative Humidity: (50 ± 15) %
Pressure: (101.3 ± 1.5) kPa

Method of Calibration :-
IEC 60942:2017

Condition of this result of calibration

1. Reference standards instrument :-

Instrument	Model	Serial No.	Cert. No.	Due Date
1) Standard microphone	4180	2661000	AA-1010-21	13 June 2022
2) Waveform Generator	33511B	MY52302264	0144RF21	17 June 2022
3) Audio Analyzing DMM	2015-P	4079144	E1U210398	2 February 2022
4) Pressure humidity and Temperature Transmitter	PTU301	F0640002	CL1-P210047 0255TE21	16 June 2022 7 July 2022

2. This result of calibration was found accurate as shown on date and place of calibration only.

3. This certification is traceable to the international system of unit maintained at :-

Reference standards instrument for Acoustic function
- National Institute of Metrology (Thailand)

Reference standards instrument for Electrical function
- Electrical and Electronics Institute; ONSC Accredited Calibration No.0119

Result of Calibration:-

1. Function : Sound pressure level

Norminal Frequency (Hz)	Specified Sound Pressure level (dB)	Measured value (dB)	Deviated value ^[1] (dB)	Acceptance limit ^[3] (dB)
1000	94	93.80	-0.20	±0.25

2. Function : Frequency

Norminal Sound Pressure Level (dB)	Specified Frequency (Hz)	Measured value (Hz)	Deviated value ^[2] (%)	Acceptance limit ^[3] (%)
94	1000	1000.3	0.0	±0.7



ELECTRICAL AND ELECTRONICS INSTITUTE
FOUNDATION FOR INDUSTRIAL DEVELOPMENT

Certificate No.: CP20210098EA

Calibration Report

3. Function : Total distortion + noise

Normal Sound Pressure level (dB)	Normal Frequency (Hz)	Measured value ^[4] (%)	Acceptance limit ^[5] (%)
94	1000	1.4	2.5

Uncertainty of measurement

Function	Uncertainty	Maximum-permitted uncertainty of measurement
Sound pressure level	0.10 dB	0.15 dB
Frequency	0.10 %	0.20 %
Total distortion + noise	0.40 %	0.50 %

Note: [1] The deviated value is the absolute value of the difference between the measured value and the corresponding specified sound pressure level.
[2] The deviated value is the absolute value of the difference in percent between the measured value and the corresponding specified frequency.
[3] The acceptance limit is for the deviated value.
[4] The measured value is the total distortion + noise, measured over the frequency range from 20 Hz to 20 kHz.
[5] The acceptance limit is for the Measured value.

Remarks: 1. Acceptance limit was IEC 60942:2017 Class 1.

-- End of Report --

Sheet No. : CR-515-2022-011



SOUND LEVEL METER CALIBRATION

Calibration Location: SECOT

Calibration Date: May 6, 22

SOUND LEVEL CALIBRATOR

Brand	Model	Serial No.	Calibrated (dB)	Frequency (Hz)
Cirrus	CR:515	94296	94.00	1000

No.	Brand	Model	Serial No.	Effective Calibration Level (dB)	SLM Reading (dB)	Offset (dB)
16	Cirrus	CR162B	G300833	93.7	93.7	0.0
20	Cirrus	CR162B	G301014	93.7	93.7	0.1
23	Cirrus	CR162B	G301027	93.7	93.7	0.0
34	Cirrus	CR161B	G302733	93.7	93.7	0.0
36	Cirrus	CR161B	G302630	93.7	93.7	0.1
39	Cirrus	CR161B	G302743	93.7	93.7	0.1
40	Cirrus	CR161B	G302740	93.7	93.7	0.0
41	Cirrus	CR161B	G302737	93.7	93.7	0.0
42	Cirrus	CR161B	G302738	93.7	93.7	0.0
43	Cirrus	CR161B	G302741	93.7	93.7	0.0
44	Cirrus	CR161B	G302742	93.7	93.7	0.0

Calibrated by :

Approved by :

Preda S.



ELECTRICAL AND ELECTRONICS INSTITUTE
FOUNDATION FOR INDUSTRIAL DEVELOPMENT

975 Moo 4, Bangpoo Industrial Estate, Soi 8, Sukhumvit Road km 37,

Phraek Sa, Mueang Samut Prakan, Samut Prakan 10280

Tel: +66 2709 4860-8 Fax: +66 2324 0917-8



Certificate No.: CP20210096EA
Operation No.: CP2021120017

Certificate of Calibration

Equipment: Sound Calibrator
Manufacturer: CASELLA
Model/Type: CEL-120/2
Serial No.: 2839225
ID No.:
Customer: SECOT Co.,Ltd.
Address: 239 Rimklongprapa Rd., Bangsue,
Bangkok 10800 Thailand
Received Date: 21 December 2021
Calibrated Date: 24 December 2021
Issued Date: 28 December 2021
Calibrated by: Ms. Juntaporn Kunhakom

Approved by:

(Mr. Sittichai Swaksuriyawong)
Group Manager

This report was prepared electronically using applicable electronic signature. Printing or copy of file are considered as a copy of the document.

The reported uncertainty of measurement was based on standard uncertainty multiplied by a coverage factor $k = 2.00$, providing a level of confidence of approximately 95%. This certificate may not be reproduced other than in full except with the prior written approval of the Electrical and Electronics Institute, Foundation for Industrial Development.



ELECTRICAL AND ELECTRONICS INSTITUTE
FOUNDATION FOR INDUSTRIAL DEVELOPMENT

Certificate No.: CP20210096EA

Calibration Report

Equipment: Sound Calibrator
Manufacturer: CASELLA
Model/Type: CEL-120/2
Serial No.: 2839225
ID No.:
Ambient Temperature: (23 ± 2) °C
Relative Humidity: (50 ± 15) %
Pressure: (101.3 ± 1.5) kPa
Method of Calibration :-
IEC 60942:2017

Condition of this result of calibration

1. Reference standards instrument :-

Instrument	Model	Serial No.	Cert. No.	Due Date
1) Standard microphone	4180	2661000	AA-1010-21	13 June 2022
2) Waveform Generator	33511B	MY52302264	0144RF21	17 June 2022
3) Audio Analyzing DMM	2015-P	4079144	E1U210398	2 February 2022
4) Pressure humidity and Temperature Transmitter	PTU301	F0640002	CL1-P210047 0255TE21	16 June 2022 7 July 2022

2. This result of calibration was found accurate as shown on date and place of calibration only.

3. This certification is traceable to the international system of unit maintained at :-

Reference standards instrument for Acoustic function

- National Institute of Metrology (Thailand)

Reference standards instrument for Electrical function

- Electrical and Electronics Institute; ONSC Accredited Calibration No.0119

Result of Calibration:-

1. Function : Sound pressure level

Nominal Frequency (Hz)	Specified Sound Pressure level (dB)	Measured value (dB)	Deviated value ^[1] (dB)	Acceptance limit ^[3] (dB)
1000	114	114.20	0.20	±0.40

2. Function : Frequency

Nominal Sound Pressure level (dB)	Specified Frequency (Hz)	Measured value (Hz)	Deviated value ^[2] (%)	Acceptance limit ^[3] (%)
114	1000	1000.0	0.0	±1.7



ELECTRICAL AND ELECTRONICS INSTITUTE
FOUNDATION FOR INDUSTRIAL DEVELOPMENT

Certificate No.: CP20210096EA

Calibration Report

3. Function : Total distortion + noise

Normal Sound Pressure level (dB)	Normal Frequency (Hz)	Measured value ^[4] (%)	Acceptance limit ^[5] (%)
114	1000	0.4	3.0

Uncertainty of measurement

Function	Uncertainty	Maximum-permitted uncertainty of measurement
Sound pressure level	0.10 dB	0.35 dB
Frequency	0.10 %	0.20 %
Total distortion + noise	0.40 %	1.00 %

Note: [1] The deviated value is the absolute value of the difference between the measured value and the corresponding specified sound pressure level.
[2] The deviated value is the absolute value of the difference in percent between the measured value and the corresponding specified frequency.
[3] The acceptance limit is for the deviated value.
[4] The measured value is the total distortion + noise, measured over the frequency range from 20 Hz to 20 kHz.
[5] The acceptance limit is for the Measured value.

Remarks: 1. Acceptance limit was IEC 60942:2017 Class 2.

-- End of Report --

Sheet No. : CEL120/2-2022-009



SOUND LEVEL METER CALIBRATION

Calibration Location: SECOT

Calibration Date: Feb 15, 22

SOUND LEVEL CALIBRATOR

Brand	Model	Serial No.	Calibrated (dB)	Frequency (Hz)
CASELLA	CEL120/2	2839225	114.0	1000

No.	Brand	Model	Serial No.	Microphone Serial No.	SLM Reading (dB)	dB Adjust
9	CASELLA	CEL-246	3173156	3173156	113.8	0.2
10	CASELLA	CEL-246	3173161	3173161	113.9	0.1
11	CASELLA	CEL-246	3173243	3173243	113.9	0.1
16	CASELLA	CEL-246	3173312	3173312	113.8	0.2
18	CASELLA	CEL-246	3173324	3173324	113.9	0.1
23	CASELLA	CEL-246	3173339	3173339	114.0	0.0
24	CASELLA	CEL-246	3173343	3173343	114.0	0.0
25	CASELLA	CEL-246	3173350	3173350	113.9	0.1

Calibrated by :

Approved by :

Preda S.



SOUND LEVEL METER CALIBRATION

Calibration Location: SECOT

Calibration Date: May 25, 22

SOUND LEVEL CALIBRATOR

Brand	Model	Serial No.	Calibrated (dB)	Frequency (Hz)		
CASELLA	CEL120/2	2839225	114.0	1000		
No.	Brand	Model	Serial No.	Microphone Serial No.	SLM Reading (dB)	dB Adjust
10	CASELLA	CEL-246	3173161	3173161	113.9	0.1
11	CASELLA	CEL-246	3173243	3173243	113.9	0.1
14	CASELLA	CEL-246	3173306	3173306	113.8	0.2
16	CASELLA	CEL-246	3173312	3173312	113.7	0.3
17	CASELLA	CEL-246	3173318	3173318	113.6	0.4
18	CASELLA	CEL-246	3173324	3173324	114.0	0.0
19	CASELLA	CEL-246	3173330	3173330	113.8	0.2
20	CASELLA	CEL-246	3173336	3173336	114.0	0.0

CERTIFICATE OF CALIBRATION

ISSUED BY Noisemeters

DATE OF ISSUE 23/04/21

CERTIFICATE NUMBER 156139

NoiseMeters
Acoustic House
Bridlington Road
Hunmanby
YO14 0PH
United Kingdom
www.noisemeters.com

Page 1 of 1

Test engineer:
Nigel Smith
Electronically signed:

doseBadge Reader

Instrument

Manufacturer: Cirrus Research plc
Model Number: RC:110A

Serial Number: 46826
Notes:

Calibration Procedure

The tests were carried out in accordance with the requirements of IEC 60942:2003 where applicable.

Date of Calibration: 22 April 2021

Functionality Results

Function	Result
Keypad	Pass
Battery Power	Pass
Display	Pass
Communication	Pass
2 way IR link	Pass
Clock	Pass

Calibration Results

	Level (dB)	Frequency (Hz)	Distortion (% THD + Noise)
Initial	114.16	998.9	0.33
Adjusted	114.00	998.9	0.32
Uncertainty	± 0.11	± 0.14	± 0.10
Tolerances	± 0.60	± 2.00	± 4.00

Environmental Conditions

Pressure: 101.90 kPa
Temperature: 24.9 °C
Humidity: 29.3 %

Notes

This certificate provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory. The results within this certificate relate only to the items calibrated. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%.

Calibrated by :

Approved by :

Sheet No. : NC-CIRRUS-2022-007



NOISE DOSE METER CALIBRATION

Calibration Location: SECOT

Calibration Date: Feb 15, 22

ACOUSTIC CALIBRATOR

Brand	Model	Serial No.	Calibrated (dB)	Frequency (Hz)
CIRRUS	RC 110A	46826	114.00	1000

No.	Brand	Model	Serial No.	Reading (dB)	dB Adjust
1	Cirrus	CR110A	CB1050	114.0	0.0
2	Cirrus	CR110A	CB1054	114.4	-0.4
3	Cirrus	CR110A	CB1055	114.1	-0.1
4	Cirrus	CR110A	CB1101	113.7	0.3
5	Cirrus	CR110A	CB1104	114.0	0.0

CERTIFICATE OF CALIBRATION

ISSUED BY Noisemeters

DATE OF ISSUE 31/03/21

CERTIFICATE NUMBER 155225

NoiseMeters
Acoustic House
Bridlington Road
Hunmanby
YO14 0PH
United Kingdom
www.noisemeters.com

Page 1 of 1

Test engineer:
Johnny Johnston
Electronically signed:

doseBadge Reader

Instrument

Manufacturer: Cirrus Research plc
Model Number: RC:110A

Serial Number: 95173
Notes:

Calibration Procedure

The tests were carried out in accordance with the requirements of IEC 60942:2003 where applicable.

Functionality Results

Function	Result
Keypad	Pass
Battery Power	Pass
Display	Pass
Communication	Pass
2 way IR link	Pass
Clock	Pass

Calibration Results

	Level (dB)	Frequency (Hz)	Distortion (% THD + Noise)
Result	114.00	994.0	0.47
Uncertainty	± 0.11	± 0.14	± 0.10
Tolerances	± 0.60	± 2.00	± 4.00

No adjustments were made during this calibration.

Environmental Conditions

Pressure: 100.60 kPa
Temperature: 21.0 °C
Humidity: 33.4 %

Notes

This certificate provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory. The results within this certificate relate only to the items calibrated. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%.

Calibrated by :

Approved by : John Sullivan



NOISE DOSE METER CALIBRATION

Calibration Location: SECOT

Calibration Date: Mar 2, 22

ACOUSTIC CALIBRATOR

Brand	Model	Serial No.	Calibrated (dB)	Frequency (Hz)
CIRRUS	RC 110A	95173	114.00	1000

No.	Brand	Model	Serial No.	Reading (dB)	dB Adjust
1	Cirrus	CR110A	CB1047	114.1	-0.1

CERTIFICATE OF CALIBRATION

ISSUED BY Noisemeters

DATE OF ISSUE 06/04/22

CERTIFICATE NUMBER 172690

NoiseMeters
Acoustic House
Bridlington Road
Hunmanby
YO14 0PH
United Kingdom
www.noisemeters.com

Page 1 of 1

Test engineer:
Nigel Smith
Electronically signed:

doseBadge Reader

Instrument

Manufacturer: Cirrus Research plc
Model Number: RC:110A

Serial Number: 95168
Notes:

Calibration Procedure

The tests were carried out in accordance with the requirements of IEC 60942:2003 where applicable.

Date of Calibration: 06 April 2022

Functionality Results

Function	Result
Keypad	Pass
Battery Power	Pass
Display	Pass
Communication	Pass
2 way IR link	Pass
Clock	Pass

Calibration Results

	Level (dB)	Frequency (Hz)	Distortion (% THD + Noise)
Initial	113.90	993.3	0.46
Adjusted	114.00	993.3	0.46
Uncertainty	± 0.11	± 0.14	± 0.10
Tolerances	± 0.60	± 2.00	± 4.00

Environmental Conditions

Pressure: 98.30 kPa
Temperature: 22.6 °C
Humidity: 42.3 %

Notes

This certificate provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory. The results within this certificate relate only to the items calibrated. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%.

Calibrated by :

Approved by :



NOISE DOSE METER CALIBRATION

Calibration Location: SECOT

Calibration Date: May 25, 22

ACOUSTIC CALIBRATOR

Brand	Model	Serial No.	Calibrated (dB)	Frequency (Hz)
CIRRUS	RC 110A	95168	114.00	1000

No.	Brand	Model	Serial No.	Reading (dB)	dB Adjust
1	Cirrus	CR110A	CA1897	114.0	0.0
2	Cirrus	CR110A	CA1898	113.4	0.6
3	Cirrus	CR110A	CA1901	114.0	0.0
4	Cirrus	CR110A	CA2539	114.4	-0.4

Calibrated by :

Approved by : Suk Suthamon

NOISE DOSE METER CALIBRATION

Calibration Location: SECOT

Calibration Date: Jun 21, 22

ACOUSTIC CALIBRATOR

Brand	Model	Serial No.	Calibrated (dB)	Frequency (Hz)
CIRRUS	RC 110A	95168	114.00	1000

No.	Brand	Model	Serial No.	Reading (dB)	dB Adjust
1	Cirrus	CR110A	CA2938	113.9	0.1
2	Cirrus	CR110A	CA4377	113.2	0.8
3	Cirrus	CR110A	CA4385	114.1	-0.1

Calibrated by :

Approved by : Suk Suthamon



NOISE DOSE METER CALIBRATION

Calibration Location: SECOT

Calibration Date: May 25, 22

ACOUSTIC CALIBRATOR

Brand	Model	Serial No.	Calibrated (dB)	Frequency (Hz)
CIRRUS	RC 110A	95168	114.00	1000

No.	Brand	Model	Serial No.	Reading (dB)	dB Adjust
1	Cirrus	CR110A	CA1897	114.0	0.0
2	Cirrus	CR110A	CA1898	113.4	0.6
3	Cirrus	CR110A	CA1901	114.0	0.0
4	Cirrus	CR110A	CA2539	114.4	-0.4

Calibrated by :

Approved by :

ภาคผนวก จ

หนังสืออนุญาตขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
จากกรมโรงงานอุตสาหกรรม



ที่อก ๐๓๑๐(๑)/๑๑ ๘ ๐ ๕

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ เขตราชเทวี
กรุงเทพมหานคร ๑๐๔๐๐

๒๑ ตุลาคม ๒๕๖๓

เรื่อง ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท ซีคอต จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๒๔ มีนาคม ๒๕๖๓

สิ่งที่ส่งมาด้วย ๑. รายชื่อผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๑ แผ่น
๒. รายชื่อเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑ แผ่น
๓. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๒ แผ่น

ตามหนังสือที่อ้างถึง บริษัท ซีคอต จำกัด ขอต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการ
วิเคราะห์เอกชน เลขทะเบียน ว-๒๓๙ สถานที่ตั้งเลขที่ ๒๓๙ ถนนริมคลองประปา แขวงบางซื่อ เขตบางซื่อ
กรุงเทพมหานคร ต่อกรมโรงงานอุตสาหกรรม นั้น

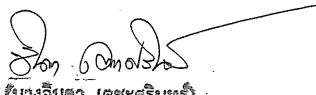
กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท ซีคอต จำกัด ต่ออายุหนังสือรับขึ้นทะเบียน
ห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๑๐ ราย ตามสิ่งที่ส่งมาด้วย ๑
ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๓๑ ราย ตามสิ่งที่ส่งมาด้วย ๒
ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนไว้วิเคราะห์ในน้ำเสีย จำนวน ๔๖ รายการ น้ำใต้ดิน
จำนวน ๑๒๓ รายการ อากาศเสีย จำนวน ๒๗ รายการ สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน ๓๔ รายการ
และดิน จำนวน ๑๒๒ รายการ รวมทั้งสิ้นจำนวน ๓๕๒ รายการ ตามสิ่งที่ส่งมาด้วย ๓

หนังสือฉบับนี้จะหมดอายุในวันที่ ๒ พฤษภาคม ๒๕๖๖ หากประสงค์จะต่ออายุหนังสือ
รับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อ
กรมโรงงานอุตสาหกรรมภายใน ๓๐ วัน ก่อนวันสิ้นอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
ซึ่งคำขอต่ออายุดังกล่าวขอรับได้ที่กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ


(นางจินตนา เดชะศรีนทร์)
ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๒๐๒ ๔๐๐๒ ๐ ๒๒๐๒ ๔๑๔๖

โทรสาร ๐ ๒๓๕๔ ๓๒๐๘ ๐ ๒๓๕๔ ๓๔๑๕

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท ซีคอต จำกัด

เลขทะเบียน ว-๒๓๙

ที่อก ๐๓๑๐(๑)/ ๑๑ ๘ ๐ ๕

ลงวันที่ ๒๑ ตุลาคม ๒๕๖๓

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๑๐ ราย

๑) นางสาวสมฤดี เกรียงไกรอุดม	ทะเบียนเลขที่ ว-๒๓๙-ค-๕๘๒๐
๒) นางสาวอารยา ทิพรัักษ์	ทะเบียนเลขที่ ว-๒๓๙-ค-๕๘๖๓
๓) นายขรรชัย เกรียงไกรอุดม	ทะเบียนเลขที่ ว-๒๓๙-ค-๕๙๗๕
๔) นางสาวเชมชุตตา อินทร์ศรี	ทะเบียนเลขที่ ว-๒๓๙-ค-๕๙๗๖
๕) นางสาวปรีดา สมใจ	ทะเบียนเลขที่ ว-๒๓๙-ค-๕๙๗๘
๖) นางสาวอริญญา มาตา	ทะเบียนเลขที่ ว-๒๓๙-ค-๕๙๗๙
๗) นางสาวลดาวัลย์ วงศ์เจริญ	ทะเบียนเลขที่ ว-๒๓๙-ค-๕๙๘๐
๘) นางสาวณัฏฐวรรณ เกตะวันดี	ทะเบียนเลขที่ ว-๒๓๙-ค-๕๙๘๒
๙) นางสาวนริสา ภูวสรเพ็ชญ์	ทะเบียนเลขที่ ว-๒๓๙-ค-๖๔๑๙
๑๐) นางสาวศิริวรรณ นิมนต์สง	ทะเบียนเลขที่ ว-๒๓๙-ค-๖๔๒๐

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท ซีคอบ จำกัด

เลขทะเบียน ว-๒๓๙

ที่ อก ๐๓๑๐(๑)/ ๑๑ ๘ ๐ ๔

ลงวันที่ ๒๑ ตุลาคม ๒๕๖๓

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๓๑ ราย

๑) นางสาวสุรชวดี ชัยธรรม	ทะเบียนเลขที่	ว-๒๓๙-จ-๕๕๒๕
๒) นางสาวสุรชวดี เทียนเตี้ย	ทะเบียนเลขที่	ว-๒๓๙-จ-๕๕๒๖
๓) นางสาวสุนันทา ศิริคุณานนท์	ทะเบียนเลขที่	ว-๒๓๙-จ-๕๕๕๓
๔) นายบวร ดีชัยยะ	ทะเบียนเลขที่	ว-๒๓๙-จ-๕๕๕๖
๕) นางสาวเกศรินทร์ วรรณวิทยา	ทะเบียนเลขที่	ว-๒๓๙-จ-๕๕๕๑
๖) นายอนันต์ พิมวันนา	ทะเบียนเลขที่	ว-๒๓๙-จ-๖๐๐๑
๗) นายชิตพล สมประสงค์	ทะเบียนเลขที่	ว-๒๓๙-จ-๖๐๐๒
๘) นางสาวศศิธร พรหมประเสริฐ	ทะเบียนเลขที่	ว-๒๓๙-จ-๖๐๐๓
๙) นายศิวะนนท์ กุลวงษ์	ทะเบียนเลขที่	ว-๒๓๙-จ-๖๐๐๕
๑๐) นางสาวโชติมาส ไทยเจริญ	ทะเบียนเลขที่	ว-๒๓๙-จ-๖๐๐๖
๑๑) นางสาวปิยขวัญ สุระโคตร	ทะเบียนเลขที่	ว-๒๓๙-จ-๖๔๒๑
๑๒) นางสาวณัฐศิริ เลิศธีรพิพัฒน์	ทะเบียนเลขที่	ว-๒๓๙-จ-๖๔๒๓
๑๓) นางสาวเกษวรินทร์ ศิลศึก	ทะเบียนเลขที่	ว-๒๓๙-จ-๖๔๒๔
๑๔) นางสาวอลิษา คณิรานนท์	ทะเบียนเลขที่	ว-๒๓๙-จ-๗๒๓๑
๑๕) นางสาวจิรนนท์ จิตุทธศรี ปิยะธนากร	ทะเบียนเลขที่	ว-๒๓๙-จ-๗๒๓๒
๑๖) นางสาวสิริวรรณ แก้วจิงดวง	ทะเบียนเลขที่	ว-๒๓๙-จ-๗๒๓๓
๑๗) นางสาวปัทมวรรณ สุวรรณวิโรจน์	ทะเบียนเลขที่	ว-๒๓๙-จ-๗๒๓๔
๑๘) นางสาวกนิษฐา เจริญเชื้อ	ทะเบียนเลขที่	ว-๒๓๙-จ-๗๒๓๖
๑๙) นายจิรากร ลิมศิลา	ทะเบียนเลขที่	ว-๒๓๙-จ-๗๒๓๗
๒๐) นายชนาธิป สิงห์เกษมศักดิ์	ทะเบียนเลขที่	ว-๒๓๙-จ-๗๒๓๘
๒๑) นายวัชรกานต์ ประมาคเต	ทะเบียนเลขที่	ว-๒๓๙-จ-๗๒๔๐
๒๒) นายทอง เฮงขวัญกุล	ทะเบียนเลขที่	ว-๒๓๙-จ-๗๒๔๒
๒๓) นางสาวกฤษณา จันทุม	ทะเบียนเลขที่	ว-๒๓๙-จ-๗๘๐๒
๒๔) นางสาวพรนภา บุตรธรรม	ทะเบียนเลขที่	ว-๒๓๙-จ-๗๘๐๓
๒๕) นางสาวธาริณี อางปลิว	ทะเบียนเลขที่	ว-๒๓๙-จ-๗๘๐๔
๒๖) นายธนโชติ ช่างล้อ	ทะเบียนเลขที่	ว-๒๓๙-จ-๗๘๐๖
๒๗) นางสาวพัชรา สมานฉันท	ทะเบียนเลขที่	ว-๒๓๙-จ-๘๑๘๓
๒๘) นางสาวจุฑารัตน์ แจ่มเรือน	ทะเบียนเลขที่	ว-๒๓๙-จ-๘๔๔๓
๒๙) นางสาวจณิสตา กุ้ยอ่อน	ทะเบียนเลขที่	ว-๒๓๙-จ-๘๔๔๗
๓๐) นางสาววรัญญา เขียนมัน	ทะเบียนเลขที่	ว-๒๓๙-จ-๘๔๔๘
๓๑) นางสาวจิรารัตน์ นุริตมนต์	ทะเบียนเลขที่	ว-๒๓๙-จ-๘๔๔๙

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท ซีคอบ จำกัด

เลขทะเบียน ว-๒๓๙

ที่ อก ๐๓๑๐(๑)/ ๑๑ ๘ ๐ ๔

ลงวันที่ ๒๑ ตุลาคม ๒๕๖๓

ขอขยายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๕๒ รายการ

น้ำเสีย จำนวน 46 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldrin	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
2	Arsenic	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[4] 2) Digestion, Inductively Coupled Plasma Method ^[4]
3	Barium	1) Digestion, Direct Nitrous Oxide-Acetylene Flame Method ^[4] 2) Digestion, Inductively Coupled Plasma Method ^[4]
4	α-BHC	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
5	β-BHC	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
6	γ-BHC	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
7	δ-BHC	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
8	Biochemical Oxygen Demand	1) 5-Day BOD Test, Azide Modification Method ^[4] 2) 5-Day BOD Test, Membrane Electrode Method ^[4]
9	Cadmium	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Method ^[4]



(นางริกาญจน์ สัตร์สกุลไชย)

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และทะเบียนห้องปฏิบัติการ

10 Chemical...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
10	Chemical Oxygen Demand	1) Open Reflux, Titrimetric method ^[4] 2) Close Reflux, Colorimetric method ^[4] 3) Closed Reflux, Titrimetric Method ^[4]
11	Chlordane	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
12	Chromium	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Method ^[4]
13	Color	ADMI Weighted-Ordinate Spectrophotometric Method ^[4]
14	Copper	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Method ^[4]
15	Cyanide	Distillation, Colorimetric method ^[4]
16	2,4-D	Liquid-Liquid Extraction, Gas Chromatographic Method ^[4]
17	4,4'-DDD	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
18	4,4'-DDE	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
19	4,4'-DDT	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
20	Dieldrin	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]



21 Endosulfan I...

(นางริกาญจน์ ฉัตรสกุลวิไล)
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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
21	Endosulfan I	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
22	Endosulfan II	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
23	Endosulfan Sulfate	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
24	Endrin	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
25	Endrin Aldehyde	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
26	Formaldehyde	Distillation, Colorimetric Method ^[3]
27	Free Chlorine	1) Iodometric Method ^[4] 2) DPD Colorimetric Method ^[4]
28	Heptachlor	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
29	Heptachlor epoxide	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
30	Hexavalent Chromium	1) Colorimetric Method ^[4] 2) Extraction, Air-Acetylene Flame Method ^[4]
31	Lead	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Method ^[4]



(นางริกาญจน์ ฉัตรสกุลวิไล)
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32 Manganese...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
32	Manganese	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Method ^[4]
33	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[4]
34	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic Method ^[4]
35	Nickel	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Method ^[4]
36	Oil & Grease	1) Liquid-Liquid, Partition-Gravimetric Method ^[4] 2) Soxhlet Extraction Method ^[4]
37	pH	Electrometric Method ^[4]
38	Phenols	1) Distillation, Chloroform Extraction Method ^[4] 2) Distillation, Direct Photometric Method ^[4]
39	Selenium	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[4] 2) Digestion, Inductively Coupled Plasma Method ^[4]
40	Sulfide	1) Iodometric method ^[4] 2) Methylene blue method ^[4]
41	Temperature	Laboratory and Field Methods ^[4]
42	Total Dissolved Solids	Dried at 180 °C ^[4]
43	Total Kjeldahl Nitrogen	1) Macro Kjeldahl Method ^[4] 2) Semi-Micro Kjeldahl Method ^[4]
44	Total Suspended Solids	Dried at 103-105 °C ^[4]
45	Trivalent Chromium	1) Digestion, Direct Air-Acetylene Flame Method; Colorimetric Method; Calculation ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method; Colorimetric Method; Calculation ^[4] 3) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation ^[4]
46	Zinc	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Method ^[4]

น้ำใต้ดิน จำนวน 123 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
2	Acetone	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^[4]
3	Aldrin	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
4	Anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
5	Antimony	Digestion, Inductively Coupled Plasma Spectrometric Method ^[4]
6	Arsenic	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[4] 2) Digestion, Inductively Coupled Plasma Method ^[4]
7	Atrazine	Liquid-Liquid Extraction, Gas Chromatographic Method ^[4]
8	Barium	1) Digestion, Direct Nitrous Oxide-Acetylene Flame Method ^[4] 2) Digestion, Inductively Coupled Plasma Spectrometric Method ^[4]
9	Benz(a)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
10	Benzene	Purge and Trap Gas Chromatographic/ Mass spectrometric Method ^[4]
11	Benzo(b)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
12	Benzo(k)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
13	Benzoic acid	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
14	Benzo(a)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
15	Benzo(g,h,i)perylene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
16	Beryllium	Digestion, Inductively Coupled Plasma Spectrometric Method ^[4]
17	Bis(2-chloroethyl)ether	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
18	Bis(2-ethylhexyl)phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
19	Bromodichloromethane	Purge and Trap Gas Chromatographic/Mass spectrometric Method ^[4]
20	Bromoform	Purge and Trap Gas Chromatographic/Mass spectrometric Method ^[4]
21	Butanol	Purge and Trap Gas Chromatographic/Mass spectrometric Method ^[4]
22	Butyl benzyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
23	Cadmium	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Spectrometric Method ^[4]
24	Carbazole	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
25	Carbon disulfide	Purge and Trap Gas Chromatographic/Mass spectrometric Method ^[4]
26	Carbon tetrachloride	Purge and Trap Gas Chromatographic/Mass spectrometric Method ^[4]
27	Chlordane	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
28	p-Chloroaniline	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
29	Chlorobenzene	Purge and Trap Gas Chromatographic/Mass spectrometric Method ^[4]
30	Chlorodibromomethane	Purge and Trap Gas Chromatographic/Mass spectrometric Method ^[4]
31	Chloroform	Purge and Trap Gas Chromatographic/Mass spectrometric Method ^[4]

(นางริกาญจน์ ฉัตรสกุลวิไล) 32 2-Chlorophenol...
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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
32	2-Chlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
33	Chromium	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Spectrometric Method ^[4]
34	Chromium (III)	1) Digestion, Direct Air-Acetylene Flame Method; Colorimetric Method; Calculation ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method; Colorimetric Method; Calculation ^[4] 3) Digestion, Inductively Coupled Plasma Spectrometric Method; Colorimetric Method; Calculation ^[4]
35	Chromium (VI)	1) Colorimetric Method ^[4] 2) Extraction, Air-Acetylene Flame Method ^[4]
36	Chrysene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
37	Cyanide	1) Distillation, Titrimetric Method ^[4] 2) Distillation, Colorimetric Method ^[4]
38	2,4-D	Liquid-Liquid Extraction, Gas Chromatographic Method ^[4]
39	DDD	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
40	DDE	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
41	DDT	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]

(นางริกาญจน์ ฉัตรสกุลวิไล)
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42 Dibenz(a,h)...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
42	Dibenz(a,h)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
43	Di-n-butyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
44	1,2-Dichlorobenzene	Purge and Trap Gas Chromatographic/ Mass spectrometric Method ^[4]
45	1,3-Dichlorobenzene	Purge and Trap Gas Chromatographic/ Mass spectrometric Method ^[4]
46	1,4-Dichlorobenzene	Purge and Trap Gas Chromatographic/ Mass spectrometric Method ^[4]
47	3,3'-Dichlorobenzidine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
48	1,1-Dichloroethane	Purge and Trap Gas Chromatographic/ Mass spectrometric Method ^[4]
49	1,2-Dichloroethane	Purge and Trap Gas Chromatographic/ Mass spectrometric Method ^[4]
50	1,1-Dichloroethylene	Purge and Trap Gas Chromatographic/ Mass spectrometric Method ^[4]
51	cis-1,2-Dichloroethylene	Purge and Trap Gas Chromatographic/ Mass spectrometric Method ^[4]
52	trans-1,2-Dichloroethylene	Purge and Trap Gas Chromatographic/ Mass spectrometric Method ^[4]
53	2,4-Dichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
54	1,2-Dichloropropane	Purge and Trap Gas Chromatographic/ Mass spectrometric Method ^[4]
55	1,3-Dichloropropane	Purge and Trap Gas Chromatographic/ Mass spectrometric Method ^[4]
56	1,3-Dichloropropene	Purge and Trap Gas Chromatographic/ Mass spectrometric Method ^[4]
57	Dieldrin	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
58	Diethyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]



59 2,4-Dimethylphenol...

(นางรวิภาญจน์ ชัตรสกุลวิไล)

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
59	2,4-Dimethylphenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
60	2,4-Dinitrophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
61	2,4-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
62	2,6-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
63	Di-n-Octyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
64	Endosulfan	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
65	Endrin	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
66	Ethylbenzene	Purge and Trap Gas Chromatographic/ Mass spectrometric Method ^[4]
67	Fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
68	Fluorene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
69	Heptachlor	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
70	Heptachlor epoxide	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
71	Hexachlorobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
72	Hexachloro-1,3-butadiene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]




73 n-Hexane...

(นางรวิภาญจน์ ชัตรสกุลวิไล)


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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
73	n-Hexane	Purge and Trap Gas Chromatographic/ Mass spectrometric Method ^[4]
74	α-HCH	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
75	β-HCH	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
76	γ-HCH	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
77	Hexachlorocyclopentadiene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
78	Hexachloroethane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
79	Indeno(1,2,3-cd)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
80	Isophorone	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
81	Lead	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Spectrometric Method ^[4]
82	Manganese	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Spectrometric Method ^[4]
83	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[4]
84	Methanol	Purge and Trap Gas Chromatographic/ Mass spectrometric Method ^[4]


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85 Methoxychlor...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
85	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic Method ^[4]
86	Methyl bromide	Purge and Trap Gas Chromatographic/ Mass spectrometric Method ^[4]
87	Methylene chloride	Purge and Trap Gas Chromatographic/ Mass spectrometric Method ^[4]
88	2-Methylphenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
89	2-Methylnaphthalene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
90	Methyl tert-butyl ether	Purge and Trap Gas Chromatographic/ Mass spectrometric Method ^[4]
91	Naphthalene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
92	Nickel	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Spectrometric Method ^[4]
93	Nitrobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
94	N-Nitrosodiphenylamine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
95	Polychlorinated Biphenyls - PCB-1016 - PCB-1221 - PCB-1232 - PCB-1242 - PCB-1248 - PCB-1254 - PCB-1260	Liquid-Liquid Extraction, Gas Chromatographic Method ^[4]
96	Pentachlorophenol	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]


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97 pH...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
97	pH	Electrometric method ^[4]
98	Phenanthrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
99	Phenol	1) Distillation, Chloroform Extraction Method ^[4] 2) Distillation, Direct Photometric Method ^[4] 3) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
100	Pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
101	Selenium	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[4] 2) Digestion, Inductively Coupled Plasma Method ^[4]
102	Silver	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Inductively Coupled Plasma Method ^[4]
103	Styrene	Purge and Trap Gas Chromatographic/ Mass spectrometric Method ^[4]
104	1,1,2,2-Tetrachloroethane	Purge and Trap Gas Chromatographic/ Mass spectrometric Method ^[4]
105	Tetrachloroethylene	Purge and Trap Gas Chromatographic/ Mass spectrometric Method ^[4]
106	Toluene	Purge and Trap Gas Chromatographic/ Mass spectrometric Method ^[4]
107	TPH (C ₅ -C ₈)	Purge and Trap, Gas Chromatographic/ Mass spectrometric Method ^[7,9]
108	TPH (C ₈ -C ₁₆)	1) Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[6,8] 2) Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass spectrometric Method ^[6,9]
109	TPH (C ₁₆ -C ₃₅)	1) Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[6,8] 2) Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass spectrometric Method ^[6,9]
110	1,2,4-Trichlorobenzene	Purge and Trap Gas Chromatographic/ Mass spectrometric Method ^[4]
111	1,1,1-Trichloroethane	Purge and Trap Gas Chromatographic/ Mass spectrometric Method ^[4]



112 1,1,2-Trichloroethane...

(นางกริยาญจน์ จิตรสกุลวิไล)

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
112	1,1,2-Trichloroethane	Purge and Trap Gas Chromatographic/ Mass spectrometric Method ^[4]
113	Trichloroethylene	Purge and Trap Gas Chromatographic/ Mass spectrometric Method ^[4]
114	2,4,5-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
115	2,4,6-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
116	1,3,5-Trimethylbenzene	Purge and Trap Gas Chromatographic/ Mass spectrometric Method ^[4]
117	Vanadium	Digestion, Inductively Coupled Plasma Spectrometric Method ^[4]
118	Vinyl chloride	Purge and Trap Gas Chromatographic/ Mass spectrometric Method ^[4]
119	m-Xylene	Purge and Trap Gas Chromatographic/ Mass spectrometric Method ^[4]
120	o-Xylene	Purge and Trap Gas Chromatographic/ Mass spectrometric Method ^[4]
121	p-Xylene	Purge and Trap Gas Chromatographic/ Mass spectrometric Method ^[4]
122	Xylene (Total)	Purge and Trap Gas Chromatographic/ Mass spectrometric Method ^[4]
123	Zinc	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Spectrometric Method ^[4]

อากาศเสีย (ปล่อยระบาย) จำนวน 27 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Antimony	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]



2 Arsenic...

(นางกริยาญจน์ จิตรสกุลวิไล)


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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
2	Arsenic	1) Isokinetic Sampling, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
3	Beryllium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
4	Cadmium	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
5	Carbon monoxide	Instrumental Analyzer Method ^[5]
6	Chlorine	1) Absorption Sampling, Ion Chromatographic Method ^[5] 2) Isokinetic Sampling, Ion Chromatographic Method ^[5]
7	Chromium	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
8	Cobalt	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
9	Copper	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
10	Cresol	Adsorption Sampling, Gas Chromatographic Method ^[5]
11	Dioxin/Furans	Isokinetic Sampling, Analysis by ISO/IEC 17025 Accredited Laboratory or Analysis by Department of Industrial Works Registered Laboratory (Dioxins/Furans Analysis Approved) ^[5]
12	Hydrogen chloride	1) Absorption Sampling, Ion Chromatographic Method ^[5] 2) Isokinetic Sampling, Ion Chromatographic Method ^[5]
13	Hydrogen Fluoride	1) Absorption Sampling, Ion Chromatographic Method ^[5] 2) Isokinetic Sampling, Ion Chromatographic Method ^[5]


 (นางริกาญจน์ ฉัตรสกุลไฉ่)
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14 Hydrogen Sulfide...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
14	Hydrogen Sulfide	Absorption Sampling, Iodometric Method ^[5]
15	Lead	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
16	Manganese	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
17	Mercury	Isokinetic Sampling, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[5]
18	Nickel	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
19	Opacity	Ringelmann's Method ^[2]
20	Oxide of Nitrogen	1) Absorption Sampling, Ion Chromatographic Method ^[5] 2) Absorption Sampling, Phenoldisulfonic acid Method ^[5] 3) Instrumental Analyzer Method ^[5]
21	Selenium	1) Isokinetic Sampling, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
22	Sulfur dioxide	1) Isokinetic Sampling, Barium-Thorin Titrimetric Method ^[5] 2) Instrumental Analyzer Method ^[5]
23	Sulfuric acid	Isokinetic Sampling, Barium-Thorin Titrimetric Method ^[5]
24	Tin	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
25	Total Suspended Particulate	Isokinetic Sampling, Gravimetric Method ^[5]



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26 Vanadium...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
26	Vanadium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
27	Xylene	1) Adsorption Sampling, Gas Chromatographic Method ^[5] 2) Adsorption Sampling, Gas Chromatographic/Mass Spectrometric Method ^[5]

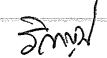
สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน 34 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[1,9,22] 2) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,26] 3) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 4) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,26]
2	Antimony	1) Waste Extraction, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[1,6,16] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 3) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[7,16] 4) Digestion, Inductively Coupled Plasma Method ^[7,14]
3	Arsenic	1) Waste Extraction, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[1,6,16] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 3) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[7,16] 4) Digestion, Inductively Coupled Plasma Method ^[7,14]
4	Barium	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14]


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3) Digestion...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
5	Beryllium	3) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 4) Digestion, Inductively Coupled Plasma Method ^[7,14] 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 2) Digestion, Inductively Coupled Plasma Method ^[7,14]
6	Cadmium	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 3) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 4) Digestion, Inductively Coupled Plasma Method ^[7,14]
7	Chlordane	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[1,9,22] 2) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,26] 3) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 4) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,26]
8	Chromium	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 3) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 4) Digestion, Inductively Coupled Plasma Method ^[7,14]
9	Chromium (III)	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method; Waste Extraction, Colorimetric Method; Calculation Method ^[1,6,15,17] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method; Waste Extraction, Colorimetric Method; Calculation Method ^[1,6,16,17]


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3) Digestion...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
10	Chromium (VI)	3) Digestion, Flame Atomic Absorption Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^[7,8,15,17] 4) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^[7,8,14,17]
11	Cobalt	1) Waste Extraction, Colorimetric Method ^[1,17] 2) Alkaline Digestion, Colorimetric Method ^[8,17]
12	Copper	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 2) Digestion, Inductively Coupled Plasma Method ^[7,14]
13	2,4-D	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 3) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 4) Digestion, Inductively Coupled Plasma Method ^[7,14]
14	DDD	1) Waste Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,24] 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[24]
15	DDE	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[1,9,22] 2) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,26] 3) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 4) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,26]

3) Soxhlet...

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
16	DDT	3) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 4) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,26] 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[1,9,22] 2) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,26] 3) Soxhlet Extraction, Gas Chromatographic Method ^[10,22]
17	Dieldrin	4) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,26] 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[1,9,22] 2) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,26] 3) Soxhlet Extraction, Gas Chromatographic Method ^[10,22]
18	Endrin	4) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,26] 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[1,9,22] 2) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,26] 3) Soxhlet Extraction, Gas Chromatographic Method ^[10,22]
19	Heptachlor	4) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,26] 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[1,9,22] 2) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,26] 3) Soxhlet Extraction, Gas Chromatographic Method ^[10,22]

4) Soxhlet...

(นางริกาญจน์ ฉัตรสกุลวิไล)
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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
20	Lead	4) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 3) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 4) Digestion, Inductively Coupled Plasma Method ^[7,14]
21	Lindane	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[1,9,22] 2) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,26] 3) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 4) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
22	Mercury	1) Waste Extraction, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[1,18] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 3) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[19] 4) Digestion, Inductively Coupled Plasma Method ^[7,14]
23	Methoxychlor	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[1,9,22] 2) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,26] 3) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 4) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
24	Molybdenum	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 2) Digestion, Inductively Coupled Plasma Method ^[7,14]

วิภา

25 Nickel...

(นางริกาญจน์ ฉัตรสกุลวิไล)
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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
25	Nickel	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 3) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 4) Digestion, Inductively Coupled Plasma Method ^[7,14]
26	Polychlorinated Biphenyls - Aroclor 1016 - Aroclor 1221 - Aroclor 1232 - Aroclor 1242 - Aroclor 1254 - Aroclor 1260	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[1,9,23] 2) Soxhlet Extraction, Gas Chromatographic Method ^[10,23]
27	Pentachlorophenol	1) Waste Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[1,24] 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[24]
28	pH	Electrometric Method ^[30,31]
29	Selenium	1) Waste Extraction, Digestion, Hydride Generation/ Atomic Absorption Spectrometric Method ^[1,6,20] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 3) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[7,20] 4) Digestion, Inductively Coupled Plasma Method ^[7,14]
30	Silver	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 2) Digestion, Inductively Coupled Plasma Method ^[7,14]
31	Thallium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 2) Digestion, Inductively Coupled Plasma Method ^[7,14]
32	Trichloroethylene	1) Waste Extraction, Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1,12,25] 2) Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[12,25]

วิภา

33 Vanadium...

(นางริกาญจน์ ฉัตรสกุลวิไล)
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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
33	Vanadium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14]
34	Zinc	2) Digestion, Inductively Coupled Plasma Method ^[7,14] 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 3) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 4) Digestion, Inductively Coupled Plasma Method ^[7,14]

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
2	Acetone	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,25]
3	Aldrin	1) Ultrasonic Extraction, Gas Chromatographic Method ^[11,22] 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
4	Anthracene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
5	Antimony	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[7,16] 2) Digestion, Inductively Coupled Plasma Method ^[7,14]
6	Arsenic	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[7,16] 2) Digestion, Inductively Coupled Plasma Method ^[7,14]
7	Atrazine	Ultrasonic Extraction, Gas Chromatographic Method ^[11,22]
8	Barium	1) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 2) Digestion, Inductively Coupled Plasma Method ^[7,14]

9 Benz(a)anthracene...

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
9	Benz(a)anthracene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
10	Benzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,25]
11	Benzo(b)fluoranthene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
12	Benzo(k)fluoranthene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
13	Benzoic acid	Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
14	Benzo(a)pyrene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
15	Benzo(g,h,i)perylene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
16	Beryllium	Digestion, Inductively Coupled Plasma Method ^[7,14]
17	Bis(2-chloroethyl)ether	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
18	Bis(2-ethylhexyl)phthalate	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
19	Bromodichloromethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,25]
20	Bromoform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,25]
21	Butanol	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,25]
22	Butyl benzyl phthalate	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
23	Cadmium	1) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 2) Digestion, Inductively Coupled Plasma Method ^[7,14]
24	Carbazole	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
25	Carbon disulfide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,25]
26	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,25]

27 Chlordane...

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
27	Chlordane	1) Ultrasonic Extraction, Gas Chromatographic Method ^[11,22] 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
28	p-Chloroaniline	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
29	Chlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,25]
30	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,25]
31	Chloroform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,25]
32	2-Chlorophenol	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
33	Chromium	1) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 2) Digestion, Inductively Coupled Plasma Method ^[7,14]
34	Chromium (III)	1) Digestion, Flame Atomic Absorption Spectrometric Method; Colorimetric Method; Calculation Method ^[7,8,15,17] 2) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation Method ^[7,8,14,17]
35	Chromium (VI)	Alkaline Digestion, Colorimetric Method ^[8,17]
36	Chrysene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
37	Cyanide	1) Extraction, Distillation, Titrimetric Method ^[27,28,29] 2) Extraction, Distillation, Colorimetric Method ^[27,28,29]
38	2,4-D	Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[24]
39	DDD	1) Ultrasonic Extraction, Gas Chromatographic Method ^[11,22] 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
40	DDE	1) Ultrasonic Extraction, Gas Chromatographic Method ^[11,22] 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]



(นางริกาญจน์ อัครสกุลวิไล)
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41 DDT...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
41	DDT	1) Ultrasonic Extraction, Gas Chromatographic Method ^[11,22] 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
42	Dibenz(a,h)anthracene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
43	Di-n-butyl phthalate	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
44	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,25]
45	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,25]
46	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,25]
47	3,3'-Dichlorobenzidine	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
48	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,25]
49	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,25]
50	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,25]
51	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,25]
52	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,25]
53	2,4-Dichlorophenol	Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
54	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,25]
55	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,25]
56	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,25]



(นางริกาญจน์ อัครสกุลวิไล)
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57 Dieldrin...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
57	Dieldrin	1) Ultrasonic Extraction, Gas Chromatographic Method ^[11,22] 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
58	Diethyl phthalate	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
59	2,4-Dimethylphenol	Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
60	2,4-Dinitrophenol	Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
61	2,4-Dinitrotoluene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
62	2,6-Dinitrotoluene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
63	Di-n-Octyl phthalate	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
64	Endosulfan	1) Ultrasonic Extraction, Gas Chromatographic Method ^[11,22] 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
65	Endrin	1) Ultrasonic Extraction, Gas Chromatographic Method ^[11,22] 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
66	Ethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,25]
67	Fluoranthene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
68	Fluorene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
69	Heptachlor	1) Ultrasonic Extraction, Gas Chromatographic Method ^[11,22] 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]

วิมล

70 Heptachlor epoxide...

(นางริกาญจน์ ฉัตรสกุลวิไล)

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
70	Heptachlor epoxide	1) Ultrasonic Extraction, Gas Chromatographic Method ^[11,22] 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
71	Hexachlorobenzene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
72	Hexachloro-1,3-butadiene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
73	n-Hexane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,25]
74	α-HCH	1) Ultrasonic Extraction, Gas Chromatographic Method ^[11,22] 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
75	β-HCH	1) Ultrasonic Extraction, Gas Chromatographic Method ^[11,22] 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
76	γ-HCH	1) Ultrasonic Extraction, Gas Chromatographic Method ^[11,22] 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
77	Hexachlorocyclopentadiene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
78	Hexachloroethane	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
79	Indeno(1,2,3-cd)pyrene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
80	Isophorone	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
81	Lead	1) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 2) Digestion, Inductively Coupled Plasma Method ^[7,14]
82	Manganese	1) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 2) Digestion, Inductively Coupled Plasma Method ^[7,14]

วิมล

83 Mercury...

(นางริกาญจน์ ฉัตรสกุลวิไล)

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
83	Mercury	1) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[19] 2) Digestion, Inductively Coupled Plasma Method ^[7,14]
84	Methanol	Ultrasonic Extraction, Direct Aqueous Injection, Gas Chromatographic Method ^[11,21]
85	Methoxychlor	1) Ultrasonic Extraction, Gas Chromatographic Method ^[11,22] 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[11,26]
86	Methyl bromide	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,25]
87	Methylene chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,25]
88	2-Methylphenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[11,26]
89	2-Methylnaphthalene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[11,26]
90	Methyl tert-butyl ether	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,25]
91	Naphthalene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,26]
92	Nickel	1) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 2) Digestion, Inductively Coupled Plasma Method ^[7,14]
93	Nitrobenzene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,26]
94	N-Nitrosodiphenylamine	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,26]
95	Polychlorinated Biphenyls - Aroclor 1016 - Aroclor 1221 - Aroclor 1232 - Aroclor 1242 - Aroclor 1248 - Aroclor 1254 - Aroclor 1260	Soxhlet Extraction, Gas Chromatographic Method ^[10,23]



96 Pentachlorophenol...

(นางริกาญจน์ จิตตรสกุลไค)

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
96	Pentachlorophenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[24]
97	Phenanthrene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,26]
98	Phenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[11,26]
99	Pyrene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,26]
100	Selenium	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[7,20] 2) Digestion, Inductively Coupled Plasma Method ^[7,14]
101	Silver	1) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 2) Digestion, Inductively Coupled Plasma Method ^[7,14]
102	Styrene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,25]
103	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,25]
104	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,25]
105	Toluene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,25]
106	TPH (C ₅ -C ₈)	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,25]
107	TPH (C ₈ -C ₁₆)	1) Soxhlet Extraction, Gas Chromatographic Method ^[10,21] 2) Soxhlet Extraction, Gas Chromatographic/Mass spectrometric Method ^[10,21]
108	TPH (C ₁₆ -C ₃₅)	1) Soxhlet Extraction, Gas Chromatographic Method ^[10,21] 2) Soxhlet Extraction, Gas Chromatographic/Mass spectrometric Method ^[10,25]
109	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,25]
110	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,25]



111 1,1,2-Trichloroethane...

(นางริกาญจน์ จิตตรสกุลไค)

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
111	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,25]
112	Trichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,25]
113	2,4,5-Trichlorophenol	Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
114	2,4,6-Trichlorophenol	Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
115	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,25]
116	Vanadium	Digestion, Inductively Coupled Plasma Method ^[7,14]
117	Vinyl chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,25]
118	m-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,25]
119	o-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,25]
120	p-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,25]
121	Xylene (Total)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,25]
122	Zinc	1) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 2) Digestion, Inductively Coupled Plasma Method ^[7,14]

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(นางริกาญจน์ ฉัตรสกุลวิไล)

ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ
และทะเบียนห้องปฏิบัติการ

ภาคผนวก ช

ใบรับรองความสามารถห้องปฏิบัติการและขอบข่ายการรับรอง
ห้องปฏิบัติการทดสอบ ตามมาตรฐาน ISO/IEC 17025
จากสำนักงานมาตรฐานอุตสาหกรรม (สมอ.)



ใบรับรองเลขที่ 20T173/1151

ใบรับรองห้องปฏิบัติการ

อาศัยอำนาจตามความในพระราชบัญญัติการมาตรฐานแห่งชาติ พ.ศ. ๒๕๕๑

เลขานุการสำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม

ออกใบรับรองฉบับนี้ให้

บริษัท ซีคोट จำกัด

มีห้องปฏิบัติการตั้งอยู่เลขที่

239 ถนนริมคลองประปา แขวงบางซื่อ เขตบางซื่อ กรุงเทพมหานคร

ได้รับการรับรองความสามารถห้องปฏิบัติการทดสอบ

ตามมาตรฐานเลขที่ มอก. 17025-2561 (ISO/IEC 17025 : 2017)

ข้อกำหนดทั่วไปว่าด้วยความสามารถห้องปฏิบัติการทดสอบและสอบเทียบ

หมายเลขการรับรองที่ ทดสอบ ๐๓๙๔

โดยมีสาขาการรับรองตามรายละเอียดแนบท้ายใบรับรอง

ตั้งแต่วันที่ ๙ กันยายน พ.ศ. ๒๕๖๓

ถึง วันที่ ๘ กันยายน พ.ศ. ๒๕๖๖

ออกให้ ณ วันที่ ๒๓ กันยายน ๒๕๖๓

(นายวีระกิตติ์ รินทกิจธนวัชร)

รองเลขาธิการ ปฏิบัติราชการแทน

เลขานุการสำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม



กระทรวงอุตสาหกรรม สำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม

รายละเอียดแนบท้ายใบรับรองห้องปฏิบัติการทดสอบ

ใบรับรองเลขที่ 20T173/1151

ชื่อห้องปฏิบัติการ

ห้องปฏิบัติการทดสอบ บริษัท ซีคोट จำกัด

ที่อยู่

239 ถนนริมคลองประปา แขวงบางซื่อ เขตบางซื่อ กรุงเทพมหานคร

หมายเลขการรับรองที่

ทดสอบ 0394

สถานภาพห้องปฏิบัติการ

☒ ถาวร ☐ นอกสถานที่ ☐ชั่วคราว ☐เคลื่อนที่

สาขาการทดสอบ	รายการทดสอบ	วิธีทดสอบ
สาขาสิ่งแวดล้อม 1. น้ำและน้ำเสีย (water and wastewater)	<ul style="list-style-type: none"> - Arsenic 0.000 5 mg/l to 0.090 0 mg/l - Arsenic 0.05 mg/l to 4.50 mg/l - Barium 0.02 mg/l to 4.50 mg/l - Cadmium 0.01 mg/l to 4.50 mg/l - Chromium 0.01 mg/l to 4.50 mg/l - Copper 0.02 mg/l to 4.50 mg/l - Iron 0.05 mg/l to 9.00 mg/l - Lead 0.03 mg/l to 4.50 mg/l - Manganese 0.01 mg/l to 9.00 mg/l - Nickel 0.01 mg/l to 4.50 mg/l - Zinc 0.02 mg/l to 9.00 mg/l 	<ul style="list-style-type: none"> - Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 23rd edition, 2017, Part 3030 F and Part 3114 C - Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 23rd edition, 2017, Part 3030 E and Part 3120 B

ฉบับที่ 1 ตั้งแต่วันที่ 9 กันยายน 2563

หน้า 1/5

กระทรวงอุตสาหกรรม สำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม

รายละเอียดแนบท้ายใบรับรองห้องปฏิบัติการทดสอบ

ใบรับรองเลขที่ 20T173/1151

หมายเลขการรับรองที่ ทดสอบ 0394

สถานภาพห้องปฏิบัติการ ☒ ถาวร ☐ นอกสถานที่ ☐ชั่วคราว ☐เคลื่อนที่

สาขาการทดสอบ	รายการทดสอบ	วิธีทดสอบ
<p>สาขาสังแวดล้อม</p> <p>1. น้ำและน้ำเสีย (ต่อ) (water and wastewater) (cont.)</p> <p>2. คุณภาพอากาศ (air quality)</p> <p>2.1 บริเวณทำงาน (workplace)</p>	<p>- COD 100 mg/l to 4 000 mg/l</p> <p>- Total dust 0.10 mg/filter to 2.00 mg/filter</p> <p>- Respirable dust 0.10 mg/filter to 2.00 mg/filter</p> <p>- Benzene 1.10 µg/tube to 420 µg/tube</p> <p>- Toluene 1.10 µg/tube to 420 µg/tube</p> <p>- Total xylenes 2.20 µg/tube to 840 µg/tube</p> <p>• m,p-xylene 1.10 µg/tube to 420 µg/tube</p> <p>• o-xylene 1.10 µg/tube to 420 µg/tube</p>	<p>- Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 23rd edition, 2017, Part 5220 D</p> <p>- NIOSH Manual of Analytical Methods (NMAM), method 0500, 4th edition, 15th August 1994 (Exclude Sampling)</p> <p>- NIOSH Manual of Analytical Method(NMAM), method 0600, 4th edition, 15th January 1998 (Exclude Sampling)</p> <p>- NIOSH Manual of Analytical Methods (NMAM) , method 1501, 4th edition, 15th March 2003 (Exclude Sampling)</p>

ฉบับที่ 1 ตั้งแต่ วันที่ 9 กันยายน 2563

หน้า 2/5

กระทรวงอุตสาหกรรม สำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม

รายละเอียดแนบท้ายใบรับรองห้องปฏิบัติการทดสอบ

ใบรับรองเลขที่ 20T173/1151

หมายเลขการรับรองที่ ทดสอบ 0394

สถานภาพห้องปฏิบัติการ ☒ ถาวร ☐ นอกสถานที่ ☐ชั่วคราว ☐เคลื่อนที่

สาขาการทดสอบ	รายการทดสอบ	วิธีทดสอบ
<p>สาขาสังแวดล้อม</p> <p>2. คุณภาพอากาศ (ต่อ) (air quality) (cont.)</p> <p>2.2 อากาศในปล่องระบาย อากาศ (stack)</p> <p>2.3 บรรยากาศทั่วไป (ambient air)</p>	<p>- Sulfur dioxide 1.00 mg/l to 16 000 mg/l (solution)</p> <p>- Hydrogen fluoride 5 µg/sample to 400 µg/sample</p> <p>- Hydrogen chloride 5 µg/sample to 400 µg/sample</p> <p>- Volatile organic compounds (VOCs)</p> <ul style="list-style-type: none"> Chloroethene 0.05 µg/m³ to 51.00 µg/m³ 1,3 - butadiene 0.04 µg/m³ to 44.00 µg/m³ Bromomethane 0.08 µg/m³ to 77.00 µg/m³ Acrolein 0.05 µg/m³ to 45.00 µg/m³ Acrylonitrile 0.04 µg/m³ to 43.00 µg/m³ Dichloromethane 0.14 µg/m³ to 69.00 µg/m³ Carbon disulfide 0.06 µg/m³ to 62.00 µg/m³ Trichloromethane 0.20 µg/m³ to 97.00 µg/m³ 	<p>- US.EPA , Code of Federal Regulations, 40 CFR 60 appendix A, Method 6, July 2019 (Exclude Sampling)</p> <p>- In-house method : WI-7.2-1-22 based on US.EPA, Code of Federal Regulations, 40 CFR 60 appendix A Method 26, 2019 (Exclude Sampling)</p> <p>- In-house method :WI-7.2-1-24 based on US.EPA , Compendium Method TO - 15, EPA / 625 / R-96 / 010b, January 1999 (Include sampling)</p>

ฉบับที่ 1 ตั้งแต่ วันที่ 9 กันยายน 2563

หน้า 3/5

กระทรวงอุตสาหกรรม สำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม

รายละเอียดแนบท้ายใบรับรองห้องปฏิบัติการทดสอบ
ใบรับรองเลขที่ 20T173/1151

หมายเลขการรับรองที่ ทดสอบ 0394

สถานภาพห้องปฏิบัติการ ☒ ถาวร ☐ นอกสถานที่ ☐ ชั่วคราว ☐ เคลื่อนที่

สาขาการทดสอบ	รายการทดสอบ	วิธีทดสอบ
สาขาส่งแวดล้อม 2. คุณภาพอากาศ (ต่อ) (air quality) (cont.) 2.3 บรรยากาศทั่วไป (ต่อ) (ambient air) (cont.)	- Volatile organic compounds (VOCs) (cont.) <ul style="list-style-type: none"> 1,2 - dichloroethane 0.08 $\mu\text{g}/\text{m}^3$ to 80.00 $\mu\text{g}/\text{m}^3$ Benzene 0.06 $\mu\text{g}/\text{m}^3$ to 63.00 $\mu\text{g}/\text{m}^3$ Carbon tetrachloride 0.25 $\mu\text{g}/\text{m}^3$ to 125 $\mu\text{g}/\text{m}^3$ Trichloroethylene 0.21 $\mu\text{g}/\text{m}^3$ to 107 $\mu\text{g}/\text{m}^3$ 1,2 - dichloropropane 0.18 $\mu\text{g}/\text{m}^3$ to 92.00 $\mu\text{g}/\text{m}^3$ Tetrachloroethylene 0.27 $\mu\text{g}/\text{m}^3$ to 135 $\mu\text{g}/\text{m}^3$ 1,2 - dibromoethane 0.31 $\mu\text{g}/\text{m}^3$ to 153 $\mu\text{g}/\text{m}^3$ 1,1,2,2 - tetrachloroethane 0.69 $\mu\text{g}/\text{m}^3$ to 137 $\mu\text{g}/\text{m}^3$ 	- In-house method :WI-7.2-1-24 US.EPA , Compendium Method TO - 15, EPA / 625 / R-96 / 010b, January 1999 (Include sampling)

รายละเอียดแนบท้ายใบรับรองห้องปฏิบัติการทดสอบ
ใบรับรองเลขที่ 20T173/1151

หมายเลขการรับรองที่ ทดสอบ 0394

สถานภาพห้องปฏิบัติการ ☒ ถาวร ☐ นอกสถานที่ ☐ ชั่วคราว ☐ เคลื่อนที่

สาขาการทดสอบ	รายการทดสอบ	วิธีทดสอบ
สาขาส่งแวดล้อม 2. คุณภาพอากาศ (ต่อ) (air quality) (cont.) 2.3 บรรยากาศทั่วไป (ต่อ) (ambient air) (cont.)	- Volatile organic compounds (VOCs) (cont.) <ul style="list-style-type: none"> Benzyl chloride 0.52 $\mu\text{g}/\text{m}^3$ to 103 $\mu\text{g}/\text{m}^3$ 1,4 - dichlorobenzene 0.24 $\mu\text{g}/\text{m}^3$ to 120 $\mu\text{g}/\text{m}^3$ 	- In-house method :WI-7.2-1-24 US.EPA , Compendium Method TO - 15, EPA / 625 / R-96 / 010b, January 1999 (Include sampling)

ออกให้ ณ วันที่ 13 กันยายน 2563



(นายวีระกิตติ์ รันทกิจธนวิษฐ์)
รองเลขาธิการ ปฏิบัติราชการแทน
เลขาธิการสำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม