

ภาคผนวก ง

ใบรับรองผลการตรวจวัดคุณภาพสิ่งแวดล้อม

ใบรับรองผลการตรวจวัดคุณภาพอากาศในบรรยากาศ



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

Location : With in the Refinery Plant, North Monitor Period : 31 Oct 2022-07 Nov 2022
Analyzer Model : API 100A Station No : SS2-01
Serial No : 238 Site Operator : Mr. Sittichai Sawangwongchai

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)						
	31-01 Nov 2022	01-02 Nov 2022	02-03 Nov 2022	03-04 Nov 2022	04-05 Nov 2022	05-06 Nov 2022	06-07 Nov 2022
13:00 - 14:00	4.5	3.7	5.6	4.4	4.7	2.9	2.6
14:00 - 15:00	4.8	2.6	3.2	3.8	3.8	3.0	3.9
15:00 - 16:00	4.8	4.2	2.6	3.8	4.8	3.1	4.6
16:00 - 17:00	3.9	4.0	4.9	5.6	5.5	4.4	4.7
17:00 - 18:00	4.4	5.2	3.3	3.6	3.3	5.1	4.2
18:00 - 19:00	2.9	5.1	4.8	2.8	5.0	3.6	4.1
19:00 - 20:00	4.1	3.8	5.5	5.3	5.1	3.6	4.7
20:00 - 21:00	5.1	5.0	5.6	3.9	4.0	3.7	5.0
21:00 - 22:00	3.7	3.2	4.1	3.4	4.1	4.7	3.4
22:00 - 23:00	2.8	3.4	3.9	3.6	4.0	3.2	4.8
23:00 - 00:00	2.8	3.7	5.3	3.9	4.3	5.5	2.8
00:00 - 01:00	4.7	3.8	3.7	2.6	3.1	4.0	3.3
01:00 - 02:00	3.8	5.0	5.0	3.1	5.2	4.7	5.4
02:00 - 03:00	2.9	4.7	3.3	4.7	4.0	3.1	3.3
03:00 - 04:00	3.6	5.1	4.4	3.8	4.3	3.5	2.6
04:00 - 05:00	4.6	5.2	2.7	5.4	2.6	3.5	4.7
05:00 - 06:00	3.0	5.0	2.9	3.3	4.3	4.2	5.2
06:00 - 07:00	3.8	4.9	3.8	3.9	3.9	5.2	4.9
07:00 - 08:00	4.7	5.4	3.5	5.1	3.4	2.9	4.4
08:00 - 09:00	5.2	3.7	5.5	2.7	5.3	4.7	4.7
09:00 - 10:00	4.6	5.6	4.2	4.3	4.4	4.8	2.8
10:00 - 11:00	3.6	4.9	3.6	4.1	5.0	5.4	3.2
11:00 - 12:00	4.2	4.7	3.7	4.7	4.8	5.2	3.6
12:00 - 13:00	2.6	4.6	3.2	5.2	3.2	5.0	3.2
Average-24Hr*	4.0	4.4	4.1	4.0	4.3	4.1	4.0
Max-1Hr	5.2	5.6	5.6	5.6	5.5	5.5	5.4
Min-1Hr	2.6	2.6	2.7	2.6	2.6	2.9	2.6
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

(Miss Preeda Somjai)
Technical Management Team



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

Location : Map Ta Phut New Town Monitor Period : 31 Oct 2022-07 Nov 2022
Analyzer Model : API 100A Station No : SS2-04
Serial No : 069 Site Operator : Mr. Sittichai Sawangwongchai

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)						
	31-01 Nov 2022	01-02 Nov 2022	02-03 Nov 2022	03-04 Nov 2022	04-05 Nov 2022	05-06 Nov 2022	06-07 Nov 2022
11:00 - 12:00	2.2	2.4	2.1	2.3	2.3	1.4	3.1
12:00 - 13:00	2.6	2.1	2.0	1.5	2.6	1.9	1.8
13:00 - 14:00	2.2	3.0	1.8	1.7	2.9	2.6	2.6
14:00 - 15:00	2.9	2.8	1.5	2.3	3.0	2.4	2.0
15:00 - 16:00	3.1	3.1	2.1	3.2	2.7	2.0	2.1
16:00 - 17:00	1.9	2.4	1.6	3.2	2.2	1.8	1.8
17:00 - 18:00	1.5	3.1	2.5	3.0	3.2	1.5	2.5
18:00 - 19:00	2.3	1.4	1.5	3.2	2.4	2.8	2.6
19:00 - 20:00	3.2	3.1	3.0	1.5	1.6	1.7	1.8
20:00 - 21:00	1.9	2.7	2.3	2.0	1.4	1.7	2.4
21:00 - 22:00	3.0	2.2	2.5	2.1	1.5	2.0	1.6
22:00 - 23:00	1.9	3.1	2.9	1.5	3.1	2.0	2.8
23:00 - 00:00	2.5	1.7	2.0	1.9	1.4	2.9	1.7
00:00 - 01:00	1.7	2.7	2.6	2.6	1.5	2.5	3.2
01:00 - 02:00	1.5	1.8	2.4	2.7	1.8	2.2	1.4
02:00 - 03:00	1.5	3.2	2.4	1.8	1.5	2.3	2.0
03:00 - 04:00	1.9	3.2	2.6	1.4	2.6	2.3	1.9
04:00 - 05:00	2.8	3.2	1.5	2.5	3.1	2.8	1.8
05:00 - 06:00	2.6	1.6	2.0	1.8	2.1	2.2	1.5
06:00 - 07:00	2.6	2.8	2.6	1.8	1.7	1.9	2.2
07:00 - 08:00	2.0	1.4	3.1	2.0	2.7	1.7	1.8
08:00 - 09:00	3.2	2.5	1.4	2.7	2.6	2.4	2.5
09:00 - 10:00	2.8	1.4	1.8	2.9	2.4	3.0	2.5
10:00 - 11:00	2.5	2.1	2.7	2.2	2.5	1.7	2.3
Average-24Hr*	2.3	2.5	2.2	2.2	2.3	2.2	2.2
Max-1Hr	3.2	3.2	3.1	3.2	3.2	3.0	3.2
Min-1Hr	1.5	1.4	1.4	1.4	1.4	1.4	1.4
Standard-1Hr	300 ppb(780 ug/cu.m)						
Standard-24Hr	120 ppb(300 ug/cu.m)						

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

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

(Miss Preeda Somjai)
Technical Management Team



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

Location : Ban Pong Community

Analyzer Model : API 100A

Serial No : 347

Monitor Period : 31 Oct 2022-07 Nov 2022

Station No : SS2-03

Site Operator : Mr. Sittichai Sawangwongchai

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)						
	31-01 Nov 2022	01-02 Nov 2022	02-03 Nov 2022	03-04 Nov 2022	04-05 Nov 2022	05-06 Nov 2022	06-07 Nov 2022
12:00 - 13:00	2.1	1.9	2.6	3.5	3.5	2.3	3.8
13:00 - 14:00	2.9	2.5	2.9	2.2	3.1	3.8	1.8
14:00 - 15:00	2.7	2.2	3.7	2.0	2.4	3.5	2.0
15:00 - 16:00	1.7	3.7	2.3	2.6	1.9	1.4	1.7
16:00 - 17:00	1.5	3.7	2.8	3.3	2.6	3.1	2.7
17:00 - 18:00	2.9	3.1	2.6	2.4	2.2	2.2	3.7
18:00 - 19:00	1.5	3.6	3.0	2.8	3.0	3.6	3.4
19:00 - 20:00	2.9	2.1	2.9	2.2	3.1	3.6	3.8
20:00 - 21:00	2.9	1.5	2.2	1.9	3.2	3.6	2.3
21:00 - 22:00	1.4	2.2	3.1	3.8	3.5	2.4	3.0
22:00 - 23:00	2.3	3.0	2.1	3.0	2.3	2.0	2.2
23:00 - 00:00	2.5	2.9	3.6	3.0	1.6	1.4	1.8
00:00 - 01:00	2.2	1.8	1.5	2.3	2.4	2.1	3.7
01:00 - 02:00	3.4	3.8	3.4	2.4	1.5	2.9	2.4
02:00 - 03:00	1.6	1.7	2.6	3.1	2.2	3.1	2.4
03:00 - 04:00	1.5	2.8	2.3	2.9	2.4	1.5	3.4
04:00 - 05:00	2.0	3.0	2.3	2.3	1.7	2.0	2.4
05:00 - 06:00	2.4	2.4	3.0	1.6	3.7	2.8	1.5
06:00 - 07:00	2.5	3.8	1.5	3.5	2.9	3.3	2.5
07:00 - 08:00	2.2	2.4	1.8	2.0	1.5	3.1	1.7
08:00 - 09:00	3.6	1.6	1.7	1.5	2.6	2.8	2.9
09:00 - 10:00	2.6	2.8	1.7	3.0	3.2	3.7	2.8
10:00 - 11:00	2.1	3.3	1.8	2.5	3.7	2.4	3.3
11:00 - 12:00	1.7	2.3	2.3	2.8	2.8	2.2	3.0
Average-24Hr*	2.3	2.7	2.5	2.6	2.6	2.7	2.7
Max-1Hr	3.6	3.8	3.7	3.8	3.7	3.8	3.8
Min-1Hr	1.4	1.5	1.5	1.5	1.5	1.4	1.5
Standard-1Hr	300 ppb(780 ug/cu.m)						
Standard-24Hr	120 ppb(300 ug/cu.m)						

Remark : * Average time between 12:00-12:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

(Miss Preeda Somjai)
Technical Management Team



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

Location : With in the Refinery Plant, North

Analyzer Model : API 200A

Serial No : 074

Monitor Period : 31 Oct 2022-07 Nov 2022

Station No : SS2-01

Site Operator : Mr. Sittichai Sawangwongchai

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)						
	31-01 Nov 2022	01-02 Nov 2022	02-03 Nov 2022	03-04 Nov 2022	04-05 Nov 2022	05-06 Nov 2022	06-07 Nov 2022
13:00 - 14:00	10.6	11.2	7.9	10.2	8.9	9.8	9.5
14:00 - 15:00	11.3	10.1	10.3	9.4	9.4	10.8	9.5
15:00 - 16:00	9.8	8.9	8.5	12.0	9.1	9.8	9.2
16:00 - 17:00	9.3	7.5	8.5	7.8	11.8	9.5	11.8
17:00 - 18:00	8.3	11.2	12.4	7.8	9.8	9.2	10.1
18:00 - 19:00	8.6	7.3	11.7	9.8	10.6	7.5	10.0
19:00 - 20:00	7.9	7.9	9.8	10.7	9.2	10.3	11.1
20:00 - 21:00	7.1	9.0	9.1	9.0	10.8	11.8	11.4
21:00 - 22:00	10.0	12.3	9.4	8.6	7.7	10.3	10.5
22:00 - 23:00	10.8	8.4	8.9	7.9	10.1	11.3	11.1
23:00 - 00:00	11.0	11.3	9.1	10.7	9.1	10.1	11.2
00:00 - 01:00	9.8	11.1	7.4	8.9	10.1	7.4	10.3
01:00 - 02:00	8.9	8.5	9.4	11.0	8.6	7.7	9.5
02:00 - 03:00	8.8	10.7	7.5	11.1	7.2	8.5	8.4
03:00 - 04:00	8.6	9.0	9.6	11.1	10.2	9.7	11.5
04:00 - 05:00	9.7	11.0	9.8	9.6	10.1	7.2	12.1
05:00 - 06:00	9.9	7.0	8.9	10.1	7.9	9.9	12.4
06:00 - 07:00	10.3	7.9	10.0	9.5	8.6	11.5	8.6
07:00 - 08:00	10.6	9.4	9.8	9.6	9.9	7.3	7.4
08:00 - 09:00	12.2	9.7	9.7	7.9	11.0	8.8	7.9
09:00 - 10:00	10.3	7.8	7.6	8.5	11.5	11.2	8.0
10:00 - 11:00	10.0	9.4	7.0	10.7	7.6	7.7	11.4
11:00 - 12:00	8.8	9.1	8.7	9.2	9.2	6.8	9.1
12:00 - 13:00	7.3	8.9	7.6	10.7	10.0	9.0	9.5
Average-24Hr*	9.6	9.4	9.1	9.7	9.5	9.3	10.1
Max-1Hr	12.2	12.3	12.4	12.0	11.8	11.8	12.4
Min-1Hr	7.1	7.0	7.0	7.8	7.2	6.8	7.4
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 : Nitrogen dioxide MTR-SPRC PLC-Refinery

Location : Map Ta Phut New Town Monitor Period : 31 Oct 2022-07 Nov 2022
Analyzer Model : API 200A Station No : SS2-04
Serial No : 096 Site Operator : Mr. Sittichai Sawangwongchai

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)						
	31-01 Nov 2022	01-02 Nov 2022	02-03 Nov 2022	03-04 Nov 2022	04-05 Nov 2022	05-06 Nov 2022	06-07 Nov 2022
11:00 - 12:00	7.0	4.3	7.9	8.2	6.6	7.4	5.0
12:00 - 13:00	5.9	7.6	5.5	5.2	8.1	6.8	7.6
13:00 - 14:00	6.0	6.1	7.1	7.5	8.2	5.0	7.2
14:00 - 15:00	5.9	8.2	6.7	7.0	4.6	6.8	5.8
15:00 - 16:00	4.6	6.8	7.0	6.8	6.5	7.4	8.0
16:00 - 17:00	7.8	5.6	6.2	6.6	4.1	8.2	4.8
17:00 - 18:00	6.1	8.0	7.6	6.3	8.9	6.2	6.1
18:00 - 19:00	6.3	5.7	6.3	8.5	8.6	5.8	7.3
19:00 - 20:00	4.1	7.1	7.9	6.7	6.9	5.9	7.7
20:00 - 21:00	6.9	6.7	7.4	7.1	7.2	7.9	8.1
21:00 - 22:00	7.0	7.1	4.8	7.3	7.0	7.0	5.5
22:00 - 23:00	8.6	6.8	8.4	4.8	5.7	7.2	5.1
23:00 - 00:00	5.5	4.4	6.2	4.9	9.0	5.6	7.0
00:00 - 01:00	7.8	6.7	5.5	5.6	6.4	7.7	7.6
01:00 - 02:00	6.5	8.9	6.3	6.1	6.8	7.8	4.5
02:00 - 03:00	7.5	5.0	7.6	7.9	7.0	5.4	4.9
03:00 - 04:00	6.8	5.7	5.8	8.4	6.5	7.7	7.2
04:00 - 05:00	5.4	5.4	7.4	8.3	5.9	5.4	6.4
05:00 - 06:00	6.2	6.0	4.8	5.6	6.1	5.8	6.5
06:00 - 07:00	6.6	5.9	4.7	6.2	8.1	8.4	8.0
07:00 - 08:00	4.6	7.0	7.9	6.7	5.5	6.6	5.0
08:00 - 09:00	6.8	7.4	5.5	8.3	7.8	5.0	7.4
09:00 - 10:00	6.6	7.5	7.5	6.6	6.7	6.6	5.0
10:00 - 11:00	5.7	6.5	7.4	7.2	6.9	6.0	8.4
Average-24Hr*	6.3	6.5	6.6	6.8	6.9	6.7	6.5
Max-1Hr	8.6	8.9	8.4	8.5	9.0	8.4	8.4
Min-1Hr	4.1	4.3	4.7	4.8	4.1	5.0	4.5
Standard-1Hr	170 ppb(320 ug/cu.m)						
Standard-24Hr							

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

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

Preeda S.
(Miss Preeda Somjai)
Technical Management Team



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

Location : Ban Plong Community Monitor Period : 31 Oct 2022-07 Nov 2022
Analyzer Model : API 200A Station No : SS2-03
Serial No : 1645 Site Operator : Mr. Sittichai Sawangwongchai

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)						
	31-01 Nov 2022	01-02 Nov 2022	02-03 Nov 2022	03-04 Nov 2022	04-05 Nov 2022	05-06 Nov 2022	06-07 Nov 2022
12:00 - 13:00	13.0	10.3	9.3	6.8	9.1	13.2	9.6
13:00 - 14:00	13.6	12.7	13.0	11.1	10.4	8.7	11.2
14:00 - 15:00	13.6	8.5	7.1	12.2	13.8	7.6	10.3
15:00 - 16:00	9.3	12.1	13.0	13.2	9.3	9.7	11.4
16:00 - 17:00	8.9	9.4	9.7	10.5	9.7	11.1	12.0
17:00 - 18:00	9.9	10.9	10.5	10.4	10.5	11.0	8.9
18:00 - 19:00	11.1	6.9	9.9	7.8	7.4	10.2	11.8
19:00 - 20:00	7.5	9.8	10.5	7.2	13.0	9.6	12.0
20:00 - 21:00	7.9	7.6	9.2	9.0	11.9	8.1	9.2
21:00 - 22:00	9.1	8.1	13.1	9.5	8.8	9.0	7.3
22:00 - 23:00	7.1	6.4	13.5	9.4	7.7	10.4	9.0
23:00 - 00:00	5.6	7.1	12.7	8.4	8.7	7.3	8.0
00:00 - 01:00	6.9	5.3	7.4	8.1	7.1	7.2	7.8
01:00 - 02:00	6.1	6.9	9.1	10.0	6.2	6.5	6.6
02:00 - 03:00	5.1	4.1	9.2	8.6	7.0	6.2	5.7
03:00 - 04:00	6.4	4.9	7.2	7.9	5.8	5.4	5.4
04:00 - 05:00	4.0	6.3	8.7	7.6	4.9	4.3	7.1
05:00 - 06:00	6.3	4.7	10.4	6.6	7.6	6.0	6.9
06:00 - 07:00	9.0	6.2	11.7	9.5	11.4	8.0	9.6
07:00 - 08:00	7.7	7.9	11.1	7.2	12.0	8.4	10.5
08:00 - 09:00	9.5	7.5	11.5	8.6	11.7	10.8	9.1
09:00 - 10:00	10.6	9.9	7.1	8.2	7.5	9.1	10.3
10:00 - 11:00	10.5	9.5	11.6	11.8	7.1	7.4	10.0
11:00 - 12:00	7.6	11.3	11.5	8.8	13.6	13.1	9.8
Average-24Hr*	8.6	8.1	10.3	9.1	9.3	8.7	9.1
Max-1Hr	13.6	12.7	13.5	13.2	13.8	13.2	12.0
Min-1Hr	4.0	4.1	7.1	6.6	4.9	4.3	5.4
Standard-1Hr	170 ppb(320 ug/cu.m)						
Standard-24Hr							

Remark : * Average time between 12:00-12:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

Preeda S.
(Miss Preeda Somjai)
Technical Management Team



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

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

Monitor Period : 31 Oct 2022-07 Nov 2022
Station No : SS2-01
Site Operator : Mr. Sittichai Sawangwongchai

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

Serial No : 537
Cal Concentration (ppb) : 0,100,200,400

Time	CO Concentration (ppm)						
	31-01 Nov 2022	01-02 Nov 2022	02-03 Nov 2022	03-04 Nov 2022	04-05 Nov 2022	05-06 Nov 2022	06-07 Nov 2022
13:00 - 14:00	5.8	6.3	5.1	5.4	5.4	5.8	6.0
14:00 - 15:00	5.1	5.5	6.1	5.1	5.9	5.9	5.3
15:00 - 16:00	6.3	5.6	6.2	5.6	5.3	6.1	5.3
16:00 - 17:00	6.1	5.8	6.0	6.1	5.5	6.0	5.9
17:00 - 18:00	6.1	5.2	5.4	5.8	5.5	6.0	6.0
18:00 - 19:00	6.3	5.7	6.3	5.7	6.3	6.0	6.3
19:00 - 20:00	6.3	5.9	5.1	6.0	5.1	6.0	5.7
20:00 - 21:00	5.8	6.0	5.2	6.3	5.2	5.9	6.2
21:00 - 22:00	5.6	5.6	5.4	5.5	5.3	5.7	5.8
22:00 - 23:00	5.4	5.8	5.5	6.0	5.5	5.5	6.1
23:00 - 00:00	6.2	5.1	5.6	6.2	5.2	6.0	5.9
00:00 - 01:00	5.9	5.7	6.3	6.0	6.0	6.3	6.2
01:00 - 02:00	5.6	5.9	5.9	6.2	6.2	6.2	6.3
02:00 - 03:00	5.4	6.1	5.5	5.3	5.6	6.1	6.1
03:00 - 04:00	5.7	6.1	5.1	6.1	5.2	5.4	5.3
04:00 - 05:00	6.0	5.4	5.8	5.7	5.8	5.6	5.2
05:00 - 06:00	6.1	5.2	5.3	6.3	5.9	5.1	5.4
06:00 - 07:00	5.3	5.6	5.7	5.5	5.3	5.1	5.9
07:00 - 08:00	6.1	6.0	5.7	5.8	5.2	6.3	6.3
08:00 - 09:00	5.7	5.5	6.0	6.0	5.2	5.7	5.9
09:00 - 10:00	5.7	5.5	5.6	5.2	5.2	6.1	6.2
10:00 - 11:00	5.2	5.8	5.2	5.3	5.5	5.4	5.1
11:00 - 12:00	5.3	5.1	5.8	6.1	5.5	5.6	5.7
12:00 - 13:00	5.1	6.3	5.1	5.5	6.3	5.9	5.7
Average-24Hr*	5.8	5.7	5.6	5.8	5.5	5.8	5.8
Max-1Hr	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Min-1Hr	5.1	5.1	5.1	5.1	5.1	5.1	5.1
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 : Map Ta Phut New Town
Analyzer Model : API 300A
Serial No : 21629

Monitor Period : 31 Oct 2022-07 Nov 2022
Station No : SS2-04
Site Operator : Mr. Sittichai Sawangwongchai

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)						
	31-01 Nov 2022	01-02 Nov 2022	02-03 Nov 2022	03-04 Nov 2022	04-05 Nov 2022	05-06 Nov 2022	06-07 Nov 2022
11:00 - 12:00	3.9	4.2	4.3	4.3	4.4	5.5	4.1
12:00 - 13:00	5.0	5.1	4.1	5.1	4.3	4.0	5.3
13:00 - 14:00	4.7	4.2	5.0	5.6	4.7	4.4	5.8
14:00 - 15:00	4.7	6.0	5.7	4.1	5.6	5.5	4.3
15:00 - 16:00	3.9	4.4	5.6	5.5	4.0	4.6	6.1
16:00 - 17:00	4.4	4.3	3.9	3.9	4.8	5.0	4.8
17:00 - 18:00	4.4	5.8	4.6	4.6	3.9	4.4	4.0
18:00 - 19:00	4.0	5.9	4.7	4.5	5.3	5.3	4.8
19:00 - 20:00	4.3	4.1	5.6	4.6	4.8	4.2	5.7
20:00 - 21:00	5.8	4.1	4.1	5.3	5.6	4.9	5.7
21:00 - 22:00	5.1	5.3	4.6	6.1	4.5	4.4	5.5
22:00 - 23:00	4.0	5.6	4.5	5.0	5.7	5.9	4.1
23:00 - 00:00	5.6	4.0	5.8	5.0	4.7	5.7	4.7
00:00 - 01:00	5.5	4.6	5.1	3.9	5.9	4.4	5.5
01:00 - 02:00	4.5	4.5	5.8	5.8	5.0	5.0	4.3
02:00 - 03:00	4.3	4.7	5.0	5.5	5.7	5.6	4.4
03:00 - 04:00	5.4	5.2	4.7	5.3	6.1	4.9	4.0
04:00 - 05:00	4.3	5.4	3.9	4.5	6.1	5.1	4.0
05:00 - 06:00	4.4	4.1	5.4	5.6	5.5	5.9	4.6
06:00 - 07:00	4.7	5.2	5.8	5.1	3.9	5.0	3.9
07:00 - 08:00	4.9	5.7	4.5	4.0	5.5	4.9	5.5
08:00 - 09:00	5.3	6.1	4.9	4.9	4.4	4.7	4.0
09:00 - 10:00	5.2	5.0	5.5	5.9	5.7	4.6	4.1
10:00 - 11:00	5.0	4.2	5.1	4.1	5.9	4.3	4.0
Average-24Hr*	4.7	4.9	4.9	4.9	5.1	4.9	4.7
Max-1Hr	5.8	6.1	5.8	6.1	6.1	5.9	6.1
Min-1Hr	3.9	4.0	3.9	3.9	3.9	4.0	3.9
Standard-1Hr	30 ppm(34.2 mg/cu.m)						
Standard-24Hr	-						

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

(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 : 31 Oct 2022-07 Nov 2022
Analyzer Model : API 300A Station No : SS2-03
Serial No : 1343 Site Operator : Mr. Sittichai Sawangwongchai

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)						
	31-01 Nov 2022	01-02 Nov 2022	02-03 Nov 2022	03-04 Nov 2022	04-05 Nov 2022	05-06 Nov 2022	06-07 Nov 2022
12:00 - 13:00	6.3	5.6	5.9	6.6	7.4	7.0	6.5
13:00 - 14:00	7.5	7.6	5.6	6.6	6.8	6.4	7.1
14:00 - 15:00	5.9	6.2	8.0	5.6	7.7	6.6	7.3
15:00 - 16:00	6.7	6.5	6.7	7.6	6.2	7.5	6.1
16:00 - 17:00	6.2	5.9	7.6	6.0	7.1	7.9	6.9
17:00 - 18:00	6.3	7.5	6.8	6.0	7.5	6.3	7.5
18:00 - 19:00	6.3	7.5	6.3	7.2	6.3	6.1	6.8
19:00 - 20:00	7.2	7.6	6.8	6.3	7.6	6.2	7.9
20:00 - 21:00	7.8	6.6	7.9	7.7	8.1	7.4	8.0
21:00 - 22:00	5.7	6.3	6.7	8.0	7.7	6.3	7.0
22:00 - 23:00	6.4	7.8	8.1	7.3	7.0	7.4	6.8
23:00 - 00:00	6.1	7.5	7.6	7.8	8.1	6.2	6.9
00:00 - 01:00	6.6	8.0	6.2	6.2	6.5	5.8	7.2
01:00 - 02:00	6.2	6.1	7.2	7.8	5.9	6.0	6.7
02:00 - 03:00	6.8	7.9	5.8	5.6	7.1	7.1	7.2
03:00 - 04:00	7.4	7.1	6.1	7.0	7.7	7.9	6.5
04:00 - 05:00	7.1	7.5	6.0	6.9	6.8	7.2	5.9
05:00 - 06:00	5.7	7.9	6.4	6.6	7.9	7.8	8.1
06:00 - 07:00	7.0	6.6	7.1	8.1	7.6	7.2	5.6
07:00 - 08:00	7.1	6.0	7.3	6.6	5.6	6.3	7.5
08:00 - 09:00	7.8	7.6	5.7	6.2	6.6	5.7	6.0
09:00 - 10:00	6.6	6.5	6.5	8.0	7.6	7.7	8.0
10:00 - 11:00	6.6	6.6	7.0	6.1	6.7	7.8	5.8
11:00 - 12:00	8.1	7.2	8.1	5.8	7.9	6.3	6.6
Average-24Hr*	6.7	7.0	6.8	6.8	7.1	6.8	6.9
Max-1Hr	8.1	8.0	8.1	8.1	8.1	7.9	8.1
Min-1Hr	5.7	5.6	5.6	5.6	5.6	5.7	5.6
Standard-1Hr	30 ppm(34.2 mg/cu.m)						
Standard-24Hr							

Remark : * Average time between 12:00-12:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

(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/H₂S
SAMPLING BY : SECOT Co., Ltd. SAMPLING DATE : 04-06/11/2022
RECEIVE DATE : 09/11/2022 ANALYTICAL DATE : 10/11/2022
REPORT DATE : 16/11/2022 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	04/11/2022	ppm	<0.001	ND	ND	ND	Intersociety Committee
(1 hr)	05/11/2022	ppm	<0.001	ND	ND	ND	Method 701
	06/11/2022	ppm	<0.001	ND	ND	ND	

Phatchara Samanchan
(Miss Phatchara Samanchan)
Analyst

Narisa Poowasanpetch
(Miss Narisa Poowasanpetch)
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 : 31/10/2022-07/11/2022
RECEIVED DATE : 09/11/2022 ANALYTICAL DATE : 09-11/11/2022
REPORT DATE : 15/11/2022 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.)	31/10-01/11/2022	mg/m ³	0.082	0.061	0.090	0.330	High Volume
	01-02/11/2022	mg/m ³	0.047	0.061	0.062		Air Sampler/
	02-03/11/2022	mg/m ³	0.063	0.057	0.072		Gravimetric
	03-04/11/2022	mg/m ³	0.055	0.068	0.079		Method
	04-05/11/2022	mg/m ³	0.062	0.083	0.060		
	05-06/11/2022	mg/m ³	0.040	0.038	0.047		
	06-07/11/2022	mg/m ³	0.047	0.043	0.067		

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 Co., Ltd. REF. NO. : SPRC-222003-COA-Amb/PM10
SAMPLING BY : SECOT Co., Ltd. SAMPLING DATE : 31/10/2022-07/11/2022
RECEIVED DATE : 09/11/2022 ANALYTICAL DATE : 09-11/11/2022
REPORT DATE : 15/11/2022 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.)	31/10-01/11/2022	mg/m ³	0.058	0.044	0.048	0.120	High Volume
	01-02/11/2022	mg/m ³	0.032	0.042	0.043		Air Sampler
	02-03/11/2022	mg/m ³	0.031	0.041	0.044		(Hi-Vol PM-10
	03-04/11/2022	mg/m ³	0.039	0.042	0.050		Size Selective Inlet)
	04-05/11/2022	mg/m ³	0.043	0.043	0.045		Gravimetric
	05-06/11/2022	mg/m ³	0.025	0.025	0.033		Method
	06-07/11/2022	mg/m ³	0.029	0.032	0.041		

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 Co., Ltd.	REQUEST SERVICE No.	: 1434/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 04-05/07/2022	ANALYTICAL DATE	: 08/07/2022
SAMPLING TIME	: 09:45-09:52	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 06/07/2022	FILE CODE	: 222003_TO-15_July
REPORT DATE	: 12/07/2022		

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	0.87	2.78	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

(Mrs. 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.	: 1526/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 19-20/07/2022	ANALYTICAL DATE	: 23/07/2022
SAMPLING TIME	: 11:15-10:15	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 21/07/2022	FILE CODE	: 222003_TO-15_July
REPORT DATE	: 25/07/2022		

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	2.71	8.66	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

(Mrs. 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.	: 1560/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 01-02/08/2022	ANALYTICAL DATE	: 04-05/08/2022
SAMPLING TIME	: 13:32-12:58	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 03/08/2022	FILE CODE	: 222003_TO-15_August
REPORT DATE	: 05/08/2022		

Compound	Non Detection		SAMPLING LOCATION		STANDARD*
	ppbv	µg/m ³	Map Ta Phut New Town	µg/m ³	
Benzene	0.004	0.013	0.42	1.34	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

Siriwan Chimsa-nga

(Miss Siriwan Chimsa-nga)

Technical Management Team

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AMBIENT AIR QUALITY ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1560/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 01-02/08/2022	ANALYTICAL DATE	: 04-05/08/2022
SAMPLING TIME	: 13:20-13:20	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 03/08/2022	FILE CODE	: 222003_TO-15_August
REPORT DATE	: 05/08/2022		

Compound	Non Detection		SAMPLING LOCATION		STANDARD*
	ppbv	µg/m ³	Ban Pong Community	µg/m ³	
Benzene	0.004	0.013	0.86	2.75	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

Siriwan Chimsa-nga

(Miss Siriwan Chimsa-nga)

Technical Management Team

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239 ถนนริมคลองประปา แขวงบางซื่อ เขตบางซื่อ กรุงเทพมหานคร 10800
239 RIMKLONGPRAPA ROAD, BANGSUE, BANGKOK 10800, THAILAND
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.	: 1787/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 01-02/09/2022	ANALYTICAL DATE	: 06/09/2022
SAMPLING TIME	: 13:50-13:45	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 03/09/2022	FILE CODE	: 222003_TO-15_September
REPORT DATE	: 08/09/2022		

Compound	Non Detection		SAMPLING LOCATION		STANDARD* ($\mu\text{g}/\text{m}^3$)
			Map Ta Phut New Town		
	ppbv	$\mu\text{g}/\text{m}^3$	ppbv	$\mu\text{g}/\text{m}^3$	
Benzene	0.004	0.013	0.74	2.36	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

(Mrs. Araya Tipparuk)

Technical Management Team

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3. * Notification of the Pollution Control Department, dated December 18,B.E.2551(2008), which was published in the Royal Government Gazette Vol. 126, Special Part 13D dated January 27, B.E. 2552 (2009).



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AMBIENT AIR QUALITY ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1787/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 01-02/09/2022	ANALYTICAL DATE	: 06/09/2022
SAMPLING TIME	: 10:49-11:00	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 03/09/2022	FILE CODE	: 222003_TO-15_September
REPORT DATE	: 08/09/2022		

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	0.85	2.72	7.6

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(Miss Siriwan Chimsa-nga)

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AMBIENT AIR QUALITY ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 2000/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 04-05/10/2022	ANALYTICAL DATE	: 07/10/2022
SAMPLING TIME	: 14:47-14:31	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 06/10/2022	FILE CODE	: 222003_TO-15_October
REPORT DATE	: 11/10/2022		

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	0.47	1.50	7.6

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

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(Miss Siriwan Chimsa-nga)

Analyst

~ T ~

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AMBIENT AIR QUALITY ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 2000/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 04-05/10/2022	ANALYTICAL DATE	: 07/10/2022
SAMPLING TIME	: 12:21-11:46	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 06/10/2022	FILE CODE	: 222003_TO-15_October
REPORT DATE	: 11/10/2022		

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	0.61	1.95	7.6

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

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(Miss Siriwan Chimsa-nga)

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AMBIENT AIR QUALITY ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 2192/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 01-02/11/2022	ANALYTICAL DATE	: 07-08/11/2022
SAMPLING TIME	: 16:01-15:30	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 03/11/2022	FILE CODE	: 222003_TO-15_November
REPORT DATE	: 15/11/2022		

Compound	Non Detection		SAMPLING LOCATION		STANDARD* ($\mu\text{g}/\text{m}^3$)
			Map Ta Phut New Town		
	ppbv	$\mu\text{g}/\text{m}^3$	ppbv	$\mu\text{g}/\text{m}^3$	
Benzene	0.004	0.013	0.64	2.04	7.6

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

Jutarat Jaemruen

(Miss Jutarat Jaemruen)

Analyst

~ R

(Mrs. Araya Tipparuk)

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AMBIENT AIR QUALITY ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 2192/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 01-02/11/2022	ANALYTICAL DATE	: 07-08/11/2022
SAMPLING TIME	: 16:32-16:08	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 03/11/2022	FILE CODE	: 222003_TO-15_November
REPORT DATE	: 15/11/2022		

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	0.87	2.78	7.6

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

Jutarat Jaemruen

(Miss Jutarat Jaemruen)

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.	: 2434/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 06-07/12/2022	ANALYTICAL DATE	: 12/12/2022
SAMPLING TIME	: 15:36-16:30	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 08/12/2022	FILE CODE	: 222003_TO-15_December
REPORT DATE	: 14/12/2022		

Compound	Non Detection		SAMPLING LOCATION		STANDARD*
	ppbv	µg/m ³	Map Ta Phut New Town	µg/m ³	
Benzene	0.004	0.013	0.89	2.84	7.6

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

Jutarat Jaemruen

(Miss Jutarat Jaemruen)

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.	: 2434/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 06-07/12/2022	ANALYTICAL DATE	: 12/12/2022
SAMPLING TIME	: 12:34-12:00	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 08/12/2022	FILE CODE	: 222003_TO-15_December
REPORT DATE	: 14/12/2022		

Compound	Non Detection		SAMPLING LOCATION		STANDARD*
	ppbv	µg/m ³	Ban Plong Community	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

Jutarat Jaemruen

(Miss Jutarat Jaemruen)

Analyst

AR

(Mrs. Araya Tipparuk)

Technical Management Team

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ใบรับรองผลการตรวจวัดคุณภาพอากาศจากปล่องระบายอากาศ



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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	: 01/11/2022
RECEIVED DATE	: 04/11/2022	ANALYTICAL DATE	: 04-05/11/2022
REPORT DATE	: 11/11/2022	SAMPLE CONDITION	: Normal
STACK LOCATION	: RFCCU Stack	OPERATOR	: Mr. Song Hengchwankun
SOURCE DESCRIPTION	: Combustion	FUEL TYPE	: Natural Gas + Refinery Fuel Gas
STACK DESCRIPTION			

Height	: 70.0	m	Gas Velocity	: 18.8	m/s
Diameter	: 3.2	m	Flow rate ⁽¹⁾	: 4,306	Ncu.m/min
Temperature	: 284.8	°C	Excess Oxygen	: 3.4	%

PARAMETER	UNIT	RESULTS ⁽¹⁾		ASSIGNED VALUE ⁽²⁾	STANDARD ⁽³⁾	REFERENCE METHODS
		3.4 % O ₂	7 % O ₂			
Particulate Matter	mg/Ncu.m	71.5	56.8	240	320	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.

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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	: 01/11/2022
RECEIVED DATE	: 02/11/2022	ANALYTICAL DATE	: 02-07/11/2022
REPORT DATE	: 09/11/2022	SAMPLE CONDITION	: Normal
STACK LOCATION	: RFCCU Stack	OPERATOR	: Mr. Song Hengchwankun
SOURCE DESCRIPTION	: Combustion	FUEL TYPE	: Natural Gas + Refinery Fuel Gas
STACK DESCRIPTION			

Height	: 70.0	m	Gas Velocity	: 18.8	m/s
Diameter	: 3.2	m	Flow rate ⁽¹⁾	: 4,306	Ncu.m/min
Temperature	: 284.8	°C	Excess Oxygen	: 3.4	%

PARAMETER	UNIT	RESULTS ⁽¹⁾		ASSIGNED VALUE ⁽²⁾	STANDARD ⁽³⁾	REFERENCE METHODS
		3.4 % 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. 2-239-ก-7802

Narisa Poowasanpetch

(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO. 2-239-ก-6419

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

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The Monitoring Result of Emission Concentration
RFCCU
STAR PETROLEUM REFINING PUBLIC CO.,LTD.
November 1, 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	3.43	3.41	124.43	124.46	98.91
2	3.48	3.45	126.59	126.61	100.85
3	3.42	3.38	126.11	126.13	100.07
Average	3.44	3.41	125.71	125.73	99.94

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	3.43	3.41	742.32	742.37	589.99
2	3.48	3.45	742.18	742.34	591.32
3	3.42	3.38	736.54	736.81	584.57
Average	3.44	3.41	740.35	740.51	588.62

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	3.43	3.41	278.49	278.57	221.39
2	3.48	3.45	264.41	264.49	210.68
3	3.42	3.38	260.24	260.32	206.53
Average	3.44	3.41	267.71	267.79	212.87

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

Date: November 1, 2022
 Start time: 11:00 AM
 O₂ instrument Model: AMI 70
 NO_x instrument Model: API 200 AH
 SO₂ instrument Model: API 100 AH
 CO instrument Model: THERMO 48 C
 Fuel Type : Fuel Gas

Run # : 1
 Location : RFCCU
 Finish time : 11:20 AM
 Serial No.: 071023-47
 Serial No.: 342
 Serial No.: 060
 Serial No.: 365
 Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
11:00 AM	3.42	129.74	733.73	287.66
11:01 AM	3.42	131.51	747.96	284.06
11:02 AM	3.41	117.69	735.79	279.56
11:03 AM	3.40	125.17	737.40	275.06
11:04 AM	3.39	125.01	740.38	272.90
11:05 AM	3.38	124.88	744.20	272.36
11:06 AM	3.39	112.64	747.04	274.34
11:07 AM	3.38	115.83	744.73	276.32
11:08 AM	3.37	124.93	744.90	271.64
11:09 AM	3.37	125.09	740.84	273.26
11:10 AM	3.39	125.28	737.08	281.90
11:11 AM	3.43	125.20	741.53	285.50
11:12 AM	3.41	125.33	743.83	288.20
11:13 AM	3.45	125.20	744.74	290.36
11:14 AM	3.47	125.47	743.83	284.06
11:15 AM	3.47	125.93	742.29	275.96
11:16 AM	3.47	126.55	742.83	275.42
11:17 AM	3.46	126.95	741.91	278.12
11:18 AM	3.49	124.73	742.59	276.86
11:19 AM	3.54	124.95	744.73	272.72
11:20 AM	3.53	124.90	746.42	272.00
Average	3.43	124.43	742.32	278.49

Signature



Miss Katesarin Vorradetwittaya
 Environmental Scientist

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

Run # : 2
Date: November 1, 2022 **Location :** RFCCU
Start time: 11:21 AM **Finish time :** 11:41 AM
O₂ instrument Model: AMI 70 **Serial No.:** 071023-47
NO_x instrument Model: API 200 AH **Serial No.:** 342
SO₂ instrument Model: API 100 AH **Serial No.:** 060
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)
11:21 AM	3.51	124.71	746.26	271.46
11:22 AM	3.50	124.49	748.33	270.74
11:23 AM	3.50	124.76	745.04	271.46
11:24 AM	3.50	124.98	743.98	269.48
11:25 AM	3.50	125.60	743.21	266.96
11:26 AM	3.48	125.76	741.98	270.02
11:27 AM	3.48	126.03	742.67	272.72
11:28 AM	3.47	126.11	740.91	270.02
11:29 AM	3.47	126.30	742.91	264.26
11:30 AM	3.46	126.98	742.13	261.02
11:31 AM	3.46	127.03	745.20	264.08
11:32 AM	3.46	126.46	743.29	265.70
11:33 AM	3.46	125.87	741.91	263.00
11:34 AM	3.48	126.60	741.91	259.40
11:35 AM	3.50	129.05	743.52	256.34
11:36 AM	3.49	131.32	740.53	255.44
11:37 AM	3.45	130.11	739.08	257.60
11:38 AM	3.45	127.54	737.71	260.30
11:39 AM	3.45	125.95	737.86	260.48
11:40 AM	3.46	126.19	738.24	261.74
11:41 AM	3.45	126.49	739.07	260.48
Average	3.48	126.59	742.18	264.41

Signature



Miss Katesarin Vorradetwittaya
Environmental Scientist

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

Run # : 3
Date: November 1, 2022 **Location :** RFCCU
Start time: 11:42 AM **Finish time :** 12:02 PM
O₂ instrument Model: AMI 70 **Serial No.:** 071023-47
NO_x instrument Model: API 200 AH **Serial No.:** 342
SO₂ instrument Model: API 100 AH **Serial No.:** 060
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)
11:42 AM	3.45	126.71	740.15	259.76
11:43 AM	3.44	126.73	736.93	258.50
11:44 AM	3.44	127.19	738.24	269.48
11:45 AM	3.44	127.81	739.00	265.34
11:46 AM	3.44	128.19	736.78	263.72
11:47 AM	3.42	128.11	736.09	264.08
11:48 AM	3.42	127.62	737.09	262.46
11:49 AM	3.41	127.22	733.87	257.42
11:50 AM	3.42	126.89	730.35	255.98
11:51 AM	3.41	127.27	732.05	258.32
11:52 AM	3.43	128.22	731.58	260.12
11:53 AM	3.43	128.92	735.11	263.90
11:54 AM	3.43	128.76	736.33	264.44
11:55 AM	3.42	128.27	736.47	261.74
11:56 AM	3.43	128.08	737.24	258.50
11:57 AM	3.41	128.00	738.32	256.88
11:58 AM	3.42	122.74	738.54	256.88
11:59 AM	3.41	102.78	739.07	255.62
12:00 PM	3.39	126.52	739.70	256.16
12:01 PM	3.39	125.90	736.55	257.24
12:02 PM	3.39	126.35	737.93	258.50
Average	3.42	126.11	736.54	260.24

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	: 31/10/2022
RECEIVED DATE	: 04/11/2022	ANALYTICAL DATE	: 04-05/11/2022
REPORT DATE	: 11/11/2022	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	: 11.2	m/s
Diameter	: 3.0	m	Flow rate ⁽¹⁾	: 2,681	Ncu.m/min
Temperature	: 186.8	°C	Excess Oxygen	: 4.3	%

PARAMETER	UNIT	RESULTS ⁽¹⁾		ASSIGNED VALUE ⁽²⁾	STANDARD ⁽³⁾	REFERENCE METHODS
		4.3 % O ₂	7 % O ₂			
Particulate Matter	mg/Ncu.m	4.3	3.6	60	60	US EPA Method 5

Phatchara Samanchan

(Miss Phatchara Samanchan)

Analyst

REG.NO. 2-239-ท-8183

Narisa 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 CDU STAR PETROLEUM REFINING PUBLIC CO.,LTD. October 31, 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	4.30	4.27	19.74	19.70	16.47
2	4.31	4.28	20.07	20.04	16.76
3	4.24	4.21	19.81	19.78	16.47
Average	4.28	4.25	19.87	19.84	16.57

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	4.30	4.27	1.96	1.91	1.60
2	4.31	4.28	2.17	2.12	1.77
3	4.24	4.21	2.45	2.41	2.01
Average	4.28	4.25	2.19	2.15	1.79

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	4.30	4.27	0.31	0.28	0.23
2	4.31	4.28	0.31	0.27	0.23
3	4.24	4.21	0.31	0.26	0.22
Average	4.28	4.25	0.31	0.27	0.23

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

Run # : 1

Date: October 31, 2022 Location : CDU

Start time: 12:10 PM Finish time : 12:30 PM

O₂ instrument Model: AMI 70 Serial No.: 071023-47

NO_x instrument Model: API 200 AH Serial No.: 342

SO₂ instrument Model: API 100 AH Serial No.: 060

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)
12:10 PM	4.33	19.44	1.79	0.31
12:11 PM	4.23	19.13	2.22	0.31
12:12 PM	4.27	19.58	2.62	0.31
12:13 PM	4.32	20.11	2.82	0.31
12:14 PM	4.25	19.73	2.92	0.31
12:15 PM	4.29	19.91	3.01	0.31
12:16 PM	4.33	19.79	3.07	0.31
12:17 PM	4.35	19.98	1.19	0.31
12:18 PM	4.38	20.24	1.25	0.31
12:19 PM	4.26	19.64	1.33	0.31
12:20 PM	4.32	19.58	1.45	0.31
12:21 PM	4.27	19.34	1.58	0.31
12:22 PM	4.25	19.08	1.65	0.31
12:23 PM	4.22	19.63	1.70	0.31
12:24 PM	4.30	20.15	1.67	0.31
12:25 PM	4.31	20.23	1.74	0.31
12:26 PM	4.35	20.17	1.74	0.31
12:27 PM	4.38	19.93	1.82	0.31
12:28 PM	4.31	20.00	1.86	0.31
12:29 PM	4.27	19.62	1.92	0.31
12:30 PM	4.21	19.30	1.88	0.31
Average	4.30	19.74	1.96	0.31

Signature



Miss Katesarin Vorradetwittaya
Environmental Scientist

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

Run # : 2

Date: October 31, 2022 Location : CDU

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

O₂ instrument Model: AMI 70 Serial No.: 071023-47

NO_x instrument Model: API 200 AH Serial No.: 342

SO₂ instrument Model: API 100 AH Serial No.: 060

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	4.23	19.74	1.90	0.31
12:32 PM	4.25	20.03	2.01	0.31
12:33 PM	4.27	20.11	2.07	0.31
12:34 PM	4.27	20.08	2.08	0.31
12:35 PM	4.25	20.06	2.11	0.31
12:36 PM	4.33	20.37	2.09	0.31
12:37 PM	4.34	20.26	2.07	0.31
12:38 PM	4.34	20.56	2.11	0.31
12:39 PM	4.32	20.94	2.14	0.31
12:40 PM	4.33	20.46	2.10	0.31
12:41 PM	4.31	19.75	2.19	0.31
12:42 PM	4.40	19.71	2.14	0.31
12:43 PM	4.31	19.35	2.19	0.31
12:44 PM	4.26	19.63	2.19	0.31
12:45 PM	4.34	20.46	2.23	0.31
12:46 PM	4.35	20.87	2.29	0.31
12:47 PM	4.29	20.01	2.35	0.31
12:48 PM	4.36	19.45	2.35	0.31
12:49 PM	4.34	19.69	2.26	0.31
12:50 PM	4.28	19.44	2.30	0.31
12:51 PM	4.36	20.44	2.30	0.31
Average	4.31	20.07	2.17	0.31

Signature



Miss Katesarin Vorradetwittaya
Environmental Scientist

STAR PETROLEUM REFINING PUBLIC CO.,LTD.

EMISSION TEST RESULT

Run #: 3

Date: October 31, 2022 Location: CDU

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

O₂ instrument Model: AMI 70 Serial No.: 071023-47

NO_x instrument Model: API 200 AH Serial No.: 342

SO₂ instrument Model: API 100 AH Serial No.: 060

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	4.31	20.70	2.30	0.31
12:53 PM	4.27	20.36	2.31	0.31
12:54 PM	4.31	20.07	2.30	0.31
12:55 PM	4.27	19.54	2.35	0.31
12:56 PM	4.30	19.33	2.31	0.31
12:57 PM	4.22	19.33	2.36	0.31
12:58 PM	4.24	19.32	2.39	0.31
12:59 PM	4.19	19.60	2.42	0.31
1:00 PM	4.27	19.89	2.46	0.31
1:01 PM	4.30	19.44	2.50	0.31
1:02 PM	4.28	19.29	2.45	0.31
1:03 PM	4.35	19.48	2.51	0.31
1:04 PM	4.19	19.67	2.49	0.31
1:05 PM	4.21	19.73	2.55	0.31
1:06 PM	4.18	19.91	2.56	0.31
1:07 PM	4.15	19.94	2.58	0.31
1:08 PM	4.07	19.85	2.54	0.31
1:09 PM	4.16	20.14	2.54	0.31
1:10 PM	4.26	20.54	2.48	0.31
1:11 PM	4.25	20.25	2.50	0.31
1:12 PM	4.21	19.66	2.55	0.31
Average	4.24	19.81	2.45	0.31

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 : 02/11/2022

RECEIVED DATE : 04/11/2022 ANALYTICAL DATE : 04-05/11/2022

REPORT DATE : 11/11/2022 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 : 10.3 m/s

Diameter : 2.0 m Flow rate⁽¹⁾ : 1,121 Ncu.m/min

Temperature : 180.5 °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	2.3	2.0	60	60	US EPA Method 5

Phatchara Samanchan

(Miss Phatchara Samanchan)

Analyst

REG.NO. 2-239-ก-8183



(Miss Narisa Poowasanpet)

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
VDU
STAR PETROLEUM REFINING PUBLIC CO.,LTD.
November 2, 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	4.69	4.73	22.69	23.06	19.82
2	4.67	4.72	23.35	23.78	20.43
3	4.72	4.78	24.12	24.61	21.22
Average	4.70	4.74	23.39	23.82	20.49

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	4.69	4.73	0.11	0.11	0.09
2	4.67	4.72	0.10	0.10	0.09
3	4.72	4.78	0.10	0.10	0.09
Average	4.70	4.74	0.10	0.10	0.09

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	4.69	4.73	0.26	0.26	0.22
2	4.67	4.72	0.23	0.23	0.20
3	4.72	4.78	0.29	0.29	0.25
Average	4.70	4.74	0.26	0.26	0.22

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

Run # : 1
Date: November 2, 2022
Location : VDU
Start time: 10:30 AM
Finish time: 10:50 AM
O₂ instrument Model: AMI 70
Serial No.: 161212-14
NO_x instrument Model: TELEDYNE 200 EH
Serial No.: 414
SO₂ instrument Model: API 100 AH
Serial No.: 132
CO instrument Model: API 300 A
Serial No.: 1070
Fuel Type : Natural Gas
Test Operator : Pisanu S.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
10:30 AM	4.79	22.00	0.11	0.38
10:31 AM	4.78	22.25	0.12	0.38
10:32 AM	4.74	22.52	0.11	0.34
10:33 AM	4.69	22.68	0.11	0.26
10:34 AM	4.75	22.78	0.11	0.29
10:35 AM	4.79	22.80	0.11	0.37
10:36 AM	4.78	22.72	0.11	0.37
10:37 AM	4.74	22.58	0.11	0.33
10:38 AM	4.76	22.50	0.11	0.34
10:39 AM	4.70	22.55	0.10	0.28
10:40 AM	4.70	22.64	0.09	0.25
10:41 AM	4.64	22.67	0.09	0.22
10:42 AM	4.60	22.66	0.11	0.16
10:43 AM	4.58	22.61	0.11	0.14
10:44 AM	4.59	22.61	0.11	0.14
10:45 AM	4.63	22.74	0.11	0.17
10:46 AM	4.66	22.91	0.11	0.21
10:47 AM	4.66	23.01	0.11	0.23
10:48 AM	4.65	23.04	0.11	0.19
10:49 AM	4.70	23.11	0.11	0.26
10:50 AM	4.66	23.18	0.11	0.22
Average	4.69	22.69	0.11	0.26

Signature

Miss Katesarin Vorradetwittaya
Environmental Scientist

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

Date: November 2, 2022
Run # : 2
Location : VDU
Start time: 10:51 AM
Finish time: 11:11 AM
O₂ instrument Model: AMI 70
Serial No.: 161212-14
NO_x instrument Model: TELEDYNE 200 EH
Serial No.: 414
SO₂ instrument Model: API 100 AH
Serial No.: 132
CO instrument Model: API 300 A
Serial No.: 1070
Fuel Type : Natural Gas
Test Operator : Pisanu S.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
10:51 AM	4.67	23.27	0.11	0.22
10:52 AM	4.68	23.37	0.11	0.23
10:53 AM	4.70	23.56	0.11	0.24
10:54 AM	4.75	23.61	0.11	0.32
10:55 AM	4.71	23.66	0.08	0.30
10:56 AM	4.67	23.62	0.09	0.24
10:57 AM	4.68	23.42	0.09	0.22
10:58 AM	4.69	23.18	0.11	0.25
10:59 AM	4.68	23.18	0.08	0.24
11:00 AM	4.67	23.12	0.09	0.23
11:01 AM	4.66	23.06	0.10	0.21
11:02 AM	4.68	23.06	0.10	0.24
11:03 AM	4.67	23.17	0.11	0.22
11:04 AM	4.67	23.28	0.08	0.23
11:05 AM	4.68	23.49	0.09	0.23
11:06 AM	4.66	23.46	0.10	0.23
11:07 AM	4.59	23.31	0.10	0.16
11:08 AM	4.57	23.24	0.10	0.13
11:09 AM	4.66	23.37	0.11	0.19
11:10 AM	4.66	23.45	0.11	0.20
11:11 AM	4.68	23.54	0.10	0.23
Average	4.67	23.35	0.10	0.23

Signature



Miss Katesarin Vorradetwittaya
Environmental Scientist

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

Date: November 2, 2022
Run # : 3
Location : VDU
Start time: 11:12 AM
Finish time: 11:32 AM
O₂ instrument Model: AMI 70
Serial No.: 161212-14
NO_x instrument Model: TELEDYNE 200 EH
Serial No.: 414
SO₂ instrument Model: API 100 AH
Serial No.: 132
CO instrument Model: API 300 A
Serial No.: 1070
Fuel Type : Natural Gas
Test Operator : Pisanu S.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
11:12 AM	4.70	23.61	0.11	0.25
11:13 AM	4.77	23.79	0.08	0.35
11:14 AM	4.74	23.98	0.11	0.34
11:15 AM	4.70	24.04	0.10	0.29
11:16 AM	4.73	24.03	0.09	0.27
11:17 AM	4.74	24.00	0.08	0.34
11:18 AM	4.69	23.99	0.08	0.25
11:19 AM	4.72	23.94	0.11	0.28
11:20 AM	4.75	24.03	0.11	0.32
11:21 AM	4.71	24.10	0.09	0.31
11:22 AM	4.68	24.13	0.10	0.23
11:23 AM	4.71	24.15	0.11	0.26
11:24 AM	4.74	24.21	0.10	0.32
11:25 AM	4.71	24.32	0.10	0.30
11:26 AM	4.74	24.45	0.09	0.30
11:27 AM	4.74	24.47	0.10	0.33
11:28 AM	4.73	24.36	0.11	0.30
11:29 AM	4.71	24.26	0.08	0.32
11:30 AM	4.70	24.23	0.08	0.25
11:31 AM	4.71	24.22	0.10	0.27
11:32 AM	4.72	24.24	0.09	0.30
Average	4.72	24.12	0.10	0.29

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	: 03/11/2022
RECEIVED DATE	: 04/11/2022	ANALYTICAL DATE	: 04-05/11/2022
REPORT DATE	: 11/11/2022	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	: 8.4	m/s
Diameter	: 3.1	m	Flow rate ⁽¹⁾	: 2,028	Ncu.m/min
Temperature	: 213.3	°C	Excess Oxygen	: 3.3	%

PARAMETER	UNIT	RESULTS ⁽¹⁾		ASSIGNED VALUE ⁽²⁾	STANDARD ⁽³⁾	REFERENCE METHODS
		3.3 % O ₂	7 % O ₂			
Particulate Matter	mg/Ncu.m	5.4	4.3	60	60	US EPA Method 5

Phatchara Samanchan

(Miss Phatchara Samanchan)

Analyst

REG.NO.7-239-ก-8183

Naris Poowasanpet

(Miss Narisa Poowasanpet)

Technical Management Team

REG.NO.7-239-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 NHTU STAR PETROLEUM REFINING PUBLIC CO.,LTD. November 3, 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	3.39	3.37	39.83	39.81	31.57
2	3.38	3.35	40.52	40.50	32.08
3	3.32	3.29	41.28	41.25	32.56
Average	3.36	3.34	40.54	40.52	32.07

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	3.39	3.37	4.16	4.09	3.24
2	3.38	3.35	4.63	4.58	3.63
3	3.32	3.29	4.94	4.90	3.87
Average	3.36	3.34	4.58	4.52	3.58

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	3.39	3.37	0.62	0.56	0.44
2	3.38	3.35	0.61	0.56	0.44
3	3.32	3.29	0.59	0.54	0.43
Average	3.36	3.34	0.60	0.55	0.44

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

Run # : 1
Date: November 3, 2022
Start time: 10:20 AM
O₂ instrument Model: AMI 70
NO_x instrument Model: API 200 AH
SO₂ instrument Model: API 100 AH
CO instrument Model: THERMO 48 C
Fuel Type : Natural Gas
Location : NHTU
Finish time : 10:40 AM
Serial No.: 071023-47
Serial No.: 342
Serial No.: 060
Serial No.: 365
Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
10:20 AM	3.44	39.90	3.94	0.63
10:21 AM	3.39	39.85	3.96	0.63
10:22 AM	3.34	39.45	4.01	0.68
10:23 AM	3.33	39.64	4.15	0.63
10:24 AM	3.20	39.88	4.18	0.62
10:25 AM	3.38	39.51	4.34	0.72
10:26 AM	3.39	39.62	4.36	0.66
10:27 AM	3.43	39.71	4.48	0.58
10:28 AM	3.35	39.91	4.58	0.56
10:29 AM	3.38	40.04	4.60	0.59
10:30 AM	3.35	39.91	4.65	0.64
10:31 AM	3.46	40.17	3.89	0.55
10:32 AM	3.54	40.53	3.93	0.63
10:33 AM	3.51	39.96	4.00	0.61
10:34 AM	3.49	40.11	3.97	0.55
10:35 AM	3.41	40.05	4.05	0.57
10:36 AM	3.35	39.82	3.96	0.63
10:37 AM	3.37	39.24	4.01	0.64
10:38 AM	3.35	39.40	4.05	0.58
10:39 AM	3.36	39.95	4.16	0.72
10:40 AM	3.38	39.81	4.16	0.62
Average	3.39	39.83	4.16	0.62

Signature



Miss Katesarin Vorradetwittaya
Environmental Scientist

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

Run # : 2
Date: November 3, 2022
Start time: 10:41 AM
O₂ instrument Model: AMI 70
NO_x instrument Model: API 200 AH
SO₂ instrument Model: API 100 AH
CO instrument Model: THERMO 48 C
Fuel Type : Natural Gas
Location : NHTU
Finish time : 11:01 AM
Serial No.: 071023-47
Serial No.: 342
Serial No.: 060
Serial No.: 365
Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
10:41 AM	3.32	40.65	4.21	0.56
10:42 AM	3.39	39.71	4.26	0.69
10:43 AM	3.39	39.64	4.32	0.63
10:44 AM	3.36	39.70	4.29	0.58
10:45 AM	3.34	40.06	4.40	0.65
10:46 AM	3.38	40.39	4.48	0.60
10:47 AM	3.43	40.25	4.51	0.59
10:48 AM	3.46	40.85	4.54	0.61
10:49 AM	3.47	41.18	4.63	0.64
10:50 AM	3.42	40.40	4.64	0.65
10:51 AM	3.42	40.15	4.65	0.62
10:52 AM	3.38	40.39	4.74	0.52
10:53 AM	3.33	40.55	4.82	0.64
10:54 AM	3.27	40.42	4.83	0.62
10:55 AM	3.32	40.72	4.89	0.55
10:56 AM	3.37	41.23	4.87	0.51
10:57 AM	3.42	41.14	4.88	0.56
10:58 AM	3.43	41.10	4.77	0.70
10:59 AM	3.33	41.08	4.75	0.63
11:00 AM	3.31	40.68	4.83	0.62
11:01 AM	3.34	40.68	4.82	0.56
Average	3.38	40.52	4.63	0.61

Signature



Miss Katesarin Vorradetwittaya
Environmental Scientist

STAR PETROLEUM REFINING PUBLIC CO.,LTD.

EMISSION TEST RESULT

Run # : 3

Date: November 3, 2022 Location : NHTU

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

O₂ instrument Model: AMI 70 Serial No.: 071023-47

NO_x instrument Model: API 200 AH Serial No.: 342

SO₂ instrument Model: API 100 AH Serial No.: 060

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	3.29	40.49	4.83	0.57
11:03 AM	3.14	40.44	4.92	0.68
11:04 AM	3.20	40.99	4.83	0.57
11:05 AM	3.25	40.99	4.86	0.53
11:06 AM	3.13	40.62	4.90	0.55
11:07 AM	3.08	40.39	4.91	0.60
11:08 AM	3.11	40.78	4.95	0.59
11:09 AM	3.15	41.30	4.95	0.56
11:10 AM	3.19	41.75	4.95	0.55
11:11 AM	3.30	41.10	4.85	0.62
11:12 AM	3.31	40.83	4.82	0.60
11:13 AM	3.46	40.80	4.93	0.61
11:14 AM	3.43	41.16	4.78	0.54
11:15 AM	3.15	41.39	4.74	0.61
11:16 AM	2.97	41.22	4.77	0.64
11:17 AM	3.11	41.03	4.92	0.61
11:18 AM	3.37	41.34	5.09	0.63
11:19 AM	3.67	41.92	5.14	0.58
11:20 AM	3.68	42.53	5.21	0.58
11:21 AM	3.84	42.63	5.27	0.49
11:22 AM	3.89	43.13	5.20	0.58
Average	3.32	41.28	4.94	0.59

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 : 01/11/2022

RECEIVED DATE : 04/11/2022 ANALYTICAL DATE : 04-05/11/2022

REPORT DATE : 11/11/2022 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 : 11.3 m/s

Diameter : 1.6 m Flow rate⁽¹⁾ : 520 Ncu.m/min

Temperature : 420.5 °C Excess Oxygen : 5.0 %

PARAMETER	UNIT	RESULTS ⁽¹⁾		ASSIGNED VALUE ⁽²⁾	STANDARD ⁽³⁾	REFERENCE METHODS
		5.0 % O ₂	7 % O ₂			
Particulate Matter	mg/Ncu.m	2.5	2.2	60	60	US EPA Method 5

Phatchara Samanchan

(Miss Phatchara Samanchan)

Analyst

REG.NO. 2-239-ก-8183



(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
DHTU
STAR PETROLEUM REFINING PUBLIC CO.,LTD.
November 1, 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	4.96	5.00	36.77	36.41	31.83
2	4.94	4.98	36.79	36.84	32.17
3	4.89	4.92	36.48	36.94	32.13
Average	4.93	4.97	36.68	36.73	32.04

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	4.96	5.00	0.96	0.96	0.84
2	4.94	4.98	1.05	1.05	0.92
3	4.89	4.92	1.09	1.09	0.95
Average	4.93	4.97	1.03	1.03	0.90

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	4.96	5.00	0.26	0.26	0.23
2	4.94	4.98	0.31	0.31	0.27
3	4.89	4.92	0.41	0.41	0.36
Average	4.93	4.97	0.33	0.33	0.28

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

Run # : 1
 Date: November 1, 2022
 Location : DHTU
 Start time: 11:23 AM
 Finish time: 11:43 AM
 O₂ instrument Model: AMI 70
 Serial No.: 121121-10
 NO_x instrument Model: API 200 AH
 Serial No.: 314
 SO₂ instrument Model: TELEDYNE 100 EH
 Serial No.: 186
 CO instrument Model: THERMO 48 C
 Serial No.: 388
 Fuel Type : Natural Gas
 Test Operator : Pisanu S.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
11:23 AM	5.07	37.03	0.44	0.54
11:24 AM	5.00	37.66	0.38	0.92
11:25 AM	4.85	37.70	0.95	0.05
11:26 AM	4.84	38.00	1.18	0.02
11:27 AM	4.94	37.98	1.21	0.04
11:28 AM	4.96	36.60	0.35	0.30
11:29 AM	4.88	36.40	0.35	0.30
11:30 AM	5.17	34.60	0.37	0.31
11:31 AM	4.67	33.60	0.59	0.06
11:32 AM	4.88	35.30	0.36	0.04
11:33 AM	4.84	36.20	0.81	0.11
11:34 AM	4.96	37.00	1.01	0.13
11:35 AM	4.93	37.10	1.13	0.15
11:36 AM	4.93	37.20	1.28	0.22
11:37 AM	4.96	37.50	1.34	0.22
11:38 AM	5.07	37.50	1.38	0.29
11:39 AM	5.07	37.10	1.42	0.31
11:40 AM	4.95	36.80	1.43	0.31
11:41 AM	5.09	37.00	1.40	0.31
11:42 AM	5.01	36.90	1.39	0.35
11:43 AM	5.06	37.00	1.35	0.40
Average	4.96	36.77	0.96	0.26

Signature



Miss Katesarin Vorradetwittaya
Environmental Scientist

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

Run # : 2

Date: November 1, 2022 Location : DHTU

Start time: 11:44 AM Finish time: 12:04 PM

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

NO_x instrument Model: API 200 AH Serial No.: 314

SO₂ instrument Model: TELEDYNE 100 EH Serial No.: 186

CO instrument Model: THERMO 48 C Serial No.: 388

Fuel Type : Natural Gas Test Operator : Pisanu S.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
11:44 AM	4.95	36.90	1.38	0.40
11:45 AM	4.89	36.80	1.39	0.40
11:46 AM	4.98	36.50	1.43	0.42
11:47 AM	5.10	36.80	1.38	0.49
11:48 AM	4.73	37.30	0.63	0.49
11:49 AM	5.01	37.70	0.33	0.49
11:50 AM	4.81	37.40	0.33	0.48
11:51 AM	4.78	37.00	0.32	0.49
11:52 AM	4.67	33.60	0.59	0.06
11:53 AM	4.88	35.30	0.36	0.04
11:54 AM	4.84	36.20	0.81	0.11
11:55 AM	4.96	37.00	1.01	0.13
11:56 AM	4.93	37.10	1.13	0.15
11:57 AM	4.93	37.20	1.28	0.22
11:58 AM	4.96	37.50	1.34	0.22
11:59 AM	5.07	37.50	1.38	0.29
12:00 PM	5.07	37.10	1.42	0.31
12:01 PM	4.95	36.80	1.43	0.31
12:02 PM	5.09	37.00	1.40	0.31
12:03 PM	5.01	36.90	1.39	0.35
12:04 PM	5.06	37.00	1.35	0.40
Average	4.94	36.79	1.05	0.31

Signature



Miss Katesarin Vorradetwittaya
Environmental Scientist

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

Run # : 3

Date: November 1, 2022 Location : DHTU

Start time: 12:05 PM Finish time: 12:25 PM

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

NO_x instrument Model: API 200 AH Serial No.: 314

SO₂ instrument Model: TELEDYNE 100 EH Serial No.: 186

CO instrument Model: THERMO 48 C Serial No.: 388

Fuel Type : Natural Gas Test Operator : Pisanu S.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
12:05 PM	4.95	36.90	1.38	0.40
12:06 PM	4.89	36.80	1.39	0.40
12:07 PM	4.98	36.50	1.43	0.42
12:08 PM	5.10	36.80	1.38	0.49
12:09 PM	4.73	37.30	1.63	0.49
12:10 PM	5.01	37.70	1.33	0.49
12:11 PM	4.81	37.40	1.33	0.48
12:12 PM	4.78	37.00	1.32	0.49
12:13 PM	4.96	36.60	1.35	0.30
12:14 PM	4.88	36.40	1.35	0.30
12:15 PM	5.17	34.60	1.37	0.31
12:16 PM	4.36	34.65	1.23	0.35
12:17 PM	4.53	35.58	1.10	0.30
12:18 PM	5.09	36.12	1.17	0.27
12:19 PM	5.78	36.50	0.74	0.45
12:20 PM	4.91	36.22	0.56	0.40
12:21 PM	5.01	37.07	0.42	0.51
12:22 PM	4.69	36.66	0.52	0.55
12:23 PM	4.63	36.54	0.32	0.36
12:24 PM	4.80	36.82	0.67	0.48
12:25 PM	4.69	35.87	0.81	0.45
Average	4.89	36.48	1.09	0.41

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	: 01/11/2022
RECEIVED DATE	: 04/11/2022	ANALYTICAL DATE	: 04-05/11/2022
REPORT DATE	: 11/11/2022	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	: 8.2 m/s
Diameter	: 1.6 m	Flow rate ⁽¹⁾	: 385 Ncu.m/min
Temperature	: 409.0 °C	Excess Oxygen	: 5.6 %

PARAMETER	UNIT	RESULTS ⁽¹⁾		ASSIGNED VALUE ⁽²⁾	STANDARD ⁽³⁾	REFERENCE METHODS
		5.6 % O ₂	7 % O ₂			
Particulate Matter	mg/Ncu.m	0.9	0.8	60	60	US EPA Method 5

Phatchara Samanchan

(Miss Phatchara Samanchan)

Analyst

REG.NO.จ-239-จ-8183

Narisa Poowasanpetch

(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO.จ-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 HVGO STAR PETROLEUM REFINING PUBLIC CO.,LTD. November 1, 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	5.39	5.46	50.63	51.14	46.04
2	5.63	5.71	49.21	49.66	45.44
3	5.59	5.67	49.41	49.82	45.47
Average	5.53	5.61	49.75	50.21	45.65

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	5.39	5.46	0.73	0.73	0.66
2	5.63	5.71	0.79	0.79	0.72
3	5.59	5.67	0.79	0.79	0.72
Average	5.53	5.61	0.77	0.77	0.70

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	5.39	5.46	0.66	0.66	0.59
2	5.63	5.71	0.44	0.44	0.40
3	5.59	5.67	0.67	0.67	0.61
Average	5.53	5.61	0.59	0.59	0.54

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

Run # : 1

Date: November 1, 2022 Location : HVGO

Start time: 11:23 AM Finish time : 11:43 AM

O₂ instrument Model: AMI 70 Serial No.: 161212-14

NO_x instrument Model: TELEDYNE 200 EH Serial No.: 414

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

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

Fuel Type : Natural Gas Test Operator : Pisanu S.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
11:23 AM	5.43	48.65	0.89	0.67
11:24 AM	5.42	48.85	0.78	0.96
11:25 AM	5.16	49.32	0.76	0.82
11:26 AM	5.13	49.18	0.70	0.52
11:27 AM	5.18	48.73	0.70	0.65
11:28 AM	5.41	48.93	0.72	0.91
11:29 AM	5.37	49.59	0.71	0.87
11:30 AM	5.37	50.30	0.73	0.94
11:31 AM	5.35	50.36	0.72	0.18
11:32 AM	5.44	50.18	0.72	0.53
11:33 AM	5.31	50.44	0.67	0.84
11:34 AM	5.33	50.81	0.63	0.96
11:35 AM	5.37	51.20	0.68	0.91
11:36 AM	5.29	51.14	0.62	0.67
11:37 AM	5.45	50.59	0.66	0.67
11:38 AM	5.60	50.50	0.69	0.30
11:39 AM	5.60	51.64	0.74	0.01
11:40 AM	5.53	53.23	0.79	0.60
11:41 AM	5.60	53.45	0.80	0.65
11:42 AM	5.49	53.20	0.80	0.77
11:43 AM	5.44	52.99	0.80	0.40
Average	5.39	50.63	0.73	0.66

Signature 

Miss Katesarin Vorradetwittaya
Environmental Scientist

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

Run # : 2

Date: November 1, 2022 Location : HVGO

Start time: 11:44 AM Finish time : 12:04 PM

O₂ instrument Model: AMI 70 Serial No.: 161212-14

NO_x instrument Model: TELEDYNE 200 EH Serial No.: 414

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

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

Fuel Type : Natural Gas Test Operator : Pisanu S.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
11:44 AM	5.48	52.70	0.80	0.35
11:45 AM	5.61	48.46	0.91	0.49
11:46 AM	5.48	48.63	0.85	0.37
11:47 AM	5.71	48.51	0.74	0.29
11:48 AM	5.57	46.97	0.77	0.68
11:49 AM	5.49	47.90	0.75	0.39
11:50 AM	5.52	47.71	0.74	0.44
11:51 AM	5.54	48.07	0.78	0.74
11:52 AM	5.52	48.18	0.79	0.16
11:53 AM	5.57	48.32	0.78	0.02
11:54 AM	5.63	48.78	0.78	0.01
11:55 AM	5.73	49.51	0.80	0.05
11:56 AM	5.73	49.53	0.80	0.74
11:57 AM	5.66	49.71	0.80	0.85
11:58 AM	5.63	50.09	0.81	1.03
11:59 AM	5.71	50.14	0.81	1.11
12:00 PM	5.66	50.10	0.80	0.69
12:01 PM	5.80	50.11	0.80	0.40
12:02 PM	5.60	50.22	0.79	0.07
12:03 PM	5.75	49.92	0.78	0.04
12:04 PM	5.75	49.94	0.78	0.34
Average	5.63	49.21	0.79	0.44

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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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: November 1, 2022
 Location: HVGO
 Start time: 12:05 PM
 Finish time: 12:25 PM
 O₂ instrument Model: AMI 70
 Serial No.: 161212-14
 NO_x instrument Model: TELEDYNE 200 EH
 Serial No.: 414
 SO₂ instrument Model: API 100 AH
 Serial No.: 132
 CO instrument Model: API 300 A
 Serial No.: 1070
 Fuel Type: Natural Gas
 Test Operator: Pisanu S.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
12:05 PM	5.82	50.90	0.77	0.45
12:06 PM	5.80	51.51	0.77	0.73
12:07 PM	5.81	50.86	0.77	0.67
12:08 PM	5.70	49.60	0.83	0.44
12:09 PM	5.54	49.45	0.78	0.53
12:10 PM	5.76	49.32	0.77	0.44
12:11 PM	5.43	48.87	0.74	0.78
12:12 PM	5.28	48.76	0.81	0.90
12:13 PM	5.80	49.35	0.79	0.81
12:14 PM	5.23	50.01	0.79	0.74
12:15 PM	5.33	48.79	0.80	0.82
12:16 PM	5.45	48.63	0.76	0.82
12:17 PM	5.67	49.31	0.76	0.93
12:18 PM	5.69	48.15	0.76	0.81
12:19 PM	5.70	49.30	0.82	0.75
12:20 PM	5.69	49.21	0.82	0.87
12:21 PM	5.46	48.43	0.83	0.54
12:22 PM	5.64	48.50	0.81	0.69
12:23 PM	5.68	49.18	0.81	0.63
12:24 PM	5.10	49.32	0.79	0.49
12:25 PM	5.71	50.11	0.79	0.33
Average	5.59	49.41	0.79	0.67

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 : 01/11/2022
 RECEIVED DATE : 04/11/2022 ANALYTICAL DATE : 04-05/11/2022
 REPORT DATE : 11/11/2022 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 : 5.2 m/s
 Diameter : 0.86 m Flow rate⁽¹⁾ : 82.8 Ncu.m/min
 Temperature : 289.0 °C Excess Oxygen : 6.7 %

PARAMETER	UNIT	RESULTS ⁽¹⁾		ASSIGNED VALUE ⁽²⁾	STANDARD ⁽³⁾	REFERENCE METHODS
		6.7 % O ₂	7 % O ₂			
Particulate Matter	mg/Ncu.m	5.2	5.1	35	60	US EPA Method 5

Phatchara Samanchan

(Miss Phatchara Samanchan)

Analyst

REG.NO. 7-239-0-8183

(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO. 7-239-0-6419

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.
November 1, 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	6.69	6.65	18.40	18.38	17.93
2	6.72	6.68	18.62	18.59	18.17
3	6.71	6.67	18.89	18.86	18.42
Average	6.71	6.67	18.64	18.61	18.17

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	6.69	6.65	2.89	2.87	2.80
2	6.72	6.68	3.30	3.27	3.20
3	6.71	6.67	3.31	3.28	3.20
Average	6.71	6.67	3.16	3.14	3.07

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	6.69	6.65	1.61	1.55	1.51
2	6.72	6.68	1.56	1.51	1.48
3	6.71	6.67	1.55	1.51	1.47
Average	6.71	6.67	1.57	1.52	1.49

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

Run # : 1
Date: November 1, 2022
Location : WCN-HTU
Start time: 4:10 PM
Finish time: 4:30 PM
O₂ instrument Model: AMI 70
Serial No.: 071023-47
NO_x instrument Model: API 200 AH
Serial No.: 342
SO₂ instrument Model: API 100 AH
Serial No.: 060
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)
4:10 PM	6.64	18.31	3.64	1.75
4:11 PM	6.56	18.38	3.54	1.70
4:12 PM	6.66	18.41	3.37	1.66
4:13 PM	6.64	18.54	3.64	1.68
4:14 PM	6.66	18.51	3.50	1.68
4:15 PM	6.73	18.55	3.36	1.62
4:16 PM	6.57	18.59	3.20	1.71
4:17 PM	6.70	18.63	3.08	1.54
4:18 PM	6.67	18.64	2.99	1.63
4:19 PM	6.74	18.72	2.92	1.63
4:20 PM	6.74	18.91	2.80	1.57
4:21 PM	6.68	18.11	2.66	1.67
4:22 PM	6.55	18.14	2.70	1.56
4:23 PM	6.56	18.14	2.58	1.61
4:24 PM	6.72	18.20	2.54	1.55
4:25 PM	6.82	18.17	2.46	1.55
4:26 PM	6.66	18.30	2.41	1.61
4:27 PM	6.80	18.25	2.36	1.53
4:28 PM	6.72	18.32	2.27	1.51
4:29 PM	6.73	18.20	2.32	1.60
4:30 PM	6.85	18.40	2.27	1.52
Average	6.69	18.40	2.89	1.61

Signature



Miss Katesarin Vorradetwittaya
Environmental Scientist

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

Run # : 2
Date: November 1, 2022
Location : WCN-HTU
Start time: 4:31 PM
Finish time : 4:51 PM
O₂ instrument Model: AMI 70
Serial No.: 071023-47
NO_x instrument Model: API 200 AH
Serial No.: 342
SO₂ instrument Model: API 100 AH
Serial No.: 060
CO instrument Model: THERMO 48 C
Serial No.: 365
Fuel Type : Natural Gas
Test Operator : Song H.

Time, min	O ₂ (%)	NOx (ppm)	SO ₂ (ppm)	CO (ppm)
4:31 PM	6.63	18.49	2.09	1.62
4:32 PM	6.70	18.43	1.97	1.54
4:33 PM	6.76	18.39	1.91	1.65
4:34 PM	6.67	18.42	1.84	1.52
4:35 PM	6.69	18.58	3.76	1.66
4:36 PM	6.68	18.56	3.77	1.58
4:37 PM	6.59	18.60	3.76	1.56
4:38 PM	6.81	18.59	3.72	1.56
4:39 PM	6.79	18.67	3.60	1.48
4:40 PM	6.73	18.61	3.58	1.58
4:41 PM	6.69	18.61	3.58	1.52
4:42 PM	6.68	18.59	3.58	1.52
4:43 PM	6.48	18.83	3.56	1.54
4:44 PM	6.78	18.67	3.59	1.51
4:45 PM	6.67	18.50	3.58	1.53
4:46 PM	6.88	18.64	3.61	1.54
4:47 PM	6.84	18.63	3.57	1.50
4:48 PM	6.82	18.81	3.55	1.63
4:49 PM	6.83	18.83	3.54	1.55
4:50 PM	6.70	18.84	3.50	1.57
4:51 PM	6.65	18.71	3.55	1.57
Average	6.72	18.62	3.30	1.56

Signature



Miss Katesarin Vorradetwittaya
Environmental Scientist

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

Run # : 3
Date: November 1, 2022
Location : WCN-HTU
Start time: 4:52 PM
Finish time : 5:12 PM
O₂ instrument Model: AMI 70
Serial No.: 071023-47
NO_x instrument Model: API 200 AH
Serial No.: 342
SO₂ instrument Model: API 100 AH
Serial No.: 060
CO instrument Model: THERMO 48 C
Serial No.: 365
Fuel Type : Natural Gas
Test Operator : Song H.

Time, min	O ₂ (%)	NOx (ppm)	SO ₂ (ppm)	CO (ppm)
4:52 PM	6.73	18.76	3.53	1.49
4:53 PM	6.73	18.82	3.45	1.59
4:54 PM	6.80	18.94	3.43	1.53
4:55 PM	6.79	18.91	3.45	1.56
4:56 PM	6.64	18.70	3.43	1.56
4:57 PM	6.79	18.77	3.46	1.56
4:58 PM	6.78	18.82	3.44	1.60
4:59 PM	6.66	18.94	3.38	1.56
5:00 PM	6.86	18.96	3.41	1.57
5:01 PM	6.72	19.12	3.38	1.63
5:02 PM	6.78	19.22	3.38	1.53
5:03 PM	6.76	19.16	3.39	1.60
5:04 PM	6.68	19.23	3.41	1.57
5:05 PM	6.54	18.73	3.24	1.48
5:06 PM	6.76	18.65	3.27	1.59
5:07 PM	6.74	18.63	3.28	1.48
5:08 PM	6.68	18.71	3.19	1.52
5:09 PM	6.69	18.96	3.50	1.54
5:10 PM	6.67	18.95	2.18	1.51
5:11 PM	6.58	18.83	2.76	1.60
5:12 PM	6.63	18.90	3.60	1.54
Average	6.71	18.89	3.31	1.55

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	: 01/11/2022
RECEIVED DATE	: 04/11/2022	ANALYTICAL DATE	: 04-05/11/2022
REPORT DATE	: 11/11/2022	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	: 4.8	m/s
Diameter	: 2.2	m	Flow rate ⁽¹⁾	: 372	Ncu.m/min
Temperature	: 500.8	°C	Excess Oxygen	: 4.2	%

PARAMETER	UNIT	RESULTS ⁽¹⁾		ASSIGNED VALUE ⁽²⁾	STANDARD ⁽³⁾	REFERENCE METHODS
		4.2 % O ₂	7 % O ₂			
Particulate Matter	mg/Ncu.m	3.2	2.7	60	-	US EPA Method 5

Phatchara Samanchan

(Miss Phatchara Samanchan)

Analyst

REG.NO.จ-239-จ-8183

Narisa Poowasanpetch

(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO.จ-239-จ-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	: 01/11/2022
RECEIVED DATE	: 02/11/2022	ANALYTICAL DATE	: 02/11/2022
REPORT DATE	: 09/11/2022	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	: 4.8	m/s
Diameter	: 2.2	m	Flow rate ⁽¹⁾	: 371.7	Ncu.m/min
Temperature	: 500.8	°C	Excess Oxygen	: 4.2	%

PARAMETER	UNIT	RESULTS ⁽¹⁾		ASSIGNED VALUE ⁽²⁾	STANDARD	REFERENCE METHODS
		4.2 % 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

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).

**The Monitoring Result of Emission Concentration
SRU
STAR PETROLEUM REFINING PUBLIC CO.,LTD.
November 1, 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	4.11	4.06	9.57	9.54	7.87
2	4.23	4.19	10.58	10.56	8.78
3	4.37	4.33	11.31	11.29	9.47
Average	4.24	4.19	10.49	10.46	8.71

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	4.11	4.06	313.84	313.95	259.14
2	4.23	4.19	320.52	320.61	266.70
3	4.37	4.33	313.47	313.54	263.02
Average	4.24	4.19	315.94	316.03	262.94

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	4.11	4.06	274.86	274.96	226.96
2	4.23	4.19	275.66	275.78	229.40
3	4.37	4.33	278.83	278.97	234.02
Average	4.24	4.19	276.45	276.57	230.11

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

Run # : 1
 Date: November 1, 2022
 Location : SRU
 Start time: 2:00 PM
 Finish time : 2:20 PM
 O₂ instrument Model: AMI 70
 Serial No.: 071023-47
 NO_x instrument Model: API 200 AH
 Serial No.: 342
 SO₂ instrument Model: API 100 AH
 Serial No.: 060
 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)
2:00 PM	3.92	9.19	312.64	280.57
2:01 PM	3.96	9.48	312.40	287.92
2:02 PM	3.94	9.97	314.45	287.45
2:03 PM	3.99	10.03	316.02	289.41
2:04 PM	4.07	10.03	316.25	285.66
2:05 PM	4.27	9.68	315.08	282.41
2:06 PM	4.04	9.71	314.82	285.91
2:07 PM	4.04	9.52	313.65	283.89
2:08 PM	4.14	9.56	313.01	285.02
2:09 PM	4.23	9.65	315.84	222.36
2:10 PM	4.18	9.48	309.60	248.87
2:11 PM	4.26	9.27	309.89	286.32
2:12 PM	4.21	9.12	310.02	282.85
2:13 PM	4.18	9.53	312.18	283.08
2:14 PM	4.22	9.56	313.84	282.36
2:15 PM	4.16	9.54	314.29	281.88
2:16 PM	4.22	9.42	315.03	281.47
2:17 PM	4.14	9.43	317.33	277.47
2:18 PM	4.09	9.36	312.18	281.18
2:19 PM	4.08	9.62	314.54	246.40
2:20 PM	4.05	9.87	317.67	229.63
Average	4.11	9.57	313.84	274.86

Signature



Miss Katesarin Vorradetwittaya

Environmental Scientist

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

Run # : 2

Date: November 1, 2022 Location : SRU

Start time: 2:21 PM Finish time : 2:41 PM

O₂ instrument Model: AMI 70 Serial No.: 071023-47

NO_x instrument Model: API 200 AH Serial No.: 342

SO₂ instrument Model: API 100 AH Serial No.: 060

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)
2:21 PM	4.03	9.89	320.09	264.97
2:22 PM	3.99	9.67	323.24	283.49
2:23 PM	4.09	9.94	322.71	278.88
2:24 PM	4.09	10.34	323.44	248.79
2:25 PM	4.19	10.37	323.69	282.78
2:26 PM	4.20	10.29	325.12	288.02
2:27 PM	4.31	10.25	327.49	276.05
2:28 PM	4.21	10.12	329.09	278.61
2:29 PM	4.14	10.32	328.60	235.63
2:30 PM	4.09	10.42	326.30	298.53
2:31 PM	4.04	10.53	329.58	279.65
2:32 PM	4.32	10.58	324.94	281.19
2:33 PM	4.25	10.67	322.15	256.92
2:34 PM	4.23	10.80	318.89	295.03
2:35 PM	4.39	10.86	316.99	284.80
2:36 PM	4.32	11.04	314.11	285.42
2:37 PM	4.45	11.03	311.72	302.04
2:38 PM	4.34	11.14	311.04	262.45
2:39 PM	4.54	11.13	312.04	273.04
2:40 PM	4.30	11.29	310.04	274.22
2:41 PM	4.36	11.45	309.60	258.37
Average	4.23	10.58	320.52	275.66

Signature



Miss Katesarin Vorradetwittaya
Environmental Scientist

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

Run # : 3

Date: November 1, 2022 Location : SRU

Start time: 2:42 PM Finish time : 3:02 PM

O₂ instrument Model: AMI 70 Serial No.: 071023-47

NO_x instrument Model: API 200 AH Serial No.: 342

SO₂ instrument Model: API 100 AH Serial No.: 060

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)
2:42 PM	4.37	11.55	309.46	267.12
2:43 PM	4.65	11.45	309.72	227.51
2:44 PM	4.34	11.34	310.95	239.13
2:45 PM	4.32	11.46	311.89	253.73
2:46 PM	4.53	11.51	312.97	279.07
2:47 PM	4.21	11.62	312.93	278.45
2:48 PM	4.52	11.60	313.09	277.75
2:49 PM	4.38	11.63	312.60	278.27
2:50 PM	4.50	11.66	314.12	291.42
2:51 PM	4.54	11.52	315.88	282.83
2:52 PM	4.32	11.52	315.83	300.44
2:53 PM	4.27	11.42	315.23	287.37
2:54 PM	4.35	11.64	311.48	296.62
2:55 PM	4.32	11.28	321.53	296.69
2:56 PM	4.26	10.47	310.84	286.92
2:57 PM	4.23	10.54	318.43	282.78
2:58 PM	4.39	10.72	314.82	291.02
2:59 PM	4.31	11.03	305.28	343.84
3:00 PM	4.28	10.61	316.36	267.79
3:01 PM	4.33	11.56	312.76	276.76
3:02 PM	4.27	11.37	316.72	249.87
Average	4.37	11.31	313.47	278.83

Signature



Miss Katesarin Vorradetwittaya
Environmental Scientist



บริษัท ซีคอต จำกัด
SECOT CO., LTD.

239 ถนนมิตรภาพระประปา แขวงบางซื่อ เขตบางซื่อ กรุงเทพฯ 10800

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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 : 12/12/2022
RECEIVED DATE : 16/12/2022 ANALYTICAL DATE : 16-17/12/2022
REPORT DATE : 21/12/2022 SAMPLE CONDITION : Normal
STACK LOCATION : Boiler#2 Stack OPERATOR : Mr. Kittipong Thakoengsuk
SOURCE DESCRIPTION : Combustion FUEL TYPE : Natural Gas + Refinery Fuel Gas

STACK DESCRIPTION

Height : 32.4 m Gas Velocity : 9.1 m/s
Diameter : 1.5 m Flow rate ⁽¹⁾ : 581 Ncu.m/min
Temperature : 160.3 °C Excess Oxygen : 3.6 %

PARAMETER	UNIT	RESULTS ⁽¹⁾		ASSIGNED VALUE ⁽²⁾	STANDARD ⁽³⁾	REFERENCE METHODS
		3.6 % O ₂	7 % O ₂			
Particulate Matter	mg/Ncu.m	2.0	1.6	60	60	US EPA Method 5

Phatchara Samanchan

(Miss Phatchara Samanchan)

Analyst

REG.NO. 7-239-9-8183

Naris Poowasanpetch

(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO. 7-239-9-6419

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 2

STAR PETROLEUM REFINING PUBLIC CO.,LTD.
December 12, 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	3.59	3.58	95.44	95.80	76.88
2	3.54	3.53	95.93	96.35	77.10
3	3.59	3.58	91.54	91.98	73.82
Average	3.57	3.56	94.31	94.71	75.94

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	3.59	3.58	0.18	0.15	0.12
2	3.54	3.53	0.18	0.15	0.12
3	3.59	3.58	0.18	0.15	0.12
Average	3.57	3.56	0.18	0.15	0.12

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	3.59	3.58	0.14	0.11	0.09
2	3.54	3.53	0.14	0.11	0.09
3	3.59	3.58	0.14	0.10	0.08
Average	3.57	3.56	0.14	0.11	0.09

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

Run # : 1
Date: December 12, 2022 **Location :** Boiler 2
Start time: 11:00 AM **Finish time :** 11:20 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 :** Kittipong T.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
11:00 AM	3.69	95.46	0.18	0.14
11:01 AM	3.65	95.84	0.18	0.14
11:02 AM	3.54	96.35	0.18	0.14
11:03 AM	3.51	96.60	0.18	0.14
11:04 AM	3.55	96.23	0.18	0.14
11:05 AM	3.63	95.77	0.18	0.14
11:06 AM	3.62	95.47	0.18	0.14
11:07 AM	3.66	95.10	0.18	0.14
11:08 AM	3.70	94.95	0.18	0.13
11:09 AM	3.59	94.96	0.18	0.14
11:10 AM	3.49	95.03	0.18	0.14
11:11 AM	3.53	95.22	0.18	0.14
11:12 AM	3.53	95.22	0.18	0.14
11:13 AM	3.54	95.37	0.18	0.14
11:14 AM	3.58	95.69	0.18	0.14
11:15 AM	3.56	95.83	0.18	0.14
11:16 AM	3.52	95.86	0.18	0.14
11:17 AM	3.63	95.58	0.17	0.14
11:18 AM	3.67	94.86	0.18	0.14
11:19 AM	3.62	94.26	0.18	0.14
11:20 AM	3.62	94.69	0.18	0.14
Average	3.59	95.44	0.18	0.14

Signature 
 Miss Katesarin Vorradetwittaya
 Environmental Scientist

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

Run # : 2
Date: December 12, 2022 **Location :** Boiler 2
Start time: 11:21 AM **Finish time :** 11:41 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 :** Kittipong T.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
11:21 AM	3.65	95.26	0.18	0.14
11:22 AM	3.53	95.59	0.18	0.14
11:23 AM	3.54	96.14	0.18	0.14
11:24 AM	3.67	96.05	0.19	0.14
11:25 AM	3.67	95.45	0.18	0.14
11:26 AM	3.62	95.36	0.19	0.14
11:27 AM	3.55	95.83	0.18	0.14
11:28 AM	3.54	96.41	0.18	0.14
11:29 AM	3.57	96.77	0.18	0.14
11:30 AM	3.57	97.37	0.18	0.14
11:31 AM	3.58	97.72	0.18	0.14
11:32 AM	3.50	97.54	0.18	0.15
11:33 AM	3.45	97.12	0.18	0.14
11:34 AM	3.56	97.36	0.18	0.14
11:35 AM	3.58	97.65	0.18	0.14
11:36 AM	3.52	97.02	0.18	0.14
11:37 AM	3.57	95.87	0.18	0.14
11:38 AM	3.40	95.01	0.18	0.14
11:39 AM	3.41	94.00	0.18	0.14
11:40 AM	3.42	92.75	0.18	0.13
11:41 AM	3.43	92.34	0.18	0.14
Average	3.54	95.93	0.18	0.14

Signature 
 Miss Katesarin Vorradetwittaya
 Environmental Scientist

STAR PETROLEUM REFINING PUBLIC CO.,LTD.

EMISSION TEST RESULT

Run # : 3

Date: December 12, 2022 Location : Boiler 2

Start time: 11:42 AM Finish time : 12:02 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 : Kittipong T.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
11:42 AM	3.49	91.83	0.18	0.14
11:43 AM	3.52	91.42	0.18	0.14
11:44 AM	3.51	90.80	0.18	0.14
11:45 AM	3.49	90.45	0.18	0.14
11:46 AM	3.57	91.13	0.18	0.14
11:47 AM	3.65	91.79	0.19	0.14
11:48 AM	3.58	91.86	0.18	0.14
11:49 AM	3.49	92.01	0.18	0.14
11:50 AM	3.48	91.74	0.18	0.14
11:51 AM	3.49	91.57	0.18	0.14
11:52 AM	3.55	91.95	0.18	0.14
11:53 AM	3.65	92.12	0.18	0.14
11:54 AM	3.63	92.47	0.18	0.13
11:55 AM	3.66	92.17	0.18	0.11
11:56 AM	3.61	91.65	0.18	0.11
11:57 AM	3.59	91.65	0.18	0.16
11:58 AM	3.61	92.03	0.18	0.13
11:59 AM	3.64	92.20	0.18	0.14
12:00 PM	3.67	91.24	0.18	0.14
12:01 PM	3.73	90.35	0.18	0.14
12:02 PM	3.68	89.98	0.18	0.13
Average	3.59	91.54	0.18	0.14

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 : 13/12/2022

RECEIVED DATE : 16/12/2022 ANALYTICAL DATE : 16-17/12/2022

REPORT DATE : 21/12/2022 SAMPLE CONDITION : Normal

STACK LOCATION : Boiler#3 Stack OPERATOR : Mr. Kittipong Thakoengsuk

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

STACK DESCRIPTION

Height : 32.4 m Gas Velocity : 6.9 m/s

Diameter : 1.5 m Flow rate ⁽¹⁾ : 450 Ncu.m/min

Temperature : 150.3 °C Excess Oxygen : 6.6 %

PARAMETER	UNIT	RESULTS ⁽¹⁾		ASSIGNED VALUE ⁽²⁾	STANDARD ⁽³⁾	REFERENCE METHODS
		6.6 % O ₂	7 % O ₂			
Particulate Matter	mg/Ncu.m	1.9	1.8	20	60	US EPA Method 5

Phatchara Samanchan
(Miss Phatchara Samanchan)

Analyst

REG.NO. 7-239-8-8183

Naris Poowasanpetch
(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO. 7-239-8-6419

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

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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 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 3
STAR PETROLEUM REFINING PUBLIC CO.,LTD.
December 13, 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	6.58	6.58	36.23	36.32	35.25
2	6.64	6.64	36.47	36.57	35.65
3	6.60	6.60	36.72	36.83	35.80
Average	6.61	6.61	36.48	36.57	35.57

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	6.58	6.58	0.14	0.12	0.12
2	6.64	6.64	0.21	0.18	0.18
3	6.60	6.60	0.38	0.34	0.33
Average	6.61	6.61	0.24	0.21	0.21

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	6.58	6.58	0.15	0.14	0.14
2	6.64	6.64	0.17	0.15	0.15
3	6.60	6.60	0.16	0.13	0.13
Average	6.61	6.61	0.16	0.14	0.14

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

Date: December 13, 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: THERMO 48 C
Fuel Type : Natural Gas

Run # : 1
Location : Boiler 3
Finish time : 11:40 AM
Serial No.: 111117-2
Serial No.: 435
Serial No.: 058
Serial No.: 365
Test Operator : Kittipong T.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
11:20 AM	6.68	36.04	0.08	0.13
11:21 AM	6.59	36.03	0.09	0.16
11:22 AM	6.68	36.15	0.14	0.16
11:23 AM	6.61	36.18	0.04	0.11
11:24 AM	6.55	36.29	0.09	0.11
11:25 AM	6.47	36.26	0.14	0.13
11:26 AM	6.50	36.20	0.14	0.13
11:27 AM	6.79	36.13	0.13	0.11
11:28 AM	6.77	35.90	0.15	0.11
11:29 AM	6.60	35.90	0.16	0.12
11:30 AM	6.55	36.09	0.10	0.17
11:31 AM	6.66	36.10	0.18	0.16
11:32 AM	6.67	35.98	0.18	0.17
11:33 AM	6.58	36.06	0.18	0.17
11:34 AM	6.48	36.17	0.19	0.17
11:35 AM	6.51	36.27	0.22	0.17
11:36 AM	6.63	36.21	0.11	0.17
11:37 AM	6.45	36.36	0.11	0.17
11:38 AM	6.51	36.64	0.13	0.17
11:39 AM	6.48	36.82	0.17	0.17
11:40 AM	6.38	37.04	0.14	0.17
Average	6.58	36.23	0.14	0.15

Signature



Miss Katesarin Vorradetwittaya
 Environmental Scientist

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

Run # : 2

Date: December 13, 2022 Location : Boiler 3

Start time: 11:41 AM Finish time : 12:01 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 : Kittipong T.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
11:41 AM	6.49	37.03	0.23	0.17
11:42 AM	6.68	36.69	0.17	0.17
11:43 AM	6.71	36.48	0.07	0.17
11:44 AM	6.66	36.43	0.23	0.17
11:45 AM	6.67	36.44	0.11	0.17
11:46 AM	6.66	36.31	0.09	0.17
11:47 AM	6.69	36.17	0.15	0.17
11:48 AM	6.62	36.27	0.19	0.17
11:49 AM	6.70	36.32	0.20	0.17
11:50 AM	6.60	36.24	0.17	0.17
11:51 AM	6.52	36.38	0.10	0.17
11:52 AM	6.70	36.46	0.15	0.17
11:53 AM	6.52	36.54	0.18	0.17
11:54 AM	6.36	36.89	0.24	0.17
11:55 AM	6.43	36.96	0.37	0.17
11:56 AM	6.73	36.59	0.24	0.17
11:57 AM	6.79	36.22	0.22	0.17
11:58 AM	6.75	36.16	0.38	0.17
11:59 AM	6.66	36.33	0.34	0.17
12:00 PM	6.72	36.53	0.29	0.17
12:01 PM	6.77	36.47	0.23	0.17
Average	6.64	36.47	0.21	0.17

Signature



Miss Katesarin Vorradetwittaya
Environmental Scientist

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

Run # : 3

Date: December 13, 2022 Location : Boiler 3

Start time: 12:02 PM Finish time : 12:22 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 : Kittipong T.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
12:02 PM	6.76	36.29	0.24	0.17
12:03 PM	6.65	36.34	0.28	0.17
12:04 PM	6.47	36.78	0.34	0.17
12:05 PM	6.45	37.05	0.31	0.17
12:06 PM	6.52	37.01	0.38	0.17
12:07 PM	6.47	37.03	0.33	0.17
12:08 PM	6.42	37.14	0.35	0.12
12:09 PM	6.73	36.92	0.36	0.11
12:10 PM	6.75	36.59	0.33	0.16
12:11 PM	6.76	36.63	0.35	0.17
12:12 PM	6.69	36.61	0.26	0.17
12:13 PM	6.70	36.57	0.43	0.17
12:14 PM	6.68	36.78	0.36	0.17
12:15 PM	6.57	36.81	0.42	0.17
12:16 PM	6.73	36.76	0.41	0.17
12:17 PM	6.73	36.62	0.44	0.17
12:18 PM	6.74	36.43	0.49	0.17
12:19 PM	6.64	36.30	0.51	0.17
12:20 PM	6.48	36.54	0.39	0.17
12:21 PM	6.36	36.85	0.41	0.17
12:22 PM	6.26	37.16	0.53	0.17
Average	6.60	36.72	0.38	0.16

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	: 02/11/2022
RECEIVED DATE	: 04/11/2022	ANALYTICAL DATE	: 04-05/11/2022
REPORT DATE	: 11/11/2022	SAMPLE CONDITION	: Normal
STACK LOCATION	: HRSG#2 Stack	OPERATOR	: Mr. Song Hengchwankun
SOURCE DESCRIPTION	: Combustion	FUEL TYPE	: Natural Gas + Refinery Fuel Gas

STACK DESCRIPTION

Height	: 21.7	m	Gas Velocity	: 16.0	m/s
Diameter	: 3.0	m	Flow rate ⁽¹⁾	: 3,761	Ncu.m/min
Temperature	: 205.8	°C	Excess Oxygen	: 14.2	%

PARAMETER	UNIT	RESULTS ⁽¹⁾		ASSIGNED VALUE ⁽²⁾	STANDARD ⁽³⁾	REFERENCE METHODS
		14.2 % O ₂	7 % O ₂			
Particulate Matter	mg/Ncu.m	3.3	6.8	60	60	US EPA Method 5

Phatchara Samanchan

(Miss Phatchara Samanchan)

Analyst

REG.NO. 7-239-ท-8183

Narisa Poowasanpeth

(Miss Narisa Poowasanpeth)

Technical Management Team

REG.NO. 7-239-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 HRSG 2 STAR PETROLEUM REFINING PUBLIC CO.,LTD. November 2, 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	14.22	14.19	42.93	42.90	88.87
2	14.22	14.19	43.43	43.40	89.90
3	14.27	14.23	43.50	43.48	90.61
Average	14.23	14.20	43.29	43.26	89.79

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	14.22	14.19	0.95	0.93	1.93
2	14.22	14.19	0.87	0.84	1.74
3	14.27	14.23	0.82	0.78	1.63
Average	14.23	14.20	0.88	0.85	1.76

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	14.22	14.19	10.34	10.31	21.36
2	14.22	14.19	10.62	10.59	21.94
3	14.27	14.23	10.43	10.40	21.67
Average	14.23	14.20	10.46	10.43	21.66

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

Date: November 2, 2022
Run # : 1
Location : HRSG 2
Start time: 10:30 AM
Finish time: 10:50 AM
O₂ instrument Model: AMI 70
Serial No.: 071023-47
NO_x instrument Model: API 200 AH
Serial No.: 342
SO₂ instrument Model: API 100 AH
Serial No.: 060
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)
10:30 AM	14.16	42.49	1.00	11.21
10:31 AM	14.23	42.50	0.99	10.97
10:32 AM	14.23	42.54	1.00	10.17
10:33 AM	14.19	42.80	0.98	9.16
10:34 AM	14.22	43.17	0.99	10.70
10:35 AM	14.20	43.22	1.00	10.27
10:36 AM	14.21	42.97	0.97	9.69
10:37 AM	14.19	43.10	0.97	8.63
10:38 AM	14.19	43.01	0.95	12.38
10:39 AM	14.15	42.82	0.98	10.30
10:40 AM	14.18	43.09	0.97	10.67
10:41 AM	14.22	43.07	0.95	10.30
10:42 AM	14.24	42.98	0.95	11.39
10:43 AM	14.29	42.79	0.93	10.69
10:44 AM	14.27	42.55	0.91	9.80
10:45 AM	14.25	42.72	0.90	10.67
10:46 AM	14.23	42.99	0.90	9.89
10:47 AM	14.23	43.06	0.88	9.52
10:48 AM	14.22	43.31	0.88	9.80
10:49 AM	14.21	43.24	0.90	10.63
10:50 AM	14.23	43.20	0.88	10.34
Average	14.22	42.93	0.95	10.34

Signature



Miss Katesarin Vorradetwittaya
Environmental Scientist

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

Date: November 2, 2022
Run # : 2
Location : HRSG 2
Start time: 10:51 AM
Finish time: 11:11 AM
O₂ instrument Model: AMI 70
Serial No.: 071023-47
NO_x instrument Model: API 200 AH
Serial No.: 342
SO₂ instrument Model: API 100 AH
Serial No.: 060
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)
10:51 AM	14.22	43.06	0.91	10.97
10:52 AM	14.22	43.22	0.89	10.67
10:53 AM	14.23	43.25	0.87	10.84
10:54 AM	14.22	43.26	0.88	10.97
10:55 AM	14.20	43.38	0.88	10.84
10:56 AM	14.21	43.23	0.87	10.75
10:57 AM	14.23	43.35	0.85	10.92
10:58 AM	14.21	43.48	0.86	10.71
10:59 AM	14.22	43.46	0.83	10.46
11:00 AM	14.21	43.19	0.86	10.58
11:01 AM	14.22	43.38	0.87	10.84
11:02 AM	14.20	43.62	0.88	10.46
11:03 AM	14.21	43.50	0.87	10.46
11:04 AM	14.21	43.31	0.85	10.46
11:05 AM	14.22	43.32	0.84	10.46
11:06 AM	14.19	43.76	0.85	10.45
11:07 AM	14.19	43.92	0.86	10.46
11:08 AM	14.21	43.81	0.87	10.46
11:09 AM	14.23	43.76	0.87	10.45
11:10 AM	14.24	43.55	0.87	10.46
11:11 AM	14.24	43.30	0.86	10.37
Average	14.22	43.43	0.87	10.62

Signature



Miss Katesarin Vorradetwittaya
Environmental Scientist

STAR PETROLEUM REFINING PUBLIC CO.,LTD.

EMISSION TEST RESULT

Run # : 3

Date: November 2, 2022 Location : HRSG 2

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

O₂ instrument Model: AMI 70 Serial No.: 071023-47

NO_x instrument Model: API 200 AH Serial No.: 342

SO₂ instrument Model: API 100 AH Serial No.: 060

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)
11:12 AM	14.18	43.36	0.89	10.54
11:13 AM	14.17	43.67	0.89	10.08
11:14 AM	14.20	43.53	0.88	10.33
11:15 AM	14.33	43.38	0.87	10.45
11:16 AM	14.35	43.25	0.86	10.45
11:17 AM	14.31	43.22	0.85	10.45
11:18 AM	14.30	43.52	0.81	10.45
11:19 AM	14.31	43.58	0.81	10.45
11:20 AM	14.29	43.65	0.81	10.45
11:21 AM	14.30	43.76	0.79	10.45
11:22 AM	14.24	43.65	0.79	10.45
11:23 AM	14.26	43.58	0.83	10.45
11:24 AM	14.27	43.68	0.80	10.45
11:25 AM	14.28	43.77	0.78	10.45
11:26 AM	14.26	43.66	0.81	10.45
11:27 AM	14.30	43.55	0.83	10.45
11:28 AM	14.29	43.21	0.81	10.45
11:29 AM	14.26	43.26	0.79	10.45
11:30 AM	14.25	43.50	0.80	10.45
11:31 AM	14.28	43.52	0.80	10.45
11:32 AM	14.28	43.20	0.81	10.45
Average	14.27	43.50	0.82	10.43

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/Bz

SAMPLING BY : SECOT Co., Ltd. SAMPLING DATE : 31/10/2022

RECEIVED DATE : 02/11/2022 ANALYTICAL DATE : 03-04/11/2022

REPORT DATE : 09/11/2022 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⁾ : 9.9 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	112.4	0.38	-	-	US EPA Method 18
	mg/l	0.36	0.001	0.21	-	
	g/s	-	0.0002	0.017	-	

Sudaporn Soonthorn

(Miss Sudaporn Soonthorn)

Analyst

Narisa Poowasanpetch

(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).



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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 : 31/10/2022
RECEIVED DATE : 02/11/2022 ANALYTICAL DATE : 02/11/2022
REPORT DATE : 09/11/2022 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⁾ : 9.9 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	20,633	504	-	-	US EPA Method 25A
	mg/l	37.1	0.91	15	17	
	g/s	-	0.150	1.212	-	

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).

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/HCl
SAMPLING BY : SECOT Co., Ltd. SAMPLING DATE : 01/11/2022
RECEIVED DATE : 02/11/2022 ANALYTICAL DATE : 09/11/2022
REPORT DATE : 09/11/2022 SAMPLE CONDITION : Normal
STACK LOCATION : Wash Tower Stack at CCRU Unit OPERATOR : Mr. Song Hengchwankun
SOURCE DESCRIPTION : Process FUEL TYPE : -

PARAMETER	UNIT	RESULTS	ASSIGNED VALUE	STANDARD	REFERENCE METHODS
Hydrogen Chloride	ppm	0.03	-	-	US EPA Method 26

Phatchara Samanchan

(Miss Phatchara Samanchan)

Analyst

REG.NO. 7-239-ท-8183

Narisa Poowasanpetch

(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO. 7-239-ท-6419

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STACK EMISSION ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd	REF. NO.	: Refinery-222003-COA-Stk/H2S
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING DATE	: 01/11/2022
RECEIVED DATE	: 02/11/2022	ANALYTICAL DATE	: 02/11/2022
REPORT DATE	: 09/11/2022	SAMPLE CONDITION	: Normal
STACK LOCATION	: Wash Tower Stack at CCRU Unit	OPERATOR	: Mr. Song Hengchwankun
SOURCE DESCRIPTION	: Process	FUEL TYPE	: -

PARAMETER	UNIT	RESULTS	ASSIGNED VALUE	STANDARD	REFERENCE METHODS
Hydrogen Sulfide	ppm	<0.30	-	-	US EPA Method 16



(Miss Sudaporn Soonthorn)

Analyst



(Miss Narisa Poowasanpetch)

Technical Management Team

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1494/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 12/07/2022	SAMPLING TIME	: 10.41
RECEIVED DATE	: 13/07/2022	ANALYTICAL DATE	: 13-19/07/2022
REPORT DATE	: 20/07/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_WW_July

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION Near the refinery outfall	STANDARD ^U
Temperature	°C	2550 B	< 0.5	28.6	≤ 40
pH	-	4500-H ⁺ B	< 0.10	8.36	5.5-9.0
Total Dissolved Solids	mg/l	2540 C	< 50	923	≤ 3,000
Total Suspended Solids	mg/l	2540 D	< 5	< 5	≤ 50
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	0.07	-
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	ND	≤ 0.75
Mercury (Hg)	mg/l	3112 B	< 0.0005	ND	≤ 0.005

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd ED. 2017 (AWWA APHA WEF)

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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 3. ^U 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.	: 1625/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 09/08/2022	SAMPLING TIME	: 09.15
RECEIVED DATE	: 10/08/2022	ANALYTICAL DATE	: 10-18/08/2022
REPORT DATE	: 19/08/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_WW_August

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION Near the refinery outfall	STANDARD ^U
Temperature	°C	2550 B	< 0.5	28.8	≤ 40
pH	-	4500-H ⁺ B	< 0.10	8.29	5.5-9.0
Total Dissolved Solids	mg/l	2540 C	< 50	615	≤ 3,000
Total Suspended Solids	mg/l	2540 D	< 5	< 5	≤ 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	1.2	≤ 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 23rd ED. 2017 (AWWA APHA WEF)

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.	: 1815/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 06/09/2022	SAMPLING TIME	: 1C.15
RECEIVED DATE	: 07/09/2022	ANALYTICAL DATE	: 07-14/09/2022
REPORT DATE	: 14/09/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_WW_September

PARAMETER	UNIT	ANALYSIS METHODS	ND	STATION	STANDARD ^{1/}
			(non-detectable)	Near the refinery outfall	
Temperature	°C	2550 B	< 0.5	29.6	≤ 40
pH		4500-H ⁺ B	< 0.10	7.54	5.5-9.0
Total Dissolved Solids	mg/l	2540 C	< 50	110	≤ 3,000
Total Suspended Solids	mg/l	2540 D	< 5	15	≤ 50
Ammonia Nitrogen	mg/l	Method 350.2	< 0.02	0.20	
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	1.8	≤ 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. 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.	: 2057/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 11/10/2022	SAMPLING TIME	: 10.47
RECEIVED DATE	: 12/10/2022	ANALYTICAL DATE	: 12-20/10/2022
REPORT DATE	: 20/10/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_WW_October

PARAMETER	UNIT	ANALYSIS METHODS	ND	STATION	STANDARD ^{1/}
			(non-detectable)	Near the refinery outfall	
Temperature	°C	2550 B	< 0.5	28.7	≤ 40
pH		4500-H ⁺ B	< 0.10	7.88	5.5-9.0
Total Dissolved Solids	mg/l	2540 C	< 50	186	≤ 3,000
Total Suspended Solids	mg/l	2540 D	< 5	13	≤ 50
Ammonia Nitrogen	mg/l	Method 350.2	< 0.02	0.10	
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	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

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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.	: 2186/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 02/11/2022	SAMPLING TIME	: 09.40
RECEIVED DATE	: 03/11/2022	ANALYTICAL DATE	: 03-10/11/2022
REPORT DATE	: 11/11/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_WW_November

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION Near the refinery outfall	STANDARD ^{1/}
Temperature	°C	2550 B	< 0.5	28.5	≤ 40
pH		4500-H ⁺ B	< 0.10	8.61	5.5-9.0
Total Dissolved Solids	mg/l	2540 C	< 50	832	≤ 3,000
Total Suspended Solids	mg/l	2540 D	< 5	< 5	≤ 50
Ammonia Nitrogen	mg/l	Method 350.2	< 0.02	0.10	
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	< 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)

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 2456/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 08/12/2022	SAMPLING TIME	: 09.31
RECEIVED DATE	: 09/12/2022	ANALYTICAL DATE	: 09-18/12/2022
REPORT DATE	: 19/12/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_WW_December

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION Near the refinery outfall	STANDARD ^{1/}
Temperature	°C	2550 B	< 0.5	27.3	≤ 40
pH		4500-H ⁺ B	< 0.10	7.92	5.5-9.0
Total Dissolved Solids	mg/l	2540 C	< 50	260	≤ 3,000
Total Suspended Solids	mg/l	2540 D	< 5	10	≤ 50
Ammonia Nitrogen	mg/l	Method 350.2	< 0.02	1.8	
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	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.	: 1495/55
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 12/07/2022	SAMPLING TIME	: 11.41-12.23
RECEIVED DATE	: 13/07/2022	ANALYTICAL DATE	: 13-19/07/2022
REPORT DATE	: 20/07/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_SW_July
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 ^U
				1	2	
Temperature	°C	2550 B	< 0.5	34.2	32.4	n ¹
pH	-	4500-H ⁺ B	< 0.10	8.62	8.65	5 - 9
Total Dissolved Solids	mg/l	2540 C	< 50	4,200	3,824	-
Suspended Solids	mg/l	2540 D	< 5	60	75	-
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	0.41	0.52	≤ 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	6.2	5.6	≤ 4.0
COD	mg/l	5220 D	< 40.00	42.58	< 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	0.006	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

NT

(Mrs. Araya Tipparuk)

Technical Management Team

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5. - Not available.



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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1626/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 09/08/2022	SAMPLING TIME	: 14.03-14.23
RECEIVED DATE	: 10/08/2022	ANALYTICAL DATE	: 10-18/08/2022
REPORT DATE	: 19/08/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONEITION	: Normal	FILE CODE	: 222003_SW_August
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 ^U
				1	2	
Temperature	°C	2550 B	< 0.5	32.0	32.6	n ¹
pH	-	4500-H ⁺ B	< 0.10	9.32	9.26	5 - 9
Total Dissolved Solids	mg/l	2540 C	< 50	3,376	2,752	-
Suspended Solids	mg/l	2540 D	< 5	157	102	-
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	0.73	0.75	≤ 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	2.5	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	0.004	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

NT

(Mrs. Araya Tipparuk)

Technical Management Team

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5. - Not available.



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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1816/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 06/09/2022	SAMPLING TIME	: 13.08-13.25
RECEIVED DATE	: 07/09/2022	ANALYTICAL DATE	: 07-14/09/2022
REPORT DATE	: 14/09/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_SW_September
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	30.3	30.3	n ¹
pH	-	4500-H ⁺ B	< 0.10	7.43	7.63	5 - 9
Total Dissolved Solids	mg/l	2540 C	< 50	1,192	1,088	-
Suspended Solids	mg/l	2540 D	< 5	82	101	-
Ammonia Nitrogen	mg/l	Method 350.2	< 0.02	0.43	0.51	≤ 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	3.0	2.4	≤ 4.0
COD	mg/l	5220 D	< 40.00	52.20	48.94	-
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	0.004	0.003	-
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

(Mrs. Araya Tipparuk)

Technical Management Team

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5. - Not available.



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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 2058/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 11/10/2022	SAMPLING TIME	: 11.02-11.55
RECEIVED DATE	: 12/10/2022	ANALYTICAL DATE	: 12-20/10/2022
REPORT DATE	: 20/10/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_SW_October
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	28.0	27.8	n ¹
pH	-	4500-H ⁺ B	< 0.10	7.61	7.51	5 - 9
Total Dissolved Solids	mg/l	2540 C	< 50	392	352	-
Suspended Solids	mg/l	2540 D	< 5	374	404	-
Ammonia Nitrogen	mg/l	Method 350.2	< 0.02	0.22	0.20	≤ 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	2.1	2.2	≤ 4.0
COD	mg/l	5220 D	< 40.00	65.05	61.62	-
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	0.006	-
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

Mrs. Araya Tipparuk

(Mrs. Araya Tipparuk)

Technical Management Team

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5. - Not available.



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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 2187/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 02/11/2022	SAMPLING TIME	: 11.15-12.10
RECEIVED DATE	: 03/11/2022	ANALYTICAL DATE	: 03-10/11/2022
REPORT DATE	: 11/11/2022	SITE OPERATOR	: Mr. Eaworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_SW_November
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	33.6	33.4	n ¹
pH		4500-H ⁺ B	< 0.10	8.24	8.27	5 - 9
Total Dissolved Solids	mg/l	2540 C	< 50	3,992	3,024	-
Suspended Solids	mg/l	2540 D	< 5	40	82	-
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	1.4	1.2	≤ 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	2.5	2.4	≤ 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	ND	ND	-
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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5. - Not available.



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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 2457/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 08/12/2022	SAMPLING TIME	: 14.41-14.53
RECEIVED DATE	: 09/12/2022	ANALYTICAL DATE	: 09-18/12/2022
REPORT DATE	: 19/12/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_SW_December
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	32.4	n ¹
pH		4500-H ⁺ B	< 0.10	8.16	8.20	5 - 9
Total Dissolved Solids	mg/l	2540 C	< 50	3,252	3,332	-
Suspended Solids	mg/l	2540 D	< 5	31	39	-
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	1.3	1.4	≤ 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	2.3	2.7	≤ 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	0.001	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

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1496/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 12/07/2022	SAMPLING TIME	: 10.56-11.22
RECEIVED DATE	: 13/07/2022	ANALYTICAL DATE	: 13-19/07/2022
REPORT DATE	: 20/07/2022	SITE OPERATOR	: Mr. Aniwat Pimwana
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_WW_July
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	32.5	31.9	32.7	32.0
pH		4500-H ⁺ B	< 0.10	7.49	8.84	10.17	7.72
Total Dissolved Solids	mg/l	2540 C	< 50	809	885	973	1,062
Suspended Solids	mg/l	2540 D	< 5	16	12	24	< 5
Fat Oil & Grease	mg/l	5520 B	< 0.50	2.9	0.86	1.1	ND
Phenols	mg/l	5530 B,C* / B,D	< 0.001*, < 0.10	0.74	0.67	1.6	ND*
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	0.76	ND	ND	ND
BOD ₅	mg/l	5210 B	< 1.0	38.0	18.8	58.7	< 1.0
COD	mg/l	5220 D	< 40.00	132	81.89	164	< 40.00
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C/Method 350.2*	< 0.02	2.6	2.4	3.2	0.05
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	ND	0.002	0.002	ND
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND	ND	ND	ND
Mercury (Hg)	mg/l	3112 B	< 0.0005	0.0026	ND	0.0019	0.0005

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

(Miss Khemchuda Insorn)
Analyst
REG. NO. 2-239-ก-5976

(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.	: 1627/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 09/08/2022	SAMPLING TIME	: 09.43-10.35
RECEIVED DATE	: 10/08/2022	ANALYTICAL DATE	: 10-18/08/2022
REPORT DATE	: 19/08/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_WW_August
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	33.1	33.7	32.5	31.4
pH		4500-H ⁺ B	< 0.10	7.12	8.18	11.25	7.53
Total Dissolved Solids	mg/l	2540 C	< 50	812	848	966	749
Suspended Solids	mg/l	2540 D	< 5	18	14	155	< 5
Fat Oil & Grease	mg/l	5520 B	< 0.50	3.7	1.4	2.3	ND
Phenols	mg/l	5530 B,C* / B,D	< 0.001*, < 0.10	0.36	0.35	0.92	ND*
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	0.93	0.62	2.6	ND
BOD ₅	mg/l	5210 B	< 1.0	42.9	14.6	39.2	< 1.0
COD	mg/l	5220 D	< 40.00	137	70.08	132	< 40.00
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C/Method 350.2*	< 0.02	3.6	3.2	3.2	ND
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	ND	ND	0.005	ND
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND	ND	ND	ND
Mercury (Hg)	mg/l	3112 B	< 0.0005	0.0021	ND	0.0020	0.0008

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

(Miss Khemchuda Insorn)
Analyst
REG. NO. 2-239-ก-5976

(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.	: 1813/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 06/09/2022	SAMPLING TIME	: 09:25-09:55
RECEIVED DATE	: 07/09/2022	ANALYTICAL DATE	: 07-14/09/2022
REPORT DATE	: 14/09/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_WW_September
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	31.1	31.0	30.4	32.4
pH		4500-H ⁺ B	< 0.10	7.00	7.82	9.98	7.54
Total Dissolved Solids	mg/l	2540 C	< 50	264	282	372	516
Suspended Solids	mg/l	2540 D	< 5	29	46	28	< 5
Fat Oil & Grease	mg/l	5520 B	< 0.50	3.0	2.3	ND	ND
Phenols	mg/l	5530 B,C* / B,D	< 0.001*, < 0.10	0.32	0.26	0.80	ND*
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	0.96	ND	3.2	ND
BOD ₅	mg/l	5210 B	< 1.0	14.7	14.4	34.0	< 1.0
COD	mg/l	5220 D	< 40.00	73.41	56.73	91.35	< 40.00
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C/Method 350.2*	< 0.02	1.3	1.3	0.93	0.40*
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	0.003	0.001	0.001	ND
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND	ND	ND	ND
Mercury (Hg)	mg/l	3112 B	< 0.0005	0.0011	0.0013	0.0029	0.0007

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd 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.

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.	: 2056/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 11/10/2022	SAMPLING TIME	: 10.12-10.39
RECEIVED DATE	: 12/10/2022	ANALYTICAL DATE	: 12-20/10/2022
REPORT DATE	: 20/10/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_WW_October
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	29.0	29.5	30.5	32.6
pH		4500-H ⁺ B	< 0.10	7.12	7.75	9.40	7.86
Total Dissolved Solids	mg/l	2540 C	< 50	264	282	668	824
Suspended Solids	mg/l	2540 D	< 5	93	42	32	< 5
Fat Oil & Grease	mg/l	5520 B	< 0.50	3.1	4.1	3.5	ND
Phenols	mg/l	5530 B,C* / B,D	< 0.001*, < 0.10	0.35	0.30	0.93	ND*
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	2.1	ND	1.5	ND
BOD ₅	mg/l	5210 B	< 1.0	60.3	31.4	30.1	< 1.0
COD	mg/l	5220 D	< 40.00	222	123	118	< 40.00
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C/Method 350.2*	< 0.02	1.8	2.1	2.5	0.08*
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	0.012	0.005	0.007	ND
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND	ND	ND	ND
Mercury (Hg)	mg/l	3112 B	< 0.0005	0.0120	0.0042	0.0051	0.0006

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd 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.

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.	: 2188/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 02/11/2022	SAMPLING TIME	: 09:52-10:42
RECEIVED DATE	: 03/11/2022	ANALYTICAL DATE	: 03-10/11/2022
REPORT DATE	: 11/11/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_WW_November
SAMPLE DESCRIPTION	1 = API Separator Effluent 3 = Equalization Tank Effluent 2 = IAF Unit Effluent 4 = Biological Treatment Effluent		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION			
				1	2	3	4
Temperature	°C	2550 B	< 0.5	34.8	29.6	35.1	33.6
pH		4500-H ⁺ B	< 0.10	7.23	7.43	9.94	7.52
Total Dissolved Solids	mg/l	2540 C	< 50	846	216	846	864
Suspended Solids	mg/l	2540 D	< 5	40	20	54	< 5
Fat Oil & Grease	mg/l	5520 B	< 0.50	11.0	4.4	4.4	ND
Phenols	mg/l	5530 B,C* / B,D	< 0.001*, < 0.10	0.91	ND	2.6	ND*
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	2.4	1.8	5.7	ND
BOD ₅	mg/l	5210 B	< 1.0	42.4	14.9	72.0	< 1.0
COD	mg/l	5220 D	< 40.00	174	42.93	190	< 40.00
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C/Method 350.2*	< 0.02	5.9	0.46	6.2	0.04
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	0.004	ND	0.001	ND
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND	ND	ND	ND
Mercury (Hg)	mg/l	3112 B	< 0.0005	0.0057	ND	0.0147	0.0012

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

REFERENCE : US EPA, 1993, Method for Chemical Analysis of Water and Waste, USEPA, EPA 600/4-79-020, Method 350.2

Khemchuda Insorn

(Miss Khemchuda Insorn)

Analyst

REG. NO. 2-239-n-5976

Araya Tipparuk

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 2-239-n-5863

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 2459/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 08/12/2022	SAMPLING TIME	: 09:44-14:21
RECEIVED DATE	: 09/12/2022	ANALYTICAL DATE	: 09-18/12/2022
REPORT DATE	: 20/12/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_WW_December
SAMPLE DESCRIPTION	1 = API Separator Effluent 3 = Equalization Tank Effluent 2 = IAF Unit Effluent 4 = Biological Treatment Effluent		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION			
				1	2	3	4
Temperature	°C	2550 B	< 0.5	33.4	35.8	36.1	34.2
pH		4500-H ⁺ B	< 0.10	7.72	8.66	9.57	7.60
Total Dissolved Solids	mg/l	2540 C	< 50	606	622	926	950
Suspended Solids	mg/l	2540 D	< 5	23	23	26	< 5
Fat Oil & Grease	mg/l	5520 B	< 0.50	9.9	1.9	6.5	ND
Phenols	mg/l	5530 B,C* / B,D	< 0.001*, < 0.10	1.2	0.87	3.0	ND*
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	2.3	1.1	4.8	ND
BOD ₅	mg/l	5210 B	< 1.0	45.2	25.5	114	< 1.0
COD	mg/l	5220 D	< 40.00	194	167	304	< 40.00
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C/Method 350.2*	< 0.02	11.8	10.8	15.0	0.61
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	0.005	0.008	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	0.0087	0.0009	0.0018	ND

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

REFERENCE : US EPA, 1993, Method for Chemical Analysis of Water and Waste, USEPA, EPA 600/4-79-020, Method 350.2

Khemchuda Insorn

(Miss Khemchuda Insorn)

Analyst

REG. NO. 2-239-n-5976

Araya Tipparuk

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 2-239-n-5863

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1569/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Integrate
SAMPLING DATE	: 03/08/2022	SAMPLING TIME	: 15.20
RECEIVED DATE	: 04/08/2022	ANALYTICAL DATE	: 04-10/08/2022
REPORT DATE	: 15/08/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_CW_August

PARAMETER	UNITS	ANALYSIS METHODS	ND (non-detectable)	SATATION Ko Saket	STANDARD ^u
Depth	m.	Measurement	-	3.0	-
Temperature	°C	2550 B	< 0.5	30.2	$\Delta \leq 1$
pH	-	4500-H ⁺ B	< 0.10	7.86	7.0-8.5
Transparency	m.	Secchi Disc	-	0.6	$\Delta \leq 10\%$
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	16.50	2 ^v
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	5.1	≥ 4
BOD ₅	mg/l	5210 B	< 1.0	1.2	-
Salinity	ppt	2520 B	< 0.10	29.0	$\Delta \leq 10\%$
Total Petroleum Hydrocarbon	µg/l	IOC/GGE(MSI)-III/3	< 0.25	ND	≤ 1.0
TOC	mg/l	5310 B	< 0.01	1.30	-
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 11th ED. 2017 (AWWA, APHA, WFP)

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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3. ^u 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.



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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No. :	1569/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Integrate
SAMPLING DATE	: 03/08/2022	SAMPLING TIME	: 16.00
RECEIVED DATE	: 04/08/2022	ANALYTICAL DATE	: 04-10/08/2022
REPORT DATE	: 15/08/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_CW_August

PARAMETER	UNITS	ANALYSIS METHODS	ND (non-detectable)	SATATION Had Sai Thong Beach	STANDARD ^u
Depth	m.	Measurement	-	2.0	-
Temperature	°C	2550 B	< 0.5	30.6	$\Delta \leq 1$
Transparency	m.	Secchi Disc	-	0.6	$\Delta \leq 10\%$
pH	-	4500-H ⁺ B	< 0.10	7.82	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	27.50	2 ^v
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	5.4	≥ 4
BOD ₅	mg/l	5210 B	< 1.0	1.7	-
Salinity	ppt	2520 B	< 0.10	17.5	$\Delta \leq 10\%$
Total Petroleum Hydrocarbon	µg/l	IOC/GGE(MSI)-III/3	< 0.25	ND	≤ 1.0
TOC	mg/l	5310 B	< 0.01	3.86	-
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 11th ED. 2017 (AWWA, APHA, WFP)

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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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.



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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1569/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Integrate
SAMPLING DATE	: 03/08/2022	SAMPLING TIME	: 15.00
RECEIVED DATE	: 04/08/2022	ANALYTICAL DATE	: 04-10/08/2022
REPORT DATE	: 15/08/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_CW_August

PARAMETER	UNITS	ANALYSIS METHODS	ND (non-detectable)	SATATION	STANDARD ^u
				Wastewater Discharge Point of Refinery (IEAT)	
Depth	m.	Measurement	-	2.0	-
Temperature	°C	2550 B	< 0.5	30.6	$\Delta \leq 2$
Transparency	m.	Secchi Disc	-	0.8	$\Delta \leq 10 \%$
pH	-	4500-H ⁺ B	< 0.10	7.91	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	18.00	^u
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	5.4	≥ 4
BOD ₅	mg/l	5210 B	< 1.0	1.6	-
Salinity	ppt	2520 B	< 0.10	18.3	$\Delta \leq 10 \%$
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 19th ED. 2017 (AWWA APHA WEF)

REFERENCE : Intergovernmental Oceanographic Commission of UNESCO (IOC) 1981

Khemchuda Insorn

(Miss Khemchuda Insorn)

Analyst

(Mrs. Araya Tipparuk)

(Mrs. Araya Tipparuk)

Technical Management Team

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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.	: 1569/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Integrate
SAMPLING DATE	: 03/08/2022	SAMPLING TIME	: 15.45
RECEIVED DATE	: 04/08/2022	ANALYTICAL DATE	: 04-10/08/2022
REPORT DATE	: 15/08/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_CW_August

PARAMETER	UNITS	ANALYSIS METHODS	ND (non-detectable)	SATATION	STANDARD ^u
				Open Coastal Water	
Depth	m.	Measurement	-	3.8	-
Temperature	°C	2550 B	< 0.5	30.2	$\Delta \leq 1$
Transparency	m.	Secchi Disc	< 0.10	0.4	$\Delta \leq 10 \%$
pH	-	4500-H ⁺ B	-	7.70	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	12.00	^u
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	5.6	≥ 4
BOD ₅	mg/l	5210 B	< 1.0	1.0	-
Salinity	ppt	2520 B	< 0.10	29.8	$\Delta \leq 10 \%$
Total Petroleum Hydrocarbon	µg/l	IOC/GGE(MSI)-III/3	< 0.25	ND	≤ 1.0
TOC	mg/l	5310 B	< 0.01	1.30	-
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 19th ED. 2017 (AWWA APHA WEF)

REFERENCE : Intergovernmental Oceanographic Commission of UNESCO (IOC) 1981

(Miss Khemchuda Insorn)

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Analyst

(Mrs. Araya Tipparuk)

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Technical Management Team

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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.	: 2500/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Integrate
SAMPLING DATE	: 15/12/2022	SAMPLING TIME	: 09.17
RECEIVED DATE	: 16/12/2022	ANALYTICAL DATE	: 16-22/12/2022
REPORT DATE	: 27/12/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_CW_December

PARAMETER	UNITS	ANALYSIS METHODS	ND (non-detectable)	SATATION Ko Saket	STANDARD ^u
Depth	m.	Measurement	-	5.0	-
Temperature	°C	2550 B	< 0.5	27.5	$\Delta \leq 1$
pH	-	4500-H ⁺ B	< 0.10	8.11	7.0-8.5
Transparency	m.	Secchi Disc	-	1.0	$\Delta \leq 10\%$
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	17.00	^{2/}
Ammonia Nitrogen	µg/l	4500-NH ₃ F	< 10.0	28.8	-
Phenols	mg/l	5530 B-C	< 0.001	ND	≤ 0.03
Dissolved Oxygen	mg/l	4500-O G	< 0.10	5.36	≥ 4
BOD ₅	mg/l	5210 B	< 1.0	1.6	-
Salinity	ppt	2520 B	< 0.10	26.0	$\Delta \leq 10\%$
Total Petroleum Hydrocarbon	µg/l	IOC/GGE(MSI)-III/3	< 0.10	ND	≤ 1.0
TOC	mg/l	5310 B	< 0.01	1.39	-
Arsenic (As)	µg/l	3114 C	< 0.10	2.81	≤ 10
Chromium Trivalent (Cr ³⁺)	µg/l	3113 B / Calculation	< 1.00	ND	-
Chromium Hexavalent (Cr ⁶⁺)	µg/l	3113 B	< 1.00	ND	≤ 50
Mercury (Hg)	µg/l	3112 B	< 0.05	ND	≤ 0.1
Nickel (Ni)	µg/l	3113 B	< 5.00	ND	-
Vanadium (V)	µg/l	3120 B	< 10.00	ND	-

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

REFERENCE : Intergovernmental Oceanographic Commission of UNESCO DOCI 1991

Khemchuda Insom

(Miss Khemchuda Insom)

Analyst

(Mrs. Araya Tipparuk)

(Mrs. Araya Tipparuk)

Technical Management Team

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WATER AND WASTEWATER ANALYSIS REPORT

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SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Integrate
SAMPLING DATE	: 15/12/2022	SAMPLING TIME	: 09.46
RECEIVED DATE	: 16/12/2022	ANALYTICAL DATE	: 16-22/12/2022
REPORT DATE	: 27/12/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_CW_December

PARAMETER	UNITS	ANALYSIS METHODS	ND (non-detectable)	SATATION Had Sai Thong Beach	STANDARD ^u
Depth	m.	Measurement	-	4.2	-
Temperature	°C	2550 B	< 0.5	27.5	$\Delta \leq 1$
Transparency	m.	Secchi Disc	-	0.8	$\Delta \leq 10\%$
pH	-	4500-H ⁺ B	< 0.10	8.14	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	15.67	^{2/}
Ammonia Nitrogen	µg/l	4500-NH ₃ F	< 10.0	14.8	-
Phenols	mg/l	5530 B-C	< 0.001	ND	≤ 0.03
Dissolved Oxygen	mg/l	4500-O G	< 0.10	5.02	≥ 4
BOD ₅	mg/l	5210 B	< 1.0	1.5	-
Salinity	ppt	2520 B	< 0.10	27.0	$\Delta \leq 10\%$
Total Petroleum Hydrocarbon	µg/l	IOC/GGE(MSI)-III/3	< 0.10	ND	≤ 1.0
TOC	mg/l	5310 B	< 0.01	1.29	-
Arsenic (As)	µg/l	3114 C	< 0.10	2.87	≤ 10
Chromium Trivalent (Cr ³⁺)	µg/l	3113 B / Calculation	< 1.00	ND	-
Chromium Hexavalent (Cr ⁶⁺)	µg/l	3113 B	< 1.00	ND	≤ 50
Mercury (Hg)	µg/l	3112 B	< 0.05	ND	≤ 0.1
Nickel (Ni)	µg/l	3113 B	< 5.00	ND	-
Vanadium (V)	µg/l	3120 B	< 10.00	ND	-

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

REFERENCE : Intergovernmental Oceanographic Commission of UNESCO DOCI 1991

Khemchuda Insom

(Miss Khemchuda Insom)

Analyst

(Mrs. Araya Tipparuk)

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SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Integrate
SAMPLING DATE	: 15/12/2022	SAMPLING TIME	: 09.06
RECEIVED DATE	: 16/12/2022	ANALYTICAL DATE	: 16-22/12/2022
REPORT DATE	: 27/12/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_CW_December

PARAMETER	UNITS	ANALYSIS METHODS	ND (non-detectable)	SATATION Wastewater Discharge Point of Refinery (IEAT)	STANDARD ^{1/}
Depth	m.	Measurement	-	3.5	-
Temperature	°C	2550 B	< 0.5	27.2	$\Delta \leq 2$
Transparency	m.	Secchi Disc	-	0.5	$\Delta \leq 10 \%$
pH	-	4500-H B	< 0.10	8.11	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	11.30	^{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	5.44	≥ 4
BOD ₅	mg/l	5210 B	< 1.0	1.7	-
Salinity	ppt	2520 B	< 0.10	25.9	$\Delta \leq 10 \%$
Chromium Trivalent (Cr ³⁺)	µg/l	3113 B / Calculation	< 1.00	ND	-
Chromium Hexavalent (Cr ⁶⁺)	µg/l	3113 B	< 1.00	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 Tipparak

(Mrs. Araya Tipparak)

Technical Management Team

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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.	: 2500/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Integrate
SAMPLING DATE	: 15/12/2022	SAMPLING TIME	: 09.30
RECEIVED DATE	: 16/12/2022	ANALYTICAL DATE	: 16-22/12/2022
REPORT DATE	: 27/12/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_CW_December

PARAMETER	UNITS	ANALYSIS METHODS	ND (non-detectable)	SATATION Open Coastal Water	STANDARD ^{1/}
Depth	m.	Measurement	-	6	-
Temperature	°C	2550 B	< 0.5	27.9	$\Delta \leq 1$
Transparency	m.	Secchi Disc	< 0.10	2.5	$\Delta \leq 10 \%$
pH	-	4500-H B	-	8.11	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	6.38	^{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	5.28	≥ 4
BOD ₅	mg/l	5210 B	< 1.0	1.7	-
Salinity	ppt	2520 B	< 0.10	27.0	$\Delta \leq 10 \%$
Total Petroleum Hydrocarbon	µg/l	IOC/GGE(MSI)-III/3	< 0.10	ND	≤ 1.0
TOC	mg/l	5310 B	< 0.01	1.18	-
Arsenic (As)	µg/l	3114 C	< 0.10	1.86	≤ 10
Chromium Trivalent (Cr ³⁺)	µg/l	3113 B / Calculation	< 1.00	ND	-
Chromium Hexavalent (Cr ⁶⁺)	µg/l	3113 B	< 1.00	ND	≤ 50
Mercury (Hg)	µg/l	3112 B	< 0.05	ND	≤ 0.1
Nickel (Ni)	µg/l	3113 B	< 5.00	ND	-
Vanadium (V)	µg/l	3120 B	< 10.00	ND	-

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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(Miss Khemchuda Insorn)

Analyst

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(Mrs. Araya Tipparak)

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No. :	1568/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Integrate
SAMPLING DATE	: 03/08/2022	SAMPLING TIME	: 12:40-14:40
RECEIVED DATE	: 04/08/2022	ANALYTICAL DATE	: 04-05/08/2022
REPORT DATE	: 08/08/2022	SITE OPERATOR	: Mr. Aniwat Pimwanna
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_CW_August

PARAMETER	UNITS	ANALYSIS METHODS	ND (non-detectable)	SAMPLING TIME	Ko Saket RESULT	STANDARD (Avg.+SD.)
Suspended Solid (SS)	mg/l	2540 D	<2.5	12:40	21.50	19.90
				13:10	16.00	
				13:40	17.50	
				14:10	16.50	
				14:40	17.00	
				Average	17.70	
				SD.	2.20	

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd ED. 2017 (AWWA, APHA, WEF)

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WATER AND WASTEWATER ANALYSIS REPORT

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SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Integrate
SAMPLING DATE	: 03/08/2022	SAMPLING TIME	: 12:55-14:55
RECEIVED DATE	: 04/08/2022	ANALYTICAL DATE	: 04-05/08/2022
REPORT DATE	: 08/08/2022	SITE OPERATOR	: Mr. Aniwat Pimwanna
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_CW_August

PARAMETER	UNITS	ANALYSIS METHODS	ND (non-detectable)	SAMPLING TIME	In front of Had Sai Thong Beach RESULT	STANDARD (Avg.+SD.)
Suspended Solid (SS)	mg/l	2540 D	< 2.5	12:55	25.50	28.16
				13:25	24.00	
				13:55	26.00	
				14:25	27.00	
				14:55	29.00	
				Average	26.30	
				SD.	1.86	

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd ED. 2017 (AWWA, APHA, WEF)

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Analyst

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SAMPLING DATE	: 03/08/2022	SAMPLING TIME	: 12:30-14:30
RECEIVED DATE	: 04/08/2022	ANALYTICAL DATE	: 04-05/08/2022
REPORT DATE	: 08/08/2022	SITE OPERATOR	: Mr. Aniwat Pimwanna
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_CW_August

PARAMETER	UNITS	ANALYSIS METHODS	ND (non-detectable)	SAMPLING TIME	Wastewater Discharge Point of Refinery (IEAT)	STANDARD (Avg.+SD.)
					RESULT	
Suspended Solid (SS)	mg/l	2540 D	< 2.5	12:30	12.50	13.84
				13:00	13.00	
				13:30	12.00	
				14:00	14.50	
				14:30	12.00	
				Average	12.80	
				SD	1.04	

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

Khemchuda Insorn

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1568/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Integrate
SAMPLING DATE	: 03/08/2022	SAMPLING TIME	: 12:50-14:50
RECEIVED DATE	: 04/08/2022	ANALYTICAL DATE	: 04-05/08/2022
REPORT DATE	: 08/08/2022	SITE OPERATOR	: Mr. Aniwat Pimwanna
SAMPLE CONDITION	: Normal	FILE CODE	: 222003_CW_August

PARAMETER	UNITS	ANALYSIS METHODS	ND (non-detectable)	SAMPLING TIME	Open Coastal Water	STANDARD
					RESULT	(Avg.+SD.)
Suspended Solid (SS)	mg/l	2540 D	< 2.5	12:50	14.50	14.32
				13:20	14.00	
				13:50	12.50	
				14:20	11.00	
				14:50	10.00	
				Average	12.40	
				SD	1.92	

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

Khemchuda Insorn

(Miss Khemchuda Insorn)

Analyst

(Mrs. Araya Tipparuk)

(Mrs. Araya Tipparuk)

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.

ใบรับรองผลการตรวจวัดระดับเสียง



Noise Monitoring Result : Community Noise

MTR-SPRC PLC-Refinery

Location : Main office complex Monitor Period : 31 Oct 2022-07 Nov 2022
SLM Model : RION NL-21 Serial No : 00187511
Site Operator : Mr. Sittichai Sawangwongchai

Calibrator Model : RION NC-74 Serial No : 34283648
Calibration Ref dB(A) : 94.0 Certified Date : 24 Dec 2021
SLM Reading / Adjust dB(A) : 93.9/0.1 Expire Date : 23 Dec 2022
Cal Sheet No.: NC-74-2022-088

Time	Equivalent Sound Pressure Level (dB(A))						
	31 Oct 2022	-01 Nov 2022	02-03 Nov 2022	03-04 Nov 2022	04-05 Nov 2022	05-06 Nov 2022	06-07 Nov 2022
15:00 - 16:00	66.0	63.9	65.2	63.8	59.6	55.2	58.2
16:00 - 17:00	59.8	64.0	64.7	64.5	60.9	56.4	57.1
17:00 - 18:00	58.7	63.7	63.9	65.8	63.4	55.3	57.6
18:00 - 19:00	57.7	62.6	63.6	66.0	58.4	52.8	55.9
19:00 - 20:00	58.6	63.5	63.8	65.7	56.8	53.9	54.1
20:00 - 21:00	58.7	62.6	63.1	64.9	57.1	53.7	53.0
21:00 - 22:00	58.6	63.5	62.8	63.3	55.3	54.4	52.7
22:00 - 23:00	58.7	62.1	63.3	69.5	55.2	52.0	51.8
23:00 - 00:00	57.2	62.6	64.0	68.6	56.5	52.7	53.5
00:00 - 01:00	57.1	63.9	64.0	68.3	56.7	52.6	63.8
01:00 - 02:00	57.8	63.0	62.8	67.1	55.8	52.5	64.5
02:00 - 03:00	58.0	64.4	63.2	63.6	56.2	51.5	61.4
03:00 - 04:00	57.7	63.6	62.5	63.3	56.6	52.0	61.5
04:00 - 05:00	57.0	63.8	61.1	64.4	56.2	54.9	61.5
05:00 - 06:00	57.8	64.3	60.7	63.7	54.9	57.4	57.7
06:00 - 07:00	60.7	64.6	61.8	62.0	53.1	57.6	65.0
07:00 - 08:00	60.0	65.7	63.1	62.8	55.4	57.5	62.8
08:00 - 09:00	75.7	65.0	62.7	64.0	57.1	56.3	62.6
09:00 - 10:00	69.7	64.5	63.1	65.3	55.7	56.9	61.3
10:00 - 11:00	63.3	66.9	62.6	64.8	55.9	58.1	62.9
11:00 - 12:00	64.6	67.3	61.8	63.2	53.5	57.9	62.2
12:00 - 13:00	60.9	65.4	62.9	58.8	54.5	57.3	62.1
13:00 - 14:00	58.8	65.4	63.2	60.4	56.6	62.1	62.1
14:00 - 15:00	60.2	63.9	63.8	60.2	55.6	69.8	62.1
Leq(24)*	64.6	64.4	63.2	65.1	57.2	59.0	61.0
Ldn	67.1	70.2	69.3	72.5	62.6	62.3	68.0
Lmax **	96.6	86.4	75.3	85.0	77.2	87.8	86.8
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 : Main office complex Monitor Period : 31 Oct 2022-07 Nov 2022
SLM Model : RION NL-21 Serial No : 00187511
Site Operator : Mr. Sittichai Sawangwongchai

Calibrator Model : RION NC-74 Serial No : 34283648
Calibration Ref dB(A) : 94.0 Certified Date : 24 Dec 2021
SLM Reading / Adjust dB(A) : 93.9/0.1 Expire Date : 23 Dec 2022
Cal Sheet No.: NC-74-2022-088

Time	L90 (dB(A))						
	31 Oct 2022	-01 Nov 2022	02-03 Nov 2022	03-04 Nov 2022	04-05 Nov 2022	05-06 Nov 2022	06-07 Nov 2022
15:00 - 16:00	55.5	56.9	60.6	61.0	56.1	53.9	54.7
16:00 - 17:00	58.1	62.2	60.9	61.4	56.7	55.6	55.8
17:00 - 18:00	57.3	61.9	61.1	62.1	56.9	53.6	55.7
18:00 - 19:00	56.8	61.0	61.8	64.4	55.7	50.8	54.9
19:00 - 20:00	55.9	61.0	62.3	64.0	55.4	52.8	52.8
20:00 - 21:00	55.3	60.0	61.5	63.1	55.7	53.2	51.7
21:00 - 22:00	56.3	60.9	61.3	61.3	53.8	53.0	51.7
22:00 - 23:00	56.8	59.2	61.8	61.6	52.8	48.9	50.4
23:00 - 00:00	55.5	59.1	62.2	61.3	55.5	52.1	49.7
00:00 - 01:00	54.7	60.9	61.5	61.1	55.6	51.9	56.7
01:00 - 02:00	56.6	60.6	60.1	61.5	54.1	50.9	57.9
02:00 - 03:00	56.6	61.7	60.9	61.3	55.3	48.7	55.3
03:00 - 04:00	56.7	61.5	60.1	61.6	55.9	49.4	52.7
04:00 - 05:00	55.9	62.0	59.2	61.5	55.9	50.5	54.2
05:00 - 06:00	55.9	62.2	58.4	61.0	52.7	54.5	56.0
06:00 - 07:00	57.6	62.7	59.7	59.8	49.5	56.4	56.6
07:00 - 08:00	58.6	62.7	61.0	60.5	51.6	56.6	59.1
08:00 - 09:00	59.2	62.4	60.7	61.6	55.0	54.6	59.4
09:00 - 10:00	58.8	62.2	61.6	61.9	50.9	54.6	57.2
10:00 - 11:00	58.3	63.8	61.2	61.7	54.7	57.2	58.0
11:00 - 12:00	59.1	63.8	60.4	58.9	50.3	56.0	58.2
12:00 - 13:00	58.6	61.4	61.1	57.7	51.7	55.0	57.8
13:00 - 14:00	56.9	61.4	61.5	57.8	54.4	55.9	57.8
14:00 - 15:00	56.3	59.6	61.3	58.1	54.2	56.1	57.9
L90(avg)*	57.2	61.5	61.0	61.4	54.6	54.1	56.2

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 : Central Control Building

Monitor Period : 31 Oct 2022-07 Nov 2022

SLM Model : RION NL-21

Serial No : 00187505

Site Operator : Mr. Sittichai Sawangwongchai

Calibrator Model : RION NC-74

Serial No : 34283648

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.: NC-74-2022-088

Time	Equivalent Sound Pressure Level (dB(A))						
	31 Oct 2022	-01 Nov 2022	02-03 Nov 2022	04-05 Nov 2022	06-07 Nov 2022	08-09 Nov 2022	10-11 Nov 2022
15:00 - 16:00	64.0	66.6	67.3	65.0	64.5	64.4	65.0
16:00 - 17:00	64.3	66.6	67.4	66.6	64.5	64.4	65.3
17:00 - 18:00	65.1	67.1	68.4	64.6	64.6	64.4	65.1
18:00 - 19:00	64.9	66.5	68.8	65.0	64.7	64.5	69.1
19:00 - 20:00	64.8	66.2	68.3	64.5	65.1	65.1	65.7
20:00 - 21:00	65.2	65.0	66.2	64.9	64.7	64.7	65.3
21:00 - 22:00	65.3	64.8	64.4	64.9	64.8	64.3	65.1
22:00 - 23:00	65.3	64.8	64.4	64.8	65.2	64.1	65.2
23:00 - 00:00	65.5	65.0	64.7	64.7	65.2	63.9	65.2
00:00 - 01:00	64.9	64.6	65.5	65.3	65.5	64.0	64.9
01:00 - 02:00	64.8	64.5	65.4	65.2	65.1	64.2	65.3
02:00 - 03:00	64.7	64.5	65.0	65.8	64.6	64.0	64.8
03:00 - 04:00	64.7	64.7	65.1	65.6	64.6	64.1	65.1
04:00 - 05:00	64.5	64.8	64.8	65.9	64.8	64.1	65.0
05:00 - 06:00	64.4	65.0	64.9	66.1	64.8	64.2	65.0
06:00 - 07:00	64.5	64.8	64.9	65.9	64.9	64.3	65.2
07:00 - 08:00	67.2	66.0	66.0	65.6	64.9	64.3	65.2
08:00 - 09:00	67.0	64.9	64.6	65.6	67.3	65.0	65.1
09:00 - 10:00	67.0	68.1	64.9	64.1	64.8	65.1	65.7
10:00 - 11:00	66.7	67.8	64.1	63.5	64.4	64.3	65.0
11:00 - 12:00	66.2	67.3	64.1	63.5	64.2	64.3	64.6
12:00 - 13:00	66.4	67.3	63.4	63.4	64.2	64.3	64.1
13:00 - 14:00	66.5	67.8	63.5	63.2	64.1	64.4	64.8
14:00 - 15:00	66.6	67.4	64.2	64.3	64.4	64.7	64.5
Leq(24)*	65.5	66.1	65.7	65.0	64.9	64.4	65.3
Ldn	71.4	71.5	71.6	71.8	71.4	70.6	71.5
Lmax **	88.2	85.7	85.3	85.1	91.8	86.7	86.6
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 : Central Control Building

Monitor Period : 31 Oct 2022-07 Nov 2022

SLM Model : RION NL-21

Serial No : 00187505

Site Operator : Mr. Sittichai Sawangwongchai

Calibrator Model : RION NC-74

Serial No : 34283648

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.: NC-74-2022-088

Time	L90 (dB(A))						
	31 Oct 2022	-01 Nov 2022	02-03 Nov 2022	04-05 Nov 2022	06-07 Nov 2022	08-09 Nov 2022	10-11 Nov 2022
15:00 - 16:00	63.6	65.6	66.5	63.7	64.0	64.1	64.6
16:00 - 17:00	63.9	65.7	66.7	63.8	63.9	64.1	64.9
17:00 - 18:00	64.3	66.1	67.9	63.8	64.2	64.1	64.6
18:00 - 19:00	64.7	65.9	68.3	64.2	64.2	64.2	64.4
19:00 - 20:00	64.5	65.6	68.0	64.2	64.4	64.3	64.9
20:00 - 21:00	64.8	64.5	64.2	64.4	64.4	64.5	65.0
21:00 - 22:00	65.0	64.5	64.1	64.6	64.4	63.9	64.9
22:00 - 23:00	65.0	64.5	64.2	64.4	64.9	63.9	65.0
23:00 - 00:00	65.0	64.5	64.3	64.3	64.9	63.6	64.9
00:00 - 01:00	64.6	64.3	65.2	64.6	65.0	63.7	64.7
01:00 - 02:00	64.5	64.2	65.1	64.7	64.5	63.7	64.8
02:00 - 03:00	64.5	64.3	64.7	65.1	64.3	63.7	64.7
03:00 - 04:00	64.4	64.4	64.9	65.0	64.3	63.9	64.8
04:00 - 05:00	64.2	64.5	64.5	65.2	64.5	63.9	64.7
05:00 - 06:00	64.1	64.7	64.5	65.5	64.5	64.0	64.7
06:00 - 07:00	64.1	64.6	64.5	65.4	64.7	64.0	64.9
07:00 - 08:00	64.5	64.4	64.8	65.2	64.5	64.0	64.9
08:00 - 09:00	65.9	64.0	64.2	64.3	64.4	63.9	64.7
09:00 - 10:00	65.8	66.7	63.9	63.4	64.3	64.2	64.8
10:00 - 11:00	65.5	66.7	63.6	63.1	64.0	64.0	64.5
11:00 - 12:00	65.1	66.2	63.1	63.0	63.8	63.9	64.0
12:00 - 13:00	65.3	66.2	63.0	62.9	63.9	64.1	63.7
13:00 - 14:00	65.3	66.3	63.0	62.8	63.8	64.0	64.2
14:00 - 15:00	65.4	66.3	63.6	63.7	64.0	64.3	63.9
L90(avg)*	64.8	65.3	65.2	64.3	64.3	64.0	64.6

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 : Northern Refinery Boundary 1 Monitor Period : 31 Oct 2022-07 Nov 2022
SLM Model : RION NL-21 Serial No : 00487723
Site Operator : Mr. Sittichai Sawangwongchai

Calibrator Model : RION NC-74 Serial No : 34283648
Calibration Ref dB(A) : 94.0 Certified Date : 24 Dec 2021
SLM Reading / Adjust dB(A) : 93.8/0.2 Expire Date : 23 Dec 2022
Cal Sheet No.: NC-74-2022-088

Time	Equivalent Sound Pressure Level (dB(A))						
	31 Oct 2022	-01 Nov 2022	02-03 Nov 2022	04 Nov 2022	05 Nov 2022	06 Nov 2022	07 Nov 2022
15:00 - 16:00	55.7	62.0	54.7	57.2	57.5	53.5	57.5
16:00 - 17:00	54.1	62.4	59.4	57.9	58.5	54.5	56.9
17:00 - 18:00	55.6	62.1	58.1	59.3	59.6	55.2	58.3
18:00 - 19:00	55.3	63.2	57.8	58.6	58.0	53.9	65.6
19:00 - 20:00	55.4	62.8	57.8	57.7	56.5	54.3	57.2
20:00 - 21:00	59.4	59.1	58.5	57.9	56.5	56.3	71.8
21:00 - 22:00	55.4	57.5	61.6	58.8	57.3	56.7	75.4
22:00 - 23:00	57.4	57.8	60.4	61.2	57.1	59.8	76.3
23:00 - 00:00	54.6	57.3	59.8	59.1	57.2	60.5	75.6
00:00 - 01:00	54.2	56.0	55.8	60.2	57.6	60.9	69.8
01:00 - 02:00	53.9	54.7	54.7	55.3	55.7	58.5	65.9
02:00 - 03:00	52.8	54.2	55.0	55.4	54.5	60.4	60.0
03:00 - 04:00	53.4	54.4	55.1	55.2	54.4	58.6	60.2
04:00 - 05:00	53.2	54.4	55.1	54.9	54.9	56.1	64.3
05:00 - 06:00	53.9	55.4	54.5	55.5	54.7	54.5	60.8
06:00 - 07:00	59.4	57.8	56.5	55.7	54.6	54.3	58.5
07:00 - 08:00	61.1	54.9	56.5	56.7	54.7	55.0	56.8
08:00 - 09:00	59.3	57.5	54.8	56.2	56.1	55.2	57.1
09:00 - 10:00	60.2	53.0	54.8	55.1	55.5	53.6	55.3
10:00 - 11:00	59.2	54.4	54.3	52.3	62.3	52.5	53.2
11:00 - 12:00	59.9	53.5	54.6	54.3	55.0	53.6	52.5
12:00 - 13:00	59.7	55.5	55.7	53.9	55.8	54.4	53.1
13:00 - 14:00	60.4	53.7	55.1	53.9	54.1	56.1	53.5
14:00 - 15:00	60.6	54.2	56.6	57.9	53.5	56.6	53.0
Leq(24)*	57.7	58.3	57.1	57.2	56.8	56.8	68.2
Ldn	62.4	63.1	63.4	64.0	62.5	64.8	76.4
Lmax **	81.2	78.2	83.2	80.7	84.1	73.8	86.4
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

Preeda S.
(Miss Preeda Somjai)
Technical Management Team



Noise Monitoring Result : Background Noise

MTR-SPRC PLC-Refinery

Location : Northern Refinery Boundary 1 Monitor Period : 31 Oct 2022-07 Nov 2022
SLM Model : RION NL-21 Serial No : 00487723
Site Operator : Mr. Sittichai Sawangwongchai

Calibrator Model : RION NC-74 Serial No : 34283648
Calibration Ref dB(A) : 94.0 Certified Date : 24 Dec 2021
SLM Reading / Adjust dB(A) : 93.8/0.2 Expire Date : 23 Dec 2022
Cal Sheet No.: NC-74-2022-088

Time	L90 (dB(A))						
	31 Oct 2022	-01 Nov 2022	02-03 Nov 2022	04 Nov 2022	05 Nov 2022	06 Nov 2022	07 Nov 2022
15:00 - 16:00	50.9	57.6	51.3	53.9	55.0	51.4	55.3
16:00 - 17:00	51.4	58.4	53.8	55.6	55.4	52.4	54.9
17:00 - 18:00	51.7	58.1	56.4	56.5	55.7	52.4	54.0
18:00 - 19:00	52.7	60.4	55.8	56.2	55.3	51.8	55.0
19:00 - 20:00	52.8	53.4	55.6	56.1	54.9	52.4	53.8
20:00 - 21:00	54.0	58.3	55.7	56.8	55.2	52.8	62.9
21:00 - 22:00	53.1	54.3	58.0	57.1	55.4	55.7	70.3
22:00 - 23:00	53.1	54.2	55.7	58.6	55.3	56.8	74.7
23:00 - 00:00	52.2	54.0	55.4	56.1	55.1	55.9	70.5
00:00 - 01:00	52.0	54.0	54.9	54.9	54.1	55.2	61.8
01:00 - 02:00	51.5	53.0	53.9	53.7	53.3	52.4	59.2
02:00 - 03:00	51.4	52.8	54.0	54.6	53.4	54.0	56.4
03:00 - 04:00	52.2	53.5	54.0	54.4	53.2	53.0	57.2
04:00 - 05:00	51.8	53.6	53.8	54.0	53.5	53.2	56.1
05:00 - 06:00	52.0	54.0	52.6	54.3	53.1	52.9	57.9
06:00 - 07:00	52.9	54.5	54.1	54.3	52.9	52.9	56.1
07:00 - 08:00	56.8	52.7	53.4	55.0	53.0	53.5	55.3
08:00 - 09:00	55.8	51.5	52.0	52.3	52.9	53.2	55.1
09:00 - 10:00	56.2	50.3	51.5	50.8	53.0	51.2	53.0
10:00 - 11:00	55.6	50.5	51.4	49.8	52.1	50.1	50.7
11:00 - 12:00	55.9	50.6	51.0	49.6	51.6	50.8	50.0
12:00 - 13:00	55.7	51.2	49.6	50.7	50.4	51.8	50.0
13:00 - 14:00	55.9	50.6	51.4	50.0	50.5	52.5	50.9
14:00 - 15:00	56.1	50.8	53.6	55.3	51.0	54.7	50.3
L90(avg)*	53.9	54.9	54.2	54.8	53.8	53.4	64.1

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

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

Preeda S.
(Miss Preeda Somjai)
Technical Management Team



Noise Monitoring Result : Community Noise

MTR-SPRC PLC-Refinery

Location : Northern Refinery Boundary 2 Monitor Period : 31 Oct 2022-07 Nov 2022
 SLM Model : RION NL-21 Serial No : 00198276
 Site Operator : Mr. Sittichai Sawangwongchai

Calibrator Model : RION NC-74 Serial No : 34283648
 Calibration Ref dB(A) : 94.0 Certified Date : 24 Dec 2021
 SLM Reading / Adjust dB(A) : 93.7/0.3 Expire Date : 23 Dec 2022
 Cal Sheet No.: NC-74-2022-088

Time	Equivalent Sound Pressure Level (dB(A))						
	31 Oct 2022	-01 Nov 2022	02-03 Nov 2022	03-04 Nov 2022	04-05 Nov 2022	05-06 Nov 2022	06-07 Nov 2022
16:00 - 17:00	54.6	53.3	69.6	54.5	52.8	53.2	55.0
17:00 - 18:00	52.6	54.7	56.7	55.8	53.3	53.2	55.1
18:00 - 19:00	54.3	53.2	56.6	55.2	55.2	55.1	64.9
19:00 - 20:00	51.5	53.0	57.4	54.5	53.7	51.8	70.8
20:00 - 21:00	51.2	51.5	56.1	55.1	55.0	52.1	52.7
21:00 - 22:00	51.6	51.3	53.1	53.0	53.3	52.2	52.8
22:00 - 23:00	51.4	52.2	53.2	52.8	52.3	51.1	52.4
23:00 - 00:00	51.7	52.0	52.4	53.0	51.5	50.7	51.9
00:00 - 01:00	51.4	52.2	52.3	53.0	51.4	51.7	53.8
01:00 - 02:00	50.9	51.7	51.9	52.7	51.3	50.3	51.7
02:00 - 03:00	50.2	51.2	52.0	51.3	52.2	49.8	52.5
03:00 - 04:00	50.1	51.0	51.9	51.4	51.2	50.8	52.8
04:00 - 05:00	51.4	51.2	52.0	51.1	51.0	51.4	53.1
05:00 - 06:00	53.0	51.8	52.3	51.3	51.2	51.5	51.9
06:00 - 07:00	55.2	54.5	53.4	51.9	50.9	51.1	51.6
07:00 - 08:00	54.4	56.2	56.1	54.2	51.9	51.9	53.0
08:00 - 09:00	52.0	52.8	54.1	56.0	54.4	53.5	55.7
09:00 - 10:00	52.7	52.3	52.4	52.5	54.2	53.4	56.6
10:00 - 11:00	52.3	52.4	53.5	51.1	52.5	51.7	56.9
11:00 - 12:00	53.1	51.3	52.8	51.5	51.6	51.8	52.2
12:00 - 13:00	51.8	51.6	51.4	50.5	51.3	50.9	52.8
13:00 - 14:00	52.8	52.4	52.0	50.7	51.9	51.4	52.2
14:00 - 15:00	54.6	57.1	51.3	52.0	51.4	52.2	53.5
15:00 - 16:00	54.0	67.9	53.9	53.3	52.9	52.6	52.8

Leq(24)*	52.7	56.5	57.9	53.2	52.6	52.1	59.2
Ldn	58.6	60.0	60.8	58.8	58.2	57.7	61.6
Lmax **	74.3	89.2	88.2	71.7	74.9	80.5	88.0

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

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

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

(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 Monitor Period : 31 Oct 2022-07 Nov 2022
 SLM Model : RION NL-21 Serial No : 00198276
 Site Operator : Mr. Sittichai Sawangwongchai

Calibrator Model : RION NC-74 Serial No : 34283648
 Calibration Ref dB(A) : 94.0 Certified Date : 24 Dec 2021
 SLM Reading / Adjust dB(A) : 93.7/0.3 Expire Date : 23 Dec 2022
 Cal Sheet No.: NC-74-2022-088

Time	L90 (dB(A))						
	31 Oct 2022	-01 Nov 2022	02-03 Nov 2022	03-04 Nov 2022	04-05 Nov 2022	05-06 Nov 2022	06-07 Nov 2022
16:00 - 17:00	51.1	51.0	50.8	52.2	51.2	50.3	52.2
17:00 - 18:00	51.1	51.7	53.9	52.0	51.1	50.3	52.4
18:00 - 19:00	50.6	50.9	54.6	52.9	52.3	50.1	51.1
19:00 - 20:00	49.9	50.5	54.8	52.9	52.1	49.8	52.5
20:00 - 21:00	50.2	50.2	52.9	52.5	51.6	49.6	51.5
21:00 - 22:00	50.3	50.3	51.7	51.6	51.6	49.6	51.7
22:00 - 23:00	50.5	51.4	51.0	51.4	51.3	49.3	51.3
23:00 - 00:00	50.5	51.2	51.2	51.9	50.7	49.4	51.0
00:00 - 01:00	49.9	51.0	50.9	51.4	50.8	48.8	50.7
01:00 - 02:00	49.7	50.6	50.8	51.1	50.5	49.4	50.6
02:00 - 03:00	49.2	50.1	50.6	50.6	50.2	48.8	51.2
03:00 - 04:00	49.0	49.9	51.0	50.9	50.4	49.7	51.9
04:00 - 05:00	49.7	50.3	50.9	50.4	50.0	49.8	52.3
05:00 - 06:00	50.1	50.5	50.7	50.4	50.2	50.2	50.2
06:00 - 07:00	51.6	51.8	50.6	50.9	49.8	49.8	50.2
07:00 - 08:00	51.0	53.3	53.2	52.0	50.0	50.2	51.3
08:00 - 09:00	50.2	50.3	51.1	53.7	51.2	51.0	52.8
09:00 - 10:00	50.5	49.8	50.2	49.8	51.2	50.7	53.8
10:00 - 11:00	50.5	50.1	50.3	49.3	50.5	49.1	51.5
11:00 - 12:00	51.0	49.6	49.2	49.2	49.7	48.5	50.4
12:00 - 13:00	49.7	49.6	49.1	48.5	49.2	48.6	50.0
13:00 - 14:00	50.8	49.8	49.5	48.5	49.3	48.7	49.6
14:00 - 15:00	50.7	53.0	49.2	48.5	49.4	50.4	50.3
15:00 - 16:00	51.2	50.5	51.1	51.4	50.3	50.9	49.9
L90(avg)*	50.4	50.8	51.5	51.2	50.7	49.8	51.4

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

(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 : RION NL-21
Site Operator : Mr. Sittichai Sawangwongchai

Monitor Period : 31 Oct 2022-07 Nov 2022

Serial No : 00487719

Calibrator Model : RION NC-74
Calibration Ref dB(A) : 94.0
SLM Reading / Adjust dB(A) : 93.9/0.1
Cal Sheet No.: NC-74-2022-088

Serial No : 34283648
Certified Date : 24 Dec 2021
Expire Date : 23 Dec 2022

Time	Equivalent Sound Pressure Level (dB(A))						
	31 Oct 2022	-01 Nov 2022	02-03 Nov 2022	03-04 Nov 2022	04-05 Nov 2022	05-06 Nov 2022	06-07 Nov 2022
16:00 - 17:00	59.9	59.4	53.1	55.8	52.1	51.1	57.4
17:00 - 18:00	58.8	56.0	60.0	58.1	54.1	51.5	53.0
18:00 - 19:00	58.8	58.7	60.5	59.8	59.1	60.9	51.4
19:00 - 20:00	59.2	57.6	60.8	57.7	58.0	54.4	50.5
20:00 - 21:00	58.3	57.9	57.4	58.5	58.2	56.9	56.4
21:00 - 22:00	60.3	54.7	53.0	54.4	58.8	60.0	58.1
22:00 - 23:00	53.9	55.4	51.4	55.8	61.6	60.5	58.0
23:00 - 00:00	55.4	56.7	50.5	56.0	60.8	53.5	54.1
00:00 - 01:00	56.7	58.4	56.4	55.3	59.6	52.2	53.1
01:00 - 02:00	55.5	56.3	58.1	54.0	57.8	52.7	53.0
02:00 - 03:00	56.6	52.3	58.0	54.4	56.3	51.3	54.1
03:00 - 04:00	53.4	49.8	54.1	55.1	56.4	49.7	59.6
04:00 - 05:00	53.5	49.7	53.1	54.9	57.6	52.9	61.2
05:00 - 06:00	53.9	53.1	53.0	54.1	56.8	53.6	56.8
06:00 - 07:00	60.0	56.9	54.1	54.2	56.0	53.2	55.2
07:00 - 08:00	59.5	61.2	59.6	55.3	54.3	52.7	55.2
08:00 - 09:00	57.7	58.4	61.2	60.5	58.3	55.8	55.4
09:00 - 10:00	55.6	53.7	56.8	59.2	57.3	56.0	50.1
10:00 - 11:00	56.9	54.4	55.2	56.5	53.4	54.3	58.0
11:00 - 12:00	56.5	52.5	55.2	54.7	51.3	50.5	54.1
12:00 - 13:00	55.8	53.6	55.4	53.3	52.4	50.4	53.1
13:00 - 14:00	55.7	53.9	50.1	54.1	56.2	60.0	53.8
14:00 - 15:00	54.1	51.8	54.8	54.9	51.8	60.5	54.7
15:00 - 16:00	54.6	53.0	52.0	54.8	58.4	60.8	53.8
Leq(24)*	57.2	56.2	56.8	56.4	57.3	56.5	55.9
Ldn	62.7	61.9	61.9	61.7	64.7	61.5	63.2
Lmax **	87.3	81.4	88.1	82.8	82.7	87.4	88.1
Standard-24Hr	70 dB(A)						
Standard-Max	115 dB(A)						

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

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

(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 : RION NL-21
Site Operator : Mr. Sittichai Sawangwongchai

Monitor Period : 31 Oct 2022-07 Nov 2022

Serial No : 00487719

Calibrator Model : RION NC-74
Calibration Ref dB(A) : 94.0
SLM Reading / Adjust dB(A) : 93.9/0.1
Cal Sheet No.: NC-74-2022-088

Serial No : 34283648
Certified Date : 24 Dec 2021
Expire Date : 23 Dec 2022

Time	L90 (dB(A))						
	31 Oct 2022	-01 Nov 2022	02-03 Nov 2022	03-04 Nov 2022	04-05 Nov 2022	05-06 Nov 2022	06-07 Nov 2022
16:00 - 17:00	49.0	51.5	48.1	47.4	47.1	44.7	53.5
17:00 - 18:00	47.1	52.3	53.8	48.0	47.9	44.9	50.2
18:00 - 19:00	47.2	51.5	55.3	51.1	48.7	46.0	49.9
19:00 - 20:00	54.0	50.3	56.6	51.0	50.1	46.4	48.9
20:00 - 21:00	57.5	56.7	53.5	50.8	49.4	47.4	50.4
21:00 - 22:00	51.0	48.0	50.2	51.5	56.9	56.5	57.7
22:00 - 23:00	48.7	49.7	49.9	53.5	57.2	54.4	57.5
23:00 - 00:00	50.2	50.0	48.9	53.8	60.2	51.6	48.9
00:00 - 01:00	49.5	57.8	50.4	53.6	58.9	49.4	52.6
01:00 - 02:00	48.9	55.5	57.7	51.7	55.8	50.1	52.0
02:00 - 03:00	56.2	50.8	57.5	52.4	54.8	48.7	47.5
03:00 - 04:00	46.5	47.6	48.9	53.9	53.5	47.5	50.9
04:00 - 05:00	46.6	48.1	52.6	53.9	56.7	49.7	48.3
05:00 - 06:00	47.5	50.5	52.0	52.6	55.4	52.7	45.8
06:00 - 07:00	50.7	50.8	47.5	51.6	55.4	52.6	44.5
07:00 - 08:00	50.3	50.9	50.9	50.1	48.6	48.2	44.0
08:00 - 09:00	49.6	46.8	48.3	52.2	50.2	48.5	44.2
09:00 - 10:00	48.6	46.8	45.8	48.3	47.9	47.2	43.9
10:00 - 11:00	49.3	46.9	44.5	46.1	46.8	44.7	57.5
11:00 - 12:00	48.3	46.5	44.0	45.5	45.9	43.2	48.9
12:00 - 13:00	47.2	46.2	44.2	43.7	45.2	43.4	52.6
13:00 - 14:00	48.7	46.1	43.9	43.4	44.7	53.8	50.7
14:00 - 15:00	47.8	45.4	44.1	43.7	44.0	55.3	52.4
15:00 - 16:00	49.0	46.0	46.6	47.8	44.5	56.6	51.9
L90(avg)*	50.7	51.2	51.9	51.0	53.8	51.2	52.0

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

(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 : RION NL-21

Site Operator : Mr. Sittichai Sawangwongchai

Monitor Period : 31 Oct 2022-07 Nov 2022

Serial No : 00198274

Calibrator Model : RION NC-74

Serial No : 34283648

Calibration Ref dB(A) : 94.0

Certified Date : 24 Dec 2021

SLM Reading / Adjust dB(A) : 93.8/0.2

Expire Date : 23 Dec 2022

Cal Sheet No.: NC-74-2022-088

Time	Equivalent Sound Pressure Level (dB(A))						
	31 Oct 2022	-01 Nov 2022	02-03 Nov 2022	04 Nov 2022	05 Nov 2022	06 Nov 2022	07 Nov 2022
15:00 - 16:00	61.8	61.0	60.3	60.9	59.9	60.9	60.4
16:00 - 17:00	63.4	62.6	62.1	62.1	60.0	60.3	59.3
17:00 - 18:00	65.1	64.6	61.7	62.6	61.6	60.4	61.8
18:00 - 19:00	61.8	62.7	63.6	64.6	64.2	63.3	67.4
19:00 - 20:00	62.0	62.1	63.3	62.9	61.8	62.6	64.3
20:00 - 21:00	62.2	62.3	62.6	65.5	63.1	62.8	65.2
21:00 - 22:00	61.7	63.5	63.2	62.8	62.8	62.5	61.6
22:00 - 23:00	60.4	60.2	59.1	61.6	62.7	63.6	59.7
23:00 - 00:00	55.4	59.0	59.8	62.2	59.1	60.1	57.0
00:00 - 01:00	57.4	56.3	57.2	60.6	60.4	59.2	55.8
01:00 - 02:00	53.6	53.7	56.5	60.6	60.4	55.0	55.1
02:00 - 03:00	56.9	52.8	52.3	59.7	56.0	55.2	57.1
03:00 - 04:00	52.8	53.6	54.1	59.9	53.3	53.3	54.1
04:00 - 05:00	53.5	53.1	52.4	60.1	52.1	52.6	53.4
05:00 - 06:00	57.0	55.1	52.9	59.8	53.5	52.6	52.1
06:00 - 07:00	63.5	61.5	56.1	60.2	54.6	53.5	53.1
07:00 - 08:00	65.1	65.3	62.6	62.4	60.7	58.7	56.9
08:00 - 09:00	61.1	62.7	66.0	65.8	65.3	63.4	64.1
09:00 - 10:00	60.7	60.1	62.9	63.8	62.1	62.8	65.3
10:00 - 11:00	60.1	60.3	64.7	61.7	60.1	61.2	62.7
11:00 - 12:00	60.6	60.6	62.7	61.6	59.0	60.6	60.3
12:00 - 13:00	61.1	61.0	60.8	61.1	59.5	60.2	59.5
13:00 - 14:00	60.6	61.7	60.6	62.0	63.5	61.8	61.8
14:00 - 15:00	61.0	63.4	59.5	62.1	60.2	60.4	60.2

Leq(24)*	61.1	61.2	62.8	62.3	60.9	60.6	61.3
Ldn	65.4	65.0	65.3	67.5	65.5	65.1	64.3
Lmax **	89.0	88.3	87.1	90.8	88.3	88.5	89.5

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

Preeda S.
(Miss Preeda Somjai)
Technical Management Team



Noise Monitoring Result : Background Noise

MTR-SPRC PLC-Refinery

Location : Eastern Refinery Boundary 1

SLM Model : RION NL-21

Site Operator : Mr. Sittichai Sawangwongchai

Monitor Period : 31 Oct 2022-07 Nov 2022

Serial No : 00198274

Calibrator Model : RION NC-74

Serial No : 34283648

Calibration Ref dB(A) : 94.0

Certified Date : 24 Dec 2021

SLM Reading / Adjust dB(A) : 93.8/0.2

Expire Date : 23 Dec 2022

Cal Sheet No.: NC-74-2022-088

Time	L90 (dB(A))						
	31 Oct 2022	-01 Nov 2022	02-03 Nov 2022	04 Nov 2022	05 Nov 2022	06 Nov 2022	07 Nov 2022
15:00 - 16:00	49.7	48.3	49.1	55.6	49.5	47.8	48.2
16:00 - 17:00	54.4	51.0	49.7	56.5	50.1	46.7	47.7
17:00 - 18:00	56.8	57.0	55.2	57.0	52.5	49.0	48.9
18:00 - 19:00	54.3	55.8	56.7	59.3	56.4	53.9	56.3
19:00 - 20:00	53.5	53.9	55.2	58.5	54.4	53.3	56.0
20:00 - 21:00	51.2	52.9	54.9	58.6	54.8	54.4	53.3
21:00 - 22:00	48.7	50.2	52.1	58.3	52.5	52.6	52.2
22:00 - 23:00	46.5	48.0	48.5	58.0	50.6	52.5	49.4
23:00 - 00:00	46.0	47.4	48.0	58.0	48.9	47.8	45.9
00:00 - 01:00	44.8	47.2	46.6	57.2	49.6	46.1	45.6
01:00 - 02:00	44.3	45.9	47.2	58.3	49.2	45.3	45.4
02:00 - 03:00	43.8	45.9	46.1	58.1	46.1	44.4	45.0
03:00 - 04:00	43.7	46.4	46.8	58.2	45.6	44.4	44.1
04:00 - 05:00	44.6	47.2	47.1	58.1	45.5	44.2	43.5
05:00 - 06:00	46.4	47.6	46.8	58.3	45.2	44.7	43.7
06:00 - 07:00	56.3	52.2	47.7	58.7	45.3	44.1	45.3
07:00 - 08:00	56.4	57.7	53.3	59.0	49.3	47.3	46.7
08:00 - 09:00	51.7	54.2	57.7	60.4	56.6	54.1	55.6
09:00 - 10:00	49.2	50.8	53.4	58.7	52.6	51.6	57.1
10:00 - 11:00	50.6	49.7	50.9	57.2	48.4	47.4	53.1
11:00 - 12:00	50.4	51.0	50.3	56.4	48.9	47.0	49.3
12:00 - 13:00	52.1	53.3	49.9	55.9	48.6	47.8	49.7
13:00 - 14:00	49.4	52.0	50.8	49.8	51.8	48.6	48.6
14:00 - 15:00	48.4	51.0	50.7	51.1	49.8	48.2	49.8
L90(avg)*	51.6	52.1	52.0	57.8	51.4	49.8	51.3

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

(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 Monitor Period : 31 Oct 2022-07 Nov 2022
SLM Model : RION NL-21 Serial No : 00187481
Site Operator : Mr. Sittichai Sawangwongchai

Calibrator Model : RION NC-74 Serial No : 34283648
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.: NC-74-2022-088

Time	Equivalent Sound Pressure Level (dB(A))						
	31 Oct 2022	-01 Nov 2022	02-03 Nov 2022	03-04 Nov 2022	04-05 Nov 2022	05-06 Nov 2022	06-07 Nov 2022
14:00 - 15:00	53.2	51.2	52.9	53.2	53.8	51.7	52.4
15:00 - 16:00	54.6	53.3	55.6	54.4	55.1	53.7	53.1
16:00 - 17:00	54.3	55.1	56.6	56.1	55.6	56.4	61.1
17:00 - 18:00	54.9	53.3	53.6	52.7	53.5	55.3	56.8
18:00 - 19:00	56.2	56.3	56.5	56.0	57.0	56.1	53.6
19:00 - 20:00	55.4	55.6	57.1	55.7	56.6	56.2	61.1
20:00 - 21:00	52.8	53.2	54.3	55.1	54.4	54.2	52.4
21:00 - 22:00	50.7	52.4	52.7	53.9	54.3	52.2	52.2
22:00 - 23:00	49.8	49.8	51.2	51.2	52.0	50.3	53.1
23:00 - 00:00	50.4	50.1	51.4	50.8	52.0	50.5	53.6
00:00 - 01:00	48.2	48.9	50.5	48.4	49.4	49.6	51.2
01:00 - 02:00	47.7	49.4	49.2	48.9	52.6	48.7	49.5
02:00 - 03:00	47.8	49.2	50.5	48.9	49.0	49.1	49.9
03:00 - 04:00	48.8	49.0	49.4	49.3	48.7	48.6	49.4
04:00 - 05:00	49.5	49.4	49.3	49.4	49.1	49.8	49.0
05:00 - 06:00	52.5	51.7	53.2	52.4	51.0	51.6	49.4
06:00 - 07:00	54.1	54.3	55.4	55.4	54.5	54.5	52.1
07:00 - 08:00	52.3	53.8	53.1	53.6	54.2	54.7	55.0
08:00 - 09:00	51.3	52.0	51.5	51.3	51.8	52.0	53.9
09:00 - 10:00	51.3	51.2	51.4	51.3	51.4	50.1	51.7
10:00 - 11:00	51.4	52.0	52.8	51.8	53.6	51.1	51.1
11:00 - 12:00	50.8	52.0	54.3	52.8	54.2	52.4	52.3
12:00 - 13:00	50.6	50.6	52.8	53.3	52.4	52.5	53.4
13:00 - 14:00	51.6	50.3	53.1	53.8	51.5	52.2	52.8
Leq(24)*	52.3	52.4	53.4	53.1	53.4	52.9	54.4
Ldn	57.3	57.5	58.5	58.1	58.3	57.7	58.5
Lmax **	73.3	73.0	78.1	74.6	80.6	74.6	80.2
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 : Southern Refinery Boundary 1 Monitor Period : 31 Oct 2022-07 Nov 2022
SLM Model : RION NL-21 Serial No : 00187481
Site Operator : Mr. Sittichai Sawangwongchai

Calibrator Model : RION NC-74 Serial No : 34283648
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.: NC-74-2022-088

Time	L90 (dB(A))						
	31 Oct 2022	-01 Nov 2022	02-03 Nov 2022	03-04 Nov 2022	04-05 Nov 2022	05-06 Nov 2022	06-07 Nov 2022
14:00 - 15:00	47.9	46.6	47.2	47.0	46.5	48.1	46.4
15:00 - 16:00	49.5	48.1	48.8	48.0	49.0	47.2	46.6
16:00 - 17:00	50.0	50.7	52.3	50.9	50.9	49.5	50.0
17:00 - 18:00	50.5	49.6	49.9	49.1	49.8	50.2	50.5
18:00 - 19:00	50.2	52.0	51.9	52.0	52.4	50.4	48.4
19:00 - 20:00	48.5	49.2	50.4	50.6	50.5	49.1	50.0
20:00 - 21:00	47.0	47.9	48.8	49.6	49.2	47.4	46.2
21:00 - 22:00	46.3	47.7	48.4	48.6	49.5	46.4	45.4
22:00 - 23:00	46.2	46.9	47.5	47.8	48.0	46.5	46.6
23:00 - 00:00	46.4	47.6	46.2	48.3	48.1	47.1	48.4
00:00 - 01:00	46.6	47.0	47.8	46.7	47.7	47.1	47.9
01:00 - 02:00	46.4	47.3	47.5	47.3	48.1	47.4	47.3
02:00 - 03:00	46.3	47.1	47.6	46.8	47.1	47.4	47.6
03:00 - 04:00	46.8	47.2	47.1	47.1	47.3	47.5	47.2
04:00 - 05:00	47.0	47.2	46.9	47.3	47.2	47.6	47.3
05:00 - 06:00	49.0	48.2	48.5	48.6	47.7	48.0	47.3
06:00 - 07:00	49.6	50.1	50.9	51.2	50.7	50.0	48.2
07:00 - 08:00	48.2	49.0	48.0	48.3	49.6	49.0	50.7
08:00 - 09:00	48.1	47.4	46.1	47.5	47.2	46.8	48.7
09:00 - 10:00	47.2	46.4	45.6	46.6	46.7	45.4	46.9
10:00 - 11:00	47.6	46.6	46.5	46.5	47.8	45.3	46.1
11:00 - 12:00	47.1	47.0	47.1	46.6	49.2	46.2	46.5
12:00 - 13:00	46.3	46.4	46.0	46.3	48.2	44.8	47.3
13:00 - 14:00	47.2	46.4	44.5	46.4	47.8	45.4	46.3
L90(avg)*	48.0	48.2	48.5	48.5	48.9	47.8	47.9

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 : Southern Refinery Boundary 2

Monitor Period : 31 Oct 2022-07 Nov 2022

SLM Model : RION NL-21

Serial No : 00187489

Site Operator : Mr. Sittichai Sawangwongchai

Calibrator Model : RION NC-74

Serial No : 34283648

Calibration Ref dB(A) : 94.0

Certified Date : 24 Dec 2021

SLM Reading / Adjust dB(A) : 93.9/0.1

Expire Date : 23 Dec 2022

Cal Sheet No.: NC-74-2022-088

Time	Equivalent Sound Pressure Level (dB(A))						
	31 Oct 2022	-01 Nov 2022	02-03 Nov 2022	03-04 Nov 2022	04-05 Nov 2022	05-06 Nov 2022	06-07 Nov 2022
13:00 - 14:00	59.6	59.2	59.1	61.6	61.9	60.2	59.3
14:00 - 15:00	61.7	60.8	61.3	60.2	61.8	59.3	59.5
15:00 - 16:00	62.2	64.0	63.2	60.2	63.2	61.1	60.3
16:00 - 17:00	62.4	62.3	64.7	59.3	64.3	63.4	66.8
17:00 - 18:00	63.3	64.1	62.8	61.1	60.2	63.8	64.6
18:00 - 19:00	62.7	63.0	64.5	63.4	64.6	63.5	61.3
19:00 - 20:00	60.8	60.6	65.0	63.8	64.0	63.6	61.8
20:00 - 21:00	59.4	60.1	62.7	63.5	62.4	61.5	60.8
21:00 - 22:00	58.0	57.9	62.1	63.6	62.1	60.3	59.5
22:00 - 23:00	58.8	57.8	60.6	61.5	60.9	59.2	60.5
23:00 - 00:00	57.1	56.5	61.3	60.3	60.3	59.4	58.0
00:00 - 01:00	57.1	56.1	60.8	59.2	58.8	58.7	58.2
01:00 - 02:00	57.0	56.6	59.0	59.4	58.8	58.1	56.6
02:00 - 03:00	57.4	56.7	58.6	58.7	58.2	58.4	57.4
03:00 - 04:00	58.3	57.5	58.6	58.1	58.1	58.0	56.2
04:00 - 05:00	60.5	59.7	57.9	58.4	58.4	58.7	56.5
05:00 - 06:00	62.1	62.7	60.7	58.0	59.2	59.5	58.9
06:00 - 07:00	61.5	60.9	62.6	58.7	62.5	62.2	62.1
07:00 - 08:00	60.2	59.1	60.6	59.5	62.2	62.6	63.0
08:00 - 09:00	60.3	59.4	59.6	62.2	60.1	60.1	61.6
09:00 - 10:00	60.0	59.8	58.9	62.6	59.6	58.7	59.5
10:00 - 11:00	60.0	60.7	60.4	60.1	60.5	59.5	60.8
11:00 - 12:00	59.4	60.0	62.0	60.5	61.6	60.0	61.2
12:00 - 13:00	59.5	65.4	60.5	60.8	60.2	59.4	60.5

Leq(24)*	60.4	60.8	61.6	61.0	61.4	60.8	61.0
Ldn	66.0	65.8	67.0	66.1	66.6	66.1	65.8
Lmax **	79.9	83.2	81.7	79.6	83.6	79.6	90.1

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

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

** Maximum Sound Pressure Level between 13:00-13:00

(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 : 31 Oct 2022-07 Nov 2022

SLM Model : RION NL-21

Serial No : 00187489

Site Operator : Mr. Sittichai Sawangwongchai

Calibrator Model : RION NC-74

Serial No : 34283648

Calibration Ref dB(A) : 94.0

Certified Date : 24 Dec 2021

SLM Reading / Adjust dB(A) : 93.9/0.1

Expire Date : 23 Dec 2022

Cal Sheet No.: NC-74-2022-088

Time	L90 (dB(A))						
	31 Oct 2022	-01 Nov 2022	02-03 Nov 2022	03-04 Nov 2022	04-05 Nov 2022	05-06 Nov 2022	06-07 Nov 2022
13:00 - 14:00	56.1	56.2	55.9	57.6	56.5	56.0	54.3
14:00 - 15:00	57.0	56.6	57.2	56.5	56.2	56.0	54.3
15:00 - 16:00	58.4	59.2	58.6	56.0	57.7	56.1	54.9
16:00 - 17:00	59.0	58.0	61.3	56.0	60.2	57.6	57.2
17:00 - 18:00	58.0	60.0	59.6	56.1	57.7	59.7	58.5
18:00 - 19:00	57.3	58.0	60.2	57.6	59.6	59.2	57.3
19:00 - 20:00	56.4	56.7	59.8	59.7	58.9	58.7	57.2
20:00 - 21:00	56.1	56.3	58.8	59.2	57.9	57.2	56.9
21:00 - 22:00	55.5	55.3	58.5	58.7	58.5	56.7	56.3
22:00 - 23:00	55.8	55.6	58.1	57.2	57.5	57.0	56.2
23:00 - 00:00	56.1	55.2	58.9	56.7	58.0	57.3	55.9
00:00 - 01:00	56.0	54.8	58.9	57.0	57.5	57.4	55.2
01:00 - 02:00	55.7	54.6	57.8	57.3	57.8	57.1	54.7
02:00 - 03:00	56.1	55.2	57.5	57.4	56.8	57.3	54.8
03:00 - 04:00	56.4	55.7	56.7	57.1	56.8	57.0	54.8
04:00 - 05:00	57.9	56.6	56.5	57.3	57.1	57.5	55.0
05:00 - 06:00	58.9	59.4	57.7	57.0	57.3	57.8	56.3
06:00 - 07:00	57.9	56.2	58.9	57.5	59.5	59.1	58.6
07:00 - 08:00	57.7	55.6	56.6	57.8	58.9	58.6	58.7
08:00 - 09:00	57.1	56.5	55.7	59.1	57.2	56.7	56.7
09:00 - 10:00	57.2	56.3	55.3	58.6	56.7	56.1	55.7
10:00 - 11:00	56.3	56.8	55.6	56.7	56.9	55.9	56.5
11:00 - 12:00	56.2	56.2	55.7	55.6	57.6	56.1	56.9
12:00 - 13:00	56.3	56.0	55.0	54.9	56.5	53.7	56.3
L90(avg)*	57.0	56.8	58.0	57.4	57.9	57.3	56.4

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

(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 : 31 Oct 2022-07 Nov 2022			
SLM Model : RION NL-21				Serial No : 00187497			
Site Operator : Mr. Sittichai Sawangwongchai							
Calibrator Model : RION NC-74				Serial No : 34283648			
Calibration Ref dB(A) : 94.0				Certified Date : 24 Dec 2021			
SLM Reading / Adjust dB(A) : 93.9/0.1				Expire Date : 23 Dec 2022			
Cal Sheet No.: NC-74-2022-088							
Time	Equivalent Sound Pressure Level (dB(A))						
	31 Oct 2022	-01 Nov 2022	02-03 Nov 2022	03-04 Nov 2022	04-05 Nov 2022	05-06 Nov 2022	06-07 Nov 2022
16:00 - 17:00	53.3	53.0	50.1	51.8	52.9	53.2	64.6
17:00 - 18:00	52.6	49.9	56.4	59.3	51.6	49.7	78.2
18:00 - 19:00	49.4	49.8	49.3	51.2	51.2	49.8	62.0
19:00 - 20:00	48.2	63.0	47.2	49.6	50.1	50.5	59.1
20:00 - 21:00	49.8	48.5	47.2	49.5	51.8	50.5	59.9
21:00 - 22:00	48.9	48.3	46.5	46.8	49.3	52.1	61.1
22:00 - 23:00	46.9	46.3	45.4	49.7	49.1	49.8	61.5
23:00 - 00:00	45.2	45.9	47.8	47.2	51.4	49.4	51.1
00:00 - 01:00	42.8	52.7	44.0	53.8	48.0	47.6	49.3
01:00 - 02:00	42.3	45.7	43.5	46.8	47.0	44.6	47.3
02:00 - 03:00	42.6	43.4	43.8	45.8	55.9	48.7	43.7
03:00 - 04:00	43.5	45.1	49.5	48.4	49.9	44.1	43.4
04:00 - 05:00	49.3	48.4	45.7	47.9	46.1	44.4	43.3
05:00 - 06:00	52.5	51.2	51.6	50.0	45.6	44.1	45.4
06:00 - 07:00	53.6	53.7	51.6	52.0	55.2	47.9	50.3
07:00 - 08:00	53.5	53.1	54.5	55.1	61.2	51.6	52.4
08:00 - 09:00	51.3	50.1	52.0	54.2	68.6	48.9	53.1
09:00 - 10:00	51.1	49.7	51.4	52.0	69.6	49.7	51.6
10:00 - 11:00	51.1	50.6	54.3	53.4	66.4	51.0	51.5
11:00 - 12:00	52.9	51.1	51.4	57.8	55.7	51.4	48.9
12:00 - 13:00	51.1	50.3	49.4	50.7	53.2	52.6	53.2
13:00 - 14:00	49.5	49.0	52.7	52.5	54.9	56.3	49.8
14:00 - 15:00	51.3	49.1	49.8	51.0	58.1	59.6	52.1
15:00 - 16:00	52.0	49.9	52.1	52.0	55.8	56.9	51.8
Leq(24)*	50.5	52.6	50.8	52.6	68.1	52.1	65.1
Ldn	55.5	56.8	55.3	57.0	68.4	55.3	65.9
Lmax **	76.5	83.9	80.2	82.0	102.2	80.1	90.0
Standard-24Hr	70 dB(A)						
Standard-Max	115 dB(A)						

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

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

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

Preeda S.
(Miss Preeda Somjai)
Technical Management Team



Noise Monitoring Result : Background Noise

MTR-SPRC PLC-Refinery

Location : Map Ta Phut New Town				Monitor Period : 31 Oct 2022-07 Nov 2022			
SLM Model : RION NL-21				Serial No : 00187497			
Site Operator : Mr. Sittichai Sawangwongchai							
Calibrator Model : RION NC-74				Serial No : 34283648			
Calibration Ref dB(A) : 94.0				Certified Date : 24 Dec 2021			
SLM Reading / Adjust dB(A) : 93.9/0.1				Expire Date : 23 Dec 2022			
Cal Sheet No.: NC-74-2022-088							
Time	L90 (dB(A))						
	31 Oct 2022	01 Nov 2022	02-03 Nov 2022	03-04 Nov 2022	04-05 Nov 2022	05-06 Nov 2022	06-07 Nov 2022
16:00 - 17:00	46.0	46.4	45.4	47.3	44.7	44.9	55.9
17:00 - 18:00	45.1	45.9	46.1	48.6	46.0	44.3	60.0
18:00 - 19:00	44.9	45.5	45.8	46.7	46.8	44.4	58.3
19:00 - 20:00	44.1	45.0	44.7	46.5	47.5	45.4	57.0
20:00 - 21:00	44.5	44.9	43.8	44.8	47.4	47.5	57.0
21:00 - 22:00	43.8	44.8	42.9	45.2	45.6	48.6	54.9
22:00 - 23:00	42.5	44.9	42.0	45.8	45.3	46.0	53.5
23:00 - 00:00	41.5	43.9	42.9	45.6	46.3	46.6	46.2
00:00 - 01:00	40.9	43.1	41.7	44.4	45.1	42.5	44.8
01:00 - 02:00	40.3	42.2	41.5	43.4	44.2	41.8	43.1
02:00 - 03:00	40.4	42.2	42.6	42.9	44.0	41.9	42.2
03:00 - 04:00	41.5	43.1	43.3	44.4	44.8	42.2	41.6
04:00 - 05:00	43.9	44.6	43.6	46.0	44.0	42.5	42.0
05:00 - 06:00	48.6	47.9	45.7	47.6	44.1	41.8	43.7
06:00 - 07:00	48.3	47.4	48.6	49.2	46.0	44.0	44.8
07:00 - 08:00	47.0	47.1	47.8	48.9	49.4	46.6	47.9
08:00 - 09:00	47.0	46.1	46.4	47.4	55.9	44.7	46.6
09:00 - 10:00	46.3	45.5	45.6	46.2	51.1	43.9	46.2
10:00 - 11:00	46.2	46.0	45.0	46.9	55.1	44.5	46.4
11:00 - 12:00	46.5	45.9	45.4	45.4	51.7	46.5	43.9
12:00 - 13:00	45.8	45.1	44.1	45.0	49.3	46.9	44.3
13:00 - 14:00	45.0	44.4	45.3	45.1	50.8	50.6	45.0
14:00 - 15:00	46.0	44.3	45.0	44.2	53.8	55.0	45.5
15:00 - 16:00	46.7	45.6	45.5	44.0	49.4	53.6	47.3
L90(avg)*	45.3	45.3	45.0	46.2	49.5	47.5	52.4

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

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

Preeda S.
(Miss Preeda Somjai)
Technical Management Team



Noise Monitoring Result : Community Noise

MTR-SPRC PLC-Refinery

Location : Soi Ruam Patana Community

Monitor Period : 31 Oct 2022-07 Nov 2022

SLM Model : RION NL-21

Serial No : 00198277

Site Operator : Mr. Sittichai Sawangwongchai

Calibrator Model : RION NC-74

Serial No : 34283648

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.: NC-74-2022-088

Time	Equivalent Sound Pressure Level (dB(A))						
	31 Oct 2022	-01 Nov 2022	02-03 Nov 2022	04-05 Nov 2022	06-07 Nov 2022	08-09 Nov 2022	10-11 Nov 2022
16:00 - 17:00	58.3	72.1	58.4	60.7	54.8	61.0	54.9
17:00 - 18:00	59.2	78.7	63.5	59.6	55.9	52.1	51.8
18:00 - 19:00	59.4	65.2	60.9	53.8	62.1	60.7	75.2
19:00 - 20:00	56.0	62.2	55.8	54.7	60.7	59.6	68.4
20:00 - 21:00	55.3	53.7	57.5	55.1	53.3	53.8	57.7
21:00 - 22:00	49.2	51.6	56.1	49.3	52.0	54.7	52.5
22:00 - 23:00	53.6	48.0	52.4	49.2	50.5	55.1	58.9
23:00 - 00:00	50.6	46.5	48.0	50.0	55.1	49.3	54.3
00:00 - 01:00	46.1	45.3	46.4	50.9	46.8	49.2	54.5
01:00 - 02:00	43.0	53.5	46.7	49.9	46.0	50.0	56.1
02:00 - 03:00	41.3	51.9	48.9	48.3	42.7	50.9	52.8
03:00 - 04:00	41.7	50.0	42.0	47.8	50.2	49.9	46.6
04:00 - 05:00	57.0	45.3	47.7	70.0	44.4	48.3	45.2
05:00 - 06:00	62.4	63.4	45.3	54.1	46.0	47.8	44.1
06:00 - 07:00	68.2	55.6	49.2	56.8	67.1	70.0	45.1
07:00 - 08:00	64.5	57.5	63.6	58.3	58.5	54.1	65.7
08:00 - 09:00	53.6	61.2	58.5	55.7	58.9	56.8	57.0
09:00 - 10:00	52.8	53.8	56.6	56.3	57.4	58.3	57.9
10:00 - 11:00	53.5	54.9	55.7	54.3	57.0	55.7	56.1
11:00 - 12:00	50.9	56.8	51.4	57.2	56.6	56.3	59.3
12:00 - 13:00	54.1	57.2	54.9	55.7	53.1	54.3	52.8
13:00 - 14:00	53.0	59.8	61.9	49.3	55.7	57.2	55.3
14:00 - 15:00	56.6	56.4	61.0	56.6	54.9	53.5	66.5
15:00 - 16:00	62.5	59.1	52.1	52.7	61.9	55.5	58.2
Leq(24)*	58.9	66.4	57.5	58.7	58.0	58.9	63.6
Ldn	66.3	67.4	58.9	67.0	64.5	66.9	64.9
Lmax **	85.5	109.5	90.7	88.9	93.0	89.4	97.9
Standard-24Hr	70 dB(A)						
Standard-Max	115 dB(A)						

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

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

(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 : 31 Oct 2022-07 Nov 2022

SLM Model : RION NL-21

Serial No : 00198277

Site Operator : Mr. Sittichai Sawangwongchai

Calibrator Model : RION NC-74

Serial No : 34283648

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.: NC-74-2022-088

Time	L90 (dB(A))						
	31 Oct 2022	-01 Nov 2022	02-03 Nov 2022	04-05 Nov 2022	06-07 Nov 2022	08-09 Nov 2022	10-11 Nov 2022
16:00 - 17:00	44.5	41.7	40.4	42.7	39.5	41.4	39.7
17:00 - 18:00	47.1	44.4	46.1	44.5	42.2	40.0	41.5
18:00 - 19:00	48.6	45.3	44.3	43.3	41.4	42.7	42.6
19:00 - 20:00	48.2	47.4	44.7	44.3	43.1	44.5	45.9
20:00 - 21:00	45.7	46.3	45.9	42.5	42.6	43.3	44.7
21:00 - 22:00	42.8	44.5	45.1	42.2	43.0	44.3	46.8
22:00 - 23:00	42.1	42.7	43.8	41.1	42.6	42.5	52.0
23:00 - 00:00	40.9	41.0	42.6	47.2	41.8	42.2	52.0
00:00 - 01:00	42.0	39.7	41.6	47.2	40.3	41.1	51.2
01:00 - 02:00	41.0	38.7	41.5	46.8	38.9	47.2	49.3
02:00 - 03:00	37.4	39.2	38.5	46.9	37.9	47.2	47.1
03:00 - 04:00	37.3	37.9	38.0	35.6	37.6	46.8	43.4
04:00 - 05:00	38.4	36.4	38.3	36.0	37.6	46.9	43.2
05:00 - 06:00	45.7	39.5	38.5	39.6	41.9	35.6	42.4
06:00 - 07:00	46.7	45.4	40.5	43.1	37.1	36.0	42.4
07:00 - 08:00	42.8	45.2	47.6	45.1	40.6	39.6	40.6
08:00 - 09:00	42.2	41.9	45.6	41.4	45.6	43.1	44.1
09:00 - 10:00	43.3	42.5	42.4	40.1	44.7	45.1	43.3
10:00 - 11:00	43.1	41.6	38.8	40.8	43.1	41.4	41.7
11:00 - 12:00	41.1	43.2	37.2	41.1	43.0	40.1	39.8
12:00 - 13:00	39.7	41.5	40.9	41.4	42.4	40.8	40.2
13:00 - 14:00	39.2	40.9	41.2	42.2	41.5	41.1	41.1
14:00 - 15:00	39.5	39.6	41.4	38.1	40.9	39.5	46.0
15:00 - 16:00	58.5	39.5	40.0	36.8	41.2	37.7	42.4
L90(avg)*	47.2	42.8	42.8	43.2	41.8	43.2	46.1

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

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

Preeda S.
(Miss Preeda Somjai)
Technical Management Team



Noise Monitoring Result : Community Noise

MTR-SPRC PLC-Refinery

Location : Wat Sopkon Community

SLM Model : RION NL-21

Site Operator : Mr. Sittichai Sawangwongchai

Monitor Period : 31 Oct 2022-07 Nov 2022

Serial No : 00487734

Calibrator Model : RION NC-74

Serial No : 34283648

Calibration Ref dB(A) : 94.0

Certified Date : 24 Dec 2021

SLM Reading / Adjust dB(A) : 93.9/0.1

Expire Date : 23 Dec 2022

Cal Sheet No.: NC-74-2022-088

Time	Equivalent Sound Pressure Level (dB(A))						
	31 Oct 2022	-01 Nov 2022	02-03 Nov 2022	03-04 Nov 2022	04-05 Nov 2022	05-06 Nov 2022	06-07 Nov 2022
18:00 - 19:00	56.0	54.3	56.8	53.9	58.4	55.0	63.5
19:00 - 20:00	52.8	55.0	55.5	59.0	53.1	50.3	63.6
20:00 - 21:00	53.9	50.3	58.6	61.7	55.3	50.8	61.2
21:00 - 22:00	50.0	50.8	52.0	56.6	51.2	50.5	51.6
22:00 - 23:00	48.4	50.5	51.6	57.3	50.5	52.8	70.6
23:00 - 00:00	53.9	52.8	51.2	53.7	56.0	46.7	78.8
00:00 - 01:00	51.2	46.7	49.9	53.5	56.1	45.1	70.5
01:00 - 02:00	53.6	45.1	49.7	53.5	54.2	44.0	62.1
02:00 - 03:00	47.7	44.0	50.0	51.9	46.8	44.7	60.4
03:00 - 04:00	49.2	44.7	51.7	50.8	46.0	47.1	59.8
04:00 - 05:00	50.9	47.1	52.1	51.5	49.7	51.1	62.0
05:00 - 06:00	53.6	51.1	52.2	49.5	53.0	53.7	65.7
06:00 - 07:00	55.1	53.7	54.5	53.0	54.0	52.9	61.6
07:00 - 08:00	55.0	52.9	56.2	55.0	50.1	55.5	62.9
08:00 - 09:00	53.9	55.5	55.5	54.4	54.8	54.8	65.1
09:00 - 10:00	53.9	54.8	56.9	56.5	56.4	55.2	67.2
10:00 - 11:00	54.4	55.2	57.0	59.4	56.4	53.1	62.1
11:00 - 12:00	57.3	53.1	57.1	56.9	58.6	57.3	57.3
12:00 - 13:00	52.6	57.3	57.3	58.4	58.3	57.3	53.1
13:00 - 14:00	53.1	57.3	60.0	57.9	57.6	53.1	57.1
14:00 - 15:00	54.6	57.7	54.3	54.5	54.2	62.1	56.9
15:00 - 16:00	54.2	57.5	56.6	57.9	55.3	62.4	58.6
16:00 - 17:00	55.3	61.6	57.6	58.6	55.5	62.9	57.3
17:00 - 18:00	55.5	57.5	57.4	62.1	54.3	62.0	57.6
Leq(24)*	53.7	54.8	55.6	56.9	55.1	56.6	67.4
Ldn	59.0	57.9	59.3	60.8	60.0	59.1	76.7
Lmax **	85.0	81.6	83.5	84.6	79.7	82.6	86.8
Standard-24Hr	70 dB(A)						
Standard-Max	115 dB(A)						

Remark : * Average time between 18:00-18:00

** Maximum Sound Pressure Level between 18:00-18:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

Preeda S.
(Miss Preeda Somjai)
Technical Management Team



Noise Monitoring Result : Background Noise

MTR-SPRC PLC-Refinery

Location : Wat Sopkon Community

SLM Model : RION NL-21

Site Operator : Mr. Sittichai Sawangwongchai

Monitor Period : 31 Oct 2022-07 Nov 2022

Serial No : 00487734

Calibrator Model : RION NC-74

Serial No : 34283648

Calibration Ref dB(A) : 94.0

Certified Date : 24 Dec 2021

SLM Reading / Adjust dB(A) : 93.9/0.1

Expire Date : 23 Dec 2022

Cal Sheet No.: NC-74-2022-088

Time	L90 (dB(A))						
	31 Oct 2022	-01 Nov 2022	02-03 Nov 2022	03-04 Nov 2022	04-05 Nov 2022	05-06 Nov 2022	06-07 Nov 2022
18:00 - 19:00	48.4	50.4	51.7	51.1	50.1	48.2	49.3
19:00 - 20:00	46.1	48.2	50.6	52.0	48.3	44.8	47.2
20:00 - 21:00	45.0	44.8	49.2	50.6	48.6	44.1	47.7
21:00 - 22:00	44.2	44.1	46.6	49.9	46.8	42.2	45.8
22:00 - 23:00	42.7	42.2	45.8	48.8	44.8	41.7	47.6
23:00 - 00:00	43.8	41.7	44.3	48.2	45.0	40.8	76.1
00:00 - 01:00	42.0	40.8	43.9	45.9	44.0	39.9	55.4
01:00 - 02:00	41.0	39.9	43.0	47.6	43.9	39.6	53.5
02:00 - 03:00	41.8	39.6	42.7	45.8	42.2	40.2	52.0
03:00 - 04:00	42.4	40.2	44.6	45.7	42.3	41.2	50.9
04:00 - 05:00	44.2	41.2	44.4	46.0	42.9	45.9	55.0
05:00 - 06:00	49.5	45.9	45.7	46.7	42.7	50.8	56.9
06:00 - 07:00	50.8	50.8	50.9	48.3	42.4	48.8	56.0
07:00 - 08:00	48.4	48.8	52.4	51.9	44.4	49.4	53.5
08:00 - 09:00	48.1	49.4	51.8	51.4	49.8	49.2	46.6
09:00 - 10:00	48.2	49.2	51.8	51.3	48.6	49.7	46.2
10:00 - 11:00	48.2	49.7	51.5	52.1	50.6	48.7	48.4
11:00 - 12:00	47.8	48.7	50.9	51.7	49.2	48.2	47.8
12:00 - 13:00	47.2	48.2	51.0	51.5	50.1	49.7	48.7
13:00 - 14:00	46.6	49.7	51.6	50.8	48.5	48.7	50.9
14:00 - 15:00	49.5	49.4	48.4	49.0	49.8	48.9	51.7
15:00 - 16:00	49.8	51.0	53.2	50.2	50.3	48.5	49.2
16:00 - 17:00	50.3	53.1	52.9	50.9	50.1	48.0	48.2
17:00 - 18:00	50.1	51.2	52.2	49.4	50.4	49.7	49.7
L90(avg)*	47.4	48.2	50.0	49.9	47.9	47.4	62.6

Remark : * Average time between 18:00-18:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

Preeda S.
(Miss Preeda Somjai)
Technical Management Team

ใบรับรองผลการตรวจวัดทรัพยากรทางน้ำ



สถานีวิจัยประมงศรีราชา

101/12 หมู่ 9 ค.บางพระ

อ.ศรีราชา จ.ชลบุรี 20110

โทร./โทรสาร. (038) 311379

รายงานผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์

ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 3 สิงหาคม 2565)

กลุ่ม/สกุลของแพลงก์ตอน	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
แพลงก์ตอนพืช				
Division Cyanophyta				
Class Cyanophyceae				
Order Nostocales				
Family Oscillatoriaceae				
<i>Oscillatoria</i> sp.	63,000	34,000	101,000	90,000
<i>Oscillatoria tenuis</i>	204,000	302,000	302,000	1,640,000
<i>Spirulina platensis</i>	-	-	76,000	-
Family Nostocaceae				
<i>Pseudanabaena</i> sp.	188,000	101,000	67,000	229,000
Division Chlorophyta				
Class Chlorophyceae				
Order Chlorococcales				
Family Hydrodictyceae				
<i>Pediastrum simplex</i>	-	-	8,000	-

ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 3 สิงหาคม 2565)

(ต่อ)

กลุ่ม/สกุลของแพลงก์ตอน	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
Division Chromophyta				
Class Bacillariophyceae				
Order Biddulphales				
Suborder Coscinodiscineae				
Family Thalassiosiraceae				
<i>Cyclotella striata</i>	251,000	168,000	269,000	389,000
<i>Skeletonema costatum</i>	39,000	25,000	6,888,000	160,000
<i>Thalassiosira</i> sp.	-	-	-	42,000
Family Melosiraceae				
<i>Paralia sulcata</i>	47,000	67,000	-	104,000
Family Coscinodiscaceae				
<i>Coscinodiscus</i> sp.	-	-	-	7,000
Family Heliopeltaceae				
<i>Actinocyclus grundleri</i>	16,000	185,000	-	-
Suborder Rhizosoleniineae				
Family Rhizosoleniaceae				
<i>Proboscia alata</i>	-	-	-	49,000
<i>Rhizosolenia acuminata</i>	-	-	-	28,000
<i>Rhizosolenia setigera</i>	-	-	-	7,000
<i>Rhizosolenia striata</i>	-	-	-	14,000
Suborder Biddulphiineae				
Family Hemiaulaceae				
<i>Hemiaulus hauckii</i>	-	-	-	21,000
Family Cymatosiraceae				
<i>Cymatosira belgica</i>	-	92,000	-	250,000
Family Chaetoceraceae				
<i>Bacteriastrum furcatum</i>	-	-	-	56,000

ตาราง ผลการวิเคราะห์แฟลงก์ตอนพืชและแฟลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 3 สิงหาคม 2565)

(ต่อ)

กลุ่ม/สกุลของแฟลงก์ตอน	ปริมาณแฟลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
Family Lithodismaceae				
<i>Bellerochea horologicalis</i>	-	-	-	21,000
Family Eupodiscaceae				
<i>Odontella aurita</i>	-	-	-	63,000
<i>Odontella mobiliensis</i>	-	-	-	21,000
<i>Odontella sinensis</i>	-	-	-	14,000
Order Bacillariales				
Suborder Fragilariineae				
Family Rhaphoneidaceae				
<i>Rhaphoneis amphiceros</i>	-	-	-	63,000
Family Thalassionemataceae				
<i>Thalassionema nitzschioides</i>	-	185,000	-	63,000
<i>Thalassionema</i> sp.	-	-	-	49,000
<i>Thalassiothrix</i> sp.	8,000	-	-	-
Family Tabellariaceae				
<i>Tabellaria fenestrata</i>	-	-	-	49,000
Family Striatellaceae				
<i>Striatella unipunctata</i>	-	-	168,000	-
Suborder Bacillariineae				
Family Achnantheaceae				
<i>Achnanthes longipes</i>	-	-	-	7,000
Family Mastogloiaaceae				
<i>Mastogloia smithii</i>	-	-	-	195,000
Family Lyrellaceae				
<i>Lyrella lyra</i>	-	-	-	111,000
Family Naviculaceae				
<i>Amphora exigua</i>	-	-	-	76,000
<i>Amphora robusta</i>	-	-	-	222,000

ตาราง ผลการวิเคราะห์แฟลงก์ตอนพืชและแฟลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 3 สิงหาคม 2565)

(ต่อ)

กลุ่ม/สกุลของแฟลงก์ตอน	ปริมาณแฟลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
<i>Diploneis bombus</i>	-	8,000	-	35,000
<i>Diploneis elliptica</i>	-	-	-	278,000
<i>Diploneis smithii</i>	-	25,000	-	90,000
<i>Haslea tromphii</i>	-	-	-	139,000
<i>Pinnularia</i> sp.	8,000	-	25,000	-
<i>Pinnularia viridis</i>	-	-	-	70,000
<i>Pleurosigma angulatum</i>	8,000	34,000	-	334,000
<i>Pleurosigma elongatum</i>	-	-	-	28,000
<i>Pleurosigma narnanii</i>	-	-	-	118,000
<i>Pleurosigma salinarum</i>	16,000	-	-	-
<i>Pleurosigma</i> sp.	-	-	-	7,000
Family Bacillariaceae				
<i>Cylindrotheca closterium</i>	63,000	-	-	21,000
<i>Nitzschia lorenziana</i>	31,000	-	34,000	285,000
<i>Nitzschia</i> sp.	-	25,000	-	83,000
Family Surirellaceae				
<i>Campylodiscus clypeus</i>	-	-	-	7,000
<i>Entomoneis alata</i>	-	-	-	28,000
<i>Entomoneis robusta</i>	-	-	-	167,000
<i>Surirella ovata</i>	-	-	-	21,000
Class Dinophyceae				
Order Prorocentrales				
Family Prorocentraceae				
<i>Prorocentrum mexicanum</i>	-	-	-	14,000
<i>Prorocentrum micans</i>	16,000	-	-	14,000
Order Gymnodiniales				
Family Gymnodinium				
<i>Gymnodinium fuscum</i>	-	8,000	-	14,000


ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 3 สิงหาคม 2565)
(ต่อ)

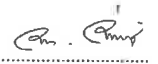
กลุ่ม/สกุลของแพลงก์ตอน	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
Order Gonyaulacalea				
Family Ceratiaceae				
Ceratium deflexum	-	-	-	7,000
Ceratium furca	24,000	-	-	-
Order Peridiniales				
Family Calciodinellaceae				
Scrippsiella trocoidea	-	42,000	370,000	-
Family Peridiniaceae				
Peridinium aciculiform	408,000	1,109,000	12,264,000	-
Peridinium quinquecorne	94,000	739,000	-	-
Family Protoperidiniaceae				
Protoperidinium depressum	-	-	-	21,000
แพลงก์ตอนสัตว์				
Phylum Protozoa				
Subphylum Plasmodroma				
Class Sarcodina				
Subclass Rhizopoda				
Order Foraminiferida				
Globorotalia sp.	-	-	-	14,000
Subphylum Ciliophora				
Class Ciliata				
Subclass Spirotricha				
Order Tintinnida				
Family Codonellidae				
Tintinnopsis sp.	16,000	17,000	8,000	7,000
Family Ptychocylidae				
Metacylis pithos	16,000	17,000	-	7,000

ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 3 สิงหาคม 2565)
(ต่อ)

กลุ่ม/สกุลของแพลงก์ตอน	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
Family Tintinnidae				
Eutintinnus fraknoi	-	-	8,000	7,000
Subclass Peritricha				
Order Peritrichida				
Vorticella sp.	-	-	-	35,000
Phylum Arthropoda				
Class Crustacea				
Subclass Copepoda				
Copepod nauplii	94,000	210,000	59,000	139,000
Order Calanoida				
Calanoid copepod	102,000	17,000	-	14,000
Order Cyclopoida				
Cyclopoid copepod	16,000	17,000	-	7,000
Subclass Cirrionida				
Cirripede nauplii	-	-	8,000	-
ชนิดของแพลงก์ตอนพืช	17	17	12	49
ชนิดของแพลงก์ตอนสัตว์	5	5	4	8
ชนิดแพลงก์ตอนรวม	22	22	16	57
ปริมาณแพลงก์ตอนพืช	1,484,000	3,149,000	20,572,000	5,821,000
ปริมาณแพลงก์ตอนสัตว์	244,000	278,000	83,000	230,000
ปริมาณแพลงก์ตอนรวม	1,728,000	3,427,000	20,655,000	6,051,000
ค่าดัชนีความหลากหลายแพลงก์ตอนพืช	2.2166	2.0183	0.9922	3.0095
ค่าดัชนีความหลากหลายแพลงก์ตอนสัตว์	1.2681	0.8954	0.9191	1.3567
ค่าดัชนีความสม่ำเสมอแพลงก์ตอนพืช	0.7824	0.7124	0.3993	0.7733
ค่าดัชนีความสม่ำเสมอแพลงก์ตอนสัตว์	0.7879	0.5563	0.6630	0.6524

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


 (นางสาวกนกวรรณ ขาวค้อน)
 ผู้วิเคราะห์


 (นายอรรถกมล อินทรชาติ)
 หัวหน้าสถานีวิจัยประมงศรีราชา



สถานีวิจัยประมงศรีราชา
 101/12 หมู่ 9 ต. บางพระ
 อ. ศรีราชา จ. ชลบุรี 20110
 โทร./โทรสาร. (038) 311379

รายงานผลการวิเคราะห์สัตว์หน้าดิน

ตาราง ผลการวิเคราะห์สัตว์หน้าดิน (เก็บตัวอย่างวันที่ 3 สิงหาคม 2565)

ชนิดสัตว์หน้าดิน	ปริมาณสัตว์หน้าดิน (ตัวต่อตารางเมตร)			
	S1	S2	S3	S4
Phylum Annelida				
Class Polychaeta				
Order Capitellida				
Family Capitellidae				
<i>Heteromastus</i> sp. (ไส้เดือนทะเล)	30	60	-	-
Family Maldanidae				
<i>Euclymene</i> sp. (ไส้เดือนทะเล)	30	-	-	-
Order Eunicida				
Family Eunicidae				
<i>Marphysa</i> sp. (ไส้เดือนทะเล)	-	-	-	89
Family Onuphidae				
<i>Diopatra</i> sp. (ไส้เดือนทะเล)	45	-	-	-
Order Phyllodocida				
Family Nephtyidae				
<i>Nephtys</i> sp. (ไส้เดือนทะเล)	15	-	-	15
Family Nereididae				
<i>Nereis</i> sp. (แม่เพรียง)	15	-	-	-

ตาราง ผลการวิเคราะห์สัตว์หน้าดิน (เก็บตัวอย่างวันที่ 3 สิงหาคม 2565) (ต่อ)

ชนิดสัตว์หน้าดิน	ปริมาณสัตว์หน้าดิน (ตัวต่อตารางเมตร)			
	S1	S2	S3	S4
Order Spionida				
Family Magelonidae				
Magelona sp. (ไส้เดือนทะเล)	15	-	-	15
Phylum Arthropoda				
Class Malacostraca				
Order Decapoda				
Family Diogenidae				
Diogenes sp. (ปูเสฉวน)	15	-	-	-
Phylum Mollusca				
Class Gastropoda				
Order Neogastropoda				
Family Nassariidae				
Nassarius sp. (หอยปากกระเจาด)	15	-	-	-
Class Bivalvia				
Order Cardiida				
Family Tellinidae				
Tellina sp. (หอยสองฝาชนิดหนึ่ง)	15	-	-	-
Order Lucinida				
Family Lucinidae				
Lucina sp. (หอยสองฝาชนิดหนึ่ง)	15	-	-	-
Order Venerida				
Family Veneridae				
Timoclea sp. (หอยสองฝาชนิดหนึ่ง)	15	-	-	-
ชนิดสัตว์หน้าดิน	11	1	-	3
ปริมาณสัตว์หน้าดิน	225	60	-	119
ค่าดัชนีความหลากหลายสัตว์หน้าดิน	2.3035	0.0000	-	0.7394

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

ดร.ณัฐ กิ่งทอง
(นายอรรถวุฒิ กิ่งทอง)
ผู้วิเคราะห์

นายอลงกต อินทรชาติ
(นายอลงกต อินทรชาติ)
หัวหน้าสถานีวิจัยประมงศรีราชา



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รายงานผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์

ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 15 ธันวาคม 2565)

กลุ่ม/สกุลของแพลงก์ตอน	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
แพลงก์ตอนพืช				
Division Cyanophyta				
Class Cyanophyceae				
Order Nostocales				
Family Oscillatoriaceae				
<i>Oscillatoria princeps</i>	-	-	9,000	-
<i>Oscillatoria tenuis</i>	29,000	37,000	-	8,000
Family Nostocaceae				
<i>Pseudanabaena</i> sp.	29,000	81,000	188,000	116,000
<i>Richelia inteacellularis</i>	-	15,000	-	116,000
Division Chlorophyta				
Class Chlorophyceae				
Order Chlorococcales				
Family Scenedesmaceae				
<i>Scenedesmus opoliensis</i>	-	7,000	-	-
<i>Strombomonas</i> sp.	-	7,000	-	-

ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 15 ธันวาคม 2565)

(ต่อ)

กลุ่ม/สกุลของแพลงก์ตอน	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
Division Chromophyta				
Class Bacillariophyceae				
Order Biddulphales				
Suborder Coscinodiscineae				
Family Thalassiosiraceae				
<i>Cyclotella striata</i>	174,000	-	3,008,000	216,000
<i>Lauderia annulata</i>	689,000	279,000	658,000	-
<i>Planktoniella sol</i>	15,000	-	-	-
<i>Skeletonema costatum</i>	5,220,000	4,542,000	9,588,000	139,000
<i>Thalassiosira anguste-lineata</i>	-	-	2,632,000	108,000
<i>Thalassiosira eccentrica</i>	36,000	-	-	-
<i>Thalassiosira subtilis</i>	7,250,000	4,197,000	28,012,000	524,000
Family Melosiraceae				
<i>Melosira dubia</i>	65,000	22,000	-	-
<i>Paralia sulcata</i>	22,000	51,000	38,000	-
Family Leptocylindraceae				
<i>Corethron criophilum</i>	87,000	-	-	-
Family Coscinodiscaceae				
<i>Coscinodiscus granii</i>	-	-	9,000	-
<i>Coscinodiscus radiatus</i>	-	15,000	9,000	8,000
<i>Coscinodiscus</i> sp.	22,000	29,000	28,000	-
<i>Palmeria hardmaniana</i>	7,000	-	-	-
Family Asterolampraceae				
<i>Asterolampra marylandica</i>	-	15,000	-	-
<i>Asteromphalus flabellatus</i>	7,000	7,000	-	8,000

ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 15 ธันวาคม 2565)

กลุ่ม/สกุลของแพลงก์ตอน	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
Family Heliopeltaceae				
<i>Actinoptychus grundleri</i>	-	-	38,000	8,000
Suborder Rhizosoleniineae				
Family Rhizosoleniaceae				
<i>Dactylosolen fragillissima</i>	73,000	22,000	19,000	77,000
<i>Guinardia delicatula</i>	22,000	154,000	9,000	116,000
<i>Guinardia flaccida</i>	167,000	118,000	160,000	139,000
<i>Guinardia striata</i>	94,000	441,000	47,000	347,000
<i>Proboscia alata</i>	29,000	51,000	-	339,000
<i>Pseudosolenia calcar-avis</i>	-	44,000	9,000	69,000
<i>Rhizosolenia acuminata</i>	-	22,000	-	54,000
<i>Rhizosolenia clevei</i>	-	-	-	8,000
<i>Rhizosolenia imbricata</i>	36,000	-	9,000	31,000
<i>Rhizosolenia robusta</i>	15,000	7,000	-	15,000
<i>Rhizosolenia setigera</i>	22,000	103,000	536,000	270,000
<i>Rhizosolenia striata</i>	-	37,000	-	54,000
<i>Rhizosolenia styliformis</i>	-	15,000	-	15,000
Suborder Biddulphiineae				
Family Hemiaulaceae				
<i>Cerataulina bicornis</i>	-	15,000	-	85,000
<i>Cerataulina pelagica</i>	435,000	1,389,000	169,000	4,920,000
<i>Climacodium frauenfeldianum</i>	-	-	28,000	85,000
<i>Eucampia cornuta</i>	145,000	74,000	75,000	100,000
<i>Eucampia zodiacus</i>	44,000	110,000	94,000	185,000
<i>Hemiaulus hauckii</i>	109,000	544,000	85,000	616,000
<i>Hemiaulus indicus</i>	674,000	1,382,000	179,000	1,617,000

ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 15 ธันวาคม 2565)

กลุ่ม/สกุลของแพลงก์ตอน	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
Family Cymatosiraceae				
<i>Cymatosira belgica</i>	29,000	426,000	-	-
Family Biddulphiaceae				
<i>Biddulphia</i> sp.	-	-	38,000	-
Family Chaetoceraceae				
<i>Bacteriastrum delicatulum</i>	1,559,000	1,176,000	150,000	177,000
<i>Bacteriastrum elongatum</i>	-	-	28,000	-
<i>Bacteriastrum furcatum</i>	2,030,000	3,087,000	1,598,000	2,156,000
<i>Bacteriastrum</i> sp.	152,000	382,000	-	131,000
<i>Chaetoceros affinis</i>	203,000	397,000	19,000	54,000
<i>Chaetoceros atlanticus</i>	-	22,000	-	-
<i>Chaetoceros castracanei</i>	-	-	-	39,000
<i>Chaetoceros coarctatus</i>	-	-	-	231,000
<i>Chaetoceros compressus</i>	1,458,000	11,466,000	122,000	1,771,000
<i>Chaetoceros costatus</i>	22,000	-	28,000	-
<i>Chaetoceros curvisetus</i>	1,421,000	6,762,000	1,222,000	6,314,000
<i>Chaetoceros debilis</i>	80,000	-	517,000	146,000
<i>Chaetoceros didymus</i>	261,000	1,103,000	103,000	539,000
<i>Chaetoceros diversus</i>	580,000	845,000	19,000	462,000
<i>Chaetoceros laciniosus</i>	-	-	66,000	131,000
<i>Chaetoceros lorenzianus</i>	508,000	390,000	47,000	847,000
<i>Chaetoceros mitra</i>	167,000	96,000	141,000	616,000
<i>Chaetoceros peruvianus</i>	203,000	37,000	9,000	185,000
<i>Chaetoceros pseudocurvisetus</i>	1,595,000	956,000	940,000	439,000
<i>Chaetoceros radicans</i>	515,000	551,000	85,000	62,000
<i>Chaetoceros rostratus</i>	87,000	15,000	19,000	116,000
<i>Chaetoceros socialis</i>	10,585,000	7,497,000	4,136,000	562,000

ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 15 ธันวาคม 2565)

กลุ่ม/สกุลของแพลงก์ตอน	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
<i>Chaetoceros</i> sp.	363,000	992,000	752,000	154,000
<i>Chaetoceros tortissimus</i>	15,000	7,000	-	23,000
Family Lithodismaceae				
<i>Bellerochea horologicalis</i>	471,000	265,000	6,392,000	-
<i>Ditylum sol</i>	-	-	19,000	-
<i>Helicotheca tamesis</i>	305,000	-	160,000	-
Family Eupodiscaceae				
<i>Odontella aurita</i>	36,000	103,000	188,000	92,000
<i>Odontella mobiliensis</i>	80,000	65,000	9,000	8,000
<i>Odontella sinensis</i>	29,000	37,000	47,000	277,000
Order Bacillariales				
Suborder Fragilariineae				
Family Fragilariaceae				
<i>Asterionellopsis glacialis</i>	-	-	9,000	-
Family Rhaphoneidaceae				
<i>Rhaphoneis ampiceros</i>	7,000	-	-	-
Family Thalassionemataceae				
<i>Thalassionema frauenfeldii</i>	2,001,000	1,397,000	846,000	308,000
<i>Thalassionema nitzschioides</i>	80,000	397,000	987,000	185,000
Family Striatellaceae				
<i>Grammatophora undulata</i>	29,000	22,000	-	15,000
Suborder Bacillariineae				
Family Achnantheaceae				
<i>Achnanthes longipes</i>	-	-	47,000	-
<i>Cocconeis scutellum</i>	-	88,000	-	-

ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 15 ธันวาคม 2565)

กลุ่ม/สกุลของแพลงก์ตอน	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
Family Lyrellaceae				
<i>Lyrella lyra</i>	22,000	7,000	-	8,000
Family Naviculaceae				
<i>Amphora exigua</i>	58,000	15,000	38,000	100,000
<i>Amphora obtusa</i>	-	176,000	-	31,000
<i>Amphora robusta</i>	319,000	478,000	47,000	439,000
<i>Amphora</i> sp.	94,000	66,000	-	-
<i>Diploneis bombus</i>	116,000	7,000	19,000	8,000
<i>Diploneis ovalis</i>	36,000	191,000	28,000	85,000
<i>Diploneis smithii</i>	36,000	44,000	-	123,000
<i>Haslea tromphii</i>	870,000	66,000	-	54,000
<i>Haslea wawrikae</i>	160,000	198,000	75,000	539,000
<i>Meunier membranacea</i>	29,000	88,000	-	123,000
<i>Navicula cuspidata</i>	181,000	96,000	66,000	85,000
<i>Navicula lanceolata</i>	131,000	338,000	-	100,000
<i>Pinnularia</i> sp.	-	-	56,000	-
<i>Pinnularia viridis</i>	-	-	94,000	69,000
<i>Pleurosigma cestuarii</i>	29,000	44,000	-	-
<i>Pleurosigma angulatum</i>	1,486,000	463,000	273,000	416,000
<i>Pleurosigma balticum</i>	73,000	-	-	-
<i>Pleurosigma elongatum</i>	290,000	59,000	38,000	54,000
<i>Pleurosigma narmanii</i>	551,000	559,000	564,000	139,000
<i>Pleurosigma</i> sp.	65,000	176,000	-	-
<i>Trachyneis</i> sp.	65,000	59,000	103,000	131,000
Family Bacillariaceae				
<i>Bacillaria paxillifer</i>	80,000	-	338,000	100,000
<i>Cylindrotheca closterium</i>	3,625,000	10,437,000	17,296,000	924,000

ตาราง ผลการวิเคราะห์แฟลงก์ตอนพืชและแฟลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 15 ธันวาคม 2565)

กลุ่ม/สกุลของแฟลงก์ตอน	(ต่อ)			
	ปริมาณแฟลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
<i>Nitzschia acicularis</i>	-	15,000	-	8,000
<i>Nitzschia lorenziana</i>	174,000	-	19,000	193,000
<i>Nitzschia obtusa</i>	-	-	28,000	-
<i>Pseudo-nitzschia heimii</i>	29,000	29,000	-	23,000
<i>Pseudo-nitzschia</i> sp.	138,000	118,000	113,000	-
Family Surirellaceae				
<i>Entomoneis robusta</i>	22,000	15,000	38,000	23,000
<i>Surirella elegans</i>	-	7,000	-	-
<i>Surirella ovata</i>	22,000	7,000	-	-
Class Dictyochophyceae				
Order Dictyochaales				
Family Dictyochophyceae				
<i>Dictyocha fibula</i>	-	22,000	-	-
Class Dinophyceae				
Order Prorocentrales				
Family Prorocentraceae				
<i>Prorocentrum micans</i>	-	51,000	122,000	15,000
<i>Prorocentrum sigmoides</i>	-	7,000	-	15,000
Order Dinophysiales				
Family Dinophysaceae				
<i>Dinophysis caudata</i>	44,000	-	-	23,000
<i>Phalacroma rudgei</i>	-	37,000	-	8,000
Order Gymnodiniales				
Family Gymnodinium				
<i>Gyrodinium instriatum</i>	-	7,000	19,000	31,000
<i>Gyrodinium spirale</i>	-	-	-	8,000

ตาราง ผลการวิเคราะห์แฟลงก์ตอนพืชและแฟลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 15 ธันวาคม 2565)

กลุ่ม/สกุลของแฟลงก์ตอน	(ต่อ)			
	ปริมาณแฟลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
Order Gonyaulacalea				
Family Ceratiaceae				
<i>Ceratium deflexum</i>	-	-	-	31,000
<i>Ceratium furca</i>	7,000	51,000	-	-
<i>Ceratium fusus</i>	29,000	118,000	-	39,000
<i>Ceratium macroceros</i>	15,000	51,000	-	31,000
<i>Ceratium trichoceros</i>	-	-	-	23,000
Family Goniomomaceae				
<i>Goniomoma polyedricum</i>	15,000	-	-	8,000
Family Gonyaulacaceae				
<i>Gonyaulax</i> sp.	-	74,000	66,000	15,000
Family Pyrophacaceae				
<i>Pyrophacus horologium</i>	-	7,000	-	-
Order Peridiniales				
Family Calciodinellaceae				
<i>Scripsiella trochoidea</i>	15,000	7,000	536,000	-
Family Protoperidiniaceae				
<i>Protoperidinium abei</i>	-	-	-	8,000
<i>Protoperidinium angustum</i>	22,000	-	28,000	-
<i>Protoperidinium conicum</i>	-	44,000	-	8,000
<i>Protoperidinium curtipes</i>	-	37,000	-	31,000
<i>Protoperidinium depressum</i>	58,000	103,000	-	23,000
<i>Protoperidinium latispinum</i>	29,000	7,000	-	-
<i>Protoperidinium punctulatum</i>	-	29,000	-	-
<i>Protoperidinium</i> sp.	22,000	-	28,000	92,000

ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 15 ธันวาคม 2565)

กลุ่ม/สกุลของแพลงก์ตอน	(ต่อ)			
	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
แพลงก์ตอนสัตว์				
Phylum Protozoa				
Subphylum Plasmodroma				
Class Sarcodina				
Subclass Rhizopoda				
Order Testacida				
Family Arcellidae				
<i>Arcella</i> sp.	-	-	9,000	-
Subphylum Ciliophora				
Class Ciliata				
Subclass Spirotricha				
Order Tintinnida				
Family Tintinnididae				
<i>Leprotintinnus nordquisti</i>	29,000	7,000	9,000	8,000
Family Codonellidae				
<i>Tintinnopsis beroidea</i>	29,000	22,000	-	-
<i>Tintinnopsis gracilis</i>	15,000	-	28,000	8,000
<i>Tintinnopsis radix</i>	15,000	-	-	-
<i>Tintinnopsis tocaninensis</i>	15,000	7,000	-	8,000
Family Codonellopsidae				
<i>Codonellopsis ostenfeldi</i>	-	7,000	-	-
<i>Stenosemella nivalis</i>	7,000	15,000	9,000	15,000
Family Cyttarocyliis				
<i>Favella panamensis</i>	22,000	-	-	-
Family Coxiellidae				
<i>Helicostomella fusiformis</i>	15,000	37,000	9,000	-

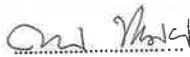
ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 15 ธันวาคม 2565)

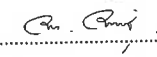
กลุ่ม/สกุลของแพลงก์ตอน	(ต่อ)			
	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
Family Petalotrichidae				
<i>Metacylis pithos</i>	44,000	15,000	-	-
Family Tintinnidae				
<i>Amphorella infundibulum</i>	7,000	7,000	-	-
<i>Eutintinnus fraknoi</i>	7,000	15,000	-	-
Subclass Peritricha				
Order Peritrichida				
<i>Vorticella</i> sp.	36,000	81,000	526,000	2,079,000
Phylum Rotifera				
Class Monogononta				
Order Ploima				
Family Lecanidae				
<i>Lecane inopinata</i>	-	-	66,000	66,000
<i>Lecane</i> sp.	7,000	-	-	-
Family Tricocercidae				
<i>Trichocerca pusilla</i>	-	7,000	-	-
Family Synchaetidae				
<i>Synchaeta</i> sp.	-	-	9,000	-
Phylum Annelida				
Class Polychaeta				
Polychaete larvae	-	7,000	-	-
Phylum Arthropoda				
Class Crustacea				
Subclass Copepoda				
Copepod nauplii	348,000	22,000	-	616,000

ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 15 ธันวาคม 2565)
(ต่อ)

กลุ่ม/สกุลของแพลงก์ตอน	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
Order Calanoida				
Calanoid copepod	22,000	-	9,000	-
Order Cyclopoida				
Cyclopoid copepod	7,000	7,000	-	8,000
Order Harpacticoida				
Harpacticoid copepod	-	-	-	8,000
Phylum Mollusca				
Class Bivalvia				
Pelecypod larvae	7,000	7,000	19,000	-
Phylum Chordata				
Subphylum Urochordata				
Class Larvacea				
Family Oikopleuridae				
<i>Oikopleura</i> sp.	29,000	-	9,000	8,000
ชนิดของแพลงก์ตอนพืช	92	100	79	97
ชนิดของแพลงก์ตอนสัตว์	18	15	11	10
ชนิดแพลงก์ตอนรวม	110	115	90	107
ปริมาณแพลงก์ตอนพืช	49,345,000	66,824,000	84,411,000	30,617,000
ปริมาณแพลงก์ตอนสัตว์	661,000	263,000	702,000	2,824,000
ปริมาณแพลงก์ตอนรวม	50,006,000	67,087,000	85,113,000	33,441,000
ค่าดัชนีความหลากหลายแพลงก์ตอนพืช	3.0132	2.9468	2.3347	3.2488
ค่าดัชนีความหลากหลายแพลงก์ตอนสัตว์	0.6664	0.6399	0.5343	0.7102
ค่าดัชนีความสม่ำเสมอแพลงก์ตอนพืช	1.9472	2.3159	1.0557	0.7729
ค่าดัชนีความสม่ำเสมอแพลงก์ตอนสัตว์	0.6737	0.8552	0.4403	0.3357

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


(นางสาวกนกวรรณ ขาวค่อน)
ผู้วิเคราะห์


(นายอลงกต อินทรชาติ)
หัวหน้าสถานีวิจัยประมงศรีราชา



สถานีวิจัยประมงศรีราชา

101/12 หมู่ 9 ต. บางพระ

อ. ศรีราชา จ. ชลบุรี 20110

โทร./โทรสาร. (038) 311379

รายงานผลการวิเคราะห์สัตว์หน้าดิน

ตาราง ผลการวิเคราะห์สัตว์หน้าดิน (เก็บตัวอย่างวันที่ 15 ธันวาคม 2565)

ชนิดสัตว์หน้าดิน	ปริมาณสัตว์หน้าดิน (ตัวต่อตารางเมตร)			
	S1	S2	S3	S4
Phylum Annelida				
Class Polychaeta				
Order Capitellida				
Family Capitellidae				
<i>Heteromastus</i> sp. (ไส้เดือนทะเล)	30	60	60	30
Order Cirratulida				
Family Paraonidae				
<i>Paraonis</i> sp. (ไส้เดือนทะเล)	60	-	-	-
Order Eunicida				
Family Eunicidae				
<i>Marphysa</i> sp. (ไส้เดือนทะเล)	30	-	-	45
Order Opheliida				
Family Opheliidae				
<i>Armandia</i> sp. (ไส้เดือนทะเล)	-	-	-	45
<i>Ophelina</i> sp. (ไส้เดือนทะเล)	-	119	15	89
Order Orbiniida				
Family Orbiniidae				
<i>Scoloplos</i> sp. (ไส้เดือนทะเล)	267	30	-	30

ตาราง ผลการวิเคราะห์สัตว์หน้าดิน (เก็บตัวอย่างวันที่ 15 ธันวาคม 2565) (ต่อ)

ชนิดสัตว์หน้าดิน	ปริมาณสัตว์หน้าดิน (ตัวต่อตารางเมตร)			
	S1	S2	S3	S4
Order Phyllodocida				
Family Glyceridae				
<i>Glycera</i> sp. (ไส้เดือนทะเล)	-	-	-	30
Family Nephtyidae				
<i>Nephtys</i> sp. (ไส้เดือนทะเล)	-	-	-	45
Order Spionida				
Family Spionidae				
<i>Magelona</i> sp. (ไส้เดือนทะเล)	-	15	-	-
Phylum Arthropoda				
Class Malacostraca				
Order Amphipoda				
Family Ampeliscidae				
<i>Ampelisca</i> sp. (แอมฟิพอด)	45	-	-	356
Order Decapoda				
Family Portunidae				
<i>Portunus</i> sp. (ปูชนิดหนึ่ง)	-	-	-	30
Phylum Mollusca				
Class Bivalvia				
Order Cardiida				
Family Donacidae				
<i>Donax</i> sp. (หอยเสียบ)	15	-	15	-
Family Posammobiidae				
<i>Soletellina</i> sp. (หอยสองฝาชนิดหนึ่ง)	-	15	-	-
Family Tellinidae				
<i>Tellina</i> sp. (หอยสองฝาชนิดหนึ่ง)	15	-	-	15

ตาราง ผลการวิเคราะห์สัตว์หน้าดิน (เก็บตัวอย่างวันที่ 15 ธันวาคม 2565) (ต่อ)

ชนิดสัตว์หน้าดิน	ปริมาณสัตว์หน้าดิน (ตัวต่อตารางเมตร)			
	S1	S2	S3	S4
Order Mytilida Family Mytilidae <i>Modiolus</i> sp. (หอยกะพง)	1,156	-	-	-
Phylum Echinodermata Class Echinoidea Order Camarodonta Family Temnopleuridae <i>Temnopleurus</i> sp. (เม่นทะเล)	-	-	-	15
Phylum Chordata Class Leptocardii Order Amphioxiformes Family Branchiostomidae <i>Branchiostoma</i> sp. (แอมฟิออกซัส)	-	-	-	356
ชนิดสัตว์หน้าดิน	8	5	3	12
ปริมาณสัตว์หน้าดิน	1,618	239	90	1,086
ค่าดัชนีความหลากหลายสัตว์หน้าดิน	0.9940	1.3022	0.8676	1.8469

- หมายเหตุ :
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 4. สถานี S4 : ทะเลเปิด

ลงนามใน พ.ศ. ๒๕๖๖
.....
(นายอรรถวุฒิ กันทะวงศ์)
ผู้วิเคราะห์

.....
(นายอลงกต อินทราชา)
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 WFP)

(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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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	
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 WFP)

(Miss Natsiri Lertterapitap)

Analyst

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(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 2-239-ก-5863

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SAMPLING DATE	: 29-31/03/2022	SAMPLING TIME	: 09.25-10.03, 10.11-10.17, 09.47-10.30
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 ^{1/}
		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 ₁₇ - C ₃₂)	mg/l	3510 C/8015 D	< 0.050	ND	ND	ND	ND	ND	≤ 0.1
- n-Octadecane									
- n-Eicosane									
- n-Docosane									
- n-Tetraacosane									
- n-Hexacosane									
- n-Octacosane									
- n-Triacontane									
- n-Dotriacontane									
- n-Tetatriacontane									
- Pentatriacontane									

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

(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

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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 ^{1/}
				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 (APHA, AWWA, WEF)

(Miss Krisana Chanthoom)

Analyst

REG. NO. 7-239-ก-7802

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 7-239-ก-5863

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PARAMETER	UNIT	ANALYSIS METHODS (non-detectable)	ND	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 21st ED. 2017 (AWWA APHA WEF)

Natsiri L.

(Miss Natsiri Lettertipapit)

Analyst

REG. NO. 2-239-ก-0001

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 2-239-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	: 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	: 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 ^{1/}
		METHODS	(non-detectable)	MW-106B	MW-107C	MW-108B	MW-109A	MW-111A	
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-Xylenc									
- o-Xylene									
- Ethylbenzene									
- TPH (C ₉ , ₁₀ - C ₁₄)	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 ₁₅ , 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-Tetraatriacontane									
- Pentatriacontane									

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

Naim Pawanapetch
(Miss Narisa Poowanapetch)

Analyst

REG. NO. 2-239-ก-6419

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 2-239-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	ND	STATION				STANDARD ^{1/}
		METHODS	(non-detectable)	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 1st ED. 2017 (AWWA APHA WFP)


(Miss Krisana Chanthoom)

Analyst

REG. NO. 7-239-ก-7802


(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	ND	STATION				STANDARD ^{1/}
		METHODS	(non-detectable)	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 1st ED. 2017 (AWWA APHA WFP)


(Miss Natsiri Lertterapipat)

Analyst

REG. NO. 7-239-ก-0001


(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

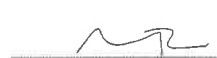
PARAMETER	UNIT	ANALYSIS	ND	STATION				STANDARD ^{1/}
		METHODS	(non-detectable)	MW-112A	MW-113A	MW-114A	MW-115A	
Total Petroleum Hydrocarbons								
- TPH (C ₇ - C ₉)	mg/l	5030 C/8260 D	< 0.003	ND	ND	ND	ND	≤ 1.4
- Pentane								
- Benzene								
- Toluene								
- m,p-Xylene								
- o-Xylene								
- Ethylbenzene								
- TPH (C ₁₀ - 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 ₁₇ - 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-Tetatriacontane								
- Pentatriacontane								

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


(Miss Narisa Poowasanetch)

Analyst

REG. NO. 1-239-R-6419


(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 1-239-R-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 ^{1/}
				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 : IS EPA 846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE 3rd ED. 2008

Natsiri L.

(Miss Natsiri Leritrapipat)

Analyst

REG. NO. 7-239-9-6423

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 7-239-n-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 METHODS	ND (non-detectable)	STATION		STANDARD ^{1/}
				MW-101 B	MW-102 A	
Total Petroleum Hydrocarbons						
- TPH (C ₉ - 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 ₁₆ - C ₃₃)	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						
- n-Hexatriacontane						

REFERENCE : IS EPA 846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE 3rd ED. 2008

(Miss Kesvarin Sinsueg)

Analyst

REG. NO. 7-239-9-6424

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 7-239-n-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: USEPA SW-846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE, 2nd ED., 1999

Natsiri L.

(Miss Natsiri Lertterapipat)

Analyst

REG. NO. 7-239-9-6423

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 7-239-n-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	: 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 ₈)	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 ₁₇ - C ₃₂)	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: USEPA SW-846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE, 2nd ED., 1999

Kesvarin Sinsueg

(Miss Kesvarin Sinsueg)

Analyst

REG. NO. 7-239-9-6424

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 7-239-n-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_March

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 : U.S. EPA SW-846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE, 3rd ED., 2000

Natsiri L.
(Miss Natsiri Lertterapipat)
Analyst
REG. NO. 7-239-9-6423

Araya Tipparuk
(Mrs. Araya Tipparuk)
Technical Management Team
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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	: 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 METHODS	ND (non-detectable)	STATION		STANDARD ^{1/}
				MW-105 B	MW-106 B	
Total Petroleum Hydrocarbons						
- TPH (C ₃ - C ₈)	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 ₂₃)	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 : U.S. EPA SW-846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE, 3rd ED., 2000

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

- 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 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	: 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-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 SOIL WASTE, 3rd ED., 2020

Natsiri L.

(Miss Natsiri Leritrapipat)

Analyst

REG. NO. 7-239-B-6423

Araya Tipparuk

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Technical Management Team

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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 ¹
		METHODS	(non-detectable)	MW-108 B	MW-109 A	
<u>Total Petroleum Hydrocarbons</u>						
- TPH (C ₂ - C ₉)	mg/kg	5035A /8260 D	< 0.003	ND	0.14	≤ 25
- Pentane						
- Benzene						
- Toluene						
- m,p-Xylene						
- o-Xylene						
- Ethylbenzene						
- TPH (C ₁₀ - 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 ₃₃)	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 SOIL WASTE, 3rd ED., 2020

Kesvarin Sinsueg

(Miss Kesvarin Sinsueg)

Analyst

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Araya Tipparuk

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 7-239-B-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	: 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 Lertterapipal)

Analyst

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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 METHODS	ND (non-detectable)	STATION		STANDARD ^{1/}
				MW-112 A	MW-113 A	
Total Petroleum Hydrocarbons						
- TPH (C ₃ - C ₆)	mg/kg	5035A /8260 D	< 0.003	ND	ND	≤ 25
- Pentane						
- Benzene						
- Toluene						
- m,p-Xylene						
- o-Xylene						
- Ethylbenzene						
- TPH (C ₉₋₃ - C ₁₆)	mg/kg	3540C/8015 D	≤ 0.25	ND	ND	≤ 25
- n-Nonane						
- n-Decane						
- n-Dodecane						
- n-Tetradecane						
- n-Hexadecane						
- TPH (C ₉₋₁₆ - C ₃₃)	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

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Noise Monitoring Result : Working Noise

MTR-SPRC PLC-Refinery

Location : CDU (Near 02GM102A) Monitor Period : Aug 18, 2022
 SLM Model : CASELLA CEL-246 Serial No : 3173108
 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.: CEL120/2-2022-085

Time	Equivalent Sound Pressure Level (dB(A))	
	Aug 18, 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	86.1	
08:00 - 09:00	86.2	
09:00 - 10:00	86.4	
10:00 - 11:00	86.2	
11:00 - 12:00	86.2	
12:00 - 13:00	86.0	
13:00 - 14:00	86.2	
14:00 - 15:00	85.9	
15:00 - 16:00		
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)*	86.2	
Lmax **	97.6	
Standard-8Hr	90 dB(A)	
Standard-Max	140 dB(A)	

Remark : * Average time between 07:00-15:00
 ** Maximum Sound Pressure Level between 07:00-15:00

(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 : Aug 18, 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) : 113.8/0.2 Expire Date : Dec 23, 2022
 Cal Sheet No.: CEL120/2-2022-085

Time	Equivalent Sound Pressure Level (dB(A))	
	Aug 18, 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	85.2	
08:00 - 09:00	85.2	
09:00 - 10:00	85.1	
10:00 - 11:00	85.0	
11:00 - 12:00	84.9	
12:00 - 13:00	85.1	
13:00 - 14:00	85.1	
14:00 - 15:00	85.0	
15:00 - 16:00		
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)*	85.1	
Lmax **	93.1	
Standard-8Hr	90 dB(A)	
Standard-Max	140 dB(A)	

Remark : * Average time between 07:00-15:00
 ** Maximum Sound Pressure Level between 07:00-15:00

(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 : Aug 18, 2022	
SLM Model : CASELLA CEL-246		Serial No : 3173303	
Site Operator : Mr. Watcharakan Pramakhate			
Calibrator Model : CASELLA CEL120/2		Serial No : 2639225	
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.: CEL120/2-2022-085			

Time	Equivalent Sound Pressure Level (dB(A))	
	Aug 18, 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	91.8	
08:00 - 09:00	91.8	
09:00 - 10:00	91.7	
10:00 - 11:00	91.6	
11:00 - 12:00	91.5	
12:00 - 13:00	91.5	
13:00 - 14:00	91.7	
14:00 - 15:00	91.8	
15:00 - 16:00		
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)*	91.7
Lmax **	92.9

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

Remark : * Average time between 07:00-15:00

** Maximum Sound Pressure Level between 07:00-15:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

(Miss Sununta Sirawuttinanon)
Technical Management Team



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

Location : RFCCU (Near 17GM102 A-B)		Monitor Period : Aug 18, 2022	
SLM Model : CASELLA CEL-246		Serial No : 1443838	
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.: CEL120/2-2022-085			

Time	Equivalent Sound Pressure Level (dB(A))	
	Aug 18, 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	86.4	
08:00 - 09:00	86.5	
09:00 - 10:00	87.3	
10:00 - 11:00	87.6	
11:00 - 12:00	86.7	
12:00 - 13:00	86.3	
13:00 - 14:00	86.1	
14:00 - 15:00	86.1	
15:00 - 16:00		
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)*	86.7
Lmax **	89.6

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

Remark : * Average time between 07:00-15:00

** Maximum Sound Pressure Level between 07:00-15:00

(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 : Nov 02, 2022		
SLM Model : CASELLA CEL-246		Serial No : 3173343		
Site Operator : Mr. Jeerawat Khothamhan				
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.: CEL120/2-2022-103				
Time	Equivalent Sound Pressure Level (dB(A))			
	Nov 02, 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				87.5
09:00 – 10:00				87.1
10:00 – 11:00				87.0
11:00 – 12:00				87.1
12:00 – 13:00				86.8
13:00 – 14:00				86.8
14:00 – 15:00				86.8
15:00 – 16:00				86.6
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 **	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

(Signature)
(Miss Katesarin Vorradetwittaya)
Environmental Scientist

(Signature)
(Miss Sununta Sirawuttinanon)
Technical Management Team



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

Location : NHTU (Near 08G102A-B)		Monitor Period : Nov 02, 2022	
SLM Model : CASELLA CEL-246		Serial No : 3173337	
Site Operator : Mr. Jeerawat Khothamhan			
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.: CEL120/2-2022-103			
Time	Equivalent Sound Pressure Level (dB(A))		
	Nov 02, 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		85.8	
09:00 - 10:00		85.8	
10:00 - 11:00		85.9	
11:00 - 12:00		85.8	
12:00 - 13:00		85.8	
13:00 - 14:00		85.7	
14:00 - 15:00		85.7	
15:00 - 16:00		85.6	
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)*		85.8	
Lmax **		96.8	
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

(Signature)
(Miss Katesarin Vorradetwittaya)
Environmental Scientist

(Signature)
(Miss Sununta Sirawuttinanon)
Technical Management Team



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

Location : Amine SRU (Near 33K101) Monitor Period : Nov 02, 2022
SLM Model : CASELLA CEL-246 Serial No : 3173161
Site Operator : Mr. Jeerawat Khotamhan

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.: CEL120/2-2022-103

Time	Equivalent Sound Pressure Level (dB(A))	
	Nov 02, 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	90.1	
09:00 - 10:00	89.6	
10:00 - 11:00	89.6	
11:00 - 12:00	89.4	
12:00 - 13:00	89.6	
13:00 - 14:00	89.4	
14:00 - 15:00	89.3	
15:00 - 16:00	89.4	
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)*	89.6	
Lmax **	92.8	
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 16G-101 A-B) Monitor Period : Nov 02, 2022
SLM Model : CASELLA CEL-246 Serial No : 3173312
Site Operator : Mr. Jeerawat Khotamhan

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.: CEL120/2-2022-103

Time	Equivalent Sound Pressure Level (dB(A))	
	Nov 02, 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	88.5	
09:00 - 10:00	88.0	
10:00 - 11:00	87.3	
11:00 - 12:00	86.9	
12:00 - 13:00	86.4	
13:00 - 14:00	86.2	
14:00 - 15:00	86.3	
15:00 - 16:00	86.2	
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)*	87.1	
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



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

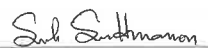
NOISE MEASUREMENT REPORT : NOISE DOSE

CLIENT NAME : Star Petroleum Refining Public Co., Ltd. REFERENCE NO. : SPRC-E222005-Dose-Aug22 (Cert)/Aug22(1)
MEASUREMENT BY : SECOT Co., Ltd. INSTRUMENT : Noise Dosimeter
MEASUREMENT DATE : 18/08/2022 CALIBRATOR TYPE : Cirrus RC110A
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 (dB(A))	
				TWA (12-hr)	STANDARD*
Operator ID#110493	Area 1	07.18-19.18	43.2	79.6	83.0
	(CDU/VDU)				
Operator ID#110309	Area 2	07.17-19.17	22.0	76.7	83.0
	(NHTU, DHTU, WCN, BSU)				
Operator ID#110681	Area 4	07.19-19.19	41.7	79.5	83.0
	(RFCCU)				


(Miss Katesarin Vorradetwittaya)

Environmental Scientist


(Miss Sununta Sirawuttinanon)

Technical Management Team

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 3. *Notification of the Department of Labour Protection and Welfare, B.E.2561 (2018).
 4. TWA means Time Weighted Average.



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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-E222005-Dose-Sep22 (Cert)/Sep22(2)
MEASUREMENT BY : SECOT Co., Ltd. INSTRUMENT : Noise Dosimeter
MEASUREMENT DATE : 14/09/2022 CALIBRATOR TYPE : Cirrus RC110A
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 (dB(A))	
				TWA (12-hr)	STANDARD*
Operator ID#110116	Area 3	07.46-19.20	44.0	79.7	83.0
	(SRU, Utility)				


(Miss Katesarin Vorradetwittaya)

Environmental Scientist


(Miss Sununta Sirawuttinanon)

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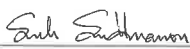
NOISE MEASUREMENT REPORT : NOISE DOSE

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: SPRC-E222005-Ns Dose(Cert)/Nov22(5)
MEASUREMENT BY	: SECOT Co., Ltd.	INSTRUMENT	: Noise Dosimeter
MEASUREMENT DATE	: 02/11/2022	CALIBRATOR TYPE	: Pulsar/22R
MEASUREMENT LOCATION	: Process area	SERIAL NO.	: 79781
SITE OPERATOR	: Mr. Watcharakan P.	CALIBRATOR REF.	: 1,000 Hz, 114 dB

USER NAME	AREA/PLANT	TIME	%DOSE	SOUND PRESSURE LEVEL (dB(A))	
				TWA (12-hr)	STANDARD*
Operator ID. : 110786	Area 1 (CDU/VDU)	07.24-18.50	36.8	78.9	83.0
Operator ID. : 110772	Area 2 (NHTU, DHTU, WCN, BSU)	07.29-18.50	54.5	80.6	83.0


(Miss Katesarin Votraderittaya)

Environmental Scientist


(Miss Sununta Sirawuttinanon)

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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-E222005-Ns Dose(Cert)/Dec22(2)
MEASUREMENT BY	: SECOT Co., Ltd.	INSTRUMENT	: Noise Dosimeter
MEASUREMENT DATE	: 01/12/2022	CALIBRATOR TYPE	: Cirrus/RC110A
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 (dB(A))	
				TWA (12-hr)	STANDARD*
Operator ID. : 110787	Area 3 (SRU, Utility)	07.07-19.00	78.8	82.2	83.0
Operator ID. : 110788	Area 4 (RFCCU)	07.07-19.00	84.5	82.5	83.0


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ภาคผนวก จ

ข้อมูลการตรวจเทียบเครื่องมือ
(Calibration Data Sheets)

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number: E04NI99E15AC084 Reference Number: 82-401409170-1
Cylinder Number: EB0108319 Cylinder Volume: 144.4 CF
Laboratory: 124 - Riverton (SAP) - NJ Cylinder Pressure: 2015 PSIG
PGVP Number: B52019 Valve Outlet: 660
Gas Code: CO,NO,NOX,SO2,BALN Certification Date: Feb 05, 2019

Expiration Date: Feb 05, 2023

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS					
Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	50.00 PPM	50.93 PPM	G1	+/- 1.4% NIST Traceable	01/28/2019, 02/05/2019
NITRIC OXIDE	50.00 PPM	50.82 PPM	G1	+/- 1.4% NIST Traceable	01/28/2019, 02/05/2019
SULFUR DIOXIDE	50.00 PPM	48.82 PPM	G1	+/- 1.0% NIST Traceable	01/28/2019, 02/05/2019
CARBON MONOXIDE	0.5000 %	0.5040 %	G1	+/- 1.1% NIST Traceable	01/31/2019
NITROGEN	Balance				

CALIBRATION STANDARDS					
Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	13060206	CC401947	4950 PPM CARBON MONOXIDE/NITROGEN	+/- 0.4%	Feb 15, 2019
PRM	12367	APEX1099237	9.82 PPM NITROGEN DIOXIDE/AIR	+/- 2.0%	Jun 02, 2017
NTRM	12010724	KAL004497	50.03 PPM NITRIC OXIDE/NITROGEN	+/- 0.8%	Mar 12, 2024
GMIS	1114201601	CC506710	4.971 PPM NITROGEN DIOXIDE/NITROGEN	+/- 2.0%	Nov 14, 2019
NTRM	14010327	KAL004376	49.08 PPM SULFUR DIOXIDE/NITROGEN	+/- 1.0%	Apr 17, 2024

The SRM, PRM or RGM noted above is only in reference to the GMIS used in the assay and not part of the analysis.

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Siemens Ultramat 6 J3-599 COHIGH	NDIR	Jan 18, 2019
Nicolet 6700 APW1100391 NO	FTIR	Jan 10, 2019
Nicolet 6700 APW1100391 NO2	FTIR	Jan 10, 2019
Nicolet 6700 APW1100391 SO2	FTIR	Jan 10, 2019

Triad Data Available Upon Request

PERMANENT NOTES: PRODUCED IN ACCORDANCE WITH ISO17025 REQUIREMENTS

NOTES:

Gross Weight: 27806.3 grams

Net Weight: 4733.2 grams

This calibration std. has been certified in accordance with the May 2012 EPA Traceability Protocol, Document EPA-600/R-12/531. All testing processes and measurements conform to the requirements of ISO/IEC 17025 and to Airgas ISO 9001:2008 and relate only to items identified on this certificate. All items are certified to be NIST Traceable with total uncertainty as detailed under Analytical Uncertainty. This document shall not be reproduced in full without written approval of the issuer.



TESTING CERT No. 3082.05

D. Krasner
Approved for Release



High Volume TSP & PM-10 Calibration Data Sheet

Calibration Location : SECOT Co., Ltd. Calibration Date : Jan 13, 2022

Hi-Vol Pump No. : BH-003 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	12.30	58.38	1,062.52	331.24	
13	15.00	9.80	52.42	786.30	225.00	
10	11.80	7.50	46.02	543.04	139.24	
7	7.80	5.00	37.81	294.92	60.84	
5	4.60	3.00	29.58	136.07	21.16	
Sum	57.40	37.60	224.21	2,822.84	777.48	

Calibrated by : *Runkawin* Approved by : *Wittayan K.*



High Volume TSP & PM-10 Calibration Data Sheet

Calibration Location : SECOT Co.,Ltd. Calibration Date : Jan 13, 2022
 Hi-Vol Pump No. : BH-010 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	18.40	13.20	60.43	1,111.91	338.56	
13	14.60	10.40	53.96	787.82	213.16	
10	11.40	7.90	47.19	537.97	129.96	
7	7.60	5.20	38.53	292.83	57.76	
5	4.60	3.20	30.50	140.30	21.16	
Sum	56.60	39.90	230.61	2,870.82	760.60	

Calibrated by : Punkawin Approved by : Wittaya 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 : Wittaya K.



High Volume TSP & PM-10 Calibration Data Sheet

Calibration Location : SECOT Co.,Ltd. Calibration Date : Jan 14, 2022
 Hi-Vol Pump No. : BH-008 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	12.50	58.84	1,023.82	302.76	
13	14.40	10.10	53.20	766.08	207.36	
10	11.60	7.80	46.90	544.04	134.56	
7	7.60	5.10	38.17	290.09	57.76	
5	4.80	3.10	30.04	144.19	23.04	
Sum	55.80	38.60	227.15	2,768.22	725.48	

Calibrated by : Punkawin Approved by : Mr. Haya K.



High Volume TSP & PM-10 Calibration Data Sheet

Calibration Location : SECOT Co.,Ltd. Calibration Date : Jan 13, 2022
 Hi-Vol Pump No. : BH-018 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	17.00	12.40	58.61	996.37	289.00	
13	14.00	10.20	53.45	748.30	196.00	
10	11.00	8.00	47.48	522.28	121.00	
7	7.20	5.20	38.53	277.42	51.84	
5	4.20	3.20	30.50	128.10	17.64	
Sum	53.40	39.00	228.57	2,672.47	675.48	

Calibrated by : Punkawin Approved by : Mr. Haya K.



High Volume TSP & PM-10 Calibration Data Sheet

Calibration Location : SECOT Co.,Ltd. Calibration Date : Jan 13, 2022
 Hi-Vol Pump No. : BH-006 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	18.40	12.50	58.84	1,082.66	338.56	
13	15.00	9.90	52.68	790.20	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	57.20	38.20	225.81	2,843.78	779.92	

Calibrated by : Punkawin Approved by : Wittaya



CONTROL UNIT CALIBRATION (Metric units, mm)

Date 13 Jan 22

Initial Final Average
 Barometric press, Pb 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 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	100.0	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 : Katesarin
 (Miss Katesarin Vorradetwittaya)



CONTROL UNIT CALIBRATION

(Metric units, mm)

Date 25 Jan 22

Barometric press, Pb

Initial	Final	Average
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 @ 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)


PITOT TUBE CALIBRATION

Calibration Location: SECOT

Calibration Date : 14/01/2022

Calibrated duct No.: 1

Calibration Standard Pitot tube data

Pitot No. : Sid-01

Coefficient (Cp) : 1

Type S Pitot No. : PS10-01

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	10.75	0.8380	0.0032
2	7.55	10.75	0.8380	0.0032
3	7.55	11.00	0.8285	-0.0064

C_{P(A),avg} 0.8349

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	11.00	0.8285	-0.0097
2	7.55	10.75	0.8380	-0.0001
3	7.55	10.50	0.8480	0.0098

C_{P(B),avg} 0.8382

| CP(A)-CP(B) | = 0.0033

C_{P(Avg)} = 0.8365

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 ***



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. : PS20-02

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	10.55	0.8460	0.0085
2	7.55	11.00	0.8285	-0.0090
3	7.55	10.75	0.8380	0.0006

C_{P(A),avg} 0.8375

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	11.00	0.8285	-0.0097
2	7.55	10.50	0.8480	0.0098
3	7.55	10.75	0.8380	-0.0001

C_{P(B),avg} 0.8382

|C_{P(A)} - C_{P(B)}| = 0.0007

C_{P(Avg)} = 0.8378

Approved by :
(Miss Katesarin Vorradetwittaya)

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

THE LINDE GROUP



Certificate Of Analysis Special Gases Mixture

Customer Details

Name:

Secot Co., Ltd.

Address:

239 Rinkongprapa Rd., Bangsue, Bangkok 10800

Customer Tag No

Certificate Details

Number:

0372/19

Material Details

Production Order:

90152419

Gas content:

6.56 M³ (nominal)

Cylinder Owner:

LINDE

Date of Issue

7-Feb-2019

Expired date:

6-Feb-2023

Material Code:

429900-J-62

Filling pressure:

145 bar (g)

Cylinder Material:

STEEL

Cylinder No.

16294

Valve:

CGA 590 BRASS

Cylinder Size:

47 L

Laboratory Report

Component

Normal Concentration

Analysis Result¹

Uncertainty²

Method of Analysis³

Oxygen

15.0%

15.0%

± 2% relative

(2) I-PB-303

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 Analyser, (3) Electrochemical Oxygen Analyser, (4) Electrochemical Moisture Analyser, (5) Total Hydrocarbon Analyser, (6) Other specified.

Page 1 of 1

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บริษัท สิบลี (ประเทศไทย) จำกัด (มหาชน)

เลขที่ 15 ถนนรามคำแหง 105/40 แขวง 14 เขตคลองเตย กรุงเทพฯ 10110

เบอร์โทร 10540 โทรสาร (66) 2338-6333
เบอร์โทร 10540 โทรสาร (66) 2338-6333
เบอร์โทร (66) 38.570-479-93 เบอร์โทร (66) 38.570-323

Sukanya Parinyasontorn

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

Linde (Thailand) Public Company Limited

15th Floor, Bangna Tower A, 2/3 Moo 14, Bangna Trad Km. 8.5 Road, Bangnaek

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

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

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PB-002/F004

Iss: H/2, 01 March 2018

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: 0333/22 Date of Issue: 8-Feb-2022 Expiry date: 8-Feb-2024
 Material Details
 Production Order: 90169719 Material Code: 511600-SK-34 Cylinder No.: D519462
 Gas content: 5.20 M³ Filling pressure: 137.0 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	40.0 ppm	39.3 ppm	± 1% relative	(6) I-PB-352	1-Feb & 8-Feb-22
Other NOx impurity		Less than 1.9 ppm			
Carbon Monoxide in Nitrogen	40.0 ppm	40.4 ppm	± 1% relative	(6) I-PB-352	1-Feb & 8-Feb-22

Reference Standard used in Assay

Reference Standard	Cylinder number	Concentration	Expiry date:
Nitric Oxide	D022358	70.7 ± 0.2 ppm	5-Mar-2023
Carbon Monoxide in Nitrogen	D022358	70.8 ± 0.2 ppm	5-Mar-2023

Analytical Instruments used in Assay

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
FTIR Spectrometers Nicolet iS50	FTIR-NO	10-Jan-2022
FTIR Spectrometers Nicolet iS50	FTIR-CO	8-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:

- 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.
- 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.
- (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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บริษัท ลินด์ (ประเทศไทย) จำกัด (มหาชน)

ชั้น 15 อาคารทราดเคเอ็ม 14 มูว 14 ถนนบางนา-ตราด กม. 6.5 แขวงคลองตัน
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 โทรสารเคลื่อนที่: 105 มูว 5 ตำบลบางนา อำเภอบางนา จังหวัดสมุทรปราการ 24180
 โทรศัพท์ (66) 38.570-479-93 โทรสาร (66) 38.570-323

Linde (Thailand) Public Company Limited

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

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	25624156	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:

- 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.
- 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.
- (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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บริษัท ลินด์ (ประเทศไทย) จำกัด (มหาชน)

ชั้น 15 อาคารทราดเคเอ็ม 14 มูว 14 ถนนบางนา-ตราด กม. 6.5 แขวงคลองตัน
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 โทรสารเคลื่อนที่: 105 มูว 5 ตำบลบางนา อำเภอบางนา จังหวัดสมุทรปราการ 24180
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Linde (Thailand) Public Company Limited

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 Thailand, Tel (66) 38.570-479-93 Fax (66) 38.570-323

PB-002/F006

Iss: H/2, 01 March 2018



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:	0330/22	Date of Issue:	8-Feb-2022	Expiry date:	8-Feb-2024
Material Details					
Production Order:	90169720	Material Code:	436700-SK-34	Cylinder No.:	D636021
Gas content:	5.23 M ³	Filling pressure:	137.0 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	78.5 ppm	± 1% relative	(6) I-PB-352	1-Feb & 8-Feb-22
Other NOx impurity		Less than 3.9 ppm			
Carbon Monoxide In Nitrogen	80.0 ppm	81.1 ppm	± 1% relative	(6) I-PB-352	1-Feb & 8-Feb-22

Reference Standard used in Assay

Reference Standard	Cylinder number	Concentration	Expiry date:
Nitric Oxide	D022358	70.7 ± 0.2 ppm	5-Mar-2023
Carbon Monoxide In Nitrogen	D022358	70.8 ± 0.2 ppm	5-Mar-2023

Analytical Instruments used in Assay

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
FTIR Spectrometers Nicolet iS50	FTIR-NO	10-Jan-2022
FTIR Spectrometers Nicolet iS50	FTIR-CO	8-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 recognized national metrology institutes.

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

[illegible]

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:	0273/22	Date of issue:	4-Feb-2022	Expiry date:	4-Feb-2030
Material Details					
Production Order:	90169723	Material Code:	445100-SK-44	Cylinder No.:	D636047
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

Analytical Result

Component	Normal Concentration	Analysis Result ¹	Uncertainty ²	Method of Analysis ³	Assay Date
Sulphur Dioxide In Nitrogen	80.0 ppm	81.0 ppm	± 1% relative	(6) I-PB-352	28-Jan & 4-Feb-22

Reference Standard used in Assay

Reference Standard :	Cylinder number	Concentration	Expiry date:
Sulphur Dioxide In Nitrogen	256240	52.73 ± 0.42 ppm	6-May-2023

Analytical Instruments used in Assay

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
FTIR Spectrometers Nicolet iS50	FTIR-SO2	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 a 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. 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.

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

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 บริษัท ลินด์ (ประเทศไทย) จำกัด (มหาชน)
 เลขที่ 15 แขวงตลาดเก่า 2/3 หมู่ 14 ถนนสายประชาคม กม. 6.5 แขวงตลาด
 อ.บางปะกง จ.สมุทรปราการ 10540 โทรศัพท์ (66) 2338-6100 โทรสาร (66) 2338-6333
 โทรสาร (66) 38.570-479-93 โทรสาร (66) 38.570-323
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 Wellgrow Plant : 105 Moo 5, T.Bangnakorn, 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: House number,239 Rimklongprapa Rd,Bangsue Bang Su Bangkok 10800 Customer Tag No.:

Certificate Details

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 M³ (normal) 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%	8.02%	± 2% relative	(1) SG-0-01
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:

- All results expressed in this report are on mole/mole basis, unless otherwise specified.
- 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.
- (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
Issd/2, 01 March 2018

Linde (Thailand) Public Company Limited

P.O. Box 100, Bangkok 10100

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

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บริษัท ลินด์ (ประเทศไทย) จำกัด (มหาชน)

เลขที่ใบรายงาน: 0103/2300018

ชั้น 15 อาคารทาวเวอร์ เอ 2/3 หมู่ 14 ถนนบางนา-ตราด กม. 6.5 บางนา

Bangplee, Samutprakarn 10540 โทรศัพท์ (66) 2338-6100 โทรสาร (66) 2338-6333

โรงงาน Wellgrow: 105 หมู่ 5 ต.บางมาค อ.บางปะกง จ.ฉะเชิงเทรา 24180

โทรศัพท์ (66) 38.570-479-93

โทรสาร (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: 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 M³ Filling pressure: 145.0 bar Valve: CGA 660 SS
Cylinder Owner: LINDE Cylinder Material: Spectra seal Cylinder Size: 40 L

Laboratory Report

Component	Normal Concentration	Analytical Result			Assay Date
		Analysis Result ¹	Uncertainty ²	Method of Analysis ³	
Sulphur Dioxide In Nitrogen	40.0 ppm	41.7 ppm	± 1% relative	(6) I-PR-352	11-Jul & 13-Jul-20

Reference Standard
Sulphur Dioxide
In Nitrogen

Reference Standard used in Assay

Cylinder number: 2662675G Concentration: 51.43 ± 0.41 ppm Expiry date: 17-Apr 2021

Instrument/Make/Model
FTIR Spectrometers Nicolet i550

Analytical Instruments used in Assay

Analytical Principle: FTIR-SO2 Last Multipoint Calibration: 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:

- 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
- 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.
- (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/F006

Issd/1, 01 October 2019

Linde (Thailand) Public Company Limited

P.O. Box 100, Bangkok 10100

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Bangplee, Samutprakarn 10540, Tel (66) 2338-6100 Fax (66) 2338-6333
Wellgrow Plant: 105 Moo 5, T.Bangmak, A.Bangpakong, Chachoengsao 24180
Thailand, Tel (66) 38.570-479-93 Fax (66) 38.570-323



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:	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.:	A009325K
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					
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 NOx 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 expiry date whichever comes first.
Storage condition: Keep in well ventilation and secure area.

Comments

When reordering, please quote the material number

Note:

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

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ชั้น 15 อาคารทาวเวอร์ เอ 2/3 หมู่ 14 ถนนบางนา-ตราด กม. 6.5 บางนา/กรุงเทพฯ

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

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

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

Linde (Thailand) Public Company Limited

PLC Registration No. 0107537000185

ชั้น 15 อาคารทาวเวอร์ เอ 2/3 หมู่ 14 ถนนบางนา-ตราด กม. 6.5 บางนา/กรุงเทพฯ

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

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

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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:	Address:		Customer Tag No.:		
Secot Co., Ltd.	House No.239, Rimklongprapa Rd, Bang Sue, Bangkok 10800				

Certificate Details					
Number:	0333/19	Date of Issue:	5-Feb-2019	Expired date:	5-Feb-2027
Material Details					
Production Order:	90152421	Material Code:	533100-AL-44	Cylinder No.:	D339462
Gas content:	6.900 M ³	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	80.0 ppm	80.9 ppm	± 1% relative	(6) I-PB-352	4-Feb-2019
Nitrogen	Balance				

Reference Standard used in Assay			
Reference Standard	Cylinder number	Concentration	Expired date
Carbon Monoxide in Nitrogen	258001SG	99.5 ± 0.8 ppm	20-Aug-2020

Analytical Instruments used in Assay		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
FTIR Spectrometers Nicolet iS50	FTIR-CO	4-Feb-2019

Recommend usage condition

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

Comments

When reordering, please quote the material number

Note:

- 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.
- 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.
- (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-K/2, 01 March 2018

บริษัท ลินด์ (ประเทศไทย) จำกัด (มหาชน)

ชั้น 15 อาคารทาวเวอร์ เอ 2/3 หมู่ 14 ถนนบางนา-ตราด กม. 6.5 บางนา/กรุงเทพฯ

โทรสาร (66) 2338-6100 โทรสาร (66) 2338-6333

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

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Linde (Thailand) Public Company Limited

PLC Registration No. 0107537000185

ชั้น 15 อาคารทาวเวอร์ เอ 2/3 หมู่ 14 ถนนบางนา-ตราด กม. 6.5 บางนา/กรุงเทพฯ

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

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

Thailand, Tel (66) 38.570-479-93 Fax (66) 38.570-323

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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:	2135/20	Date of Issue:	19-May-2020	Expiry date:	18-May-2028
Material Details					
Production Order:	90160199	Material Code:	477200-AL-44	Cylinder No.:	D595120
Gas content:	6.90 M ³	Filling pressure:	145.0 bar	Valve:	CGA 660 SS
Cylinder Owner:	LINDE	Cylinder Material:	Aluminum	Cylinder Size:	50 L

Laboratory Report

Analytical Result

Component	Nominal Concentration	Analysis Result ¹	Uncertainty ²	Method of Analysis ³	Assay Date
Sulphur Dioxide in Nitrogen	800 ppm	802 ppm	± 1% relative	(6) I-PB-352	12-May & 19-May-20

Reference Standard used in Assay

Reference Standard	Cylinder number	Concentration	Expiry date:
Sulphur Dioxide in Nitrogen	205838SG	514.9 ± 2.4 ppm	18-Dec-2020

Analytical Instruments used in Assay

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
FTIR Spectrometers Nicolet iS50	FTIR-SO2	11-May-2020

Recommend usage condition

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

Comments

When reordering, please quote the material number

Note:

- 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
- 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.
- (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)

เลขที่เอกสาร: 2135/20

วันที่ 15 มกราคม 2563 ถึง 2/3 หน้า 14 หมายเลขเอกสาร: 6.5 หมายเลขเอกสาร

เลขที่โทรศัพท์: 10540 โทรสาร (66) 2338-6100 โทรสาร (66) 2338-6333

โทรสาร: 105 หมู่ 5 ตำบลลำไย อำเภอลำไย จังหวัดลำปาง 24180

โทรสาร (66) 38.570-479-93

โทรสาร (66) 38.570-323

Sukanya Parinyasontorn

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

PB-002/FO06

Linde (Thailand) Public Company Limited Issd/1, 01 October 2019

15th Floor, Bangna Tower A, 2/3 Moo 14, Bangna-Trad Km. 6 S Road, Bangkok

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

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

Thailand, Tel (66) 38.570-479-93

Fax (66) 38.570-323



Request Service No. 098/65

Page 1 of 3

Calibration Certificate

Nomenclature : Brand : Mettler Toledo Type : Top-Loading Electronic Balance

Model : AG245 Serial No. : 1117293916 (198129-0)

Submitted by : Laboratory of SECOT CO., LTD.

Location of Calibration : BAL Room , 6th Floor, Secot Co., Ltd.

Calibration range : 0 – 200 g Scale division : 0.00001 g (41g) / 0.0001 g (210g)

Calibration date : May 26, 2022

Reference Standard No. M2110188S, M210183, M220177

Traceable to : Metrological Center SCI ECO Services Co., Ltd, THAI CALIBRATION SERVICES Co., Ltd

Ambient Condition : Temperature 24.28 – 24.42 °C

Humidity 48.10 – 50.90 % RH

Calibrated By : Sasipa Jaidee Approved By : Siripa Jhannong

(Miss Sasipa Jaidee)

(Miss Siripa Jhannong)

Testing Officer

Chief of Technical Management

Date : 26/05/2022

Date : 26/05/2022

Issued Date : May 27, 2022

Measurement Report

Request Service No. 098/65

Page 2 of 3

Description: Brand : Mettler Toledo Type : Top-Loading Electronic Balance
Model : AG245 Serial No. : 1117293916 (198129-0)
Calibration range : 0 – 200 g Scale division : 0.00001 g (41g) / 0.0001 g (210g)
Calibration date : May 26, 2022
Ambient Condition : Temperature 24.28 – 24.42 °C Relative humidity 48.10 – 50.90 % RH

Measurement data :

1. Repeatability of Reading :

Load (g)	Standard Deviation of Reading (g)	Maximum Difference between Successive Reading (g)
50	0.000047	0.0002
100	0.000067	0.0002
150	0.000048	0.0001
200	0.000052	0.0001

2. Off-Center Loading :

A Mass of 50.0000 g was placed and moved to various position on the pan.

Unit : g

Center	Front	Left	Back	Right	Center	Maximum Difference
50.00020	50.00046	50.00030	50.00000	50.00010	50.00020	0.00026

Issued Date : May 27, 2022

Request Service No.098/65

Page 3 of 3

3. Departure from Nominal Value :

Reading (g)	Correction (g)	Uncertainty (+/- g)
0	0.000000	± 0.000008
0.5	0.000005	± 0.000014
1	-0.000014	± 0.000018
10	-0.000071	± 0.000034
20	-0.000091	± 0.000047
40	-0.000151	± 0.000074
60	-0.00030	± 0.00012
80	-0.00021	± 0.00014
100	-0.00038	± 0.00016
120	-0.00041	± 0.00018
140	-0.00048	± 0.00021
160	-0.00050	± 0.00023
180	-0.00067	± 0.00025
200	-0.00124	± 0.00027

Calibrated by : Sasipa Jaidee Approved By : Jhannong
(Miss Sasipa Jaidee) (Miss Siripa Jhannong)

Testing Officer

Chief of Technical Management

Date : 26/05/2022
Date : 26/05/2022

Issued Date : May 27, 2022



Request Service No.100/65

Page 1 of 3

Calibration Certificate

Nomenclature : Brand : Sartorius Type : Top-Loading Electronic Balance

Model : BSA224S-CW Serial No. : 32191636

Submitted by : Laboratory of SECOT CO., LTD.

Location of Calibration : BAL Room , 6th Floor, Secot Co., Ltd.

Calibration range : 0 – 200 g Scale division : 0.0001 g (220 g)

Calibration date : May 24, 2022

Reference Standard No. M220177, M210183

Traceable to : Metrological Center SCI ECO Services Co., Ltd.

Ambient Condition : Temperature 24.80-24.90 °C

Humidity 50.4-52.9 % RH

Calibrated By : *Khemchuda Insorn*

Approved By : *Siripa Jhannong*

(Miss Khemchuda Insorn)

(Miss Siripa Jhannong)

Testing Officer

Chief of Technical Management

Date : *25/05/2022*

Date : *25/05/2022*

Issued Date : May 25, 2022

Measurement Report

Request Service No.100/65

Page 2 of 3

Description : Brand : Sartorius

Type : Top-Loading Electronic Balance

Model : BSA224S-CW

Serial No. : 32191636

Calibration range : 0 – 200 g

Scale division : 0.0001 g (220 g)

Calibration date : May 25, 2021

Ambient Condition : Temperature 24.80-24.90 °C Relative humidity 50.4-52.9 % RH

Measurement data :

1. Repeatability of Reading :

Load (g)	Standard Deviation of Reading (g)	Maximum Difference between Successive Reading (g)
50	0.00010	0.0003
100	0.00008	0.0003
150	0.00005	0.0001
200	0.00005	0.0001

2. Off-Center Loading :

A Mass of 50.0000 g was placed and moved to various position on the pan.

Unit : g

Center	Front	Left	Back	Right	Center	Maximum Difference
49.99980	49.99984	49.99994	49.99986	49.99994	49.99980	0.00014

Issued Date : May 25, 2022

Request Service No. 100/65

Page 3 of 3

3. Departure from Nominal Value :

Reading (g)	Correction (g)	Uncertainty (+/- g)
0	0.00000	± 0.00008
1	-0.00004	± 0.00008
5	+0.00013	± 0.00008
10	+0.00018	± 0.00008
20	+0.00009	± 0.00010
40	-0.00005	± 0.00010
60	+0.00012	± 0.00014
80	+0.00017	± 0.00014
100	-0.00020	± 0.00017
120	+0.00003	± 0.00019
140	+0.00004	± 0.00021
160	+0.00006	± 0.00022
180	+0.00004	± 0.00025
200	+0.00002	± 0.00027

Calibrated by :

(Miss Khemchuda Insorn)

Testing Officer

Date :

Approved By :

(Miss Siripa Jhannong)

Chief of Technical Management

Date :

Issued Date : May 25, 2022



มูลนิธิสถาบันพัฒนาผู้ประกอบการ
 ฐานธุรกิจและนวัตกรรมอุตสาหกรรม
 Foundation for Industrial Development National Food Institute
 Food Industrial Laboratory Service Center



Calibration Certificate

Certificate No.:

2203876-001-01

Client name:

SECOT CO., LTD.

Address:

 239 Rimklongprapa Road,
 Bangsue, Bangsue, Bangkok 10800

Page 1 of 3

Equipment:

CHAMBER (Hot Air Oven)

Manufacturer:

BINDER

Model:

ED 53

Serial No.:

01-27152

ID No.:

N/A

Order No.:

2203876

Operation No.:

2203876-001

Date of Receipt:

1 August 2022

Date of Calibration:

1 August 2022

Calibrated by

 Mr.Yothin Charoensuk
 Scientist

Approved by

(Mr.Pheraphat Tuanjit) (for)

Manager, Division of Calibration Laboratory

Responsible for the Technical Management Team

Date of Issue:

3 August 2022

The uncertainties are for a confidence probability of approximately 95 %.

This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the units of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the National Food Institute.

FCS-009 Revision: 01 Date: 20-04-55



FCS-009



CAL

Calibratech Co.,Ltd.

7/106-7 Moo 2, Sukhprachan 3 Rd., Bangpoo, Pakkred, Nonthaburi 11120

Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech.cal@yahoo.com, calibratech.cal@hotmail.com

NSO-TIS-TS17025
CALIBRATION 0030

Certificate of Calibration

Certificate No. : 65-420016-1

Page : 1 of 2

Submitted by : Secot Co.,Ltd.

239 RimKlongrappa Road, Bangsue, Bangkok 10800 Thailand

Equipment : pH Meter with electrode

pH meter

Manufacturer : Mettler Toledo

Model : Seven2Go S2

Range : N/A

pH

Resolution : 0.01

pE

Serial No. : B924795409

ID No. : N/A

Electrode

Model : InLab Expert Go-ISM

Serial No. : 78611E0

Environment : Ambient Temperature : $(25 \pm 2) ^\circ\text{C}$ Relative Humidity : $(50 \pm 15) \%$

Date of Received : 15 February 2022

Date of Calibration : 24 February 2022

Date of Issue : 24 February 2022

Calibrated by : Bunjerd Masri

Calibration Method : In-house method CAL-M4201 direct measurement by using standard voltage calibrator and using certified reference material (CRM)

Reference Standard Instruments : This certification is traceable to the International System of Units

1. Multiproduct Calibrator

ID No.	Cert. No.	Due Date	Traceability
--------	-----------	----------	--------------

440001	21E997	17 Mar 2023	National Institute of Metrology Thailand (NIMT)
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2. Standard Buffer Solution

pH	Cert. No.	Lot No.	Exp. Date	Traceability
4.008	61235182	795894	14 Feb 2024	CPA Chem Ltd. Accredited to ISO 17034 and ISO/IEC 17025
6.985	61223875	769927	15 May 2022	CPA Chem Ltd. Accredited to ISO 17034 and ISO/IEC 17025
10.008	61244986	795895	25 Feb 2023	CPA Chem Ltd. Accredited to ISO 17034 and ISO/IEC 17025

Approved by :

(Bunjerd Masri)

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full except with the prior written approval of the Calibratech Co.,Ltd.



CAL-F0031-03

CAL

Calibratech Co.,Ltd.

7/106-7 Moo 2, Sukhprachan 3 Rd., Bangpoo, Pakkred, Nonthaburi 11120

Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech.cal@yahoo.com, calibratech.cal@hotmail.com

Certificate of Calibration

Certificate No. : 65-420016-1

Page : 2 of 2

Result of Calibration :

UUC Condition As-Received : Good

Function : Electrical measurement

pH meter

Performing standard curve by Multiproduct Calibrator at pH (4,7,10)

Adjustment Curve at nominal pH	Applied Voltage (mV)	Nominal Value (pH)	UUC Reading		Correction (mV)	Uncertainty (\pm mV)
			(pH)	(mV)		
4, 7, 10	177.4800	4	4.00	177	0	0.58
	0.0000	7	7.00	0	0	0.58
	-177.4800	10	10.00	-177	0	0.58

Function : pH meter with electrode

Performing a three - buffer standard curve using buffer nominal pH (4,7,10)

Adjustment Curve at nominal pH	Standard Buffer (pH)	UUC Reading (pH)	Correction (pH)	Uncertainty (\pm pH)
4, 7, 10	4.008	4.01	0.00	0.010
	6.985	7.00	-0.01	0.011
	10.008	10.01	0.00	0.014

Remark

UUC : Unit Under Calibration

This result of calibration was found accurate as shown on date and place of calibration only.

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2$, providing a level of confidence of approximately 95%

- o o o -

B



CAL-F0031-03

Calibration Certificate

Certificate No.: 2203876-002-01
Client name: SECOT CO., LTD.
Address: 239 Rimklongprapa Road,
 Bangsue, Bangsue, Bangkok 10800

Page 1 of 3

Equipment: CHAMBER (Incubator)

Manufacturer: MEMMERT

Model: ICP 400

Serial No.: K406.0004

ID No.: N/A


Order No.: 2203876

Operation No.: 2203876-002

Date of Receipt: 1 August 2022

Date of Calibration: 1 August 2022

Calibrated by Mr.Yothin Charoensuk
Scientist

Approved by 
(Mr. Phieraphat Tuanjit) (for)
Manager, Division of Calibration Laboratory
Responsible for the Technical Management Team

Date of Issue: 3 August 2022

The uncertainties are for a confidence probability of approximately 95 %.

This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the units of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the National Food Institute.

F-C5-009 Revision: 01 Date: 20-04-65



Calibration Report

Certificate No.:	2203876-002-01		
Equipment:	CHAMBER (Incubator)		
	Model:	ICP 400	Serial No.: K406.0004
	Resolution:	0.1 °C	ID No.: N/A
	Manufacturer:	MEMMERT	

Date of Calibration: 1 August 2022

Page 2 of 3

Location: Laboratory, SECOT CO., LTD.

Environment Condition:

Ambient Temperature	(29 ± 1) °C
Relative Humidity	(66 ± 5) %
Line Voltage	(220 ± 5) Volt

Condition of this results of Calibration:

1. This instrument was calibrated by insert 9 standard thermometer into its chamber and calibration according to W-TE-014 Based on TLAS G-20-1/02-08 (E): Guidelines for Calibration and Checks of Temperature Controlled Enclosures.
- The temperature scale used was based on ITS - 90.
 - All data show below were final values and the initial data may be obtained upon request.

2. Reference Standard Instrument :

Instrument	Model	Serial No./ID No.	Certificate No.	Due Date	Through
Digital Thermometer with sensor	34972A	MY57003188	TE 650469-01	11 June 2023	NATIONAL FOOD INSTITUTE
	RTD	CH#201-209/ RTD#201-209			

3. This certificate is traceable to International System of Units (SI Units).
4. This certificate was certified only for the Instrument we calibrated.
5. This result of calibration was found accurate as shown on date and place of calibration only.
6. Condition of Calibrated item : Good

UUC Description :

Time of Record	1	Hour	9	Minute	At	20.0	°C
Fresh air Damper	-	Open	Position	-			
	X	Close	Fan	-			
	-	Not Available					

7. Result of Calibration : ☒ Without adjustment ☐ After adjustment

P. J. Genghard
3 Aug. 2002

F-CS-012 Revision: 01 Date: 20-04-65

2000-2002: 2002-2003: 2003-2004: 2004-2005: 2005-2006: 2006-2007: 2007-2008: 2008-2009: 2009-2010: 2010-2011: 2011-2012: 2012-2013: 2013-2014: 2014-2015: 2015-2016: 2016-2017: 2017-2018: 2018-2019: 2019-2020: 2020-2021: 2021-2022: 2022-2023: 2023-2024: 2024-2025: 2025-2026: 2026-2027: 2027-2028: 2028-2029: 2029-2030: 2030-2031: 2031-2032: 2032-2033: 2033-2034: 2034-2035: 2035-2036: 2036-2037: 2037-2038: 2038-2039: 2039-2040: 2040-2041: 2041-2042: 2042-2043: 2043-2044: 2044-2045: 2045-2046: 2046-2047: 2047-2048: 2048-2049: 2049-2050: 2050-2051: 2051-2052: 2052-2053: 2053-2054: 2054-2055: 2055-2056: 2056-2057: 2057-2058: 2058-2059: 2059-2060: 2060-2061: 2061-2062: 2062-2063: 2063-2064: 2064-2065: 2065-2066: 2066-2067: 2067-2068: 2068-2069: 2069-2070: 2070-2071: 2071-2072: 2072-2073: 2073-2074: 2074-2075: 2075-2076: 2076-2077: 2077-2078: 2078-2079: 2079-2080: 2080-2081: 2081-2082: 2082-2083: 2083-2084: 2084-2085: 2085-2086: 2086-2087: 2087-2088: 2088-2089: 2089-2090: 2090-2091: 2091-2092: 2092-2093: 2093-2094: 2094-2095: 2095-2096: 2096-2097: 2097-2098: 2098-2099: 2099-2100: 2100-2101: 2101-2102: 2102-2103: 2103-2104: 2104-2105: 2105-2106: 2106-2107: 2107-2108: 2108-2109: 2109-2110: 2110-2111: 2111-2112: 2112-2113: 2113-2114: 2114-2115: 2115-2116: 2116-2117: 2117-2118: 2118-2119: 2119-2120: 2120-2121: 2121-2122: 2122-2123: 2123-2124: 2124-2125: 2125-2126: 2126-2127: 2127-2128: 2128-2129: 2129-2130: 2130-2131: 2131-2132: 2132-2133: 2133-2134: 2134-2135: 2135-2136: 2136-2137: 2137-2138: 2138-2139: 2139-2140: 2140-2141: 2141-2142: 2142-2143: 2143-2144: 2144-2145: 2145-2146: 2146-2147: 2147-2148: 2148-2149: 2149-2150: 2150-2151: 2151-2152: 2152-2153: 2153-2154: 2154-2155: 2155-2156: 2156-2157: 2157-2158: 2158-2159: 2159-2160: 2160-2161: 2161-2162: 2162-2163: 2163-2164: 2164-2165: 2165-2166: 2166-2167: 2167-2168: 2168-2169: 2169-2170: 2170-2171: 2171-2172: 2172-2173: 2173-2174: 2174-2175: 2175-2176: 2176-2177: 2177-2178: 2178-2179: 2179-2180: 2180-2181: 2181-2182: 2182-2183: 2183-2184: 2184-2185: 2185-2186: 2186-2187: 2187-2188: 2188-2189: 2189-2190: 2190-2191: 2191-2192: 2192-2193: 2193-2194: 2194-2195: 2195-2196: 2196-2197: 2197-2198: 2198-2199: 2199-2200: 2200-2201: 2201-2202: 2202-2203: 2203-2204: 2204-2205: 2205-2206: 2206-2207: 2207-2208: 2208-2209: 2209-2210: 2210-2211: 2211-2212: 2212-2213: 2213-2214: 2214-2215: 2215-2216: 2216-2217: 2217-2218: 2218-2219: 2219-2220: 2220-2221: 2221-2222: 2222-2223: 2223-2224: 2224-2225: 2225-2226: 2226-2227: 2227-2228: 2228-2229: 2229-2230: 2230-2231: 2231-2232: 2232-2233: 2233-2234: 2234-2235: 2235-2236: 2236-2237: 2237-2238: 2238-2239: 2239-2240: 2240-2241: 2241-2242: 2242-2243: 2243-2244: 2244-2245: 2245-2246: 2246-2247: 2247-2248: 2248-2249: 2249-2250: 2250-2251: 2251-2252: 2252-2253: 2253-2254: 2254-2255: 2255-2256: 2256-2257: 2257-2258: 2258-2259: 2259-2260: 2260-2261: 2261-2262: 2262-2263: 2263-2264: 2264-2265: 2265-2266: 2266-2267: 2267-2268: 2268-2269: 2269-2270: 2270-2271: 2271-2272: 2272-2273: 2273-2274: 2274-2275: 2275-2276: 2276-2277: 2277-2278: 2278-2279: 2279-2280: 2280-2281: 2281-2282: 2282-2283: 2283-2284: 2284-2285: 2285-2286: 2286-2287: 2287-2288: 2288-2289: 2289-2290: 2290-2291: 2291-2292: 2292-2293: 2293-2294: 2294-2295: 2295-2296: 2296-2297: 2297-2298: 2298-2299: 2299-2300: 2300-2301: 2301-2302: 2302-2303: 2303-2304: 2304-2305: 2305-2306: 2306-2307: 2307-2308: 2308-2309: 2309-2310: 2310-2311: 2311-2312: 2312-2313: 2313-2314: 2314-2315: 2315-2316: 2316-2317: 2317-2318: 2318-2319: 2319-2320: 2320-2321: 2321-2322: 2322-2323: 2323-2324: 2324-2325: 2325-2326: 2326-2327: 2327-2328: 2328-2329: 2329-2330: 2330-2331: 2331-2332: 2332-2333: 2333-2334: 2334-2335: 2335-2336: 2336-2337: 2337-2338: 2338-2339: 2339-2340: 2340-2341: 2341-2342: 2342-2343: 2343-2344: 2344-2345: 2345-2346: 2346-2347: 2347-2348: 2348-2349: 2349-2350: 2350-2351: 2351-2352: 2352-2353: 2353-2354: 2354-2355: 2355-2356: 2356-2357: 2357-2358: 2358-2359: 2359-2360: 2360-2361: 2361-2362: 2362-2363: 2363-2364: 2364-2365: 2365-2366: 2366-2367: 2367-2368: 2368-2369: 2369-2370: 2370-2371: 2371-2372: 2372-2373: 23



Calibration Report

Certificate No.:	2203876-002-01		
Equipment:	CHAMBER (Incubator)		
	Model:	ICP 400	Serial No.: K406.0004
	Resolution:	0.1 °C	ID No.: N/A
	Manufacturer:	MEMMERT	

Date of Calibration: 1 August 2022

Page 3 of 3

Calibration point: 20.0 °C

Calibration result:

Calibration Condition	Temperature (°C)	Relative Humidity (%)	Line Voltage (Volt)
MIN	27.6	61	215.0
MAX	29.5	71	225.0

Table 1 : Reporting of Temperature

Calibration point (°C)	Measured Temperature (°C) @ Sensor No. (Sensor No.9 is REF)									Uncertainty ± (°C)
	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	
20.0	20.01	20.09	20.11	20.07	20.18	20.09	20.05	19.99	20.09	0.27

Table 2 : Reporting of Characterization Result

UUC* Setting (°C)	UUC* reading (°C)			Stability ± (°C)	Uniformity (°C)	Overall Variation (°C)
	MIN	MAX	Average			
20.0	20.0	20.0	20.0	0.10	0.10	0.37

Note The quoted uncertainty include " Stability " and " Loading effect (20% of Temp Uniformity) "

UUC* = Unit Under Calibration

Stability = One-half of the greatest maximum difference of measured temperatures at any one sensors, for at least half an hour after reaching steady state.

Uniformity = The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time.

Overall Variation = The difference of the maximum and minimum measured temperatures throughout observation time.

The report uncertainty of measurement was based on standard uncertainty multiplied by coverage factor $k = 2$, providing a level of confidence of approximately 95 %.

End



Calibration Certificate

Certificate No.: 2203876-003-01
Client name: SECOT CO., LTD.
Address: 239 Rimklongprapa Road,
 Bangsue, Bangsue, Bangkok 10800

Page 1 of 3

Equipment: Water Bath

Manufacturer: MEMMERT

Model: WB 29

Serial No.: 1698.0051

ID No.: N/A


Order No.: 2203876

Operation No.: 2203876-003

Date of Receipt: 1 August 2022

Date of Calibration: 1 August 2022

Calibrated by Mr.Yothin Charoensuk
Scientist

Approved by 
(Mr.Pheraphat Tuanjit) (for)
Manager, Division of Calibration Laboratory
Responsible for the Technical Management Team

Date of Issue: 3 August 2022

The uncertainties are for a confidence probability of approximately 95 %.

This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the units of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the National Food Institute.



Calibration Report

Certificate No.:	2203876-003-01		
Equipment:	Water Bath		
	Model: WB 29	Serial No.: 1698.0051	
	Resolution: 0.1 °C	ID No.: N/A	
	Manufacturer: MEMMERT		
Date of Calibration:	1 August 2022		

Location: Laboratory, SECOT CO., LTD.

Environment Condition: Ambient Temperature (29 ± 1) °C
Relative Humidity (66 ± 5) %
Line Voltage (224 ± 1) Volt

Condition of this results of Calibrations:

1. This instrument was calibrated by Insert 5 standard thermometer into its liquid bath and calibration according to W-TE-011 based on ASTM E715-80 (2016): Standard Specification for Gravity-Convection and Forced-Circulation Water Baths.
- The temperature scale used is ITS - 90.
 - All data show below were final values and the initial data may be obtained upon request.

2. Reference Standard Instrument :

Instrument	Model	Serial No./ID No.	Certificate No.	Due Date	Through
Digital Thermometer with sensor	34972A	MY57003188	TE 650469-01	11 June 2023	NATIONAL FOOD INSTITUTE
	RTD	RTD#301-305 / CH#301-305			

3. This certificate is traceable to International System of Units (SI Units).
4. This certificate was certified only for the Instrument we calibrated.
5. This result of calibration was found accurate as shown on date and place of calibration only.
6. Condition of Calibrated item : Good

UUC Description:

Time of Record 1 Hour 9 Minute At 95.0 °C

- | | | |
|----------------------------|---|--------------------|
| 7. Result of Calibration : | X | Without adjustment |
| | | After adjustment |

A. Grenham Ltd
3 Aug. 2022



Calibration Report

Certificate No.: 2203876-003-01
Equipment: Water Bath
 Model: WB 29
 Resolution: 0.1 °C
 Manufacturer: MEMMERT
Date of Calibration: 1 August 2022

Serial No.: I698.0051
 ID No.: N/A

Page 3 of 3

Calibration point: 95.0 °C

Calibration result:

Calibration Condition	Temperature (°C)	Relative Humidity (%)	Line Voltage (Volt)
Min	28.2	61	223.0
Max	29.7	71	225.0

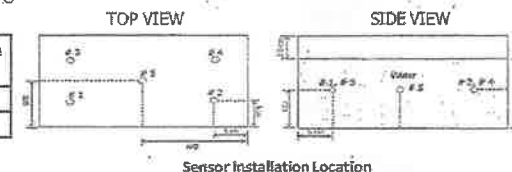


Table 1 : Reporting of Temperature

Calibration Point (°C)	Measured Temperature (°C) @ Sensor No. (Sensor No.5 is REF)					Uncertainty ± (°C)
	# 1	# 2	# 3	# 4	# 5	
95.0	95.08	95.09	95.03	94.94	94.99	0.38

Table 2: Reporting of Characterization Result

UUC* Setting (°C)	UUC* reading (°C)			Stability ± (°C)	Uniformity (°C)	Overall Variation (°C)
	MIN	MAX	Average			
95.0	94.9	95.1	95.0	0.25	0.10	0.69

Note

The quoted uncertainty include "Stability" and "Loading effect (20% of Temp Uniformity)"

UUC* = Unit Under Calibration

Stability = One-half of the greatest maximum difference of measured temperatures at any one sensors, for at least half an hour after reaching steady state.

Uniformity = The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time.

Overall Variation = The difference of the maximum and minimum measured temperatures throughout observation time.

The report uncertainty of measurement was based on standard uncertainty multiplied by coverage factor $k=2$, providing a level of confidence of approximately 95 %.

----- End -----





MAINTENANCE REPORT
ATOMIC ABSORPTION SPECTROPHOTOMETER MODEL
3110 + HGA600 + FIAS100 + AMALGAM

Customer : บริษัท ซีคอต จำกัด Date Tested: June 16, 2022
 Address : 239 ถนนริมคลองประปา Recommendation Recertification
 แขวงบางซื่อ เขตบางซื่อ Period 6 Months
 กรุงเทพฯ 10800 Recertification Due: December 15, 2022
 User Name: คุณ อารยา Date Last Certified: December 16, 2021
 Phone: 02-9593600 ext. 507 Visit Number: 1 OF 2
 E-mail: labmail@secot.co.th TH Onesource Phone: 081-7316733
 E-mail: thonesource@gmail.com

CONFIGURATION TESTED

MODEL	SERIAL NUMBER	SOFTWARE
AA-3110	311N6062102	AAWINLAB 3.2
HGA 600	2698	
AS 60	2124	
FIAS 100	1114	
AMALGAM	160S2110102	
TEST STANDARD USED	PART NUMBER	
Copper	N9300183	
GFAAS Mixed STD	N9300244	
PE standard of Mercury	N9300174	



MAINTENANCE REPORT
ATOMIC ABSORPTION SPECTROPHOTOMETER MODEL
3110 + HGA600 + FIAS100 + AMALGAM

SERIAL NUMBER 311N6062102

DATE TESTED June 16, 2022

1. OPTIC CHECKS

- A. Optical alignment condition (if necessary) ☐ OK
 B. Condition of Mirrors, Lenses etc. ☐ OK
 C. D2 and HCL beam adjust (if necessary) ☐ OK

2. ELECTRONICS CHECKS

- A. Power Supplies
 + 5.00 Vdc ± 0.2 Vdc ☐ + 5.0 Vdc
 + 11.50 Vdc ± 0.2 Vdc ☐ + 11.4 Vdc
 + 15.00 Vdc ± 1.0 Vdc ☐ + 15.2 Vdc
 - 15.00 Vdc ± 1.0 Vdc ☐ - 14.9 Vdc
 B. D2 Power supplies
 +150 Vdc ☐ NA Vdc
 + 450 Vdc ☐ NA Vdc
 C. PMT Power supply
 - 250 Vdc ☐ -249.0 Vdc

3. GAS SYSTEM CHECKS

- A. Leak test all internal and external gas box joints ☐ OK
 B. All gas box safety features ☐ OK
 C. Burner system including nebulizer and all o-ring and gasket ☐ OK
 D. Drain system ☐ OK

4. FIAS CHECK

- A. Output power supplies
 +5 VDC ± 0.25 VDC. ☐ 5.01 VDC. ☐ +40 VDC. ± 0.5 VDC. ☐ 40.02 VDC.
 B. Valve and pump clean ☐ OK



MAINTENANCE REPORT
ATOMIC ABSORPTION SPECTROPHOTOMETER MODEL
3110 + HGA600 + FIAS100 + AMALGAM

SERIAL NUMBER 311N6062102	DATE TESTED June 16, 2022
----------------------------------	----------------------------------

5. PERFORMANCE TEST FOR FLAME

A. Optical Filter 0.2 % Abs At 324.8 nm \pm 10 % (SPEC. = 0.1713) 0.174 Abs.

B. Performance Tests with PE standard.

B1. Run Std. Of Cu and Cr at 324.8 ; 357.9 nm, Concentration 4 , 4 ppm respectively
 Results = 0.222, 0.228 Abs, with flow spoiler. respectively
 Characteristic Concentration 0.079 ; 0.077 mg/L respectively

B2. Run Std. of Pb at 283.3 nm; Concentration 20 ppm
 Results = 0.1960 Abs, with flow spoiler.
 Characteristic Concentration 0.449 mg/L

C. Performance Tests (For C₂H₂ + N₂O Flame)

Run Std. Of Al at 309.3 nm; Concentration 50 ppm
 Results = 0.237 Abs, with flow spoiler.
 Characteristic Concentration 0.928 mg/L

6. PERFORMANCE TEST FOR FIAS **ACTUAL VALUE**

A. Characteristic mass for Mercury
 (500 ul of 10 ug/l Hg for 0.07 Abs.) 0.077 Abs.
 Characteristic Mass 314 pg / 0.0044 Abs. 285.7 pg/0.0044 Abs.
 RSD \leq 2% 0.62 %

B. Characteristic mass for Arsenic
 (500 ul of 10 ug/l As for 0.45 Abs.) 0.468 Abs.
 Characteristic Mass 48 pg / 0.0044 Abs. 47.0 pg/0.0044 Abs.
 RSD \leq 2% 0.83 %

C. Characteristic mass for Mercury Amalgamation
 (1000 ul of 1.0 ug/l Hg for 0.03 Abs.) 0.029 Abs.
 Characteristic Mass 147 pg / 0.0044 Abs. 151.7 pg/0.0044 Abs.
 RSD \leq 2% 1.71 %



MAINTENANCE REPORT
ATOMIC ABSORPTION SPECTROPHOTOMETER MODEL
3110 + HGA600 + FIAS100 + AMALGAM

SERIAL NUMBER 311N6062102	DATE TESTED June 16, 2022
----------------------------------	----------------------------------

7. PERFORMANCE CHECK FOR FURNACE

A. Internal & External gas flow ☐ OK

B. Contract Cylinder (replace if necessary) ☐ OK

C. Quartz Windows ☐ OK

D. Gas Tubing and Joins ☐ OK

E. Cooling System ☐ OK

8. AUTOSAMPLER CHECK

A. Arm and gears ☐ OK

B. Sample and Rinse Pump ☐ OK

C. Tray and Sensors ☐ OK

9. PERFORMANCE TEST FOR FURNACE **ACTUAL VALUE**

Test run using Chromium

1. Standard Deviation after 5 replicates of blank \leq 0.005 0.001

2. Characteristic mass (5 ug / L for Cr, 3 pg/0.0044 A-s) 2.8 pg / 0.0044 A-s

Peak Area 0.155 A-s

Relative Standard Deviation \leq 2 % 1.03 %

Test run using Lead

Characteristic mass (20 ug / L for Pb, 10 pg/0.0044 A-s) 9.4 pg / 0.0044 A-s

Peak Area 0.188 A-s

Relative Standard Deviation \leq 2 % 1.24 %



FSR1485

MAINTENANCE REPORT
ATOMIC ABSORPTION SPECTROPHOTOMETER MODEL
3110 + HGA600 + FIAS100 + AMALGAM

SERIAL NUMBER 311N6062102

DATE TESTED

June 16, 2022

Remarks :

NA Mean no applicant

This is to certify that the above tests have been performed and the configuration tested



meets



does not meet.

the PerkinElmer Specifications listed on this certificate.

This certificate does not modify PerkinElmer's standard terms and condition of sale, including warranty terms.

TH ONE SOURCE CO., LTD.*Krungchai T.*

Krungchai Treevichien)

Customer Support Engineer

Page 5 of 5



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3 : EQUIPMENT CALIBRATION AND TESTING SERVICES

534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250

TEL. 0-2717-3000 FAX. 0-2719-9484

Cert.No.: 22TW262

Page.: 1 of 2

Certificate of Testing

Equipment :	DO Meter
Manufacturer :	Hanna
Model :	HI98193
Serial No. :	06110066101
ID No. :	-
Received Date :	22 November 2022
Test Date :	23 November 2022
Reference :	2211-0761DN-1
Submitted by :	Secot Co.,Ltd. 239 Rinklongprapa Road, Bangsue, Bangkok 10800
Laboratory Condition :	Temperature (25 ± 5) °C Humidity (50 ± 20) %
Test Procedure :	In - house method : CP-CH9 by Comparison Technique with Azide Modification Method
Tested by :	Walalak Sirithean
Approved by :	<i>Walu.</i> Approved Signatory
(/) Malee Bulkruea () Saithip Meangmai () Warakorn Lerngagtrakul	
Issue Date :	25 November 2022



Cert.No.: 22TW262
Page.: 2 of 2

Condition of this result of calibration

1. Reference Standard Instruments :

This certification is traceable to the International System of Unit through the reference standards laboratory of Industrial Calibration Center, Technology Promotion Association (Thailand-Japan).

<u>Instruments</u>	<u>Serial No.</u>	<u>ID No.</u>	<u>Certificate No.</u>	<u>Due Date</u>
1) Burette		130BU10	21CG1389	25 Mar 2023
2) Balance	1126143764	140RC004	22MM50	20 Sep 2023

2. Standard Material :-

<u>Material</u>	<u>Manufacturer</u>	<u>Lot.No.</u>	<u>Assay</u>
Sodium Thiosulfate pentahydrate	Merck	AM1763316	100.2%

Result : Dissolved Oxygen Meter Adjustment With Air 100 %

Dissolved Oxygen Probe No.: KC1N2993N

<u>Titration Method</u> (Azide Modification Method) (mg/L)	<u>DO Meter</u> Reading (mg/L)	<u>Standard Deviation</u> (mg/L)
8.14	8.14	0.0071

This report was certified only for the instrument we tested. It is allowable to use for study the system efficiency. The environmental impact control and present to organization it may concerned Intend to use for advertising and referral purpose is prohibited. This report may not be reproduced other in full, without written approval of the laboratory

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BECTHAI BANGKOK EQUIPMENT & CHEMICAL CO., LTD.
CALIBRATION LABORATORY

300 Phaholyothin Road, Phayathai, Bangkok 10400, Thailand Tel: +66 2615-2929 Fax: +66 2615-2350-1
E-mail: bkk@becthai.com Website: www.becthai.com



Certificate No. : CAL-22-119

Page : 1 of 4

CERTIFICATE OF CALIBRATION

Equipment	:	Spectrophotometer
Manufacturer	:	Thermo Scientific
Model	:	Genesys 150 UV-VIS
Serial No.	:	9A5Y332022
ID No.	:	N/A
Customer	:	Secot Company Limited
	:	239 Rimklongprapa Road,
	:	Bangsue, Bangkok 10800, Thailand
Location	:	Customer Laboratory
Date of Receipt	:	1 March 2022
Date of Calibration	:	1 March 2022
Date of Issue	:	5 March 2022
Ambient Temperature	:	(25±10) °C
Relative Humidity	:	(60±20) %
Condition As-Received	:	Used Item

Calibrated by

Palawat

(Mr. Palawat Lunchak)

Calibration Engineer

Approved by

Jintana

(Ms. Jintana Sangthajaroenlap)

Calibration Manager

The reported expanded uncertainty of measurement was based on a combined 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 head of Calibration Laboratory.

Indicated values are valid for the state of the Spectrophotometer at the time of calibration only.



BECTHAI BANGKOK EQUIPMENT & CHEMICAL CO., LTD.
CALIBRATION LABORATORY

300 Phaholyothin Road, Phayathai, Bangkok 10400, Thailand Tel: +66 2615-2929 Fax: +66 2615-2350-1
 E-mail: bkk@becthai.com Website: www.becthai.com



Certificate No. : CAL-22-119

Page : 2 of 4

CALIBRATION REPORT

Conditions of this result of calibration

1. Reference Standard Material :

Material	Model	Serial No.	Cert.No.	Due date
Holmium Glass Filter	RM-HG	12705	98236	12 Feb 24
Didymium Glass Filter	RM-DG	13498	98233	12 Feb 24
Neutral Density Filter	RM-1N2N3N	8323	98259	13 Feb 24
Potassium Dichromate Solution	RM-06	23429	98252	12 Feb 24

2. Traceability : This certification is traceable to the International System of Unit maintained at;
 The Starna Scientific Ltd. Accredited Calibration Laboratory No. 0659.

3. Method of calibration :

The calibration procedure was carried out according to the Guide to CPM-CAL-02 based on ASTM E275-08 (2013) and-
 ASTM E925-09 (2014).

4. Result of calibration :

(✓) without adjustment

() after adjustment

5. Equipment Specifications:

Spectral Bandwidth :	2.0	nm
Data Interval :	0.2	nm
Scan Speed :	Slow	nm/min



BECTHAI BANGKOK EQUIPMENT & CHEMICAL CO., LTD.
CALIBRATION LABORATORY

300 Phaholyothin Road, Phayathai, Bangkok 10400, Thailand Tel: +66 2615-2929 Fax: +66 2615-2350-1
 E-mail: bkk@becthai.com Website: www.becthai.com



Certificate No. : CAL-22-119

Page : 3 of 4

CALIBRATION REPORT

Wavelength Calibration

Certified Values of Reference Material (nm)	Nominal Value (nm)	UUC*Reading (nm)	Error (nm)	Uncertainty of Measurement (± nm)
241.74	241.74	241.260	-0.480	0.16
637.98	637.98	637.547	-0.433	0.17
879.27	879.27	878.895	-0.375	0.17

Photometric Calibration for Visible

Wavelength (nm)	Certified Values of Reference Material (A)	UUC* Reading (A)	Error (A)	Uncertainty of Measurement (± A)
420.0	Zero	0.000	0.0000	0.0028
	0.5716	0.571	-0.0006	0.0031
	0.7358	0.733	-0.0028	0.0034
	1.0713	1.072	0.0007	0.0032
440.0	Zero	0.000	0.0000	0.0028
	0.561	0.561	0.0000	0.0031
	0.718	0.716	-0.0020	0.0031
	1.0459	1.047	0.0011	0.0032
465.0	Zero	0.000	0.0000	0.0028
	0.5111	0.511	-0.0001	0.0032
	0.6618	0.660	-0.0018	0.0030
	0.9635	0.965	0.0015	0.0034
546.1	Zero	0.000	0.0000	0.0028
	0.5222	0.521	-0.0012	0.0034
	0.6687	0.667	-0.0017	0.0029
	0.9768	0.977	0.0002	0.0043
590.0	Zero	0.000	0.0000	0.0028
	0.5541	0.553	-0.0011	0.0033
	0.6975	0.695	-0.0025	0.0031
	1.0206	1.020	-0.0006	0.0045
635.0	Zero	0.000	0.0000	0.0028
	0.5398	0.539	-0.0008	0.0033
	0.6658	0.664	-0.0018	0.0033
	0.9741	0.974	-0.0001	0.0045

Remark : Each individual filter is measured against the empty filter holder (blank) used to zero the Spectrophotometer.

Note:

UUC* : Unit Under Calibration



BECTHAI BANGKOK EQUIPMENT & CHEMICAL CO., LTD.
CALIBRATION LABORATORY

300 Phaholyothin Road, Phayathai, Bangkok 10400, Thailand Tel: +66 2615-2929 Fax: +66 2615-2350-1
E-mail: bkk@becthai.com Website: www.becthai.com



Certificate No. : CAL-22-119

Page : 4 of 4

CALIBRATION REPORT

Photometric Calibration for UV

Wavelength (nm)	Certified Values of Reference Material (A)	UUC* Reading (A)	Error (A)	Uncertainty of Measurement (\pm A)
235.0	Zero	0.000	0.0000	0.0050
	0.7345	0.735	0.0005	0.0076
257.0	Zero	0.000	0.0000	0.0050
	0.8498	0.849	-0.0008	0.0074
313.0	Zero	0.000	0.0000	0.0050
	0.2853	0.287	0.0017	0.0055
350.0	Zero	0.000	0.0000	0.0050
	0.6306	0.630	-0.0006	0.0063

Remark : The Potassium Dichromate Filled cells are measured against a Perchloric acid blank.

Note:

UUC* : Unit Under Calibration

- End of Report -

Chit 15/05/61



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.: CP20210095EA
Operation No.: CP2021120016

Certificate of Calibration

Equipment: Sound Calibrator
Manufacturer: RION
Model/Type: NC-74
Serial No.: 34283648
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.

Certificate No.: CP20210095EA

Calibration Report

Equipment: Sound Calibrator
Manufacturer: RION
Model/Type: NC-74
Serial No.: 34283648
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

Normal Frequency (Hz)	Specified Sound Pressure level (dB)	Measured value (dB)	Deviated value ^[1] (dB)	Acceptance limit ^[3] (dB)
1000	94	94.22	0.22	±0.25

2. Function : Frequency

Normal Sound Pressure level (dB)	Specified Frequency (Hz)	Measured value (Hz)	Deviated value ^[2] (%)	Acceptance limit ^[3] (%)
94	1000	1003.0	0.3	±0.7

Certificate No.: CP20210095EA

Calibration Report

3. Function : Total distortion + noise

Normal Sound Pressure level (dB)	Normal Frequency (Hz)	Measured value ^[1] (%)	Acceptance limit ^[5] (%)
94	1000	1.3	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. Using the 1/2-inch microphone adaptor NC-74-002.

2. Acceptance limit was IEC 60942:2017 Class 1.

- - End of Report - -



SOUND LEVEL METER CALIBRATION

Calibration Location: SECOT

Calibration Date: Oct 31, 22

SOUND LEVEL CALIBRATOR

Brand	Model	Serial No.	Calibrated (dB)	Frequency (Hz)
RION	NC-74	34283648	94.00	1000

No.	Brand	Model	Serial No.	Microphone Serial No.	SLM Reading (dB)	dB Adjust
26	RION	NL-21	00187481	117664	94.0	0.0
34	RION	NL-21	00187489	117711	93.9	0.1
42	RION	NL-21	00187497	117801	93.9	0.1
50	RION	NL-21	00187505	117809	94.0	0.0
56	RION	NL-21	00187511	117816	93.9	0.1
62	RION	NL-21	00487719	118988	93.9	0.1
66	RION	NL-21	00487723	118993	93.8	0.2
77	RION	NL-21	00487734	119006	93.9	0.1
92	RION	NL-21	00198274	123477	93.8	0.2
94	RION	NL-21	00198276	123479	93.7	0.3
95	RION	NL-21	00198277	123480	94.0	0.0

Calibrated by :

Approved by :

Preeda 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.

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

Normal 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

Normal Sound Pressure level (dB)	Specified Frequency (Hz)	Measured value (Hz)	Deviated value ^[2] (%)	Acceptance limit ^[3] (%)
114	1000	1000.0	0.0	±1.7

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 - -



SOUND LEVEL METER CALIBRATION

Calibration Location: SECOT

Calibration Date: Aug 18, 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
2	CASELLA	CEL-246	1443618	1443618	114.0	0.0
4	CASELLA	CEL-246	1443817	1443817	113.9	0.1
5	CASELLA	CEL-246	1443838	1443838	113.8	0.2
6	CASELLA	CEL-246	3173108	3173108	113.8	0.2
8	CASELLA	CEL-246	3173135	3173135	113.8	0.2
10	CASELLA	CEL-246	3173161	3173161	113.9	0.1
11	CASELLA	CEL-246	3173243	3173243	113.8	0.2
12	CASELLA	CEL-246	3173303	3173303	113.7	0.3

Calibrated by :

Approved by :



SOUND LEVEL METER CALIBRATION

Calibration Location: SECOT

Calibration Date: Nov 2, 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	114.0	0.0
14	CASELLA	CEL-246	3173306	3173306	114.0	0.0
15	CASELLA	CEL-246	3173311	3173311	114.0	0.0
16	CASELLA	CEL-246	3173312	3173312	114.0	0.0
21	CASELLA	CEL-246	3173337	3173337	114.0	0.0
24	CASELLA	CEL-246	3173343	3173343	114.0	0.0
25	CASELLA	CEL-246	3173350	3173350	114.0	0.0

Calibrated by :

Approved by :

CERTIFICATE OF CALIBRATION

ISSUED BY Noisemeters

DATE OF ISSUE 06/04/22 CERTIFICATE NUMBER 172690

Noisemeters

Noisemeters
Acoustic House
Bridlington Road
Hunmanby
YO14 0PH
United Kingdom
www.noisemeters.com

Page 1 of 1

Test engineer:
Nigel Smith
Electronically signed:

Nigel Smith

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%.

Sheet No. : NC-CIRRUS-2022-106



NOISE DOSE METER CALIBRATION

Calibration Location: SECOT

Calibration Date: Aug 18, 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	CB1025	114.5	-0.5
2	Cirrus	CR110A	CB1040	114.3	-0.3
3	Cirrus	CR110A	CB1042	114.3	-0.3
4	Cirrus	CR110A	CB1048	113.9	0.1

Calibrated by :

[Signature]

Approved by :

[Signature]

NC-CIRRUS-2022-106/SPRC 18/26/08/2022

SECOT CO., LTD.
239 Rimklongprapa Rd, Bangsue, Bangkok, 10800, THAILAND
Tel: (662) 959-3600 Fax: (662) 959-3535
E-Mail: envserv@secot.co.th



NOISE DOSE METER CALIBRATION

Calibration Location: SECOT

Calibration Date: Sep 14, 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	Pulsar	22	PB644	113.4	0.6

Calibrated by :

Approved by :



NOISE DOSE METER CALIBRATION

Calibration Location: SECOT

Calibration Date: Dec 1, 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	CB1042	114.2	-0.2
2	Cirrus	CR110A	CB1049	114.0	0.0

Calibrated by :

Approved by :

CERTIFICATE OF CALIBRATION

ISSUED BY **Noisemeters**

DATE OF ISSUE **06/04/22** CERTIFICATE NUMBER **172693**

NoiseMeters

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: Pulsar Instruments Plc Serial Number: 79781
Model Number: Model 22R 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	113.80	999.4	0.46
Adjusted	114.00	999.4	0.46
Uncertainty	± 0.11	± 0.14	± 0.10
Tolerances	± 0.60	± 2.00	± 4.00

Environmental Conditions

Pressure: 100.10 kPa
Temperature: 22.8 °C
Humidity: 42.5 %

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%.

Sheet No. : **NC-PULSAR-2022-024**



NOISE DOSE METER CALIBRATION

Calibration Location: **SECOT**

Calibration Date: **Nov 2, 22**

ACOUSTIC CALIBRATOR

Brand	Model	Serial No.	Calibrated (dB)	Frequency (Hz)
PULSAR	22R	79781	114.00	1000

No.	Brand	Model	Serial No.	Reading (dB)	dB Adjust
1	Pulsar	22	PB621	114.0	0.0
2	Pulsar	22	PB637	114.0	0.0
3	Pulsar	22	PB638	114.0	0.0

Calibrated by :



Approved by :



ภาคผนวก จ

หนังสืออนุญาตขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
จากกรมโรงงานอุตสาหกรรม



ที่ อก ๐๓๑๐(๑)/ ๑๗๔ ๕

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๐๕ กุมภาพันธ์ ๒๕๖๕

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท ซีคอฟ จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๒๘ มกราคม ๒๕๖๕

ตามหนังสือที่อ้างถึง บริษัท ซีคอฟ จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๒๓๙
สถานที่ตั้งเลขที่ ๒๓๙ ถนนริมคลองประปา แขวงบางซื่อ เขตบางซื่อ กรุงเทพมหานคร ขอเปลี่ยนแปลง
บุคลากรของห้องปฏิบัติการวิเคราะห์ ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้

๑. ให้ยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๔ ราย

- | | |
|-------------------------------------|----------------------------|
| ๑) นางสาวโชติมาส ไทยเจริญ | ทะเบียนเลขที่ ๖-๒๓๙-จ-๖๐๐๖ |
| ๒) นางสาวณัฐศิริ เลิศธีรพัฒน์ | ทะเบียนเลขที่ ๖-๒๓๙-จ-๖๔๒๓ |
| ๓) นางสาวเกวรินทร์ ศิลศึก | ทะเบียนเลขที่ ๖-๒๓๙-จ-๖๔๒๔ |
| ๔) นางสาวจิรนนท์ จิตตะศรี ปิยะธนากร | ทะเบียนเลขที่ ๖-๒๓๙-จ-๗๒๓๒ |

๒. ให้เพิ่มผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๑ ราย

- | | |
|----------------------------|----------------------------|
| นางสาวณัฐศิริ เลิศธีรพัฒน์ | ทะเบียนเลขที่ ๖-๒๓๙-ค-๐๐๐๑ |
|----------------------------|----------------------------|

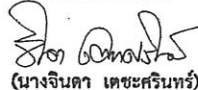
๓. ให้เพิ่มเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๒ ราย

- | | |
|---------------------------------|----------------------------|
| ๑) นางสาวสุตาพร สุนทร | ทะเบียนเลขที่ ๖-๒๓๙-จ-๐๐๐๑ |
| ๒) นางสาวณัฐณิชา อินทรประสิทธิ์ | ทะเบียนเลขที่ ๖-๒๓๙-จ-๐๐๐๒ |

อนึ่ง หนังสือฉบับนี้จะหมดอายุพร้อมหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
ที่ อก ๐๓๑๐(๑)/๑๑๘๐๔ ลงวันที่ ๒๑ ตุลาคม ๒๕๖๓ คือในวันที่ ๒ พฤษภาคม ๒๕๖๖ ทั้งนี้ สามารถยื่นคำ
ขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม ตาม QR Code ท้ายหนังสือฉบับนี้

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ


(นางจินดา เดชะศรีนทร์)

ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน
ปฏิบัติการตามแผนปฏิบัติการกรมโรงงานอุตสาหกรรม



ยื่นคำขอผ่านระบบอิเล็กทรอนิกส์

กองวิจัยและเตือนภัยมลพิษโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕

โทรสาร ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๙๔

ไปรษณีย์อิเล็กทรอนิกส์ saraban@diw.mail.go.th



ที่ อก ๐๓๑๐(๑)/ ๑๑ ๘ ๐ ๕

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ เขตราชเทวี
กรุงเทพมหานคร ๑๐๕๐๐

๒๑ ตุลาคม ๒๕๖๓

เรื่อง ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท ซีคอฟ 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 ซีคอฟ จำกัด ขอต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการ
วิเคราะห์เอกชน เลขทะเบียน ๖-๒๓๙ สถานที่ตั้งเลขที่ ๒๓๙ ถนนริมคลองประปา แขวงบางซื่อ เขตบางซื่อ
กรุงเทพมหานคร ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท ซีคอฟ จำกัด ต่ออายุหนังสือรับขึ้นทะเบียน
ห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๑๐ ราย ตามสิ่งที่ส่งมาด้วย ๑

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๓๑ ราย ตามสิ่งที่ส่งมาด้วย ๒

ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนไว้วิเคราะห์ในน้ำเสีย จำนวน ๔๖ รายการ น้ำได้ดิน
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


(นางจินดา เดชะศรีนทร์)

ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน
ปฏิบัติการตามแผนปฏิบัติการกรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๒๐๒ ๔๐๐๒ ๐ ๒๒๐๒ ๔๑๔๖

โทรสาร ๐ ๒๓๕๔ ๓๒๐๘ ๐ ๒๓๕๔ ๓๔๑๕

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท ซีคोट จำกัด

เลขทะเบียน ว-๒๓๙

ที่ อก ๐๓๑๐(๑)/ ๑๑ ๘ ๐ ๔

ลงวันที่ ๒๑ ตุลาคม ๒๕๖๓

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๑๐ ราย

๑) นางสาวฤดี เกรียงไกรอุดม	ทะเบียนเลขที่ ว-๒๓๙-ค-๕๕๒๐
๒) นางอารยา ทิพรักษ์	ทะเบียนเลขที่ ว-๒๓๙-ค-๕๕๖๓
๓) นายขรรชัย เกรียงไกรอุดม	ทะเบียนเลขที่ ว-๒๓๙-ค-๕๕๗๕
๔) นางสาวชมชุตตา อินทร์ศรี	ทะเบียนเลขที่ ว-๒๓๙-ค-๕๕๗๖
๕) นางสาวปรีดา สมใจ	ทะเบียนเลขที่ ว-๒๓๙-ค-๕๕๗๘
๖) นางสาวอริญญา มาตา	ทะเบียนเลขที่ ว-๒๓๙-ค-๕๕๗๙
๗) นางสาวลดาวัลย์ วงศ์เจริญ	ทะเบียนเลขที่ ว-๒๓๙-ค-๕๕๘๐
๘) นางสาวมณีวรรณ เกตวันดี	ทะเบียนเลขที่ ว-๒๓๙-ค-๕๕๘๒
๙) นางสาวนริสา ภูวสรเพ็ญ	ทะเบียนเลขที่ ว-๒๓๙-ค-๖๔๑๙
๑๐) นางสาวศิริวรรณ อิมสง่า	ทะเบียนเลขที่ ว-๒๓๙-ค-๖๔๒๐

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท ซีคोट จำกัด

เลขทะเบียน ว-๒๓๙

ที่ อก ๐๓๑๐(๑)/ ๑๑ ๘ ๐ ๔

ลงวันที่ ๒๑ ตุลาคม ๒๕๖๓

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๓๑ ราย

๑) นางสาวสุรัชวี ชัยธรรม	ทะเบียนเลขที่ ว-๒๓๙-จ-๕๕๒๕
๒) นางสาวสุธาทิพย์ เทียนเตี้ย	ทะเบียนเลขที่ ว-๒๓๙-จ-๕๕๒๙
๓) นางสาวสุนันทา ศิริคุณานนท์	ทะเบียนเลขที่ ว-๒๓๙-จ-๕๕๘๓
๔) นายบวร ศิขัยยะ	ทะเบียนเลขที่ ว-๒๓๙-จ-๕๕๘๖
๕) นางสาวเกศรินทร์ วรเดชาวิทยา	ทะเบียนเลขที่ ว-๒๓๙-จ-๕๕๙๑
๖) นายอนันต์พนธ์ พิมวันนา	ทะเบียนเลขที่ ว-๒๓๙-จ-๖๐๐๑
๗) นายชิตพล สมประสงค์	ทะเบียนเลขที่ ว-๒๓๙-จ-๖๐๐๒
๘) นางสาวศศิธร พรหมประเสริฐ	ทะเบียนเลขที่ ว-๒๓๙-จ-๖๐๐๓
๙) นายศิวนนท์ กลวงษ์	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 คณิธรานนท์	ทะเบียนเลขที่ ว-๒๓๙-จ-๗๒๓๑
๑๕) นางสาวจิรนนท์ จิตตะศรี ปิยะธนากร	ทะเบียนเลขที่ ว-๒๓๙-จ-๗๒๓๒
๑๖) นางสาวสิริวรรณ แก้วชิงดวง	ทะเบียนเลขที่ ว-๒๓๙-จ-๗๒๓๓
๑๗) นางสาวปัทมวรรณ สุวรรณวิโรจน์	ทะเบียนเลขที่ ว-๒๓๙-จ-๗๒๓๔
๑๘) นางสาวกนิษฐา เจริญเชื้อ	ทะเบียนเลขที่ ว-๒๓๙-จ-๗๒๓๖
๑๙) นายจิรากร ล้อมศิลา	ทะเบียนเลขที่ ว-๒๓๙-จ-๗๒๓๗
๒๐) นายชนาธิป สิงห์เกษมศักดิ์	ทะเบียนเลขที่ ว-๒๓๙-จ-๗๒๓๘
๒๑) นายวัชรกานต์ ประมาคะเต	ทะเบียนเลขที่ ว-๒๓๙-จ-๗๒๔๐
๒๒) นายชอง เสงฆ์กุล	ทะเบียนเลขที่ ว-๒๓๙-จ-๗๒๔๒
๒๓) นางสาวกฤษณา จันทุม	ทะเบียนเลขที่ ว-๒๓๙-จ-๗๘๐๒
๒๔) นางสาวพรนภา บุตรธรรม	ทะเบียนเลขที่ ว-๒๓๙-จ-๗๘๐๓
๒๕) นางสาวธาริณี อาจปลิว	ทะเบียนเลขที่ ว-๒๓๙-จ-๗๘๐๔
๒๖) นายธนโชติ ช่างล้อ	ทะเบียนเลขที่ ว-๒๓๙-จ-๗๘๐๖
๒๗) นางสาวพัชรา สมานพันธ์	ทะเบียนเลขที่ ว-๒๓๙-จ-๘๑๑๓
๒๘) นางสาวจุฑารัตน์ แจ่มเรือน	ทะเบียนเลขที่ ว-๒๓๙-จ-๘๔๔๓
๒๙) นางสาวจณิสตา กุ้ยอ่อน	ทะเบียนเลขที่ ว-๒๓๙-จ-๘๕๓๗
๓๐) นางสาววรัญญา เขียนม้น	ทะเบียนเลขที่ ว-๒๓๙-จ-๘๕๓๘
๓๑) นางสาวจิรารัตน์ นุริตมนต์	ทะเบียนเลขที่ ว-๒๓๙-จ-๘๕๓๙

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท ซีคอฟ 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 จิตรสกุลไธ)

ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ
และทะเบียนห้องปฏิบัติการ

10 Chemical...

-๒-

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]



(นางริกาญจน์ จิตรสกุลไธ)

ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ
และทะเบียนห้องปฏิบัติการ

21 Endosulfan I...

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]

วิภา

(นางริกาญจน์ ฉัตรสกุลวิไล)

32 Manganese...

ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ

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]

วิภา

(นางริกาญจน์ ฉัตรสกุลวิไล)

น้ำใต้ดิน...

ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ

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]

วิทย์

16 Beryllium...

(นางริกาญจน์ ถักรสกุลวิไล)

ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ

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]

วิทย์

32 2-Chlorophenol...

(นางริกาญจน์ ถักรสกุลวิไล)

ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ

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]

วิทย์

42 Diben(a,h)...

(นางริกาญจน์ ฉัตรสกุลวิไล)
ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ
และทะเบียนห้องปฏิบัติการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
42	Diben(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]

วิทย์

59 2,4-Dimethylphenol...

(นางริกาญจน์ ฉัตรสกุลวิไล)
ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ
และทะเบียนห้องปฏิบัติการ

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...

(นางริภาณูจน์ ฉัตรสกุลวิไล)
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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]

85 Methoxychlor...

(นางริภาณูจน์ ฉัตรสกุลวิไล)
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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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 และทะเบียนห้องปฏิบัติการ

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]


 (นางริกาญจน์ ฉัตรสกุลวิไล)
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112 1,1,2-Trichloroethane...

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]

วิมล

(นางริกาญจน์ ฉัตรสุภาวดี)

ผู้อำนวยการศูนย์มาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ
และทะเบียนห้องปฏิบัติการ

2 Arsenic...

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]

วิมล

(นางริกาญจน์ ฉัตรสุภาวดี)

ผู้อำนวยการศูนย์มาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ

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]

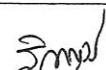
26 Vanadium...


(นางริยาญจน์ ฉัตรสกุลวิไล)
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และทะเบียนห้องปฏิบัติการ

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]
6	Cadmium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 2) Digestion, Inductively Coupled Plasma Method ^[7,14]
7	Chlordane	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]
8	Chromium	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]
9	Chromium (III)	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]
		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]

3) Digestion...

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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]
		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...

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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] 4) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,26]
17	Dieldrin	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]
18	Endrin	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]
19	Heptachlor	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...

4) Soxhlet...

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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]

25 Nickel...

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และทะเบียนห้องปฏิบัติการ

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 1248 - 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]

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33 Vanadium...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
33	Vanadium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 2) Digestion, Inductively Coupled Plasma Method ^[7,14]
34	Zinc	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]

ดิน จำนวน 122 รายการ

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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และทะเบียนห้องปฏิบัติการ

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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และทะเบียนห้องปฏิบัติการ

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]

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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 จิตตรกุลวิไล)

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และทะเบียนห้องปฏิบัติการ

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]



(นางริกาญจน์ จิตตรกุลวิไล)

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และทะเบียนห้องปฏิบัติการ

70 Heptachlor epoxide...

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]



83 Mercury...

(นางริกาญจน์ นัตตสกุลวิไล)

ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ
และทะเบียนเครื่องใช้การ

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 นัตตสกุลวิไล)

ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ
และทะเบียนเครื่องใช้การ

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]



(นางริกาญจน์ จิตตรกุลไฉ)

ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ

111 1,1,2-Trichloroethane...

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 จิตตรกุลไฉ)

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(นางริภาญจน์ จันตรสกุลวิไล)

ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ

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(นางริภาญจน์ จันตรสกุลวิไล)

ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ
และทะเบียนห้องปฏิบัติการ

ภาคผนวก ข

ใบรับรองความสามารถห้องปฏิบัติการและขอบข่ายการรับรอง
ห้องปฏิบัติการทดสอบ ตามมาตรฐาน ISO/IEC 17025
จากสำนักงานมาตรฐานอุตสาหกรรม (สมอ.)



ใบรับรองเลขที่ 20T173/1151

ใบรับรองห้องปฏิบัติการ

อาศัยอำนาจตามความในพระราชบัญญัติการมาตรฐานแห่งชาติ พ.ศ. ๒๕๕๑

เลขาธิการสำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม

ออกใบรับรองฉบับนี้ให้

บริษัท ซีคอต จำกัด

มีห้องปฏิบัติการตั้งอยู่เลขที่

239 ถนนริมคลองประปา แขวงบางซื่อ เขตบางซื่อ กรุงเทพมหานคร

ได้รับการรับรองความสามารถห้องปฏิบัติการทดสอบ

ตามมาตรฐานเลขที่ นอก. 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

(นายวีระกิตต์ วันทกิจอนันท์)

รองเลขาธิการ ปฏิบัติราชการแทน

เลขาธิการสำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม



กระทรวงอุตสาหกรรม สำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม

รายละเอียดแนบท้ายใบรับรองห้องปฏิบัติการทดสอบ

ใบรับรองเลขที่ 20T173/1151

ชื่อห้องปฏิบัติการ

ห้องปฏิบัติการทดสอบ บริษัท ซีคอต จำกัด

ที่อยู่

239 ถนนริมคลองประปา แขวงบางซื่อ เขตบางซื่อ กรุงเทพมหานคร

หมายเลขการรับรองที่

ทดสอบ 0394

สถานภาพห้องปฏิบัติการ

☒ ถาวร ☐ นอกสถานที่ ☐ ชั่วคราว ☐ เคลื่อนที่

สาขาการทดสอบ	รายการทดสอบ	วิธีทดสอบ
สาขาสังแวดล้อม 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
สาขาสิ่งแวดล้อม		
1. น้ำและน้ำเสีย (ต่อ) (water and wastewater) (cont.)	- COD 100 mg/l to 4 000 mg/l	- Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 23 rd edition, 2017, Part 5220 D
2. คุณภาพอากาศ (air quality)		
2.1 บริเวณทำงาน (workplace)	- Total dust 0.10 mg/filter to 2.00 mg/filter - Respirable dust 0.10 mg/filter to 2.00 mg/filter - Benzene 1.10 µg/tube to 420 µg/tube - Toluene 1.10 µg/tube to 420 µg/tube - Total xylenes 2.20 µg/tube to 840 µg/tube • m,p-xylene 1.10 µg/tube to 420 µg/tube • o-xylene 1.10 µg/tube to 420 µg/tube	- NIOSH Manual of Analytical Methods (NMAM), method 0500, 4 th edition, 15 th August 1994 (Exclude Sampling) - NIOSH Manual of Analytical Method(NMAM), method 0600, 4 th edition, 15 th January 1998 (Exclude Sampling) - NIOSH Manual of Analytical Methods (NMAM) , method 1501, 4 th edition, 15 th March 2003 (Exclude Sampling)

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
สาขาสิ่งแวดล้อม		
2. คุณภาพอากาศ (ต่อ) (air quality) (cont.)		
2.2 อากาศในปล่องระบาย อากาศ (stack)	- Sulfur dioxide 1.00 mg/l to 16 000 mg/l (solution)	- US.EPA , Code of Federal Regulations, 40 CFR 60 appendix A, Method 6, July 2019 (Exclude Sampling)
2.3 บรรยากาศทั่วไป (ambient air)	- Hydrogen fluoride 5 µg/sample to 400 µg/sample - Hydrogen chloride 5 µg/sample to 400 µg/sample - Volatile organic compounds (VOCs) • Chloroethene 0.05 µg/m ³ to 51.00 µg/m ³ • 1,3 - butadiene 0.04 µg/m ³ to 44.00 µg/m ³ • Bromomethane 0.08 µg/m ³ to 77.00 µg/m ³ • Acrolein 0.05 µg/m ³ to 45.00 µg/m ³ • Acrylonitrile 0.04 µg/m ³ to 43.00 µg/m ³ • Dichloromethane 0.14 µg/m ³ to 69.00 µg/m ³ • Carbon disulfide 0.06 µg/m ³ to 62.00 µg/m ³ • Trichloromethane 0.20 µg/m ³ to 97.00 µg/m ³	- 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) - 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)

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
สาขาสิ่งแวดล้อม 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
สาขาสิ่งแวดล้อม 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 ๑3 กันยายน ๒563



(นายวิระกิตต์ รันกิจธนวัน)
รองเลขาธิการ ปฏิบัติราชการแทน
เลขาธิการสำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม