

ภาคผนวก ค
ใบรายงานผลการวิเคราะห์



ภาคผนวก ค-1

ใบรายงานผลการวิเคราะห์ ระยะก่อนก่อสร้าง



ANALYSIS REPORT

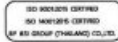
CUSTOMER NAME : STAR FUELS MARKETING LIMITED.
ADDRESS : 202 MOO 1 HUA KHAD SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 082 829 6210 e-mail : sakofees@sprc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : MARCH 14, 2024
SAMPLING TIME : 13:15 HOUR
SAMPLING METHOD : GRAB
SAMPLING BY : MR ANANT HLOOR
ANALYZED BY : MISS NAPAPORN KHUNNOOKOHUM
RECEIVED DATE : MARCH 15, 2024
ANALYTICAL DATE : MARCH 15-27, 2024
ISSUE DATE : MARCH 28, 2024
REPORT NO. : 2024-U026438
WORK NO. : 2024-002104
ANALYSIS NO. : T24AF449-0001

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT ผลการวิเคราะห์ เมื่อทราบผลทางเคมี สีที่ชัดเจนแล้ว (known as %v) T24AF449-0001	REGULATORY STANDARD	DETECTION LIMIT
FLOATABLE OIL AND GREASE	-	OBSERVATION METHOD	NOT VISIBLE	NOT VISIBLE	-
TURBIDITY	NTU	NEPHELOMETRIC METHOD (SM PART 2130 B)	13	-	0.1
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM PART 2540 D)	13.3	10 ⁶	10
OIL AND GREASE	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	-	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLEAR YELLOW		

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.
REGULATORY STANDARD : SEAWATER QUALITY STANDARDS, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, B.E. 2564
PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 138, PART 245 D, DATED OCTOBER 6, 2021
CLASS 5 : SEAWATER QUALITY FOR INDUSTRY AND PORTS (1) SEAWATER ADJACENT TO INDUSTRIAL ESTATES BOUNDARY ACCORDING TO
THE INDUSTRIAL ESTATE AUTHORITY OF THAILAND ACT AND INDUSTRIAL ZONE ACCORDING TO INDUSTRIAL LAW WITH A
BOUNDARY FROM THE HIGHEST TIDE LINE TO THE LOWEST TIDE LINE UP TO A DISTANCE OF 1000 METERS ALONG THE HORIZONTAL
LINE OF THE SEAWATER SURFACE (2) SEAWATER IN THE PORTAL AREA THE MOORING AREA ACCORDING TO THE NAVIGATION IN
THE THAI WATERS ACT (3) SEAWATER ADJACENT TO THE TERMINAL PORT THAT ACCEPTS SHIPS OF 500 GROSS TONS (OR ABOVE)
OR THE BERTHS LENGTH IS FROM 100 METERS (OR ABOVE), OR HAS A TOTAL BERTH AREA OF 1000 SQUARE METERS OR ABOVE,
WITH A BOUNDARY STARTING FROM THE ADJACENT BERTH TO A DISTANCE OF 1000 METERS ALONG THE SEAWATER SURFACE.
10⁶ : THE RESULTS SHOULD NOT BE CHANGED BY MORE THAN THE SUM OF DAILY OR MONTHLY OR YEARLY AVERAGE AND
THE STANDARD DIVIATION. DAILY AVERAGE WAS CALCULATED FROM HOURLY MEASUREMENT OR AT LEAST 5 SAMPLES TAKEN AT
EQUAL TIME INTERVAL WITHIN ONE DAY. MONTHLY AVERAGE WAS CALCULATED FROM DAILY MEASUREMENT OR AT LEAST
4 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE MONTH. YEARLY AVERAGE WAS CALCULATED FROM MONTHLY
MEASUREMENT AT EQUAL TIME INTERVAL AND THE SAME PLACE WITHIN ONE YEAR.
ND : NON-DETECTABLE.

(MRS PIYAPAT SUTTAMANUTWONG)
LABORATORY SUPERVISOR

MARCH 29, 2024



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• THIS ANALYSIS REPORT APPROVES ONLY FOR THE SAMPLES AS RECEIVED.

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- End of Analysis Report -

ANALYSIS REPORT

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ADDRESS : 202 MOO 1 HUA KHAD SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 082 829 6210 e-mail : sakofees@sprc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : MARCH 14, 2024
SAMPLING TIME : 12:40 HOUR
SAMPLING METHOD : GRAB
SAMPLING BY : MR ANANT HLOOR
ANALYZED BY : MISS NAPAPORN KHUNNOOKOHUM
RECEIVED DATE : MARCH 15, 2024
ANALYTICAL DATE : MARCH 15-27, 2024
ISSUE DATE : MARCH 28, 2024
REPORT NO. : 2024-U026443
WORK NO. : 2024-002104
ANALYSIS NO. : T24AF449-0001

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT ผลการวิเคราะห์ เมื่อทราบผลทางเคมี สีที่ชัดเจนแล้ว (known as %v) T24AF449-0001	REGULATORY STANDARD	DETECTION LIMIT
FLOATABLE OIL AND GREASE	-	OBSERVATION METHOD	NOT VISIBLE	NOT VISIBLE	-
TURBIDITY	NTU	NEPHELOMETRIC METHOD (SM PART 2130 B)	9.3	-	0.1
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM PART 2540 D)	6.4	10 ⁶	10
OIL AND GREASE	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	-	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLEAR YELLOW		

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.
REGULATORY STANDARD : SEAWATER QUALITY STANDARDS, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, B.E. 2564
PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 138, PART 245 D, DATED OCTOBER 6, 2021
CLASS 5 : SEAWATER QUALITY FOR INDUSTRY AND PORTS (1) SEAWATER ADJACENT TO INDUSTRIAL ESTATES BOUNDARY ACCORDING TO
THE INDUSTRIAL ESTATE AUTHORITY OF THAILAND ACT AND INDUSTRIAL ZONE ACCORDING TO INDUSTRIAL LAW WITH A
BOUNDARY FROM THE HIGHEST TIDE LINE TO THE LOWEST TIDE LINE UP TO A DISTANCE OF 1000 METERS ALONG THE HORIZONTAL
LINE OF THE SEAWATER SURFACE (2) SEAWATER IN THE PORTAL AREA THE MOORING AREA ACCORDING TO THE NAVIGATION IN
THE THAI WATERS ACT (3) SEAWATER ADJACENT TO THE TERMINAL PORT THAT ACCEPTS SHIPS OF 500 GROSS TONS (OR ABOVE)
OR THE BERTHS LENGTH IS FROM 100 METERS (OR ABOVE), OR HAS A TOTAL BERTH AREA OF 1000 SQUARE METERS OR ABOVE,
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EQUAL TIME INTERVAL WITHIN ONE DAY. MONTHLY AVERAGE WAS CALCULATED FROM DAILY MEASUREMENT OR AT LEAST
4 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE MONTH. YEARLY AVERAGE WAS CALCULATED FROM MONTHLY
MEASUREMENT AT EQUAL TIME INTERVAL AND THE SAME PLACE WITHIN ONE YEAR.
ND : NON-DETECTABLE.

(MRS PIYAPAT SUTTAMANUTWONG)
LABORATORY SUPERVISOR

MARCH 29, 2024



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ADDRESS : 202 MOO 1 HUA KHAD SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 082 829 6210 e-mail : sakofee@spc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : MARCH 14, 2024
SAMPLING TIME : 12:00 HOUR
SAMPLING METHOD : GRAB
SAMPLING BY : MR. ANANT HUDOR
ANALYZED BY : MISS NAPAPORN KHUNNOKKULUM

RECEIVED DATE : MARCH 15, 2024
ANALYTICAL DATE : MARCH 15-27, 2024
ISSUE DATE : MARCH 28, 2024
REPORT NO. : 2024-U026324
WORK NO. : 2024-002104
ANALYSIS NO. : T24AF446-0001

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT ผลการตรวจ พบ (หรือไม่มีพบ) T24AF446-0001	REGULATORY STANDARD	DETECTION LIMIT
FLOATABLE OIL AND GREASE	-	OBSERVATION METHOD	NOT VISIBLE	NOT VISIBLE	-
TURBIDITY	NTU	NEPHELOMETRIC METHOD (SM PART 2130 B)	8.2	-	0.1
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM PART 2540 D)	9.3	n ^a	1.0
OIL AND GREASE	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM PART 5620 B)	ND	-	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLEAR YELLOW		

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.
REGULATORY STANDARD : SEAWATER QUALITY STANDARDS, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, B.E. 2564
PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 136, PART 245 D, DATED OCTOBER 6, 2021
CLASS 5 : SEAWATER QUALITY FOR INDUSTRY AND PORTS (1) SEAWATER ADJACENT TO INDUSTRIAL ESTATES BOUNDARY ACCORDING TO THE INDUSTRIAL ESTATE AUTHORITY OF THAILAND ACT AND INDUSTRIAL ZONE ACCORDING TO INDUSTRIAL LAW WITH A BOUNDARY FROM THE HIGHEST TIDE LINE TO THE LOWEST TIDE LINE UP TO A DISTANCE OF 1000 METERS ALONG THE HORIZONTAL LINE OF THE SEAWATER SURFACE (2) SEAWATER IN THE PORTAL AREA THE MOORING AREA ACCORDING TO THE NAVIGATION IN THE THAI WATERS ACT (3) SEAWATER ADJACENT TO THE TERMINAL PORT THAT ACCEPTS SHIPS OF 500 GROSS TONS (OR ABOVE) OR THE BERTHS LENGTH IS FROM 100 METERS (OR ABOVE), OR HAS A TOTAL BERTH AREA OF 1000 SQUARE METERS OR ABOVE, WITH A BOUNDARY STARTING FROM THE ADJACENT BERTH TO A DISTANCE OF 1000 METERS ALONG THE SEAWATER SURFACE.
n^a : THE RESULTS SHOULD NOT BE CHANGED BY MORE THAN THE SUM OF DAILY OR MONTHLY OR YEARLY AVERAGE AND THE STANDARD DIVATION. DAILY AVERAGE WAS CALCULATED FROM HOURLY MEASUREMENT OR AT LEAST 5 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE DAY. MONTHLY AVERAGE WAS CALCULATED FROM DAILY MEASUREMENT OR AT LEAST 4 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE MONTH. YEARLY AVERAGE WAS CALCULATED FROM MONTHLY MEASUREMENT AT EQUAL TIME INTERVAL AND THE SAME PLACE WITHIN ONE YEAR.
ND : NON-DETECTABLE.

(RIS PETAIPAT SUITAPANUTWONG)
LABORATORY SUPERVISOR
MARCH 29, 2024

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BY SGS GROUP (THAILAND) CO., LTD.

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ANALYSIS REPORT

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ADDRESS : 202 MOO 1 HUA KHAD SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 082 829 6210 e-mail : sakofee@spc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : MARCH 14, 2024
SAMPLING TIME : 11:20 HOUR
SAMPLING METHOD : GRAB
SAMPLING BY : MR. ANANT HUDOR
ANALYZED BY : MISS NAPAPORN KHUNNOKKULUM

RECEIVED DATE : MARCH 15, 2024
ANALYTICAL DATE : MARCH 15-27, 2024
ISSUE DATE : MARCH 28, 2024
REPORT NO. : 2024-U026434
WORK NO. : 2024-002104
ANALYSIS NO. : T24AF447-0001

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT ผลการตรวจ พบ (หรือไม่มีพบ) T24AF447-0001	REGULATORY STANDARD	DETECTION LIMIT
FLOATABLE OIL AND GREASE	-	OBSERVATION METHOD	NOT VISIBLE	NOT VISIBLE	-
TURBIDITY	NTU	NEPHELOMETRIC METHOD (SM PART 2130 B)	15	-	0.1
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM PART 2540 D)	15.2	n ^a	1.0
OIL AND GREASE	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM PART 5620 B)	ND	-	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLEAR YELLOW		

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.
REGULATORY STANDARD : SEAWATER QUALITY STANDARDS, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, B.E. 2564
PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 136, PART 245 D, DATED OCTOBER 6, 2021
CLASS 5 : SEAWATER QUALITY FOR INDUSTRY AND PORTS (1) SEAWATER ADJACENT TO INDUSTRIAL ESTATES BOUNDARY ACCORDING TO THE INDUSTRIAL ESTATE AUTHORITY OF THAILAND ACT AND INDUSTRIAL ZONE ACCORDING TO INDUSTRIAL LAW WITH A BOUNDARY FROM THE HIGHEST TIDE LINE TO THE LOWEST TIDE LINE UP TO A DISTANCE OF 1000 METERS ALONG THE HORIZONTAL LINE OF THE SEAWATER SURFACE (2) SEAWATER IN THE PORTAL AREA THE MOORING AREA ACCORDING TO THE NAVIGATION IN THE THAI WATERS ACT (3) SEAWATER ADJACENT TO THE TERMINAL PORT THAT ACCEPTS SHIPS OF 500 GROSS TONS (OR ABOVE) OR THE BERTHS LENGTH IS FROM 100 METERS (OR ABOVE), OR HAS A TOTAL BERTH AREA OF 1000 SQUARE METERS OR ABOVE, WITH A BOUNDARY STARTING FROM THE ADJACENT BERTH TO A DISTANCE OF 1000 METERS ALONG THE SEAWATER SURFACE.
n^a : THE RESULTS SHOULD NOT BE CHANGED BY MORE THAN THE SUM OF DAILY OR MONTHLY OR YEARLY AVERAGE AND THE STANDARD DIVATION. DAILY AVERAGE WAS CALCULATED FROM HOURLY MEASUREMENT OR AT LEAST 5 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE DAY. MONTHLY AVERAGE WAS CALCULATED FROM DAILY MEASUREMENT OR AT LEAST 4 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE MONTH. YEARLY AVERAGE WAS CALCULATED FROM MONTHLY MEASUREMENT AT EQUAL TIME INTERVAL AND THE SAME PLACE WITHIN ONE YEAR.
ND : NON-DETECTABLE.

(RIS PETAIPAT SUITAPANUTWONG)
LABORATORY SUPERVISOR
MARCH 29, 2024

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BY SGS GROUP (THAILAND) CO., LTD.

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CUSTOMER NAME : STAR FUELS MARKETING LIMITED.
ADDRESS : 202 MOO 1, HUA KHAD SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 082 829 6210 e-mail : sakofee@sprc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER.
SAMPLING DATE : MARCH 14, 2024
SAMPLING TIME : 13.20 HOUR
SAMPLING METHOD^h : PLANKTON NET
SAMPLING BY^h : MR. ANANT MUDOR
ANALYZED BY : MISS NAPAPORN PURATAKO

RECEIVED DATE : MARCH 15, 2024
ANALYTICAL DATE : MARCH 15-25, 2024
ISSUE DATE : MARCH 29, 2024
REPORT NO. : 2024-U026213
WORK NO. : 2024-002104
ANALYSIS NO. : T24AF448-0002

PHYTOPLANKTON (Natural Unit/ml.)	COUNTING UNIT	RESULT ^h	
		SAMPLE NO. 1 T24AF448-0002	
Division Cyanophyta			
Class Cyanophyceae			
Family Oscillatoriaceae			
Oscillatoria spp. ^h	FILAMENT	6	
Division Chromophyta			
Class Bacillariophyceae			
Family Thalassiosiraceae			
Lauderia aruata ^h	FILAMENT	12	
Skellatzenia spp. ^h	FILAMENT	29	
Thalassiosira spp. ^h	CELL	54	
Family Melosiraceae			
Paralia sulcata ^h	CELL	12	
Family Leptocylindraceae			
Corethron crithaleum ^h	CELL	17	
Leptocylindrus denticus ^h	FILAMENT	14	
Family Coscinodiscaceae			
Coscinodiscus spp. ^h	CELL	54	
Family Rhizosoleniaceae			
Guthriea spp. ^h	CELL	56	
Protosira alata ^h	CELL	16	
Rhizosolenia spp. ^h	CELL	179	
Family Hemisulaceae			
Hemisulva spp. ^h	CELL	45	
Family Chaetocerotaceae			
Bacteriosira spp. ^h	FILAMENT	18	
Chaetoceros spp. ^h	CELL	9,407	
Family Eupodaceae			
Oubertella spp. ^h	CELL	8	
Triceratium spp. ^h	CELL	2	
Family Fragilariaceae			
Asterionella gracilis ^h	CELL	36	

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1/3



PHYTOPLANKTON (Natural Unit/ml.)	COUNTING UNIT	RESULT ^h	
		SAMPLE NO. 1 T24AF448-0002	
Family Thalassiosiraceae			
Thalassiosira nitrochloides ^h	CELL	120	
Family Naviculaceae			
Amphora spp. ^h	CELL	16	
Diptonella spp. ^h	CELL	12	
Pleurosigma spp. ^h	CELL	61	
Trachyneis spp. ^h	CELL	10	
Family Bacillariaceae			
Bacillaria paxillifer ^h	CELL	546	
Cylindrotheca gracilis ^h	CELL	23	
Nitzschia spp. ^h	CELL	46	
N. longissima ^h	CELL	63	
Pseudo-nitzschia spp. ^h	CELL	441	
Family Surirellaceae			
Entomoneis spp. ^h	CELL	225	
Surirella spp. ^h	CELL	5	
Class Dinophyceae			
Family Prorocentraceae			
Prorocentrum spp. ^h	CELL	10	
Family Dinophysiaceae			
Dinophysis spp. ^h	CELL	5	
Family Noctilucaeae			
Noctiluca spp. ^h	CELL	7	
Family Cerataceae			
Ceratium spp. ^h	CELL	16	
C. furca ^h	CELL	14	
C. fusus ^h	CELL	6	
Family Peridiniaceae			
Peridinium spp. ^h	CELL	19	

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2/3

2024-U026213

ZOOPLANKTON (UNITS/m ³)	COUNTING UNIT	RESULT
		SAMPLE NO. 1 T24AF448-0002
Phylum Chordata		
Class Larvacea		
Family Oikopleuridae		
Oikopleura sp.	INDIVIDUAL	42,397
TOTAL ABUNDANCE	UNITS/m ³	861,008
ORGANISMS COUNTED	NUMBER	10
SAMPLE CONDITION (VISUAL OBSERVATION)		
COLOUR AND TURBIDITY OF WATER		YELLOW/TURBID
COLOUR OF SEDIMENT		BROWN

NOTE: 1. STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF 23RD EDITION, 2017 PART 1020 F.
SAMPLE NAME SAMPLE NO. 1 บริเวณที่มีการขุดลอกคลองบริเวณหน้าท่าเรือของโรงงาน (คลองลำช้าง)

(MISS CHAWEEWAN BOONLA)
LABORATORY SUPERVISOR

APRIL 1, 2024



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2/2

2024-U026214

- End of Analysis Report -

ANALYSIS REPORT

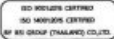
CUSTOMER NAME : STAR FUELS MARKETING LIMITED.
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CONTACT INFORMATION : TEL : 082 829 6210 e-mail : sakofee@sprc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKHORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEDIMENT RECEIVED DATE : MARCH 15, 2024
SAMPLING DATE : MARCH 14, 2024 ANALYTICAL DATE : MARCH 15-22, 2024
SAMPLING TIME : 13:30 HOUR ISSUE DATE : MARCH 29, 2024
SAMPLING METHOD : PETERSEN GRAB REPORT NO. : 2024-U026215
SAMPLING BY : MR ANANT MUJOR WORK NO. : 2024-002104
ANALYZED BY : MISS PATCHAREE KONGCHUMMAN ANALYSIS NO. : T24AF448-0003

BENTHOS (INDIVIDUALS/m ²)	RESULT
	SAMPLE NO. 1 T24AF448-0003
Phylum Annelida	
Class Polychaeta	
Family Nereididae	7
Family Spionidae	7
TOTAL DENSITY (INDIVIDUALS/m ²)	14
AMOUNT OF SPECIES	2
SAMPLE CONDITION	CLAY WITH SHELLS

SAMPLE NO. 1 บริเวณที่มีการขุดลอกคลองบริเวณหน้าท่าเรือของโรงงาน (คลองลำช้าง)

(MISS CHAWEEWAN BOONLA)
LABORATORY SUPERVISOR

APRIL 1, 2024



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(202 SONGKHLA-RANDU ROAD, SINGHANAKHON, SONGKHLA 90280 TEL: 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : MARCH 14, 2024
SAMPLING TIME : 12:45 HOUR
SAMPLING METHOD : PLANKTON NET
SAMPLING BY : MR ANANT MUDOR
ANALYZED BY : MISS NAPAPORN PURATAKO

RECEIVED DATE : MARCH 15, 2024
ANALYTICAL DATE : MARCH 15-26, 2024
ISSUE DATE : MARCH 29, 2024
REPORT NO. : 2024-U026227
WORK NO. : 2024-002104
ANALYSIS NO. : T24AF449-0002

PHYTOPLANKTON (Natural Unit/ml.)	COUNTING UNIT	RESULT ¹
		SAMPLE NO. 1 T24AF449-0002
Division Cyanophyta		
Class Cyanophyceae		
Family Oscillatoriaceae		
<i>Oscillatoria</i> spp. ^b	FLAMENT	22
Division Chromophyta		
Class Bacillariophyceae		
Family Thalassiosiraceae		
<i>Thalassiosira</i> spp. ^b	CELL	283
Family Melosiraceae		
<i>Paralella sulcata</i> ^b	CELL	12
Family Coscinodiscaceae		
<i>Coscinodiscus</i> spp. ^b	CELL	19
Family Rhizosoleniaceae		
<i>Gyrodinium</i> spp. ^b	CELL	13
<i>Protophloea</i> spp. ^b	CELL	13
<i>Rhizosolenia</i> spp. ^b	CELL	62
Family Hemiseliaceae		
<i>Hemiselia</i> spp. ^b	CELL	8
Family Chaetocerotaceae		
<i>Bacillaria</i> spp. ^b	FLAMENT	24
<i>Chaetoceros</i> spp. ^b	CELL	12,155
Family Eupodiscaceae		
<i>Eupodiscus</i> spp. ^b	CELL	14
<i>Therapsacus</i> spp. ^b	CELL	2
Family Fragilariaceae		
<i>Asterionellopsis gracilis</i> ^b	CELL	36
Family Thalassionemataceae		
<i>Thalassionema nitrochlorides</i> ^b	CELL	212
Family Naviculaceae		
<i>Amphora</i> spp. ^b	CELL	10
<i>Pleurosigma</i> spp. ^b	CELL	64

ISO 9001:2015
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PHYTOPLANKTON (Natural Unit/ml.)	COUNTING UNIT	RESULT ¹
		SAMPLE NO. 1 T24AF449-0002
Family Bacillariaceae		
<i>Bacillaria</i> spp. ^b	CELL	127
<i>Cylindrotheca gracilis</i> ^b	CELL	117
<i>Nitzschia</i> spp. ^b	CELL	49
<i>N. longissima</i> ^b	CELL	18
<i>Pseudo-nitzschia</i> spp. ^b	CELL	99
Family Surirellaceae		
<i>Entomoneis</i> spp. ^b	CELL	61
<i>Surirella</i> spp. ^b	CELL	25
Class Dictyochophyceae		
Family Dictyochophyceae		
<i>Dictyocha</i> spp. ^b	CELL	10
Class Dinophyceae		
Family Prorocentraceae		
<i>Prorocentrum</i> spp. ^b	CELL	12
Family Dinophysiaceae		
<i>Dinophysis</i> spp. ^b	CELL	24
Family Gymnodiniaceae		
<i>Gymnodinium</i> spp. ^b	CELL	2
Family Noctilucaeaceae		
<i>Noctiluca</i> spp. ^b	CELL	2
Family Ceratophyceae		
<i>Ceratium</i> spp. ^b	CELL	12
<i>C. furca</i> ^b	CELL	29
<i>C. furca</i> ^b	CELL	31

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2024-U026227

PHYTOPLANKTON (Natural Units/mL)	COUNTING UNIT	RESULT ¹
		SAMPLE NO. 1 T24AF449-0002
Family Peridiniaceae	CELL	136
Peridinium spp. ²		
Family Protoperidiniaceae	CELL	33
Protoperidinium spp. ²		
TOTAL ABUNDANCE ³	Natural Units/mL	13,696
ORGANISMS COUNTED ³	NUMBER	33
SAMPLE VOLUME COLLECTION ²	ml	170
SAMPLE VOLUME FILTERED THROUGH PLANKTON NET ³	LITER	42.39
SAMPLE CONDITION (VISUAL OBSERVATION)		
COLOUR AND TURBIDITY OF WATER		COLOURLESS/CLEAR
COLOUR OF SEDIMENT		YELLOW

¹ : ISO/IEC 17025 ACCREDITED BY THAI INDUSTRIAL STANDARDS INSTITUTE (TISI)

² : VERIFIED BY OWN LABORATORY QUALITY SYSTEM, BUT NOT IN SCOPE OF ACCREDITATION

NOTE: 1. STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF 23RD EDITION, 2017 PART 10200 F.
2. REPORTING COUNTS (Natural Units/mL) BASED ON SUBSAMPLING 1 mL FILTERED WATER SAMPLE WHICH FIELD COLLECTED FROM A PLANKTON NET TOWING.

SAMPLE NAME SAMPLE NO. 1 บริเวณพื้นที่การวางเคเบิ้ลสายเคเบิลใต้น้ำบริเวณคลองน้ำเค็มและบึงหนอง (บริเวณเขื่อน)



(MISS CHAWEEWAN BOONLA)
LABORATORY SUPERVISOR

APRIL 1, 2024

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2024-U026227

- End of Analysis Report -

ANALYSIS REPORT

CUSTOMER NAME : STAR FUELS MARKETING LIMITED.
ADDRESS : 202 MOO 1 HUA KHAD SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 082 829 6210 e-mail : sakofees@sprc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKHON, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
RECEIVED DATE : MARCH 15, 2024
SAMPLING DATE : MARCH 14, 2024
ANALYTICAL DATE : MARCH 15-25, 2024
SAMPLING TIME : 12:45 HOUR
ISSUE DATE : MARCH 29, 2024
SAMPLING METHOD : PLANKTON NET
REPORT NO. : 2024-U026230
SAMPLING BY : MR ANANT MUDOR
WORK NO. : 2024-002104
ANALYZED BY : MISS NARAPORN PURATAKO
ANALYSIS NO. : T24AF449-0002

ZOOPLANKTON (Units/Lm ³)	COUNTING UNIT	RESULT
		SAMPLE NO. 1 T24AF449-0002
Phylum Protozoa		
Class Sarcodina		
Foraminifera	CELL	1233
Class Ciliata		
Family Codonellidae		
Trinopsis sp.	CELL	608
Phylum Annelida		
Class Polychaeta		
Polychaete Larva	INDIVIDUAL	6,754
Phylum Arthropoda		
Class Crustacea		
Cyclopoid Copepod	INDIVIDUAL	41,089
Calanoid Copepod	INDIVIDUAL	52,755
Nauplius of Copepod	INDIVIDUAL	357,579
Ceripedia Nauplius	INDIVIDUAL	7,968
Phylum Mollusca		
Class Gastropoda		
Gastropod Larva	INDIVIDUAL	192,851
Class Bivalvia		
Bivalvia Larva	INDIVIDUAL	3,681

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ZOOPLANKTON (UNIT/Sm ³)	COUNTING UNIT	RESULT
		SAMPLE NO. 1 T24AF449-0002
Phylum Chordata Class Larvacea Family Oikopleuridae Oikopleura sp.	INDIVIDUAL	5,521
TOTAL ABUNDANCE	UNIT/Sm ³	590,039
ORGANISMS COUNTED	NUMBER	10
SAMPLE CONDITION (VISUAL OBSERVATION) COLOUR AND TURBIDITY OF WATER COLOUR OF SEDIMENT		COLOURLESS/CLEAR YELLOW

ISSUANCE: 1. STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF 23RD EDITION, 2017 PART 1020 F.
SAMPLE NAME SAMPLE NO. 1 บริเวณที่มีการเพาะเลี้ยงสาหร่ายสีน้ำตาลบนโต๊ะทดลองในห้องปฏิบัติการ (กึ่งกลางแจ้ง)

(MISS CHAWEEWAN BOONLA)
LABORATORY SUPERVISOR

APRIL 1, 2024

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2024-U026230

- End of Analysis Report -

ANALYSIS REPORT

CUSTOMER NAME : STAR FUELS MARKETING LIMITED.
ADDRESS : 202 MDO 1 HUA KHAI SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 082 829 6210 e-mail : sakofees@sprc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEDIMENT
SAMPLING DATE : MARCH 14, 2024
SAMPLING TIME : 12:55 HOUR
SAMPLING METHOD : PETERSEN GRAB
SAMPLING BY : MR ANANT MUJOR
ANALYZED BY : MISS PATCHAREE KONGCHUMMAN
RECEIVED DATE : MARCH 15, 2024
ANALYTICAL DATE : MARCH 15-22, 2024
ISSUE DATE : MARCH 29, 2024
REPORT NO. : 2024-U026232
WORK NO. : 2024-002104
ANALYSIS NO. : T24AF449-0003

BENTHOS (INDIVIDUAL/Sm ²)	RESULT
	SAMPLE NO. 1 T24AF449-0003
Phylum Annelida Class Polychaeta Family Spionidae	14
TOTAL DENSITY (INDIVIDUAL/Sm ²)	14
AMOUNT OF SPECIES	1
SAMPLE CONDITION	CLAY WITH SHELLS

SAMPLE NO. 1 บริเวณที่มีการเพาะเลี้ยงสาหร่ายสีน้ำตาลบนโต๊ะทดลองในห้องปฏิบัติการ (กึ่งกลางแจ้ง)

(MISS CHAWEEWAN BOONLA)
LABORATORY SUPERVISOR

APRIL 1, 2024

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ANALYSIS REPORT

CUSTOMER NAME : STAR FUELS MARKETING LIMITED.
ADDRESS : 202 MDO 1 HUA KHMO SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 082 829 6210 e-mail : sakofee@sprc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SONGHANAKHON, SONGKHLA 90280 TEL. 0 7433 1790 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : MARCH 14, 2024
SAMPLING TIME : 12:10 HOUR
SAMPLING METHOD^h : PLANKTON NET
SAMPLING BY^h : MR ANANT MUDOR
ANALYZED BY : MISS NAPAPORN PURATAKO

RECEIVED DATE : MARCH 15, 2024
ANALYTICAL DATE : MARCH 15-25, 2024
ISSUE DATE : MARCH 29, 2024
REPORT NO. : 2024-U026194
WORK NO. : 2024-002104
ANALYSIS NO. : T24AF446-0002

PHYTOPLANKTON (Natural Unit/mL)	COUNTING UNIT	RESULT ^h
		SAMPLE NO. 1 T24AF446-0002
Division Cyanophyta		
Class Cyanophyceae		
Family Oscillatoriaceae		
Oscillatoria spp. ^h	FLAMENT	22
Division Chromophyta		
Class Bacillariophyceae		
Family Thalassiosiraceae		
Lauderia annulata ^h	FLAMENT	5
Planktoniella spp. ^h	CELL	12
Thalassiosira spp. ^h	CELL	499
Family Melosiraceae		
Paralia sulcata ^h	CELL	18
Family Leptocythindraceae		
Corethron crispulum ^h	CELL	10
Leptocythidus danicus ^h	FLAMENT	17
Family Coscinodiscaceae		
Coscinodiscus spp. ^h	CELL	25
Palmeria hardmaniana ^h	CELL	2
Family Rhizosoleniaceae		
Guanodir spp. ^h	CELL	15
Protosella alata ^h	CELL	8
Rhizosolenia spp. ^h	CELL	24
Family Chaetocerotaceae		
Bacteriastrium spp. ^h	FLAMENT	29
Chaetoceros spp. ^h	CELL	63 408
Family Eupodiscaceae		
Odontella spp. ^h	CELL	35
Family Thalassionemataceae		
Thalassionema frauenfeldi ^h	CELL	9
T. nitzschoides ^h	CELL	204



PHYTOPLANKTON (Natural Unit/mL)	COUNTING UNIT	RESULT ^h
		SAMPLE NO. 1 T24AF446-0002
Family Naviculaceae		
Amphioxys spp. ^h	CELL	12
Planktoniella spp. ^h	CELL	60
Trachyneis spp. ^h	CELL	9
Family Bacillariaceae		
Bacillaria paxillifer ^h	CELL	485
Cylindrotheca gracilis ^h	CELL	18
Nitzschia spp. ^h	CELL	27
N. longissima ^h	CELL	10
Pseudo-nitzschia spp. ^h	CELL	396
Family Surirellaceae		
Entomoneis spp. ^h	CELL	63
Surirella spp. ^h	CELL	289
Class Dictyochophyceae		
Family Dictyochophyceae		
Dictyocha spp. ^h	CELL	14
Class Dinophyceae		
Family Prorocentraceae		
Prorocentrum spp. ^h	CELL	32
Family Dinophysiaceae		
Dinophysis spp. ^h	CELL	4
Family Noctilucaeae		
Noctiluca spp. ^h	CELL	5
Family Ceratocaceae		
Ceratium spp. ^h	CELL	10
C. furca ^h	CELL	15
C. fusus ^h	CELL	8



PHYTOPLANKTON (Natural Units/mL)	COUNTING UNIT	RESULT ^a
		SAMPLE NO. 1 T24AF446-0002
Family Peridiniaceae <i>Peridinium</i> spp. ^b	CELL	234
Family Protoperidiniaceae <i>Protoperidinium</i> spp. ^b	CELL	136
TOTAL ABUNDANCE ^b	Natural Units/mL	66,172
ORGANISMS COUNTED ^b	NUMBER	36
SAMPLE VOLUME COLLECTION ^b	ML	386
SAMPLE VOLUME FILTERED THROUGH PLANKTON NET ^b	LITER	42.39
SAMPLE CONDITION (VISUAL OBSERVATION) COLOUR AND TURBIDITY OF WATER COLOUR OF SEDIMENT		YELLOW/TURBID BROWN

^a : ISO/IEC 17025 ACCREDITED BY THAI INDUSTRIAL STANDARDS INSTITUTE (TISI)

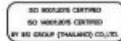
^b : VERIFIED BY OWN LABORATORY QUALITY SYSTEM, BUT NOT IN SCOPE OF ACCREDITATION

NOTE: 1. STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF 23RD EDITION, 2017 PART 9020 F.
2. REPORTING COUNTS (Natural Units/mL) BASED ON SUBSAMPLING 1 mL FILTERED WATER SAMPLE WHICH FIELD COLLECTED FROM A PLANKTON NET TOWING.
SAMPLE NAME SAMPLE NO. 1 บริเวณท่าเรือ (บริเวณท่า)



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LABORATORY SUPERVISOR

APRIL 1, 2024



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2024-U026194

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ANALYSIS REPORT

CUSTOMER NAME : STAR FUELS MARKETING LIMITED.
ADDRESS : 202 MOO 1 HUA KHUO SINGHANAKORN SONGKHLA 90280
CONTACT INFORMATION : TEL : 082 629 6210 e-mail : satofees@sprc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : MARCH 14, 2024
SAMPLING TIME : 12:10 HOUR
SAMPLING METHOD : PLANKTON NET
SAMPLING BY : MR ANANT MUJODR
ANALYZED BY : MISS NAPAORN PURATAKO
RECEIVED DATE : MARCH 15, 2024
ANALYTICAL DATE : MARCH 15-25, 2024
ISSUE DATE : MARCH 29, 2024
REPORT NO. : 2024-U026195
WORK NO. : 2024-002104
ANALYSIS NO. : T24AF446-0002

ZOOPLANKTON (UNIT/m ³)	COUNTING UNIT	RESULT
		SAMPLE NO. 1 T24AF446-0002
Phylum Protozoa Class Ciliata Family Codonellidae <i>Tintinnopsis</i> sp. Family Cyclarocylinidae <i>Favella</i> sp.	CELL CELL	 64,596
Phylum Annelida Class Polychaeta Polychaeta Larva	INDIVIDUAL	2,496
Phylum Arthropoda Class Crustacea Cyclopoid Copepod Calanoid Copepod Nauplius of Copepod Zoea	INDIVIDUAL INDIVIDUAL INDIVIDUAL INDIVIDUAL	106,862 34,776 427,409 3,728
Phylum Mollusca Class Gastropoda Gastropod Larva Class Bivalvia Bivalvia Larva	INDIVIDUAL INDIVIDUAL	 6,225 11,922



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ZOOPLANKTON (UNITS/m ³)	COUNTING UNIT	RESULT
		SAMPLE NO. 1 T24AF446-0002
Phylum Chordata		
Class Larvacea		
Family Oikopleuridae		
Oikopleura sp.	INDIVIDUAL	3,728
TOTAL ABUNDANCE	UNITS/m ³	662,234
ORGANISMS COUNTED	NUMBER	10
SAMPLE CONDITION (VISUAL OBSERVATION)		
COLOUR AND TURBIDITY OF WATER		YELLOW/TURBID
COLOUR OF SEDIMENT		BROWN

NOTE: 1. STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF 23RD EDITION, 2017 PART 1020 F.
SAMPLE NAME SAMPLE NO. 1 บริเวณท่าเรือ (near pier)

(MISS CHAWEEWAN BOONLA)
LABORATORY SUPERVISOR

APRIL 1, 2024

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2024-U026195

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ANALYSIS REPORT

CUSTOMER NAME : STAR FUELS MARKETING LIMITED.
ADDRESS : 202 MOO 1 HUA KHAD SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 082 629 6210 e-mail : sakofee@sprc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEDIMENT
SAMPLING DATE : MARCH 14, 2024
SAMPLING TIME : 12:15 HOUR
SAMPLING METHOD : PETERSEN GRAB
SAMPLING BY : MR ANANT MUJOR
ANALYZED BY : MISS PATCHAREE KONGCHUMNAN
RECEIVED DATE : MARCH 15, 2024
ANALYTICAL DATE : MARCH 15-22, 2024
ISSUE DATE : MARCH 29, 2024
REPORT NO. : 2024-U026196
WORK NO. : 2024-002104
ANALYSIS NO. : T24AF446-0003

BENTHOS (INDIVIDUALS/m ²)	RESULT
	SAMPLE NO. 1 T24AF446-0003
Phylum Annelida	
Class Polychaeta	
Family Orbiniidae	7
TOTAL DENSITY (INDIVIDUALS/m ²)	7
AMOUNT OF SPECIES	1
SAMPLE CONDITION	CLAY WITH SHELLS

SAMPLE NO. 1 บริเวณท่าเรือ (near pier)

(MISS CHAWEEWAN BOONLA)
LABORATORY SUPERVISOR

APRIL 1, 2024

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ANALYSIS REPORT

CUSTOMER NAME : STAR FUELS MARKETING LIMITED.
ADDRESS : 202 MOO 1 HUA KHAI SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 082 629 6210 e-mail : sakofee@spc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKHORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : MARCH 14, 2024
SAMPLING TIME : 11:25 HOUR
SAMPLING METHOD : PLANKTON NET
SAMPLING BY : MR. ANANT MUDOR
ANALYZED BY : MISS NAPAORN PURATAKO

RECEIVED DATE : MARCH 15, 2024
ANALYTICAL DATE : MARCH 15-26, 2024
ISSUE DATE : MARCH 29, 2024
REPORT NO. : 2024-U026207
WORK NO. : 2024-002104
ANALYSIS NO. : T24AF447-0002

PHYTOPLANKTON (Natural Units/ml.)	COUNTING UNIT	RESULT ¹
		SAMPLE NO. 1 T24AF447-0002
Division Cyanophyta		
Class Cyanophyceae		
Family Oscillatoraceae		
Oscillatoria spp. ^b	FLAMENT	39
Division Chromophyta		
Class Bacillariophyceae		
Family Thalassiosiraceae		
Thalassiosira spp. ^b	CELL	484
Family Melosiraceae		
Paralia sulcata ^b	CELL	33
Family Leptocyndraceae		
Coscinotus cricophum ^b	CELL	13
Family Coscinodiscaceae		
Coscinodiscus spp. ^b	CELL	32
Palmeria hardmaniana ^b	CELL	5
Family Rhizosoleniaceae		
Gulmaria spp. ^b	CELL	43
Protophysa alata ^b	CELL	45
Rhizosolenia spp. ^b	CELL	59
Family Hemisulaceae		
Hemisulca spp. ^b	CELL	26
Family Chaetocerotaceae		
Bacillaria spp. ^b	FLAMENT	64
Chaetoceros spp. ^b	CELL	42,576
Family Lithodermaceae		
Dityum spp. ^b	CELL	2
Family Eupodaceae		
Odontella spp. ^b	CELL	34
Theriatum spp. ^b	CELL	2

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PHYTOPLANKTON (Natural Units/ml.)	COUNTING UNIT	RESULT ¹
		SAMPLE NO. 1 T24AF447-0002
Family Thalassiosiraceae		
Thalassiosira nitracoides ^b	CELL	455
Family Naviculaceae		
Amphora spp. ^b	CELL	23
Diploneis spp. ^b	CELL	33
Platysira spp. ^b	CELL	167
Trachyneis spp. ^b	CELL	12
Family Bacillariaceae		
Bacillaria paxillifera ^b	CELL	454
Cylindrotheca gracilis ^b	CELL	27
Nitzschia spp. ^b	CELL	76
N. angulatus ^b	CELL	19
Pseudo-nitzschia spp. ^b	CELL	382
Family Surirellaceae		
Entomoneis spp. ^b	CELL	87
Surirella spp. ^b	CELL	77
Class Dinophyceae		
Family Prorocentraceae		
Prorocentrum spp. ^b	CELL	65
Family Dinophysiaceae		
Dinophysis spp. ^b	CELL	95
Family Noctilucae		
Noctiluca spp. ^b	CELL	11
Family Cerataceae		
Ceratium spp. ^b	CELL	23
C. furca ^b	CELL	7
C. furca ^b	CELL	8
Family Goniodomaceae		
Gonyaulax spp. ^b	CELL	2
Family Pyrophacaceae		
Pyrophacus spp. ^b	CELL	2
Family Peridiniaceae		
Peridinium spp. ^b	CELL	96

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2024-U026207

PHYTOPLANKTON (Natural Units/ml.)	COUNTING UNIT	RESULT ^a
		SAMPLE NO. 1 T24AF447-0002
Family Protopendriaceae		
Protopendrium spp. ^b	CELL	131
TOTAL ABUNDANCE ^b	(Natural Units/ml.)	45,630
ORGANISMS COUNTED ^b	NUMBER	37
SAMPLE VOLUME COLLECTION ^b	ml	180
SAMPLE VOLUME FILTERED THROUGH PLANKTON NET ^b	LITER	42.39
SAMPLE CONDITION (VISUAL OBSERVATION) COLOUR AND TURBIDITY OF WATER COLOUR OF SEDIMENT		YELLOW/TURBID BROWN

^a : ISO/IEC 17025 ACCREDITED BY THAI INDUSTRIAL STANDARDS INSTITUTE (TISI)

^b : VERIFIED BY OWN LABORATORY QUALITY SYSTEM, BUT NOT IN SCOPE OF ACCREDITATION

NOTE: 1. STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF 23¹⁰ EDITION, 2017 PART 9200 F.
2. REPORTING COUNTS (Natural Units/ml.) BASED ON SUBSAMPLING 1 mL FILTERED WATER SAMPLE WHICH FIELD COLLECTED
FROM A PLANKTON NET TOWING.
SAMPLE NAME SAMPLE NO. 1 : หนองจอกน้ำ (Naunaotha)

(MISS CHAWEEWAN BOONLA)
LABORATORY SUPERVISOR

APRIL 1, 2024

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2024-U026207

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ANALYSIS REPORT

CUSTOMER NAME : STAR FUELS MARKETING LIMITED.
ADDRESS : 202 MOO 1 HUA KHAD SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 082 629 6210 e-mail : sakofee@spe.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : MARCH 14, 2024
SAMPLING TIME : 11:25 HOUR
SAMPLING METHOD : PLANKTON NET
SAMPLING BY : MR. ANANT MUDOR
ANALYZED BY : MISS NAPAPORN PURATAKO
RECEIVED DATE : MARCH 15, 2024
ANALYTICAL DATE : MARCH 15-25, 2024
ISSUE DATE : MARCH 29, 2024
REPORT NO. : 2024-U026208
WORK NO. : 2024-002104
ANALYSIS NO. : T24AF447-0002

ZOOPLANKTON (UNITS/ml.)	COUNTING UNIT	RESULT
		SAMPLE NO. 1 T24AF447-0002
Phylum Protozoa		
Class Ciliata		
Family Codonellidae		
Zitronopsis sp.	CELL	30,434
Family Cytrocyclidae		
Fovella sp.	CELL	15,238
Phylum Annelida		
Class Polychaeta		
Polychaete Larva	INDIVIDUAL	17,978
Phylum Arthropoda		
Class Crustacea		
Cyclopoid Copepod	INDIVIDUAL	200,693
Calanoid Copepod	INDIVIDUAL	146,688
Harpacticoid Copepod	INDIVIDUAL	2,782
Nauplius of Copepod	INDIVIDUAL	577,198
Comprea Nauplius	INDIVIDUAL	12,456
Phylum Mollusca		
Class Bivalvia		
Bivalvia Larva	INDIVIDUAL	49,824

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ZOOPLANKTON (UNIT/Sm ³)	COUNTING UNIT	RESULT
		SAMPLE NO. 1 T24AF447-0002
Phylum Chordata		
Class Larvacea		
Family Oikopleuridae		
Oikopleura sp.	INDIVIDUAL	24.912
TOTAL ABUNDANCE	UNIT/Sm ³	1078.093
ORGANISMS COUNTED	NUMBER	10
SAMPLE CONDITION (VISUAL OBSERVATION)		
COLOUR AND TURBIDITY OF WATER		YELLOW/TURBID
COLOUR OF SEDIMENT		BROWN

NOTES: 1. STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF 23RD EDITION, 2017 PART 1020 F.
SAMPLE NAME SAMPLE NO. 1 สัตตราชมัน (sattachaman)

(MISS CHAWEEWAN BOONLA)
LABORATORY SUPERVISOR

APRIL 1, 2024

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BY BS GROUP (THAILAND) CO., LTD.

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2024-U026208

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ANALYSIS REPORT			
CUSTOMER NAME		: STAR FUELS MARKETING LIMITED.	
ADDRESS		: 202 MDO 1 HUA KHAD SINGHANAKORN SONGKHLA 90280	
CONTACT INFORMATION		: TEL : 082 829 6210 e-mail : sakofee@sprc.co.th	
SAMPLING SOURCE		: SONGKHLA PETROLEUM TERMINAL (202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL 0 7433 1780 FAX 0 7433 1780).	
SAMPLE TYPE		: SEDIMENT	RECEIVED DATE : MARCH 15, 2024
SAMPLING DATE		: MARCH 14, 2024	ANALYTICAL DATE : MARCH 15-22, 2024
SAMPLING TIME		: 11:30 HOUR	ISSUE DATE : MARCH 29, 2024
SAMPLING METHOD		: PETERSEN GRAB	REPORT NO. : 2024-U026209
SAMPLING BY		: MR ANANT MUDOR	WORK NO. : 2024-002104
ANALYZED BY		: MISS PATCHAREE KONGCHUMMAN	ANALYSIS NO. : T24AF447-0003

BENTHOS (INDIVIDUAL/Sm ²)	RESULT
	SAMPLE NO. 1 T24AF447-0003
Phylum Annelida	
Class Polychaeta	
Family Orbiniidae	14
TOTAL DENSITY (INDIVIDUAL/Sm ²)	14
AMOUNT OF SPECIES	1
SAMPLE CONDITION	CLAY

SAMPLE NO. 1 สัตตราชมัน (sattachaman)

(MISS CHAWEEWAN BOONLA)
LABORATORY SUPERVISOR

APRIL 1, 2024

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BY BS GROUP (THAILAND) CO., LTD.

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ใบรายงานผลการวิเคราะห์ ระยะก่อสร้าง



ANALYSIS REPORT

CUSTOMER NAME : STAR FUELS MARKETING LIMITED.
ADDRESS : 202 MOO 1 HUA KHAD SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 082 829 6210 e-mail : sakofees@sprc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : MARCH 22, 2024
SAMPLING TIME : 15:35 HOUR
SAMPLING METHOD : COMPOSITE
SAMPLING BY : MR ANANT MUDOR
ANALYZED BY : MISS NAPAPORN KHUNNOKKHUM
RECEIVED DATE : MARCH 23, 2024
ANALYTICAL DATE : MARCH 23-29, 2024
ISSUE DATE : APRIL 1, 2024
REPORT NO. : 2024-U027148
WORK NO. : 2024-002104
ANALYSIS NO. : T24AG191-0001

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT ผลการวิเคราะห์ ตามวิธีมาตรฐาน T24AG191-0001	REGULATORY STANDARD	DETECTION LIMIT
FLOATABLE OIL AND GREASE	-	OBSERVATION METHOD	NOT VISIBLE	NOT VISIBLE	-
TURBIDITY	NTU	NEPHELOMETRIC METHOD (SM PART 2130 B)	6.1	-	0.1
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM PART 2540 D)	7.7	10	10
OIL AND GREASE	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	-	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLEAR YELLOW		

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.
REGULATORY STANDARD : SEAWATER QUALITY STANDARDS, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, B.E. 2564
PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 138, PART 245 D, DATED OCTOBER 6, 2021
CLASS 5 : SEAWATER QUALITY FOR INDUSTRY AND PORTS (1) SEAWATER ADJACENT TO INDUSTRIAL ESTATES BOUNDARY ACCORDING TO
THE INDUSTRIAL ESTATE AUTHORITY OF THAILAND ACT AND INDUSTRIAL ZONE ACCORDING TO INDUSTRIAL LAW WITH A
BOUNDARY FROM THE HIGHEST TIDE LINE TO THE LOWEST TIDE LINE UP TO A DISTANCE OF 1000 METERS ALONG THE HORIZONTAL
LINE OF THE SEAWATER SURFACE (2) SEAWATER IN THE PORTAL AREA THE MOORING AREA ACCORDING TO THE NAVIGATION IN
THE THAI WATERS ACT (3) SEAWATER ADJACENT TO THE TERMINAL PORT THAT ACCEPTS SHIPS OF 500 GROSS TONS (OR ABOVE)
OR THE BERTHS LENGTH IS FROM 100 METERS (OR ABOVE), OR HAS A TOTAL BERTH AREA OF 1000 SQUARE METERS (OR ABOVE)
WITH A BOUNDARY STARTING FROM THE ADJACENT BERTH TO A DISTANCE OF 1000 METERS ALONG THE SEAWATER SURFACE.
IF : THE RESULTS SHOULD NOT BE CHANGED BY MORE THAN THE SUM OF DAILY OR MONTHLY OR YEARLY AVERAGE AND
THE STANDARD DIVIATION. DAILY AVERAGE WAS CALCULATED FROM HOURLY MEASUREMENT OR AT LEAST 5 SAMPLES TAKEN AT
EQUAL TIME INTERVAL WITHIN ONE DAY. MONTHLY AVERAGE WAS CALCULATED FROM DAILY MEASUREMENT OR AT LEAST
4 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE MONTH. YEARLY AVERAGE WAS CALCULATED FROM MONTHLY
MEASUREMENT AT EQUAL TIME INTERVAL AND THE SAME PLACE WITHIN ONE YEAR.
ND : NON-DETECTABLE.

(MRS PIYAPAT SUTTAMANUTWONG)
LABORATORY SUPERVISOR

APRIL 2, 2024

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ANALYSIS REPORT

CUSTOMER NAME : STAR FUELS MARKETING LIMITED.
ADDRESS : 202 MOO 1 HUA KHAD SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 082 829 6210 e-mail : sakofees@sprc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : MARCH 22, 2024
SAMPLING TIME : 15:45 HOUR
SAMPLING METHOD : COMPOSITE
SAMPLING BY : MR ANANT MUDOR
ANALYZED BY : MISS NAPAPORN KHUNNOKKHUM
RECEIVED DATE : MARCH 23, 2024
ANALYTICAL DATE : MARCH 23-29, 2024
ISSUE DATE : APRIL 1, 2024
REPORT NO. : 2024-U027149
WORK NO. : 2024-002104
ANALYSIS NO. : T24AG191-0002

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT ผลการวิเคราะห์ ตามวิธีมาตรฐาน T24AG191-0002	REGULATORY STANDARD	DETECTION LIMIT
FLOATABLE OIL AND GREASE	-	OBSERVATION METHOD	NOT VISIBLE	NOT VISIBLE	-
TURBIDITY	NTU	NEPHELOMETRIC METHOD (SM PART 2130 B)	6.9	-	0.1
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM PART 2540 D)	8.1	10	10
OIL AND GREASE	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	-	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLEAR YELLOW		

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.
REGULATORY STANDARD : SEAWATER QUALITY STANDARDS, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, B.E. 2564
PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 138, PART 245 D, DATED OCTOBER 6, 2021
CLASS 5 : SEAWATER QUALITY FOR INDUSTRY AND PORTS (1) SEAWATER ADJACENT TO INDUSTRIAL ESTATES BOUNDARY ACCORDING TO
THE INDUSTRIAL ESTATE AUTHORITY OF THAILAND ACT AND INDUSTRIAL ZONE ACCORDING TO INDUSTRIAL LAW WITH A
BOUNDARY FROM THE HIGHEST TIDE LINE TO THE LOWEST TIDE LINE UP TO A DISTANCE OF 1000 METERS ALONG THE HORIZONTAL
LINE OF THE SEAWATER SURFACE (2) SEAWATER IN THE PORTAL AREA THE MOORING AREA ACCORDING TO THE NAVIGATION IN
THE THAI WATERS ACT (3) SEAWATER ADJACENT TO THE TERMINAL PORT THAT ACCEPTS SHIPS OF 500 GROSS TONS (OR ABOVE)
OR THE BERTHS LENGTH IS FROM 100 METERS (OR ABOVE), OR HAS A TOTAL BERTH AREA OF 1000 SQUARE METERS (OR ABOVE)
WITH A BOUNDARY STARTING FROM THE ADJACENT BERTH TO A DISTANCE OF 1000 METERS ALONG THE SEAWATER SURFACE.
IF : THE RESULTS SHOULD NOT BE CHANGED BY MORE THAN THE SUM OF DAILY OR MONTHLY OR YEARLY AVERAGE AND
THE STANDARD DIVIATION. DAILY AVERAGE WAS CALCULATED FROM HOURLY MEASUREMENT OR AT LEAST 5 SAMPLES TAKEN AT
EQUAL TIME INTERVAL WITHIN ONE DAY. MONTHLY AVERAGE WAS CALCULATED FROM DAILY MEASUREMENT OR AT LEAST
4 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE MONTH. YEARLY AVERAGE WAS CALCULATED FROM MONTHLY
MEASUREMENT AT EQUAL TIME INTERVAL AND THE SAME PLACE WITHIN ONE YEAR.
ND : NON-DETECTABLE.

(MRS PIYAPAT SUTTAMANUTWONG)
LABORATORY SUPERVISOR

APRIL 2, 2024

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ANALYSIS REPORT

CUSTOMER NAME : STAR FUELS MARKETING LIMITED.
ADDRESS : 202 MOO 1 HUA KHAI SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 082 829 6210 e-mail : sakofees@spc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : MARCH 22, 2024
SAMPLING TIME : 15:20 HOUR
SAMPLING METHOD : COMPOSITE
SAMPLING BY : MR. ANANT MUDOR
ANALYZED BY : MISS NAPAPORN KHUNNONGKOHUM
RECEIVED DATE : MARCH 23, 2024
ANALYTICAL DATE : MARCH 23-29, 2024
ISSUE DATE : APRIL 1, 2024
REPORT NO. : 2024-U027150
WORK NO. : 2024-002104
ANALYSIS NO. : T24AG191-0003

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT ผลการวิเคราะห์ T24AG191-0003	REGULATORY STANDARD	DETECTION LIMIT
FLOATABLE OIL AND GREASE	-	OBSERVATION METHOD	NOT VISIBLE	NOT VISIBLE	-
TURBIDITY	NTU	NEPHELOMETRIC METHOD (SM PART 2130 B)	6.6	-	0.1
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM PART 2540 D)	6.7	n ^o	10
OIL AND GREASE	mg/L	LIQUID-LIQUID PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	-	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLEAR YELLOW		

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.
REGULATORY STANDARD : SEAWATER QUALITY STANDARDS, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, B.E. 2564
PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 138, PART 245 D, DATED OCTOBER 6, 2021.
CLASS 5 : SEAWATER QUALITY FOR INDUSTRY AND PORTS (1) SEAWATER ADJACENT TO INDUSTRIAL ESTATES BOUNDARY ACCORDING TO
THE INDUSTRIAL ESTATE AUTHORITY OF THAILAND ACT AND INDUSTRIAL ZONE ACCORDING TO INDUSTRIAL LAW WITH A
BOUNDARY FROM THE HIGHEST TIDE LINE TO THE LOWEST TIDE LINE UP TO A DISTANCE OF 1000 METERS ALONG THE HORIZONTAL
LINE OF THE SEAWATER SURFACE (2) SEAWATER IN THE PORTAL AREA THE MOORING AREA ACCORDING TO THE NAVIGATION IN
THE THAI WATERS ACT (3) SEAWATER ADJACENT TO THE TERMINAL PORT THAT ACCEPTS SHIPS OF 800 GROSS TONS (OR ABOVE)
OR THE BERTHS LENGTH IS FROM 100 METERS (OR ABOVE), OR HAS A TOTAL BERTH AREA OF 1000 SQUARE METERS OR ABOVE,
WITH A BOUNDARY STARTING FROM THE ADJACENT BERTH TO A DISTANCE OF 1000 METERS ALONG THE SEAWATER SURFACE.
n^o : THE RESULTS SHOULD NOT BE CHANGED BY MORE THAN THE SUM OF DAILY OR MONTHLY OR YEARLY 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. MONTHLY AVERAGE WAS CALCULATED FROM DAILY MEASUREMENT OR AT LEAST
4 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE MONTH. YEARLY AVERAGE WAS CALCULATED FROM MONTHLY
MEASUREMENT AT EQUAL TIME INTERVAL AND THE SAME PLACE WITHIN ONE YEAR.
ND : NON-DETECTABLE.

(MRS PIYAPAT SUTTAMANUTWONG)
LABORATORY SUPERVISOR

APRIL 2, 2024

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ANALYSIS REPORT

CUSTOMER NAME : STAR FUELS MARKETING LIMITED.
ADDRESS : 202 MOO 1 HUA KHAI SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 082 829 6210 e-mail : sakofees@spc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : MARCH 22, 2024
SAMPLING TIME : 15:10 HOUR
SAMPLING METHOD : COMPOSITE
SAMPLING BY : MR. ANANT MUDOR
ANALYZED BY : MISS NAPAPORN KHUNNONGKOHUM
RECEIVED DATE : MARCH 23, 2024
ANALYTICAL DATE : MARCH 23-29, 2024
ISSUE DATE : APRIL 1, 2024
REPORT NO. : 2024-U027151
WORK NO. : 2024-002104
ANALYSIS NO. : T24AG191-0004

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT ผลการวิเคราะห์ T24AG191-0004	REGULATORY STANDARD	DETECTION LIMIT
FLOATABLE OIL AND GREASE	-	OBSERVATION METHOD	NOT VISIBLE	NOT VISIBLE	-
TURBIDITY	NTU	NEPHELOMETRIC METHOD (SM PART 2130 B)	3	-	0.1
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM PART 2540 D)	14.9	n ^o	10
OIL AND GREASE	mg/L	LIQUID-LIQUID PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	-	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLEAR YELLOW		

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.
REGULATORY STANDARD : SEAWATER QUALITY STANDARDS, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, B.E. 2564
PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 138, PART 245 D, DATED OCTOBER 6, 2021.
CLASS 5 : SEAWATER QUALITY FOR INDUSTRY AND PORTS (1) SEAWATER ADJACENT TO INDUSTRIAL ESTATES BOUNDARY ACCORDING TO
THE INDUSTRIAL ESTATE AUTHORITY OF THAILAND ACT AND INDUSTRIAL ZONE ACCORDING TO INDUSTRIAL LAW WITH A
BOUNDARY FROM THE HIGHEST TIDE LINE TO THE LOWEST TIDE LINE UP TO A DISTANCE OF 1000 METERS ALONG THE HORIZONTAL
LINE OF THE SEAWATER SURFACE (2) SEAWATER IN THE PORTAL AREA THE MOORING AREA ACCORDING TO THE NAVIGATION IN
THE THAI WATERS ACT (3) SEAWATER ADJACENT TO THE TERMINAL PORT THAT ACCEPTS SHIPS OF 800 GROSS TONS (OR ABOVE)
OR THE BERTHS LENGTH IS FROM 100 METERS (OR ABOVE), OR HAS A TOTAL BERTH AREA OF 1000 SQUARE METERS OR ABOVE,
WITH A BOUNDARY STARTING FROM THE ADJACENT BERTH TO A DISTANCE OF 1000 METERS ALONG THE SEAWATER SURFACE.
n^o : THE RESULTS SHOULD NOT BE CHANGED BY MORE THAN THE SUM OF DAILY OR MONTHLY OR YEARLY 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. MONTHLY AVERAGE WAS CALCULATED FROM DAILY MEASUREMENT OR AT LEAST
4 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE MONTH. YEARLY AVERAGE WAS CALCULATED FROM MONTHLY
MEASUREMENT AT EQUAL TIME INTERVAL AND THE SAME PLACE WITHIN ONE YEAR.
ND : NON-DETECTABLE.

(MRS PIYAPAT SUTTAMANUTWONG)
LABORATORY SUPERVISOR

APRIL 2, 2024

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ANALYSIS REPORT

CUSTOMER NAME : STAR FUELS MARKETING LIMITED.
ADDRESS : 202 MOO 1 HUA KHAD SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 082 829 6210 e-mail : sakofees@sprc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : MARCH 27, 2024
SAMPLING TIME : 15:00 HOUR
SAMPLING METHOD : COMPOSITE
SAMPLING BY : MR ANANT MUDOR
ANALYZED BY : MISS NAPAPORN KHUNNOKKHUM

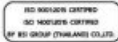
RECEIVED DATE : MARCH 29, 2024
ANALYTICAL DATE : MARCH 29-APRIL 4, 2024
ISSUE DATE : APRIL 5, 2024
REPORT NO. : 2024-U028880
WORK NO. : 2024-002104
ANALYSIS NO. : T24AG632-0001

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT ผลการวิเคราะห์ การทดสอบในห้อง ปฏิบัติการ SEA-WATER T24AG632-0001	REGULATORY STANDARD	DETECTION LIMIT
FLOATABLE OIL AND GREASE	-	OBSERVATION METHOD	NOT VISIBLE	NOT VISIBLE	-
TURBIDITY	NTU	NEPHELOMETRIC METHOD (SM PART 2130 B)	8.7	-	0.1
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM PART 2540 D)	10.0	nt	10
OIL AND GREASE	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	-	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLEAR -		

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.
REGULATORY STANDARD : SEAWATER QUALITY STANDARDS, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, B.E. 2564
PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL 138, PART 245 D, DATED OCTOBER 5, 2021
CLASS 5 : SEAWATER QUALITY FOR INDUSTRY AND PORTS (1) SEAWATER ADJACENT TO INDUSTRIAL ESTATES BOUNDARY ACCORDING TO
THE INDUSTRIAL ESTATE AUTHORITY OF THAILAND ACT AND INDUSTRIAL ZONE ACCORDING TO INDUSTRIAL LAW WITH A
BOUNDARY FROM THE HIGHEST TIDE LINE TO THE LOWEST TIDE LINE UP TO A DISTANCE OF 1000 METERS ALONG THE HORIZONTAL
LINE OF THE SEAWATER SURFACE (2) SEAWATER IN THE PORTAL AREA THE MOORING AREA ACCORDING TO THE NAVIGATION IN
THE THAI WATERS ACT (3) SEAWATER ADJACENT TO THE TERMINAL PORT THAT ACCEPTS SHIPS OF 500 GROSS TONS (OR ABOVE)
OR THE BERTHS LENGTH IS FROM 100 METERS (OR ABOVE), OR HAS A TOTAL BERTH AREA OF 1000 SQUARE METERS (OR ABOVE)
WITH A BOUNDARY STARTING FROM THE ADJACENT BERTH TO A DISTANCE OF 1000 METERS ALONG THE SEAWATER SURFACE.
nt : THE RESULTS SHOULD NOT BE CHANGED BY MORE THAN THE SUM OF DAILY OR MONTHLY OR YEARLY AVERAGE AND
THE STANDARD DIVIATION. DAILY AVERAGE WAS CALCULATED FROM HOURLY MEASUREMENT OR AT LEAST 5 SAMPLES TAKEN AT
EQUAL TIME INTERVAL WITHIN ONE DAY. MONTHLY AVERAGE WAS CALCULATED FROM DAILY MEASUREMENT OR AT LEAST
4 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE MONTH. YEARLY AVERAGE WAS CALCULATED FROM MONTHLY
MEASUREMENT AT EQUAL TIME INTERVAL AND THE SAME PLACE WITHIN ONE YEAR.
ND : NON-DETECTABLE.

(MISS BENJAWAN VIRIYOTHAI)
LABORATORY SUPERVISOR

APRIL 8, 2024



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ANALYSIS REPORT

CUSTOMER NAME : STAR FUELS MARKETING LIMITED.
ADDRESS : 202 MOO 1 HUA KHAD SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 082 829 6210 e-mail : sakofees@sprc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : MARCH 27, 2024
SAMPLING TIME : 15:10 HOUR
SAMPLING METHOD : COMPOSITE
SAMPLING BY : MR ANANT MUDOR
ANALYZED BY : MISS NAPAPORN KHUNNOKKHUM

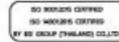
RECEIVED DATE : MARCH 29, 2024
ANALYTICAL DATE : MARCH 29-APRIL 4, 2024
ISSUE DATE : APRIL 5, 2024
REPORT NO. : 2024-U028880
WORK NO. : 2024-002104
ANALYSIS NO. : T24AG632-0002

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT ผลการวิเคราะห์ การทดสอบในห้อง ปฏิบัติการ SEA-WATER T24AG632-0002	REGULATORY STANDARD	DETECTION LIMIT
FLOATABLE OIL AND GREASE	-	OBSERVATION METHOD	NOT VISIBLE	NOT VISIBLE	-
TURBIDITY	NTU	NEPHELOMETRIC METHOD (SM PART 2130 B)	8.0	-	0.1
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM PART 2540 D)	8.8	nt	10
OIL AND GREASE	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	-	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLEAR -		

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.
REGULATORY STANDARD : SEAWATER QUALITY STANDARDS, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, B.E. 2564
PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL 138, PART 245 D, DATED OCTOBER 5, 2021
CLASS 5 : SEAWATER QUALITY FOR INDUSTRY AND PORTS (1) SEAWATER ADJACENT TO INDUSTRIAL ESTATES BOUNDARY ACCORDING TO
THE INDUSTRIAL ESTATE AUTHORITY OF THAILAND ACT AND INDUSTRIAL ZONE ACCORDING TO INDUSTRIAL LAW WITH A
BOUNDARY FROM THE HIGHEST TIDE LINE TO THE LOWEST TIDE LINE UP TO A DISTANCE OF 1000 METERS ALONG THE HORIZONTAL
LINE OF THE SEAWATER SURFACE (2) SEAWATER IN THE PORTAL AREA THE MOORING AREA ACCORDING TO THE NAVIGATION IN
THE THAI WATERS ACT (3) SEAWATER ADJACENT TO THE TERMINAL PORT THAT ACCEPTS SHIPS OF 500 GROSS TONS (OR ABOVE)
OR THE BERTHS LENGTH IS FROM 100 METERS (OR ABOVE), OR HAS A TOTAL BERTH AREA OF 1000 SQUARE METERS (OR ABOVE)
WITH A BOUNDARY STARTING FROM THE ADJACENT BERTH TO A DISTANCE OF 1000 METERS ALONG THE SEAWATER SURFACE.
nt : THE RESULTS SHOULD NOT BE CHANGED BY MORE THAN THE SUM OF DAILY OR MONTHLY OR YEARLY AVERAGE AND
THE STANDARD DIVIATION. DAILY AVERAGE WAS CALCULATED FROM HOURLY MEASUREMENT OR AT LEAST 5 SAMPLES TAKEN AT
EQUAL TIME INTERVAL WITHIN ONE DAY. MONTHLY AVERAGE WAS CALCULATED FROM DAILY MEASUREMENT OR AT LEAST
4 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE MONTH. YEARLY AVERAGE WAS CALCULATED FROM MONTHLY
MEASUREMENT AT EQUAL TIME INTERVAL AND THE SAME PLACE WITHIN ONE YEAR.
ND : NON-DETECTABLE.

(MISS BENJAWAN VIRIYOTHAI)
LABORATORY SUPERVISOR

APRIL 8, 2024



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- THIS ANALYSIS REPORT APPROVES ONLY FOR THE SAMPLES AS RECEIVED.

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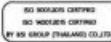
ANALYSIS REPORT

CUSTOMER NAME : STAR FUELS MARKETING LIMITED.
ADDRESS : 202 MOO 1 HUA KHAD SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 082 829 6210 e-mail : sakofees@spr.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : MARCH 27, 2024
SAMPLING TIME : 14:50 HOUR
SAMPLING METHOD : COMPOSITE
SAMPLING BY : MR ANANT HUDOR
ANALYZED BY : MISS NAPAPORN KHUNNOKKOHUM
RECEIVED DATE : MARCH 29, 2024
ANALYTICAL DATE : MARCH 29-APRIL 4, 2024
ISSUE DATE : APRIL 5, 2024
REPORT NO. : 2024-U028882
WORK NO. : 2024-002104
ANALYSIS NO. : T24AG632-0003

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			สีฟ้าเข้ม สีฟ้าใส T24AG632-0003		
FLOATABLE OIL AND GREASE	-	OBSERVATION METHOD	NOT VISIBLE	NOT VISIBLE	-
TURBIDITY	NTU	NEPHELOMETRIC METHOD (SM PART 2130 B)	6.8	-	0.1
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM PART 2540 D)	6.2	nt	10
OIL AND GREASE	mg/L	LIQUID-LIQUID PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	-	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLEAR		

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.
REGULATORY STANDARD : SEAWATER QUALITY STANDARDS, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, B.E. 2564
PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 138, PART 245 D, DATED OCTOBER 6, 2021
CLASS 5 : SEAWATER QUALITY FOR INDUSTRY AND PORTS (1) SEAWATER ADJACENT TO INDUSTRIAL ESTATES BOUNDARY ACCORDING TO THE INDUSTRIAL ESTATE AUTHORITY OF THAILAND ACT AND INDUSTRIAL ZONE ACCORDING TO INDUSTRIAL LAW WITH A BOUNDARY FROM THE HIGHEST TIDE LINE TO THE LOWEST TIDE LINE UP TO A DISTANCE OF 1000 METERS ALONG THE HORIZONTAL LINE OF THE SEAWATER SURFACE (2) SEAWATER IN THE PORTAL AREA THE MOORING AREA ACCORDING TO THE NAVIGATION IN THE THAI WATERS ACT (3) SEAWATER ADJACENT TO THE TERMINAL PORT THAT ACCEPTS SHIPS OF 500 GROSS TONS (OR ABOVE) OR THE BERTHS LENGTH IS FROM 100 METERS (OR ABOVE), OR HAS A TOTAL BERTH AREA OF 1000 SQUARE METERS OR ABOVE, WITH A BOUNDARY STARTING FROM THE ADJACENT BERTH TO A DISTANCE OF 1000 METERS ALONG THE SEAWATER SURFACE.
nt : THE RESULTS SHOULD NOT BE CHANGED BY MORE THAN THE SUM OF DAILY OR MONTHLY OR YEARLY AVERAGE AND THE STANDARD DIVIATION. DAILY AVERAGE WAS CALCULATED FROM HOURLY MEASUREMENT OR AT LEAST 5 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE DAY. MONTHLY AVERAGE WAS CALCULATED FROM DAILY MEASUREMENT OR AT LEAST 4 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE MONTH. YEARLY AVERAGE WAS CALCULATED FROM MONTHLY MEASUREMENT AT EQUAL TIME INTERVAL AND THE SAME PLACE WITHIN ONE YEAR.
ND : NON-DETECTABLE.


(MISS BENJAWAN VIRIYOTHAJ)
LABORATORY SUPERVISOR
APRIL 8, 2024



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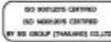
ANALYSIS REPORT

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CONTACT INFORMATION : TEL : 082 829 6210 e-mail : sakofees@spr.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : MARCH 27, 2024
SAMPLING TIME : 14:40 HOUR
SAMPLING METHOD : COMPOSITE
SAMPLING BY : MR ANANT HUDOR
ANALYZED BY : MISS NAPAPORN KHUNNOKKOHUM
RECEIVED DATE : MARCH 29, 2024
ANALYTICAL DATE : MARCH 29-APRIL 4, 2024
ISSUE DATE : APRIL 5, 2024
REPORT NO. : 2024-U028883
WORK NO. : 2024-002104
ANALYSIS NO. : T24AG632-0004

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			สีฟ้าเข้ม สีฟ้าใส T24AG632-0004		
FLOATABLE OIL AND GREASE	-	OBSERVATION METHOD	NOT VISIBLE	NOT VISIBLE	-
TURBIDITY	NTU	NEPHELOMETRIC METHOD (SM PART 2130 B)	9.6	-	0.1
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM PART 2540 D)	10.9	nt	10
OIL AND GREASE	mg/L	LIQUID-LIQUID PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	-	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLEAR		

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.
REGULATORY STANDARD : SEAWATER QUALITY STANDARDS, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, B.E. 2564
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nt : THE RESULTS SHOULD NOT BE CHANGED BY MORE THAN THE SUM OF DAILY OR MONTHLY OR YEARLY AVERAGE AND THE STANDARD DIVIATION. DAILY AVERAGE WAS CALCULATED FROM HOURLY MEASUREMENT OR AT LEAST 5 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE DAY. MONTHLY AVERAGE WAS CALCULATED FROM DAILY MEASUREMENT OR AT LEAST 4 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE MONTH. YEARLY AVERAGE WAS CALCULATED FROM MONTHLY MEASUREMENT AT EQUAL TIME INTERVAL AND THE SAME PLACE WITHIN ONE YEAR.
ND : NON-DETECTABLE.


(MISS BENJAWAN VIRIYOTHAJ)
LABORATORY SUPERVISOR
APRIL 8, 2024



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ADDRESS : 202 MOO 1 HUA KHAD SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 082 829 6210 e-mail : sakofees@sprc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : APRIL 4, 2024
SAMPLING TIME : 14:25 HOUR
SAMPLING METHOD : COMPOSITE
SAMPLING BY : MR ANANT MUJOR
ANALYZED BY : MISS NAPAORN KHUNNOKHUM

RECEIVED DATE : APRIL 6, 2024
ANALYTICAL DATE : APRIL 6-11, 2024
ISSUE DATE : APRIL 19, 2024
REPORT NO. : 2024-U031946
WORK NO. : 2024-002104
ANALYSIS NO. : T24AH431-0001

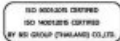
PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT ผลการวิเคราะห์ ทางเคมีของน้ำ ทะเลสาบสงขลา T24AH431-0001	REGULATORY STANDARD	DETECTION LIMIT
FLOATABLE OIL AND GREASE	-	OBSERVATION METHOD	NOT VISIBLE	NOT VISIBLE	-
TURBIDITY	NTU	NEPHELOMETRIC METHOD (SM PART 2130 B)	4.7	-	0.1
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM PART 2540 D)	5.2	n ^a	10
OIL AND GREASE	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	-	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLEAR BROWN		

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.
REGULATORY STANDARD : SEAWATER QUALITY STANDARDS, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, B.E. 2564
PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL 138, PART 245 D, DATED OCTOBER 6, 2021
CLASS 5 : SEAWATER QUALITY FOR INDUSTRY AND PORTS (1) SEAWATER ADJACENT TO INDUSTRIAL ESTATES BOUNDARY ACCORDING TO THE INDUSTRIAL ESTATE AUTHORITY OF THAILAND ACT AND INDUSTRIAL ZONE ACCORDING TO INDUSTRIAL LAW WITH A BOUNDARY FROM THE HIGHEST TIDE LINE TO THE LOWEST TIDE LINE UP TO A DISTANCE OF 1000 METERS ALONG THE HORIZONTAL LINE OF THE SEAWATER SURFACE (2) SEAWATER IN THE PORTAL AREA THE MOORING AREA ACCORDING TO THE NAVIGATION IN THE THAI WATERS ACT (3) SEAWATER ADJACENT TO THE TERMINAL PORT THAT ACCEPTS SHIPS OF 500 GROSS TONS (OR ABOVE) OR THE BERTHS LENGTH IS FROM 100 METERS (OR ABOVE), OR HAS A TOTAL BERTH AREA OF 1000 SQUARE METERS (OR ABOVE), WITH A BOUNDARY STARTING FROM THE ADJACENT BERTH TO A DISTANCE OF 1000 METERS ALONG THE SEAWATER SURFACE.
n^a : THE RESULTS SHOULD NOT BE CHANGED BY MORE THAN THE SUM OF DAILY OR MONTHLY OR YEARLY AVERAGE AND THE STANDARD DIVIATION. DAILY AVERAGE WAS CALCULATED FROM HOURLY MEASUREMENT OR AT LEAST 5 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE DAY. MONTHLY AVERAGE WAS CALCULATED FROM DAILY MEASUREMENT OR AT LEAST 4 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE MONTH. YEARLY AVERAGE WAS CALCULATED FROM MONTHLY MEASUREMENT AT EQUAL TIME INTERVAL AND THE SAME PLACE WITHIN ONE YEAR.
ND : NON-DETECTABLE.



(MRS PIYAPAT SUTTAMANUTWONG)
LABORATORY SUPERVISOR

APRIL 22, 2024



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- End of Analysis Report -

ANALYSIS REPORT

CUSTOMER NAME : STAR FUELS MARKETING LIMITED.
ADDRESS : 202 MOO 1 HUA KHAD SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 082 829 6210 e-mail : sakofees@sprc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : APRIL 4, 2024
SAMPLING TIME : 14:30 HOUR
SAMPLING METHOD : COMPOSITE
SAMPLING BY : MR ANANT MUJOR
ANALYZED BY : MISS NAPAORN KHUNNOKHUM

RECEIVED DATE : APRIL 6, 2024
ANALYTICAL DATE : APRIL 6-11, 2024
ISSUE DATE : APRIL 19, 2024
REPORT NO. : 2024-U031946
WORK NO. : 2024-002104
ANALYSIS NO. : T24AH431-0002

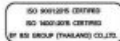
PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT ผลการวิเคราะห์ ทางเคมีของน้ำ ทะเลสาบสงขลา T24AH431-0002	REGULATORY STANDARD	DETECTION LIMIT
FLOATABLE OIL AND GREASE	-	OBSERVATION METHOD	NOT VISIBLE	NOT VISIBLE	-
TURBIDITY	NTU	NEPHELOMETRIC METHOD (SM PART 2130 B)	7.7	-	0.1
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM PART 2540 D)	8.9	n ^a	10
OIL AND GREASE	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	-	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLEAR BROWN		

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.
REGULATORY STANDARD : SEAWATER QUALITY STANDARDS, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, B.E. 2564
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n^a : THE RESULTS SHOULD NOT BE CHANGED BY MORE THAN THE SUM OF DAILY OR MONTHLY OR YEARLY AVERAGE AND THE STANDARD DIVIATION. DAILY AVERAGE WAS CALCULATED FROM HOURLY MEASUREMENT OR AT LEAST 5 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE DAY. MONTHLY AVERAGE WAS CALCULATED FROM DAILY MEASUREMENT OR AT LEAST 4 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE MONTH. YEARLY AVERAGE WAS CALCULATED FROM MONTHLY MEASUREMENT AT EQUAL TIME INTERVAL AND THE SAME PLACE WITHIN ONE YEAR.
ND : NON-DETECTABLE.



(MRS PIYAPAT SUTTAMANUTWONG)
LABORATORY SUPERVISOR

APRIL 22, 2024



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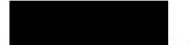
ANALYSIS REPORT

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CONTACT INFORMATION : TEL : 082 829 6210 e-mail : sakofees@spr.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : APRIL 4, 2024
SAMPLING TIME : 14:20 HOUR
SAMPLING METHOD : COMPOSITE
SAMPLING BY : MR. ANANT HJLOOR
ANALYZED BY : MISS NAPAORN KHUNNOKKHUM

RECEIVED DATE : APRIL 6, 2024
ANALYTICAL DATE : APRIL 6-11, 2024
ISSUE DATE : APRIL 19, 2024
REPORT NO. : 2024-U031989
WORK NO. : 2024-002104
ANALYSIS NO. : T24AH431-0003

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT ผลตรวจพบ T24AH431-0003	REGULATORY STANDARD	DETECTION LIMIT
FLOATABLE OIL AND GREASE	-	OBSERVATION METHOD	NOT VISIBLE	NOT VISIBLE	-
TURBIDITY	NTU	NEPHELOMETRIC METHOD (SM PART 2130 B)	6.8	-	0.1
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM PART 2540 D)	7.4	n ^o	1.0
OIL AND GREASE	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM PART 5620 B)	ND	-	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLEAR BROWN		

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.
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n^o : THE RESULTS SHOULD NOT BE CHANGED BY MORE THAN THE SUM OF DAILY OR MONTHLY OR YEARLY 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. MONTHLY AVERAGE WAS CALCULATED FROM DAILY MEASUREMENT OR AT LEAST 4 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE MONTH. YEARLY AVERAGE WAS CALCULATED FROM MONTHLY MEASUREMENT AT EQUAL TIME INTERVAL AND THE SAME PLACE WITHIN ONE YEAR.
ND : NON-DETECTABLE.


(MRS PIYAPAT SUTTANANUTWONG)
LABORATORY SUPERVISOR
APRIL 22, 2024

ANALYSIS REPORT

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(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : APRIL 9, 2024
SAMPLING TIME : 15:10 HOUR
SAMPLING METHOD : COMPOSITE
SAMPLING BY : MR ANANT MUJOR
ANALYZED BY : MISS NAPAPORN KHUNNOKKHULM

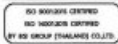
RECEIVED DATE : APRIL 11, 2024
ANALYTICAL DATE : APRIL 11-23, 2024
ISSUE DATE : APRIL 25, 2024
REPORT NO. : 2024-U034055
WORK NO. : 2024-002104
ANALYSIS NO. : T24AH774-0001

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT ผลการวิเคราะห์ ตามวิธีมาตรฐาน T24AH774-0001	REGULATORY STANDARD	DETECTION LIMIT
FLOATABLE OIL AND GREASE	-	OBSERVATION METHOD	NOT VISIBLE	NOT VISIBLE	-
TURBIDITY	NTU	NEPHELOMETRIC METHOD (SM PART 210 B)	10	-	0.1
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM PART 2540 D)	9.8	10	10
OIL AND GREASE	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	-	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			YELLOW/CLEAR BROWN		

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.
REGULATORY STANDARD : SEAWATER QUALITY STANDARDS, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, B.E. 2564
PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 138, PART 245 D, DATED OCTOBER 6, 2021
CLASS 5 : SEAWATER QUALITY FOR INDUSTRY AND PORTS (1) SEAWATER ADJACENT TO INDUSTRIAL ESTATES BOUNDARY ACCORDING TO
THE INDUSTRIAL ESTATE AUTHORITY OF THAILAND ACT AND INDUSTRIAL ZONE ACCORDING TO INDUSTRIAL LAW WITH A
BOUNDARY FROM THE HIGHEST TIDE LINE TO THE LOWEST TIDE LINE UP TO A DISTANCE OF 1000 METERS ALONG THE HORIZONTAL
LINE OF THE SEAWATER SURFACE (2) SEAWATER IN THE PORTAL AREA THE MOORING AREA ACCORDING TO THE NAVIGATION IN
THE THAI WATERS ACT (3) SEAWATER ADJACENT TO THE TERMINAL PORT THAT ACCEPTS SHIPS OF 500 GROSS TONS (OR ABOVE)
OR THE BERTHS LENGTH IS FROM 100 METERS (OR ABOVE), OR HAS A TOTAL BERTH AREA OF 1000 SQUARE METERS OR ABOVE,
WITH A BOUNDARY STARTING FROM THE ADJACENT BERTH TO A DISTANCE OF 1000 METERS ALONG THE SEAWATER SURFACE.
: THE RESULTS SHOULD NOT BE CHANGED BY MORE THAN THE SUM OF DAILY OR MONTHLY OR YEARLY AVERAGE AND
THE STANDARD DIVIATION. DAILY AVERAGE WAS CALCULATED FROM HOURLY MEASUREMENT OR AT LEAST 5 SAMPLES TAKEN AT
EQUAL TIME INTERVAL WITHIN ONE DAY. MONTHLY AVERAGE WAS CALCULATED FROM DAILY MEASUREMENT OR AT LEAST
4 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE MONTH. YEARLY AVERAGE WAS CALCULATED FROM MONTHLY
MEASUREMENT AT EQUAL TIME INTERVAL AND THE SAME PLACE WITHIN ONE YEAR.
ND : NON-DETECTABLE.

(MRS PIYAPAT SUTTAMANUTWONG)
LABORATORY SUPERVISOR

APRIL 25, 2024



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• THIS ANALYSIS REPORT APPROVES ONLY FOR THE SAMPLES AS RECEIVED.

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- End of Analysis Report -



ANALYSIS REPORT

CUSTOMER NAME : STAR FUELS MARKETING LIMITED.
ADDRESS : 202 MOO 1 HUA KHAI SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 082 829 6210 e-mail : sakofees@sprc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : APRIL 9, 2024
SAMPLING TIME : 15:15 HOUR
SAMPLING METHOD : COMPOSITE
SAMPLING BY : MR ANANT MUJOR
ANALYZED BY : MISS NAPAPORN KHUNNOKKHULM

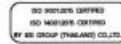
RECEIVED DATE : APRIL 11, 2024
ANALYTICAL DATE : APRIL 11-23, 2024
ISSUE DATE : APRIL 25, 2024
REPORT NO. : 2024-U034056
WORK NO. : 2024-002104
ANALYSIS NO. : T24AH774-0002

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT ผลการวิเคราะห์ ตามวิธีมาตรฐาน T24AH774-0002	REGULATORY STANDARD	DETECTION LIMIT
FLOATABLE OIL AND GREASE	-	OBSERVATION METHOD	NOT VISIBLE	NOT VISIBLE	-
TURBIDITY	NTU	NEPHELOMETRIC METHOD (SM PART 210 B)	7.9	-	0.1
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM PART 2540 D)	7.2	10	10
OIL AND GREASE	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	-	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			YELLOW/CLEAR BROWN		

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.
REGULATORY STANDARD : SEAWATER QUALITY STANDARDS, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, B.E. 2564
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LINE OF THE SEAWATER SURFACE (2) SEAWATER IN THE PORTAL AREA THE MOORING AREA ACCORDING TO THE NAVIGATION IN
THE THAI WATERS ACT (3) SEAWATER ADJACENT TO THE TERMINAL PORT THAT ACCEPTS SHIPS OF 500 GROSS TONS (OR ABOVE)
OR THE BERTHS LENGTH IS FROM 100 METERS (OR ABOVE), OR HAS A TOTAL BERTH AREA OF 1000 SQUARE METERS OR ABOVE,
WITH A BOUNDARY STARTING FROM THE ADJACENT BERTH TO A DISTANCE OF 1000 METERS ALONG THE SEAWATER SURFACE.
: THE RESULTS SHOULD NOT BE CHANGED BY MORE THAN THE SUM OF DAILY OR MONTHLY OR YEARLY AVERAGE AND
THE STANDARD DIVIATION. DAILY AVERAGE WAS CALCULATED FROM HOURLY MEASUREMENT OR AT LEAST 5 SAMPLES TAKEN AT
EQUAL TIME INTERVAL WITHIN ONE DAY. MONTHLY AVERAGE WAS CALCULATED FROM DAILY MEASUREMENT OR AT LEAST
4 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE MONTH. YEARLY AVERAGE WAS CALCULATED FROM MONTHLY
MEASUREMENT AT EQUAL TIME INTERVAL AND THE SAME PLACE WITHIN ONE YEAR.
ND : NON-DETECTABLE.

(MRS PIYAPAT SUTTAMANUTWONG)
LABORATORY SUPERVISOR

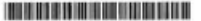
APRIL 25, 2024



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- End of Analysis Report -



ANALYSIS REPORT

CUSTOMER NAME : STAR FUELS MARKETING LIMITED.
ADDRESS : 202 MOO 1 HUA KHAI SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 082 829 6210 e-mail : sakofees@sprc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : APRIL 9, 2024
SAMPLING TIME : 15:00 HOUR
SAMPLING METHOD : COMPOSITE
SAMPLING BY : MR. ANANT MUDOR
ANALYZED BY : MISS NAPAPORN KHUNNOKKHUM

RECEIVED DATE : APRIL 11, 2024
ANALYTICAL DATE : APRIL 11-23, 2024
ISSUE DATE : APRIL 25, 2024
REPORT NO. : 2024-U034057
WORK NO. : 2024-002104
ANALYSIS NO. : T24AH774-0003

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			สีฟ้า/น้ำใส T24AH774-0003 NOT VISIBLE		
FLOATABLE OIL AND GREASE	-	OBSERVATION METHOD	NOT VISIBLE	NOT VISIBLE	-
TURBIDITY	NTU	NEPHELOMETRIC METHOD (SM PART 2130 B)	11	-	0.1
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM PART 2540 D)	11.0	11 ^a	10
OIL AND GREASE	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	-	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			YELLOW/CLEAR BROWN		

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.
REGULATORY STANDARD : SEAWATER QUALITY STANDARDS, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, B.E. 2564
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11^a : THE RESULTS SHOULD NOT BE CHANGED BY MORE THAN THE SUM OF DAILY OR MONTHLY OR YEARLY AVERAGE AND THE STANDARD DIVIATION. DAILY AVERAGE WAS CALCULATED FROM HOURLY MEASUREMENT OR AT LEAST 5 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE DAY. MONTHLY AVERAGE WAS CALCULATED FROM DAILY MEASUREMENT OR AT LEAST 4 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE MONTH. YEARLY AVERAGE WAS CALCULATED FROM MONTHLY MEASUREMENT AT EQUAL TIME INTERVAL AND THE SAME PLACE WITHIN ONE YEAR.
ND : NON-DETECTABLE.

(MRS PIYAPAT SUTTANANUTWONG)
LABORATORY SUPERVISOR

APRIL 25, 2024



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ADDRESS : 202 MOO 1 HUA KHAI SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 082 829 6210 e-mail : sakofees@sprc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : APRIL 9, 2024
SAMPLING TIME : 14:50 HOUR
SAMPLING METHOD : COMPOSITE
SAMPLING BY : MR. ANANT MUDOR
ANALYZED BY : MISS NAPAPORN KHUNNOKKHUM

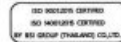
RECEIVED DATE : APRIL 11, 2024
ANALYTICAL DATE : APRIL 11-23, 2024
ISSUE DATE : APRIL 25, 2024
REPORT NO. : 2024-U034058
WORK NO. : 2024-002104
ANALYSIS NO. : T24AH774-0004

PARAMETER	UNIT	METHOD OF ANALYSES	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			สีฟ้า/น้ำใส T24AH774-0004		
FLOATABLE OIL AND GREASE	-	OBSERVATION METHOD	NOT VISIBLE	NOT VISIBLE	-
TURBIDITY	NTU	NEPHELOMETRIC METHOD (SM PART 2130 B)	8.0	-	0.1
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM PART 2540 D)	8.7	11 ^a	10
OIL AND GREASE	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	-	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			YELLOW/CLEAR BROWN		

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.
REGULATORY STANDARD : SEAWATER QUALITY STANDARDS, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, B.E. 2564
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CLASS 5 : SEAWATER QUALITY FOR INDUSTRY AND PORTS (1) SEAWATER ADJACENT TO INDUSTRIAL ESTATES BOUNDARY ACCORDING TO THE INDUSTRIAL ESTATE AUTHORITY OF THAILAND ACT AND INDUSTRIAL ZONE ACCORDING TO INDUSTRIAL LAW WITH A BOUNDARY FROM THE HIGHEST TIDE LINE TO THE LOWEST TIDE LINE UP TO A DISTANCE OF 1000 METERS ALONG THE HORIZONTAL LINE OF THE SEAWATER SURFACE (2) SEAWATER IN THE PORTAL AREA THE MOORING AREA ACCORDING TO THE NAVIGATION IN THE THAI WATERS ACT (3) SEAWATER ADJACENT TO THE TERMINAL PORT THAT ACCEPTS SHIPS OF 500 GROSS TONS (OR ABOVE) OR THE BERTHS LENGTH IS FROM 100 METERS (OR ABOVE), OR HAS A TOTAL BERTH AREA OF 1000 SQUARE METERS OR ABOVE, WITH A BOUNDARY STARTING FROM THE ADJACENT BERTH TO A DISTANCE OF 1000 METERS ALONG THE SEAWATER SURFACE.
11^a : THE RESULTS SHOULD NOT BE CHANGED BY MORE THAN THE SUM OF DAILY OR MONTHLY OR YEARLY AVERAGE AND THE STANDARD DIVIATION. DAILY AVERAGE WAS CALCULATED FROM HOURLY MEASUREMENT OR AT LEAST 5 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE DAY. MONTHLY AVERAGE WAS CALCULATED FROM DAILY MEASUREMENT OR AT LEAST 4 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE MONTH. YEARLY AVERAGE WAS CALCULATED FROM MONTHLY MEASUREMENT AT EQUAL TIME INTERVAL AND THE SAME PLACE WITHIN ONE YEAR.
ND : NON-DETECTABLE.

(MRS PIYAPAT SUTTANANUTWONG)
LABORATORY SUPERVISOR

APRIL 25, 2024



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ANALYSIS REPORT

CUSTOMER NAME : STAR FUELS MARKETING LIMITED.
ADDRESS : 202 MOO 1 HUA KHAD SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 082 829 6210 e-mail : sakofee@eprc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : APRIL 17, 2024
SAMPLING TIME : 15:10 HOUR
SAMPLING METHOD : COMPOSITE
SAMPLING BY : MR ANANT HUDOR
ANALYZED BY : MISS NAPAPORN KHUNNOKKHUM

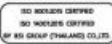
RECEIVED DATE : APRIL 19, 2024
ANALYTICAL DATE : APRIL 19-25, 2024
ISSUE DATE : APRIL 26, 2024
REPORT NO. : 2024-U035254
WORK NO. : 2024-002104
ANALYSIS NO. : T24A3093-0001

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT ผลการวิเคราะห์ ตามข้อบังคับ มาตรฐาน T24A3093-0001	REGULATORY STANDARD	DETECTION LIMIT
FLOATABLE OIL AND GREASE	-	OBSERVATION METHOD	NOT VISIBLE	NOT VISIBLE	-
TURBIDITY	NTU	NEPHELOMETRIC METHOD (SM PART 2130 B)	8.5	-	0.1
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM PART 2540 D)	8.3	n ^o	10
OIL AND GREASE	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM PART 5620 B)	ND	-	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLEAR BROWN		

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.
REGULATORY STANDARD : SEAWATER QUALITY STANDARDS, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, B.E. 2564
PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL.138, PART 245 D, DATED OCTOBER 6, 2021.
CLASS 5 : SEAWATER QUALITY FOR INDUSTRY AND PORTS (1) SEAWATER ADJACENT TO INDUSTRIAL ESTATES BOUNDARY ACCORDING TO THE INDUSTRIAL ESTATE AUTHORITY OF THAILAND ACT AND INDUSTRIAL ZONE ACCORDING TO INDUSTRIAL LAW WITH A BOUNDARY FROM THE HIGHEST TIDE LINE TO THE LOWEST TIDE LINE UP TO A DISTANCE OF 1000 METERS ALONG THE HORIZONTAL LINE OF THE SEAWATER SURFACE (2) SEAWATER IN THE PORTAL AREA THE MOORING AREA ACCORDING TO THE NAVIGATION IN THE THAI WATERS ACT (3) SEAWATER ADJACENT TO THE TERMINAL PORT THAT ACCEPTS SHIPS OF 500 GROSS TONS (OR ABOVE) OR THE BERTHS LENGTH IS FROM 100 METERS (OR ABOVE), OR HAS A TOTAL BERTH AREA OF 1000 SQUARE METERS (OR ABOVE), WITH A BOUNDARY STARTING FROM THE ADJACENT BERTH TO A DISTANCE OF 1000 METERS ALONG THE SEAWATER SURFACE.
n^o : THE RESULTS SHOULD NOT BE CHANGED BY MORE THAN THE SUM OF DAILY OR MONTHLY OR YEARLY AVERAGE AND THE STANDARD DIVIATION. DAILY AVERAGE WAS CALCULATED FROM HOURLY MEASUREMENT OR AT LEAST 5 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE DAY. MONTHLY AVERAGE WAS CALCULATED FROM DAILY MEASUREMENT OR AT LEAST 4 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE MONTH. YEARLY AVERAGE WAS CALCULATED FROM MONTHLY MEASUREMENT AT EQUAL TIME INTERVAL AND THE SAME PLACE WITHIN ONE YEAR.
ND : NON-DETECTABLE.

(MRS PIYAPAT SUTTAMANUTWONG)
LABORATORY SUPERVISOR

APRIL 26, 2024



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ANALYSIS REPORT

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ADDRESS : 202 MOO 1 HUA KHAD SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 082 829 6210 e-mail : sakofee@eprc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : APRIL 17, 2024
SAMPLING TIME : 15:15 HOUR
SAMPLING METHOD : COMPOSITE
SAMPLING BY : MR ANANT HUDOR
ANALYZED BY : MISS NAPAPORN KHUNNOKKHUM

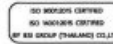
RECEIVED DATE : APRIL 19, 2024
ANALYTICAL DATE : APRIL 19-25, 2024
ISSUE DATE : APRIL 26, 2024
REPORT NO. : 2024-U035256
WORK NO. : 2024-002104
ANALYSIS NO. : T24A3093-0002

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT ผลการวิเคราะห์ ตามข้อบังคับ มาตรฐาน T24A3093-0002	REGULATORY STANDARD	DETECTION LIMIT
FLOATABLE OIL AND GREASE	-	OBSERVATION METHOD	NOT VISIBLE	NOT VISIBLE	-
TURBIDITY	NTU	NEPHELOMETRIC METHOD (SM PART 2130 B)	15	-	0.1
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM PART 2540 D)	20.2	n ^o	10
OIL AND GREASE	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM PART 5620 B)	ND	-	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLEAR BROWN		

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.
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PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL.138, PART 245 D, DATED OCTOBER 6, 2021.
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n^o : THE RESULTS SHOULD NOT BE CHANGED BY MORE THAN THE SUM OF DAILY OR MONTHLY OR YEARLY AVERAGE AND THE STANDARD DIVIATION. DAILY AVERAGE WAS CALCULATED FROM HOURLY MEASUREMENT OR AT LEAST 5 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE DAY. MONTHLY AVERAGE WAS CALCULATED FROM DAILY MEASUREMENT OR AT LEAST 4 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE MONTH. YEARLY AVERAGE WAS CALCULATED FROM MONTHLY MEASUREMENT AT EQUAL TIME INTERVAL AND THE SAME PLACE WITHIN ONE YEAR.
ND : NON-DETECTABLE.

(MRS PIYAPAT SUTTAMANUTWONG)
LABORATORY SUPERVISOR

APRIL 26, 2024



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ANALYSIS REPORT

CUSTOMER NAME : STAR FUELS MARKETING LIMITED.
ADDRESS : 202 MOO 1 HUA KHAI SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 082 829 6210 e-mail : sakofee@spc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : APRIL 17, 2024
SAMPLING TIME : 15:00 HOUR
SAMPLING METHOD : COMPOSITE
SAMPLING BY : MR ANANT HUDOR
ANALYZED BY : MISS NAPAPORN KHUNNOKKOHJH

RECEIVED DATE : APRIL 19, 2024
ANALYTICAL DATE : APRIL 19-25, 2024
ISSUE DATE : APRIL 26, 2024
REPORT NO. : 2024-U035257
WORK NO. : 2024-002104
ANALYSIS NO. : T24A1093-0003

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT สีน้ำตาล T24A1093-0003	REGULATORY STANDARD	DETECTION LIMIT
FLOATABLE OIL AND GREASE	-	OBSERVATION METHOD	NOT VISIBLE	NOT VISIBLE	-
TURBIDITY	NTU	NEPHELOMETRIC METHOD (SM PART 2130 B)	9.0	-	0.1
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM PART 2540 D)	12.4	n ^o	10
OIL AND GREASE	mg/L	LIQUID-LIQUID PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	-	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLEAR BROWN		

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.
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BOUNDARY FROM THE HIGHEST TIDE LINE TO THE LOWEST TIDE LINE UP TO A DISTANCE OF 1000 METERS ALONG THE HORIZONTAL
LINE OF THE SEAWATER SURFACE (2) SEAWATER IN THE PORTAL AREA THE MOORING AREA ACCORDING TO THE NAVIGATION IN
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OR THE BERTHS LENGTH IS FROM 100 METERS (OR ABOVE), OR HAS A TOTAL BERTH AREA OF 1000 SQUARE METERS OR ABOVE,
WITH A BOUNDARY STARTING FROM THE ADJACENT BERTH TO A DISTANCE OF 1000 METERS ALONG THE SEAWATER SURFACE.
n^o : THE RESULTS SHOULD NOT BE CHANGED BY MORE THAN THE SUM OF DAILY OR MONTHLY OR YEARLY 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. MONTHLY AVERAGE WAS CALCULATED FROM DAILY MEASUREMENT OR AT LEAST
4 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE MONTH YEARLY AVERAGE WAS CALCULATED FROM MONTHLY
MEASUREMENT AT EQUAL TIME INTERVAL AND THE SAME PLACE WITHIN ONE YEAR.
ND : NON-DETECTABLE.

(MRS PIYAPAT SUTTAMANUTWONG)
LABORATORY SUPERVISOR

APRIL 26, 2024

ISO 15189 CERTIFIED
ISO 14001 CERTIFIED
BY ISO GROUP (THAILAND) COLTIS

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ANALYSIS REPORT

CUSTOMER NAME : STAR FUELS MARKETING LIMITED.
ADDRESS : 202 MOO 1 HUA KHAI SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 082 829 6210 e-mail : sakofee@spc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : APRIL 17, 2024
SAMPLING TIME : 14:50 HOUR
SAMPLING METHOD : COMPOSITE
SAMPLING BY : MR ANANT HUDOR
ANALYZED BY : MISS NAPAPORN KHUNNOKKOHJH

RECEIVED DATE : APRIL 19, 2024
ANALYTICAL DATE : APRIL 19-25, 2024
ISSUE DATE : APRIL 26, 2024
REPORT NO. : 2024-U035258
WORK NO. : 2024-002104
ANALYSIS NO. : T24A1093-0004

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT สีน้ำตาล T24A1093-0004	REGULATORY STANDARD	DETECTION LIMIT
FLOATABLE OIL AND GREASE	-	OBSERVATION METHOD	NOT VISIBLE	NOT VISIBLE	-
TURBIDITY	NTU	NEPHELOMETRIC METHOD (SM PART 2130 B)	9.4	-	0.1
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM PART 2540 D)	12.4	n ^o	10
OIL AND GREASE	mg/L	LIQUID-LIQUID PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	-	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLEAR BROWN		

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.
REGULATORY STANDARD : SEAWATER QUALITY STANDARDS, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, B.E. 2564
PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL 138, PART 245 D, DATED OCTOBER 6, 2021.
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LINE OF THE SEAWATER SURFACE (2) SEAWATER IN THE PORTAL AREA THE MOORING AREA ACCORDING TO THE NAVIGATION IN
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WITH A BOUNDARY STARTING FROM THE ADJACENT BERTH TO A DISTANCE OF 1000 METERS ALONG THE SEAWATER SURFACE.
n^o : THE RESULTS SHOULD NOT BE CHANGED BY MORE THAN THE SUM OF DAILY OR MONTHLY OR YEARLY 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. MONTHLY AVERAGE WAS CALCULATED FROM DAILY MEASUREMENT OR AT LEAST
4 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE MONTH YEARLY AVERAGE WAS CALCULATED FROM MONTHLY
MEASUREMENT AT EQUAL TIME INTERVAL AND THE SAME PLACE WITHIN ONE YEAR.
ND : NON-DETECTABLE.

(MRS PIYAPAT SUTTAMANUTWONG)
LABORATORY SUPERVISOR

APRIL 26, 2024

ISO 15189 CERTIFIED
ISO 14001 CERTIFIED
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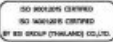
ANALYSIS REPORT

CUSTOMER NAME : STAR FUELS MARKETING LIMITED.
ADDRESS : 202 MOO 1 HUA KHAD SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 082 829 6210 e-mail : sakofees@sprc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : APRIL 23, 2024
SAMPLING TIME : 16:00 HOUR
SAMPLING METHOD : COMPOSITE
SAMPLING BY : MR. ANANT HUDOR
ANALYZED BY : MISS NAPAPORN KHUNNOKKIJUM
RECEIVED DATE : APRIL 25, 2024
ANALYTICAL DATE : APRIL 25-28, 2024
ISSUE DATE : MAY 3, 2024
REPORT NO. : 2024-U036614
WORK NO. : 2024-002104
ANALYSIS NO. : T24AJS55-0001

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT ตรวจพบสารปนเปื้อนในน้ำทะเลตามข้อกำหนด T24AJS55-0001	REGULATORY STANDARD	DETECTION LIMIT
FLOATABLE OIL AND GREASE	-	OBSERVATION METHOD	NOT VISIBLE	NOT VISIBLE	-
TURBIDITY	NTU	NEPHELOMETRIC METHOD (SM PART 230 B)	13	-	0.1
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM PART 2540 D)	11.3	n ^a	10
OIL AND GREASE	mg/L	LIQUID-LIQUID PARTITION-GRAVIMETRIC METHOD (SM PART 5620 B)	ND	-	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLEAR YELLOW		

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.
REGULATORY STANDARD : SEAWATER QUALITY STANDARDS, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, B.E. 2564
PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 138, PART 245 D, DATED OCTOBER 6, 2021.
CLASS 5 : SEAWATER QUALITY FOR INDUSTRY AND PORTS (1) SEAWATER ADJACENT TO INDUSTRIAL ESTATES BOUNDARY ACCORDING TO THE INDUSTRIAL ESTATE AUTHORITY OF THAILAND ACT AND INDUSTRIAL ZONE ACCORDING TO INDUSTRIAL LAW WITH A BOUNDARY FROM THE HIGHEST TIDE LINE TO THE LOWEST TIDE LINE UP TO A DISTANCE OF 1000 METERS ALONG THE HORIZONTAL LINE OF THE SEAWATER SURFACE (2) SEAWATER IN THE PORTAL AREA THE MOORING AREA ACCORDING TO THE NAVIGATION IN THE THAI WATERS ACT (3) SEAWATER ADJACENT TO THE TERMINAL PORT THAT ACCEPTS SHIPS OF 500 GROSS TONS (OR ABOVE) OR THE BERTH'S LENGTH IS FROM 100 METERS (OR ABOVE), OR HAS A TOTAL BERTH AREA OF 1000 SQUARE METERS (OR ABOVE), WITH A BOUNDARY STARTING FROM THE ADJACENT BERTH TO A DISTANCE OF 1000 METERS ALONG THE SEAWATER SURFACE.
n^a : THE RESULTS SHOULD NOT BE CHANGED BY MORE THAN THE SUM OF DAILY OR MONTHLY OR YEARLY AVERAGE AND THE STANDARD DIVIATION. DAILY AVERAGE WAS CALCULATED FROM HOURLY MEASUREMENT OR AT LEAST 5 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE DAY. MONTHLY AVERAGE WAS CALCULATED FROM DAILY MEASUREMENT OR AT LEAST 4 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE MONTH. YEARLY AVERAGE WAS CALCULATED FROM MONTHLY MEASUREMENT AT EQUAL TIME INTERVAL AND THE SAME PLACE WITHIN ONE YEAR.
ND : NON-DETECTABLE.

(MRS PIYAPAT SUTTAMANUTWONG)
LABORATORY SUPERVISOR



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SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : APRIL 23, 2024
SAMPLING TIME : 16:05 HOUR
SAMPLING METHOD : COMPOSITE
SAMPLING BY : MR. ANANT HUDOR
ANALYZED BY : MISS NAPAPORN KHUNNOKKIJUM
RECEIVED DATE : APRIL 25, 2024
ANALYTICAL DATE : APRIL 25-30, 2024
ISSUE DATE : MAY 3, 2024
REPORT NO. : 2024-U036615
WORK NO. : 2024-002104
ANALYSIS NO. : T24AJS55-0002

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT ตรวจพบสารปนเปื้อนในน้ำทะเลตามข้อกำหนด T24AJS55-0002	REGULATORY STANDARD	DETECTION LIMIT
FLOATABLE OIL AND GREASE	-	OBSERVATION METHOD	NOT VISIBLE	NOT VISIBLE	-
TURBIDITY	NTU	NEPHELOMETRIC METHOD (SM PART 230 B)	13	-	0.1
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM PART 2540 D)	12.5	n ^a	10
OIL AND GREASE	mg/L	LIQUID-LIQUID PARTITION-GRAVIMETRIC METHOD (SM PART 5620 B)	ND	-	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLEAR BROWN		

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.
REGULATORY STANDARD : SEAWATER QUALITY STANDARDS, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, B.E. 2564
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ND : NON-DETECTABLE.

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SAMPLE TYPE : SEAWATER
SAMPLING DATE : APRIL 23, 2024
SAMPLING TIME : 15:50 HOUR
SAMPLING METHOD : COMPOSITE
SAMPLING BY : MR ANANT MUJOR
ANALYZED BY : MISS NAPAORN KHUNNOKKHUM

RECEIVED DATE : APRIL 25, 2024
ANALYTICAL DATE : APRIL 25-28, 2024
ISSUE DATE : MAY 3, 2024
REPORT NO. : 2024-U036617
WORK NO. : 2024-002104
ANALYSIS NO. : T24A1555-0003

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT ผลวิเคราะห์ พบสารพิษ T24A1555-0003	REGULATORY STANDARD	DETECTION LIMIT
FLOATABLE OIL AND GREASE	-	OBSERVATION METHOD	NOT VISIBLE	NOT VISIBLE	-
TURBIDITY	NTU	NEPHELOMETRIC METHOD (SM PART 210 B)	10	-	0.1
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM PART 2540 D)	9.2	nt	10
OIL AND GREASE	mg/L	LIQUID-LIQUID PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	-	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLARA YELLOW		

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.
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4 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE MONTH. YEARLY AVERAGE WAS CALCULATED FROM MONTHLY
MEASUREMENT AT EQUAL TIME INTERVAL AND THE SAME PLACE WITHIN ONE YEAR.
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SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : APRIL 23, 2024
SAMPLING TIME : 15:40 HOUR
SAMPLING METHOD : COMPOSITE
SAMPLING BY : MR ANANT MUJOR
ANALYZED BY : MISS NAPAORN KHUNNOKKHUM

RECEIVED DATE : APRIL 25, 2024
ANALYTICAL DATE : APRIL 25-30, 2024
ISSUE DATE : MAY 3, 2024
REPORT NO. : 2024-U036618
WORK NO. : 2024-002104
ANALYSIS NO. : T24A1555-0004

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT ผลวิเคราะห์ T24A1555-0004	REGULATORY STANDARD	DETECTION LIMIT
FLOATABLE OIL AND GREASE	-	OBSERVATION METHOD	NOT VISIBLE	NOT VISIBLE	-
TURBIDITY	NTU	NEPHELOMETRIC METHOD (SM PART 210 B)	11	-	0.1
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM PART 2540 D)	12.8	nt	10
OIL AND GREASE	mg/L	LIQUID-LIQUID PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	-	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLARA BROWN		

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.
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4 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE MONTH. YEARLY AVERAGE WAS CALCULATED FROM MONTHLY
MEASUREMENT AT EQUAL TIME INTERVAL AND THE SAME PLACE WITHIN ONE YEAR.
ND : NON-DETECTABLE.

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LABORATORY SUPERVISOR

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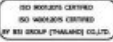
CUSTOMER NAME : STAR FUELS MARKETING LIMITED.
ADDRESS : 202 MOO 1 HUA KHAD SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 082 829 6210 e-mail : sakofees@sprc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANDU ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : APRIL 30, 2024
SAMPLING TIME : 15:40 HOUR
SAMPLING METHOD : COMPOSITE
SAMPLING BY : MR ANANT MUJOR
ANALYZED BY : MISS NARAPORN KHUNNOKKHUM

RECEIVED DATE : MAY 2, 2024
ANALYTICAL DATE : MAY 2-9, 2024
ISSUE DATE : MAY 10, 2024
REPORT NO. : 2024-U039816
WORK NO. : 2024-002104
ANALYSIS NO. : T24AJ197-0001

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT ผลการวิเคราะห์ ตามค่าเฉลี่ย ของตัวอย่าง T24AJ197-0001	REGULATORY STANDARD	DETECTION LIMIT
FLOATABLE OIL AND GREASE	-	OBSERVATION METHOD	NOT VISIBLE	NOT VISIBLE	-
TURBIDITY	NTU	NEPHELOMETRIC METHOD (SM. PART 2100 B)	12	-	0.1
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM. PART 2540 D)	16.7	nt	1.0
OIL AND GREASE	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM. PART 5520 B)	ND	-	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLEAR BROWN		

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23RD EDITION, 2017.
REGULATORY STANDARD : SEAWATER QUALITY STANDARDS, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, B.E. 2564
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CLASS 5 : SEAWATER QUALITY FOR INDUSTRY AND PORTS (1) SEAWATER ADJACENT TO INDUSTRIAL ESTATES BOUNDARY ACCORDING TO THE INDUSTRIAL ESTATE AUTHORITY OF THAILAND ACT AND INDUSTRIAL ZONE ACCORDING TO INDUSTRIAL LAW WITH A BOUNDARY FROM THE HIGHEST TIDE LINE TO THE LOWEST TIDE LINE UP TO A DISTANCE OF 1000 METERS ALONG THE HORIZONTAL LINE OF THE SEAWATER SURFACE (2) SEAWATER IN THE PORTAL AREA THE MOORING AREA ACCORDING TO THE NAVIGATION IN THE THAI WATERS ACT (3) SEAWATER ADJACENT TO THE TERMINAL PORT THAT ACCEPTS SHIPS OF 500 GROSS TONS (OR ABOVE) OR THE BERTHS LENGTH IS FROM 100 METERS (OR ABOVE), OR HAS A TOTAL BERTH AREA OF 1000 SQUARE METERS (OR ABOVE), WITH A BOUNDARY STARTING FROM THE ADJACENT BERTH TO A DISTANCE OF 1000 METERS ALONG THE SEAWATER SURFACE.
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ND : NON-DETECTABLE.

(MRS PIYAPAT SUTTAMANUTWONG)
LABORATORY SUPERVISOR



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ANALYSIS REPORT

CUSTOMER NAME : STAR FUELS MARKETING LIMITED.
ADDRESS : 202 MOO 1 HUA KHAD SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 082 829 6210 e-mail : sakofees@sprc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANDU ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : APRIL 30, 2024
SAMPLING TIME : 15:45 HOUR
SAMPLING METHOD : COMPOSITE
SAMPLING BY : MR ANANT MUJOR
ANALYZED BY : MISS NARAPORN KHUNNOKKHUM

RECEIVED DATE : MAY 2, 2024
ANALYTICAL DATE : MAY 2-9, 2024
ISSUE DATE : MAY 10, 2024
REPORT NO. : 2024-U039817
WORK NO. : 2024-002104
ANALYSIS NO. : T24AJ197-0002

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT ผลการวิเคราะห์ ตามค่าเฉลี่ย ของตัวอย่าง T24AJ197-0002	REGULATORY STANDARD	DETECTION LIMIT
FLOATABLE OIL AND GREASE	-	OBSERVATION METHOD	NOT VISIBLE	NOT VISIBLE	-
TURBIDITY	NTU	NEPHELOMETRIC METHOD (SM. PART 2100 B)	12	-	0.1
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM. PART 2540 D)	16.7	nt	1.0
OIL AND GREASE	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM. PART 5520 B)	ND	-	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLEAR BROWN		

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23RD EDITION, 2017.
REGULATORY STANDARD : SEAWATER QUALITY STANDARDS, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, B.E. 2564
PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 138, PART 245 D, DATED OCTOBER 6, 2021
CLASS 5 : SEAWATER QUALITY FOR INDUSTRY AND PORTS (1) SEAWATER ADJACENT TO INDUSTRIAL ESTATES BOUNDARY ACCORDING TO THE INDUSTRIAL ESTATE AUTHORITY OF THAILAND ACT AND INDUSTRIAL ZONE ACCORDING TO INDUSTRIAL LAW WITH A BOUNDARY FROM THE HIGHEST TIDE LINE TO THE LOWEST TIDE LINE UP TO A DISTANCE OF 1000 METERS ALONG THE HORIZONTAL LINE OF THE SEAWATER SURFACE (2) SEAWATER IN THE PORTAL AREA THE MOORING AREA ACCORDING TO THE NAVIGATION IN THE THAI WATERS ACT (3) SEAWATER ADJACENT TO THE TERMINAL PORT THAT ACCEPTS SHIPS OF 500 GROSS TONS (OR ABOVE) OR THE BERTHS LENGTH IS FROM 100 METERS (OR ABOVE), OR HAS A TOTAL BERTH AREA OF 1000 SQUARE METERS (OR ABOVE), WITH A BOUNDARY STARTING FROM THE ADJACENT BERTH TO A DISTANCE OF 1000 METERS ALONG THE SEAWATER SURFACE.
nt : THE RESULTS SHOULD NOT BE CHANGED BY MORE THAN THE SUM OF DAILY OR MONTHLY OR YEARLY 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. MONTHLY AVERAGE WAS CALCULATED FROM DAILY MEASUREMENT OR AT LEAST 4 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE MONTH. YEARLY AVERAGE WAS CALCULATED FROM MONTHLY MEASUREMENT AT EQUAL TIME INTERVAL AND THE SAME PLACE WITHIN ONE YEAR.
ND : NON-DETECTABLE.

(MRS PIYAPAT SUTTAMANUTWONG)
LABORATORY SUPERVISOR



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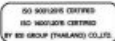
CUSTOMER NAME : STAR FUELS MARKETING LIMITED.
ADDRESS : 202 MOO 1 HUA KHAD SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 062 829 6210 e-mail : sakofees@sprc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : APRIL 30, 2024
SAMPLING TIME : 15:35 HOUR
SAMPLING METHOD : COMPOSITE
SAMPLING BY : MR ANANT MUDOR
ANALYZED BY : MISS NAPAORN KHUNNOKKHUM

RECEIVED DATE : MAY 2, 2024
ANALYTICAL DATE : MAY 2-9, 2024
ISSUE DATE : MAY 10, 2024
REPORT NO. : 2024-U039819
WORK NO. : 2024-002104
ANALYSIS NO. : T24A3197-0003

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT ผลการตรวจวิเคราะห์ T24A3197-0003	REGULATORY STANDARD	DETECTION LIMIT
FLOATABLE OIL AND GREASE	-	OBSERVATION METHOD	NOT VISIBLE	NOT VISIBLE	-
TURBIDITY	NTU	NEPHELOMETRIC METHOD (SM PART 2100 B)	8.4	-	0.1
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM PART 2540 D)	11.3	nt	10
OIL AND GREASE	mg/L	LIQUID-LIQUID PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	-	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLEAR BROWN		

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REGULATORY STANDARD : SEAWATER QUALITY STANDARDS, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, B.E. 2564
PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 138, PART 245 D, DATED OCTOBER 6, 2021.
CLASS 5 : SEAWATER QUALITY FOR INDUSTRY AND PORTS (1) SEAWATER ADJACENT TO INDUSTRIAL ESTATES BOUNDARY ACCORDING TO THE INDUSTRIAL ESTATE AUTHORITY OF THAILAND ACT AND INDUSTRIAL ZONE ACCORDING TO INDUSTRIAL LAW WITH A BOUNDARY FROM THE HIGHEST TIDE LINE TO THE LOWEST TIDE LINE UP TO A DISTANCE OF 1000 METERS ALONG THE HORIZONTAL LINE OF THE SEAWATER SURFACE (2) SEAWATER IN THE PORTAL AREA THE MOORING AREA ACCORDING TO THE NAVIGATION IN THE THAI WATERS ACT (3) SEAWATER ADJACENT TO THE TERMINAL PORT THAT ACCEPTS SHIPS OF 500 GROSS TONS (OR ABOVE) OR THE BERTHS LENGTH IS FROM 100 METERS (OR ABOVE), OR HAS A TOTAL BERTH AREA OF 1000 SQUARE METERS OR ABOVE, WITH A BOUNDARY STARTING FROM THE ADJACENT BERTH TO A DISTANCE OF 1000 METERS ALONG THE SEAWATER SURFACE.
nt : THE RESULTS SHOULD NOT BE CHANGED BY MORE THAN THE SUM OF DAILY OR MONTHLY OR YEARLY AVERAGE AND THE STANDARD DIVIATION. DAILY AVERAGE WAS CALCULATED FROM HOURLY MEASUREMENT OR AT LEAST 5 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE DAY. MONTHLY AVERAGE WAS CALCULATED FROM DAILY MEASUREMENT OR AT LEAST 4 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE MONTH. YEARLY AVERAGE WAS CALCULATED FROM MONTHLY MEASUREMENT AT EQUAL TIME INTERVAL AND THE SAME PLACE WITHIN ONE YEAR.
ND : NON-DETECTABLE.

(MRS PIYAPAT SUTTANANUTWONG)
LABORATORY SUPERVISOR



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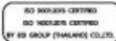
CUSTOMER NAME : STAR FUELS MARKETING LIMITED.
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CONTACT INFORMATION : TEL : 062 829 6210 e-mail : sakofees@sprc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : APRIL 30, 2024
SAMPLING TIME : 15:30 HOUR
SAMPLING METHOD : COMPOSITE
SAMPLING BY : MR ANANT MUDOR
ANALYZED BY : MISS NAPAORN KHUNNOKKHUM

RECEIVED DATE : MAY 2, 2024
ANALYTICAL DATE : MAY 2-9, 2024
ISSUE DATE : MAY 10, 2024
REPORT NO. : 2024-U039826
WORK NO. : 2024-002104
ANALYSIS NO. : T24A3197-0004

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT ผลการตรวจวิเคราะห์ T24A3197-0004	REGULATORY STANDARD	DETECTION LIMIT
FLOATABLE OIL AND GREASE	-	OBSERVATION METHOD	NOT VISIBLE	NOT VISIBLE	-
TURBIDITY	NTU	NEPHELOMETRIC METHOD (SM PART 2130 B)	8.4	-	0.1
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM PART 2540 D)	9.5	nt	10
OIL AND GREASE	mg/L	LIQUID-LIQUID PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	-	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLEAR YELLOW		

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.
REGULATORY STANDARD : SEAWATER QUALITY STANDARDS, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, B.E. 2564
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CLASS 5 : SEAWATER QUALITY FOR INDUSTRY AND PORTS (1) SEAWATER ADJACENT TO INDUSTRIAL ESTATES BOUNDARY ACCORDING TO THE INDUSTRIAL ESTATE AUTHORITY OF THAILAND ACT AND INDUSTRIAL ZONE ACCORDING TO INDUSTRIAL LAW WITH A BOUNDARY FROM THE HIGHEST TIDE LINE TO THE LOWEST TIDE LINE UP TO A DISTANCE OF 1000 METERS ALONG THE HORIZONTAL LINE OF THE SEAWATER SURFACE (2) SEAWATER IN THE PORTAL AREA THE MOORING AREA ACCORDING TO THE NAVIGATION IN THE THAI WATERS ACT (3) SEAWATER ADJACENT TO THE TERMINAL PORT THAT ACCEPTS SHIPS OF 500 GROSS TONS (OR ABOVE) OR THE BERTHS LENGTH IS FROM 100 METERS (OR ABOVE), OR HAS A TOTAL BERTH AREA OF 1000 SQUARE METERS OR ABOVE, WITH A BOUNDARY STARTING FROM THE ADJACENT BERTH TO A DISTANCE OF 1000 METERS ALONG THE SEAWATER SURFACE.
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ND : NON-DETECTABLE.

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CONTACT INFORMATION : TEL : 082 829 6210 e-mail : sakofee@sprc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : MAY 9, 2024
SAMPLING TIME : 14:50 HOUR
SAMPLING METHOD : COMPOSITE
SAMPLING BY : MR ANANT MUJOR
ANALYZED BY : MISS NAPAPORN KHUNNOKKOLM

RECEIVED DATE : MAY 10, 2024
ANALYTICAL DATE : MAY 10-17, 2024
ISSUE DATE : MAY 17, 2024
REPORT NO. : 2024-U042553
WORK NO. : 2024-002104
ANALYSIS NO. : T24A038-0001

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT วิเคราะห์ผลการ ทดสอบตามวิธี ทดสอบที่ T24A038-0001	REGULATORY STANDARD	DETECTION LIMIT
FLOATABLE OIL AND GREASE	-	OBSERVATION METHOD	NOT VISIBLE	NOT VISIBLE	-
TURBIDITY	NTU	NEPHELOMETRIC METHOD (SM PART 230 B)	6.1	-	0.1
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM PART 2540 D)	9.1	n ^a	10
OIL AND GREASE	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	-	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLEAR YELLOW		

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REGULATORY STANDARD : SEAWATER QUALITY STANDARDS, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, B.E. 2564
PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 98, PART 245 D, DATED OCTOBER 6, 2021
CLASS 5 : SEAWATER QUALITY FOR INDUSTRY AND PORTS (1) SEAWATER ADJACENT TO INDUSTRIAL ESTATES BOUNDARY ACCORDING TO THE INDUSTRIAL ESTATE AUTHORITY OF THAILAND ACT AND INDUSTRIAL ZONE ACCORDING TO INDUSTRIAL LAW WITH A BOUNDARY FROM THE HIGHEST TIDE LINE TO THE LOWEST TIDE LINE UP TO A DISTANCE OF 1000 METERS ALONG THE HORIZONTAL LINE OF THE SEAWATER SURFACE (2) SEAWATER IN THE PORTAL AREA THE MOORING AREA ACCORDING TO THE NAVIGATION IN THE THAI WATERS ACT (3) SEAWATER ADJACENT TO THE TERMINAL PORT THAT ACCEPTS SHIPS OF 500 GROSS TONS (OR ABOVE) OR THE BERTHS LENGTH IS FROM 100 METERS (OR ABOVE), OR HAS A TOTAL BERTH AREA OF 1000 SQUARE METERS OR ABOVE, WITH A BOUNDARY STARTING FROM THE ADJACENT BERTH TO A DISTANCE OF 1000 METERS ALONG THE SEAWATER SURFACE.
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ND : NON-DETECTABLE.

(MRS PIYAPAT SUTTAMUNUTWONG)
LABORATORY SUPERVISOR

ISO 9001:2015 CERTIFIED
BY ISO GROUP (THAILAND) CO., LTD.

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ANALYSIS REPORT

CUSTOMER NAME : STAR FUELS MARKETING LIMITED.
ADDRESS : 202 MOO 1 HUA KHAI SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 082 829 6210 e-mail : sakofee@sprc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : MAY 9, 2024
SAMPLING TIME : 15:00 HOUR
SAMPLING METHOD : COMPOSITE
SAMPLING BY : MR ANANT MUJOR
ANALYZED BY : MISS NAPAPORN KHUNNOKKOLM

RECEIVED DATE : MAY 10, 2024
ANALYTICAL DATE : MAY 10-17, 2024
ISSUE DATE : MAY 17, 2024
REPORT NO. : 2024-U042554
WORK NO. : 2024-002104
ANALYSIS NO. : T24A038-0002

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT วิเคราะห์ผลการ ทดสอบตามวิธี ทดสอบที่ T24A038-0002	REGULATORY STANDARD	DETECTION LIMIT
FLOATABLE OIL AND GREASE	-	OBSERVATION METHOD	NOT VISIBLE	NOT VISIBLE	-
TURBIDITY	NTU	NEPHELOMETRIC METHOD (SM PART 230 B)	5.1	-	0.1
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM PART 2540 D)	10.0	n ^a	10
OIL AND GREASE	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	-	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLEAR YELLOW		

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REGULATORY STANDARD : SEAWATER QUALITY STANDARDS, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, B.E. 2564
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CLASS 5 : SEAWATER QUALITY FOR INDUSTRY AND PORTS (1) SEAWATER ADJACENT TO INDUSTRIAL ESTATES BOUNDARY ACCORDING TO THE INDUSTRIAL ESTATE AUTHORITY OF THAILAND ACT AND INDUSTRIAL ZONE ACCORDING TO INDUSTRIAL LAW WITH A BOUNDARY FROM THE HIGHEST TIDE LINE TO THE LOWEST TIDE LINE UP TO A DISTANCE OF 1000 METERS ALONG THE HORIZONTAL LINE OF THE SEAWATER SURFACE (2) SEAWATER IN THE PORTAL AREA THE MOORING AREA ACCORDING TO THE NAVIGATION IN THE THAI WATERS ACT (3) SEAWATER ADJACENT TO THE TERMINAL PORT THAT ACCEPTS SHIPS OF 500 GROSS TONS (OR ABOVE) OR THE BERTHS LENGTH IS FROM 100 METERS (OR ABOVE), OR HAS A TOTAL BERTH AREA OF 1000 SQUARE METERS OR ABOVE, WITH A BOUNDARY STARTING FROM THE ADJACENT BERTH TO A DISTANCE OF 1000 METERS ALONG THE SEAWATER SURFACE.
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ND : NON-DETECTABLE.

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LABORATORY SUPERVISOR

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ADDRESS : 202 MOO 1 HUA KHAD SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 082 829 6210 e-mail : sakofees@sprc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANDI ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : MAY 9, 2024
SAMPLING TIME : 14:40 HOUR
SAMPLING METHOD : COMPOSITE
SAMPLING BY : MR ANANT MUDOR
ANALYZED BY : MISS NAPAPORN KHUNNOKKULUM

RECEIVED DATE : MAY 10, 2024
ANALYTICAL DATE : MAY 10-17, 2024
ISSUE DATE : MAY 17, 2024
REPORT NO. : 2024-U042555
WORK NO. : 2024-002104
ANALYSIS NO. : T24A/938-0003

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
FLOATABLE OIL AND GREASE	-	OBSERVATION METHOD	NOT VISIBLE	NOT VISIBLE	-
TURBIDITY	NTU	NEPHELOMETRIC METHOD (SM PART 2100 B)	96	-	0.1
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM PART 2540 D)	17.1	17	1.0
OIL AND GREASE	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	-	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			YELLOW/TURBID BROWN		

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ND : NON-DETECTABLE.

(MRS PIYAPAT SUTTAMANUTWONG)
LABORATORY SUPERVISOR



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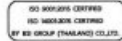
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SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANDI ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : MAY 9, 2024
SAMPLING TIME : 14:30 HOUR
SAMPLING METHOD : COMPOSITE
SAMPLING BY : MR ANANT MUDOR
ANALYZED BY : MISS NAPAPORN KHUNNOKKULUM

RECEIVED DATE : MAY 10, 2024
ANALYTICAL DATE : MAY 10-17, 2024
ISSUE DATE : MAY 17, 2024
REPORT NO. : 2024-U042556
WORK NO. : 2024-002104
ANALYSIS NO. : T24A/938-0004

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
FLOATABLE OIL AND GREASE	-	OBSERVATION METHOD	NOT VISIBLE	NOT VISIBLE	-
TURBIDITY	NTU	NEPHELOMETRIC METHOD (SM PART 2100 B)	3.8	-	0.1
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM PART 2540 D)	8.2	17	1.0
OIL AND GREASE	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	-	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			YELLOW/CLEAR BROWN		

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REGULATORY STANDARD : SEAWATER QUALITY STANDARDS, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, B.E. 2564
PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 98, PART 245 D, DATED OCTOBER 6, 2021
CLASS 5 : SEAWATER QUALITY FOR INDUSTRY AND PORTS (1) SEAWATER ADJACENT TO INDUSTRIAL ESTATES BOUNDARY ACCORDING TO THE INDUSTRIAL ESTATE AUTHORITY OF THAILAND ACT AND INDUSTRIAL ZONE ACCORDING TO INDUSTRIAL LAW WITH A BOUNDARY FROM THE HIGHEST TIDE LINE TO THE LOWEST TIDE LINE UP TO A DISTANCE OF 1000 METERS ALONG THE HORIZONTAL LINE OF THE SEAWATER SURFACE (2) SEAWATER IN THE PORTAL AREA THE MOORING AREA ACCORDING TO THE NAVIGATION IN THE THAI WATERS ACT (3) SEAWATER ADJACENT TO THE TERMINAL PORT THAT ACCEPTS SHIPS OF 500 GROSS TONS (OR ABOVE) OR THE BERTHS LENGTH IS FROM 100 METERS (OR ABOVE), OR HAS A TOTAL BERTH AREA OF 1000 SQUARE METERS OR ABOVE, WITH A BOUNDARY STARTING FROM THE ADJACENT BERTH TO A DISTANCE OF 1000 METERS ALONG THE SEAWATER SURFACE.
17 : THE RESULTS SHOULD NOT BE CHANGED BY MORE THAN THE SUM OF DAILY OR MONTHLY OR YEARLY AVERAGE AND THE STANDARD DIVIATION. DAILY AVERAGE WAS CALCULATED FROM HOURLY MEASUREMENT OR AT LEAST 5 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE DAY. MONTHLY AVERAGE WAS CALCULATED FROM DAILY MEASUREMENT OR AT LEAST 4 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE MONTH. YEARLY AVERAGE WAS CALCULATED FROM MONTHLY MEASUREMENT AT EQUAL TIME INTERVAL AND THE SAME PLACE WITHIN ONE YEAR.
ND : NON-DETECTABLE.

(MRS PIYAPAT SUTTAMANUTWONG)
LABORATORY SUPERVISOR



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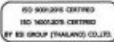
ANALYSIS REPORT

CUSTOMER NAME : STAR FUELS MARKETING LIMITED.
ADDRESS : 202 MOO 1 HUA KHAD SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 082 829 6210 e-mail : sakofees@sprc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : MAY 16, 2024
SAMPLING TIME : 14:20 HOUR
SAMPLING METHOD : COMPOSITE
SAMPLING BY : MR ANANT MUDOR
ANALYZED BY : MISS NAPAPORN KHUNNOOKHUM
RECEIVED DATE : MAY 17, 2024
ANALYTICAL DATE : MAY 17-27, 2024
ISSUE DATE : MAY 27, 2024
REPORT NO. : 2024-U045557
WORK NO. : 2024-002104
ANALYSIS NO. : T24AK562-0001

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT พบตะกอนสีน้ำตาล ตามค่าปกติ T24AK562-0001	REGULATORY STANDARD	DETECTION LIMIT
FLOATABLE OIL AND GREASE	-	OBSERVATION METHOD	NOT VISIBLE	NOT VISIBLE	-
TURBIDITY	NTU	NEPHELOMETRIC METHOD (SM PART 2100 B)	11	-	0.1
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM PART 2540 D)	11.0	11	1.0
OIL AND GREASE	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	-	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLEAR YELLOW		

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.
REGULATORY STANDARD : SEAWATER QUALITY STANDARDS, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, B.E. 2564
PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL 138, PART 245 D, DATED OCTOBER 5, 2021
CLASS 5 : SEAWATER QUALITY FOR INDUSTRY AND PORTS (1) SEAWATER ADJACENT TO INDUSTRIAL ESTATES BOUNDARY ACCORDING TO THE INDUSTRIAL ESTATE AUTHORITY OF THAILAND ACT AND INDUSTRIAL ZONE ACCORDING TO INDUSTRIAL LAW WITH A BOUNDARY FROM THE HIGHEST TIDE LINE TO THE LOWEST TIDE LINE UP TO A DISTANCE OF 1000 METERS ALONG THE HORIZONTAL LINE OF THE SEAWATER SURFACE (2) SEAWATER IN THE PORTAL AREA THE MOORING AREA ACCORDING TO THE NAVIGATION IN THE THAI WATERS ACT (3) SEAWATER ADJACENT TO THE TERMINAL PORT THAT ACCEPTS SHIPS OF 500 GROSS TONS (OR ABOVE) OR THE BERTHS LENGTH IS FROM 100 METERS (OR ABOVE), OR HAS A TOTAL BERTH AREA OF 1000 SQUARE METERS (OR ABOVE), WITH A BOUNDARY STARTING FROM THE ADJACENT BERTH TO A DISTANCE OF 1000 METERS ALONG THE SEAWATER SURFACE.
11 : THE RESULTS SHOULD NOT BE CHANGED BY MORE THAN THE SUM OF DAILY OR MONTHLY OR YEARLY AVERAGE AND THE STANDARD DIVIATION. DAILY AVERAGE WAS CALCULATED FROM HOURLY MEASUREMENT OR AT LEAST 5 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE DAY. MONTHLY AVERAGE WAS CALCULATED FROM DAILY MEASUREMENT OR AT LEAST 4 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE MONTH. YEARLY AVERAGE WAS CALCULATED FROM MONTHLY MEASUREMENT AT EQUAL TIME INTERVAL AND THE SAME PLACE WITHIN ONE YEAR.
ND : NON-DETECTABLE.

(MRS PIYAPAT SUTTAMANUTWONG)
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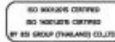
ANALYSIS REPORT

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CONTACT INFORMATION : TEL : 082 829 6210 e-mail : sakofees@sprc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : MAY 16, 2024
SAMPLING TIME : 14:25 HOUR
SAMPLING METHOD : COMPOSITE
SAMPLING BY : MR ANANT MUDOR
ANALYZED BY : MISS NAPAPORN KHUNNOOKHUM
RECEIVED DATE : MAY 17, 2024
ANALYTICAL DATE : MAY 17-27, 2024
ISSUE DATE : MAY 27, 2024
REPORT NO. : 2024-U045558
WORK NO. : 2024-002104
ANALYSIS NO. : T24AK562-0002

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT พบตะกอนสีน้ำตาล ตามค่าปกติ T24AK562-0002	REGULATORY STANDARD	DETECTION LIMIT
FLOATABLE OIL AND GREASE	-	OBSERVATION METHOD	NOT VISIBLE	NOT VISIBLE	-
TURBIDITY	NTU	NEPHELOMETRIC METHOD (SM PART 2130 B)	11	-	0.1
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM PART 2540 D)	12.6	11	1.0
OIL AND GREASE	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	-	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLEAR YELLOW		

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.
REGULATORY STANDARD : SEAWATER QUALITY STANDARDS, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, B.E. 2564
PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL 138, PART 245 D, DATED OCTOBER 5, 2021
CLASS 5 : SEAWATER QUALITY FOR INDUSTRY AND PORTS (1) SEAWATER ADJACENT TO INDUSTRIAL ESTATES BOUNDARY ACCORDING TO THE INDUSTRIAL ESTATE AUTHORITY OF THAILAND ACT AND INDUSTRIAL ZONE ACCORDING TO INDUSTRIAL LAW WITH A BOUNDARY FROM THE HIGHEST TIDE LINE TO THE LOWEST TIDE LINE UP TO A DISTANCE OF 1000 METERS ALONG THE HORIZONTAL LINE OF THE SEAWATER SURFACE (2) SEAWATER IN THE PORTAL AREA THE MOORING AREA ACCORDING TO THE NAVIGATION IN THE THAI WATERS ACT (3) SEAWATER ADJACENT TO THE TERMINAL PORT THAT ACCEPTS SHIPS OF 500 GROSS TONS (OR ABOVE) OR THE BERTHS LENGTH IS FROM 100 METERS (OR ABOVE), OR HAS A TOTAL BERTH AREA OF 1000 SQUARE METERS (OR ABOVE), WITH A BOUNDARY STARTING FROM THE ADJACENT BERTH TO A DISTANCE OF 1000 METERS ALONG THE SEAWATER SURFACE.
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ND : NON-DETECTABLE.

(MRS PIYAPAT SUTTAMANUTWONG)
LABORATORY SUPERVISOR



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(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : MAY 16, 2024
SAMPLING TIME : 14:10 HOUR
SAMPLING METHOD : COMPOSITE
SAMPLING BY : MR. ANANT MUDOR
ANALYZED BY : MISS NAPAPORN KHUNNOKKOLUM
RECEIVED DATE : MAY 17, 2024
ANALYTICAL DATE : MAY 17-27, 2024
ISSUE DATE : MAY 27, 2024
REPORT NO. : 2024-UH5559
WORK NO. : 2024-002104
ANALYSIS NO. : T24AKS62-0003

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT ผลการวิเคราะห์ T24AKS62-0003	REGULATORY STANDARD	DETECTION LIMIT
FLOATABLE OIL AND GREASE	-	OBSERVATION METHOD	NOT VISIBLE	NOT VISIBLE	-
TURBIDITY	NTU	NEPHELOMETRIC METHOD (SM PART 2130 B)	11	-	0.1
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM PART 2540 D)	14.0	11 ^a	1.0
OIL AND GREASE	mg/L	LIQUID-LIQUID PARTITION GRAVIMETRIC METHOD (SM PART 5520 B)	ND	-	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLEAR YELLOW		

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.
REGULATORY STANDARD : SEAWATER QUALITY STANDARDS, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, B.E. 2564
PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 136, PART 245 D, DATED OCTOBER 6, 2021.
CLASS 5 : SEAWATER QUALITY FOR INDUSTRY AND PORTS (1) SEAWATER ADJACENT TO INDUSTRIAL ESTATES BOUNDARY ACCORDING TO
THE INDUSTRIAL ESTATE AUTHORITY OF THAILAND ACT AND INDUSTRIAL ZONE ACCORDING TO INDUSTRIAL LAW WITH A
BOUNDARY FROM THE HIGHEST TIDE LINE TO THE LOWEST TIDE LINE UP TO A DISTANCE OF 1000 METERS ALONG THE HORIZONTAL
LINE OF THE SEAWATER SURFACE (2) SEAWATER IN THE PORTAL AREA THE MOORING AREA ACCORDING TO THE NAVIGATION IN
THE THAI WATERS ACT (3) SEAWATER ADJACENT TO THE TERMINAL PORT THAT ACCEPTS SHIPS OF 500 GROSS TONS (OR ABOVE)
OR THE BERTH'S LENGTH IS FROM 100 METERS (OR ABOVE), OR HAS A TOTAL BERTH AREA OF 1000 SQUARE METERS OR ABOVE,
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11^a : THE RESULTS SHOULD NOT BE CHANGED BY MORE THAN THE SUM OF DAILY OR MONTHLY OR YEARLY AVERAGE AND
THE STANDARD DIVIATION. DAILY AVERAGE WAS CALCULATED FROM HOURLY MEASUREMENT OR AT LEAST 5 SAMPLES TAKEN AT
EQUAL TIME INTERVAL WITHIN ONE DAY. MONTHLY AVERAGE WAS CALCULATED FROM DAILY MEASUREMENT OR AT LEAST
4 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE MONTH. YEARLY AVERAGE WAS CALCULATED FROM MONTHLY
MEASUREMENT AT EQUAL TIME INTERVAL AND THE SAME PLACE WITHIN ONE YEAR.
ND : NON-DETECTABLE.

(MRS PEYAPAT SUTTAMANUTWONG)
LABORATORY SUPERVISOR

ANALYSIS REPORT

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CONTACT INFORMATION : TEL : 082 829 6210 e-mail : sakofees@sprc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : MAY 16, 2024
SAMPLING TIME : 14:00 HOUR
SAMPLING METHOD : COMPOSITE
SAMPLING BY : MR. ANANT MUDOR
ANALYZED BY : MISS NAPAPORN KHUNNOKKOLUM
RECEIVED DATE : MAY 17, 2024
ANALYTICAL DATE : MAY 17-27, 2024
ISSUE DATE : MAY 27, 2024
REPORT NO. : 2024-UH55560
WORK NO. : 2024-002104
ANALYSIS NO. : T24AKS62-0004

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT ผลการวิเคราะห์ T24AKS62-0004	REGULATORY STANDARD	DETECTION LIMIT
FLOATABLE OIL AND GREASE	-	OBSERVATION METHOD	NOT VISIBLE	NOT VISIBLE	-
TURBIDITY	NTU	NEPHELOMETRIC METHOD (SM PART 2130 B)	5.2	-	0.1
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM PART 2540 D)	6.2	11 ^a	1.0
OIL AND GREASE	mg/L	LIQUID-LIQUID PARTITION GRAVIMETRIC METHOD (SM PART 5520 B)	ND	-	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLEAR YELLOW		

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.
REGULATORY STANDARD : SEAWATER QUALITY STANDARDS, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, B.E. 2564
PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 136, PART 245 D, DATED OCTOBER 6, 2021.
CLASS 5 : SEAWATER QUALITY FOR INDUSTRY AND PORTS (1) SEAWATER ADJACENT TO INDUSTRIAL ESTATES BOUNDARY ACCORDING TO
THE INDUSTRIAL ESTATE AUTHORITY OF THAILAND ACT AND INDUSTRIAL ZONE ACCORDING TO INDUSTRIAL LAW WITH A
BOUNDARY FROM THE HIGHEST TIDE LINE TO THE LOWEST TIDE LINE UP TO A DISTANCE OF 1000 METERS ALONG THE HORIZONTAL
LINE OF THE SEAWATER SURFACE (2) SEAWATER IN THE PORTAL AREA THE MOORING AREA ACCORDING TO THE NAVIGATION IN
THE THAI WATERS ACT (3) SEAWATER ADJACENT TO THE TERMINAL PORT THAT ACCEPTS SHIPS OF 500 GROSS TONS (OR ABOVE)
OR THE BERTH'S LENGTH IS FROM 100 METERS (OR ABOVE), OR HAS A TOTAL BERTH AREA OF 1000 SQUARE METERS OR ABOVE,
WITH A BOUNDARY STARTING FROM THE ADJACENT BERTH TO A DISTANCE OF 1000 METERS ALONG THE SEAWATER SURFACE.
11^a : THE RESULTS SHOULD NOT BE CHANGED BY MORE THAN THE SUM OF DAILY OR MONTHLY OR YEARLY AVERAGE AND
THE STANDARD DIVIATION. DAILY AVERAGE WAS CALCULATED FROM HOURLY MEASUREMENT OR AT LEAST 5 SAMPLES TAKEN AT
EQUAL TIME INTERVAL WITHIN ONE DAY. MONTHLY AVERAGE WAS CALCULATED FROM DAILY MEASUREMENT OR AT LEAST
4 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE MONTH. YEARLY AVERAGE WAS CALCULATED FROM MONTHLY
MEASUREMENT AT EQUAL TIME INTERVAL AND THE SAME PLACE WITHIN ONE YEAR.
ND : NON-DETECTABLE.

(MRS PEYAPAT SUTTAMANUTWONG)
LABORATORY SUPERVISOR

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ใบรายงานผลการวิเคราะห์ ระยะดำเนินการ





ANALYSIS REPORT

CUSTOMER NAME : STAR FUELS MARKETING LIMITED.
ADDRESS : 202 MOO 1 HUA KHAI SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 0 7433 1779, 080 965 5888 e-mail : sakofee@spc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : EFFLUENT
SAMPLING DATE : JANUARY 19, 2024
SAMPLING TIME : 08:00 HOUR
SAMPLING METHOD : -
SAMPLING BY : CUSTOMER
ANALYZED BY : MISS NAPAPORN KHUNNOKKHUM

RECEIVED DATE : JANUARY 22, 2024
ANALYTICAL DATE : JANUARY 22-27, 2024
REPORT NO. : 2024-U008114
WORK NO. : 2024-000239
ANALYSIS NO. : T24AB231-0001

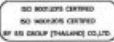
PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			EFFLUENT (SHELL'S API) T24AB231-0001		
pH *	-	ELECTROMETRIC METHOD (SM. PART 4500-H+ B)	6.3 (25°C)	5.5-9.0	-
BIOCHEMICAL OXYGEN DEMAND *	mg/L	5-DAY BOD TEST, MEMBRANE ELECTRODE METHOD (SM. PART 5210 B AND PART 4500-O G)	3.1	≤ 20	2.0
CHEMICAL OXYGEN DEMAND *	mg/L	CLOSED REFLEX, COLOURIMETRIC METHOD (SM. PART 5220 D)	ND	≤ 100	25.0
TOTAL SUSPENDED SOLIDS *	mg/L	DRIED AT 103-105 °C (SM. PART 2540 D)	5.5	≤ 50	5.0
TOTAL DISSOLVED SOLIDS *	mg/L	DRIED AT 180 °C (SM. PART 2540 C)	106	≤ 3,000	25
TOTAL KJELDAHL NITROGEN *	mg/L	DIGESTION, DISTILLATION, TITRIMETRIC METHOD (SM. PART 4500-NORG C)	< LOQ	≤ 100	1.5
OIL AND GREASE *	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM. PART 5520 B)	ND	≤ 5	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			YELLOW/CLEAR YELLOW		

* : ISO/IEC 17025 ACCREDITED BY THAI INDUSTRIAL STANDARDS INSTITUTE (TISI)
* : ISO/IEC 17025 ACCREDITED BY DEPARTMENT OF SCIENCE SERVICE (DSS)
* : VERIFIED BY OWN LABORATORY QUALITY SYSTEM, BUT STILL NOT ACCREDITED

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23 * EDITION, 2017.
REGULATORY STANDARD : INDUSTRIAL EFFLUENT STANDARDS, NOTIFICATION OF THE MINISTRY OF INDUSTRY, B.E. 2560, PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 134, PART 153 D, DATED JUNE 7, 2017.
ND : NON-DETECTABLE.
< LOQ : < LIMIT OF QUANTITATION (TOTAL KJELDAHL NITROGEN ≥ 15 AND < 5.0 mg/L).

(MRS PIYAPAT SUTTANANUTWONG)
LABORATORY SUPERVISOR

JANUARY 31, 2024



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SAMPLE TYPE : EFFLUENT
SAMPLING DATE : JANUARY 19, 2024
SAMPLING TIME : 08:00 HOUR
SAMPLING METHOD : -
SAMPLING BY : CUSTOMER
ANALYZED BY : MISS NAPAPORN KHUNNOKKHUM

RECEIVED DATE : JANUARY 22, 2024
ANALYTICAL DATE : JANUARY 22-27, 2024
REPORT NO. : 2024-U008115
WORK NO. : 2024-000239
ANALYSIS NO. : T24AB231-0002

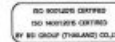
PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			EFFLUENT (SHELL'S API) T24AB231-0002		
pH *	-	ELECTROMETRIC METHOD (SM. PART 4500-H+ B)	6.3 (25°C)	5.5-9.0	-
BIOCHEMICAL OXYGEN DEMAND *	mg/L	5-DAY BOD TEST, MEMBRANE ELECTRODE METHOD (SM. PART 5210 B AND PART 4500-O G)	3.1	≤ 20	2.0
CHEMICAL OXYGEN DEMAND *	mg/L	CLOSED REFLEX, COLOURIMETRIC METHOD (SM. PART 5220 D)	ND	≤ 100	25.0
TOTAL SUSPENDED SOLIDS *	mg/L	DRIED AT 103-105 °C (SM. PART 2540 D)	6.6	≤ 50	5.0
TOTAL DISSOLVED SOLIDS *	mg/L	DRIED AT 180 °C (SM. PART 2540 C)	96	≤ 3,000	25
TOTAL KJELDAHL NITROGEN *	mg/L	DIGESTION, DISTILLATION, TITRIMETRIC METHOD (SM. PART 4500-NORG C)	ND	≤ 100	1.5
OIL AND GREASE *	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM. PART 5520 B)	ND	≤ 5	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			YELLOW/CLEAR YELLOW		

* : ISO/IEC 17025 ACCREDITED BY THAI INDUSTRIAL STANDARDS INSTITUTE (TISI)
* : ISO/IEC 17025 ACCREDITED BY DEPARTMENT OF SCIENCE SERVICE (DSS)
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REGULATORY STANDARD : INDUSTRIAL EFFLUENT STANDARDS, NOTIFICATION OF THE MINISTRY OF INDUSTRY, B.E. 2560, PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 134, PART 153 D, DATED JUNE 7, 2017.
ND : NON-DETECTABLE.

(MRS PIYAPAT SUTTANANUTWONG)
LABORATORY SUPERVISOR

JANUARY 31, 2024



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ANALYSIS REPORT

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SAMPLE TYPE : EFFLUENT
SAMPLING DATE : JANUARY 19, 2024
SAMPLING TIME : 08:00 HOUR
SAMPLING METHOD : -
SAMPLING BY : CUSTOMER
ANALYZED BY : MISS NAPAPORN KHUNNOOKHUM

RECEIVED DATE : JANUARY 22, 2024
ANALYTICAL DATE : JANUARY 22-27, 2024
REPORT NO. : 2024-U008116
WORK NO. : 2024-000239
ANALYSIS NO. : T24A8231-0003

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			EFFLUENT (JETTY API) T24A8231-0003		
pH ^a	-	ELECTROMETRIC METHOD (SM PART 4500-H ⁺ B)	6.4 (25°C)	5.5-9.0	-
BIOCHEMICAL OXYGEN DEMAND ^a	mg/L	5-DAY BOD TEST, MEMBRANE ELECTRODE METHOD (SM PART 5210 B AND PART 4500-O ₂ G)	3.0	≤ 20	2.0
CHEMICAL OXYGEN DEMAND ^c	mg/L	CLOSED REFLEX COLOURIMETRIC METHOD (SM PART 5220 D)	ND	≤ 100	25.0
TOTAL SUSPENDED SOLIDS ^a	mg/L	DRIED AT 103-105 °C (SM PART 2540 D)	5.4	≤ 50	5.0
TOTAL DISSOLVED SOLIDS ^b	mg/L	DRIED AT 180 °C (SM PART 2540 C)	81	≤ 3,000	25
TOTAL KJELDAHL NITROGEN ^c	mg/L	DIGESTION, DISTILLATION, TITRIMETRIC METHOD (SM PART 4500-Norg C)	ND	≤ 100	15
OIL AND GREASE ^c	mg/L	LIQUID-LIQUID PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	≤ 5	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			YELLOW/CLEAR YELLOW		

^a : ISO/IEC 17025 ACCREDITED BY THAI INDUSTRIAL STANDARDS INSTITUTE (TISI)

^b : ISO/IEC 17025 ACCREDITED BY DEPARTMENT OF SCIENCE SERVICE (DSS)

^c : VERIFIED BY OWN LABORATORY QUALITY SYSTEM, BUT STILL NOT ACCREDITED

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.

REGULATORY STANDARD : INDUSTRIAL EFFLUENT STANDARDS, NOTIFICATION OF THE MINISTRY OF INDUSTRY, B.E. 2560, PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 134, PART 153 D, DATED JUNE 7, 2017.

ND : NON-DETECTABLE.

(MRS. PSYAPAT SUTTANANUTWONG)
LABORATORY SUPERVISOR

JANUARY 31, 2024



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- End of Analysis Report -



ANALYSIS REPORT

CUSTOMER NAME : STAR FUELS MARKETING LIMITED.
ADDRESS : 202 MOO 1 HUA KHAD SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 0 7433 1779, 080 965 5888 e-mail : sakofees@sprc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : JANUARY 19, 2024
SAMPLING TIME : 08:30 HOUR
SAMPLING METHOD : -
SAMPLING BY : CUSTOMER
ANALYZED BY : MISS NAPAPORN KHUNNOOKHUM

RECEIVED DATE : JANUARY 22, 2024
ANALYTICAL DATE : JANUARY 22-27, 2024
REPORT NO. : 2024-U008118
WORK NO. : 2024-000239
ANALYSIS NO. : T24A8231-0005

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			SEAWATER (IN FRONT OF JETTY) T24A8231-0005		
pH	-	ELECTROMETRIC METHOD (SM PART 4500-H ⁺ B)	7.2 (25°C)	7.0-8.5	-
TURBIDITY	NTU	NEPHELOMETRIC METHOD (SM PART 2130 B)	25	-	0.1
BIOCHEMICAL OXYGEN DEMAND	mg/L	MEMBRANE ELECTRODE METHOD (SM PART 5210 B AND PART 4500-O ₂ G)	13	-	0.5
CHEMICAL OXYGEN DEMAND	mg/L	CLOSED REFLEX, TITRIMETRIC METHOD (SM PART 5220 C)	79.2	-	25.0
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM PART 2540 D)	30.6	n ^a	10
TOTAL DISSOLVED SOLIDS	mg/L	TOTAL DISSOLVED SOLIDS DRIED AT 180 °C (SM PART 2540 C)	30,450	-	25
TOTAL KJELDAHL NITROGEN	mg/L	IN-HOUSE METHOD, UAL/TP-WAS-001 (KJELDAHL METHOD); SM PART 4500-Norg C	ND	-	15

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PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			SEAWATER (IN FRONT OF JETTY) T24A8231-0005		
OIL AND GREASE	mg/L	LIQUID-LIQUID PARTITION-GRAVIMETRIC METHOD (SM PART 9520 B)	ND	-	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			YELLOW/TURBID BROWN		

IN-HOUSE : BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.
SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.
REGULATORY STANDARD : SEAWATER QUALITY STANDARDS, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, B.E. 2564
PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 138, PART 245 D, DATED OCTOBER 6, 2021
CLASS 5 : SEAWATER QUALITY FOR INDUSTRY AND PORTS
(1) SEAWATER ADJACENT TO INDUSTRIAL ESTATES BOUNDARY ACCORDING TO THE INDUSTRIAL ESTATE AUTHORITY OF THAILAND ACT AND INDUSTRIAL ZONE ACCORDING TO INDUSTRIAL LAW WITH A BOUNDARY FROM THE HIGHEST TIDE LINE TO THE LOWEST TIDE LINE UP TO A DISTANCE OF 1000 METERS ALONG THE HORIZONTAL LINE OF THE SEAWATER SURFACE (2) SEAWATER IN THE PORTAL AREA THE MOORING AREA ACCORDING TO THE NAVIGATION IN THE THAI WATERS ACT (3) SEAWATER ADJACENT TO THE TERMINAL PORT THAT ACCEPTS SHIPS OF 500 GROSS TONS (OR ABOVE) OR THE BERTHS LENGTH IS FROM 100 METERS (OR ABOVE), OR HAS A TOTAL BERTH AREA OF 1000 SQUARE METERS OR ABOVE, WITH A BOUNDARY STARTING FROM THE ADJACENT BERTH TO A DISTANCE OF 1000 METERS ALONG THE SEAWATER SURFACE.
: THE RESULTS SHOULD NOT BE CHANGED BY MORE THAN THE SUM OF DAILY OR MONTHLY OR YEARLY AVERAGE AND THE STANDARD DIVIATION. DAILY AVERAGE WAS CALCULATED FROM HOURLY MEASUREMENT OR AT LEAST 5 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE DAY. MONTHLY AVERAGE WAS CALCULATED FROM DAILY MEASUREMENT OR AT LEAST 4 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE MONTH. YEARLY AVERAGE WAS CALCULATED FROM MONTHLY MEASUREMENT AT EQUAL TIME INTERVAL AND THE SAME PLACE WITHIN ONE YEAR.
ND : NON-DETECTABLE.

ANALYSIS REPORT

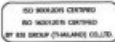
CUSTOMER NAME : STAR FUELS MARKETING LIMITED.
ADDRESS : 202 MOO 1 HUA KHAD SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 0 7433 1779, 080 965 5888 e-mail : sakofee@sprc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : EFFLUENT
SAMPLING DATE : FEBRUARY 23, 2024
SAMPLING TIME : 12:00 HOUR
SAMPLING METHOD : -
SAMPLING BY : CUSTOMER
ANALYZED BY : MISS NAPAPORN KHUNNOOKHUM
RECEIVED DATE : FEBRUARY 27, 2024
ANALYTICAL DATE : FEBRUARY 27 - MARCH 5, 2024
ISSUE DATE : MARCH 8, 2024
REPORT NO. : 2024-U019407
WORK NO. : 2024-000239
ANALYSIS NO. : T24AD905-0001

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			EFFLUENT (SHELL'S API) T24AD905-0001		
pH ^a	-	ELECTROMETRIC METHOD (SM PART 4505-H B)	7.0 (25°C)	5.5-9.0	-
BIOCHEMICAL OXYGEN DEMAND ^a	mg/L	5-DAY BOD TEST, MEMBRANE ELECTRODE METHOD (SM PART 5210 B AND PART 4505-O G)	2.1	≤ 20	20
CHEMICAL OXYGEN DEMAND ^a	mg/L	CLOSED REFLEX, COLOURIMETRIC METHOD (SM PART 5220 D)	ND	≤ 120	25.0
TOTAL SUSPENDED SOLIDS ^a	mg/L	DRIED AT 103-105 °C (SM PART 2540 D)	ND	≤ 50	5.0
TOTAL DISSOLVED SOLIDS ^a	mg/L	DRIED AT 180 °C (SM PART 2540 C)	133	≤ 3,000	25
TOTAL KJELDAHL NITROGEN ^a	mg/L	DIGESTION, DISTILLATION, TITRIMETRIC METHOD (SM PART 4500-Norg C)	< LOQ	≤ 100	15
OIL AND GREASE ^a	mg/L	LIQUID-LIQUID PARTITION-GRAVIMETRIC METHOD (SM PART 9520 B)	ND	≤ 5	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			YELLOW/CLUM BROWN		

^a : ISO/IEC 17025 ACCREDITED BY THAI INDUSTRIAL STANDARDS INSTITUTE (TISI)
^b : ISO/IEC 17025 ACCREDITED BY DEPARTMENT OF SCIENCE SERVICE (DSS)
^c : VERIFIED BY OWN LABORATORY QUALITY SYSTEM, BUT STILL NOT ACCREDITED
SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.
REGULATORY STANDARD : INDUSTRIAL EFFLUENT STANDARDS, NOTIFICATION OF THE MINISTRY OF INDUSTRY, B.E. 2560.
PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 134, PART 163 D, DATED JUNE 7, 2017.
ND : NON-DETECTABLE.
< LOQ : < LIMIT OF QUANTITATION (TOTAL KJELDAHL NITROGEN ≥ 15 AND < 5.0 mg/L).

(MRS PIYAPAT SUTTAMANUTWONG)
LABORATORY SUPERVISOR

JANUARY 31, 2024



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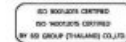
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2024-U008118

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(MRS PIYAPAT SUTTAMANUTWONG)
LABORATORY SUPERVISOR

MARCH 11, 2024



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ANALYSIS REPORT

CUSTOMER NAME : STAR FUELS MARKETING LIMITED.
ADDRESS : 202 MOO 1 HUA KHAD SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 0 7433 1779, 080 965 5888 e-mail : sakofees@sprc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : EFFLUENT
SAMPLING DATE : FEBRUARY 23, 2024
SAMPLING TIME : 12:00 HOUR
SAMPLING METHOD : -
SAMPLING BY : CUSTOMER
ANALYZED BY : MISS NAPAPORN KHUNNOKKOLUM
RECEIVED DATE : FEBRUARY 27, 2024
ANALYTICAL DATE : FEBRUARY 27 - MARCH 5, 2024
ISSUE DATE : MARCH 8, 2024
REPORT NO. : 2024-U019408
WORK NO. : 2024-000239
ANALYSIS NO. : T24AD905-0002

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			EFFLUENT (SHELLS CPI) T24AD905-0002		
pH ^a	-	ELECTROMETRIC METHOD (SM PART 4500-H ⁺ B)	6.9 (25°C)	5.5-9.0	-
BIOCHEMICAL OXYGEN DEMAND ^b	mg/L	5-DAY BOD TEST, MEMBRANE ELECTRODE METHOD (SM PART 5210 B AND PART 4500-O ₂)	2.1	≤ 20	2.0
CHEMICAL OXYGEN DEMAND ^c	mg/L	CLOSED REFLEX, COLOURIMETRIC METHOD (SM PART 5220 D)	ND	≤ 120	25.0
TOTAL SUSPENDED SOLIDS ^d	mg/L	DRIED AT 103-105 °C (SM PART 2540 D)	ND	≤ 50	5.0
TOTAL DISSOLVED SOLIDS ^e	mg/L	DRIED AT 180 °C (SM PART 2540 C)	106	≤ 3,000	25
TOTAL KJELDAHL NITROGEN ^f	mg/L	DIGESTION, DISTILLATION, TITRIMETRIC METHOD (SM PART 4500-Norg C)	< LOQ	≤ 100	15
OIL AND GREASE ^g	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	≤ 5	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			YELLOW/CLEAR BROWN		

^a : ISO/IEC 17025 ACCREDITED BY THAI INDUSTRIAL STANDARDS INSTITUTE (TISI)
^b : ISO/IEC 17025 ACCREDITED BY DEPARTMENT OF SCIENCE SERVICE (DSS)
^c : VERIFIED BY OWN LABORATORY QUALITY SYSTEM, BUT STILL NOT ACCREDITED

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.

REGULATORY STANDARD : INDUSTRIAL EFFLUENT STANDARDS, NOTIFICATION OF THE MINISTRY OF INDUSTRY, B.E. 2560, PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 134, PART 153 D, DATED JUNE 7, 2017.

ND : NON-DETECTABLE.

< LOQ : < LIMIT OF QUANTITATION (TOTAL KJELDAHL NITROGEN ≥ 15 AND < 5.0 mg/L).

(MRS PIYAPAT SUTTAMANUTWONG)
LABORATORY SUPERVISOR

MARCH 11, 2024

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ANALYSIS REPORT

CUSTOMER NAME : STAR FUELS MARKETING LIMITED.
ADDRESS : 202 MOO 1 HUA KHAD SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 0 7433 1779, 080 965 5888 e-mail : sakofees@sprc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : EFFLUENT
SAMPLING DATE : FEBRUARY 23, 2024
SAMPLING TIME : 13:00 HOUR
SAMPLING METHOD : -
SAMPLING BY : CUSTOMER
ANALYZED BY : MISS NAPAPORN KHUNNOKKOLUM
RECEIVED DATE : FEBRUARY 27, 2024
ANALYTICAL DATE : FEBRUARY 27 - MARCH 5, 2024
ISSUE DATE : MARCH 8, 2024
REPORT NO. : 2024-U019409
WORK NO. : 2024-000239
ANALYSIS NO. : T24AD905-0003

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			EFFLUENT (JETTY API) T24AD905-0003		
pH ^a	-	ELECTROMETRIC METHOD (SM PART 4500-H ⁺ B)	6.8 (25°C)	5.5-9.0	-
BIOCHEMICAL OXYGEN DEMAND ^b	mg/L	5-DAY BOD TEST, MEMBRANE ELECTRODE METHOD (SM PART 5210 B AND PART 4500-O ₂)	ND	≤ 20	2.0
CHEMICAL OXYGEN DEMAND ^c	mg/L	CLOSED REFLEX, COLOURIMETRIC METHOD (SM PART 5220 D)	ND	≤ 120	25.0
TOTAL SUSPENDED SOLIDS ^d	mg/L	DRIED AT 103-105 °C (SM PART 2540 D)	ND	≤ 50	5.0
TOTAL DISSOLVED SOLIDS ^e	mg/L	DRIED AT 180 °C (SM PART 2540 C)	115	≤ 3,000	25
TOTAL KJELDAHL NITROGEN ^f	mg/L	DIGESTION, DISTILLATION, TITRIMETRIC METHOD (SM PART 4500-Norg C)	< LOQ	≤ 100	15
OIL AND GREASE ^g	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	≤ 5	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			YELLOW/CLEAR BROWN		

^a : ISO/IEC 17025 ACCREDITED BY THAI INDUSTRIAL STANDARDS INSTITUTE (TISI)
^b : ISO/IEC 17025 ACCREDITED BY DEPARTMENT OF SCIENCE SERVICE (DSS)
^c : VERIFIED BY OWN LABORATORY QUALITY SYSTEM, BUT STILL NOT ACCREDITED

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.

REGULATORY STANDARD : INDUSTRIAL EFFLUENT STANDARDS, NOTIFICATION OF THE MINISTRY OF INDUSTRY, B.E. 2560, PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 134, PART 153 D, DATED JUNE 7, 2017.

ND : NON-DETECTABLE.

< LOQ : < LIMIT OF QUANTITATION (TOTAL KJELDAHL NITROGEN ≥ 15 AND < 5.0 mg/L).

(MRS PIYAPAT SUTTAMANUTWONG)
LABORATORY SUPERVISOR

MARCH 11, 2024

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ANALYSIS REPORT					
CUSTOMER NAME : STAR FUELS MARKETING LIMITED.					
ADDRESS : 202 MOO 1 HUA KHAD SINGHANAKHON SONGKHLA 90280					
CONTACT INFORMATION : TEL : 0 7433 1779, 080 965 5888 e-mail : sakofee@spr.co.th					
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL (202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).					
SAMPLE TYPE : SEAWATER					
SAMPLING DATE : FEBRUARY 23, 2024					
SAMPLING TIME : 13:00 HOUR					
SAMPLING METHOD : -					
SAMPLING BY : CUSTOMER					
ANALYZED BY : MISS NAPAPORN KHUNNOKHUJ					
RECEIVED DATE : FEBRUARY 27, 2024					
ANALYTICAL DATE : FEBRUARY 27 - MARCH 5, 2024					
ISSUE DATE : MARCH 8, 2024					
REPORT NO. : 2024-U019411					
WORK NO. : 2024-000299					
ANALYSIS NO. : T24AD905-0005					
PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT SEAWATER (IN FRONT OF JETTY) T24AD905-0005	REGULATORY STANDARD	DETECTION LIMIT
pH	-	ELECTROMETRIC METHOD (SM PART 4500-H+ B)	7.6 (29°C)	7.0-8.5	-
TURBIDITY	NTU	NEPHELOMETRIC METHOD (SM PART 2100 B)	4.4	-	0.1
BIOCHEMICAL OXYGEN DEMAND	mg/L	5-DAY BOD TEST, MEMBRANE ELECTRODE METHOD (SM PART 5210 B AND PART 4500-O G)	1.1	-	0.5
CHEMICAL OXYGEN DEMAND	mg/L	CLOSED REFLEX, TITRIMETRIC METHOD (SM PART 5220 C)	49.1	-	25.0
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM PART 2540 D)	6.5	m ³	10
TOTAL DISSOLVED SOLIDS	mg/L	DRIED AT 180 °C (SM PART 2540 C)	23,990	-	25
TOTAL KJELDAHL NITROGEN	mg/L	DIGESTION, DISTILLATION, TITRIMETRIC METHOD (SM PART 4500-Norg C)	ND	-	15

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT (IN FRONT OF JETTY) T24AD905-0005	REGULATORY STANDARD	DETECTION LIMIT
OIL AND GREASE	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	-	3
SAMPLE CONDITION			COLOURLESS/CLEAR YELLOW		
WATER'S COLOUR/TURBID					
SEDIMENT					
SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23 "EDITION, 2017.					
REGULATORY STANDARD : SEAWATER QUALITY STANDARDS, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, B.E. 2564 PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 138, PART 245-D, DATED OCTOBER 6, 2021.					
CLASS 5 : SEAWATER QUALITY FOR INDUSTRY AND PORTS					
(1) SEAWATER ADJACENT TO INDUSTRIAL ESTATES BOUNDARY ACCORDING TO THE INDUSTRIAL ESTATE AUTHORITY OF THAILAND ACT AND INDUSTRIAL ZONE ACCORDING TO INDUSTRIAL LAW WITH A BOUNDARY FROM THE HIGHEST TIDE LINE TO THE LOWEST TIDE LINE UP TO A DISTANCE OF 1000 METERS ALONG THE HORIZONTAL LINE OF THE SEAWATER SURFACE (2) SEAWATER IN THE PORTAL AREA THE MOORING AREA ACCORDING TO THE NAVIGATION IN THE THAI WATERS ACT (3) SEAWATER ADJACENT TO THE TERMINAL PORT THAT ACCEPTS SHIPS OF 500 GROSS TONS (OR ABOVE) OR THE BERTHS LENGTH IS FROM 100 METERS (OR ABOVE), OR HAS A TOTAL BERTH AREA OF 1000 SQUARE METERS OR ABOVE, WITH A BOUNDARY STARTING FROM THE ADJACENT BERTH TO A DISTANCE OF 1000 METERS ALONG THE SEAWATER SURFACE.					
m ³	: THE RESULTS SHOULD NOT BE CHANGED BY MORE THAN THE SUM OF DAILY OR MONTHLY OR YEARLY AVERAGE AND THE STANDARD DIVIATION. DAILY AVERAGE WAS CALCULATED FROM HOURLY MEASUREMENT OR AT LEAST 5 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE DAY. MONTHLY AVERAGE WAS CALCULATED FROM DAILY MEASUREMENT OR AT LEAST 4 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE MONTH. YEARLY AVERAGE WAS CALCULATED FROM MONTHLY MEASUREMENT AT EQUAL TIME INTERVAL AND THE SAME PLACE WITHIN ONE YEAR.				
ND	: NON-DETECTABLE.				



ANALYSIS REPORT

CUSTOMER NAME : STAR FUELS MARKETING LIMITED.
ADDRESS : 202 MOO 1 HUA KHAI SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 0 7433 1779, 080 965 5888 e-mail : sakofees@sprc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : EFFLUENT
SAMPLING DATE : MARCH 20, 2024
SAMPLING TIME : 11:00 HOUR
SAMPLING METHOD : -
SAMPLING BY : CUSTOMER
ANALYZED BY : MISS NAPAPORN KHUNNOKKHAM

RECEIVED DATE : MARCH 23, 2024
ANALYTICAL DATE : MARCH 23-29, 2024
ISSUE DATE : APRIL 3, 2024
REPORT NO. : 2024-U027500
WORK NO. : 2024-000239
ANALYSIS NO. : T24AG174-0001

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			EFFLUENT (SHELLS AP1) T24AG174-0001		
pH ^a	-	ELECTROMETRIC METHOD (SM PART 4500-H ⁺ B)	6.4 (25°C)	5.5-9.0	-
BIOCHEMICAL OXYGEN DEMAND ^a	mg/L	5-DAY BOD TEST, MEMBRANE ELECTRODE METHOD (SM PART 5210 B AND PART 4500-C G)	2.5	≤ 20	2.0
CHEMICAL OXYGEN DEMAND ^c	mg/L	CLOSED REFLEX, COLOURIMETRIC METHOD (SM PART 5220 D)	ND	≤ 120	25.0
TOTAL SUSPENDED SOLIDS ^c	mg/L	DRIED AT 103-105 °C (SM PART 2540 D)	ND	≤ 50	5.0
TOTAL DISSOLVED SOLIDS ^b	mg/L	DRIED AT 180 °C (SM PART 2540 C)	160	≤ 3,000	25
TOTAL KJELDAHL NITROGEN ^c	mg/L	DIGESTION, DISTILLATION, TITRIMETRIC METHOD (SM PART 4500-NORG C)	< LOQ	≤ 100	15
OIL AND GREASE ^c	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	≤ 5	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			YELLOW/CLEAR BROWN		

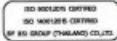
^a : ISO/IEC 17025 ACCREDITED BY THAI INDUSTRIAL STANDARDS INSTITUTE (TISI)
^b : ISO/IEC 17025 ACCREDITED BY DEPARTMENT OF SCIENCE SERVICE (DSS)
^c : VERIFIED BY OWN LABORATORY QUALITY SYSTEM, BUT STILL NOT ACCREDITED

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.
REGULATORY STANDARD : INDUSTRIAL EFFLUENT STANDARDS, NOTIFICATION OF THE MINISTRY OF INDUSTRY, B.E. 2560, PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 134, PART 153 D, DATED JUNE 7, 2017.
ND : NON-DETECTABLE.
< LOQ : < LIMIT OF QUANTITATION (TOTAL KJELDAHL NITROGEN ≥ 15 AND < 5.0 mg/L).



(MRS PEYPAT SUTTAMANUTWONG)
LABORATORY SUPERVISOR

APRIL 4, 2024



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ANALYSIS REPORT

CUSTOMER NAME : STAR FUELS MARKETING LIMITED.
ADDRESS : 202 MOO 1 HUA KHAI SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 0 7433 1779, 080 965 5888 e-mail : sakofees@sprc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : EFFLUENT
SAMPLING DATE : MARCH 20, 2024
SAMPLING TIME : 11:00 HOUR
SAMPLING METHOD : -
SAMPLING BY : CUSTOMER
ANALYZED BY : MISS NAPAPORN KHUNNOKKHAM

RECEIVED DATE : MARCH 23, 2024
ANALYTICAL DATE : MARCH 23-29, 2024
ISSUE DATE : APRIL 3, 2024
REPORT NO. : 2024-U027502
WORK NO. : 2024-000239
ANALYSIS NO. : T24AG174-0002

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			EFFLUENT (SHELLS CP1) T24AG174-0002		
pH ^a	-	ELECTROMETRIC METHOD (SM PART 4500-H ⁺ B)	6.5 (25°C)	5.5-9.0	-
BIOCHEMICAL OXYGEN DEMAND ^a	mg/L	5-DAY BOD TEST, MEMBRANE ELECTRODE METHOD (SM PART 5210 B AND PART 4500-C G)	< 2.0	≤ 20	2.0
CHEMICAL OXYGEN DEMAND ^c	mg/L	CLOSED REFLEX, COLOURIMETRIC METHOD (SM PART 5220 D)	ND	≤ 120	25.0
TOTAL SUSPENDED SOLIDS ^c	mg/L	DRIED AT 103-105 °C (SM PART 2540 D)	ND	≤ 50	5.0
TOTAL DISSOLVED SOLIDS ^b	mg/L	DRIED AT 180 °C (SM PART 2540 C)	178	≤ 3,000	25
TOTAL KJELDAHL NITROGEN ^c	mg/L	DIGESTION, DISTILLATION, TITRIMETRIC METHOD (SM PART 4500-NORG C)	ND	≤ 100	15
OIL AND GREASE ^c	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	≤ 5	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			YELLOW/CLEAR YELLOW		

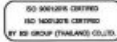
^a : ISO/IEC 17025 ACCREDITED BY THAI INDUSTRIAL STANDARDS INSTITUTE (TISI)
^b : ISO/IEC 17025 ACCREDITED BY DEPARTMENT OF SCIENCE SERVICE (DSS)
^c : VERIFIED BY OWN LABORATORY QUALITY SYSTEM, BUT STILL NOT ACCREDITED

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.
REGULATORY STANDARD : INDUSTRIAL EFFLUENT STANDARDS, NOTIFICATION OF THE MINISTRY OF INDUSTRY, B.E. 2560, PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 134, PART 153 D, DATED JUNE 7, 2017.
ND : NON-DETECTABLE.



(MRS PEYPAT SUTTAMANUTWONG)
LABORATORY SUPERVISOR

APRIL 4, 2024



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ANALYSIS REPORT

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ADDRESS : 202 MOO 1 HUA KHAD SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 0 7433 1779, 080 965 5888 e-mail : sakotees@sprc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : EFFLUENT
SAMPLING DATE : MARCH 20, 2024
SAMPLING TIME : 11:30 HOUR
SAMPLING METHOD : -
SAMPLING BY : CUSTOMER
ANALYZED BY : MISS NAPAPORN KHUNNOKKHUM
RECEIVED DATE : MARCH 23, 2024
ANALYTICAL DATE : MARCH 23-29, 2024
ISSUE DATE : APRIL 3, 2024
REPORT NO. : 2024-U027503
WORK NO. : 2024-000239
ANALYSIS NO. : T24AGL74-0003

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT EFFLUENT (JETTY API) T24AGL74-0003	REGULATORY STANDARD	DETECTION LIMIT
pH ^a	-	ELECTROMETRIC METHOD (SM PART 4500-H B)	6.6 (25°C)	5.5-9.0	-
BIOCHEMICAL OXYGEN DEMAND ^a	mg/L	5-DAY BOD TEST, MEMBRANE ELECTRODE METHOD (SM PART 5210 B AND PART 4500-C G)	3.0	≤ 20	2.0
CHEMICAL OXYGEN DEMAND ^c	mg/L	CLOSED REFLEX, COLOURIMETRIC METHOD (SM PART 5220 D)	ND	≤ 120	25.0
TOTAL SUSPENDED SOLIDS ^a	mg/L	DRIED AT 103-105 °C (SM PART 2540 D)	ND	≤ 90	5.0
TOTAL DISSOLVED SOLIDS ^b	mg/L	DRIED AT 180 °C (SM PART 2540 C)	164	≤ 3,000	25
TOTAL KJELDAHL NITROGEN ^c	mg/L	DIGESTION, DISTILLATION, TITRIMETRIC METHOD (SM PART 4500-NORG C)	< LOQ	≤ 100	15
OIL AND GREASE ^c	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	≤ 5	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			YELLOW/CLAR YELLOW		

^a : ISO/IEC 17025 ACCREDITED BY THAI INDUSTRIAL STANDARDS INSTITUTE (TISI)

^b : ISO/IEC 17025 ACCREDITED BY DEPARTMENT OF SCIENCE SERVICE (DSS)

^c : VERIFIED BY OWN LABORATORY QUALITY SYSTEM, BUT STILL NOT ACCREDITED

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23RD EDITION, 2017.

REGULATORY STANDARD : INDUSTRIAL EFFLUENT STANDARDS, NOTIFICATION OF THE MINISTRY OF INDUSTRY, B.E. 2560.
PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 134, PART 133 D, DATED JUNE 7, 2017.

ND : NON-DETECTABLE.

< LOQ : < LIMIT OF QUANTITATION (TOTAL KJELDAHL NITROGEN ≥ 15 AND < 5.0 mg/L).

(MRS PIYAPAT SUTTANANUTWONG)
LABORATORY SUPERVISOR

APRIL 4, 2024

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CONTACT INFORMATION : TEL : 0 7433 1779, 080 965 5888 e-mail : sakotees@sprc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : MARCH 20, 2024
SAMPLING TIME : 11:30 HOUR
SAMPLING METHOD : -
SAMPLING BY : CUSTOMER
ANALYZED BY : MISS NAPAPORN KHUNNOKKHUM
RECEIVED DATE : MARCH 23, 2024
ANALYTICAL DATE : MARCH 23-29, 2024
ISSUE DATE : APRIL 3, 2024
REPORT NO. : 2024-L027505
WORK NO. : 2024-000239
ANALYSIS NO. : T24AGL74-0005

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT SEAWATER (IN FRONT OF JETTY) T24AGL74-0005	REGULATORY STANDARD	DETECTION LIMIT
pH	-	ELECTROMETRIC METHOD (SM PART 4500-H B)	7.2 (25°C)	7.0-8.5	-
TURBIDITY	NTU	NEPHELOMETRIC METHOD (SM PART 2130 B)	12	-	0.1
BIOCHEMICAL OXYGEN DEMAND	mg/L	MEMBRANE ELECTRODE METHOD (SM PART 5210 B AND PART 4500-C G)	12	-	0.5
CHEMICAL OXYGEN DEMAND	mg/L	CLOSED REFLEX, TITRIMETRIC METHOD (SM PART 5220 C)	618	-	25.0
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM PART 2540 D)	115	n ^a	1.0
TOTAL DISSOLVED SOLIDS	mg/L	TOTAL DISSOLVED SOLIDS DRIED AT 180 °C (SM PART 2540 C)	34,380	-	25
TOTAL KJELDAHL NITROGEN	mg/L	IN-HOUSE METHOD: UMETP WAS.001 (KJELDAHL METHOD); SM PART 4500-NORG C	< LOQ	-	15

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PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			SEAWATER (IN FRONT OF JETTY) T24AG174-0005		
OIL AND GREASE	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM PART 5220 B)	ND	-	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLEAR BROWN		

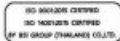
IN-HOUSE : BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23RD EDITION, 2017.
SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23RD EDITION, 2017.

REGULATORY STANDARD : SEAWATER QUALITY STANDARDS, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, B.E. 2564
PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 138, PART 245 D, DATED OCTOBER 6, 2021

CLASS 5 : SEAWATER QUALITY FOR INDUSTRY AND PORTS
(1) SEAWATER ADJACENT TO INDUSTRIAL ESTATES BOUNDARY ACCORDING TO THE INDUSTRIAL ESTATE AUTHORITY OF THAILAND ACT AND INDUSTRIAL ZONE ACCORDING TO INDUSTRIAL LAW WITH A BOUNDARY FROM THE HIGHEST TIDE LINE TO THE LOWEST TIDE LINE UP TO A DISTANCE OF 1000 METERS ALONG THE HORIZONTAL LINE OF THE SEAWATER SURFACE (2) SEAWATER IN THE PORTAL AREA THE MOORING AREA ACCORDING TO THE NAVIGATION IN THE THAI WATERS ACT (3) SEAWATER ADJACENT TO THE TERMINAL PORT THAT ACCEPTS SHIPS OF 500 GROSS TONS (OR ABOVE) OR THE BERTHS LENGTH IS FROM 100 METERS (OR ABOVE), OR HAS A TOTAL BERTH AREA OF 1000 SQUARE METERS OR ABOVE, WITH A BOUNDARY STARTING FROM THE ADJACENT BERTH TO A DISTANCE OF 1000 METERS ALONG THE SEAWATER SURFACE.
: THE RESULTS SHOULD NOT BE CHANGED BY MORE THAN THE SUM OF DAILY OR MONTHLY OR YEARLY 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. MONTHLY AVERAGE WAS CALCULATED FROM DAILY MEASUREMENT OR AT LEAST 4 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE MONTH. YEARLY AVERAGE WAS CALCULATED FROM MONTHLY MEASUREMENT AT EQUAL TIME INTERVAL AND THE SAME PLACE WITHIN ONE YEAR.
ND : NON-DETECTABLE.
< LOQ : < LIMIT OF QUANTITATION (TOTAL KJELDAHL NITROGEN ≥ 15 AND < 5.0 mg/L).

(MRS PEYAPAT SUTTAMANUTWONG)
LABORATORY SUPERVISOR

APRIL 4, 2024



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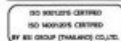
CUSTOMER NAME : STAR FUELS MARKETING LIMITED.
ADDRESS : 202 MOO 1 HUA KHAD SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 0 7433 1779, 080 965 5888 e-mail : sakofee@spc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : EFFLUENT
RECEIVED DATE : APRIL 24, 2024
ANALYTICAL DATE : APRIL 24-MAY 3, 2024
SAMPLING DATE : APRIL 22, 2024
ANALYTICAL DATE : APRIL 24-MAY 3, 2024
SAMPLING TIME : 10:00 HOUR
ISSUE DATE : MAY 7, 2024
SAMPLING METHOD : -
REPORT NO. : 2024-U037565
SAMPLING BY : CUSTOMER
WORK NO. : 2024-000239
ANALYZED BY : MISS NAPAPORN KHUNNOKHUJH
ANALYSIS NO. : T24A521-0001

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			EFFLUENT (SHELL'S API) T24A521-0001		
pH	-	ELECTROMETRIC METHOD (SM PART 4500-H ⁺ B)	7.0 (25°C)	5.5-9.0	-
BIOCHEMICAL OXYGEN DEMAND	mg/L	5-DAY BOD TEST, MEMBRANE ELECTRODE METHOD (SM PART 5210 B AND PART 4500-O ₂ G)	22	≤ 20	20
CHEMICAL OXYGEN DEMAND	mg/L	CLOSED REFLEX, COLOURIMETRIC METHOD (SM PART 5220 D)	ND	≤ 120	25.0
TOTAL SUSPENDED SOLIDS	mg/L	DRIED AT 103-105 °C (SM PART 2540 D)	ND	≤ 50	5.0
TOTAL DISSOLVED SOLIDS	mg/L	DRIED AT 180 °C (SM PART 2540 C)	185	$\leq 3,000$	25
TOTAL KJELDAHL NITROGEN	mg/L	DIGESTION, DISTILLATION, TITRIMETRIC METHOD (SM PART 4500-NH ₃ C)	ND	≤ 100	15
OIL AND GREASE	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM PART 5220 B)	ND	≤ 5	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			YELLOW/CLEAR BROWN		

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23RD EDITION, 2017.
REGULATORY STANDARD : INDUSTRIAL EFFLUENT STANDARDS, NOTIFICATION OF THE MINISTRY OF INDUSTRY, B.E. 2560,
PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 134, PART 153 D, DATED JUNE 7, 2017.

ND : NON-DETECTABLE.

(MRS PEYAPAT SUTTAMANUTWONG)
LABORATORY SUPERVISOR



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CUSTOMER NAME : STAR FUELS MARKETING LIMITED.
ADDRESS : 202 MOO 1 HUA KHAI SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 0 7433 1779, 080 965 5888 e-mail : sakofees@sprc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : EFFLUENT
SAMPLING DATE : APRIL 22, 2024
SAMPLING TIME : 10:00 HOUR
SAMPLING METHOD : -
SAMPLING BY : CUSTOMER
ANALYZED BY : MISS NAPAPORN KHUNNOOKHUM
RECEIVED DATE : APRIL 24, 2024
ANALYTICAL DATE : APRIL 24-MAY 3, 2024
ISSUE DATE : MAY 7, 2024
REPORT NO. : 2024-U037566
WORK NO. : 2024-000239
ANALYSIS NO. : T24AJS21-0002

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT EFFLUENT (SHELL'S CPI) T24AJS21-0002	REGULATORY STANDARD	DETECTION LIMIT
pH	-	ELECTROMETRIC METHOD (SM PART 4500-H+ B)	6.9 (25°C)	5.5-9.0	-
BIOCHEMICAL OXYGEN DEMAND	mg/L	5-DAY BOD TEST, MEMBRANE ELECTRODE METHOD (SM PART 5210 B AND PART 4500-O G)	< 2.0	≤ 20	2.0
CHEMICAL OXYGEN DEMAND	mg/L	CLOSED REFLEX, COLOURIMETRIC METHOD (SM PART 5220 D)	ND	≤ 100	25.0
TOTAL SUSPENDED SOLIDS	mg/L	DRIED AT 103-105 °C (SM PART 2540 D)	ND	≤ 50	5.0
TOTAL DISSOLVED SOLIDS	mg/L	DRIED AT 180 °C (SM PART 2540 C)	188	≤ 3,000	25
TOTAL KJELDAHL NITROGEN	mg/L	DIGESTION, DISTILLATION, TITRIMETRIC METHOD (SM PART 4500-Norg C)	< LOQ	≤ 100	15
OIL AND GREASE	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	≤ 5	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			YELLOW/TURBID BROWN		

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.
REGULATORY STANDARD : INDUSTRIAL EFFLUENT STANDARDS, NOTIFICATION OF THE MINISTRY OF INDUSTRY, B.E. 2560,
PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 134, PART 153 D, DATED JUNE 7, 2017.
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< LOQ : < LIMIT OF QUANTITATION (TOTAL KJELDAHL NITROGEN ≥ 15 AND < 5.0 mg/L).


(MRS PIYAPAT SUTTAMANUTWONG)
LABORATORY SUPERVISOR

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CUSTOMER NAME : STAR FUELS MARKETING LIMITED.
ADDRESS : 202 MOO 1 HUA KHAI SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 0 7433 1779, 080 965 5888 e-mail : sakofees@sprc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : EFFLUENT
SAMPLING DATE : APRIL 22, 2024
SAMPLING TIME : 11:00 HOUR
SAMPLING METHOD : -
SAMPLING BY : CUSTOMER
ANALYZED BY : MISS NAPAPORN KHUNNOOKHUM
RECEIVED DATE : APRIL 24, 2024
ANALYTICAL DATE : APRIL 24-MAY 3, 2024
ISSUE DATE : MAY 7, 2024
REPORT NO. : 2024-U037567
WORK NO. : 2024-000239
ANALYSIS NO. : T24AJS21-0003

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT EFFLUENT (JETTY API) T24AJS21-0003	REGULATORY STANDARD	DETECTION LIMIT
pH	-	ELECTROMETRIC METHOD (SM PART 4500-H+ B)	6.8 (25°C)	5.5-9.0	-
BIOCHEMICAL OXYGEN DEMAND	mg/L	5-DAY BOD TEST, MEMBRANE ELECTRODE METHOD (SM PART 5210 B AND PART 4500-O G)	2.2	≤ 20	2.0
CHEMICAL OXYGEN DEMAND	mg/L	CLOSED REFLEX, COLOURIMETRIC METHOD (SM PART 5220 D)	ND	≤ 100	25.0
TOTAL SUSPENDED SOLIDS	mg/L	DRIED AT 103-105 °C (SM PART 2540 D)	ND	≤ 50	5.0
TOTAL DISSOLVED SOLIDS	mg/L	DRIED AT 180 °C (SM PART 2540 C)	189	≤ 3,000	25
TOTAL KJELDAHL NITROGEN	mg/L	DIGESTION, DISTILLATION, TITRIMETRIC METHOD (SM PART 4500-Norg C)	< LOQ	≤ 100	15
OIL AND GREASE	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	≤ 5	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			YELLOW/CLEAR BROWN		

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.
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PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 134, PART 153 D, DATED JUNE 7, 2017.
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LABORATORY SUPERVISOR

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ANALYSIS REPORT

CUSTOMER NAME	: STAR FUELS MARKETING LIMITED.	RECEIVED DATE	: APRIL 24, 2024
ADDRESS	: 202 MOO 1 HUA KHAI SONGKHANONG SONGKHLA 90280	ANALYTICAL DATE	: APRIL 24-MAY 3, 2024
CONTACT INFORMATION	: TEL : 0 7433 1779, 080 965 5885 e-mail : sakofees@sprc.co.th	ISSUE DATE	: MAY 7, 2024
SAMPLING SOURCE	: SONGKHLA PETROLEUM TERMINAL (202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).	REPORT NO.	: 2024-U037569
SAMPLE TYPE	: SEAWATER	WORK NO.	: 2024-000239
SAMPLING DATE	: APRIL 22, 2024	ANALYSIS NO.	: T24A1521-0005
SAMPLING TIME	: 11:00 HOUR		
SAMPLING METHOD	: -		
SAMPLING BY	: CUSTOMER		
ANALYZED BY	: MISS NAPAORN KHUNNOKKHUM		

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			SEAWATER (IN FRONT OF JETTY) T24A1521-0005		
pH	-	ELECTROMETRIC METHOD (SM PART 4500-H ⁺ B)	7.8 (25°C)	7.0-8.5	-
TURBIDITY	NTU	NEPHELOMETRIC METHOD (SM PART 2130 B)	7.3	-	0.1
BIOCHEMICAL OXYGEN DEMAND	mg/L	MEMBRANE ELECTRODE METHOD (SM PART 5210 B AND PART 4500-O G)	16	-	0.5
CHEMICAL OXYGEN DEMAND	mg/L	CLOSED REFLLX TITRIMETRIC METHOD (SM PART 5220 C)	78.4	-	25.0
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM PART 2540 D)	8.4	nt	10
TOTAL DISSOLVED SOLIDS	mg/L	TOTAL DISSOLVED SOLIDS DRIED AT 180 °C (SM PART 2540 C)	37,440	-	25
TOTAL KJELDAHL NITROGEN	mg/L	IN-HOUSE METHOD: UAF-TP-WAS-001 (KJELDAHL METHOD); SM PART 4500-Nitrog C	ND	-	15

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			SEAWATER (IN FRONT OF JETTY) T24A1521-0005		
OIL AND GREASE	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	-	3
SAMPLE CONDITION					
WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLAR YELLOW		

IN-HOUSE : BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23RD EDITION, 2017.
SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23RD EDITION, 2017.
REGULATORY STANDARD : SEAWATER QUALITY STANDARDS, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, B.E. 2564
PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 138, PART 245 D, DATED OCTOBER 6, 2021
CLASS 5 : SEAWATER QUALITY FOR INDUSTRY AND PORTS
(1) SEAWATER ADJACENT TO INDUSTRIAL ESTATES BOUNDARY ACCORDING TO THE INDUSTRIAL ESTATE AUTHORITY OF THAILAND ACT AND INDUSTRIAL ZONE ACCORDING TO INDUSTRIAL LAW WITH A BOUNDARY FROM THE HIGHEST TIDE LINE TO THE LOWEST TIDE LINE UP TO A DISTANCE OF 1000 METERS ALONG THE HORIZONTAL LINE OF THE SEAWATER SURFACE (2) SEAWATER IN THE PORTAL AREA THE MOORING AREA ACCORDING TO THE NAVIGATION IN THE THAI WATERS ACT (3) SEAWATER ADJACENT TO THE TERMINAL PORT THAT ACCEPTS SHIPS OF 500 GROSS TONS (OR ABOVE) OR THE BERTHS LENGTH IS FROM 100 METERS (OR ABOVE), OR HAS A TOTAL BERTH AREA OF 1000 SQUARE METERS OR ABOVE, WITH A BOUNDARY STARTING FROM THE ADJACENT BERTH TO A DISTANCE OF 1000 METERS ALONG THE SEAWATER SURFACE.
nt : THE RESULTS SHOULD NOT BE CHANGED BY MORE THAN THE SUM OF DAILY OR MONTHLY OR YEARLY AVERAGE AND THE STANDARD DIVIATION. DAILY AVERAGE WAS CALCULATED FROM HOURLY MEASUREMENT OR AT LEAST 5 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE DAY. MONTHLY AVERAGE WAS CALCULATED FROM DAILY MEASUREMENT OR AT LEAST 4 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE MONTH. YEARLY AVERAGE WAS CALCULATED FROM MONTHLY MEASUREMENT AT EQUAL TIME INTERVAL AND THE SAME PLACE WITHIN ONE YEAR.
ND : NON-DETECTABLE.

(MISS PIYAPAT SUTTAMANUTWONG)
LABORATORY SUPERVISOR

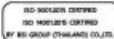
ANALYSIS REPORT

CUSTOMER NAME : STAR FUELS MARKETING LIMITED.
ADDRESS : 202 MOO 1 HUA KHAI SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 0 7433 1779, 080 965 5888 e-mail : sakofees@spc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANDOL ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : EFFLUENT
SAMPLING DATE : MAY 24, 2024
SAMPLING TIME : 15:20 HOUR
SAMPLING METHOD : -
SAMPLING BY : CUSTOMER
ANALYZED BY : MISS NAPAPORN KHUNNOKKULUM
RECEIVED DATE : MAY 27, 2024
ANALYTICAL DATE : MAY 27 - JUNE 1, 2024
ISSUE DATE : JUNE 7, 2024
REPORT NO. : 2024-U048904
WORK NO. : 2024-000239
ANALYSIS NO. : T24AL267-0001

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT EFFLUENT (SHELL'S API) T24AL267-0001	REGULATORY STANDARD	DETECTION LIMIT
pH	-	ELECTROMETRIC METHOD (SM PART 4500-H B)	6.4 (25°C)	5.5-9.0	-
BIOCHEMICAL OXYGEN DEMAND	mg/L	5-DAY BOD TEST, MEMBRANE ELECTRODE METHOD (SM PART 5210 B AND PART 4500-O G)	2.7	≤ 20	2.0
CHEMICAL OXYGEN DEMAND	mg/L	CLOSED REFLEX, COLOURIMETRIC METHOD (SM PART 5220 D)	ND	≤ 100	25.0
TOTAL SUSPENDED SOLIDS	mg/L	DRIED AT 103-105 °C (SM PART 2540 D)	ND	≤ 50	5.0
TOTAL DISSOLVED SOLIDS	mg/L	DRIED AT 180 °C (SM PART 2540 C)	111	≤ 3,000	25
TOTAL KJELDAHL NITROGEN	mg/L	DIGESTION, DISTILLATION, TITRIMETRIC METHOD (SM PART 4500-Norg C)	ND	≤ 100	1.5
OIL AND GREASE	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	≤ 5	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			YELLOW/CLEAR BROWN		

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.
REGULATORY STANDARD : INDUSTRIAL EFFLUENT STANDARDS, NOTIFICATION OF THE MINISTRY OF INDUSTRY, B.E. 2560.
PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 134, PART 153 D, DATED JUNE 7, 2017.
ND : NON-DETECTABLE

(MRS PIYAPAT SUTTANANUTWONG)
LABORATORY SUPERVISOR



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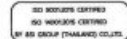
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SAMPLE TYPE : EFFLUENT
SAMPLING DATE : MAY 24, 2024
SAMPLING TIME : 15:20 HOUR
SAMPLING METHOD : -
SAMPLING BY : CUSTOMER
ANALYZED BY : MISS NAPAPORN KHUNNOKKULUM
RECEIVED DATE : MAY 27, 2024
ANALYTICAL DATE : MAY 27 - JUNE 1, 2024
ISSUE DATE : JUNE 7, 2024
REPORT NO. : 2024-U048905
WORK NO. : 2024-000239
ANALYSIS NO. : T24AL267-0002

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT EFFLUENT (SHELL'S API) T24AL267-0002	REGULATORY STANDARD	DETECTION LIMIT
pH	-	ELECTROMETRIC METHOD (SM PART 4500-H B)	6.6 (25°C)	5.5-9.0	-
BIOCHEMICAL OXYGEN DEMAND	mg/L	5-DAY BOD TEST, MEMBRANE ELECTRODE METHOD (SM PART 5210 B AND PART 4500-O G)	< 2.0	≤ 20	2.0
CHEMICAL OXYGEN DEMAND	mg/L	CLOSED REFLEX, COLOURIMETRIC METHOD (SM PART 5220 D)	ND	≤ 100	25.0
TOTAL SUSPENDED SOLIDS	mg/L	DRIED AT 103-105 °C (SM PART 2540 D)	ND	≤ 50	5.0
TOTAL DISSOLVED SOLIDS	mg/L	DRIED AT 180 °C (SM PART 2540 C)	107	≤ 3,000	25
TOTAL KJELDAHL NITROGEN	mg/L	DIGESTION, DISTILLATION, TITRIMETRIC METHOD (SM PART 4500-Norg C)	ND	≤ 100	1.5
OIL AND GREASE	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	≤ 5	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			YELLOW/CLEAR BROWN		

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.
REGULATORY STANDARD : INDUSTRIAL EFFLUENT STANDARDS, NOTIFICATION OF THE MINISTRY OF INDUSTRY, B.E. 2560.
PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 134, PART 153 D, DATED JUNE 7, 2017.
ND : NON-DETECTABLE

(MRS PIYAPAT SUTTANANUTWONG)
LABORATORY SUPERVISOR



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ANALYSIS REPORT

CUSTOMER NAME

ADDRESS

CONTACT INFORMATION

SAMPLING SOURCE

SAMPLE TYPE

SAMPLING DATE

SAMPLING TIME

SAMPLING METHOD

SAMPLING BY

ANALYZED BY

: STAR FUELS MARKETING LIMITED.

: 202 MOO 1 HUA KHAI SINGHANAKHON SONGKHLA 90280

: TEL : 0 7433 1779, 080 965 5888 e-mail : sakofee@epic.co.th

: SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).

: EFFLUENT

: MAY 24, 2024

: 15:40 HOUR

: -

: CUSTOMER

: MISS NAPAPORN KHUNNOKKHUM

RECEIVED DATE : MAY 27, 2024

ANALYTICAL DATE : MAY 27 - JUNE 1, 2024

ISSUE DATE : JUNE 7, 2024

REPORT NO. : 2024-U048906

WORK NO. : 2024-000239

ANALYSIS NO. : T24AL267-0003

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT EFFLUENT (JETTY API) T24AL267-0003	REGULATORY STANDARD	DETECTION LIMIT
pH	-	ELECTROMETRIC METHOD (SM PART 4500-H+ B)	8.7 (25°C)	8.5-9.0	-
BIOCHEMICAL OXYGEN DEMAND	mg/L	5-DAY BOD TEST, MEMBRANE ELECTRODE METHOD (SM PART 5210 B AND PART 4500-O G)	< 2.0	≤ 20	2.0
CHEMICAL OXYGEN DEMAND	mg/L	CLOSED REFLUX, COLOURIMETRIC METHOD (SM PART 5220 D)	ND	≤ 120	25.0
TOTAL SUSPENDED SOLIDS	mg/L	DRIED AT 103-105 °C (SM PART 2540 D)	ND	≤ 50	5.0
TOTAL DISSOLVED SOLIDS	mg/L	DRIED AT 180 °C (SM PART 2540 C)	110	≤ 3,000	25
TOTAL KJELDAHL NITROGEN	mg/L	DIGESTION, DISTILLATION, TITRIMETRIC METHOD (SM PART 4500-Norg C)	ND	≤ 100	15
OIL AND GREASE	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	≤ 5	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			YELLOW/CLEAR BROWN		

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.
REGULATORY STANDARD : INDUSTRIAL EFFLUENT STANDARDS, NOTIFICATION OF THE MINISTRY OF INDUSTRY, B.E. 2560,
PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 134, PART 153 D, DATED JUNE 7, 2017.
ND : NON-DETECTABLE.

(MISS PISAVAT SUTTANANUWONG)
LABORATORY SUPERVISOR

- End of Analysis Report -

ANALYSIS REPORT

CUSTOMER NAME

ADDRESS

CONTACT INFORMATION

SAMPLING SOURCE

SAMPLE TYPE

SAMPLING DATE

SAMPLING TIME

SAMPLING METHOD

SAMPLING BY

ANALYZED BY

: STAR FUELS MARKETING LIMITED.

: 202 MOO 1 HUA KHAI SINGHANAKHON SONGKHLA 90280

: TEL : 0 7433 1779, 080 965 5888 e-mail : sakofee@epic.co.th

: SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).

: SEAWATER

: MAY 24, 2024

: 15:40 HOUR

: -

: CUSTOMER

: MISS NAPAPORN KHUNNOKKHUM

RECEIVED DATE : MAY 27, 2024

ANALYTICAL DATE : MAY 27 - JUNE 1, 2024

ISSUE DATE : JUNE 7, 2024

REPORT NO. : 2024-U048908

WORK NO. : 2024-000239

ANALYSIS NO. : T24AL267-0005

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT SEAWATER (ON FRONT OF JETTY) T24AL267-0005	REGULATORY STANDARD	DETECTION LIMIT
pH	-	ELECTROMETRIC METHOD (SM PART 4500-H+ B)	8.0 (25°C)	7.0-8.5	-
TURBIDITY	NTU	NEPHELOMETRIC METHOD (SM PART 2100 B)	5.4	-	0.1
BIOCHEMICAL OXYGEN DEMAND	mg/L	MEMBRANE ELECTRODE METHOD (SM PART 5210 B AND PART 4500-O G)	0.7	-	0.5
CHEMICAL OXYGEN DEMAND	mg/L	CLOSED REFLUX, TITRIMETRIC METHOD (SM PART 5220 C)	53.3	-	25.0
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM PART 2540 D)	7.8	n ^a	10
TOTAL DISSOLVED SOLIDS	mg/L	TOTAL DISSOLVED SOLIDS DRIED AT 180 °C (SM PART 2540 C)	36,860	-	25
TOTAL KJELDAHL NITROGEN	mg/L	IN-HOUSE METHOD: UNETP-IWAS.001 (KJELDAHL METHOD); SM PART 4500-Norg C	ND	-	15

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PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			SEAWATER (IN FRONT OF JETTY) T24AL267-0605		
OIL AND GREASE	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM PART 5220 B)	ND	-	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLAR YELLOW		

IN-HOUSE : BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23RD EDITION, 2017.
SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23RD EDITION, 2017.
REGULATORY STANDARD : SEAWATER QUALITY STANDARDS, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, B.E. 2564
PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL.138, PART 245 D, DATED OCTOBER 6, 2021

CLASS 5 : SEAWATER QUALITY FOR INDUSTRY AND PORTS
(1) SEAWATER ADJACENT TO INDUSTRIAL ESTATES BOUNDARY ACCORDING TO THE INDUSTRIAL ESTATE AUTHORITY OF THAILAND ACT AND INDUSTRIAL ZONE ACCORDING TO INDUSTRIAL LAW WITH A BOUNDARY FROM THE HIGHEST TIDE LINE TO THE LOWEST TIDE LINE UP TO A DISTANCE OF 1000 METERS ALONG THE HORIZONTAL LINE OF THE SEAWATER SURFACE (2) SEAWATER IN THE PORTAL AREA THE MOORING AREA ACCORDING TO THE NAVIGATION IN THE THAI WATERS ACT (3) SEAWATER ADJACENT TO THE TERMINAL PORT THAT ACCEPTS SHIPS OF 900 GROSS TONS (OR ABOVE) OR THE BERTHS LENGTH IS FROM 100 METERS (OR ABOVE), OR HAS A TOTAL BERTH AREA OF 1000 SQUARE METERS OR ABOVE, WITH A BOUNDARY STARTING FROM THE ADJACENT BERTH TO A DISTANCE OF 1000 METERS ALONG THE SEAWATER SURFACE.

nt : THE RESULTS SHOULD NOT BE CHANGED BY MORE THAN THE SUM OF DAILY OR MONTHLY OR YEARLY 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. MONTHLY AVERAGE WAS CALCULATED FROM DAILY MEASUREMENT OR AT LEAST 4 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE MONTH. YEARLY AVERAGE WAS CALCULATED FROM MONTHLY MEASUREMENT AT EQUAL TIME INTERVAL AND THE SAME PLACE WITHIN ONE YEAR.

ND : NON-DETECTABLE

ANALYSIS REPORT

CUSTOMER NAME : STAR FUELS MARKETING LIMITED.
ADDRESS : 202 MDO 1 HUA KHAO SINGHAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 0 7433 1779, 080 965 5888 e-mail : sakofees@sprc.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHAKHORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : EFFLUENT
SAMPLING DATE : JUNE 27, 2024
SAMPLING TIME : 22:00 HOUR
SAMPLING METHOD : -
SAMPLING BY : CUSTOMER
ANALYZED BY : MESS NAPAPORN KHUMKOKKHUM
RECEIVED DATE : JULY 1, 2024
ANALYTICAL DATE : JULY 1-6, 2024
ISSUE DATE : JULY 12, 2024
REPORT NO. : 2024-U063126
WORK NO. : 2024-000239
ANALYSIS NO. : T24A0650-0001

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT EFFLUENT (SHELL'S API) T24A0650-0001	REGULATORY STANDARD	DETECTION LIMIT
pH ^a	-	ELECTROMETRIC METHOD (SM PART 4500-H ⁺ B)	7.0 (25°C)	5.5-9.0	-
BIOCHEMICAL OXYGEN DEMAND ^b	mg/L	5-DAY BOD TEST, MEMBRANE ELECTRODE METHOD (SM PART 5210 B AND PART 4500-O ₂ C)	< 2.0	≤ 20	2.0
CHEMICAL OXYGEN DEMAND ^c	mg/L	CLOSED REFLEX, COLOURIMETRIC METHOD (SM PART 5220 D)	ND	≤ 120	25.0
TOTAL SUSPENDED SOLIDS ^d	mg/L	DRIED FROM 103 TO 105 °C (SM PART 2540 D)	ND	≤ 50	5.0
TOTAL DISSOLVED SOLIDS ^e	mg/L	DRIED AT 180 °C (SM PART 2540 C)	150	≤ 3,000	25
TOTAL KjELDAHL NITROGEN ^f	mg/L	SEMI-MICRO-KJELDAHL METHOD (SM PART 4500-NH ₄ C)	ND	≤ 100	15
OIL AND GREASE ^g	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	≤ 5	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			YELLOW/CLAR BROWN		

^a : ISO/IEC 17025 ACCREDITED BY THAI INDUSTRIAL STANDARDS INSTITUTE (TISI)
^b : ISO/IEC 17025 ACCREDITED BY DEPARTMENT OF SCIENCE SERVICE (DSS)
^c : VERIFIED BY OWN LABORATORY QUALITY SYSTEM, BUT STILL NOT ACCREDITED

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 24TH EDITION, 2023.
REGULATORY STANDARD : INDUSTRIAL EFFLUENT STANDARDS, NOTIFICATION OF THE MINISTRY OF INDUSTRY, B.E. 2560,
PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 134, PART 153 D, DATED JUNE 7, 2017.
ND : NOT DETECTED.

(MRS PIYAPAT SUTTAMANUTWONG)
LABORATORY SUPERVISOR

(MRS PIYAPAT SUTTAMANUTWONG)
LABORATORY SUPERVISOR

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ISO 14001:2015 CERTIFIED
BY BSI GROUP (THAILAND) CO., LTD.

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2024-U048908

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SAMPLING TIME : 22:00 HOUR
SAMPLING METHOD : -
SAMPLING BY : CUSTOMER
ANALYZED BY : MISS NAPAPORN KHUNNOKKHUM
RECEIVED DATE : JULY 1, 2024
ANALYTICAL DATE : JULY 1-6, 2024
ISSUE DATE : JULY 12, 2024
REPORT NO. : 2024-U063129
WORK NO. : 2024-000239
ANALYSIS NO. : T24A0650-0002

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT EFFLUENT (SHELL'S CPE) T24A0650-0002	REGULATORY STANDARD	DETECTION LIMIT
pH ^a	-	ELECTROMETRIC METHOD (SM PART 4500-H+ B)	7.0 (25°C)	5.5-9.0	-
BIOCHEMICAL OXYGEN DEMAND ^a	mg/L	5-DAY BOD TEST, MEMBRANE ELECTRODE METHOD (SM PART 5210 B AND PART 4500-O G)	< 2.0	≤ 20	2.0
CHEMICAL OXYGEN DEMAND ^a	mg/L	CLOSED REFLEX, COLOURIMETRIC METHOD (SM PART 5220 D)	ND	≤ 120	25.0
TOTAL SUSPENDED SOLIDS ^a	mg/L	DRIED FROM 103 TO 105 °C (SM PART 2540 D)	ND	≤ 50	5.0
TOTAL DISSOLVED SOLIDS ^a	mg/L	DRIED AT 180 °C (SM PART 2540 C)	145	≤ 3,000	25
TOTAL KJELDAHL NITROGEN ^a	mg/L	SEMI-MICRO-KJELDAHL METHOD (SM PART 4500-Norg C)	ND	≤ 100	15
OIL AND GREASE ^a	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	≤ 5	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			YELLOW/CLEAR BROWN		

^a : ISO/IEC 17025 ACCREDITED BY THAI INDUSTRIAL STANDARDS INSTITUTE (TISI)
^b : ISO/IEC 17025 ACCREDITED BY DEPARTMENT OF SCIENCE SERVICE (DSS)
^c : VERIFIED BY OWN LABORATORY QUALITY SYSTEM, BUT STILL NOT ACCREDITED

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 24th EDITION, 2023.
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PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 134, PART 183 D, DATED JUNE 7, 2017.
ND : NOT DETECTED.

(MRS PTAPAT SUTTANANUTWONG)
LABORATORY SUPERVISOR



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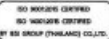
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CONTACT INFORMATION : TEL : 0 7433 1779, 080 965 5888 e-mail : sakofees@sprc.co.th
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(202 SONGKHLA-RANCO ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : EFFLUENT
SAMPLING DATE : JUNE 27, 2024
SAMPLING TIME : 23:00 HOUR
SAMPLING METHOD : -
SAMPLING BY : CUSTOMER
ANALYZED BY : MISS NAPAPORN KHUNNOKKHUM
RECEIVED DATE : JULY 1, 2024
ANALYTICAL DATE : JULY 1-6, 2024
ISSUE DATE : JULY 12, 2024
REPORT NO. : 2024-U063129
WORK NO. : 2024-000239
ANALYSIS NO. : T24A0650-0003

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT EFFLUENT (JETTY API) T24A0650-0003	REGULATORY STANDARD	DETECTION LIMIT
pH ^a	-	ELECTROMETRIC METHOD (SM PART 4500-H+ B)	7.1 (25°C)	5.5-9.0	-
BIOCHEMICAL OXYGEN DEMAND ^a	mg/L	5-DAY BOD TEST, MEMBRANE ELECTRODE METHOD (SM PART 5210 B AND PART 4500-O G)	< 2.0	≤ 20	2.0
CHEMICAL OXYGEN DEMAND ^a	mg/L	CLOSED REFLEX, COLOURIMETRIC METHOD (SM PART 5220 D)	ND	≤ 120	25.0
TOTAL SUSPENDED SOLIDS ^a	mg/L	DRIED FROM 103 TO 105 °C (SM PART 2540 D)	ND	≤ 50	5.0
TOTAL DISSOLVED SOLIDS ^a	mg/L	DRIED AT 180 °C (SM PART 2540 C)	153	≤ 3,000	25
TOTAL KJELDAHL NITROGEN ^a	mg/L	SEMI-MICRO-KJELDAHL METHOD (SM PART 4500-Norg C)	ND	≤ 100	15
OIL AND GREASE ^a	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	≤ 5	3
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			YELLOW/CLEAR BROWN		

^a : ISO/IEC 17025 ACCREDITED BY THAI INDUSTRIAL STANDARDS INSTITUTE (TISI)
^b : ISO/IEC 17025 ACCREDITED BY DEPARTMENT OF SCIENCE SERVICE (DSS)
^c : VERIFIED BY OWN LABORATORY QUALITY SYSTEM, BUT STILL NOT ACCREDITED

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 24th EDITION, 2023.
REGULATORY STANDARD : INDUSTRIAL EFFLUENT STANDARDS, NOTIFICATION OF THE MINISTRY OF INDUSTRY, B.E. 2560,
PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 134, PART 183 D, DATED JUNE 7, 2017.
ND : NOT DETECTED.

(MRS PTAPAT SUTTANANUTWONG)
LABORATORY SUPERVISOR



• PROHIBITED TO PARTIALLY COPY ANALYSIS REPORT PRIOR TO WRITTEN PERMISSION BY THE LABORATORY.
• THIS ANALYSIS REPORT APPROVES ONLY FOR THE SAMPLES AS RECEIVED.

1/1



- End of Analysis Report -

ANALYSIS REPORT

CUSTOMER NAME : STAR FUELS MARKETING LIMITED.
ADDRESS : 202 MOO 1 HUA KHAD SINGHANAKHON SONGKHLA 90280
CONTACT INFORMATION : TEL : 082 829 6210 e-mail : sakofee@spr.co.th
SAMPLING SOURCE : SONGKHLA PETROLEUM TERMINAL
(202 SONGKHLA-RANOD ROAD, SINGHANAKORN, SONGKHLA 90280 TEL. 0 7433 1780 FAX 0 7433 1780).
SAMPLE TYPE : SEAWATER
SAMPLING DATE : JUNE 7, 2024
SAMPLING TIME : 11:30 HOUR
SAMPLING METHOD : COMPOSITE, STERILE TECHNIQUE
SAMPLING BY : MR ANANT MUJOR
ANALYZED BY : MR KORINWIT CHASTRISAKUL

RECEIVED DATE : JUNE 8, 2024
ANALYTICAL DATE : JUNE 8 - JULY 2, 2024
ISSUE DATE : JULY 8, 2024
REPORT NO. : 2024-U060509
WORK NO. : 2024-002104
ANALYSIS NO. : T24AMS49-0001

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT ผลการวิเคราะห์ผล ค่าวิเคราะห์ T24AMS49-0001	REGULATORY STANDARD	DETECTION LIMIT
pH ^a	-	ELECTROMETRIC METHOD (AT SITE) SM PART 4500-H ⁺ B AND 1060 B	7.6 (34°C)	7.0-8.5	-
TEMPERATURE ^a	°C	THERMOMETER (AT SITE) SM PART 2550 B	34	n ^b	-
ODOUR ^a	-	OBSERVATION METHOD	NONE	NONE	-
SALINITY ^c	ppt	ELECTRICAL CONDUCTIVITY METHOD (AT SITE) SM PART 2520 B AND 1090 B	26.8	n ^b	0.1
TRANSPARENCY ^c	m	SECCHI DISC	0.8	n ^b	-
DISSOLVED OXYGEN ^c	mg/L	MEMBRANE ELECTRODE METHOD (AT SITE) SM PART 4500-O ₂ G	5.8	≥ 4	0.5
FREE CHLORINE ^c	mg/L Cl ₂	MODIFIED DPD COLOURIMETRIC METHOD (AT SITE)	ND	-	0.1
FLOATABLE OIL AND GREASE ^c	-	OBSERVATION METHOD	NOT VISIBLE	NOT VISIBLE	-
COLOUR ^d	-	FOREL-ULE COLOUR SCALE	12	1-22	-
SUSPENDED SOLIDS ^c	mg/L	GRAVIMETRIC METHOD (SM PART 2540 D)	23.2	n ^b	10
FAT, OIL AND GREASE ^e	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM PART 5520 B)	ND	-	3
TOTAL AMMONIA ^h	µg/L N	IN-HOUSE METHOD: UAE-TP-WAT.001 BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA&WEF, 24th ED., 2023, PART 4500-NH ₃ -H	138	≤ 950	100
NITRATE-NITROGEN ^h	µg/L N	CADMIUM REDUCTION AND COLOURIMETRIC METHOD (BASED ON PRACTICAL HANDBOOK OF SEAWATER ANALYSIS (STRICKLAND AND PARSON, 1972, 11.6))	4.86	≤ 60	0.50
PHENOLS ^g	mg/L	DISTILLATION, 4-AMINODIPYRINE METHOD (SM PART 5530 B AND PART 5530 D)	ND	-	0.015
PHOSPHATE-PHOSPHORUS ^h	µg/L P	IN-HOUSE METHOD: UAE-TP-WAT.002 BASED ON PRACTICAL HANDBOOK OF SEAWATER ANALYSIS STRICKLAND AND PARSON, 1972	14.0	≤ 45	0.50



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT ผลการวิเคราะห์ผล ค่าวิเคราะห์ T24AMS49-0001	REGULATORY STANDARD	DETECTION LIMIT
PETROLEUM HYDROCARBON ^a	µg/L	INTERGOVERNMENT OCEANOGRAPHIC COMMISSION, MANUAL FOR MONITORING OIL AND DISSOLVED DISPERSED PETROLEUM HYDROCARBONS IN MARINE WATERS AND ON BEACHES, 1994	0.09	≤ 5	0.02
SULPHIDE ^a	µg/L	METHYLENE BLUE COLOURIMETRIC METHOD (METHOD OF SEAWATER ANALYSIS, GRASSHOFF, 1999, CHAPTER 5)	ND	≤ 10	10
FLUORIDE ^a	mg/L F	SPADNS METHOD (SM PART 4500-F (d))	ND	≤ 1	0.2
CYANIDE ^c	µg/L CN	DISTILLATION, PYRIDINE-BARBITURIC ACID METHOD (SM PART 4500-CN C AND PART 4500-CN E)	ND	≤ 7	5
METALS					
ARSENIC ^c	µg/L As	PRE-CONCENTRATION AND HYDRIDE GENERATION ATOMIC ABSORPTION SPECTROMETRIC METHOD (BASED ON METHOD OF SEAWATER ANALYSIS, GRASSHOFF, 1999, CHAPTER 12)	ND	≤ 10	0.300
TOTAL MERCURY ^a	µg/L Hg	US EPA 2005: 245.7, REVISION 2.0, FEBRUARY 2005	ND	≤ 0.1	0.020
HEXAVALENT CHROMIUM ^c	µg/L Cr ⁶⁺	PRE-CONCENTRATION AND ELECTRO-THERMAL ATOMIC ABSORPTION SPECTROMETRIC METHOD (BASED ON METHOD OF SEAWATER ANALYSIS, GRASSHOFF, 1999, CHAPTER 12)	ND	≤ 100	0.100
CADMIUM ^a	µg/L Cd	PRE-CONCENTRATION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (BASED ON METHOD OF SEAWATER ANALYSIS, GRASSHOFF, 1999, CHAPTER 12)	ND	≤ 5	0.100
TOTAL CHROMIUM ^a	µg/L Cr	PRE-CONCENTRATION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (BASED ON METHOD OF SEAWATER ANALYSIS, GRASSHOFF, 1999, CHAPTER 12)	ND	≤ 100	0.100
COPPER ^c	µg/L Cu	PRE-CONCENTRATION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (BASED ON METHOD OF SEAWATER ANALYSIS, GRASSHOFF, 1999, CHAPTER 12)	0.290	≤ 8	0.100
IRON ^a	µg/L Fe	PRE-CONCENTRATION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (BASED ON METHOD OF SEAWATER ANALYSIS, GRASSHOFF, 1999, CHAPTER 12)	16.0	≤ 300	0.100
LEAD ^c	µg/L Pb	PRE-CONCENTRATION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (BASED ON METHOD OF SEAWATER ANALYSIS, GRASSHOFF, 1999, CHAPTER 12)	0.210	≤ 8.5	0.100
MANGANESE ^c	µg/L Mn	PRE-CONCENTRATION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (BASED ON METHOD OF SEAWATER ANALYSIS, GRASSHOFF, 1999, CHAPTER 12)	0.130	≤ 100	0.100
ZINC ^c	µg/L Zn	PRE-CONCENTRATION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (BASED ON METHOD OF SEAWATER ANALYSIS, GRASSHOFF, 1999, CHAPTER 12)	106	≤ 50	0.100

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			ประเทศไทย T24AMS49-0001		
MICROBIOLOGY					
COLIFORM BACTERIA ^{a, b}	MPN/100 mL	MULTIPLE-TUBE FERMENTATION TECHNIQUE (SM PART 9221 B AND C)	2,400	≤ 1,000	1.8
FAECAL COLIFORM BACTERIA ^{a, b}	CFU/100 mL	MEMBRANE FILTER TECHNIQUE (SM PART 9222 D)	1,700	≤ 100	1
POLYCHLORINATED BIPHENYLS (PCBs)					
PCBs ^c	µg/L	LIQUID-LIQUID EXTRACTION GAS CHROMATOGRAPHIC (GC) METHOD (SM PART 9431 B)	ND	NOT DETECTED	0.10

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT ประเทศไทย T24AMS49-0001	REGULATORY STANDARD	DETECTION LIMIT
RADIOACTIVE (SC)					
GROSS ALPHA ^a	Bq/L	METHOD/REFERENCE	0.090	≤ 0.1	-
GROSS BETA ^a	Bq/L	METHOD/REFERENCE	0.244	≤ 1.0	-
SAMPLE CONDITION					
WATER'S COLOUR/TURBID SEDIMENT			YELLOW/CLAY BROWN		

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^b : ISO/IEC 17025 ACCREDITED BY DEPARTMENT OF SCIENCE SERVICE (DSS)
^c : VERIFIED BY OWN LABORATORY QUALITY SYSTEM, BUT STILL NOT ACCREDITED

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 24TH EDITION, 2023.
REGULATORY STANDARD : SEAWATER QUALITY STANDARDS, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, B.E. 2564
PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 138, PART 245 D, DATED OCTOBER 6, 2021
CLASS 5 : SEAWATER QUALITY FOR INDUSTRY AND PORTS (1) SEAWATER ADJACENT TO INDUSTRIAL ESTATES BOUNDARY ACCORDING TO THE INDUSTRIAL ESTATE AUTHORITY OF THAILAND ACT AND INDUSTRIAL ZONE ACCORDING TO INDUSTRIAL LAW WITH A BOUNDARY FROM THE HIGHEST TIDE LINE TO THE LOWEST TIDE LINE UP TO A DISTANCE OF 1000 METERS ALONG THE HORIZONTAL LINE OF THE SEAWATER SURFACE (2) SEAWATER IN THE PORTAL AREA THE MOORING AREA ACCORDING TO THE NAVIGATION IN THE THAI WATERS ACT (3) SEAWATER ADJACENT TO THE TERMINAL PORT THAT ACCEPTS SHIPS OF 500 GROSS TONS (OR ABOVE) OR THE BERTHS LENGTH IS FROM 100 METERS (OR ABOVE), OR HAS A TOTAL BERTH AREA OF 1000 SQUARE METERS OR ABOVE, WITH A BOUNDARY STARTING FROM THE ADJACENT BERTH TO A DISTANCE OF 1000 METERS ALONG THE SEAWATER SURFACE.
n1 : ANY CHANGE SHALL NOT EXCEED 10% OF THE MINIMUM SALINITY. (THE MINIMUM LEVEL OF SALINITY SHALL BE DETERMINED BASED ON MARINE WATER SAMPLES TAKEN IN THE SAME SEASON AND FROM THE SAME STATION FOR 1 YEAR DURING WHICH OCCURRENCE OF TIDES EXISTS).
n2 : AN INCREASE SHALL NOT EXCEED 2°C FROM THE NATURAL TEMPERATURE.
n3 : A DECREASE SHALL NOT BE EXCEED THAN 10% OF THE MINIMUM TRANSPARENCY GOVERNED BY NATURAL CONDITION (THE MINIMUM LEVEL OF TRANSPARENCY SHALL BE ASCERTAINED BASED ON MARINE WATER SAMPLES TAKEN IN THE SAME SEASON AND FROM THE SAME STATION FOR 1 YEAR DURING WHICH OCCURRENCE OF TIDES EXISTS).
n4 : THE RESULTS SHOULD NOT BE CHANGED BY MORE THAN THE SUM OF DAILY OR MONTHLY OR YEARLY AVERAGE AND THE STANDARD DIVIATION. DAILY AVERAGE WAS CALCULATED FROM HOURLY MEASUREMENT OR AT LEAST 5 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE DAY. MONTHLY AVERAGE WAS CALCULATED FROM DAILY MEASUREMENT OR AT LEAST 4 SAMPLES TAKEN AT EQUAL TIME INTERVAL WITHIN ONE MONTH. YEARLY AVERAGE WAS CALCULATED FROM MONTHLY MEASUREMENT AT EQUAL TIME INTERVAL AND THE SAME PLACE WITHIN ONE YEAR.
METHOD REFERENCE : IN HOUSE METHOD BASED ON EPA METHOD 900.0, SECTION 1 GROSS ALPHA AND GROSS BETA RADIOACTIVITY IN DRINKING WATER METHOD 900.0. IN "PRESCRIBED PROCEDURES FOR MEASUREMENT OF RADIOACTIVITY IN DRINKING WATER" EPA-600/4-80-032 (1980).
^a : COLLECTED THE SAMPLE AT 30 CENTIMETRES UNDER THE WATER SURFACE LEVEL.
ND : NOT DETECTED.
SC : THE TEST WAS SUBCONTRACTED TO THE ANOTHER LABORATORY.

(MR BHUCHONK PANICHERTUMPI)
LABORATORY SUPERVISOR

ภาคผนวก ง
มาตรฐานคุณภาพสิ่งแวดล้อม



ภาคผนวก ง-1

มาตรฐานตามประกาศกระทรวงอุตสาหกรรม
เรื่อง กำหนดมาตรฐานควบคุมการระบายน้ำทิ้งจากโรงงาน พ.ศ. 2560
ประกาศในราชกิจจานุเบกษา เล่ม 134 ตอนพิเศษ 153ง
วันที่ 7 มิถุนายน พ.ศ. 2560



ประกาศกระทรวงอุตสาหกรรม

เรื่อง กำหนดมาตรฐานควบคุมการระบายน้ำทิ้งจากโรงงาน

พ.ศ. ๒๕๖๐

โดยที่เป็นการสมควรปรับปรุงการกำหนดมาตรฐานควบคุมการระบายน้ำทิ้งจากการประกอบกิจการโรงงาน เพื่อให้มีค่ามาตรฐานและวิธีการตรวจสอบน้ำทิ้งจากโรงงานให้เหมาะสมและเป็นไปตามมาตรฐานสากล รวมถึงเป็นการควบคุมการระบายน้ำทิ้งจากโรงงาน อาศัยอำนาจตามความในข้อ ๑๔ แห่งกฎกระทรวงฉบับที่ ๒ (พ.ศ. ๒๕๓๕) ออกตามความในพระราชบัญญัติโรงงาน พ.ศ. ๒๕๓๕ ที่ระบุว่า “ห้ามระบายน้ำทิ้งออกจากโรงงาน เว้นแต่ได้ทำการอย่างหนึ่งหรือหลายอย่างจนน้ำทิ้งนั้นมีลักษณะเป็นไปตามที่รัฐมนตรีกำหนดโดยประกาศในราชกิจจานุเบกษา แต่ทั้งนี้ต้องไม่ใช้วิธีทำให้เจือจาง (dilution)” รัฐมนตรีว่าการกระทรวงอุตสาหกรรมจึงออกประกาศ ดังต่อไปนี้

ข้อ ๑ ประกาศนี้เรียกว่า “ประกาศกระทรวงอุตสาหกรรม เรื่อง กำหนดมาตรฐานควบคุมการระบายน้ำทิ้งจากโรงงาน พ.ศ. ๒๕๖๐”

ข้อ ๒ ประกาศนี้ใช้บังคับตั้งแต่วันที่ ๗ มิถุนายน พ.ศ. ๒๕๖๐ เป็นต้นไป

ข้อ ๓ ให้ยกเลิกประกาศกระทรวงอุตสาหกรรม ฉบับที่ ๒ (พ.ศ. ๒๕๓๕) ออกตามความในพระราชบัญญัติโรงงาน พ.ศ. ๒๕๓๕ เรื่อง กำหนดคุณลักษณะของน้ำทิ้งที่ระบายออกจากโรงงาน ลงวันที่ ๑๔ มิถุนายน พ.ศ. ๒๕๓๕

ข้อ ๔ ในประกาศนี้

“โรงงาน” หมายความว่า โรงงานจำพวกที่ ๑ จำพวกที่ ๒ จำพวกที่ ๓ ตามกฎหมายว่าด้วยโรงงาน

“น้ำทิ้ง” หมายความว่า น้ำที่เกิดจากการประกอบกิจการโรงงาน น้ำจากการใช้น้ำของคนงาน หรือน้ำจากกิจกรรมอื่นในโรงงาน ที่จะระบายออกจากโรงงาน หรือเขตประกอบการอุตสาหกรรม

ข้อ ๕ มาตรฐานน้ำทิ้ง ต้องมีคุณภาพ ดังต่อไปนี้

๕.๑ ความเป็นกรดและด่าง (pH) ตั้งแต่ ๕.๕ ถึง ๙.๐

๕.๒ อุณหภูมิ (Temperature) ไม่เกิน ๔๐ องศาเซลเซียส

๕.๓ สี (Color) ไม่เกิน ๓๐๐ เอิตเอ็มไอ

๕.๔ ของแข็งละลายน้ำทั้งหมด (Total Dissolved Solids หรือ TDS) มีค่าดังนี้

(๑) กรณีระบายลงแหล่งน้ำ ต้องไม่เกิน ๓,๐๐๐ มิลลิกรัมต่อลิตร

(๒) กรณีระบายลงแหล่งน้ำที่มีค่าของแข็งละลายน้ำทั้งหมดเกินกว่า ๓,๐๐๐ มิลลิกรัมต่อลิตร ค่าของแข็งละลายน้ำทั้งหมดในน้ำทิ้งที่จะระบายได้ต้องมีค่าเกินกว่าค่าของแข็งละลายน้ำทั้งหมดที่มีอยู่ในแหล่งน้ำนั้นไม่เกิน ๕,๐๐๐ มิลลิกรัมต่อลิตร

๕.๕ ของแข็งแขวนลอยทั้งหมด (Total Suspended Solids) ไม่เกิน ๕๐ มิลลิกรัมต่อลิตร

๕.๖ บีโอดี (Biochemical Oxygen Demand) ไม่เกิน ๒๐ มิลลิกรัมต่อลิตร

๕.๗ ซีโอดี (Chemical Oxygen Demand) ไม่เกิน ๑๒๐ มิลลิกรัมต่อลิตร

๕.๘ ซัลไฟด์ (Sulfide) ไม่เกิน ๑ มิลลิกรัมต่อลิตร

๕.๙ ไซยาไนด์ (Cyanides CN) ไม่เกิน ๐.๒ มิลลิกรัมต่อลิตร

๕.๑๐ น้ำมันและไขมัน (Oil and Grease) ไม่เกิน ๕ มิลลิกรัมต่อลิตร

๕.๑๑ ฟORMALดีไฮด์ (Formaldehyde) ไม่เกิน ๑ มิลลิกรัมต่อลิตร

๕.๑๒ สารประกอบฟีนอล (Phenols) ไม่เกิน ๑ มิลลิกรัมต่อลิตร

๕.๑๓ คลอรีนอิสระ (Free Chlorine) ไม่เกิน ๑ มิลลิกรัมต่อลิตร

๕.๑๔ สารฆ่าศัตรูพืชและสัตว์ (Pesticide) ต้องตรวจไม่พบ

๕.๑๕ ทีเคเอ็น (Total Kjeldahl Nitrogen) ไม่เกิน ๑๐๐ มิลลิกรัมต่อลิตร

๕.๑๖ โลหะหนัก มีค่าดังนี้

(๑) สังกะสี (Zn) ไม่เกิน ๕.๐ มิลลิกรัมต่อลิตร

(๒) โครเมียมเฮกซะวาเลนต์ (Hexavalent Chromium) ไม่เกิน ๐.๒๕ มิลลิกรัมต่อลิตร

(๓) โครเมียมไตรวาเลนต์ (Trivalent Chromium) ไม่เกิน ๐.๗๕ มิลลิกรัมต่อลิตร

(๔) สารหนู (As) ไม่เกิน ๐.๒๕ มิลลิกรัมต่อลิตร

(๕) ทองแดง (Cu) ไม่เกิน ๒.๐ มิลลิกรัมต่อลิตร

(๖)ปรอท (Hg) ไม่เกิน ๐.๐๐๕ มิลลิกรัมต่อลิตร

(๗) แคดเมียม (Cd) ไม่เกิน ๐.๐๓ มิลลิกรัมต่อลิตร

(๘) แบเรียม (Ba) ไม่เกิน ๑.๐ มิลลิกรัมต่อลิตร

(๙) ซีลีเนียม (Se) ไม่เกิน ๐.๐๒ มิลลิกรัมต่อลิตร

(๑๐) ตะกั่ว (Pb) ไม่เกิน ๐.๒ มิลลิกรัมต่อลิตร

(๑๑) นิกเกิล (Ni) ไม่เกิน ๑.๐ มิลลิกรัมต่อลิตร

(๑๒) แมงกานีส (Mn) ไม่เกิน ๕.๐ มิลลิกรัมต่อลิตร

ข้อ ๖ การตรวจสอบค่ามาตรฐานน้ำทิ้งจากโรงงาน ตามข้อ ๕ ให้ใช้วิธีดังต่อไปนี้

๖.๑ ความเป็นกรดและด่าง ให้ใช้เครื่องมือวัดความเป็นกรดและด่างของน้ำ (pH Meter) ที่มีความละเอียดไม่ต่ำกว่า ๐.๑ หน่วย

๖.๒ อุณหภูมิ ให้ใช้เครื่องมือวัดอุณหภูมิวัดขณะทำการเก็บตัวอย่าง

- ๖.๓

สี ให้ใช้วิธีเอ็ดเอ็มโอ (ADMI Method)
- ๖.๔

ของแข็งละลายน้ำทั้งหมด ให้ใช้วิธีระเหยตัวอย่างที่กรองผ่านกระดาษกรองใยแก้ว (Glass Fiber Filter Disk) และอบแห้งที่อุณหภูมิ ๑๘๐ องศาเซลเซียส เป็นเวลาอย่างน้อย ๑ ชั่วโมง
- ๖.๕

ของแข็งแขวนลอยทั้งหมด ให้ใช้วิธีกรองผ่านกระดาษกรองใยแก้ว (Glass Fiber Filter) และอบแห้งที่อุณหภูมิ ๑๐๓-๑๐๕ องศาเซลเซียส เป็นเวลาอย่างน้อย ๑ ชั่วโมง
- ๖.๖

บิโอดี ให้ใช้วิธีบ่มตัวอย่างที่อุณหภูมิ ๒๐ องศาเซลเซียส เป็นเวลา ๕ วัน ติดต่อกัน และหาค่าออกซิเจนละลายด้วยวิธีไอโซไนติฟิเคชัน (Azide Modification) หรือวิธีเมมเบรนอิเล็กโทรด (Membrane Electrode)
- ๖.๗

ซีโอดี ให้ใช้วิธีย่อยสลายโดยใช้โพแทสเซียมไดโครเมต (Potassium Dichromate)
- ๖.๘

ซัลไฟด์ ให้ใช้วิธีไอโอดิเมตริก (Iodometric Method) หรือวิธีเมทิลีนบลู (Methylene Blue Method)
- ๖.๙

โซยาโนด ให้ใช้การกลั่น (Distillation) และตรวจวัดด้วยวิธีเทียบสี (Colorimetric Method) หรือวิธี Flow Injection Analysis
- ๖.๑๐

น้ำมันและไขมัน ให้ใช้วิธีสกัดด้วยเทคนิค Liquid – Liquid Extraction หรือ Soxhlet Extraction ด้วยตัวทำละลายแล้วแยกหาน้ำหนักของน้ำมันและไขมัน
- ๖.๑๑

ฟอร์มาลดีไฮด์ ให้ใช้วิธีเทียบสี (Colorimetric Method)
- ๖.๑๒

สารประกอบฟีนอล ให้ใช้การกลั่น (Distillation) และตรวจวัดด้วยวิธีเทียบสี (Colorimetric Method)
- ๖.๑๓

คลอรีนอิสระ ให้ใช้วิธีไตเตรท (Titrimetric Method) หรือวิธีเทียบสี (Colorimetric Method)
- ๖.๑๔

สารฆ่าศัตรูพืชและสัตว์ ให้ใช้วิธีก๊าซโครมาโตกราฟี (Gas-Chromatographic Method) หรือวิธีไฮเพอร์ฟอร์แมนซ์ ลิกวิด โครมาโตกราฟี (High-Performance Liquid Chromatographic Method)
- ๖.๑๕

ทีเคเอ็น ให้ใช้วิธีเจลดาล์ (Kjeldahl)
- ๖.๑๖

โลหะหนัก

(๑)

สังกะสี ทองแดง แคดเมียม แบเรียม ตะกั่ว นิกเกิลและแมงกานีส ให้ใช้วิธีย่อยสลายตัวอย่างด้วยกรด (Acid digestion) และวัดหาปริมาณโลหะด้วยวิธีอะตอมมิกแอบซอร์พชันสเปกโตรเมตรี (Atomic Absorption Spectrometry : AAS) หรือวิธีอินดักทีฟลิคัพเพิลพลาสมา (Inductively Coupled Plasma)

(๒)

โครเมียม

- ก)

โครเมียมทั้งหมด ให้ใช้วิธีย่อยสลายตัวอย่างด้วยกรด (Acid digestion) และวัดหาปริมาณโลหะด้วยวิธีอะตอมมิกแอบซอร์พชันสเปกโตรเมตรี (Atomic Absorption Spectrometry : AAS) หรือวิธีอินดักทีฟลิคัพเพิลพลาสมา (Inductively Coupled Plasma)
- ข)

โครเมียมเอกซวาเลนท์ ให้ใช้วิธีเทียบสี (Colorimetric Method) หรือวิธีสกัดและตรวจวัดด้วยวิธีอะตอมมิกแอบซอร์พชันสเปกโตรเมตรี (Atomic Absorption Spectrometry : AAS) หรือวิธีสกัดและตรวจวัดด้วยวิธีอินดักทีฟลิคัพเพิลพลาสมา (Inductively Coupled Plasma)
- ค)

โครเมียมโครวาเลนท์ ให้ใช้วิธีคำนวณจากค่าส่วนของโครเมียมทั้งหมดกับโครเมียมเอกซวาเลนท์

(๓)

สารหนูและซีลีเนียม ให้ใช้วิธีอะตอมมิกแอบซอร์พชันสเปกโตรโฟโตเมตรี (Atomic Absorption Spectrophotometry) ชนิดไฮไดรด์เจนเนอเรชัน (Hydride Generation) หรือวิธีอินดักทีฟลิคัพเพิลพลาสมา (Inductively Coupled Plasma)

(๔)

ปรอท ให้ใช้วิธีโคลด์เวเปอร์อะตอมมิกแอบซอร์พชันสเปกโตรเมตรี (Cold Vapor Atomic Absorption Spectrometry) หรือวิธีโคลด์เวเปอร์อะตอมมิกฟลูออเรสเซนซ์สเปกโตรเมตรี (Cold Vapor Atomic Fluorescence Spectrometry) หรือวิธีอินดักทีฟลิคัพเพิลพลาสมา (Inductively Coupled Plasma)

ข้อ ๗

การตรวจสอบค่ามาตรฐานน้ำทิ้งจากโรงงาน ตามข้อ ๖ ให้เป็นไปตามคู่มือวิเคราะห์น้ำและน้ำเสียของสมาคมวิศวกรรมสิ่งแวดล้อมแห่งประเทศไทย หรือ Standard Methods for the Examination of Water and Wastewater ซึ่ง American Public Health Association, American Water Work Association และ Water Environment Federation ของประเทศสหรัฐอเมริกากำหนด หรือตามที่กรมโรงงานอุตสาหกรรมกำหนด

ข้อ ๘

การเก็บตัวอย่างน้ำทิ้งเพื่อการตรวจสอบค่ามาตรฐาน ตามข้อ ๕ ให้เป็นดังต่อไปนี้

๘.๑

จุดเก็บตัวอย่าง ให้เก็บในจุดระบายทิ้งออกจากโรงงาน ไม่ว่าจะมีจุดเดียวหรือหลายจุดก็ตาม หรือจุดอื่นที่สามารถใช้เป็นตัวแทนของน้ำทิ้งที่ระบายออกจากโรงงาน กรณีมีการระบายทิ้งหลายจุดให้เก็บทุกจุด

๘.๒

วิธีการเก็บตัวอย่างน้ำทิ้ง ณ จุดเก็บตัวอย่างตาม ๘.๑ ให้เก็บแบบจับวง (Grab Sample)

ข้อ ๙

การกำหนดค่ามาตรฐานน้ำทิ้งให้แตกต่างไปจากข้อ ๕ สำหรับโรงงานในประเภทหรือชนิดใดเป็นการเฉพาะให้เป็นไปตามประกาศกรมโรงงานอุตสาหกรรม

ข้อ ๑๐ ให้ประกาศกรมโรงงานอุตสาหกรรม (พ.ศ. ๒๕๓๙) เรื่อง กำหนดคุณลักษณะน้ำทิ้งที่ระบายออกนอกโรงงานให้มีค่าแตกต่างจากที่กำหนดไว้ในประกาศกระทรวงอุตสาหกรรม ฉบับที่ ๒ (พ.ศ. ๒๕๓๙) เรื่อง กำหนดคุณลักษณะของน้ำทิ้งที่ระบายออกจากโรงงาน ลงวันที่ ๑๘ กุมภาพันธ์ พ.ศ. ๒๕๔๐ ยังคงบังคับใช้ได้ต่อไปจนกว่าจะได้มีการยกเลิก

ประกาศ ณ วันที่ ๓๐ พฤษภาคม พ.ศ. ๒๕๖๐
อุตตม สาวนายน
รัฐมนตรีว่าการกระทรวงอุตสาหกรรม

ภาคผนวก ง-2

มาตรฐานตามประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ
เรื่อง กำหนดมาตรฐานคุณภาพน้ำทะเล
ประกาศในราชกิจจานุเบกษา เล่ม 138 ตอนพิเศษ 255 ง
วันที่ 6 ตุลาคม พ.ศ. 2564



ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ

เรื่อง กำหนดมาตรฐานคุณภาพน้ำทะเล

โดยที่เป็นการสมควรปรับปรุงการกำหนดมาตรฐานคุณภาพน้ำทะเล ให้เหมาะสมตามความก้าวหน้าในทางวิทยาศาสตร์ เทคโนโลยี และความเปลี่ยนแปลงทางเศรษฐกิจและสังคมของประเทศ เพื่อเป็นเกณฑ์ทั่วไปสำหรับการส่งเสริมและรักษาคุณภาพสิ่งแวดล้อมตามพระราชบัญญัติส่งเสริมและรักษาคุณภาพสิ่งแวดล้อมแห่งชาติ พ.ศ. ๒๕๓๕

อาศัยอำนาจตามความในมาตรา ๓๒ (๒) และมาตรา ๓๔ แห่งพระราชบัญญัติส่งเสริมและรักษาคุณภาพสิ่งแวดล้อมแห่งชาติ พ.ศ. ๒๕๓๕ และคำสั่งสำนักนายกรัฐมนตรีที่ ๓๑๐/๒๕๕๔ ลงวันที่ ๒๔ ธันวาคม ๒๕๕๔ เรื่อง มอบหมายและมอบอำนาจให้รองนายกรัฐมนตรีและรัฐมนตรีประจำสำนักนายกรัฐมนตรีปฏิบัติหน้าที่ประธานกรรมการ รองประธานกรรมการ และกรรมการในคณะกรรมการต่าง ๆ ตามกฎหมายและระเบียบสำนักนายกรัฐมนตรี และมติคณะกรรมการสิ่งแวดล้อมแห่งชาติ ในการประชุมครั้งที่ ๓/๒๕๖๐ เมื่อวันที่ ๖ กันยายน ๒๕๖๐ จึงออกประกาศกำหนดมาตรฐานคุณภาพน้ำทะเล ไว้ดังต่อไปนี้

ข้อ ๑ ให้ยกเลิกประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ ๒๗ (พ.ศ. ๒๕๔๙) เรื่อง กำหนดมาตรฐานคุณภาพน้ำทะเล ลงวันที่ ๒๖ ธันวาคม พ.ศ. ๒๕๔๙

ข้อ ๒ ในประกาศนี้

“น้ำทะเล” หมายความว่า น้ำทั้งหมดในเขตน่านน้ำไทย แต่ไม่รวมถึง น้ำในแหล่งน้ำผิวดินตามประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ เรื่อง กำหนดมาตรฐานคุณภาพน้ำในแหล่งน้ำผิวดิน

“น่านน้ำไทย” หมายความว่า บรรดาน่านน้ำที่อยู่ภายใต้อาณาจอธิปไตยของประเทศไทยตามกฎหมายด้วยการเดินเรือในน่านน้ำไทย

“ค่าความโปร่งใสต่ำสุด” หมายความว่า ค่าความโปร่งใสต่ำสุดที่ตรวจวัดได้ของตัวอย่างน้ำทะเลที่เก็บจากสถานีเก็บตัวอย่างน้ำทะเลเดียวกันย้อนหลัง ๑ ปี ในช่วงเวลาน้ำขึ้น น้ำลง และฤดูกาลเดียวกัน

“ค่าความเค็มต่ำสุด” หมายความว่า ค่าความเค็มต่ำสุดที่ตรวจวัดได้ของตัวอย่างน้ำทะเลที่เก็บจากสถานีเก็บตัวอย่างน้ำทะเลเดียวกันย้อนหลัง ๑ ปี ในช่วงเวลาน้ำขึ้น น้ำลง และฤดูกาลเดียวกัน

“เขตกันชน” หมายความว่า เขตระยะระหว่างประเภทการใช้ประโยชน์คุณภาพน้ำทะเล โดยเขตกันชนมีพื้นที่นับตั้งแต่แนวแบ่งเขตคุณภาพน้ำทะเลด้านที่มีคุณภาพน้ำทะเลต่ำกว่าออกไปเป็นระยะ ๕๐๐ เมตร ติดต่อกันเป็นเส้นขนาน

หมวด ๑

ประเภทและมาตรฐานคุณภาพน้ำทะเลในเขตน่านน้ำไทย

- ข้อ ๓ ให้แบ่งคุณภาพน้ำทะเลในเขตน่านน้ำไทยออกเป็น ๖ ประเภท ดังต่อไปนี้
- (๑) คุณภาพน้ำทะเลเพื่อการอนุรักษ์ทรัพยากรธรรมชาติ ได้แก่ แหล่งน้ำทะเลที่มีได้จัดไว้เพื่อการใช้ประโยชน์อย่างหนึ่งโดยเฉพาะ ซึ่งเป็นแหล่งน้ำทะเลตามธรรมชาติสำหรับเป็นที่แพร่พันธุ์หรืออนุบาลของสัตว์น้ำวัยอ่อน หรือเป็นแหล่งอาหาร หรือที่อยู่อาศัยของสัตว์น้ำ พืช หรือหญ้าทะเล
- (๒) คุณภาพน้ำทะเลเพื่อการอนุรักษ์แหล่งปะการัง ได้แก่ แหล่งน้ำทะเลที่มีปะการัง โดยมีขอบเขตครอบคลุมพื้นที่ในรัศมีแนวราบกับผิวน้ำ นับจากเส้นตรงที่ลากตั้งฉากกับเส้นที่เชื่อมจุดนอกสุดของแนวปะการังออกไปเป็นระยะ ๑,๐๐๐ เมตร
- (๓) คุณภาพน้ำทะเลเพื่อการเพาะเลี้ยงสัตว์น้ำ ได้แก่ แหล่งน้ำทะเลซึ่งมีประกาศกำหนดให้เป็นพื้นที่เพาะเลี้ยงสัตว์น้ำ ตามกฎหมายว่าด้วยการประมง
- (๔) คุณภาพน้ำทะเลเพื่อการนันทนาการ ได้แก่ แหล่งน้ำทะเลซึ่งมีประกาศขององค์กรปกครองส่วนท้องถิ่นกำหนดให้เป็นเขตเพื่อการว่ายน้ำ หรือใช้ประโยชน์เพื่อการนันทนาการทางน้ำ
- (๕) คุณภาพน้ำทะเลเพื่อการอุตสาหกรรม และท่าเรือ ได้แก่ แหล่งน้ำทะเลที่อยู่ประชิดกับเขตนิคมอุตสาหกรรม ตามกฎหมายว่าด้วยการนิคมอุตสาหกรรมแห่งประเทศไทย เขตประกอบการอุตสาหกรรมตามกฎหมายว่าด้วยโรงงาน เขตท่าเรือ ตามกฎหมายว่าด้วยการเดินเรือในน่านน้ำไทย ท่าเรือ หรือท่าเทียบเรือ แล้วแต่กรณี โดยมีขอบเขตนับตั้งแต่แนวน้ำลงต่ำสุดออกไปจนถึงระยะ ๑,๐๐๐ เมตร ตามแนวราบกับผิวน้ำ
- (๖) คุณภาพน้ำทะเลสำหรับเขตชุมชน ได้แก่ แหล่งน้ำทะเลที่อยู่ประชิดกับชุมชนที่มีประกาศกำหนดให้เป็นเทศบาล ตามกฎหมายว่าด้วยเทศบาล เมืองพัทยา หรือกรุงเทพมหานคร เฉพาะเขตเทศบาล เขตเมืองพัทยา หรือเขตกรุงเทพมหานครที่ติดกับชายฝั่งทะเลเท่านั้น โดยให้นับตั้งแต่แนวน้ำลงต่ำสุดออกไปจนถึงระยะ ๑,๐๐๐ เมตร ตามแนวราบกับผิวน้ำ
- ข้อ ๔ คุณภาพน้ำทะเลตามข้อ ๓ (๑) ต้องมีมาตรฐาน ดังต่อไปนี้
- (๑) ไม่มีวัตถุที่น้ำรั้งเกี่ยจอย่อยอยู่บนผิวน้ำ
- (๒) ไม่มีน้ำมันหรือไขมันที่สามารถมองเห็นได้ด้วยตาเปล่าลอยอยู่บนผิวน้ำ
- (๓) สีของน้ำทะเลอยู่ใน scale ของสารละลาย Forel-Ule ซึ่งมีค่าตั้งแต่ ๑-๒๒

- (๔) กลิ่นต้องไม่เป็นที่น่ารังเกียจ คือ ไม่มีกลิ่นที่ก่อให้เกิดความเดือดร้อนรำคาญ เช่น กลิ่นน้ำมัน กลิ่นก๊าซไข่เน่า กลิ่นสารเคมี กลิ่นขยะ กลิ่นเน่า เป็นต้น โดยความเห็นของคณะผู้ตรวจวัดต้องเป็นเอกฉันท์
- (๕) อุณหภูมิ (Temperature) เปลี่ยนแปลงเพิ่มขึ้นไม่เกิน ๑ องศาเซลเซียส จากสภาพธรรมชาติ
- (๖) ความเป็นกรดและด่าง (pH) มีค่าระหว่าง ๗.๐-๘.๕
- (๗) ความโปร่งใส (Transparency) มีค่าลดลงจากสภาพธรรมชาติไม่เกินร้อยละ ๑๐ จากค่าความโปร่งใสต่ำสุด
- (๘) สารแขวนลอย (Suspended Solids) มีค่าเปลี่ยนแปลงเพิ่มขึ้นไม่เกินผลรวมของค่าเฉลี่ย ๑ วัน หรือ ๑ เดือน หรือ ๑ ปี กับกับค่าเบี่ยงเบนมาตรฐานของค่าเฉลี่ยนั้น ๆ โดยค่าเฉลี่ย ๑ วัน ให้วัดทุกชั่วโมง หรืออย่างน้อย ๕ ครั้ง ที่ช่วงเวลาเท่า ๆ กัน ค่าเฉลี่ย ๑ เดือน ให้วัดทุกวันหรืออย่างน้อย ๔ ครั้ง ที่ช่วงเวลาเท่า ๆ กัน ใน ๑ เดือน ณ เวลาเดียวกัน และค่าเฉลี่ย ๑ ปี ให้วัดทุกเดือน ณ วันที่และเวลาเดียวกัน
- (๙) ความเค็ม (Salinity) มีค่าเปลี่ยนแปลงไม่เกินร้อยละ ๑๐ ของค่าความเค็มต่ำสุด
- (๑๐) ไฮโดรคาร์บอนไฮโดรคาร์บอน (Petroleum Hydrocarbon) มีค่าไม่เกิน ๐.๕ ไมโครกรัมต่อลิตร
- (๑๑) ออกซิเจนละลาย (Dissolved Oxygen) มีค่าไม่น้อยกว่า ๔ มิลลิกรัมต่อลิตร
- (๑๒) แบคทีเรียกลุ่มโคลิฟอร์มทั้งหมด (Total Coliform Bacteria) มีค่าไม่เกิน ๑,๐๐๐ เอ็มพีเอ็นต่อ ๑๐๐ มิลลิลิตร
- (๑๓) แบคทีเรียกลุ่มฟิโคไลโคลิฟอร์ม (Fecal Coliform Bacteria) มีค่าไม่เกิน ๗๐ ซีเอฟยูต่อ ๑๐๐ มิลลิลิตร
- (๑๔) ไนเตรท-ไนโตรเจน (Nitrate-Nitrogen) มีค่าไม่เกิน ๒๐ ไมโครกรัม-ไนโตรเจนต่อลิตร
- (๑๕) ฟอสเฟต-ฟอสฟอรัส (Phosphate-Phosphorus) มีค่าไม่เกิน ๑๕ ไมโครกรัม-ฟอสฟอรัสต่อลิตร
- (๑๖) แอมโมเนียรวม (Total Ammonia) มีค่าไม่เกิน ๑๐๐ ไมโครกรัม-ไนโตรเจนต่อลิตร
- (๑๗)ปรอทรวม (Total Mercury) มีค่าไม่เกิน ๐.๑ ไมโครกรัมต่อลิตร
- (๑๘) แคดเมียม (Cadmium) มีค่าไม่เกิน ๕ ไมโครกรัมต่อลิตร
- (๑๙) โครเมียมรวม (Total Chromium) มีค่าไม่เกิน ๑๐๐ ไมโครกรัมต่อลิตร
- (๒๐) โครเมียมเฮกซาวาเลนต์ (Chromium Hexavalent) มีค่าไม่เกิน ๕๐ ไมโครกรัมต่อลิตร
- (๒๑) ตะกั่ว (Lead) มีค่าไม่เกิน ๘.๕ ไมโครกรัมต่อลิตร
- (๒๒) ทองแดง (Copper) มีค่าไม่เกิน ๘ ไมโครกรัมต่อลิตร
- (๒๓) แมงกานีส (Manganese) มีค่าไม่เกิน ๑๐๐ ไมโครกรัมต่อลิตร
- (๒๔) สังกะสี (Zinc) มีค่าไม่เกิน ๕๐ ไมโครกรัมต่อลิตร

- (๒๕) เหล็ก (Iron) มีค่าไม่เกิน ๓๐๐ ไมโครกรัมต่อลิตร
- (๒๖) ฟลูออไรด์ (Fluoride) มีค่าไม่เกิน ๑ มิลลิกรัมต่อลิตร
- (๒๗) ฟีนอล (Phenol) มีค่าไม่เกิน ๐.๐๓ มิลลิกรัมต่อลิตร
- (๒๘) ซัลไฟด์ (Sulfide) มีค่าไม่เกิน ๑๐ ไมโครกรัมต่อลิตร
- (๒๙) ไซยาไรด์ (Cyanide) มีค่าไม่เกิน ๗ ไมโครกรัมต่อลิตร
- (๓๐) พีซีบี (PCBs, Polychlorinated Biphenyl) ต้องตรวจไม่พบ
- (๓๑) สารหนู (Arsenic) มีค่าไม่เกิน ๑๐ ไมโครกรัมต่อลิตร
- (๓๒) กัมมันตภาพรังสี (Radioactivity) มีค่ากัมมันตภาพรังสีรวมแอลฟา (Alpha) ไม่เกิน ๐.๑ เบคเคอเรลต่อลิตร ค่ากัมมันตภาพรังสีรวมเบตา (Beta) ที่ไม่รวมรังสีจากโปตัสเซียม-๔๐ มีค่าไม่เกิน ๑.๐ เบคเคอเรลต่อลิตร
- (๓๓) สารประกอบดีบุกอินทรีย์ชนิดไตรบิวทิล (Tributyltin) มีค่าไม่เกิน ๑๐ นาโนกรัมต่อลิตร
- (๓๔) สารเคมีที่ใช้ในการป้องกันกำจัดศัตรูพืชและสัตว์ชนิดที่มีคลอรีน ได้แก่
- (ก) อัลดริน (Aldrin) มีค่าไม่เกิน ๑.๓ ไมโครกรัมต่อลิตร
- (ข) คลอเดน (Chlordane) มีค่าไม่เกิน ๐.๐๐๔ ไมโครกรัมต่อลิตร
- (ค) ดีดีที (DDT) มีค่าไม่เกิน ๐.๐๐๑ ไมโครกรัมต่อลิตร
- (ง) ดีลด์ริน (Dieldrin) มีค่าไม่เกิน ๐.๐๐๑๔ ไมโครกรัมต่อลิตร
- (จ) เอลดริน (Endrin) มีค่าไม่เกิน ๐.๐๐๒๓ ไมโครกรัมต่อลิตร
- (ฉ) เอ็นโดซัลฟาน (Endosulfan) มีค่าไม่เกิน ๐.๐๐๘๗ ไมโครกรัมต่อลิตร
- (ช) เฮปตาคลอร์ (Heptachlor) มีค่าไม่เกิน ๐.๐๐๓๖ ไมโครกรัมต่อลิตร
- (ซ) ลินเดน (Lindane) มีค่าไม่เกิน ๐.๑๖ ไมโครกรัมต่อลิตร
- (๓๕) สารเคมีที่ใช้ในการป้องกันกำจัดศัตรูพืชและสัตว์ชนิดอื่น ได้แก่
- (ก) อะลาคลอร์ (Alachlor) ต้องตรวจไม่พบ
- (ข) อะเมทริน (Ametryn) ต้องตรวจไม่พบ
- (ค) อะทราซีน (Atrazine) ต้องตรวจไม่พบ
- (ง) คาร์บาริล (Carbaryl) ต้องตรวจไม่พบ
- (จ) คาร์เบนดาซิม (Carbendazim) ต้องตรวจไม่พบ
- (ฉ) คลอไพริฟอส (Chlorpyrifos) ต้องตรวจไม่พบ
- (ช) ไซเปอร์เมทริน (Cypermethrin) ต้องตรวจไม่พบ
- (ซ) ๒,๔-ดี (๒,๔-D) ต้องตรวจไม่พบ
- (ฅ) ไดเอรอน (Diuron) ต้องตรวจไม่พบ
- (ญ) โกลโฟเซท (Glyphosate) ต้องตรวจไม่พบ

(ฎ) มาลาไอออน (Malathion) ต้องตรวจไม่พบ
(ฏ) แมนโคเซบ (Mancozeb) ต้องตรวจไม่พบ
(ฐ) เมพธิล พาราไอออน (Methyl parathion) ต้องตรวจไม่พบ
(ฑ) พาราไอออน (Parathion) ต้องตรวจไม่พบ
(ฒ) โปรพานิล (Propanil) ต้องตรวจไม่พบ

ข้อ ๕ คุณภาพน้ำทะเลตามข้อ ๓ (๒) ต้องมีมาตรฐานตามข้อ ๔ เว้นแต่

(๑) อุณหภูมิ (Temperature) ห้ามมีค่าเปลี่ยนแปลงจากสภาพธรรมชาติ

(๒) ออกซิเจนละลาย (Dissolved Oxygen) มีค่าไม่น้อยกว่า ๖ มิลลิกรัมต่อลิตร

(๓) แบคทีเรียกลุ่มเอ็นเทอโรคอกโค (Enterococci Bacteria) มีค่าไม่เกิน ๓๕ ซีเอฟยูต่อ ๑๐๐ มิลลิลิตร

ข้อ ๖ คุณภาพน้ำทะเลตามข้อ ๓ (๓) ต้องมีมาตรฐานตามข้อ ๔ เว้นแต่

(๑) ไนเตรท-ไนโตรเจน (Nitrate-Nitrogen) มีค่าไม่เกิน ๖๐ ไมโครกรัม-ไนโตรเจนต่อลิตร

(๒) ฟอสเฟต-ฟอสฟอรัส (Phosphate-Phosphorus) มีค่าไม่เกิน ๔๕ ไมโครกรัม-ฟอสฟอรัสต่อลิตร

(๓) แอมโมเนียรวม (Total Ammonia) มีค่าไม่เกิน ๗๐๐ ไมโครกรัม-ไนโตรเจนต่อลิตร

ข้อ ๗ คุณภาพน้ำทะเลตามข้อ ๓ (๔) ต้องมีมาตรฐานตามข้อ ๔ เว้นแต่

(๑) อุณหภูมิ (Temperature) มีค่าเปลี่ยนแปลงเพิ่มขึ้นไม่เกิน ๒ องศาเซลเซียสจากสภาพธรรมชาติ

(๒) ปีโตรเลียมไฮโดรคาร์บอน (Petroleum Hydrocarbon) มีค่าไม่เกิน ๑ ไมโครกรัมต่อลิตร

(๓) แบคทีเรียกลุ่มฟิโคไลฟอร์ม (Fecal Coliform Bacteria) มีค่าไม่เกิน ๑๐๐ ซีเอฟยูต่อ ๑๐๐ มิลลิลิตร

(๔) แบคทีเรียกลุ่มเอ็นเทอโรคอกโค (Enterococci Bacteria) มีค่าไม่เกิน ๓๕ ซีเอฟยูต่อ ๑๐๐ มิลลิลิตร

(๕) ไนเตรท-ไนโตรเจน (Nitrate-Nitrogen) มีค่าไม่เกิน ๖๐ ไมโครกรัม-ไนโตรเจนต่อลิตร

(๖) แอมโมเนียรวม (Total Ammonia) มีค่าไม่เกิน ๒๐๐ ไมโครกรัม-ไนโตรเจนต่อลิตร

ข้อ ๘ คุณภาพน้ำทะเลตามข้อ ๓ (๕) ต้องมีมาตรฐานตามข้อ ๔ เว้นแต่

(๑) อุณหภูมิ (Temperature) มีค่าเปลี่ยนแปลงเพิ่มขึ้นไม่เกิน ๒ องศาเซลเซียสจากสภาพธรรมชาติ

(๒) ปีโตรเลียมไฮโดรคาร์บอน (Petroleum Hydrocarbon) มีค่าไม่เกิน ๕ ไมโครกรัมต่อลิตร

(๓) แบคทีเรียกลุ่มฟิโคไลฟอร์ม (Fecal Coliform Bacteria) มีค่าไม่เกิน ๑๐๐ ซีเอฟยูต่อ ๑๐๐ มิลลิลิตร

(๔) ไนเตรท-ไนโตรเจน (Nitrate-Nitrogen) มีค่าไม่เกิน ๖๐ ไมโครกรัม-ไนโตรเจนต่อลิตร

(๕) ฟอสเฟต-ฟอสฟอรัส (Phosphate-Phosphorus) มีค่าไม่เกิน ๔๕ ไมโครกรัม-ฟอสฟอรัสต่อลิตร

(๖) แอมโมเนียรวม (Total Ammonia) มีค่าไม่เกิน ๕๕๐ ไมโครกรัม-ไนโตรเจนต่อลิตร

(๗) คลอรีนคงเหลือ (Residual Chlorine) มีค่าไม่เกิน ๐.๐๑ มิลลิกรัมต่อลิตร

ข้อ ๙ คุณภาพน้ำทะเลตามข้อ ๓ (๖) ต้องมีมาตรฐานตามข้อ ๔ เว้นแต่

(๑) อุณหภูมิ (Temperature) มีค่าเปลี่ยนแปลงเพิ่มขึ้นไม่เกิน ๒ องศาเซลเซียสจากสภาพธรรมชาติ

(๒) ปีโตรเลียมไฮโดรคาร์บอน (Petroleum Hydrocarbon) มีค่าไม่เกิน ๕ ไมโครกรัมต่อลิตร

(๓) แบคทีเรียกลุ่มฟิโคไลฟอร์ม (Fecal Coliform Bacteria) มีค่าไม่เกิน ๑๐๐ ซีเอฟยูต่อ ๑๐๐ มิลลิลิตร

(๔) ไนเตรท-ไนโตรเจน (Nitrate-Nitrogen) มีค่าไม่เกิน ๖๐ ไมโครกรัม-ไนโตรเจนต่อลิตร

(๕) ฟอสเฟต-ฟอสฟอรัส (Phosphate-Phosphorus) มีค่าไม่เกิน ๔๕ ไมโครกรัม-ฟอสฟอรัสต่อลิตร

(๖) แอมโมเนียรวม (Total Ammonia) มีค่าไม่เกิน ๕๕๐ ไมโครกรัม-ไนโตรเจนต่อลิตร

(๗) คลอรีนคงเหลือ (Residual Chlorine) มีค่าไม่เกิน ๐.๐๑ มิลลิกรัมต่อลิตร

ข้อ ๑๐ ในกรณีเขตคุณภาพน้ำทะเลเพื่อการอุตสาหกรรมและท่าเรือ หรือคุณภาพน้ำทะเลสำหรับเขตชุมชนทับซ้อนกับเขตคุณภาพน้ำทะเลเพื่อการอนุรักษ์แหล่งปะการัง การเพาะเลี้ยงสัตว์น้ำ หรือ การนันทนาการ แล้วแต่กรณี มาตรฐานคุณภาพน้ำทะเลในเขตพื้นที่ทับซ้อนดังกล่าว ให้เป็นไปตามค่ามาตรฐานคุณภาพน้ำทะเลประเภทที่มีค่าเข้มงวดมากที่สุด

ข้อ ๑๑ การแบ่งประเภทคุณภาพน้ำทะเลตามข้อ ๓ จะต้องกำหนดเขตกันชน (Buffer zone) ระหว่างคุณภาพน้ำทะเลแต่ละประเภทไว้ด้วย โดยมาตรฐานคุณภาพน้ำทะเลในเขตกันชน (Buffer zone) จะต้องมีความเข้มงวดน้อยกว่าค่าเฉลี่ยระหว่างค่ามาตรฐานคุณภาพน้ำทะเลที่อยู่ติดต่อกัน เว้นแต่

(๑) การแบ่งประเภทคุณภาพน้ำทะเลประเภทใดประเภทหนึ่ง ไม่ได้กำหนดค่ามาตรฐานค่าใดค่าหนึ่งไว้ ค่ามาตรฐานน้ำทะเลในเขตกันชนจะต้องมีค่าไม่เกินไปกว่าค่ามาตรฐานคุณภาพน้ำทะเลตามประเภทของคุณภาพน้ำทะเลที่ได้มีการกำหนดไว้

(๒) การแบ่งประเภทคุณภาพน้ำทะเลใด กำหนดค่ามาตรฐานคุณภาพน้ำทะเลไว้ โดยห้ามเปลี่ยนแปลงไปจากค่าเดิมตามธรรมชาติ ค่ามาตรฐานคุณภาพน้ำทะเลในเขตกันชนต้องมีค่าไม่เกินครึ่งหนึ่งของค่ามาตรฐานคุณภาพน้ำทะเล ตามประเภทของคุณภาพน้ำทะเลที่มีการกำหนดไว้เป็นตัวเลข

หมวด ๒

วิธีการเก็บตัวอย่างและตรวจสอบคุณภาพน้ำทะเลในเขตน่านน้ำไทย

- ข้อ ๑๒ ให้ทำการเก็บตัวอย่างน้ำทะเล ดังนี้
- (๑) หาก ณ จุดตรวจสอบ มีความลึกน้อยกว่า ๕ เมตร ให้เก็บตัวอย่างน้ำทะเลที่ความลึก ๑ เมตร และสูงจากท้องน้ำ ๑ เมตร
- (๒) หาก ณ จุดตรวจสอบ มีความลึกอยู่ระหว่าง ๕-๒๐ เมตร ให้เก็บตัวอย่างน้ำทะเลที่ความลึก ๑ เมตร กึ่งกลางน้ำ และสูงจากท้องน้ำ ๑ เมตร
- (๓) หาก ณ จุดตรวจสอบ มีความลึกอยู่ระหว่าง ๒๐-๔๐ เมตร ให้เก็บตัวอย่างน้ำทะเลที่ความลึก ๑ เมตร ๑๐ เมตร ๒๐ เมตร ๓๐ เมตร และสูงจากท้องน้ำ ๑ เมตร
- (๔) หาก ณ จุดตรวจสอบ มีความลึกอยู่ระหว่าง ๔๐-๑๐๐ เมตร ให้เก็บตัวอย่างน้ำทะเลที่ความลึก ๑ เมตร ๒๐ เมตร ๔๐ เมตร ๘๐ เมตร และสูงจากท้องน้ำ ๑ เมตร
- (๕) หาก ณ จุดตรวจสอบ มีความลึกมากกว่า ๑๐๐ เมตร ให้เก็บตัวอย่างน้ำทะเลที่ความลึก ๑ เมตร ที่ทุก ๆ ความลึก ๕๐ เมตร และสูงจากท้องน้ำ ๑ เมตร
- (๖) หาก ณ จุดตรวจสอบมีความลึกของน้ำน้อยกว่าหรือเท่ากับ ๑ เมตร ให้เก็บตัวอย่างน้ำทะเลที่ระดับกึ่งกลางความลึกของน้ำ เว้นแต่แบบที่เรียกกลุ่มโคลิฟอร์มทั้งหมด (Total Coliform Bacteria) แบบที่เรียกกลุ่มฟิโคไลโคลิฟอร์ม (Fecal Coliform Bacteria) และแบบที่เรียกกลุ่มเอ็นเทอโรคอกโค (Enterococci Bacteria) ให้เก็บตัวอย่างที่ระดับความลึกได้วิน้ำ ๓๐ เซนติเมตร สำหรับวัดอุณหภูมิ ความโปร่งใส น้ำมันและไขมันบนผิวน้ำ ไม่ต้องเก็บตัวอย่าง แต่ให้ตรวจวัด ณ จุดตรวจสอบ
- ข้อ ๑๓ ให้เก็บตัวอย่างน้ำทะเลในช่วงเวลาดังแต่น้ำลงถึงน้ำลงต่ำสุด เฉพาะในบริเวณที่ได้รับอิทธิพลจากน้ำขึ้นน้ำลง
- ข้อ ๑๔ การเก็บตัวอย่างน้ำทะเลและอุปกรณ์ที่จะต้องใช้จะต้องเป็นไปตามที่กำหนดในคู่มือการเก็บและวิเคราะห์ตัวอย่างน้ำทะเลของกรมควบคุมมลพิษหรือตามที่กำหนดไว้ใน Standard Method for the Examination of Water and Wastewater (APHA, AWWA and WEF, ฉบับล่าสุด) Method of Seawater Analysis (Grasshoff ,1999) Practical Handbook of Seawater Analysis (Strickland and Parson, 1972) A Manual of Chemical and Biological Methods for Seawater Analysis (Parsons et al., 1984) Recommended guidelines for measuring organic compounds in Puget Sound water, sediment an tissue samples (Puget Sound Estuary Program, 1997) Prescribed Procedures for Measurement of

Radioactivity in Drinking Water (Krieger and Whittaker, 1980) Proceedings of the organotin symposium, Comprehensive method for determination of aquatic butyl/tin and butylmethyltin species at ultra trace levels using simultaneous hybridization/extraction with GC/FPD detection (Matthias et. al. 1986 a,b) หรือวิธีการอื่นใด ที่คณะกรรมการควบคุมมลพิษประกาศกำหนด และให้มีการดำเนินการเพื่อลดผลการปนเปื้อนจากคลอไรด์ หรือมีการ Pre – concentration ก่อนการวิเคราะห์

ข้อ ๑๕ การตรวจสอบคุณภาพน้ำทะเลให้ใช้วิธีการ ดังต่อไปนี้

- (๑) การตรวจสอบวัดอุณหภูมิ น้ำมันและไขมันบนผิวน้ำให้สังเกตบริเวณผิวน้ำ
- (๒) การตรวจสอบสีให้ใช้วิธีสังเกตโดยเทียบกับ Forel-Ule color scale
- (๓) การตรวจสอบกลิ่นให้ใช้วิธีการดมกลิ่น โดยต้องมีผู้ตรวจวัดไม่น้อยกว่า ๓ คน และเก็บตัวอย่างในขวดแก้ว หรือ TFE-line ๒ ขวดต่อ ๑ จุดเก็บตัวอย่าง ทำการตรวจวัดทันทีเมื่อถึงจุดตรวจวัด โดยความเห็นของคณะผู้ตรวจวัดต้องเป็นเอกฉันท์
- (๔) การตรวจสอบอุณหภูมิ (Temperature) ให้ใช้ Thermometer หรือ Electrical Sensor Method
- (๕) การตรวจสอบค่าความเป็นกรดและด่าง (pH) ให้ใช้เครื่องวัดความเป็นกรดและด่าง (pH meter) หรือวิธีตรวจสอบค่าความเป็นกรดและด่างของน้ำทะเลด้วย Spectrophotometric Determination
- (๖) การตรวจสอบค่าความโปร่งใส (Transparency) ให้ใช้แผ่น Secchi Disc สำหรับตรวจวัดน้ำทะเล
- (๗) การตรวจสอบค่าสารแขวนลอย (Suspended Solids) ให้ใช้วิธี Gravimetric Method
- (๘) การตรวจสอบค่าความเค็ม (Salinity) ให้ใช้วิธี Argentometric หรือวิธี Electrical Conductivity Method หรือวิธี Density หรือวิธี Refractometer
- (๙) การตรวจสอบค่าปิโตรเลียมไฮโดรคาร์บอน (Petroleum Hydrocarbon) ให้ใช้วิธี Pre-concentration ตามด้วยวิธี Fluorescence Spectrophotometry
- (๑๐) การตรวจสอบค่าออกซิเจนละลาย (Dissolved Oxygen) ให้ใช้วิธี Azide Modification Method หรือวิธี Membrane Electrode Method หรือวิธี Winkler Method
- (๑๑) การตรวจสอบค่าแบคทีเรียกลุ่มโคลิฟอร์มทั้งหมด (Total Coliform Bacteria) ให้ใช้วิธี Multiple Tube Fermentation Technique
- (๑๒) การตรวจสอบค่าแบคทีเรียกลุ่มฟิโคไลโคลิฟอร์ม (Fecal Coliform Bacteria) และค่าแบคทีเรียกลุ่มเอ็นเทอโรคอกโค (Enterococci Bacteria) ให้ใช้วิธี Membrane Filter Technique
- (๑๓) การตรวจสอบค่าไนเตรท-ไนโตรเจน (Nitrate-Nitrogen) ให้ใช้วิธี Cadmium Reduction Method เปลี่ยนไนเตรทเป็นไนไตรท์ก่อน แล้วใช้วิธี Colorimetric Method

(๑๔) การตรวจสอบค่าฟอสเฟต-ฟอสฟอรัส (Phosphate-phosphorus) ให้ใช้วิธี Colorimetric Method

(๑๕) การตรวจสอบค่าแอมโมเนียรวม (Total Ammonia) ให้ใช้วิธี Phenol-Hypochlorite Method

(๑๖) การตรวจสอบค่าปรอทรวม (Total Mercury) ให้ใช้วิธี Pre-concentration ตามด้วยวิธี Cold-Vapor/Hydride Generation-Atomic Absorption Spectrometric Method หรือวิธี Cold-Vapor/Hydride Generation-Atomic Fluorescence Spectrmtric Method หรือวิธี Inductively Coupled Plasma

(๑๗) การตรวจสอบค่าแคดเมียม (Cadmium) โครเมียมรวม (Total Chromium) ตะกั่ว (Lead) และทองแดง (Copper) ให้ใช้วิธี Pre-concentration ตามด้วยวิธี Electrothermal Atomic Absorption Spectrometric Method หรือวิธี Inductively Coupled Plasma Method

(๑๘) การตรวจสอบค่าโครเมียมเฮกซะวาเลนต์ (Chromium Hexavalent) ให้ใช้วิธี Pre-concentration ตามด้วยวิธี Electrothermal Atomic Absorption Spectrometric Method หรือวิธี Inductively Coupled Plasma Method

(๑๙) การตรวจสอบค่าแมงกานีส (Manganese) สังกะสี (Zinc) และเหล็ก (Iron) ให้ใช้วิธี Pre-concentration ตามด้วยวิธี Flame Atomic Absorption Spectrometric Method หรือวิธี Electrothermal Atomic Absorption Spectrometric Method หรือวิธี Inductively Coupled Plasma Method

(๒๐) การตรวจสอบค่าฟลูออไรด์ (Fluoride) ให้ใช้วิธี SPADNS Colorimetric Method

(๒๑) การตรวจสอบค่าคลอรีนคงเหลือ (Residual Chlorine) ให้ใช้วิธี N, N-diethyl-p-phenylenediamine Method

(๒๒) การตรวจสอบค่าฟีนอล (Phenol) ให้ใช้วิธี Distillation ตามด้วย Aminoantipyrine Colorimetric Method

(๒๓) การตรวจสอบค่าซัลไฟด์ (Sulfide) ให้ใช้วิธี Methylene Blue Colorimetric Method

(๒๔) การตรวจสอบค่าไซยาไนด์ (Cyanide) ให้ใช้วิธี Pyridine Barbituric Acid Colorimetric Method

(๒๕) การตรวจสอบค่าพีซีบี (PCBs, Polychlorinated Biphenyl) ให้ใช้วิธี Preconcentration ตามด้วยวิธี Gas Chromatography with Electron Capture Detector

(๒๖) การตรวจสอบค่าสารหนู (Arsenic) ให้ใช้วิธี Pre-concentration ตามด้วยวิธี Hydride Generation - Atomic Absorption Spectrometric Method หรือวิธี Electrothermal Atomic

Absorption Spectrometric Method หรือวิธี Inductively Coupled Plasma Method ที่มีระบบจัดการรบกวนของคลอไรด์

(๒๗) การตรวจสอบค่าสารประกอบที่บุกอินทรีย์ชนิดไตรบิวทิล (Tributyltin) ให้ใช้วิธี Pre-concentration ตามด้วยวิธี Gas Chromatography with Flame Photometric Detector หรือวิธี Gas Chromatography with Mass Spectrophotometry หรือวิธี High Performance Liquid Chromatography-ICP-MS

(๒๘) การตรวจสอบค่ากัมมันตภาพรังสีรวมเบตา (Beta) ให้ใช้วิธี Evaporation ค่ากัมมันตภาพรังสีรวมแอลฟา (Alpha) ให้ใช้วิธี Co-precipitation และค่าโปตัสเซียม-๔๐ ให้ใช้วิธี Gamma Spectrometry (USEPA) หรือวิธีคำนวณจากค่า Salinity

(๒๙) การตรวจสอบค่าสารเคมีที่ใช้ในการป้องกันกำจัดศัตรูพืชและสัตว์ ให้ใช้วิธี Pre-concentration ตามด้วยวิธี Gas Chromatography with Mass Spectrophotometry หรือวิธี High Performance Liquid Chromatography (HPLC)

ข้อ ๑๖ ประกาศนี้ให้ใช้บังคับตั้งแต่วันถัดจากวันประกาศในราชกิจจานุเบกษาเป็นต้นไป

ประกาศ ณ วันที่ ๑๓ ตุลาคม พ.ศ. ๒๕๖๐
พลเอก ประยุทธ์ จันทร์โอชา
รองนายกรัฐมนตรี ปฏิบัติหน้าที่
ประธานกรรมการสิ่งแวดล้อมแห่งชาติ

ภาคผนวก จ
เอกสารสอบเทียบเครื่องมือ



List of Instrument Certificates for Environmental Quality Analysis

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration*
1	Analytical Balance	FAT OIL AND GREASE	Mettler Toledo	AB204-S/FACT / 1129361010	National Food Institute,Ministry of Industry, Thailand	2303074-001-01	27 May 23	25 May 24
2	Analytical Balance	SUSPENDED SOLIDS	Mettler Toledo	XSR205DU / C009071872	Technology Promotion Association (Thailand-Japan)	23MM112	26 Apr 23	25 Apr 24
3	Turbidity Meter (Portable)	TURBIDITY (NTU)	Oakton Instruments(China)	T100IR / 1120501017	Technology Promotion Association (Thailand-Japan)	23CH1148	15 Sep 23	13 Sep 24

Due Date of Calibration* : Based on the annual calibration plan. At least 1 time per year.

Calibration Certificate

Certificate No.: 2303074-001-01
Client name: UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address: 3 Soi Udomsuk 41, Sukhumvit Road,
Bangchack, Prakanong, Bangkok 10260

Page 1 of 3

Equipment: Electronic Balance
Manufacturer: METTLER TOLEDO
Model: AB204-S/FACT
Serial No.: 1129361010
ID No.: UAE.WAS.002/2552
Order No.: 2303074
Operation No.: 2303074-001
Date of Receipt: 26 May 2023
Date of Calibration: 26 May 2023

Calibrated by Mr.Pheraphat Tuanjit
Scientist
Approved by (Miss Preeyaporn Jaengkarnkit)
Vice President, Department of Laboratory Services
Responsible for the Technical Management Team
Date of Issue: 29 May 2023

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-CS-009 Revision: 01 Date: 20-04-65

2008 ๒๕๕๑-๒๕๖๕ ๓๖ หมู่ ๖ ตำบลสุรนารี อำเภอสุรนารี จังหวัดสุรินทร์ ๓๑๒๐๐
2008 ๒๕๕๑-๒๕๖๕ ๓๖ หมู่ ๖ ตำบลสุรนารี อำเภอสุรนารี จังหวัดสุรินทร์ ๓๑๒๐๐
Tel : +66(0) 2422 8568 Fax : +66(0) 2422 8545



Calibration Report

Certificate No.: 2303074-001-01
Equipment: Electronic Balance
Model: AB204-S/FACT
Serial No.: 1129361010
Capacity: 220 g
Manufacturer: METTLER TOLEDO
Resolution: 0.0001 g
ID No.: UAE.WAS.002/2552

Page 2 of 3

Date of Calibration: 26 May 2023
Environment Condition: Ambient Temperature: 23.7 ± 0.1 °C Relative Humidity: 61 ± 2.2 %
Place of Calibration: Room 108 Balance Room, UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.

Condition of Equipment: Good Condition
Condition of This Results of Calibration:
1. Calibration Method: NFI Method W-MA-001 In-House Method based on UKAS Lab 14 : 2019
2. Reference Standards:
Reference Standard Model Serial No. Calibrated By Certificate No. Due Date
Standard Weight Class E2 1mg to 200g 8505567572 TCS M23042535 8 April 2024
Instrument Model Serial No. Calibrated By Certificate No. Due Date
Thermo-Hygro Meter 608-H1 NFI.BTH 018/23 Quality Reborn QR23-0491 21 February 2024
3. This certification is traceable to SI UNIT
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.

Calibration Results:

1. Repeatability of Reading:

Nominal Value (g)	Standard Deviation of Reading (g)
100	0.000948
200	0.000948

2. Off-Center Error:

A mass of 100 g was placed and moved to various position on pan.
The balance reading obtained is given in the table.

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
1 (g)	2 (g)	3 (g)
99.9995	99.9995	99.9999
99.9995	99.9995	99.9999
99.9995	99.9995	99.9997
(g)	(g)	(g)
		(Maximum Difference)
		0.0003

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

2008 ๒๕๕๑-๒๕๖๕ ๓๖ หมู่ ๖ ตำบลสุรนารี อำเภอสุรนารี จังหวัดสุรินทร์ ๓๑๒๐๐
2008 ๒๕๕๑-๒๕๖๕ ๓๖ หมู่ ๖ ตำบลสุรนารี อำเภอสุรนารี จังหวัดสุรินทร์ ๓๑๒๐๐
Tel : +66(0) 2422 8568 Fax : +66(0) 2422 8545

Calibration Report

Certificate No.: 2303074-001-01
Equipment: Electronic Balance
Model: AB204-S/FACT
Serial No.: 1129361010
Capacity: 220 g
Manufacturer: METTLER TOLEDO
Resolution: 0.0001 g
ID No.: UAE.WAS.002/2552

Date of Calibration: 26 May 2023
Calibration Results: (Continued)
Calibration Range: 0-200 g
Calibration Adjustment: Internal Calibration

3. Departure from Nominal Value:

Nominal Value (g)	Standard Value (g)	Average Reading (g)	Correction (g)	Uncertainty (± g)	Coverage Factor k
Unload	0.00000	0.00000	0.00000	0.000000	2.00
0.01	0.01000	0.01000	0.00000	0.000008	2.00
0.05	0.05000	0.05000	0.00000	0.000008	2.00
0.1	0.10001	0.09999	0.00001	0.000008	2.00
0.2	0.20001	0.19999	0.00001	0.000008	2.00
0.5	0.50002	0.50000	0.00000	0.000008	2.00
1	1.00000	1.00000	0.00000	0.000009	2.00
2	2.00002	2.00000	0.00000	0.000009	2.00
5	5.00002	5.00000	0.00000	0.000009	2.00
10	10.00001	9.99999	0.00001	0.000009	2.00
20	20.00001	20.00000	0.00000	0.000009	2.00
50	50.00003	49.99999	0.00001	0.000011	2.00
70	70.00006	69.99999	0.00002	0.000013	2.00
100	100.00006	99.99999	0.00002	0.000016	2.00
150	150.00009	149.99999	0.00002	0.000021	2.00
200	200.00016	199.99998	0.00004	0.000028	2.00

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor of approximately 95 %.

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

2008 ๒๕๕๑-๒๕๖๕ ๓๖ หมู่ ๖ ตำบลสุรนารี อำเภอสุรนารี จังหวัดสุรินทร์ ๓๑๒๐๐
2008 ๒๕๕๑-๒๕๖๕ ๓๖ หมู่ ๖ ตำบลสุรนารี อำเภอสุรนารี จังหวัดสุรินทร์ ๓๑๒๐๐
Tel : +66(0) 2422 8568 Fax : +66(0) 2422 8545



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES & EQUIPMENT CALIBRATION AND TESTING SERVICES
5344 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL. 0-2717-3000-29 FAX. 0-2719-9484

Certificate of Calibration

Cert.No.: 23MM112
Page.: 1 of 3

Equipment : Electronic Balance
Manufacturer : Mettler Toledo
Model : XSR205
Serial No. : C009071872
ID No. : UAE.WAO.012/2563
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchack, Phakhanong,
Bangkok 10260

Location : Balance Room

Received order : 26 April 2023
Calibration Date : 26 April 2023
Ambient Temperature : 15 °C to 40 °C
Relative Humidity : 30 % to 90 %

Calibrated by : Man Pattanapongpaiboon

Approved by : () Pornthippa Tameyakul
() Malek Butkrues
() Suwit Imjai

Issue Date : 2 May 2023

The uncertainties are for a confidence probability of approximately 95%

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เอกสารไม่ควบคุม



Equipment : Electronic Balance
Condition As-Received : Used Item
Reference : 2304-0459OC-1
Cert.No.: 23MM112
Page: 2 of 3

Procedure used :-

Calibration were conducted using in-house calibration procedure CP-OB01 according to direct measurement method against standard weight.

Condition of this result of calibration

1. Reference standard instruments:-

Instruments	Model	Serial No.	ID No.	Test report No.	Due date
1) Standard Weight Set (E2)	15884	24053	70RC007	MM-0010-22	20 Jan 2024

- This certificate is valid only to the item calibrated on date and place of calibration.
- This result of calibration was made on requested at the point specified by customer.
- This certificate is not certified for any commercial transaction.
- This certification is traceable to the International System of Unit.

Result of calibration () Without Adjustment (*) After Adjustment by Internal Calibration

Range capacity : 0 g to 81 g Resolution 0.00001 g
81 g to 220 g Resolution 0.0001 g

Before Adjustment :

Applied Weight (g)	Balance Reading (g)	Correction (g)	Measurement Uncertainty (± mg)	Coverage Factor (k)
80	80.00005	-0.00005	0.15	2.00
200	199.9999	+0.0001	0.29	2.00

After Adjustment :

1. Determination of the standard deviation of weighing machine

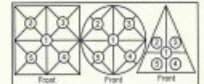
(n = 10)

Applied Weight (g)	Standard Deviation of Reading (g)
80	0.000007
200	0.000000

เอกสารไม่ควบคุม



Equipment : Electronic Balance
Condition As-Received : Used Item
Reference : 2304-0459OC-1
Cert.No.: 23MM112
Page: 3 of 3



Maximum difference between off-center and central loading (g)

Position 1 (g)	Position 2 (g)	Position 3 (g)	Position 4 (g)	Position 5 (g)
-0.0001	-0.0001	0.0000	-0.0001	-0.0001

0.0001

3. Departure from nominal value

Applied Weight (g)	Balance Reading (g)	Correction (g)	Measurement Uncertainty (± mg)	Coverage Factor (k)
Unload	0.00000	0.00000	0.014	2.13
0.05	0.05001	-0.00001	0.015	2.09
0.1	0.10001	-0.00001	0.015	2.09
1	1.00001	-0.00001	0.018	2.04
5	5.00003	-0.00003	0.026	2.00
20	20.00006	-0.00006	0.045	2.00
50	50.00006	-0.00006	0.080	2.00
80	80.00004	-0.00004	0.15	2.00
100	100.0000	0.0000	0.16	2.00
150	150.0000	0.0000	0.29	2.00
200	200.0000	0.0000	0.29	2.00

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

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เอกสารไม่ควบคุม



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

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

TEL. 0-2717-3000-29 FAX. 0-2719-9484

Cert.No.: 23CH1148
Page: 1 of 2

Certificate of Calibration

Equipment : Turbidity Meter
Manufacturer : Oakton
Model : T100IR
Serial No. : 1120501017
ID. No. : UAE.WAT.056/2563
Condition As-Received : Used Item
Received Date : 13 September 2023
Calibration Date : 14 September 2023
Reference : 2309-0458DSC-1
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong, Bangkok 10260

Ambient Temperature : (25 ± 2.5) °C
Relative Humidity : (50 ± 20) %
Calibration Procedure : In - house method : CP-CH11
based on direct measurement by
using Formazin standard solution

Calibrated by : Walalak Sirithan

Approved by :
Approved Signatory

() Saithip Meangmai
(✓) Warakorn Lemgagtrakul
() Ponpan Paipim

Issue Date : 15 September 2023

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 head of Calibration and Testing Equipment Services.

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A 0011853



Cert.No.: 23CH1148
Page: 2 of 2

Condition of this calibration result

1. Reference Standard Instruments :

This certification is traceable to the International System of unit (SI unit) through:-
- Technology Promotion Association (Thailand-Japan).

Instruments	Serial No.	ID No.	Certificate No.	Due date
1) Thermo-Hygograph	1103328	13DEC010	23C1361	13 June 2024
2) Electronic Balance	1124013382	140RC006	23MM18	20 Feb 2024

2. Standard Material : The Formazin suspension has been prepared gravimetric from

Material	Manufacturer	Lot No.	Assay
1) Hexamethylenetetramine	HIMEDIA	0000493947	99.65%
2) Hydrastinum Sulfate	HIMEDIA	0000522014	99.40%

3. This certificate is valid only to the item calibrated on date and place of calibration.

Calibration result

Performing five - Formazin suspension standard curve by using 0,20,100,400,800 NTU
Turbidity Meter Serial Number : 1120501017

Standard Formazine suspension (NTU)	UUC* Reading (NTU)	Uncertainty of Measurement (± NTU)	Coverage Factor k
0	0.00	0.0067	2.00
20	20.3	0.39	2.00
100	101	0.76	2.00
400	401	1.5	2.05
800	800	2.1	2.23

Remark - UUC* = Unit Under Calibration
- NTU = Nephelometric Turbidity Units

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

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เอกสารไม่ควบคุม

a 1179917

List of Instrument Certificates for Environmental Quality Analysis

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration*
1	Analytical Balance	FAT OIL AND GREASE	Mettler Toledo	AB204-S/FACT / 1129361010	Technology Promotion Association (Thailand-Japan)	24MM292	11 May 24	10 May 25
2	Analytical Balance	SUSPENDED SOLIDS	Mettler Toledo	XSR205DU / C009071872	National Food Institute,Ministry of Industry, Thailand	2402283-001-01	2 Apr 24	1 Apr 25
3	Turbidity Meter (Portable)	TURBIDITY (NTU)	Oakton Instruments(China)	T100IR / 1120501017	Technology Promotion Association (Thailand-Japan)	23CH1148	15 Sep 23	13 Sep 24

Due Date of Calibration* : Based on the annual calibration plan. At least 1 time per year.



Certificate of Calibration

Cert.No.: 24MM292
Page.: 1 of 3

Equipment : Electronic Balance
Manufacturer : Mettler Toledo
Model : AB204-S/FACT
Serial No. : 1129361010
ID No. : UAE.WAS.002/2552
Submitted by : United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong,
Bangkok 10260
Location : Balance Room (108)
Received order : 11 May 2024
Calibration Date : 11 May 2024
Ambient Temperature : 15 °C to 40 °C
Relative Humidity : 30 % to 80 %
Calibrated by : Khit Ruttanaprapachal
Approved by :
() Porpan Paipim
() Suwit Imjai
(✓) Kunchit Promprat

Issue Date : 15 May 2024

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 head of Corporate Services 3: Equipment Calibration and Testing Services.

เอกสารไม่ควบคุม



Equipment : Electronic Balance
Condition As-Received : Used Item
Reference : 2405-0166OC-1
Procedure used :-

Cert.No.: 24MM292
Page: 2 of 3

Calibration were conducted using in-house calibration procedure CP-OB01 based on UKAS LAB 14 according to direct measurement method against standard weight.

Condition of this result of calibration

1. Reference standard instruments:-

Instruments	Model	Serial No.	ID No.	Test report No.	Due date
1) Standard Weight Set (E2)	15884	24053	70RC007	MM-0013-24	25 Jan 2026

- This certificate is valid only to the item calibrated on date and place of calibration.
- This result of calibration was made on requested at the point specified by customer.
- This certificate is not certified for any commercial transaction.
- This certification is traceable to the International System of Unit.

Result of calibration () Without Adjustment (*) After Adjustment by Internal Calibration

Range capacity : 0 g to 220 g Resolution 0.0001 g

Before Adjustment :

Applied Weight	Balance Reading	Correction	Measurement Uncertainty	Coverage Factor
(g)	(g)	(g)	(± mg)	(k)
100	100.0000	0.0000	0.19	2.03
200	200.0008	-0.0006	0.30	2

After Adjustment :

1. Determination of the standard deviation of weighing machine (n = 10)

Applied Weight	Standard Deviation of Reading (g)
(g)	
100	0.00007
200	0.00005

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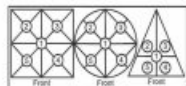
Equipment : Electronic Balance
Condition As-Received : Used Item
Reference : 2405-0166OC-1
Result of calibration

2. Effect of off center loading

A mass of 100 g was placed to various position on the pan.
The weighing machine reading error obtained is given in the table

Position 1	Position 2	Position 3	Position 4	Position 5	Maximum difference between off-center and central loading
(g)	(g)	(g)	(g)	(g)	(g)
-0.0004	-0.0004	-0.0003	-0.0003	-0.0004	0.0001

Cert.No.: 24MM292
Page: 3 of 3



3. Departure from nominal value

Applied Weight	Balance Reading	Correction	Measurement Uncertainty	Coverage Factor
(g)	(g)	(g)	(± mg)	(k)
Unload	0.0000	0.0000	0.15	2.13
0.01	0.0100	0.0000	0.15	2.13
0.05	0.0500	0.0000	0.15	2.13
0.1	0.1000	0.0000	0.15	2.13
0.5	0.5000	0.0000	0.15	2.13
1	1.0000	0.0000	0.15	2.13
10	10.0000	0.0000	0.15	2.11
50	49.9999	+0.0001	0.17	2.08
100	99.9999	+0.0001	0.19	2.03
150	149.9998	+0.0002	0.29	2
200	199.9990	+0.0010	0.30	2

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

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เอกสารไม่ควบคุม



มูลนิธิส่งเสริมพัฒนาอาหาร
ศูนย์บริการข้อมูลอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center



Calibration Certificate

Certificate No.: 2402283-001-01
Client name: UNITED ANALYST AND ENGINEERING CONSULTANT CO., LTD.
Address: 3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong, Bangkok 10260

Page 1 of 4

Equipment: Electronic Balance

Manufacturer: METTLER TOLEDO

Model: XSR205DU

Serial No.: C009071872

ID No.: UAE.WAO.012/2563

Order No.: 2402283

Operation No.: 2402283-001

Date of Receipt: 2 April 2024

Date of Calibration: 2 April 2024

Calibrated by Mr.Jerawut Papawuttipong
Scientist

Approved by

(Mr.Prasongchai Chongkij)

Manager, Division of Calibration Laboratory
Responsible for the Technical Management Team

Date of Issue: 9 April 2024

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-CS-009 Revision: 01 Date: 20-04-65

เอกสารไม่ควบคุม



Calibration Report

Certificate No.: 2402283-001-01
Equipment: Electronic Balance
Model: XSR2050U
Serial No.: C09071872
Capacity: 220 g
Manufacturer: METTLER TOLEDO
Resolution: 0.00001 g / 0.0001 g
ID No.: UAE.WAO.012/2563

Date of Calibration: 2 April 2024 Page 2 of 4

Environment Condition: Ambient Temperature: 24.5 ± 0.5 °C Relative Humidity: 47.5 ± 2.5 %

Place of Calibration: Laboratory, UNITED ANALYST AND ENGINEERING CONSULTANT CO., LTD.

Condition of Equipment: Good Condition

Condition of This Results of Calibration:

1. Calibration Method: NFI Method W-MA-001 In-House Method based on UKAS Lab 14 : 2019

2. Reference Standards:

Reference Standard Model Serial No. Calibrated By Certificate No. Due Date
Standard Weight Class E2 1mg to 200g 8095967572 TCS M23040535 8 April 2024

Instrument Model Serial No. Calibrated By Certificate No. Due Date
Thermo-Hygro Meter 608-H1 NFI.BTH 016/23 Quality Reborn QR24-0343 9 February 2023

3. This certification is traceable to SI UNIT
4. This certification is certified only for the instrument we calibrated.
5. This result of calibration was found accurate as shown on date and place of calibration only.

Calibration Results:

1. Repeatability of Reading:

Nominal Value (g)	Standard Deviation of Reading (g)
40	0.0000052
80	0.0000063
100	0.000048
200	0.000053

2. Off-Center Error:

A mass of 100 g was placed and moved to various position on pan.

The balance reading obtained is given in the table.



1	2	3	4	5	6	(Maximum Difference)
(g)	(g)	(g)	(g)	(g)	(g)	(g)
100.0002	100.0001	100.0002	99.9999	100.0001	100.0001	0.0003

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

2008 ต.สุขุมวิท 36 แขวงคลองเตย เขตคลองเตย กรุงเทพมหานคร 10110
2008 Soi 36, Asoke Asoke Road, Bang Na Khan Subdistrict, Bang Phai District, Bangkok 10710, Thailand
Tel: +66(0) 2422 8688 Fax: +66(0) 2422 8545



Calibration Report

Certificate No.: 2402283-001-01
Equipment: Electronic Balance
Model: XSR2050U
Serial No.: C09071872
Capacity: 220 g
Manufacturer: METTLER TOLEDO
Resolution: 0.00001 g / 0.0001 g
ID No.: UAE.WAO.012/2563

Date of Calibration: 2 April 2024 Page 3 of 4

Calibration Results: (Continued)

Calibration Range: 0 - 80 g

Calibration Adjustment: Internal Calibration

3. Departure from Nominal Value: (Range: 0 - 80 g ; Resolution: 0.00001 g)

Nominal Value (g)	Standard Value (g)	Average Reading (g)	Correction (g)	Uncertainty (# g)	Coverage Factor k
Unloaded	0.000000	0.000000	0.000000	0.0000000	2.00
0.001	0.001003	0.001011	-0.000011	0.0000091	2.00
0.005	0.005003	0.004999	0.000001	0.0000094	2.00
0.01	0.010003	0.010000	0.000000	0.0000091	2.00
0.05	0.049996	0.050000	0.000000	0.0000098	2.00
0.1	0.100011	0.100000	0.000011	0.0000111	2.00
0.5	0.500016	0.500011	0.000001	0.000014	2.00
1	1.000003	1.000002	-0.000002	0.000016	2.00
2	2.000023	2.000001	0.000001	0.000017	2.00
5	5.000017	5.000002	0.000000	0.000020	2.00
10	10.000009	10.000000	0.000001	0.000026	2.00
20	20.000031	20.000002	0.000001	0.000037	2.00
30	30.000040	30.000003	0.000001	0.000052	2.00
50	50.000028	50.000004	-0.000001	0.000068	2.00
80	80.000068	80.000005	0.000002	0.00011	2.00

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

2008 ต.สุขุมวิท 36 แขวงคลองเตย เขตคลองเตย กรุงเทพมหานคร 10110
2008 Soi 36, Asoke Asoke Road, Bang Na Khan Subdistrict, Bang Phai District, Bangkok 10710, Thailand
Tel: +66(0) 2422 8688 Fax: +66(0) 2422 8545



Calibration Report

Certificate No.: 2402283-001-01
Equipment: Electronic Balance
Model: XSR2050U
Serial No.: C09071872
Capacity: 220 g
Manufacturer: METTLER TOLEDO
Resolution: 0.00001 g / 0.0001 g
ID No.: UAE.WAO.012/2563

Date of Calibration: 2 April 2024 Page 4 of 4

Calibration Results: (Continued)

Calibration Range: 81 - 200 g

Calibration Adjustment: Internal Calibration

3. Departure from Nominal Value: (Range: 81 - 200 g ; Resolution: 0.0001 g)

Nominal Value (g)	Standard Value (g)	Average Reading (g)	Correction (g)	Uncertainty (# g)	Coverage Factor k
90	90.00010	90.00000	0.00010	0.00015	2.00
100	100.00006	100.00000	0.00006	0.00015	2.00
110	110.00007	110.00001	0.00000	0.00017	2.00
120	120.00009	120.00000	0.00000	0.00018	2.00
130	130.00010	130.00000	0.00010	0.00019	2.00
140	140.00014	140.00000	0.00014	0.00020	2.00
150	150.00009	150.00001	0.00000	0.00020	2.00
160	160.00010	160.00001	0.00000	0.00022	2.00
170	170.00012	170.00001	0.00000	0.00023	2.00
200	200.00016	200.00000	0.00016	0.00028	2.00

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

----- End -----

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

2008 ต.สุขุมวิท 36 แขวงคลองเตย เขตคลองเตย กรุงเทพมหานคร 10110
2008 Soi 36, Asoke Asoke Road, Bang Na Khan Subdistrict, Bang Phai District, Bangkok 10710, Thailand
Tel: +66(0) 2422 8688 Fax: +66(0) 2422 8545



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

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

TEL: 0-2717-3000-29 FAX: 0-2719-9484

Certificate of Calibration

Cert.No.: 23CH1148

Page: 1 of 2

Equipment: Turbidity Meter
Manufacturer: Oakton
Model: T100IR
Serial No.: 1120501017
ID. No.: UAE.WAT.056/2563
Condition As-Received: Used Item
Received Date: 13 September 2023
Calibration Date: 14 September 2023
Reference: 2309-0458DSC-1
Submitted by: United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong, Bangkok 10260
Ambient Temperature: (25 ± 2.5) °C
Relative Humidity: (50 ± 20) %
Calibration Procedure: In-house method : CP-CH11
based on direct measurement by
using Formazin standard solution

Calibrated by: Walalak Sirithean

Approved by:
Approved Signatory

() Saithip Meangmai
(x) Warakom Lemgatrakul
() Ponpan Paipim

Issue Date: 15 September 2023

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 head of Calibration and Testing Equipment Services.

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Cert.No. : 23CH1148

Page. : 2 of 2

Condition of this calibration result

1. Reference Standard Instruments :

This certification is traceable to the International System of unit (SI unit) through:-
- Technology Promotion Association (Thailand-Japan).

Instruments	Serial No.	ID No.	Certificate No.	Due date
1) Thermo-Hygrograph	1103328	130EC010	23C1361	13 June 2024
2) Electronic Balance	1124013382	140RC006	23MM18	20 Feb 2024

2. Standard Material : The Formazin suspension has been prepared gravimetric from

Material	Manufacturer	Lot No.	Assay
1) Hexamethylenetetramine	HIMEDIA	0000493947	99.65%
2) Hydrazinium Sulfate	HIMEDIA	0000522014	99.40%

3. This certificate is valid only to the item calibrated on date and place of calibration.

Calibration result

Performing five - Formazin suspension standard curve by using 0,20,100,400,800 NTU
Turbidity Meter Serial Number : 1120501017

Standard Formazine suspension (NTU)	UUC* Reading (NTU)	Uncertainty of Measurement (\pm NTU)	Coverage Factor k
0	0.00	0.0067	2.00
20	20.3	0.39	2.00
100	101	0.76	2.00
400	401	1.5	2.05
800	800	2.1	2.23

Remark
- UUC* = Unit Under Calibration
- NTU = Nephelometric Turbidity Units

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

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List of Instrument Certificates for Environmental Quality Analysis

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration*
1	Atomic Absorption Spectrometer	ARSENIC CHROMIUM HEXVALENT	Agilent Technologies	AA240FS / MY13160001	Agilent Technologies (Thailand) Co.,Ltd.	Preventive Maintenance Checklist	24 Jan 24	23 Jan 25
2	Analytical Balance	FAT OIL AND GREASE	Mettler Toledo	AB204-S/FACT / 1129361010	Technology Promotion Association (Thailand-Japan)	24MM292	11 May 24	10 May 25
3	Analytical Balance	SUSPENDED SOLIDS	Mettler Toledo	XSR205DU / C009071872	National Food Institute,Ministry of Industry, Thailand	2402283-001-01	2 Apr 24	1 Apr 25
4	Continuous Flow Analyzer(CFA)	CYANIDE TOTAL AMMONIA	Skalar Analytical B.V., the Netherlands	San++5000-02 / 182688	DKSH (Thailand) Ltd.	Service Report/Test Report WC-00018067	20 Feb 24	19 Feb 25
5	DO Meter	DO	Horiba	LAQUA-DO210 / HE9M0021	Technology Promotion Association (Thailand-Japan)	24TW128	19 Jun 24	17 Jun 25
6	SCT Meter	SALINITY	Horiba	LAQUA-EC210 / HC0H0002	Technology Promotion Association (Thailand-Japan)	24CH29	10 Jan 24	8 Jan 25
7	Hot Air Oven	SUSPENDED SOLIDS	Memmert	UF55 / B212.0411	Technology Promotion Association (Thailand-Japan)	24TM589	1 Apr 24	31 Mar 25
8	Cooled Incubator	FECAL COLIFORM BACTERIA TOTAL COLIFORM BACTERIA	Binder	KB400 / WTB20200000015535	Technology Promotion Association (Thailand-Japan)	24TM647	1 Apr 24	31 Mar 25
9	Inductively Coupled Plasma- Optical Emission Spectrometer(ICP-OES)	CADMIUM CHROMIUM COPPER IRON LEAD MANGANESE ZINC	Agilent Technologies, USA	5110 VDV(G8015AA) / MY803001	Agilent Technologies (Thailand) Co.,Ltd.	Preventive Maintenance Checklist	13 Nov 23	12 Nov 24
10	pH Meter	pH	YSI Environmental	pH 100A / JC02729	Technology Promotion Association (Thailand-Japan)	23CH1223/1	27 Sep 23	26 Sep 24

List of Instrument Certificates for Environmental Quality Analysis

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration*
11	UV-VIS Spectrophotometer	PHENOLS SULPHIDE	Hitachi	U-1900 / 2021-064	DQE Services Co.,Ltd.	SP24-008	16 Jan 24	15 Jan 25
12	UV-VIS Spectrophotometer	FLUORIDE NITRATE NITROGEN PHOSPHATE PHOSPHORUS	Hitachi	U-2900 / 21E22-009	DQE Services Co.,Ltd.	SP24-001	4 Jan 24	3 Jan 25

Due Date of Calibration* : Based on the annual calibration plan. At least 1 time per year.

Agilent 55 240 280 Series Atomic Absorption Spectroscopy Systems

Preventive Maintenance Checklist

Agilent Preventive Maintenance provides factory recommended service for your analytical systems to assure reliable operation and the accuracy of your results.

Delivered by highly trained and certified service engineers using genuine Agilent parts and supplies, Agilent Preventive Maintenance provides everything you need to reduce unplanned downtime and keep your systems operating at their peak. This checklist will be completed at the end of the service and provided to you as a record of the installation.

Note: While non-current production AA instrument and/or accessory models are not covered specifically in this document it can be used as a basic reference.

For more information about Agilent Technologies services please visit our web site using the following URL: <http://www.agilent.com/en-us/services>

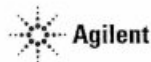
Introduction

Customer Information

- Customers should provide all necessary operating supplies upon request of the engineer.
- A customer representative should be available to the engineer while performing the preventive maintenance procedures.
- Any parts, not included in the Parts Lists section of this document, are not part of the recommended Preventive Maintenance service, nor are they included in the price of this service.
- If a system requires the use of extra or special procedures and/or parts for the maintenance service, then these must be ordered separately and charged as a repair, which may incur additional costs.

Revision: 10.00, Issued: November 2021

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Important Customer Web Links

- For more information about Agilent Technologies services, please visit our website using the following URL: <http://www.agilent.com/en-us/products/crosslab-instrument-services/service-repair>
- To access Agilent University, visit <http://www.agilent.com/crosslab/university/> to learn about training options, which include online, classroom and onsite delivery. A training specialist can work directly with you to help determine your best options.
- A useful Agilent Resource Center web page is available, which includes short videos on maintenance, quick lists of consumables for new instruments, and other valuable information. Check out the Resource Page here: <https://www.agilent.com/en-us/agilentresources>
- Need technical support, FAQs, supplies? – visit our Support Home page at <http://www.agilent.com/search/support>
- Get answers. Share insights. Build connections. Join the Agilent Community at <https://community.agilent.com/welcome>

Service Engineer's Responsibilities

- Contact the customer and ensure that all necessary supplies are available before the preventive maintenance visit.
- Confirm the ability of the instrument to deliver continued safe operation as established via the Agilent AA safe operation flow chart. (Refer directly to the AA 55/240/280 Preventive Maintenance Scope of Work to make this decision.)
- Only select those pages that relate to the system or module being serviced.
- Complete empty fields with the relevant information.
- Complete the relevant checkboxes in the checklist using either a "X" or tick mark "✓".
- Check "Section not applicable" check boxes to indicate services/tasks not delivered, as appropriate.
- Complete the Preventive Maintenance service in the order of the tasks listed.
- Complete the Service Review section together with the customer.
- Complete the fields for page numbers at the foot of each selected page.
- Complete the total number of pages field in the Service Completion section.
- Ask the customer to sign the Service Completion section including the customer's and your signature.

This information is subject to change without notice.

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Instrument Maintenance

System Information

☐ Check this box if an instrument configuration report is attached instead of completing the table.

Instrument System Name and ID	
Instrument System Site and Location	UNITED ANALYST AND ENGINEERING CONSULTANT / 2nd Lab

List System Component Product Numbers	List the Serial Numbers of each Component
1. G 8432 A	17 0316 0001
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	

Preparation, Safe operation and Initial performance checks

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Preventive Maintenance Procedures

FLAME SYSTEM section

☐ Section not applicable

Electronic components

- ☒ Review and confirm instrument configuration data in SVD
- ☒ Confirm power supply voltages using the SVD Power Supply diagnostic
- ☒ For Dual Beam instruments - Confirm RBC frequency using the SVD RBC frequency diagnostic.

Mechanical components

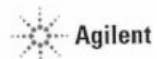
- ☒ Check the burner adjuster controls for complete and free movement. If the burner adjuster needs lubrication, use Molykote 321 or mineral-based molybdenum disulfide grease.
- ☒ Run SVD tests to exercise all motor drives over the full range of their travel:
 - ☒ Monochromator drive
 - ☒ Slit drive
 - ☒ Lamp selector
 - ☐ ABA N/A

Optics components

- ☒ Check that external optical surfaces are clean – Clean or replace as required.
- ☒ Use SVD and perform Mono Wavelength Correction.
- ☒ Use SVD and perform Slit Calibration.
- ☒ Use SVD and perform Grating Squareness Diagnostic.
- ☒ Use SVD and perform Zero Order Offset/Mono Correction.
- ☒ Use SVD and perform Wavelength Repeatability.
- ☒ Physically inspect selected HC lamps (customer to supply per their choice) and measure the % Gain for each lamp. Advise customer if lamps are showing emission degradation due to age.
- ☒ Check that the signal energy of the D2 and HC lamps track properly. Advise customer if their D2 lamp is showing emission degradation due to age.

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Sample Introduction and Atomization

- ☒ Inspect the burner interlock plate to ensure that the interlock pin is secure and correct for the burner type.
- ☒ Clean the burner slot with a clean white card.
- ☒ Check the uniformity of the slot width.
- ☒ Clean the burner if required.
- ☒ Change the burner o-ring.
- ☒ Clean the nebulizer, spray chamber and liquid trap.
- ☒ Change all o-rings and seals in the nebulizer, nebulizer block and spray chamber.
- ☒ Check that the pressure relief bung releases readily.
- ☒ Change o-rings on the fuel and oxidant delivery bars.
- ☒ Leave the liquid trap EMPTY and verify the flame will not ignite in this state.
- ☒ Refill liquid trap and check that overflow drains freely into the drain/waste tube.
- ☒ Check the drain/waste tube for good drainage. It should not have tight bends, kinks or loops and the lower end must be above the liquid level in the waste vessel.
- ☒ Check and clean the igniter electrode.

Gas handling components and safety interlocks

- ☒ Pressure test for leaks
- ☒ Leak test gasbox internal components and connections
- ☒ Check safety interlock status and operation using the SVD interlock monitoring diagnostic.

Analytical performance for Flame systems

- ☒ Ignite a flame.
- ☒ Check that you can adjust the nebulizer uptake rate from 4 to 6.5 mL per minute.
- ☒ Optimize the instrument ready to perform Cu sensitivity test.
- ☒ Create a manual method to perform a Basic Cu ABS test - "Final Performance Testing"
- ☒ Run a PM completed sensitivity test for a 5 ppm copper sample and record the results in the AA PM Performance test results and measurements table.

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FURNACE SYSTEM section

- ☒ Section not applicable

Electronic components

- ☐ Review and confirm instrument configuration data in SVD
- ☐ Confirm power supply voltages using the SVD Power Supply diagnostic.

Mechanical components

- ☐ Run SVD tests to exercise all motor drives over the full range of their travel:
 - ☐ Monochromator drive
 - ☐ Slit drive
 - ☐ Lamp selector

Optics components

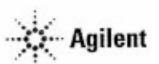
- ☐ Check that external optical surfaces are clean – Clean or replace as required.
- ☐ Use SVD and perform Mono Wavelength Correction.
- ☐ Use SVD and perform Slit Calibration.
- ☐ Use SVD and perform Grating Squareness Diagnostic.
- ☐ Use SVD and perform Zero Order Offset/Mono Correction.
- ☐ Use SVD and perform Wavelength Repeatability.
- ☐ Physically inspect selected HC lamps (customer to supply per their choice) and measure the % Gain for each lamp. Advise customer if lamps are showing emission degradation due to age.

Gas handling, water system and workhead component checks

- ☐ Inspect the GTA workhead gas hoses and connections for leaks.
- ☐ Pressure test for gas leaks
- ☐ If the cooler system is accessible (stand-alone) check for correct operation and coolant/water level – this includes any temperature and pressure settings plus filter cleaning (air flow and water).
- ☐ Inspect the GTA workhead water hoses and connections for leaks.
- ☐ Check all graphite components and replace if necessary.

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- ☐ Tube
- ☐ Electrodes
- ☐ Shroud

- ☐ Check and clean the end windows on the workhead.
- ☐ Check safety interlock operation.

Analytical performance for Furnace systems

- ☐ Optimize the instrument ready to perform Cu sensitivity test.
- ☐ Run the sensitivity test for a 25 ppb copper sample and record the results in the results table.

PSD autosampler accessory for Furnace systems

- ☒ Section NOT Applicable
- ☐ Check condition of the PSD capillary – replace if necessary
- ☐ Check condition and operation of PSD syringe – ensure it does not have air locks and bubbles.
- ☐ Change PSD rinse bottle o-ring.
- ☐ Check and clean the rinse vessel.
- ☐ Check the drain tube for good drainage. It should not have tight bends, kinks or loops and the lower end must be above the liquid level in the waste vessel.
- ☐ Ensure that the waste vessel is suitable for use with the furnace system.

Sample introduction pump system (SIPS) accessory

- ☒ Section NOT Applicable
- ☐ Re-torque screws securing the hubs, presser arms and pump rotors.
- ☐ Adjust each roller so that it rotates freely.
- ☐ Wipe clean the pump rotor rollers and pump bands with a dry clean cloth.
- ☐ Ensure that the presser arms and the surfaces near the pump are free from dirt and spills.
- ☐ Remove the pump module rear cover and check for the incursion of liquids and any signs of corrosion.
- ☐ Re-torque the nuts that fasten the motor mounting plates to the chassis.
- ☐ Check clips securing the diluents holder and replace if necessary.
- ☐ Disconnect, clean T-piece, and reassemble the tubing using the following steps.

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- ☐ Remove the T-piece by disconnecting the pump tubes, the pump bands and all other tubing.
- ☐ Place the T-piece in an ultrasonic bath containing strong detergent 1-5% Decon 30 or similar, for approximately 5-10 minutes.
- ☐ Wash the T-piece under a tap with a strong flow of water.
- ☐ Rinse with distilled water through all of the inlets in the reverse direction to normal sample flow.
- ☐ Reassemble.

Sample preparation system (SPS 4) accessory

- ☒ Section NOT Applicable

The Agilent SPS 4 autosampler is designed to need minimal maintenance.

The following maintenance requirements are suggested to maintain the performance of the autosampler.

- ☐ Cleaning the spill tray, rack location mat, end frames and chassis accessories with a damp soft cloth and diluted mild detergent.
- ☐ Cleaning the autosampler cover panels with domestic window cleaner.
- ☐ Checking the X- axis and Z- axis drive belts for cracks, splits, damaged teeth, excessive fraying, color changes or degradation from fumes.
- ☐ Check the X- axis, Theta- axis and Z- axis FFC cables for cracks, incorrect positioning, damaged edge or damaged connectors.

NOTE: The autosampler requires no extra lubrication throughout its lifetime.

For further details refer to the SPS 4 service manual GB410-90050.

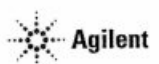
Sample preparation system (SPS 3) accessory

- ☒ Section NOT Applicable

- ☐ Check the x-axis and z-axis timing belts – Replace if there is any cracks, splits or color deterioration and belt tension.
- ☐ Check belt tensions - adjust if required
- ☐ Check the lubrication pad for single x-axis shaft. If pad is dry or customer has observed any vibration or erratic movements of the x-axis carriage, add 1 mL of Dow Corning 200 @ Fluid, 200 CS into the well.
- ☐ Check the auto-sampler ability to find tube positions - Calibrate if required.
- ☐ Clean the exterior surfaces of the accessory with soft lint free cloth. This cloth can be dampened with warm water or a mild detergent. Do not use organic solvents or abrasive cleaning agents.

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Vapor generation accessory VGA (hydride generator)

☒ Section NOT Applicable

- ☐ Inspect VGA gas supply hose.
- ☐ Inspect/replace VGA pump tubing.
- ☐ Check low gas pressure interlock setting – adjust if required.
- ☐ Check precision orifice gas flow setting – adjust if required.
- ☐ Check gas regulator pressure to 46 psi (325 kPa) – adjust if required.
- ☐ Clean the exterior surfaces of the accessory with soft lint free cloth. This cloth can be dampened with warm water or a mild detergent. Do not use organic solvents or abrasive cleaning agents.

UltraAA lamp accessory (external)

☒ Section NOT Applicable

- ☐ Check the condition of the power cable.
- ☐ Clean the exterior surfaces of the accessory with soft lint free cloth. This cloth can be dampened with warm water or a mild detergent. Do not use organic solvents or abrasive cleaning agents.

Restore System

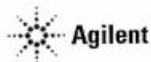
- ☒ If you have altered the customer's instrumentation during the course of PM, restore to the original status to allow the customer to conduct their normal activities (e.g., reload the customer's method.)

Guidance

If the PM service is performed prior to a qualification service, then use the qualification procedure as a guide for final instrument set up and checkout.

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Signature Page

Service Review

- ☒ Attach available reports/printouts of all tests to this documentation.
- ☒ Record the Preventive Maintenance service activity in the customer's records/logbook.
- ☒ Update/reset instrument maintenance counters as appropriate.
- ☒ Affix the PM sticker to the system or instrument logbook based on the customer's request.
- ☒ Complete the Service Engineer Comments section if there are additional comments.
- ☒ Review this service, parts replaced, and test results obtained with the customer.
- ☒ If the instrument firmware was updated, record the details of the change in the Service Engineer's Comments box or if necessary, in the customer's IQ records.

Test Results

Test Description		
Flame optics PMT Gain test		
For copper at 324.8 nm, 4 mA, 0.5 nm slit width	< 55 %	44 %
Flame performance test with 5 ppm copper sample		
Air /acetylene, mixing paddle removed	Abs value > 0.5	0.7401 A
Air /acetylene, mixing paddle installed, 10 replicates	%RSD < 1.0	0.5 % RSD
Deuterium furnace optics PMT Gain test		
For copper at 324.8 nm, 4 mA, 0.5 nm slit width	< 55 %	N/A
Deuterium furnace performance test with 25 ppb copper sample (324.8 nm)		
Precision %RSD	≤ 4.0%	N/A
Abs value	≥ 0.15	N/A
Zeeman furnace analytical performance: 25 ppb copper sample (327.4 nm)		
Precision %RSD	≤ 4.0%	N/A
Abs value	≥ 0.10	N/A
MSR%	≥ 70 %	N/A

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AA consumable and parts list table

Part Description	Product/Model # where used	PM supplied or Consumable	Instrument-Type
Test Solution – Cu 5ppm solution	6610030100	50 55 140 240 280	PM supplied
Test Solution - Blank solution	5190-7001	50 55 140 240 280	PM supplied
Copper, 1000 ug/ml, 100ml	5190-8279	50 55 140 240 280	*
Kit, Mk 7 O-rings, aqueous, complete set	9910093400	50 55 140 240 280	PM supplied
Organic Kit	9910093500	50 55 140 240 280	PM supplied
Wire Nebulizer Cleaning	9910024700	50 55 140 240 280	consumable
Tubing-Capillary Std Nebs	9910024800	50 55 140 240 280	consumable
Capillary Tube Hvac Neb (3) (organics only)	9910044000	50 55 140 240 280	consumable
Glass impact beads (5/pk)	9910025700	50 55 140 240 280	consumable
Teflon impact beads (5/pk) (organics only)	9910053300	50 55 140 240 280	consumable
Burner cleaning strip (100/pk)	9910053900	50 55 140 240 280	consumable
Window UV silica – round (right side)	2010082600	50 55 140 240 280	PM supplied
Window UV silica – rectangular (left side)	2010082500	50 55 140 240 280	PM supplied
Pad adhesive window (round)	4910012700	50 55 140 240 280	PM supplied
Pad adhesive window (rectangular)	4910012800	50 55 140 240 280	PM supplied
Electrode kit (1 pr) (D2)	6310003400	GTA120	PM supplied
Shroud (D2)	6310003100	GTA120	PM supplied
Zeeman electrode kit (1 pr)	6310003500	GTA120	PM supplied
Zeeman shroud	6310003600	GTA120	PM supplied
O-ring PSD rinse bottle	6910025900	PSD120	PM supplied

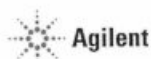
* For engineers who only service AA instruments 5190-8279 can be used as a cheaper alternative for 6610030100.

Items classified as PM supplied in the above table are included in the standard PM

Those classified as consumable should be provided by the customer or charged to the customer if supplied by the Agilent service engineer.

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Service Engineer Comments (optional)

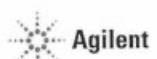
If there are any specific points you wish to raise as part of performing the installation or other items of interest for the customer, please write in this box.

Service Completion

Service request number: 6006371115 Date service completed: 24 January 2024
 Agilent signature: Woravit T. Customer signature: Jiradee
 Total number of pages in this document: 13

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SVD Results Report



Report ID: Diagnostic Start Time: 1/24/2024 9:47:24 AM Diagnostic End Time: 1/24/2024 10:10:55 AM

Customer: Service Engineer: Worawit T.
Address: Contact Details:

Instrument Configuration

Configuration:

Serial Number: MY13160001 Turret Type: Automatic
Instrument Model: Varian AA140/240/280 Number Of Lamps: 4
Flame Instrument: True Mono Type: Automatic
Furnace Instrument: True Gasbox Type: 'Y' Gas Box
Zeeman Present: False Auto Burner Adjuster: False
Internal Zeeman: False Mains Frequency: 50
Internal UltraAA: False Firmware Version: 2.11
Optics Type: Double Beam Photomultiplier Type: Normal(900nm)
D2 BG Correction Fitted: True PWB Version: 45
Boot Block Version: 1.09

EEPROM Data:

Instrument Run Hours: 62609.832 D2 Run Hours: 49136.000
Zero Wavelength Offset: 30.148 D2 Serial Number: not set !
Mono Correction: 0.765 D2 Install Date: 1/1/1970
Flame Hours: 29902.416 D2 Original Intensity: 1.000
D2 Last Intensity: 475.000

Frequency:

Averaging Period: 30.0
Datapoint Count: 20

Upper Limit: 51.00 Highest Measured Frequency: 50.00
Average Frequency: 50.00
Lower Limit: 49.00 Lowest Measured Frequency: 50.00

Result: **Passed**

Report Generated At: 1/24/2024 10:11:18 AM

1

SVD Results Report

เอกสารไม่ควบคุม

Power Supply:

Averaging Period: 30.0

Datapoint Count: 20

	Lower Limit (V)	Actual (V)	Upper Limit (V)	Result:
12.00 V Rail	10.80	12.19	13.20	Passed
-12.00 V Rail	-13.20	-11.90	-10.80	Passed
5.00 V Rail	4.50	5.05	5.50	Passed
310.00 V Rail	279.00	320.00	341.00	Passed

Report Generated At: 1/24/2024 10:11:18 AM

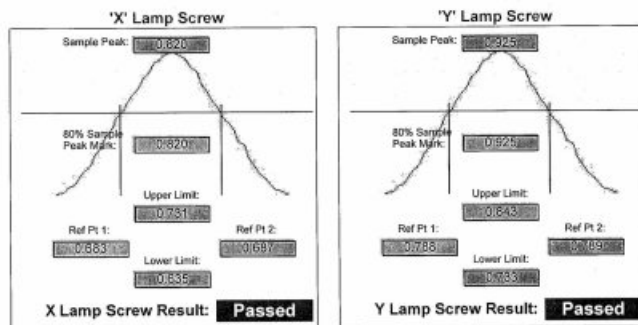
2

SVD Results Report

เอกสารไม่ควบคุม

Optics

Beam Balance:

Lamp Type: Copper
Lamp Socket Used: 3Peak Selected: 324.80
Lamp Alignment: **Performed**

Grating Squareness:

Lamp Element(s): Copper
Lamp Turret Position: 3
Lamp Current(mA): 4.00
Slit Width(nm): 0.5
1st Order Wavelength(nm): 324.80
Lamp Alignment: **Performed**

	Lower Limit (nm)	Actual (nm)	Upper Limit (nm)	Result:
Zero Order	-0.10	0.00	0.10	Passed
First Order	324.45	324.75	325.15	Passed
Second Order	649.23	649.52	649.97	Passed

Report Generated At: 1/24/2024 10:11:18 AM

3

SVD Results Report

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Wavelength Repeatability:

Lamp Used: Copper
Peak Used(nm): 324.750
Connected to Socket: 3

Lamp Current(mA): 4
Slit Width(nm): 0.2
Slit Height: Normal

Lamp Alignment: **Performed**

Lower Limit(nm)	324.788	Upper Limit(nm)
(Approach from Zero Order)		
Sample 1:	324.828	Sample 2: 324.828
Sample 3:	324.828	Sample 4: 324.823
Sample 5:	324.823	Sample 6: 324.823
Sample 7:	324.823	Sample 8: 324.823
Sample 9:	324.823	Sample 10: 324.823

Mean: 324.825

Standard Deviation: 0.002

Result: **Passed**

Report Generated At: 1/24/2024 10:11:18 AM

4

SVD Results Report

เอกสารไม่ควบคุม

Mechanical

Wavelength Drive:

Passed

Slit Drive:

Passed

Turret Drive:

Passed

Auto Burner Adjuster Drive:

Untested

Miscellaneous

Signal Processing Linearity:

Calculate Mode: New Calc Mode

	Lower Limit	Actual	Upper Limit	Result:
S0	114	261	297	Passed
S1	156	165	191	Passed
S2	271	296	332	Passed
S3	474	507	579	Passed
S4	825	918	1008	Passed
S5	1435	1528	1754	Passed
S6	2498	2769	3053	Passed
S7	4347	4752	5313	Passed

Interlocks:

Burner Fitted: Working

N2O Burner Fitted: Untested

Flame Shield Closed: Working

Gas Control Fitted: Untested

Pressure Release Bung Fitted: Working

Liquid Trap Fitted: Working

Flame Detect: Working

GCU Active: Working

Oxidant Pressure: Working

Oxidant Changeover: Untested

Ignition: Working

Auto Lamp Recognition:

Lamp 1: Uncoded Lamp/Not Connected

Lamp 5: Not Supported

Lamp 2: 87 - Silver/Cadmium/Lead/Zinc(UltrAA) (Ag/C

Lamp 6: Not Supported

Lamp 3: 14 - Copper (Cu)

Lamp 7: Not Supported

Lamp 4: Uncoded Lamp/Not Connected

Lamp 8: Not Supported

Result: Passed

GTA Temperature Monitoring:

Not Performed

Notes:

PM 24 Jan 2024

Signatures:

24/1/24

24/1/24

Date

Worawit T.

Date

Sequential by time report

1/24/2024 11:46 AM

Page 1 of 1

SpectrAA

Analyst

Date Started 1/24/2024 11:39 AM GMT: 1/24/2024 4:39 AM

Worksheet Cu 5 PPM Sense check

Comment

Methods Cu

Computer name DESKTOP-R5UFRS

Serial Number: MY13160001

Method: Cu (Flame)

Sample ID	Conc. mg/L	%RSD	Mean Abs
CAL ZERO	0.000	55.0	0.0003
Readings			
	0.0002	0.0002	0.0004
1/24/2024			
STANDARD 1	5.000	1.7	0.7419
Readings			
	0.7274	0.7515	0.7408
1/24/2024			

Abs

Linear - Cal. Set 1

Cu mg/L

Curve Fit = Linear

Characteristic Conc = 0.028 mg/L

r = 1.0000

Calculated Conc = 0.000 5.000

Residuals = 0.000 0.000

Abs = 0.14833 x C + 0.00025

Sample 001	4.988	0.7	0.7401
Readings			
	0.7454	0.7369	0.7349
1/24/2024			

Sequential by time report

1/24/2024 11:50 AM

Page 1 of 1

SpectrAA

Analyst

Date Started 1/24/2024 11:47 AM GMT: 1/24/2024 4:47 AM

Worksheet Cu 5 PPM Precision

Comment

Methods Cu

Computer name DESKTOP-R5UFRS

Serial Number: MY13160001

Method: Cu (Flame)

Sample ID	Exp Abs	%RSD	Mean Abs
Cu Precision	0.723	0.5	0.7232
Readings			
	0.7221	0.7195	0.7226
	0.7201	0.7213	0.7266
1/24/2024			

Abs

Cu Precision

Time



Certificate of Calibration

Cert.No.: 24MM292
Page.: 1 of 3

Equipment : Electronic Balance
Manufacturer : Mettler Toledo
Model : AB204-S/FACT
Serial No. : 1129361010
ID No. : UAE.WAS.002/2552
Submitted by : United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong,
Bangkok 10260
Location : Balance Room (108)
Received order : 11 May 2024
Calibration Date : 11 May 2024
Ambient Temperature : 15 °C to 40 °C
Relative Humidity : 30 % to 90 %
Calibrated by : Khitt Ruttanaprapachai
Approved by :
() Porpan Palpim
() Suwit Imjai
(✓) Kunchit Promprat

Issue Date : 15 May 2024

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 head of Corporate Services 3: Equipment Calibration and Testing Services.

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Equipment : Electronic Balance
Condition As-Received : Used Item
Reference : 2405-0166OC-1
Procedure used >:

Cert.No.: 24MM292
Page: 2 of 3

Calibration were conducted using in-house calibration procedure CP-OB01 based on UKAS LAB 14 according to direct measurement method against standard weight.

Condition of this result of calibration

1. Reference standard instruments:-

Instruments	Model	Serial No.	ID No.	Test report No.	Due date
1) Standard Weight Set (E2)	15884	24053	70RC007	MM-0013-24	25 Jan 2026

- This certificate is valid only to the item calibrated on date and place of calibration.
- This result of calibration was made on requested at the point specified by customer.
- This certificate is not certified for any commercial transaction.
- This certification is traceable to the International System of Unit.

Result of calibration () Without Adjustment (*) After Adjustment by Internal Calibration

Range capacity : 0 g to 220 g Resolution 0.0001 g

Before Adjustment :

Applied Weight	Balance Reading	Correction	Measurement Uncertainty	Coverage Factor
(g)	(g)	(g)	(± mg)	(k)
100	100.0000	0.0000	0.19	2.03
200	200.0008	-0.0006	0.30	2

After Adjustment :

1. Determination of the standard deviation of weighing machine (n = 10)

Applied Weight	Standard Deviation of Reading (g)
(g)	
100	0.00007
200	0.00005

เอกสารไม่ควบคุม



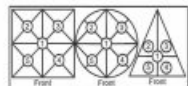
Equipment : Electronic Balance
Condition As-Received : Used Item
Reference : 2405-0166OC-1
Result of calibration

2. Effect of off center loading

A mass of 100 g was placed to various position on the pan.
The weighing machine reading error obtained is given in the table

Position 1	Position 2	Position 3	Position 4	Position 5	Maximum difference between off-center and central loading
(g)	(g)	(g)	(g)	(g)	(g)
-0.0004	-0.0004	-0.0003	-0.0003	-0.0004	0.0001

Cert.No.: 24MM292
Page: 3 of 3



3. Departure from nominal value

Applied Weight	Balance Reading	Correction	Measurement Uncertainty	Coverage Factor
(g)	(g)	(g)	(± mg)	(k)
Unload	0.0000	0.0000	0.15	2.13
0.01	0.0100	0.0000	0.15	2.13
0.05	0.0500	0.0000	0.15	2.13
0.1	0.1000	0.0000	0.15	2.13
0.5	0.5000	0.0000	0.15	2.13
1	1.0000	0.0000	0.15	2.13
10	10.0000	0.0000	0.15	2.11
50	49.9999	+0.0001	0.17	2.08
100	99.9999	+0.0001	0.19	2.03
150	149.9998	+0.0002	0.29	2
200	199.9990	+0.0010	0.30	2

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

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เอกสารไม่ควบคุม



มูลนิธิส่งเสริมพัฒนาอาหาร
ศูนย์บริการข้อมูลอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center



Calibration Certificate

Certificate No.: 2402283-001-01
Client name: UNITED ANALYST AND ENGINEERING CONSULTANT CO., LTD.
Address: 3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong, Bangkok 10260

Page 1 of 4

Equipment: Electronic Balance
Manufacturer: METTLER TOLEDO
Model: XSR205DU
Serial No.: C009071872
ID No.: UAE.WAO.012/2563
Order No.: 2402283
Operation No.: 2402283-001
Date of Receipt: 2 April 2024
Date of Calibration: 2 April 2024

Calibrated by Mr.Jerawut Pragawuttipong
Scientist

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

Date of Issue: 9 April 2024

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-CS-009 Revision: 01 Date: 20-04-65

เอกสารไม่ควบคุม



nfi.com

Calibration Report

Certificate No.: 2402283-001-01
Equipment: Electronic Balance
Model: XSR2050U
Serial No.: C09071872
Capacity: 220 g
Manufacturer: METTLER TOLEDO
Resolution: 0.00001 g / 0.0001 g
ID No.: UAE.WAO.012/2563

Date of Calibration: 2 April 2024 Page 2 of 4

Environment Condition: Ambient Temperature: 24.5 ± 0.5 °C Relative Humidity: 47.5 ± 2.5 %

Place of Calibration: Laboratory, UNITED ANALYST AND ENGINEERING CONSULTANT CO., LTD.

Condition of Equipment: Good Condition

Condition of This Results of Calibration:

1. Calibration Method: NFI Method W-MA-001 In-House Method based on UKAS Lab 14 : 2019

2. Reference Standards:

Reference Standard	Model	Serial No.	Calibrated By	Certificate No.	Due Date
Standard Weight Class E2	1mg to 200g	8905967572	TCS	M23040535	8 April 2024
Instrument	Model	Serial No.	Calibrated By	Certificate No.	Due Date
Thermo-Hygro Meter	608-H1	NFI.BTH 016/23	Quality Reborn	QR24-0343	9 February 2025

3. This certification is traceable to SI UNIT

4. This certification is certified only for the instrument we calibrated.

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

Calibration Results:

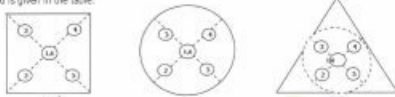
1. Repeatability of Reading:

Nominal Value (g)	Standard Deviation of Reading (g)
40	0.000052
80	0.000063
100	0.000048
200	0.000053

2. Off-Center Error:

A mass of 100 g was placed and moved to various position on pan.

The balance reading obtained is given in the table.



1	2	3	4	5	6	(Maximum Difference)
(g)	(g)	(g)	(g)	(g)	(g)	(g)
100.0002	100.0001	100.0002	99.9999	100.0001	100.0001	0.0003

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

2008 ถนนสุขุมวิท 35 แขวงคลองเตย เขตวัฒนา กรุงเทพมหานคร 10110
2008 Soi 35, Asoh Asoh Road, Bang Na Khan Subdistrict, Bang Phai District, Bangkok 10700, Thailand
Tel: +66(0) 2422 8688 Fax: +66(0) 2422 8545 **เอกสารไม่ควบคุม**

Calibration Report

Certificate No.: 2402283-001-01
Equipment: Electronic Balance
Model: XSR2050U
Serial No.: C09071872
Capacity: 220 g
Manufacturer: METTLER TOLEDO
Resolution: 0.00001 g / 0.0001 g
ID No.: UAE.WAO.012/2563

Date of Calibration: 2 April 2024 Page 3 of 4

Calibration Results: (Continued)

Calibration Range: 0 - 80 g

Calibration Adjustment: Internal Calibration

3. Departure from Nominal Value: (Range: 0 - 80 g ; Resolution: 0.00001 g)

Nominal Value (g)	Standard Value (g)	Average Reading (g)	Correction (g)	Uncertainty (± g)	Coverage Factor k
Unloaded	0.000000	0.000000	0.000000	0.0000268	2.00
0.001	0.001003	0.001011	-0.000011	0.0000291	2.00
0.005	0.005003	0.004999	0.000001	0.0000294	2.00
0.01	0.010003	0.010000	0.000000	0.0000291	2.00
0.05	0.049996	0.050000	0.000000	0.0000298	2.00
0.1	0.100011	0.100000	0.000011	0.0000311	2.00
0.5	0.500016	0.500011	0.000001	0.0000314	2.00
1	1.000003	1.000002	-0.000002	0.0000316	2.00
2	2.000023	2.000011	0.000011	0.0000317	2.00
5	5.000017	5.000012	0.000000	0.0000320	2.00
10	10.000009	10.000000	0.000001	0.0000326	2.00
20	20.000031	20.000002	0.000001	0.0000337	2.00
30	30.000040	30.000003	0.000001	0.0000352	2.00
50	50.000028	50.000004	-0.000001	0.0000368	2.00
80	80.000068	80.000005	0.000002	0.0000411	2.00

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

2008 ถนนสุขุมวิท 35 แขวงคลองเตย เขตวัฒนา กรุงเทพมหานคร 10110
2008 Soi 35, Asoh Asoh Road, Bang Na Khan Subdistrict, Bang Phai District, Bangkok 10700, Thailand
Tel: +66(0) 2422 8688 Fax: +66(0) 2422 8545 **เอกสารไม่ควบคุม**

Calibration Report

Certificate No.: 2402283-001-01
Equipment: Electronic Balance
Model: XSR2050U
Serial No.: C09071872
Capacity: 220 g
Manufacturer: METTLER TOLEDO
Resolution: 0.00001 g / 0.0001 g
ID No.: UAE.WAO.012/2563

Date of Calibration: 2 April 2024 Page 4 of 4

Calibration Results: (Continued)

Calibration Range: 81 - 200 g

Calibration Adjustment: Internal Calibration

3. Departure from Nominal Value: (Range: 81 - 200 g ; Resolution: 0.0001 g)

Nominal Value (g)	Standard Value (g)	Average Reading (g)	Correction (g)	Uncertainty (± g)	Coverage Factor k
90	90.00010	90.00000	0.00010	0.00015	2.00
100	100.00006	100.00000	0.00006	0.00015	2.00
110	110.00007	110.00001	0.00000	0.00017	2.00
120	120.00009	120.00000	0.00009	0.00018	2.00
130	130.00010	130.00000	0.00010	0.00019	2.00
140	140.00014	140.00000	0.00014	0.00020	2.00
150	150.00009	150.00001	0.00008	0.00020	2.00
160	160.00010	160.00001	0.00009	0.00022	2.00
170	170.00012	170.00001	0.00011	0.00023	2.00
200	200.00016	200.00000	0.00016	0.00028	2.00

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k, level of confidence of approximately 95 %.

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

2008 ถนนสุขุมวิท 35 แขวงคลองเตย เขตวัฒนา กรุงเทพมหานคร 10110
2008 Soi 35, Asoh Asoh Road, Bang Na Khan Subdistrict, Bang Phai District, Bangkok 10700, Thailand
Tel: +66(0) 2422 8688 Fax: +66(0) 2422 8545 **เอกสารไม่ควบคุม**

Technology



Service Report

TO	FOR
Company: United Analyst and Engineering Consultant Co., Ltd. - Bangkok-HQ Address: 700/2 หมู่ที่ 1 Phrakhanong District, Bangkok, 10260	Work Order Number: WO-0018067 Contact: Kamphong Boonpuang Email: kamphong.b@uaeconsultant.co.th Tel: +66 2763 2828 (7021), +66 8 6347 7390

WORK ORDER INFORMATION			
Top-Level		Order Type	Preventive Maintenance
Installed Product ID	IB-00105024	Billing Type	Paid
Product	SKALAR SAN++ Classic 2SAN59000	PO No.	SSPR2400629
Serial No.	182688	Warranty No.	
		Contract No.	

PRODUCTS SERVICED		
Installed Product Id	Serial Number	Product

PROBLEM DESCRIPTION	
PM 1/1	

Line Number	Engineer	Start Date And Time	End Date And Time	Billable Labor Hour	Billable Travel Hour	Travel KM
WL-00071161	Yongyuth Chanphong	02/20/2024 8:53 AM	02/20/2024 6:07 PM	9.23333		
WL-00092966	Ronnarit Dechnawarat	02/20/2024 8:53 AM	02/20/2024 6:07 PM	9.23333		
Total				18.46666	0	0

! Reach us at DKSH Service-Hotline : +66 2 639 7000
2533 Sukhumvit Road, Bangkok, 10260, Phrakhanong, Bangkok, Thailand
Phone +66 2 639 7000 Fax +66 2 333 1026

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เอกสารไม่ควบคุม Page 1 of 2



Line Number	Work Description
WL-00071161	ท่า PM เรือร้อย
WL-00092966	ท่า PM เรือร้อย

PARTS CONSUMED		
Part No	Part Description	Quantity

EXPENSES			
Part No	Expense Type	Description	Line Quantity

RECOMMENDED PARTS	
แนะนำอะไหล่ที่ต้องสั่งซื้อเพิ่มเติมดังนี้ , อะไหล่ พารามิเตอร์ Ammonia จำนวน 2 รายการ (9220, 3026) , อะไหล่ พารามิเตอร์ Phenol และ Cyanide จำนวน 6 รายการ (5454, 3028, 3031, 3034, 3036, 3150)	

REMARKS

Travel Time Disclaimer:

Please note that the travel time in this report only includes time taken to reach the installed equipment location. It does not include our engineer's return travel time.

Customer Signature:

Customer Signature

Technician: Yungyuth Chanphong

Job Title: Service Manager

Email: yungyuth.yc@dksh.com

Date: 04/10/2024

! Reach us at DKSH Service-Hotline : +66 2 639 7000
2533 Sukhumvit Road, Bangkok, 10260, Phrakhanong, Bangkok, Thailand
Phone +66 2 639 7000 Fax +66 2 333 1026

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เอกสารไม่ควบคุม Page 2 of 2



Job No. WO-00018067

Test Report

Customers	United Analyst and Engineering Consultant Co., Ltd.		
Equipment	Continuous Flow Analyzer	Manufacturer	SKALAR
Controller Mdel	SA5000	Auto Sample Model	SA1052
Controller Serial No.	182688	Auto Sample Serial No.	181729
Date of test	20-Feb-2024	Period	12 Month
Environment temperature	24.7 °C	Humidity	62.2 %RH

Results

Instrument Checked

Item	Characteristic	Before		After		Remark	
1	Visual inspect	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail		
2	Power supply (210 - 240 VAC)	220	VAC	220	VAC		
3	Computer	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail		
4	Program	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail		
5	Auto sampler	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail		
6	Module holder						
	- Motor pump	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail		
	- Pump tube	<input type="checkbox"/> Pass	<input type="checkbox"/> Fail	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail	*	
	- Air-injection	<input type="checkbox"/> Pass	<input type="checkbox"/> Fail	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail	*	
	- Chemistry manifolds, Switching valve, Coil, Membrane	<input type="checkbox"/> Pass	<input type="checkbox"/> Fail	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail	** , ***	
7	Detector						
	- Filter	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail		
	- Flow cell	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail		
	- Lamp	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail		
8	Interface	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail		
9	Rinsing valves	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail	N/A	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail	N/A
10	Temperature / Reactor	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail	N/A	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail	N/A
11	Flame photometer	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail	N/A	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail	N/A
12	UPS / Stabilizer	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail	N/A	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail	N/A

Warning and Error Checked

Item	Event	Before		After	
13	Error list	<input checked="" type="checkbox"/> None		<input checked="" type="checkbox"/> None	
		<input type="checkbox"/> Appear :		<input type="checkbox"/> Appear :	

DKSH Technology Limited (Head office)
2533 Sukhumvit Road, Bangkok, Phrakhanong, Bangkok, 10260
Phone +66 2 639 7000, Mobile +66 93 813 8681, yungyuth.yc@dksh.com, www.dksh.com

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Page 1/2



Check with Standard

Item	Characteristic	Before			After			Remark
14	Base Line Test	<input type="checkbox"/> Pass	<input type="checkbox"/> Fail	<input type="checkbox"/> N/A	<input type="checkbox"/> Pass	<input type="checkbox"/> Fail	<input type="checkbox"/> N/A	
15	Detector Signal Test	<input type="checkbox"/> Pass	<input type="checkbox"/> Fail	<input type="checkbox"/> N/A	<input type="checkbox"/> Pass	<input type="checkbox"/> Fail	<input type="checkbox"/> N/A	

Summary of checked

- ☐ The instrument can work normally and efficiently. (เครื่องมือวัดสามารถทำงานได้ปกติและมีประสิทธิภาพ)
- ☐ The instrument can work but it's requiring to maintenance. (เครื่องมือวัดสามารถทำงานได้แต่ต้องบำรุงรักษา)
- ☐ The instrument could not work it's requiring to repair. (เครื่องมือวัดไม่สามารถทำงานได้แต่ต้องการซ่อมบำรุง)

Remark :

* Pump tube และ Air tube เริ่มเสื่อมสภาพ ได้เปลี่ยนอะไหล่ทั้งหมดแล้วตามระยะการใช้งาน
** อะไหล่ 9220 (Manifold T, SiSiC needle) ขาดไม่สามารถซ่อมได้ และได้เปลี่ยนมาใช้ 5216 ทดแทนชั่วคราว
*** อะไหล่ 5454 (Nipple polyethylene NS) เสีย ได้ทำการเปลี่ยนใหม่แล้ว

หมายเหตุ แนะนำอะไหล่ที่ควรซื้อเพิ่มเติมดังนี้	
1. อะไหล่ พารามิเตอร์ Ammonia จำนวน 2 รายการ (9220, 3026)	
2. อะไหล่ พารามิเตอร์ Phenol และ Cyanide จำนวน 6 รายการ (5454, 3028, 3031, 3034, 3036, 3150)	

Standard Equipment Used		
Equipment	Equipment I.D.	
Digital multi meter	S/N 57600592	Due date : 8-Jul-2024
Thermo hygrometer	S/N 39520444	Due date : 27-Dec-2024

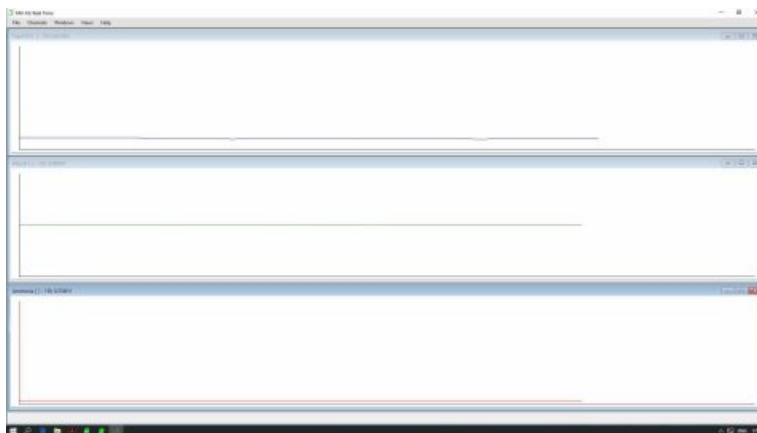
Test By : Approved by :

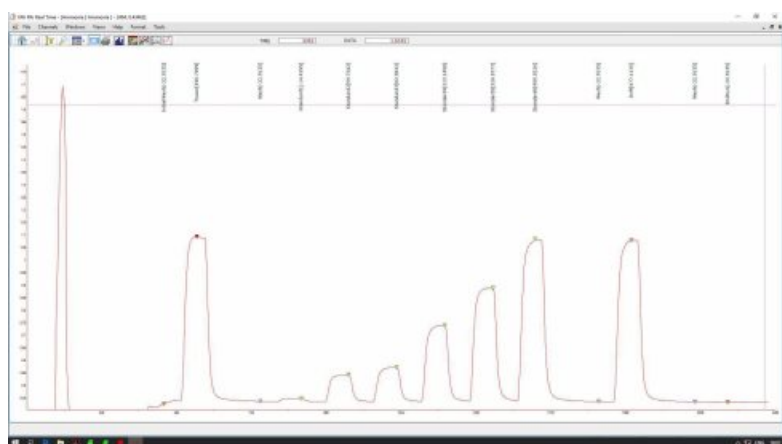
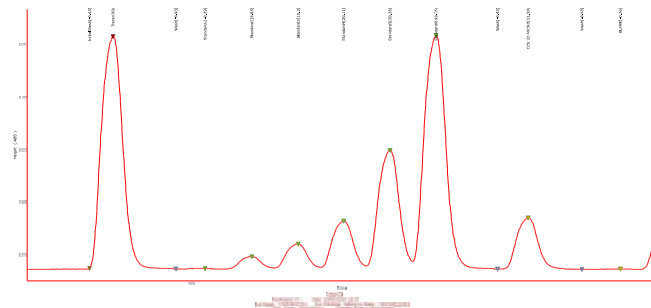
Position : Supervisor, Technical Service Position : Manager, Technical Services

DKSH Technology Limited (Head office)
2533 Sukhumvit Road, Bangkok, Phrakhanong, Bangkok, 10260
Phone +66 2 639 7000, Mobile +66 93 813 8681, yungyuth.yc@dksh.com, www.dksh.com

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Page 2/2





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

Page: 1 of 2

Certificate of Testing

Issue Date : 20 June 2024

Approved Signatory



Cert.No.: 24TW128
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).

Instruments	Serial No.	ID No.	Certificate No.	Due Date
1. Burette	-	130BU10	23CG1172	22 Mar 2025
2. Balance	14233821	110RC001	23MM405	16 July 2024

2. Standard Material :-

Material	Manufacturer	Lot.No.	Assay
Sodium Thiosulfate pentahydrate	Merck	AM1763316	100.2%

Result : Dissolved Oxygen Meter Adjustment With Air 100 %
Dissolved Oxygen Probe No.: 9K2H0067

Titration Method (Azide Modification Method)	DO Meter Reading	Standard Deviation
(mg/L)	(mg/L)	(mg/L)
8.10	8.10	0.0071

This report was certified only for the instrument we tested. It is allowable to use for study
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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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL. 0-2717-3000-29 FAX 0-2719-9484



Certificate of Calibration

Cert. No.: 24LM97
Page.: 1 of 2

Equipment : DO Meter with Sensor
Manufacturer : Horiba
Model : LAQUA-DO210
Serial No. : HE9M0021
ID No. : UAE.EFM.014/2563(EFM.DO.03/63)
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong,
Bangkok 10260
Location : TPA On Site Calibration Laboratory
Received Order : 18 June 2024
Calibrated Date : 20 June 2024
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
AC Line Voltage : (220 ± 22) V
Calibrated by : Warakorn Lemgagtrakul
Approved by : [Signature]
() Porpan Palpim
() Suwit Imjai
(✓) Kunchit Promprat
Issue Date : 24 June 2024

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 head of Corporate Services 3: Equipment Calibration and Testing Services.



Equipment : DO Meter with Sensor
Condition As-Received : Used Item
Reference : 2406-0571WSC-2

Cert. No.: 24LM97
Page.: 2 of 2

Procedure Used :-

Calibration were conducted using in-house calibration procedure CP-OT01 according to comparison with
Industrial Platinum Resistance Thermometer (IPT) into Temperature Bath.

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Digital Thermometer	2188080	231216	TPA	11 Oct 2024

2. This certificate is valid only to the item calibrated on date and place of calibration.

3. This certification is traceable to the International System of Unit.

Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment

Function : Temperature measurement.

This instrument was connected with temperature sensor, S/N.: 9K2H0067

Calibration Point (°C)	Immersion Depth (mm)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty (± °C)	Coverage Factor k
25.0	80	25.002	25.0	-0.002	0.16	2.00
30.0	80	30.002	30.0	-0.002	0.16	2.00
35.0	80	35.003	35.0	-0.003	0.16	2.00

UUC* : Unit Under Calibration

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a
coverage factor *k*, providing a level of confidence of approximately 95 %.

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL. 0-2717-3000-29 FAX 0-2719-9484



Cert.No.: 24CH29
Page.: 1 of 3

Certificate of Calibration

Equipment : Conductivity Meter
Manufacturer : Horiba
Model : LAQUA-EC210
Serial No. : HCDH0002
ID No. : UAE.EFM.079/2564(EFM.SCT.05/64)
Condition As-Received: Used Item
Received Date : 09 January 2024
Calibration Date : 10 January 2024
Reference : 2401-0220WSC-2
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong, Bangkok 10260
Ambient Temperature : (25 ± 2.5) °C
Relative Humidity : (50 ± 15) %
Calibration Procedure:
In-house method :
- CP-CH6 by direct measurement
with certified reference material (CRM)
- CP-CH8 by comparison with standard thermometer

Calibrated by : Warakorn Lemgagtrakul

Approved by : [Signature]

(✓) Sathip Meangmai
() Warakorn Lemgagtrakul
() Porpan Palpim

Issue Date : 16 January 2024

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 head of Corporate Services 3: Equipment Calibration and Testing Services.

A 0062462



Equipment : Hot Air Oven
Condition As-Received : Used Item
Reference : 2404-0004OC-3
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

Cert. No.: 24TM589
Page : 3 of 3

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor k
104.0	104.0	104.0	0.032	0.47	0.84	2
120.0	120.0	120.0	0.12	0.72	1.3	2
180.0	180.0	180.0	0.13	1.2	1.5	2

Calibration Point (°C)	Measured Temperature (°C)									Uncertainty (± °C)
	1	2	3	4	5	6	7	8	9 (ref.)	
104.0	104.484	103.847	104.226	104.232	104.106	103.891	104.275	104.127	104.013	0.42
120.0	120.486	120.089	120.635	120.596	119.531	119.844	120.364	120.144	120.158	1.1
180.0	180.574	179.769	180.285	180.870	179.594	179.790	180.287	179.961	179.802	1.1

Average* : The average of 30 values in each position.

Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.

Temperature 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 or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.

Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation.

UUC* : Unit Under Calibration

Note : The reported uncertainty of measurement was included stability and excluded uniformity .

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

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เอกสารไม่ควบคุม
a 1209738



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL.0-2717-3000-29 FAX.0-2719-9484



Certificate of Calibration

Cert. No.: 24TM647
Page : 1 of 3

Equipment : Incubator
Manufacturer : Binder
Model : KB 400 E6
Serial No. : 2020000015535
ID No. : UAE.MIC.018/2564
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong,
Bangkok 10260
Location : Microbiology Laboratory (302)
Received Order : 01 April 2024
Calibration Date : 01 April 2024
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %

Calibrated by : Man Pattanapongpaiboon

Approved by :

() Ponpan Paipim
(✓) Suwit Imjai
() Kunchit Promprat

Issue Date : 7 April 2024

The Uncertainties are for a confidence probability of approximately 95%

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Equipment : Incubator
Condition As-Received : Used Item
Reference : 2404-0003OC-6

Cert. No.: 24TM647
Page : 2 of 3

Procedure Used :-

Calibration were conducted using calibration procedure CP-OT02 based on TLAS G-20 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector (RTD).
The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Serial No.	Cert. No.	Traceable	Due Date
1.) Data Acquisition	MY49023932	23LM122	TPA	26 Jul 2024

2. This certificate is valid only to the item calibrated on date and place of calibration.

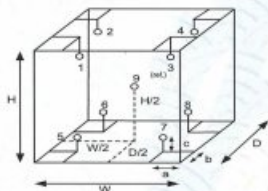
3. This certification is traceable to the International System of Unit.

Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Close



Probe Installation Details :

a = 10 cm
b = 10 cm
c = 10 cm

Dimension of Chamber :

D = 0.48 m
W = 0.65 m
H = 1.2 m
Capacity = 0.37 m³

Environment during calibration		
	Beginning	Finished
Temp. (°C)	24	24
REL.Humid. (%)	54	57
AC Supply (Volt)	221	223

Position :	Ref. Std. ID No.:
1	20-16RTD-01
2	20-16RTD-02
3	20-16RTD-03
4	23-16RTD-04
5	22-16RTD-05
6	20-16RTD-06
7	20-16RTD-07
8	22-16RTD-08
9 (ref.)	22-16RTD-09



Equipment : Incubator
Condition As-Received : Used Item
Reference : 2404-0003OC-6
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

Cert. No.: 24TM647
Page : 3 of 3

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor k
35.0	35.0	35.0	0.035	0.19	0.22	2

Calibration Point (°C)	Measured Temperature (°C)									Uncertainty (± °C)
	1	2	3	4	5	6	7	8	9 (ref.)	
35.0	35.000	35.022	34.841	34.851	35.027	35.011	35.023	35.028	35.007	0.30

Average* : The average of 30 values in each position.

Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.

Temperature 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 or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.

Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation.

UUC* : Unit Under Calibration

Note : The reported uncertainty of measurement was included stability and excluded uniformity .

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

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เอกสารไม่ควบคุม



Cert.No.: 23CH1223/1
Page.: 1 of 3

Certificate of Calibration

This Certificate was issued to replace to the Certificate No.23CH1223

Equipment : pH Meter
Manufacturer : YSI
Model : pH100A
Serial No. : JC02729
ID No. : UAE.EFM.195/2561(ENV.pH.04/61)
Condition As-Received: Used Item
Received Date : 26 September 2023
Calibration Date : 27 September 2023
Reference : 2309-0881WSC-1
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong, Bangkok 10260

Ambient Temperature : (25 ± 2.5) °C
Relative Humidity : (50 ± 15) %
Calibration Procedure : In - house method ;
- CP-CH5 by direct measurement with standard
voltage calibrator and direct measurement with
certified reference material (CRM)
- CP-CH8 by comparison with standard thermometer

Calibrated by : Warakorn Lemgagrakul

Approved by :
(✓) Salthip Meangmai
() Warakorn Lemgagrakul
() Ponpan Paipim

Issue Date : 16 October 2023

The Uncertainties are for a confidence probability of approximately 95%

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Approval of the head of Corporate Services 3: Equipment Calibration and Testing Services.

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A 0053486



Cert.No.: 23CH1223/1
Page.: 2 of 3

Condition of this calibration result

1. Reference Standard Instrument : -
- | Instrument | Serial No. | ID No. | Cert. No. | Due Date |
|--------------------------------|------------|----------|-----------|-------------|
| 1) Document Process Calibrator | 54030049 | 130RC116 | 23E2802 | 27 Aug 2024 |
| 2) Ref. Standard Thermometer | 4982054 | 110RC044 | 23I908 | 26 Jul 2024 |
- This certification is traceable to the International System of Unit maintained through:-
- Technology Promotion Association (Thailand-Japan)
2. Certified Reference Materials : The measurement results are traceable to SI through CPA chem Ltd.,
ANSI-ASQ National Accreditation Board, Accredited No. AR-1835

Buffer Solution	Manufacturer	Lot No.	Exp. date
pH 4.008	CPA chem	913598	14 July 2025
pH 6.986	CPA chem	863833	28 Dec 2023
pH 9.997	CPA chem	913600	14 July 2024

3. This certificate is valid only to the item calibrated on date and place of calibration.

Calibration Results

Function : mV Measurement

Performing standard curve by Fluke at pH (4.7)(7.10)

Unit Under Calibration	Nominal Value	Standard Voltage Input		Actual Reading		Uncertainty of Measurement (±mV)	Coverage factor k
	pH	mV	mV	mV	pH		
pH Meter S/N.: JC02729	4.00	177.48	177	4.01		0.58	2.00
	7.00	0.00	0	7.00		0.58	2.00
	7.00	0.00	0	7.00		0.58	2.00
	10.00	-177.48	-177	10.01		0.58	2.00

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a 1184884



Cert.No.: 23CH1223/1
Page.: 3 of 3

Calibration Results

Function : pH Measurement

Performing three buffers standard curve by using buffer nominal pH (4.7)(7.10)

Unit Under Calibration	Standard pH Buffer Solution	Actual pH Reading	Actual mV Reading (mV)	Uncertainty of pH measurement (±)	Coverage factor k
pH Electrode S/N.: 230308SIA605377	4.008	4.01	171	0.0079	2.00
	6.986	7.00	-1	0.011	2.00
	6.986	7.00	-1	0.011	2.00
	9.997	10.01	-178	0.0095	2.00

Function : Temperature Measurement

(°) Without adjustment

This equipment was connected with Temperature Probe;

- Model :
- Serial No. : 230308SIA605377
Dimension of probe;
- Length : 110 mm
- Diameter : 12 mm
- Immersion Depth : 100 mm

Calibration Point (°C)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty of measurement (± °C)	Coverage factor k
25.0	25.002	25.1	0.098	0.13	2.00
30.0	30.003	30.1	0.097	0.13	2.00
35.0	35.001	35.0	-0.001	0.13	2.00

Remark : - UUC* = Unit Under Calibration

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

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a 1184883

DQE Services Co.,Ltd.



32 Soi Ladprao-Wanghin 55, Ladprao-Wanghin Rd., Ladprao, Bangkok 10250
Phone : +66 (0)2 538 2054, Email : dqeservicesinfo@gmail.com



CERTIFICATE OF CALIBRATION

Certificate No. : SP24-008

Page 1 of 5

Customer : United Analyst and Engineering Consultant Co.,Ltd. (Head Office)

Address : 3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260

Location of calibration : Laboratory 315

Equipment : UV-Vis Spectrophotometer

Manufacturer : Hitachi

Model : U-1900

Serial No. : 2021-064

ID No. : UAE.WAS.006/2552

Received Date : 16 January 2024

Calibration Date : 16 January 2024

Issue Date : 19 January 2024

Condition Instrument : Good

Calibrated by : (Mr. Tanawat Kittadach)

Technical Manager

Approved by : (Ms. Chomsirak Sangngern)

Quality Manager

The calibration result is applied only to the above calibrated item and was found accurate as shown on date and place of calibration only.

The measurement capability of the laboratory and its uncertainty is recognized national standards and to the unit of measurement realized in the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the DQE Services Co., Ltd.

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REPORT OF CALIBRATION

Certificate No. : SP24-008

Page 2 of 5

Environment Condition : Ambient Temperature 25 ± 5 °CRelative humidity 55 ± 20 %RH

Calibration method : In-house method CP-01 Based on ASTM E275-08

Certified Reference Materials :

Material	Serial No.	Certificate No.	Due date
Absorbance Standard set	25760	115663	25 October 2025
Absorbance Standard set	25757	115638	25 October 2025
Wavelength Standard set	25806	115657	25 October 2025
Wavelength Standard set	25758	115665	25 October 2025

Traceability : This certification is traceable to the International System of Unit maintained at National -

Institute of Standards and Technology (NIST) through Starna Scientific Limited

Spectral Band Width of UUC : 4.0 nm.

Scan Speed of UUC : 200 nm/min

Scan Interval of UUC : 0.1 nm.

Resolution of UUC : Photometric 0.001 Abs.

Wavelength 0.1 nm.

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FM-708-02 R01 1/11/2021



REPORT OF CALIBRATION

Certificate No. : SP24-008

Page 3 of 5

Calibration Results : Without adjustment

Photometric Accuracy :

Wavelength (nm.)	CRMs Values (Abs)	UUC Reading (Abs)	Correction (Abs)	Uncertainty (Abs)	Coverage factor k
420	0.0000	0.000	0.0000	0.0028	2.00
	0.5780	0.575	0.0030	0.0031	2.00
	1.0484	1.046	0.0024	0.0029	2.00
	2.1876	2.186	0.0016	0.0080	2.00
440	0.0000	0.000	0.0000	0.0028	2.00
	0.5595	0.558	0.0015	0.0034	2.00
	1.0239	1.024	-0.0001	0.0035	2.00
	2.1230	2.121	0.0020	0.0079	2.00
465	0.0000	0.000	0.0000	0.0028	2.00
	0.5230	0.520	0.0030	0.0030	2.00
	0.9633	0.961	0.0023	0.0029	2.00
	1.9753	1.975	0.0003	0.0070	2.00
546.1	0.0000	0.000	0.0000	0.0028	2.00
	0.5181	0.516	0.0021	0.0031	2.00
	1.0002	0.999	0.0012	0.0033	2.00
	1.9973	1.994	0.0033	0.0084	2.00
590	0.0000	0.000	0.0000	0.0028	2.00
	0.5517	0.550	0.0017	0.0030	2.00
	1.0803	1.080	0.0003	0.0030	2.00
	2.0373	2.032	0.0053	0.0080	2.00
635	0.0000	0.000	0.0000	0.0028	2.00
	0.5591	0.558	0.0011	0.0031	2.00
	1.0518	1.051	0.0008	0.0030	2.00
	1.9274	1.923	0.0044	0.0079	2.00

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FM-708-02 R01 1/11/2021



REPORT OF CALIBRATION

Certificate No. : SP24-008

Page 4 of 5

Photometric Accuracy :

Wavelength (nm.)	CRMs Values (Abs)	UUC Reading (Abs)	Correction (Abs)	Uncertainty (Abs)	Coverage factor k
235	0.0000	0.000	0.0000	0.0050	2.00
	0.7469	0.748	-0.0011	0.0057	2.00
257	0.0000	0.000	0.0000	0.0050	2.00
	0.8674	0.865	0.0024	0.0059	2.00
313	0.0000	0.000	0.0000	0.0050	2.00
	0.2919	0.293	-0.0011	0.0051	2.00
350	0.0000	0.000	0.0000	0.0050	2.00
	0.6430	0.641	0.0020	0.0055	2.00

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FM-708-02 R01 1/11/2021



REPORT OF CALIBRATION

Certificate No. : SP24-008

Page 5 of 5

Wavelength Accuracy :

CRMs Values (nm.)	UUC Reading (nm.)	Correction (nm.)	Uncertainty (nm.)	Coverage factor k
241.54	241.1	0.44	0.18	2.00
279.40	278.9	0.50	0.18	2.00
288.70	288.0	0.70	0.18	2.00
334.22	333.8	0.42	0.18	2.00
361.26	360.8	0.46	0.18	2.00
418.48	418.2	0.28	0.18	2.00
446.70	446.0	0.70	0.18	2.00
453.20	453.1	0.10	0.18	2.00
460.06	459.6	0.46	0.18	2.00
536.90	536.4	0.50	0.18	2.00
637.94	637.6	0.34	0.18	2.00
440.74	440.1	0.64	0.18	2.00
472.22	472.0	0.22	0.18	2.00
513.70	513.5	0.20	0.18	2.00
528.72	528.2	0.52	0.18	2.00
574.60	574.3	0.30	0.18	2.00
585.48	585.0	0.48	0.20	2.00
684.63	684.2	0.43	0.18	2.00
740.27	740.0	0.27	0.20	2.00
748.28	747.8	0.48	0.18	2.00
807.16	806.8	0.36	0.18	2.00
879.70	879.2	0.50	0.18	2.00

Remark : - UUC = Unit Under Calibration

- N/A = Not Available

- The result expanded uncertainty of measurement U is stated as the standard uncertainty of measurement multiplied by the coverage factor k, which for a normal distribution corresponds to a coverage probability of approximately 95%

- * Indicates non YISI accredited

- End of Certificate -

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FM-708-02 R01 1/11/2021

DQE Services Co.,Ltd.

DQE Services

32 Soi Ladprao-Wanghin 55, Ladprao-Wanghin Rd., Ladprao, Bangkok 10230

Phone : +66 (0)2 538 2054, Email : dqeservicesinfo@gmail.com



ISO 17025:2017
CALIBRATION DATA

CERTIFICATE OF CALIBRATION

Certificate No. : SP24-001

Page 1 of 5

Customer : United Analyst and Engineering Consultant Co.,Ltd. (Head Office)

Address : 3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260

Location of calibration : Laboratory 213

Equipment : UV-Vis Spectrophotometer

Manufacturer : Hitachi

Model : U-2900

Serial No. : 21E22-009

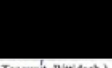
ID No. : UAE.WAT.051/2564


Received Date : 4 January 2024

Calibration Date : 4 January 2024

Issue Date : 5 January 2024

Condition Instrument : Good

Calibrated by : 

Approved by : 

(Mr.Tanawut Ritidach)

(Ms.Unonthicha Sangngern)

Technical Manager

Quality Manager

The calibration result is applied only to the above calibrated item and was found accurate as shown on date and place of calibration only.

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 DQE Services Co., Ltd.

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FM-708-02 R01 1/11/2021

DQE Services Co.,Ltd.

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ISO 17025:2017
CALIBRATION DATA

REPORT OF CALIBRATION

Certificate No. : SP24-001

Page 2 of 5

Environment Condition : Ambient Temperature 25 ± 5 °C

Relative humidity 55 ± 20 %RH

Calibration method : In-house method CP-01 Based on ASTM E275-08

Certified Reference Materials :

Material	Serial No.	Certificate No.	Due date
Absorbance Standard set	25760	115663	25 October 2025
Absorbance Standard set	25757	115638	25 October 2025
Wavelength Standard set	25806	115657	25 October 2025
Wavelength Standard set	25758	115665	25 October 2025

Traceability : This certification is traceable to the International System of Unit maintained at National -

Institute of Standards and Technology (NIST) through Sarna Scientific Limited

Spectral Band Width of UUC : 1.5 nm.

Scan Speed of UUC : 200 nm/min

Scan Interval of UUC : 0.1 nm.

Resolution of UUC : Photometric 0.001 Abs.

Wavelength 0.1 nm.

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FM-708-02 R01 1/11/2021

DQE Services Co.,Ltd.

DQE Services

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ISO 17025:2017
CALIBRATION DATA

REPORT OF CALIBRATION

Certificate No. : SP24-001

Page 3 of 5

Calibration Results : Without adjustment

Photometric Accuracy :

Wavelength (nm.)	CRMs Values (Abs)	UUC Reading (Abs)	Correction (Abs)	Uncertainty (Abs)	Coverage factor k
420	0.0000	0.000	0.0000	0.0028	2.00
	0.5780	0.575	0.0030	0.0031	2.00
	1.0484	1.045	0.0034	0.0029	2.00
	2.1876	2.192	-0.0044	0.0080	2.00
440	0.0000	0.000	0.0000	0.0028	2.00
	0.5595	0.558	0.0015	0.0034	2.00
	1.0239	1.023	0.0009	0.0035	2.00
	2.1230	2.125	-0.0020	0.0079	2.00
465	0.0000	0.000	0.0000	0.0028	2.00
	0.5230	0.520	0.0030	0.0030	2.00
	0.9633	0.961	0.0023	0.0029	2.00
	1.9753	1.975	0.0003	0.0070	2.00
546.1	0.0000	0.000	0.0000	0.0028	2.00
	0.5181	0.516	0.0021	0.0031	2.00
	1.0002	0.997	0.0032	0.0033	2.00
	1.9973	1.993	0.0043	0.0084	2.00
590	0.0000	0.000	0.0000	0.0028	2.00
	0.5517	0.550	0.0017	0.0030	2.00
	1.0803	1.079	0.0013	0.0030	2.00
	2.0373	2.032	0.0053	0.0080	2.00
635	0.0000	0.000	0.0000	0.0028	2.00
	0.5591	0.558	0.0011	0.0031	2.00
	1.0518	1.050	0.0018	0.0030	2.00
	1.9274	1.923	0.0044	0.0079	2.00

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FM-708-02 R01 1/11/2021

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ISO 17025:2017
CALIBRATION DATA

REPORT OF CALIBRATION

Certificate No. : SP24-001

Page 4 of 5

Photometric Accuracy :

Wavelength (nm.)	CRMs Values (Abs)	UUC Reading (Abs)	Correction (Abs)	Uncertainty (Abs)	Coverage factor k
235	0.0000	0.000	0.0000	0.0050	2.00
	0.7469	0.743	0.0039	0.0057	2.00
257	0.0000	0.000	0.0000	0.0050	2.00
	0.8674	0.862	0.0054	0.0059	2.00
313	0.0000	0.000	0.0000	0.0050	2.00
	0.2919	0.289	0.0029	0.0051	2.00
350	0.0000	0.000	0.0000	0.0050	2.00
	0.6430	0.641	0.0020	0.0055	2.00

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FM-708-02 R01 1/11/2021

REPORT OF CALIBRATION

Certificate No. : SP24-001

Page 5 of 5

Wavelength Accuracy :

CRMs Values (nm.)	UUC Reading (nm.)	Correction (nm.)	Uncertainty (nm.)	Coverage factor <i>k</i>
241.72	241.2	0.52	0.18	2.00
279.45	279.0	0.45	0.18	2.00
287.81	287.4	0.41	0.18	2.00
334.06	333.8	0.26	0.18	2.00
360.93	360.6	0.33	0.18	2.00
418.59	418.4	0.19	0.18	2.00
445.94	445.8	0.14	0.18	2.00
453.66	453.4	0.26	0.18	2.00
460.02	459.8	0.22	0.18	2.00
536.59	536.4	0.19	0.18	2.00
637.98	638.0	-0.02	0.18	2.00
431.38	431.2	0.18	0.18	2.00
472.50	472.5	0.00	0.18	2.00
513.47	513.4	0.07	0.18	2.00
528.88	528.9	-0.02	0.18	2.00
573.17	573.4	-0.23	0.18	2.00
585.35	585.2	0.15	0.20	2.00
684.40	684.4	0.00	0.18	2.00
740.72	741.0	-0.28	0.20	2.00
748.55	748.8	-0.25	0.18	2.00
807.03	807.1	-0.07	0.18	2.00
879.28	879.5	-0.22	0.18	2.00

Remark : - UUC = Unit Under Calibration

- N/A = Not Available

- The result expanded uncertainty of measurement *U* is stated as the standard uncertainty of measurement multiplied by the coverage factor *k*.

which for a normal distribution corresponds to a coverage probability of approximately 95%

- * Indicates not TISI accredited

- End of Certificate -

เอกสารไม่ควบคุม

PM-708-02 R01 1/11/2021

List of Instrument Certificates for Environmental Quality Analysis

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration*
1	Analytical Balance	FAT OIL AND GREASE	Mettler Toledo	AB204-S/FACT / 1129361010	Technology Promotion Association (Thailand-Japan)	24MM292	11 May 24	10 May 25
2	Analytical Balance	TOTAL DISSOLVED SOLIDS	Mettler Toledo	XSR205DU / C210685394	National Food Institute,Ministry of Industry, Thailand	2402283-002-01	2 Apr 24	1 Apr 25
3	Analytical Balance	SUSPENDED SOLIDS	Mettler Toledo	XSR205DU / C009071872	National Food Institute,Ministry of Industry, Thailand	2402283-001-01	2 Apr 24	1 Apr 25
4	DO Meter	BIOCHEMICAL OXYGEN DEMAND	YSI	5100 / 11B 101863	Technology Promotion Association (Thailand-Japan)	24TW39	21 Feb 24	20 Feb 25
5	Hot Air Oven	SUSPENDED SOLIDS	Memmert	UF55 / B212.0411	Technology Promotion Association (Thailand-Japan)	24TM589	1 Apr 24	31 Mar 25
6	Kjelttec System Distilling Unit	TOTAL KJELDAHL NITROGEN	Foss Tecator (Labtec)	KT200 / 91790524	FOSS South East Asia	9810	8 Feb 24	7 Feb 25
7	Kjelttec Distillation Unit	TOTAL KJELDAHL NITROGEN	FOSS	Kjelttec 8100 / 91889052	FOSS South East Asia	9807	8 Feb 24	7 Feb 25
8	Turbidity Meter (Portable)	TURBIDITY (NTU)	Oakton Instruments(China)	T100IR / 1120501017	Technology Promotion Association (Thailand-Japan)	23CH1148	15 Sep 23	13 Sep 24

Due Date of Calibration* : Based on the annual calibration plan. At least 1 time per year.



Certificate of Calibration

Cert.No.: 24MM292
Page.: 1 of 3

Equipment : Electronic Balance
Manufacturer : Mettler Toledo
Model : AB204-S/FACT
Serial No. : 1129361010
ID No. : UAE.WAS.002/2552
Submitted by : United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong,
Bangkok 10260
Location : Balance Room (108)
Received order : 11 May 2024
Calibration Date : 11 May 2024
Ambient Temperature : 15 °C to 40 °C
Relative Humidity : 30 % to 90 %
Calibrated by :
Approved by :
() Porpan Palpim
() Suwit Imjai
(✓) Kunchit Promprat

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 head of Corporate Services 3: Equipment Calibration and Testing Services.

เอกสารไม่ควบคุม



Equipment : Electronic Balance
Condition As-Received : Used Item
Reference : 2405-0166OC-1
Procedure used >

Cert.No.: 24MM292
Page: 2 of 3

Calibration were conducted using in-house calibration procedure CP-OB01 based on UKAS LAB 14 according to direct measurement method against standard weight.

Condition of this result of calibration

1. Reference standard instruments:-

Instruments	Model	Serial No.	ID No.	Test report No.	Due date
1) Standard Weight Set (E2)	15884	24053	70RC007	MM-0013-24	25 Jan 2026

- This certificate is valid only to the item calibrated on date and place of calibration.
- This result of calibration was made on requested at the point specified by customer.
- This certificate is not certified for any commercial transaction.
- This certification is traceable to the International System of Unit.

Result of calibration () Without Adjustment (*) After Adjustment by Internal Calibration

Range capacity : 0 g to 220 g Resolution 0.0001 g

Before Adjustment :

Applied Weight	Balance Reading	Correction	Measurement Uncertainty	Coverage Factor
(g)	(g)	(g)	(± mg)	(k)
100	100.0000	0.0000	0.19	2.03
200	200.0008	-0.0006	0.30	2

After Adjustment :

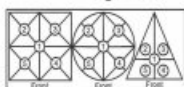
1. Determination of the standard deviation of weighing machine (n = 10)

Applied Weight	Standard Deviation of Reading (g)
(g)	
100	0.00007
200	0.00005



Equipment : Electronic Balance
Condition As-Received : Used Item
Reference : 2405-0166OC-1
Result of calibration

Cert.No.: 24MM292
Page: 3 of 3



Maximum difference between off-center and central loading

Position 1	Position 2	Position 3	Position 4	Position 5
(g)	(g)	(g)	(g)	(g)
-0.0004	-0.0004	-0.0003	-0.0003	-0.0004

3. Departure from nominal value

Applied Weight	Balance Reading	Correction	Measurement Uncertainty	Coverage Factor
(g)	(g)	(g)	(± mg)	(k)
Unload	0.0000	0.0000	0.15	2.13
0.01	0.0100	0.0000	0.15	2.13
0.05	0.0500	0.0000	0.15	2.13
0.1	0.1000	0.0000	0.15	2.13
0.5	0.5000	0.0000	0.15	2.13
1	1.0000	0.0000	0.15	2.13
10	10.0000	0.0000	0.15	2.11
50	49.9999	+0.0001	0.17	2.08
100	99.9999	+0.0001	0.19	2.03
150	149.9998	+0.0002	0.29	2
200	199.9990	+0.0010	0.30	2

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

-000-

เอกสารไม่ควบคุม



มูลนิธิสถาบันพัฒนาผลิตภัณฑ์อาหาร
ศูนย์บริการห้องปฏิบัติการมาตรฐานอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center



Calibration Certificate

Certificate No.: 2402283-002-01
Client name: UNITED ANALYST AND ENGINEERING CONSULTANT CO., LTD.
Address: 3 SOI UDOMSUK 41, SUKHUMVIT ROAD,
Bangchak, Phrakhanong, Bangkok 10260

Page 1 of 4

Equipment: Electronic Balance
Manufacturer: METTLER TOLEDO
Model: XSR205DU
Serial No.: C210685394
ID No.: UAE.WAO.010/2565

Order No.: 2402283
Operation No.: 2402283-002
Date of Receipt: 2 April 2024
Date of Calibration: 2 April 2024

Calibrated by Mr.Jerawut Prapawuttipong
Scientist

Approved by
(Signature)
Manager, Division of Calibration Laboratory
Responsible for the Technical Management Team

Date of Issue: 9 April 2024

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-CS-009 Revision: 01 Date: 20-04-65

เอกสารไม่ควบคุม



Calibration Report

Certificate No.: 2402283-002-01
Equipment: Electronic Balance
Model: XSR205DU
Serial No.: C210685394
Capacity: 220 g
Manufacturer: METTLER TOLEDO
Resolution: 0.0001 g / 0.0001 g
ID No.: UAE.WAO.01Q/2565

Date of Calibration: 2 April 2024 **Page 2 of 4**

Environment Condition: Ambient Temperature: 24.5 ± 0.5 °C Relative Humidity: 47.5 ± 2.5 %

Place of Calibration: Laboratory, UNITED ANALYST AND ENGINEERING CONSULTANT CO., LTD.

Condition of Equipment: Good Condition

Condition of This Results of Calibration:

1. Calibration Method: NFI Method W-MA-001 In-House Method based on UKAS Lab 14 : 2019

2. Reference Standards:

Reference Standard	Model	Serial No.	Calibrated By	Certificate No.	Due Date
Standard Weight Class E2	1mg to 200g	B505367572	TCS	M23040535	8 April 2024
Instrument	Model	Serial No.	Calibrated By	Certificate No.	Due Date
Thermo-Hygro Meter	608-H1	NFI.BTH.016/23	Quality Reborn	Q624-0343	9 February 2025

3. This certificate is traceable to SI UNIT

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.

Calibration Results:

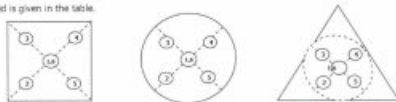
1. Repeatability of Reading:

Nominal Value (g)	Standard Deviation of Reading (g)
40	0.000042
80	0.000052
100	0.000048
200	0.000048

2. Off-Center Error:

A mass of 100 g was placed and moved to various position on pan.

The balance reading obtained is given in the table.



1	2	3	4	5	6	(Maximum Difference)
(g)	(g)	(g)	(g)	(g)	(g)	(g)
100.0000	100.0001	99.9999	99.9999	100.0001	100.0000	0.0001

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

2008 ๒๕๕๓ ถนนสุขุมวิท 36 แขวงคลองเตย เขตคลองเตย กรุงเทพมหานคร 10110
2008 Soi 36, Asoi Asoi Road, Bang Yi Khan Subdistrict, Bang Phai District, Bangkok 10700, Thailand
Tel : +66(0) 2422 8568 Fax : +66(0) 2422 8545



Calibration Report

Certificate No.: 2402283-002-01
Equipment: Electronic Balance
Model: XSR205DU
Serial No.: C210685394
Capacity: 220 g
Manufacturer: METTLER TOLEDO
Resolution: 0.0001 g / 0.0001 g
ID No.: UAE.WAO.01Q/2565

Date of Calibration: 2 April 2024 **Page 3 of 4**

Calibration Results: (Continued)

Calibration Range: 0 - 80 g

Calibration Adjustment: Internal Calibration

3. Departure from Nominal Value: (Range: 0 - 80 g ; Resolution: 0.00001 g)

Nominal Value (g)	Standard Value (g)	Average Reading (g)	Correction (g)	Uncertainty (± g)	Coverage Factor k
Unloaded	0.000000	0.000000	0.000000	0.0000086	2.00
0.001	0.001003	0.001011	-0.000011	0.0000089	2.00
0.005	0.005003	0.005020	-0.000020	0.0000092	2.00
0.01	0.010003	0.010000	0.000000	0.0000089	2.00
0.05	0.049996	0.050000	0.000000	0.0000096	2.00
0.1	0.100011	0.100000	0.000011	0.000011	2.00
0.5	0.500016	0.500001	0.000015	0.000014	2.00
1	1.000003	1.000002	-0.000002	0.000016	2.00
2	2.000023	2.000001	-0.000021	0.000017	2.00
5	5.000017	5.000002	-0.000015	0.000020	2.00
10	10.000009	10.000002	-0.000007	0.000026	2.00
20	20.000031	20.000002	-0.000029	0.000037	2.00
30	30.000040	30.000001	-0.000039	0.000050	2.00
50	50.000028	50.000002	-0.000026	0.000068	2.00
80	80.000068	80.000002	-0.000066	0.00011	2.00

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

2008 ๒๕๕๓ ถนนสุขุมวิท 36 แขวงคลองเตย เขตคลองเตย กรุงเทพมหานคร 10110
2008 Soi 36, Asoi Asoi Road, Bang Yi Khan Subdistrict, Bang Phai District, Bangkok 10700, Thailand
Tel : +66(0) 2422 8568 Fax : +66(0) 2422 8545



Calibration Report

Certificate No.: 2402283-002-01
Equipment: Electronic Balance
Model: XSR205DU
Serial No.: C210685394
Capacity: 220 g
Manufacturer: METTLER TOLEDO
Resolution: 0.0001 g / 0.0001 g
ID No.: UAE.WAO.01Q/2565

Date of Calibration: 2 April 2024 **Page 4 of 4**

Calibration Results: (Continued)

Calibration Range: 81 - 200 g

Calibration Adjustment: Internal Calibration

3. Departure from Nominal Value: (Range: 81 - 200 g ; Resolution: 0.0001 g)

Nominal Value (g)	Standard Value (g)	Average Reading (g)	Correction (g)	Uncertainty (± g)	Coverage Factor k
90	90.00010	90.00001	-0.00009	0.00015	2.00
100	100.00006	100.00001	-0.00005	0.00015	2.00
110	110.00007	110.00001	-0.00006	0.00016	2.00
120	120.00009	120.00000	-0.00009	0.00017	2.00
130	130.00010	130.00000	-0.00010	0.00019	2.00
140	140.00014	140.00000	-0.00014	0.00020	2.00
150	150.00009	150.00001	-0.00008	0.00020	2.00
160	160.00010	160.00001	-0.00009	0.00022	2.00
170	170.00012	170.00001	-0.00011	0.00023	2.00
200	200.00016	200.00002	-0.00014	0.00028	2.00

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

----- End -----

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

2008 ๒๕๕๓ ถนนสุขุมวิท 36 แขวงคลองเตย เขตคลองเตย กรุงเทพมหานคร 10110
2008 Soi 36, Asoi Asoi Road, Bang Yi Khan Subdistrict, Bang Phai District, Bangkok 10700, Thailand
Tel : +66(0) 2422 8568 Fax : +66(0) 2422 8545



Calibration Certificate

Certificate No.: 2402283-001-01
Client name: UNITED ANALYST AND ENGINEERING CONSULTANT CO., LTD.
Address: 3 Soi Udomsuk 41, Sukhumvit Road, Bangchack, Prakhonong, Bangkok 10260

Equipment: Electronic Balance

Manufacturer: METTLER TOLEDO

Model: XSR205DU

Serial No.: C009071872

ID No.: UAE.WAO.012/2563

Order No.: 2402283

Operation No.: 2402283-001

Date of Receipt: 2 April 2024

Date of Calibration: 2 April 2024

Calibrated by Mr.Jerawut Prapawuttipong
Scientist

Approved by

(Mr. J. Prapawuttipong)
Manager, Division of Calibration Laboratory

Date of Issue: 9 April 2024

Responsible for the Technical Management Team

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-CS-009 Revision: 01 Date: 20-04-65

2008 ๒๕๕๓ ถนนสุขุมวิท 36 แขวงคลองเตย เขตคลองเตย กรุงเทพมหานคร 10110
2008 Soi 36, Asoi Asoi Road, Bang Yi Khan Subdistrict, Bang Phai District, Bangkok 10700, Thailand
Tel : +66(0) 2422 8568 Fax : +66(0) 2422 8545





Cert.No.: 24TW39
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).

Instruments	Serial No.	ID No.	Certificate No.	Due Date
1. Burette	-	130BU10	23CG1172	22 Mar 2025
2. Balance	14233821	110RC001	23MM405	16 July 2024

2. Standard Material :-

Material	Manufacturer	Lot.No.	Assay
Sodium Thiosulfate pentahydrate	Merck	AM1763316	100.2%

Result : Dissolved Oxygen Meter Adjustment With Air 100 %
Dissolved Oxygen Probe No.: 22B100125

Titration Method (Azide Modification Method)	DO Meter Reading	Standard Deviation
(mg/L)	(mg/L)	(mg/L)
8.20	8.19	0.0055

This report was certified only for the instrument we tested. It is allowable to use for study 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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เอกสารไม่



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL. 0-2717-3000-29 FAX. 0-2719-8484



Cert. No.: 24TM589
Page : 1 of 3

Certificate of Calibration

Equipment : Hot Air Oven
Manufacturer : Memmert
Model : UF 55
Serial No. : B212.0411
ID No. : UAE.WAO.005/2556
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong,
Bangkok 10260
Location : Lab Floor 2
Received Order : 01 April 2024
Calibration Date : 01 - 02 April 2024
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
Calibrated by : Krisda Malee
Approved by :
() Ponpan Paipim
(✓) Suwit Imjai
() Kunchit Promprat
Issue Date : 5 April 2024

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 head of Corporate Services 3: Equipment Calibration and Testing Services.

เอกสารไม่ควบคุม
A 0065055



Equipment : Hot Air Oven
Condition As-Received : Used Item
Reference : 2404-0004OC-3
Cert. No.: 24TM589
Page : 2 of 3

Procedure Used :-

Calibration were conducted using calibration procedure CP-OT02 based on TLAS G-20 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector (RTD) and Thermocouple Type T.

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Data Acquisition	MY57013711	23LM115	TPA	11 Jul 2024

2. This certificate is valid only to the item calibrated on date and place of calibration.

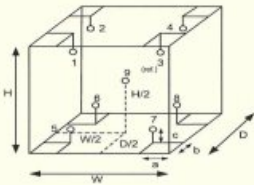
3. This certification is traceable to the International System of Unit.

Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Close



Probe Installation Details : Dimension of Chamber :
a = 5.0 cm D = 0.50 m
b = 5.0 cm W = 0.80 m
c = 5.0 cm H = 0.75 m
Capacity = 0.30 m³

Environment during calibration		
	Beginning	Finished
Temp. (°C)	27	26
REL.Humid. (%)	47	48
AC Supply (Volt)	221	220

Ref. Std. ID No. : @ Calibration Point		
Position :	(120 to 180) °C	(104) °C
1	21-18TC-01	22-18RTD-2/1
2	21-18TC-02	18RTD-2/2
3	21-18TC-03	18RTD-2/3
4	21-18TC-04	18RTD-2/4
5	21-18TC-05	18RTD-2/5
6	21-18TC-06	18RTD-2/6
7	21-18TC-07	18RTD-2/7
8	21-18TC-08	18RTD-2/8
9 (ref.)	21-18TC-09	18RTD-2/9

เอกสารไม่ควบคุม
a 1209739



Equipment : Hot Air Oven
Condition As-Received : Used Item
Reference : 2404-0004OC-3
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close
Cert. No.: 24TM589
Page : 3 of 3

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor k
104.0	104.0	104.0	0.032	0.47	0.84	2
120.0	120.0	120.0	0.12	0.72	1.3	2
180.0	180.0	180.0	0.13	1.2	1.5	2

Calibration Point (°C)	Measured Temperature (°C)									Uncertainty (± °C)
	1	2	3	4	5	6	7	8	9 (ref.)	
104.0	104.464	103.847	104.226	104.232	104.106	103.691	104.275	104.127	104.013	0.42
120.0	120.486	120.089	120.635	120.596	119.531	119.644	120.364	120.144	120.158	1.1
180.0	180.574	179.769	180.285	180.870	179.594	179.790	180.287	179.961	179.802	1.1

Average* : The average of 30 values in each position.

Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.

Temperature 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 or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.

Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation.

UUC* : Unit Under Calibration

Note : The reported uncertainty of measurement was included stability and excluded uniformity .

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

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เอกสารไม่ควบคุม
a 1209738

FOSS

Customer Service Report

Date:	9 Feb 2024
Customer:	UAE
Instrument:	K7200
Report No:	9810
Address:	BANGKOK
Serial:	91790524
Hours Start	09:00
Hours Finish	11:30
Travel To Customer	1 hr
Labour	09:00 - 11:30
Travel From Customer	16:30 - 18:00

Application		Special		Job Type		Standard	
Normal	x	Courtesy Visit	x	Installation	x	Training	x
Distributor	x	PMA Onboarding	x	Quote	x	In House	x
Internal	x	Warranty	x	Repair	x	PM	x
Digital Service	x	Sales Support	x	Remote	x	Other	x

PO/Quote Number: If applicable

PMA Type: FOSSCARE If applicable Contract No. If applicable

Details of Work / Test	Condition / Status
# PM K7200	
- ตรวจสอบและปรับตั้ง PM	
- ตรวจสอบและปรับตั้ง 3 pin 100 ml	
- ปรับค่า 50 ml - 80 ml	
- ตรวจสอบและปรับตั้ง kit	
- ตรวจสอบและปรับตั้ง	
# ตรวจสอบ SOPH Head ตรวจสอบและปรับตั้ง	
10000225 SOPH Head Complete 1 PC	
Instrument Ready for Use	OK Not OK If not OK - Comment

Part No.	Batch	Description	Qty
10009965	14.12.2020	FOSS PM kit lot 100 lot 101 Analysis 100	1

Signed FOSS	Signed Customer
Name	Name
Would you be willing to participate in a brief survey in order to tell us how we performed?	
Email	

เอกสารไม่ควบคุม

FOSS

Customer Service Report

Date:	8-9 Feb 2024
Customer:	UAE
Instrument:	K7200
Report No:	9807
Address:	BANGKOK
Serial:	91889052
Hours Start	09:00
Hours Finish	11:30
Travel To Customer	1.5 hr
Labour	09:00 - 11:30
Travel From Customer	16:00 - 18:00

Application		Special		Job Type		Standard	
Normal	x	Courtesy Visit	x	Installation	x	Training	x
Distributor	x	PMA Onboarding	x	Quote	x	In House	x
Internal	x	Warranty	x	Repair	x	PM	x
Digital Service	x	Sales Support	x	Remote	x	Other	x

PO/Quote Number: If applicable

PMA Type: FOSSCARE If applicable Contract No. If applicable

Details of Work / Test	Condition / Status
# PM K7200	
- ตรวจสอบและปรับตั้ง PM	
- ตรวจสอบและปรับตั้ง 3 pin 100 ml	
- ปรับค่า 50 ml - 80 ml	
- ตรวจสอบและปรับตั้ง kit	
- ตรวจสอบและปรับตั้ง	
# ตรวจสอบ SOPH Head ตรวจสอบและปรับตั้ง	
10000225 SOPH Head Complete 1 PC	
Instrument Ready for Use	OK Not OK If not OK - Comment

Part No.	Batch	Description	Qty
60031807	13.10.2023	FOSS PM kit 8100/8100 12.30	1

Signed FOSS	Signed Customer
Name	Name
Would you be willing to participate in a brief survey in order to tell us how we performed?	
Email	

เอกสารไม่ควบคุม

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3 : EQUIPMENT CALIBRATION AND TESTING SERVICES534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL: 0-2717-3000-29 FAX: 0-2719-9484Cert.No.: 23CH1148
Page.: 1 of 2

Certificate of Calibration

Equipment : Turbidity Meter
Manufacturer : Oakton
Model : T100IR
Serial No. : 1120501017
ID. No. : UAE.WAT.056/2563
Condition As-Received : Used Item
Received Date : 13 September 2023
Calibration Date : 14 September 2023
Reference : 2309-0458DSC-1
Submitted by : United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong, Bangkok 10260
Ambient Temperature : (25 ± 2.5) °C
Relative Humidity : (50 ± 20) %
Calibration Procedure : In-house method : CP-CH11
based on direct measurement by
using Formazin standard solution
Calibrated by : Walalak Sirinthean
Approved by : [Signature]
() Saithip Meangmai
() Warakorn Lemgagtrakul
() Ponpan Paipim
Issue Date : 15 September 2023

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 head of Calibration and Testing Equipment Services.

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A 0011853

Cert.No.: 23CH1148
Page.: 2 of 2

Condition of this calibration result

1. Reference Standard Instruments :

This certification is traceable to the International System of unit (SI unit) through:-
Technology Promotion Association (Thailand-Japan).

Instruments	Serial No.	ID No.	Certificate No.	Due date
1) Thermo-Hygograph	1103328	130EC010	23C1361	13 June 2024
2) Electronic Balance	1124013382	140RC006	23MM18	20 Feb 2024

2. Standard Material : The Formazin suspension has been prepared gravimetric from

Material	Manufacturer	Lot No.	Assay
1) Hexamethylenetetramine	HIMEDIA	0000493947	99.65%
2) Hydrazinium Sulfate	HIMEDIA	0000522014	99.40%

3. This certificate is valid only to the item calibrated on date and place of calibration.

Calibration result

Performing five - Formazin suspension standard curve by using 0,20,100,400,800 NTU
Turbidity Meter Serial Number : 1120501017

Standard	UUC* Reading	Uncertainty of Measurement	Coverage
Formazine suspension	(NTU)	(± NTU)	Factor
0	0.00	0.0067	2.00
20	20.3	0.39	2.00
100	101	0.76	2.00
400	401	1.5	2.05
800	800	2.1	2.23

Remark - UUC* = Unit Under Calibration
- NTU = Nephelometric Turbidity Units

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

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เอกสารไม่ควบคุม

a 1179917

ภาคผนวก จ

เอกสารชี้แนะทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน





กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ เขตปทุมธานี
เขตราชเทวี กรุงเทพฯ ๑๐๑๐๐

๑๓ พฤษภาคม ๒๕๖๕

เรื่อง เปลี่ยนแปลงบุคลากร สารเคมีที่วิเคราะห์และเอกสารอ้างอิงวิธีวิเคราะห์สารเคมี

เรียน กรรมการผู้จัดการ บริษัท ปูนีต แอนนาลิสต์ แอนด์ เอ็นจิเนียริง คอนสัลแตนท์ จำกัด

อ้างถึง ๑. คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารเคมีของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๙ มีนาคม ๒๕๖๕

๒. คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารเคมีของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๓๒ มีนาคม ๒๕๖๕

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือเปลี่ยนแปลงบุคลากร สารเคมีที่วิเคราะห์และเอกสารอ้างอิง
วิธีวิเคราะห์สารเคมี บริษัท ปูนีต แอนนาลิสต์ แอนด์ เอ็นจิเนียริง คอนสัลแตนท์ จำกัด
จำนวน ๑๙ แผ่น

ตามคำขออ้างอิง ๑ และ ๒ บริษัท ปูนีต แอนนาลิสต์ แอนด์ เอ็นจิเนียริง คอนสัลแตนท์ จำกัด
ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๑๕๕ สถานที่ตั้งเลขที่ ๓ ซอยสุขุมสุข ๕๓ ถนนสุขุมวิท แขวงบางจาก
เขตพระโขนง กรุงเทพมหานคร ขอเปลี่ยนแปลงบุคลากร สารเคมีที่วิเคราะห์และเอกสารอ้างอิงวิธีวิเคราะห์
สารเคมี ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นให้เปลี่ยนแปลงดังนี้

๓. ให้ยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๒ ราย

๑) นางสาววิภา ฉายสิงห์ ทะเบียนเลขที่

๒) นายณัฐพล สุขศรี ทะเบียนเลขที่

๔. ให้เพิ่มผู้ควบคุมห้องปฏิบัติการวิเคราะห์เอกชน จำนวน ๑ ราย

นางสาวพรนิจ ไซยะสุขุทธิพิทักษ์ ทะเบียนเลขที่

๕. ให้เพิ่มเจ้าหน้าที่ห้องปฏิบัติการวิเคราะห์เอกชน จำนวน ๒๗ ราย

๑) นางสาวณัฏฐา กิตินานุ ทะเบียนเลขที่

๒) นายนันทวัฒน์ หันประโชชน์ ทะเบียนเลขที่

๓) นางสาวปณิศา ชูพิชิต์ ทะเบียนเลขที่

๔) นางสาวธิดาวัลย์ โพธิ์พันธ์ ทะเบียนเลขที่

๕) นายอาทิตย์ ลาภา ทะเบียนเลขที่

๖) นางสาวบุญยาพร บุญธรรม ทะเบียนเลขที่

๗) นางสาวพัชรพรพรรณ จันทะบุณย ทะเบียนเลขที่

๘) นางสาวณฤศร์ ใต้นันทะ ทะเบียนเลขที่

๙) นางสาวนริศพร รินทรารุ ทะเบียนเลขที่

๑๐) นางสาวพัชรินทร์ แพรกทอง ทะเบียนเลขที่

๑๑) นายธิตติศักดิ์ ภูมิบุตร ทะเบียนเลขที่

๑๒) นางสาวปวีณา...

๑๒) นางสาวปวีณา แทนชนบท ทะเบียนเลขที่
๑๓) นางสาวปวีณา แทนชนบท ทะเบียนเลขที่
๑๔) นางสาวกรรณิกา ทองด้วง ทะเบียนเลขที่
๑๕) นางสาวกรรณิกา ทองด้วง ทะเบียนเลขที่
๑๖) นายณัฐพล สุขศรี ทะเบียนเลขที่
๑๗) นางสาวปาริฉัตร ทองใบ ทะเบียนเลขที่
๑๘) นางสาวสุวิมล สันติสุข ทะเบียนเลขที่
๑๙) นายชัยวัฒน์ จันทะบุณย ทะเบียนเลขที่
๒๐) นางสาวสุวิมล สันติสุข ทะเบียนเลขที่
๒๑) นางสาวกัญญา สันติสุข ทะเบียนเลขที่
๒๒) นางสาวกัญญา สันติสุข ทะเบียนเลขที่
๒๓) นางสาวกัญญา สันติสุข ทะเบียนเลขที่
๒๔) นางสาวกัญญา สันติสุข ทะเบียนเลขที่
๒๕) นางสาวกัญญา สันติสุข ทะเบียนเลขที่
๒๖) นางสาวกัญญา สันติสุข ทะเบียนเลขที่
๒๗) นางสาวกัญญา สันติสุข ทะเบียนเลขที่
๒๘) นางสาวกัญญา สันติสุข ทะเบียนเลขที่
๒๙) นางสาวกัญญา สันติสุข ทะเบียนเลขที่
๓๐) นางสาวกัญญา สันติสุข ทะเบียนเลขที่

๔. ให้ยกเลิกขอขึ้นทะเบียนสารเคมีในน้ำเสีย น้ำใต้ดิน และสิ่งปฏิกูลหรือวัสดุที่ไม่ได้ดิน
ตามรายการเอกสารแนบท้ายหนังสือต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ที่ ๑๓๑๐(๑) /
๓๕๖๕ ลงวันที่ ๙ กุมภาพันธ์ ๒๕๖๕

๕. ให้วิเคราะห์สารเคมีตามข้อ ๔ ได้รับขึ้นทะเบียนวิเคราะห์ในน้ำเสีย น้ำใต้ดิน
และสิ่งปฏิกูลหรือวัสดุที่ไม่ได้ดิน ตามเอกสารแนบท้ายหนังสือเปลี่ยนแปลงบุคลากร สารเคมีที่วิเคราะห์และ
เอกสารอ้างอิงวิธีวิเคราะห์สารเคมี ดังสิ่งที่ส่งมาด้วย

อนึ่ง หนังสือฉบับนี้จะต้องต่ออายุหรือหนังสือต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
ในวันที่ ๒ กุมภาพันธ์ ๒๕๖๕

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายพรศร กลิ่นกรอง)
นายพรศร กลิ่นกรอง
อธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและพัฒนาสิ่งแวดล้อมโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบและตรวจประเมินห้องปฏิบัติการ

โทร. ๐ ๒๕๓๐ ๖๓๑๒ ต่อ ๒๑๐๑-๕

โทรสาร ๐ ๒๕๓๐ ๖๓๑๒ ต่อ ๒๑๐๑

ไปรษณีย์อิเล็กทรอนิกส์ saraban@div.mail.go.th



"อุตสาหกรรมก้าวไกล ประเด็นนโยบายด้านสิ่งแวดล้อม พัฒนาอุตสาหกรรมสีเขียว"

เอกสารแนบท้ายหนังสือเปลี่ยนแปลงบุคลากร สารเคมีที่วิเคราะห์และเอกสารอ้างอิงวิธีวิเคราะห์สารเคมี

บริษัท ปูนีต แอนนาลิสต์ แอนด์ เอ็นจิเนียริง คอนสัลแตนท์ จำกัด เลขทะเบียน ๖-๑๕๕

ที่ ๑๓ ๑๓๑๐(๑) / ๕๓ ๓๕ พฤษภาคม ๒๕๖๕

ขอขยายสารเคมีที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๒๐๗ รายการ

น้ำ/น้ำเสีย จำนวน ๔๖ รายการ

ลำดับ	สารเคมี	วิธีวิเคราะห์
1	Aldrin	Liquid-Liquid Extraction, Gas Chromatographic Method ^[3]
2	Arsenic	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[3] 2) Digestion, Inductively Coupled Plasma Method ^[3]
3	Barium	Digestion, Inductively Coupled Plasma Method ^[3]
4	α-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method ^[3]
5	β-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method ^[3]
6	δ-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method ^[3]
7	γ-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method ^[3]
8	Biochemical Oxygen Demand	1) 5-Day BOD Test, Azide Modification Method ^[3] 2) 5-Day BOD Test, Membrane Electrode Method ^[3]
9	Cadmium	1) Digestion, Direct Air-Acetylene Flame Method ^[3] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[3] 3) Digestion, Inductively Coupled Plasma Method ^[3]
10	Chemical Oxygen Demand	1) Closed Reflux, Titrimetric Method ^[3] 2) Closed Reflux, Colorimetric Method ^[3] 3) Open Reflux, Titrimetric Method ^[3]
11	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic Method ^[3]
12	Chromium	1) Digestion, Direct Air-Acetylene Flame Method ^[3] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[3] 3) Digestion, Inductively Coupled Plasma Method ^[3]
13	Color	ADMI Weighted-Ordinate Spectrophotometric Method ^[3]
14	Copper	1) Digestion, Direct Air-Acetylene Flame Method ^[3] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[3] 3) Digestion, Inductively Coupled Plasma Method ^[3]
15	Cyanide	1) Distillation, Direct Air-Acetylene Flame Method ^[3] 2) Flow Injection Analysis Method ^[3]
16	o,p'-DDT	Liquid-Liquid Extraction, Gas Chromatographic Method ^[3]

17 4,4'-DDD...

ลำดับ	สารเคมี	วิธีวิเคราะห์
17	4,4'-DDD	Liquid-Liquid Extraction, Gas Chromatographic Method ^[3]
18	4,4'-DDE	Liquid-Liquid Extraction, Gas Chromatographic Method ^[3]
19	4,4'-DDT	Liquid-Liquid Extraction, Gas Chromatographic Method ^[3]
20	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic Method ^[3]
21	Endosulfan I	Liquid-Liquid Extraction, Gas Chromatographic Method ^[3]
22	Endosulfan II	Liquid-Liquid Extraction, Gas Chromatographic Method ^[3]
23	Endosulfan sulfate	Liquid-Liquid Extraction, Gas Chromatographic Method ^[3]
24	Endrin	Liquid-Liquid Extraction, Gas Chromatographic Method ^[3]
25	Endrin aldehyde	Liquid-Liquid Extraction, Gas Chromatographic Method ^[3]
26	Formaldehyde	Distillation, Colorimetric Method ^[3]
27	Free Chlorine	1) Iodometric Method ^[3] 2) DPD Ferrous Titrimetric Method ^[3]
28	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic Method ^[3]
29	Heptachlor Epoxide	Liquid-Liquid Extraction, Gas Chromatographic Method ^[3]
30	Hexavalent Chromium	1) Colorimetric Method ^[3] 2) Extraction, Direct Air-Acetylene Flame Method ^[3]
31	Lead	1) Digestion, Direct Air-Acetylene Flame Method ^[3] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[3] 3) Digestion, Inductively Coupled Plasma Method ^[3]
32	Manganese	1) Digestion, Direct Air-Acetylene Flame Method ^[3] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[3] 3) Digestion, Inductively Coupled Plasma Method ^[3]
33	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[3]
34	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic Method ^[3]
35	Nickel	1) Digestion, Direct Air-Acetylene Flame Method ^[3] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[3] 3) Digestion, Inductively Coupled Plasma Method ^[3]
36	Oil & Grease	1) Soxhlet Extraction Method ^[3] 2) Soxhlet Extraction Method ^[3]
37	pH	Electrometric Method ^[3]

38 Phenols...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
38	Phenols	1) Distillation, Chloroform Extraction Method ^[3] 2) Distillation, Direct Photometric Method ^[3]
39	Selenium	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[3] 2) Digestion, Inductively Coupled Plasma Method ^[3]
40	Sulfide	1) Iodometric Method ^[3] 2) Methylene Blue Method ^[3]
41	Temperature	Laboratory and Field Methods ^[3]
42	Total Dissolved Solids	Dried at 180 °C ^[3]
43	Total Kjeldahl Nitrogen	Semi-Micro-Kjeldahl Method ^[3]
44	Total Suspended Solids	Dried from 103 to 105 °C ^[3]
45	Trivalent Chromium	1) Digestion, Direct Air-Acetylene Flame Method; Colorimetric Method; Calculation ^[3] 2) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation ^[3]
46	Zinc	1) Digestion, Direct Air-Acetylene Flame Method ^[3] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[3] 3) Digestion, Inductively Coupled Plasma Method ^[3]

น้ำใต้ดิน จำนวน 126 รายการ

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[3] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[3]
2	Acetone	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[3]
3	Aldrin	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[3] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[3]
4	Anthracene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[3] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[3]

5 Antimony...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
5	Antimony	Digestion, Inductively Coupled Plasma Method ^[3]
6	Arsenic	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[3] 2) Digestion, Inductively Coupled Plasma Method ^[3]
7	Atrazine	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[3]
8	Barium	1) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[3] 2) Digestion, Inductively Coupled Plasma Method ^[3]
9	Benz(a)anthracene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[3] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[3]
10	Benzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[3]
11	Benzo(b)fluoranthene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[3] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[3]
12	Benzo(k)fluoranthene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[3] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[3]
13	Benzoic acid	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[3]
14	Benzo(a)pyrene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[3] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[3]
15	Benzo(g,h,i)perylene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[3] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[3]
16	Beryllium	Digestion, Inductively Coupled Plasma Method ^[3]
17	Bis(2-chloroethyl)ether	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[3]
18	Bis(2-ethylhexyl)phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[3]

19 Bromodichloromethane...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
19	Bromodichloromethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[3]
20	Bromoform	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[3]
21	Butanol	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[3]
22	Butyl benzyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[3]
23	Cadmium	1) Digestion, Direct Air-Acetylene Flame Method ^[3] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[3] 3) Digestion, Inductively Coupled Plasma Method ^[3]
24	Carbazole	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[3]
25	Carbon disulfide	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[3]
26	Carbon tetrachloride	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[3]
27	Chlordane	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[3] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[3]
28	p-Chloroaniline	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[3]
29	Chlorobenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[3]
30	Chlorodibromomethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[3]
31	Chloroform	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[3]
32	2-Chlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[3]
33	Chromium	1) Digestion, Direct Air-Acetylene Flame Method; Colorimetric Method; Calculation ^[3] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[3] 3) Digestion, Inductively Coupled Plasma Method ^[3]

34 Chromium (III)...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
34	Chromium (III)	1) Digestion, Direct Air-Acetylene Flame Method; Colorimetric Method; Calculation ^[3] 2) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation ^[3]
35	Chromium (VI)	1) Colorimetric Method ^[3] 2) Extraction, Air-Acetylene Flame Method ^[3]
36	Chrysene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[3] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[3]
37	Cyanide	Distillation, Colorimetric Method ^[3]
38	2,4-D	Liquid-Liquid Extraction, Gas Chromatographic Method ^[3]
39	DDD	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[3] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[3]
40	DDE	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[3] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[3]
41	DDT	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[3] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[3]
42	Dibenz(a,h)anthracene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[3] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[3]
43	Di-n-butyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[3]
44	1,2-Dichlorobenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[3]
45	1,3-Dichlorobenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[3]
46	1,4-Dichlorobenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[3]
47	3,3'-Dichlorobenzidine	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[3]

48 1,1-Dichloroethane...

ลำดับ	สารเคมี	วิธีวิเคราะห์
48	1,1-Dichloroethane	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾
49	1,2-Dichloroethane	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾
50	1,1-Dichloroethylene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾
51	cis-1,2-Dichloroethylene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾
52	trans-1,2-Dichloroethylene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾
53	2,4-Dichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾
54	1,2-Dichloropropane	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾
55	1,3-Dichloropropane	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾
56	1,3-Dichloropropene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾
57	Dieldrin	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽³⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾
58	Diethyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾
59	2,4-Dimethylphenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾
60	2,4-Dinitrophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾
61	2,4-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾
62	2,6-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾
63	Di n Octyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾
64	Endosulfan	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽³⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾

ลำดับ	สารเคมี	วิธีวิเคราะห์
65	Endrin	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽³⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾
66	Ethylbenzene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾
67	Fluoranthene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽³⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾
68	Fluorene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽³⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾
69	Heptachlor	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽³⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾
70	Heptachlor epoxide	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽³⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾
71	Hexachlorobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾
72	Hexachloro-1,3-butadiene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾
73	n-Hexane	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾
74	α-HCH	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽³⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾
75	β-HCH	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽³⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾

76 γ-HCH...

ลำดับ	สารเคมี	วิธีวิเคราะห์
76	γ-HCH	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽³⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾
77	Hexachlorocyclopentadiene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾
78	Hexachloroethane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾
79	Indeno(1,2,3-cd)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾
80	Isophorone	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾
81	Lead	1) Digestion, Direct Air-Acetylene Flame Method ⁽³⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽³⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽³⁾
82	Manganese	1) Digestion, Direct Air-Acetylene Flame Method ⁽³⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽³⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽³⁾
83	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽³⁾
84	Methanol	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾
85	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽³⁾
86	Methyl bromide	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾
87	Methylene chloride	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾
88	2-Methylphenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾
89	2-Methylnaphthalene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽³⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾
90	Methyl tert-butyl ether	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾

91 Naphthalene...

ลำดับ	สารเคมี	วิธีวิเคราะห์
91	Naphthalene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽³⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾
92	Nickel	1) Digestion, Direct Air-Acetylene Flame Method ⁽³⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽³⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽³⁾
93	Nitrobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾
94	N-Nitrosodiphenylamine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾
95	N-Nitrosodi-n-propylamine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾
96	Polychlorinated Biphenyls - PCB 1016 - PCB 1221 - PCB 1232 - PCB-1242 - PCB-1248 - PCB-1254 - PCB-1260	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽³⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾
97	Pentachlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾
98	pH	Electrometric Method ⁽³⁾
99	Phenanthrene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽³⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾
100	Phenol	1) Distillation, Chloroform Extraction Method ⁽³⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾
101	Pyrene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽³⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽³⁾

102 Pyrene...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
102	Selenium	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[3] 2) Digestion, Inductively Coupled Plasma Method ^[3]
103	Silver	Digestion, Inductively Coupled Plasma Method ^[3]
104	Styrene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^[3]
105	1,1,2,2-Tetrachloroethane	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^[3]
106	Tetrachloroethylene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^[3]
107	Toluene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^[3]
108	Iovaphene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[3] 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[3]
109	TPH (C ₅ - C ₈)	1) Purge and Trap, Gas Chromatographic Method ^[3,20] 2) Purge and Trap, Gas Chromatographic/ Mass spectrometric Method ^[3,23]
110	TPH (C ₈ - C ₁₀)	Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[7,28]
111	TPH (C ₁₀ - C ₃₀)	Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[7,28]
112	1,2,4-Trichlorobenzene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^[3]
113	1,1,1-Trichloroethane	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^[3]
114	1,1,2-Trichloroethane	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^[3]
115	Trichloroethylene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^[3]
116	2,4,5-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[3]
117	2,4,6-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[3]
118	1,3,5-Trimethylbenzene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^[3]

119 Vanadium...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
119	Vanadium	Digestion, Inductively Coupled Plasma Method ^[3]
120	Vinyl acetate	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^[3]
121	Vinyl chloride	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^[3]
122	m-Xylene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^[3]
123	o-Xylene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^[3]
124	p-Xylene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^[3]
125	Xylene (Total)	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^[3]
126	Zinc	1) Digestion, Direct Air-Acetylene Flame Method ^[3] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[3] 3) Digestion, Inductively Coupled Plasma Method ^[3]

สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน 35 รายการ

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
1	Aldrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[7,23] 2) Ultrasonic Extraction, Gas Chromatographic Method ^[8,21]
2	Antimony	Digestion, Inductively Coupled Plasma Method ^[3,12]
3	Arsenic	1) Waste Extraction, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[3,14] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[3,12] 3) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[3,14] 4) Digestion, Inductively Coupled Plasma Method ^[3,12]
4	Barium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[3,12] 2) Digestion, Inductively Coupled Plasma Method ^[3,12]

5 Beryllium...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
5	Beryllium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[3,12] 2) Digestion, Inductively Coupled Plasma Method ^[3,12]
6	Cadmium	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[3,13] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[3,12] 3) Digestion, Flame Atomic Absorption Spectrometric Method ^[3,13] 4) Digestion, Inductively Coupled Plasma Method ^[3,12]
7	Chlordane	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[7,21] 2) Ultrasonic Extraction, Gas Chromatographic Method ^[8,21]
8	Chromium	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[3,13] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[3,12] 3) Digestion, Flame Atomic Absorption Spectrometric Method ^[3,13] 4) Digestion, Inductively Coupled Plasma Method ^[3,12]
9	Chromium (III)	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method; Waste Extraction, Colorimetric Method; Calculation ^[3,13,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method; Waste Extraction, Colorimetric Method; Calculation ^[3,12,15] 3) Digestion, Flame Atomic Absorption Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation ^[3,13,15] 4) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation ^[3,12,15]
10	Chromium (VI)	1) Waste Extraction, Colorimetric Method; 2) Alkaline Digestion, Colorimetric Method
11	Cobalt	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[3,12] 2) Digestion, Inductively Coupled Plasma Method ^[3,12]

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
12	Copper	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[3,13] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[3,12] 3) Digestion, Flame Atomic Absorption Spectrometric Method ^[3,13] 4) Digestion, Inductively Coupled Plasma Method ^[3,12]
13	2,4-D	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[7,21] 2) Ultrasonic Extraction, Gas Chromatographic Method ^[8,21]
14	DDD	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[7,21] 2) Ultrasonic Extraction, Gas Chromatographic Method ^[8,21]
15	DDE	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[7,21] 2) Ultrasonic Extraction, Gas Chromatographic Method ^[8,21]
16	DDT	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[7,21] 2) Ultrasonic Extraction, Gas Chromatographic Method ^[8,21]
17	Dieldrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[7,21] 2) Ultrasonic Extraction, Gas Chromatographic Method ^[8,21]
18	Endrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[7,21] 2) Ultrasonic Extraction, Gas Chromatographic Method ^[8,21]
19	Heptachlor	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[7,21] 2) Ultrasonic Extraction, Gas Chromatographic Method ^[8,21]

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
20	Lead	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^(1,4,13) 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,4,12) 3) Digestion, Flame Atomic Absorption Spectrometric Method ^(5,13) 4) Digestion, Inductively Coupled Plasma Method ^(5,12)
21	Lindane	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(1,7,21) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(8,21)
22	Mercury	1) Waste Extraction, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^(1,4,1) 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,4,12) 3) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^(1,7) 4) Digestion, Inductively Coupled Plasma Method ^(5,12) 5) Thermal Decomposition Amalgamation and Atomic Absorption Spectrometric Method ^(1,8)
23	Methoxychlor	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(1,7,21) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(8,21)
24	Molybdenum	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,4,12) 2) Digestion, Inductively Coupled Plasma Method ^(5,12)
25	Nickel	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^(1,4,13) 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,4,12) 3) Digestion, Flame Atomic Absorption Spectrometric Method ^(5,13) 4) Digestion, Inductively Coupled Plasma Method ^(5,12)

26 Polychlorinated Biphenyls...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
26	Polychlorinated Biphenyls - Aroclor 1016 - Aroclor 1221 - Aroclor 1232 - Aroclor 1242 - Aroclor 1248 - Aroclor 1254 - Aroclor 1260 - 2-Chlorobiphenyl - 2,3-Dichlorobiphenyl - 2,2',5-Trichlorobiphenyl - 2,4',5-Trichlorobiphenyl - 2,2',3,5'-Tetrachlorobiphenyl - 2,2',5,5'-Tetrachlorobiphenyl - 2,3',4,4'-Tetrachlorobiphenyl - 2,2',3,4,5'-Pentachlorobiphenyl - 2,2',4,5,5'-Pentachlorobiphenyl - 2,3,3',4',6'-Pentachlorobiphenyl - 2,2',3,4,4',5'-Hexachlorobiphenyl - 2,2',3,4,5,5'-Hexachlorobiphenyl - 2,2',3,5,5',6'-Hexachlorobiphenyl - 2,2',4,4',5,5'-Hexachlorobiphenyl - 2,2',3,3',4,4',5'-Heptachlorobiphenyl - 2,2',3,4,4',5,6'-Heptachlorobiphenyl - 2,2',3,4',5,5',6'-Heptachlorobiphenyl - 2,2',3,3',4,4',5,5',6'-Nonachlorobiphenyl	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(1,7,22) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(8,22)

27 Polychlorinated Biphenyls...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
27	Pentachlorophenol	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,7,24) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(8,26) Electrometric Method ^(25,26)
28	pH	
29	Selenium	1) Waste Extraction, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^(1,4,13) 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,4,12) 3) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^(5,13) 4) Digestion, Inductively Coupled Plasma Method ^(5,12)
30	Silver	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,4,12) 2) Digestion, Inductively Coupled Plasma Method ^(5,12)
31	Thallium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,4,12) 2) Digestion, Inductively Coupled Plasma Method ^(5,12)
32	Toxaphene	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(1,7,21) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(8,21)
33	Trichloroethylene	1) Waste Extraction, Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(1,10,23) 2) Waste Extraction, Equilibrium Headspace, Gas Chromatographic/Mass Spectrometric Method ^(1,9,23) 3) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(1,12,23) 4) Equilibrium Headspace, Gas Chromatographic/Mass Spectrometric Method ^(5,23)
34	Vanadium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,4,12) 2) Digestion, Inductively Coupled Plasma Method ^(5,12)

35 Zinc...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
35	Zinc	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^(1,4,13) 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,4,12) 3) Digestion, Flame Atomic Absorption Spectrometric Method ^(5,13) 4) Digestion, Inductively Coupled Plasma Method ^(5,12)

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12. United States...

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บริษัท ยูเออี จำกัด
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บริษัท ยูเออี จำกัด
100 หมู่ 10 ต.บางพลีใหญ่ อ.บางพลี จ.สมุทรปราการ 10540

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบและประเมินผลเชิงปริมาณ การวิเคราะห์ดินและน้ำ การวิเคราะห์อากาศ การวิเคราะห์ของเสีย



ที่ กค ๐๓๑๐(๑) ๑๖ ๙ ๑ ๘

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๑๓ ธันวาคม ๒๕๖๖

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท ยูเออี แอนาไลติก แอนด์ เอ็นจิเนียริ่ง คอนซัลแตนท์ จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และขออนุมัติของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๗ พฤศจิกายน ๒๕๖๖

ตามที่บริษัท ยูเออี แอนาไลติก แอนด์ เอ็นจิเนียริ่ง คอนซัลแตนท์ จำกัด ขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และขออนุมัติของห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๑๔๕ สถานที่ตั้งเลขที่ ๓ ซอยอุดมสุข ๔๓ ถนนสุขุมวิท แขวงบางจาก เขตพระโขนง กรุงเทพมหานคร ขอเปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์ ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้เพิ่มเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๖ ราย ได้แก่

- | | |
|--------------------------|---------------|
| ๑) นางสาวพรพิมล ประจักษ์ | ทะเบียนเลขที่ |
| ๒) นายวิมล ภูมิกุล | ทะเบียนเลขที่ |
| ๓) นางสาวณิชา แก้วภาพ | ทะเบียนเลขที่ |
| ๔) นายนิพนธ์ สุขศรี | ทะเบียนเลขที่ |
| ๕) นายสิทธิพล พรหมทอง | ทะเบียนเลขที่ |
| ๖) นางสาวนันทพร การงานดี | ทะเบียนเลขที่ |

อนึ่ง หนังสือฉบับนี้จะหมดอายุพร้อมหนังสือต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ต่อในวันที่ ๒ กุมภาพันธ์ ๒๕๖๘ ทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์ กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายประจักษ์ ชัยพรหม)
ผู้อำนวยการกองวิเคราะห์และประเมินผลเชิงปริมาณ
มูลนิธิราชประชานุเคราะห์ กรมโรงงานอุตสาหกรรม



กองวิจัยและเตือนภัยมลพิษโรงงาน
กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบและประเมินผลเชิงปริมาณ
โทร. ๐ ๒๕๓๐ ๖๓๒๒ ต่อ ๒๑๐๓-๕
โทรสาร ๐ ๒๕๓๐ ๖๓๒๒ ต่อ ๒๑๕๔
ไปรษณีย์อิเล็กทรอนิกส์ sarabang@diw.mail.go.th



"อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"



ที่ กค ๐๓๑๐(๑) ๘ ๙ ๒ ๕

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๒๕ พฤษภาคม ๒๕๖๖

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท ยูเออี แอนาไลติก แอนด์ เอ็นจิเนียริ่ง คอนซัลแตนท์ จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และขออนุมัติของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๑๖ พฤษภาคม ๒๕๖๖

ตามที่บริษัท ยูเออี แอนาไลติก แอนด์ เอ็นจิเนียริ่ง คอนซัลแตนท์ จำกัด ขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และขออนุมัติของห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๑๔๕ สถานที่ตั้งเลขที่ ๓ ซอยอุดมสุข ๔๓ ถนนสุขุมวิท แขวงบางจาก เขตพระโขนง กรุงเทพมหานคร ขอเปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์ ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้

๑. ให้อยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๕ ราย

- | | |
|--------------------------|---------------|
| ๑) นางสาวพรพิมล ประจักษ์ | ทะเบียนเลขที่ |
| ๒) นายวิมล ภูมิกุล | ทะเบียนเลขที่ |
| ๓) นางสาวณิชา แก้วภาพ | ทะเบียนเลขที่ |
| ๔) นายนิพนธ์ สุขศรี | ทะเบียนเลขที่ |
| ๕) นายสิทธิพล พรหมทอง | ทะเบียนเลขที่ |

๒. ให้เพิ่มเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๔ ราย

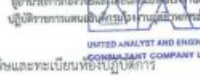
- | | |
|---------------------------|---------------|
| ๑) นางสาววิภา ฝ้ายสิงห์ | ทะเบียนเลขที่ |
| ๒) นางสาวณิชา สุขศรี | ทะเบียนเลขที่ |
| ๓) นางสาวเพ็ญพิชชา รอดทอง | ทะเบียนเลขที่ |
| ๔) นางสาวณิชา แสงสว่าง | ทะเบียนเลขที่ |

อนึ่ง หนังสือฉบับนี้จะหมดอายุพร้อมหนังสือต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ต่อในวันที่ ๒ กุมภาพันธ์ ๒๕๖๘ ทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์ กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายประจักษ์ ชัยพรหม)
ผู้อำนวยการกองวิเคราะห์และประเมินผลเชิงปริมาณ
มูลนิธิราชประชานุเคราะห์ กรมโรงงานอุตสาหกรรม



กองวิจัยและเตือนภัยมลพิษโรงงาน
กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบและประเมินผลเชิงปริมาณ
โทร. ๐ ๒๕๓๐ ๖๓๒๒ ต่อ ๒๑๐๓-๕
โทรสาร ๐ ๒๕๓๐ ๖๓๒๒ ต่อ ๒๑๕๔
ไปรษณีย์อิเล็กทรอนิกส์ sarabang@diw.mail.go.th



"อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"





ที่ อก ๐๓๑๐(๑)/ ๖ ๐ ๒ ๘

กรมโรงงานอุตสาหกรรม
ถนนพหลโยธิน
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

ยี่สิบ หนึ่ง เดือน มิถุนายน พุทธศักราช ๒๕๖๕
ที่ อก ๐๓๑๐(๑)/๖๐๒๘ ลงวันที่ ๕ กุมภาพันธ์ ๒๕๖๕ คือในวันที่ ๒ กุมภาพันธ์ ๒๕๖๕ ทั้งนี้ สามารถยื่นคำขอ
ผ่านระบบอิเล็กทรอนิกส์ได้ทั้งหน้าเว็บไซต์กรมโรงงานอุตสาหกรรม ตาม QR Code ที่แนบมาด้วย

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายประจักษ์ อัครพงษ์)
ผู้อำนวยการส่วนเฝ้าระวังและติดตาม
ปฏิบัติการตามนโยบายกรมโรงงานอุตสาหกรรม



ยื่นคำขอผ่านระบบอิเล็กทรอนิกส์

เรื่อง เปลี่ยนแปลงบุคลากรและสารมลพิษที่วิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท ยูโนเด็ค แอนาไลติกส์ แอนด์ เอ็นจิเนียริ่ง คอนซัลแตนท์ จำกัด

อ้างถึง คำขอรับเปลี่ยน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษขอส่งปฏิบัติการวิเคราะห์เอกสาร
ลงวันที่ ๓๐ มกราคม ๒๕๖๕

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือเปลี่ยนแปลงบุคลากรและสารมลพิษที่วิเคราะห์

บริษัท ยูโนเด็ค แอนาไลติกส์ แอนด์ เอ็นจิเนียริ่ง คอนซัลแตนท์ จำกัด จำนวน ๒ แผ่น

ตามหนังสือที่ยังถึง บริษัท ยูโนเด็ค แอนาไลติกส์ แอนด์ เอ็นจิเนียริ่ง คอนซัลแตนท์ จำกัด
ห้องปฏิบัติการวิเคราะห์เอกสาร เลขทะเบียน ๖-๑๔๕ สถานที่ตั้งเลขที่ ๓ ซอยสุขุมสุข ๔๑ ถนนสุขุมวิท
แขวงบางจาก เขตพระโขนง กรุงเทพมหานคร ขอเปลี่ยนแปลงบุคลากรและสารมลพิษที่วิเคราะห์ที่
ความละเอียดแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้

๑. ให้ยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๒ ราย

๑) นายวิญญู สุวรรณราช ทะเบียนเลขที่ [REDACTED]

๒) นายพิพัฒน์ ดันธกุล ทะเบียนเลขที่ [REDACTED]

๒. ให้เพิ่มเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑๑ ราย

๑) นางสาวอรุณา ประสานศรี ทะเบียนเลขที่ [REDACTED]

๒) นายพศพล เนียมเนียม ทะเบียนเลขที่ [REDACTED]

๓) นายศุภกร สวรรค์ ทะเบียนเลขที่ [REDACTED]

๔) นายคณพล คลานนท์ ทะเบียนเลขที่ [REDACTED]

๕) นายโชติชัย พุ่มไส ทะเบียนเลขที่ [REDACTED]

๖) นายณวัชร์ กลั่นบ้านเกาะ ทะเบียนเลขที่ [REDACTED]

๗) นายธีรวัฒน์ อรรณวรรณ ทะเบียนเลขที่ [REDACTED]

๘) นายนิธิต พงศ์ ขะขุนทด ทะเบียนเลขที่ [REDACTED]

๙) นางสาวณัฐกานดา พลนิกกิจ ทะเบียนเลขที่ [REDACTED]

๑๐) นางสาวชไมพร ทองบุญมี ทะเบียนเลขที่ [REDACTED]

๑๑) นางสาวพรธิศา ขจรเนติพิทักษ์ ทะเบียนเลขที่ [REDACTED]

๓. ให้เพิ่มรอบการวิเคราะห์ที่วิเคราะห์ในดิน ตามสิ่งที่ส่งมาด้วย



ดำเนินการ

อนึ่ง...

กองวิจัยและพัฒนาเฝ้าระวังมลพิษโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๕๖๐ ๖๓๒๒ ต่อ ๒๕๐๕-๕ โทรสาร ๐ ๒๕๖๐ ๖๓๒๒ ต่อ ๒๕๐๕

ไปรษณีย์อิเล็กทรอนิกส์ sarabang@dlw.mail.go.th



ดำเนินการ



"อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"



เอกสารแนบท้ายหนังสือเปลี่ยนแปลงบุคลากรและสารมลพิษที่วิเคราะห์

บริษัท ยูโนเด็ค แอนาไลติกส์ แอนด์ เอ็นจิเนียริ่ง คอนซัลแตนท์ จำกัด เลขทะเบียน ๖-๑๔๕

ที่ อก ๐๓๑๐(๑)/ ๖ ๐ ๒ ๘

ลงวันที่ ๒๒ มีนาคม ๒๕๖๕

ขอขยายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๑๖ รายการ

สืบ จำนวน 16 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Benzene	Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method (1,2)
2	Carbon tetrachloride	Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method (1,2)
3	1,2-Dichloroethane	Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method (1,2)
4	1,1-Dichloroethylene	Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method (1,2)
5	cis-1,2-Dichloroethylene	Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method (1,2)
6	trans-1,2-Dichloroethylene	Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method (1,2)
7	Ethylbenzene	Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method (1,2)
8	Methylene chloride	Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method (1,2)
9	Styrene	Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method (1,2)
10	Tetrachloroethylene	Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method (1,2)
11	Toluene	Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method (1,2)
12	Trichloroethylene	Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method (1,2)
13	m-Xylene	Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method (1,2)
14	o-Xylene	Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method (1,2)
15	p-Xylene	Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method (1,2)
16	Xylene (Total)	Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method (1,2)

ดำเนินการ



ดำเนินการ

เอกสารอ้างอิง...

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ กองวิจัยและพัฒนาเฝ้าระวังมลพิษโรงงาน กรมโรงงานอุตสาหกรรม โทร. ๐ ๒๕๖๐ ๖๓๒๒ ต่อ ๒๕๐๕-๕



ที่ อก ๐๓๑๐(๑)/ ๑๕๕๕.๕.๕

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๒๕ ตุลาคม ๒๕๖๕

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท ยูโนเด็ค แอนนาลิสต์ แอนด์ เอ็นจิเนียริ่ง คอนซัลแตนท์ จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และขอปิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๑๘ ตุลาคม ๒๕๖๕

ตามหนังสือที่อ้างถึง บริษัท ยูโนเด็ค แอนนาลิสต์ แอนด์ เอ็นจิเนียริ่ง คอนซัลแตนท์ จำกัด
ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๑๕๕๕ สภาที่ตั้งเลขที่ ๓ ซอยอุดมสุข ๔๑ ถนนสุขุมวิท แขวงบางจาก
เขตพระโขนง กรุงเทพมหานคร ขอเปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์ ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้

๑. ให้ออกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๘ ราย

- | | |
|---|---------------|
| ๑) นางสาวรามา แก้วชื่อนอก | ทะเบียนเลขที่ |
| ๒) นายกนกพงศ์ บุญพวง | ทะเบียนเลขที่ |
| ๓) นายกฤตพล พงศ์สตาพร | ทะเบียนเลขที่ |
| ๔) นางสาวอัญญลักษณ์ อนุโชติกาญจนนารถ | ทะเบียนเลขที่ |
| ๒. ให้เพิ่มผู้ควบคุมห้องปฏิบัติการวิเคราะห์ จำนวน ๒ ราย | |
| ๑) นายกนกพงศ์ บุญพวง | ทะเบียนเลขที่ |
| ๒) นางสาวรามา แก้วชื่อนอก | ทะเบียนเลขที่ |
| ๓. ให้เพิ่มเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑๒ ราย | |
| ๑) นายชินวัฒน์ หอยสิงห์ | ทะเบียนเลขที่ |
| ๒) นายประพันธ์ แก้วภาคำ | ทะเบียนเลขที่ |
| ๓) นายกิตติศักดิ์ มุสิกกุล | ทะเบียนเลขที่ |
| ๔) นายคุณานนท์ อุตสาหกรรมานนท์ | ทะเบียนเลขที่ |
| ๕) นายชาญณรงค์ อัครอ | ทะเบียนเลขที่ |
| ๖) นางสาวจิรณาส ศรีวรรณ | ทะเบียนเลขที่ |
| ๗) นายสุจิต โปชันเงิน | ทะเบียนเลขที่ |
| ๘) นายเจษฎา ชั่วศรี | ทะเบียนเลขที่ |
| ๙) นายวศุข เหมสุลิน | ทะเบียนเลขที่ |
| ๑๐) นายสุรศักดิ์ ชุมเอื้อ | ทะเบียนเลขที่ |
| ๑๑) นายสุโรจ หล้าโ | ทะเบียนเลขที่ |
| ๑๒) นายชัย บัวสด | ทะเบียนเลขที่ |



อนึ่ง หนังสือฉบับนี้...

อนึ่ง หนังสือฉบับนี้จะมีผลใช้บังคับเมื่อได้รับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
ที่ อก ๐๓๑๐(๑)/๑๕๕๕๕ ลงวันที่ ๔ กุมภาพันธ์ ๒๕๖๕ คือในวันที่ ๒ กุมภาพันธ์ ๒๕๖๕ ทั้งนี้ สามารถยื่นคำขอ
ผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม ตาม QR Code ที่แนบมาเพื่อทราบ

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายประสม ค้างคอง)

ผู้อำนวยการอาวุโสและเขียนแบบสถาปัตย์โรงงาน
ปฏิบัติการตามหนังสือกรมโรงงานอุตสาหกรรม



ยื่นคำขอผ่านระบบอิเล็กทรอนิกส์

กองวิจัยและเขียนแบบสถาปัตย์โรงงาน

กลุ่มมาตรฐานวิศวกรรมวิเคราะห์ทดสอบและเขียนแบบห้องปฏิบัติการ

โทร. ๐ ๒๕๓๐ ๖๓๒๒ ต่อ ๒๑๐๓-๕

โทรสาร ๐ ๒๕๓๐ ๖๓๒๒ ต่อ ๒๑๐๓

ไปรษณีย์อิเล็กทรอนิกส์ sarabang@dw.mail.go.th



ดำเนินการถูกต้อง



"อุตสาหกรรมก้าวไกล ประเทไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"



ที่ อก ๐๓๑๐(๑)/ ๑๒ ๑๕๕๕

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๐๑ กันยายน ๒๕๖๕

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท ยูโนเด็ค แอนนาลิสต์ แอนด์ เอ็นจิเนียริ่ง คอนซัลแตนท์ จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และขอปิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๒๖ สิงหาคม ๒๕๖๕

ตามหนังสือที่อ้างถึง บริษัท ยูโนเด็ค แอนนาลิสต์ แอนด์ เอ็นจิเนียริ่ง คอนซัลแตนท์ จำกัด
ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๑๕๕๕ สภาที่ตั้งเลขที่ ๓ ซอยอุดมสุข ๔๑ ถนนสุขุมวิท แขวงบางจาก
เขตพระโขนง กรุงเทพมหานคร ขอเปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์ ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้

๑. ให้ออกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๘ ราย

- | | |
|---|---------------|
| ๑) นายปริดา ไชยภูมิสุกุล | ทะเบียนเลขที่ |
| ๒) นายปิยะฉัตร ศรีบุญ | ทะเบียนเลขที่ |
| ๓) นายธีรเมธ สุขศรี | ทะเบียนเลขที่ |
| ๔) นางสาวจิรพรรณ ขอนพา | ทะเบียนเลขที่ |
| ๕) นายศักดิ์สิทธิ์ เกตุสิงห์ | ทะเบียนเลขที่ |
| ๖) นางสาวลัดดาวัลย์ โพธิ์พันธ์ | ทะเบียนเลขที่ |
| ๗) นางสาวกมลวรรณ เจริญพันธ์ | ทะเบียนเลขที่ |
| ๘) นางสาวจันทร์จิรา ประกอบทรัพย์ | ทะเบียนเลขที่ |
| ๒. ให้เพิ่มเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑๑ ราย | |
| ๑) นางสาวนาคาชา แหวงในเมือง | ทะเบียนเลขที่ |
| ๒) นางสาวกมลวรรณ สิมมา | ทะเบียนเลขที่ |
| ๓) นายบัณฑิต วงศ์คำ | ทะเบียนเลขที่ |
| ๔) นายประพันธ์ฤทธิ์ เมื่อนาง | ทะเบียนเลขที่ |
| ๕) นางสาวกมลวิภา สำจิต | ทะเบียนเลขที่ |
| ๖) นางสาวนภาพร ชื่นนุกุล | ทะเบียนเลขที่ |
| ๗) นางสาวเบญญา มอญคุณ | ทะเบียนเลขที่ |
| ๘) นายอมรพล อมรสิทธิ์ | ทะเบียนเลขที่ |
| ๙) นางสาวศรีเพชร ทองขาว | ทะเบียนเลขที่ |
| ๑๐) นางสาวนิชากร สุภชาติโกศล | ทะเบียนเลขที่ |
| ๑๑) นางสาววิมลวรรณ คำคำ | ทะเบียนเลขที่ |



อนึ่ง หนังสือฉบับนี้...

อนึ่ง หนังสือฉบับนี้จะมีผลใช้บังคับเมื่อได้รับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
ที่ อก ๐๓๑๐(๑)/๑๕๕๕๕ ลงวันที่ ๔ กุมภาพันธ์ ๒๕๖๕ คือในวันที่ ๒ กุมภาพันธ์ ๒๕๖๕ ทั้งนี้ สามารถยื่นคำขอ
ผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม ตาม QR Code ที่แนบมาเพื่อทราบ

จึงเรียนมาเพื่อทราบ

(นายประสม ค้างคอง)

ผู้อำนวยการอาวุโสและเขียนแบบสถาปัตย์โรงงาน
ปฏิบัติการตามหนังสือกรมโรงงานอุตสาหกรรม



ยื่นคำขอผ่านระบบอิเล็กทรอนิกส์

กองวิจัยและเขียนแบบสถาปัตย์โรงงาน

กลุ่มมาตรฐานวิศวกรรมวิเคราะห์ทดสอบและเขียนแบบห้องปฏิบัติการ

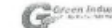
โทร. ๐ ๒๕๓๐ ๖๓๒๒ ต่อ ๒๑๐๓-๕

โทรสาร ๐ ๒๕๓๐ ๖๓๒๒ ต่อ ๒๑๐๓

ไปรษณีย์อิเล็กทรอนิกส์ sarabang@dw.mail.go.th



ดำเนินการถูกต้อง



"อุตสาหกรรมก้าวไกล ประเทไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"



ที่ อก ๐๓๑๐(๑)/ ๑๘๘๘



กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๒๑ เมษายน ๒๕๖๕

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท ยูโนเด็ค แอนนาลิสต์ แอนด์ เอ็นจิเนียริ่ง คอนซัลแตนท์ จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และขอใบสลิปการลงทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๓๐ มีนาคม ๒๕๖๕

ตามหนังสือที่อ้างถึง บริษัท ยูโนเด็ค แอนนาลิสต์ แอนด์ เอ็นจิเนียริ่ง คอนซัลแตนท์ จำกัด
ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๑๔๕ สถานะที่ ๑ ขอขอยกเลิก ชวนสุญวิท แวบลางจาก
เขตพระโขนง กรุงเทพมหานคร ขอเปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์ ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้

๑. ให้ยกเลิกบุคคลากรของห้องปฏิบัติการวิเคราะห์ จำนวน ๒ ราย

๑) นางมานิดา แยมโย ทะเบียนเลขที่ ๖-๑๔๕-๙-๐๐๐๕

๒) นางสาวภัสวรรณ คงคำ ทะเบียนเลขที่ ๖-๑๔๕-๙-๐๐๑๒

๒. ให้ยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๒ ราย

๑) นางสาวศิริพร อภิการุณ ทะเบียนเลขที่ ๖-๑๔๕-๙-๐๐๖๔

๒) นางสาวพนัสนิชา กลิ่นพูน ทะเบียนเลขที่ ๖-๑๔๕-๙-๐๐๘๔

๓. ให้เพิ่มเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๒ ราย

๑) นางสาวอัญญลักขณ์ ชนโชติกาญจนการ ทะเบียนเลขที่ ๖-๑๔๕-๙-๐๑๐๗

๒) นางสาวจันทร์จิรา ประกอบทรัพย์ ทะเบียนเลขที่ ๖-๑๔๕-๙-๐๑๐๘

อนึ่ง หนังสือฉบับนี้จะมีผลตั้งแต่วันที่ ๒ กุมภาพันธ์ ๒๕๖๕ คือในวันที่ ๒ กุมภาพันธ์ ๒๕๖๕ ทั้งนี้ สามารถยื่นคำขอ
ผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม ตาม QR Code ที่แนบมาเพื่อสืบ

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ



ผู้อำนวยการกองควบคุมโรงงานอุตสาหกรรม
ผู้ตรวจราชการกรมฝ่ายบริหารและกฎหมาย

ยื่นคำขอผ่านระบบอิเล็กทรอนิกส์

กองวิจัยและพัฒนายุทธศาสตร์โรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบและทะเบียนผู้ประกอบการ

โทร. ๐ ๒๕๓๐ ๖๓๒๖ ต่อ ๒๑๐๓-๕ โทรสาร ๐ ๒๕๓๐ ๖๓๒๖ ต่อ ๒๑๐๓-๕

ไปรษณีย์อิเล็กทรอนิกส์ saraban@dlw.go.th

ดำเนินการโดย



"อุตสาหกรรมก้าวไกล ประเพณีก้าวไกล ร่วมกันพัฒนาอุตสาหกรรมสีเขียว"



ที่ อก ๐๓๑๐(๑)/ ๑๘๘๘

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๑๙ กุมภาพันธ์ ๒๕๖๕

เรื่อง ต่ออายุหนังสือขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท ยูโนเด็ค แอนนาลิสต์ แอนด์ เอ็นจิเนียริ่ง คอนซัลแตนท์ จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และขอใบสลิปการลงทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๒๗ ธันวาคม ๒๕๖๔

๑. รายชื่อผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๔๐ ราย

๒. รายชื่อเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑๐๖ ราย

๓. ขอบข่ายสารเคมีที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม

ตามหนังสือที่อ้างถึง บริษัท ยูโนเด็ค แอนนาลิสต์ แอนด์ เอ็นจิเนียริ่ง คอนซัลแตนท์ จำกัด

ขอต่ออายุหนังสือขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๑๔๕ สถานะที่ ๑
ขอขอยกเลิก ชวนสุญวิท แวบลางจาก เขตพระโขนง กรุงเทพมหานคร ขอกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท ยูโนเด็ค แอนนาลิสต์ แอนด์ เอ็นจิเนียริ่ง
คอนซัลแตนท์ จำกัด ต่ออายุหนังสือขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๔๐ ราย ตามสิ่งที่ส่งมาด้วย ๑

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑๐๖ ราย ตามสิ่งที่ส่งมาด้วย ๒

ค. ขอบข่ายสารเคมีที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย ป่าไผ่ดิน อากาศเสีย สิ่งปฏิกูล

หรือวัสดุที่ไม่ได้แจ้ง และดิน ตามสิ่งที่ส่งมาด้วย ๓

หนังสือฉบับนี้จะมีผลตั้งแต่วันที่ ๒ กุมภาพันธ์ ๒๕๖๕ หากประสงค์จะต่ออายุหนังสือ

ขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุหรือขอเอกสารประกอบคำขอต่อ

กรมโรงงานอุตสาหกรรมภายใน ๓๐ วัน ก่อนวันสิ้นสุดของหนังสือขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
ทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม ตาม QR Code ที่แนบมาเพื่อสืบ

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ



ผู้อำนวยการกองควบคุมโรงงานอุตสาหกรรม
ผู้ตรวจราชการกรมฝ่ายบริหารและกฎหมาย

ยื่นคำขอผ่านระบบอิเล็กทรอนิกส์

กองวิจัยและพัฒนายุทธศาสตร์โรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบและทะเบียนผู้ประกอบการ

โทร. ๐ ๒๕๓๐ ๖๓๒๖ ต่อ ๒๑๐๓-๕ โทรสาร ๐ ๒๕๓๐ ๖๓๒๖ ต่อ ๒๑๐๓-๕

ไปรษณีย์อิเล็กทรอนิกส์ saraban@dlw.go.th

ดำเนินการโดย

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สิ่งที่ส่งมาด้วย ๑

เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท ยูโนเด็ค แอนนาลิสต์ แอนด์ เอ็นจิเนียริ่ง คอนซัลแตนท์ จำกัด เลขทะเบียน ๖-๑๔๕

ที่ อก ๐๓๑๐(๑)/ ๑๘๘๘

ลงวันที่ ๑๙ กุมภาพันธ์ ๒๕๖๕

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๔๐ ราย

๑) นางสาวกฤษวรรณ ภัทธีรกุล ทะเบียนเลขที่

๒) นายณรงค์ ฉิมพาลี ทะเบียนเลขที่

๓) นางสาวนันทิดา บุญไชย ทะเบียนเลขที่

๔) นางปิยะพัชร สุทธิมนัสวงษ์ ทะเบียนเลขที่

๕) นางมานิดา แยมโย ทะเบียนเลขที่

๖) นางสาวเบญจวรรณ วิโรทัย ทะเบียนเลขที่

๗) นายพรศักดิ์ วงศ์อนุรักษชัย ทะเบียนเลขที่

๘) นางสาวฉวีวรรณ บุญลา ทะเบียนเลขที่

๙) นายสุวิทย์ จอดนอก ทะเบียนเลขที่

๑๐) นางสาวโชติกา สมบรรณ ทะเบียนเลขที่

๑๑) นางสาวบุษกร เลิศภาณุมาศ ทะเบียนเลขที่

๑๒) นางสาววิไลลักษณ์ ศรีสุข ทะเบียนเลขที่

๑๓) นางสาวปวีณา จรัสใจพิพัฒน์ ทะเบียนเลขที่

๑๔) นาสิตา บรรจงใจรักษ์ ทะเบียนเลขที่

๑๕) นายปฏิกรณ์ คณะนา ทะเบียนเลขที่

๑๖) นายธีรวัฒน์ ชมเม้ง ทะเบียนเลขที่

๑๗) นางสาวศิริพร ศรีประสิทธิ์ ทะเบียนเลขที่

๑๘) นางสาวสวิตติ วิจิตร ทะเบียนเลขที่

๑๙) นางสาวนพวรรณ สุวรักษ์ ทะเบียนเลขที่

๒๐) นายภูษณ์ พานิชย์เลิศอำไพ ทะเบียนเลขที่

๒๑) นายณัฐวัฒน์ แสงสวัสดิ์ ทะเบียนเลขที่

๒๒) นายเอกพันธ์ ปะคะมานันท์ ทะเบียนเลขที่

๒๓) นางสาวปวีณา จรัสใจพิพัฒน์ ทะเบียนเลขที่

๒๔) นางสาวจณจิราพร ทำสะอาด ทะเบียนเลขที่

๒๕) นางสาวสุวรรณา คงทอง ทะเบียนเลขที่

๒๖) นางสาววรรณ พัดทองชื่น ทะเบียนเลขที่

๒๗) นายวิรุทธ ไกแก้ว ทะเบียนเลขที่

๒๘) นายวีรพงษ์ เทพพนนท์ ทะเบียนเลขที่

๒๙) นายอนุชา สวัสดิ์ ทะเบียนเลขที่

๓๐) นายวิทย์ เชื้อพิสิกุล ทะเบียนเลขที่

๓๑) นางสาวอติพร รังสวัสดิ์ ทะเบียนเลขที่

๓๒) นางสาวภัสวรรณ คงคำ ทะเบียนเลขที่

๓๓) นายสุวิทย์ อุดมจันทร์ ทะเบียนเลขที่

๓๔) นางสาวพนัสนิชา กลิ่นพูน ทะเบียนเลขที่

๓๕) นางสาวพิมพ์พรณ สมบุรณ์ ทะเบียนเลขที่



UAE ANALYST AND ENGINEERING CONSULTANT COMPANY LIMITED

ดำเนินการโดย

ยื่นคำขอผ่านระบบอิเล็กทรอนิกส์

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๓๖) นายสุวัฒน์...

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท ยูโรเทค แอนาไลติกส์ แอนด์ เอ็นจิเนียริ่ง คอนซัลแตนท์ จำกัด เลขทะเบียน ๖-๑๔๕
ที่ กก ๐๓๑๐(๑)/ ๑๔๕๗๕ ลงวันที่ ๑๔ กุมภาพันธ์ ๒๕๖๕

ขอขยายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๘๗ รายการ

น้ำเสีย จำนวน ๕6 รายการ

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
1	Aldrin	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
2	Arsenic	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
3	Barium	Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
4	α-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
5	β-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
6	δ-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
7	γ-BHC	Liquid-Liquid Extraction, Gas Chromatographic 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⁾
10	Chemical Oxygen Demand	1) Closed Reflux, Titrimetric Method ⁽⁴⁾ 2) Closed Reflux, Colorimetric Method ⁽⁴⁾ 3) Open Reflux, Titrimetric Method ⁽⁴⁾
11	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic 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	1) Distillation, Colorimetric Method ⁽⁴⁾ 2) Flow Injection Analysis Method ⁽⁴⁾

16 o,p'-DDT...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
16	o,p'-DDT	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
17	4,4'-DDD	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
18	4,4'-DDE	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
19	4,4'-DDT	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
20	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
21	Endosulfan I	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
22	Endosulfan II	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
23	Endosulfan sulfate	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
24	Endrin	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
25	Endrin aldehyde	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
26	Formaldehyde	Distillation, Colorimetric Method ⁽⁴⁾
27	Free Chlorine	1) Iodometric Method ⁽⁴⁾ 2) DPD Ferrous Titrimetric Method ⁽⁴⁾
28	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
29	Heptachlor Epoxide	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
30	Hexavalent Chromium	1) Colorimetric Method ⁽⁴⁾ 2) Extraction, Direct 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⁾
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...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
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	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, 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⁾

น้ำดื่ม จำนวน 126 รายการ

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) 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...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
4	Anthracene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
5	Antimony	Digestion, Inductively Coupled Plasma 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/Mass Spectrometric Method ⁽⁴⁾
8	Barium	1) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
9	Benz(a)anthracene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
10	Benzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
11	Benzo(b)fluoranthene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
12	Benzo(k)fluoranthene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) 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	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾

15 Benzo(g,h,i)perylene...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
15	Benzo(g,h,i)perylene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
16	Beryllium	Digestion, Inductively Coupled Plasma 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 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...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
30	Chlorodibromomethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
31	Chloroform	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
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 Method ⁽⁴⁾
34	Chromium (III)	1) Digestion, Direct Air-Acetylene Flame Method; Colorimetric Method; Calculation ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation ⁽⁴⁾
35	Chromium (VI)	1) Colorimetric Method ⁽⁴⁾ 2) Extraction, Air-Acetylene Flame Method ⁽⁴⁾
36	Chrysene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
37	Cyanide	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⁾

42 Dibenz(a,h)anthracene...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
42	Dibenz(a,h)anthracene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) 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...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
58	Diethyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
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	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
68	Fluorene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) 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...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
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	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
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 Method ⁽⁴⁾

82 Manganese...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
82	Manganese	1) Digestion, Direct Air-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 3) Digestion, Inductively Coupled Plasma 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	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	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) 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	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) 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 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	N-Nitrosodi-n-propylamine	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾

96 Polychlorinated Biphenyls...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
96	Polychlorinated Biphenyls - PCB 1016 - PCB 1221 - PCB 1232 - PCB 1242 - PCB 1248 - PCB 1254 - PCB 1260	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
97	Pentachlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
98	pH	Electrometric Method ⁽⁴⁾
99	Phenanthrene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
100	Phenol	1) Distillation, Chloroform Extraction Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
101	Pyrene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
102	Selenium	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
103	Silver	Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
104	Styrene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
105	1,1,2,2-Tetrachloroethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
106	Tetrachloroethylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
107	Toluene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾

108 Toxaphene...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
108	Toxaphene	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
109	TPH (C ₅ - C ₆)	1) Purge and Trap, Gas Chromatographic Method ^(1,2) 2) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(1,2)
110	TPH (C ₉ - C ₁₆)	Separatory Funnel, Liquid-Liquid Extraction, Gas Chromatographic Method ^(3,2)
111	TPH (C ₁₈ - C ₂₅)	Separatory Funnel, Liquid-Liquid Extraction, Gas Chromatographic Method ^(3,2)
112	1,2,4-Trichlorobenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
113	1,1,1-Trichloroethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
114	1,1,2-Trichloroethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
115	Trichloroethylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
116	2,4,5-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
117	2,4,6-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
118	1,3,5-Trimethylbenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
119	Vanadium	Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
120	Vinyl acetate	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
121	Vinyl chloride	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
122	m-Xylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
123	o-Xylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾

124 p-Xylene...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
124	p-Xylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
125	Xylene (Total)	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
126	Zinc	1) Digestion, Direct Air-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾

อากาศเสีย (ปล่องระเหย) จำนวน 25 รายการ

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
1	Antimony	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽³⁾
2	Arsenic	1) Isokinetic Sampling, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ⁽³⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽³⁾
3	Cadmium	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ⁽³⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽³⁾
4	Carbon Monoxide	Instrumental Analyzer Method ⁽³⁾
5	Chlorine	Isokinetic Sampling, Ion Chromatographic Method ⁽³⁾
6	Chromium	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ⁽³⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽³⁾
7	Cobalt	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽³⁾
8	Copper	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ⁽³⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽³⁾
9	Cresol	Absorption Sampling, Gas Chromatographic Method ⁽³⁾

10 Dioxins/Furans...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
10	Dioxins/Furans	Isokinetic Sampling ⁽³⁾
11	Hydrogen Chloride	Isokinetic Sampling, Ion Chromatographic Method ⁽³⁾
12	Hydrogen Fluoride	Isokinetic Sampling, Ion Chromatographic Method ⁽³⁾
13	Hydrogen Sulfide	Absorption Sampling, Iodometric Method ⁽³⁾
14	Lead	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ⁽³⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽³⁾
15	Manganese	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ⁽³⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽³⁾
16	Mercury	Isokinetic Sampling, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽³⁾
17	Nickel	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ⁽³⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽³⁾
18	Opacity	Ringelmann's Method ⁽¹⁾
19	Oxides of Nitrogen	1) Absorption Sampling, Phenoldisulfonic acid Method ⁽³⁾ 2) Instrumental Analyzer Method ⁽³⁾
20	Selenium	1) Isokinetic Sampling, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ⁽³⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽³⁾
21	Sulfur Dioxide	1) Absorption Sampling, Barium-Thorin Titrimetric Method ⁽³⁾ 2) Instrumental Analyzer Method ⁽³⁾
22	Sulfuric Acid	Isokinetic Sampling, Barium-Thorin Titrimetric Method ⁽³⁾
23	Total Suspended Particulate	Isokinetic Sampling, Gravimetric Method ⁽³⁾
24	Vanadium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽³⁾
25	Xylene	1) Absorption Sampling, Gas Chromatographic Method ⁽³⁾ 2) Absorption Sampling, Gas Chromatographic Method ⁽³⁾

สิ่งปนเปื้อน...

สิ่งปนเปื้อนหรือวัสดุที่ไม่ใช่ตัว จำนวน 35 รายการ

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
1	Aldrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(2,9,22) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22)
2	Antimony	Digestion, Inductively Coupled Plasma Method ^(7,13)
3	Arsenic	1) Waste Extraction, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^(2,4,13) 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(2,4,13) 3) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^(7,13) 4) Digestion, Inductively Coupled Plasma Method ^(7,13)
4	Barium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(2,4,13) 2) Digestion, Inductively Coupled Plasma Method ^(7,13)
5	Beryllium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(2,4,13) 2) Digestion, Inductively Coupled Plasma Method ^(7,13)
6	Cadmium	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^(2,4,14) 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(2,4,13) 3) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,14) 4) Digestion, Inductively Coupled Plasma Method ^(7,13)
7	Chlordane	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(2,9,22) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22)
8	Chromium	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^(2,4,14) 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(2,4,13)

3) Digestion,...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
9	Chromium (III)	3) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,14) 4) Digestion, Inductively Coupled Plasma Method ^(7,13) 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method; Waste Extraction, Colorimetric Method; Calculation ^(2,4,14) 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method; Waste Extraction, Colorimetric Method; Calculation ^(2,4,13,16) 3) Digestion, Flame Atomic Absorption Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation ^(7,8,14) 4) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation ^(7,8,13,16)
10	Chromium (VI)	1) Waste Extraction, Colorimetric Method ^(2,16) 2) Alkaline Digestion, Colorimetric Method ^(8,16)
11	Cobalt	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(2,4,13) 2) Digestion, Inductively Coupled Plasma Method ^(7,13)
12	Copper	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^(2,4,14) 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(2,4,13) 3) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,14) 4) Digestion, Inductively Coupled Plasma Method ^(7,13)
13	2,4-D	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(2,9,22) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22)
14	DDD	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(2,9,22) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22)

15 DOE...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
15	DDE	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(2,9,22) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22)
16	DDT	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(2,9,22) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22)
17	Dieldrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(2,9,22) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22)
18	Endrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(2,9,22) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22)
19	Heptachlor	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(2,9,22) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22)
20	Lead	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^(2,6,14) 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(2,6,13) 3) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,14) 4) Digestion, Inductively Coupled Plasma Method ^(7,13)
21	Lindane	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(2,9,22) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22)
22	Mercury	1) Waste Extraction, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^(2,17) 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(2,6,13)

3) Digestion,...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
23	Methoxychlor	3) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^(7,18) 4) Digestion, Inductively Coupled Plasma Method ^(7,13) 5) Thermal Decomposition Amalgamation and Atomic Absorption Spectrometric Method ⁽¹⁹⁾
24	Molybdenum	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(2,9,22) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22)
25	Nickel	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(2,6,13) 2) Digestion, Inductively Coupled Plasma Method ^(7,13) 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^(2,6,14) 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(2,6,13) 3) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,14) 4) Digestion, Inductively Coupled Plasma Method ^(7,13)
26	Polychlorinated Biphenyls - Aroclor 1016 - Aroclor 1221 - Aroclor 1232 - Aroclor 1242 - Aroclor 1248 - Aroclor 1254 - Aroclor 1260 - 2-Chlorobiphenyl - 2,3-Dichlorobiphenyl - 2,2',5'-Trichlorobiphenyl - 2,4',5'-Trichlorobiphenyl - 2,2',3,5'-Tetrachlorobiphenyl - 2,2',5,5'-Tetrachlorobiphenyl - 2,3',4,4'-Tetrachlorobiphenyl - 2,2',3,4,5'-Pentachlorobiphenyl	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(2,9,22) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22)

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- 2,2',4,5,5'...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
27	- 2,2',4,5,5'-Pentachlorobiphenyl - 2,3,3',4',6-Pentachlorobiphenyl - 2,2',3,4,4',5'-Hexachlorobiphenyl - 2,2',3,4,5,5'-Hexachlorobiphenyl - 2,2',3,5,5',6-Hexachlorobiphenyl - 2,2',4,4',5,5'-Hexachlorobiphenyl - 2,2',3,3',4,4',5-Heptachlorobiphenyl - 2,2',3,4,4',5,5'-Heptachlorobiphenyl - 2,2',3,4,4',5,6-Heptachlorobiphenyl - 2,2',3,3',4,4',5,6-Nonachlorobiphenyl Pentachlorophenol	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(2,9,26) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26) Electrometric Method ^(31,32)
28	pH	
29	Selenium	1) Waste Extraction, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^(2,4,20) 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(2,6,13) 3) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^(7,20) 4) Digestion, Inductively Coupled Plasma Method ^(7,13)

30 Silver...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
30	Silver	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(2,6,13) 2) Digestion, Inductively Coupled Plasma Method ^(7,13)
31	Thallium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(2,6,13) 2) Digestion, Inductively Coupled Plasma Method ^(7,13)
32	Toxaphene	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(2,9,22) 2) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22)
33	Trichloroethylene	1) Waste Extraction, Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(2,12,25) 2) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
34	Vanadium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(2,6,13) 2) Digestion, Inductively Coupled Plasma Method ^(7,13)
35	Zinc	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^(2,6,14) 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(2,6,13) 3) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,14) 4) Digestion, Inductively Coupled Plasma Method ^(7,13)

คืน จำนวน 125 รายการ

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,26) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
2	Acetone	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(2,12,25)

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3 Aldrin...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
3	Aldrin	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
4	Anthracene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,26) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
5	Antimony	Digestion, Inductively Coupled Plasma Method ^(7,13)
6	Arsenic	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^(7,13) 2) Digestion, Inductively Coupled Plasma Method ^(7,13)
7	Atrazine	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
8	Barium	Digestion, Inductively Coupled Plasma Method ^(7,13)
9	Benz(a)anthracene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,26) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
10	Benzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
11	Benzo(b)fluoranthene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,26) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
12	Benzo(k)fluoranthene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,26) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
13	Benzoic acid	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
14	Benzo(a)pyrene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,26) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)

15 Benzo(g,h,i)perylene...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
15	Benzo(g,h,i)perylene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
16	Beryllium	Digestion, Inductively Coupled Plasma Method ^(7,13)
17	Bis(2-chloroethyl)ether	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
18	Bis(2-ethylhexyl)phthalate	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
19	Bromodichloromethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
20	Bromoform	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
21	Butanol	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
22	Butyl benzyl phthalate	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
23	Cadmium	1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,14) 2) Digestion, Inductively Coupled Plasma Method ^(7,13)
24	Carbazole	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
25	Carbon disulfide	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
26	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
27	Chlordane	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
28	p-Chloroaniline	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
29	Chlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
30	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)

31 Chloroform...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
31	Chloroform	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
32	2-Chlorophenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
33	Chromium	1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,14) 2) Digestion, Inductively Coupled Plasma Method ^(7,13)
34	Chromium (III)	1) Digestion, Flame Atomic Absorption Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation ^(7,8,14) 2) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation ^(7,8,13,14)
35	Chromium (VI)	Alkaline Digestion, Colorimetric Method ^(8,14)
36	Chrysene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,26) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
37	Cyanide	Extraction, Distillation, Colorimetric Method ^(7,29,30)
38	2,4-D	Ultrasonic Extraction, Gas Chromatographic Method ⁽²⁷⁾
39	DDD	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
40	DDE	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
41	DDT	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
42	Dibenz(a,h)anthracene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,26) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)

43 Di-n-butyl phthalate...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
43	Di-n-butyl phthalate	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
44	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
45	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
46	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
47	3,3'-Dichlorobenzidine	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
48	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
49	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
50	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
51	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
52	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
53	2,4-Dichlorophenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
54	1,2-Dichloropropene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
55	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
56	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
57	Dieldrin	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
58	Diethyl phthalate	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
59	2,4-Dimethylphenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)

60 2,4-Dinitrophenol...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
60	2,4-Dinitrophenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,24)
61	2,4-Dinitrotoluene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,24)
62	2,6-Dinitrotoluene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,24)
63	Di-n-Octyl phthalate	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,24)
64	Endosulfan	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,24)
65	Endrin	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,24)
66	Ethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
67	Fluoranthene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,24) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,24)
68	Fluorene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,24) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,24)
69	Heptachlor	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,24)
70	Heptachlor epoxide	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,24)

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71 Hexachlorobenzene...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
71	Hexachlorobenzene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,24)
72	Hexachloro-1,3-butadiene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
73	n-Hexane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
74	α-HCH	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,24)
75	β-HCH	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,24)
76	γ-HCH	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,24)
77	Hexachlorocyclopentadiene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,24)
78	Hexachloroethane	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,24)
79	Indeno(1,2,3-cd)pyrene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,24) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,24)
80	Isophorone	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,24)
81	Lead	1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,14) 2) Digestion, Inductively Coupled Plasma Method ^(7,15)
82	Manganese	1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,14) 2) Digestion, Inductively Coupled Plasma Method ^(7,15)

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83 Mercury...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
83	Mercury	1) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽¹⁴⁾ 2) Digestion, Inductively Coupled Plasma Method ^(7,15) 3) Thermal Decomposition Amalgamation and Atomic Absorption Spectrometric Method ⁽¹⁴⁾
84	Methanol	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
85	Methoxychlor	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,24)
86	Methyl bromide	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
87	Methylene chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
88	2-Methylphenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,24)
89	2-Methylnaphthalene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,24)
90	Methyl tert-butyl ether	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
91	Naphthalene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,24) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,24)
92	Nickel	1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,14) 2) Digestion, Inductively Coupled Plasma Method ^(7,15)
93	Nitrobenzene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,24)
94	N-Nitrosodiphenylamine	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,24)
95	N-Nitrosodi-n-propylamine	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,24)

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96 Polychlorinated Biphenyls...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
96	Polychlorinated Biphenyls - Aroclor 1016 - Aroclor 1221 - Aroclor 1232 - Aroclor 1242 - Aroclor 1248 - Aroclor 1254 - Aroclor 1260 Polychlorinated Biphenyls - 2-Chlorobiphenyl - 2,3-Dichlorobiphenyl - 2,2',5-Trichlorobiphenyl - 2,4',5-Trichlorobiphenyl - 2,2',3,5'-Tetrachlorobiphenyl - 2,2',5,5'-Tetrachlorobiphenyl - 2,3',4,4'-Tetrachlorobiphenyl - 2,2',3,4,5'-Pentachlorobiphenyl - 2,2',4,5,5'-Pentachlorobiphenyl - 2,3,3',4',6-Pentachlorobiphenyl - 2,2',3,4,4',5'-Hexachlorobiphenyl - 2,2',3,4,5,5'-Hexachlorobiphenyl - 2,2',3,5,5',6-Hexachlorobiphenyl - 2,2',4,4',5,5'-Hexachlorobiphenyl - 2,2',3,3',4,4',5-Heptachlorobiphenyl - 2,2',3,4,4',5,5'-Heptachlorobiphenyl - 2,2',3,4,4',5,6-Heptachlorobiphenyl	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,24) Ultrasonic Extraction, Gas Chromatographic Method ^(10,22) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,24)

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- 2,2',3,4',5,5',6...

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
97	- 2,2',3,4',5,5',6-Heptachlorobiphenyl - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl Pentachlorophenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
98	Phenanthrene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,24) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
99	Phenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
100	Pyrene	1) Ultrasonic Extraction, Gas Chromatographic Method ^(10,24) 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
101	Selenium	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^(7,22) 2) Digestion, Inductively Coupled Plasma Method ^(7,23)
102	Silver	Digestion, Inductively Coupled Plasma Method ^(7,23)
103	Styrene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
104	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
105	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
106	Toluene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
107	Toxaphene	Ultrasonic Extraction, Gas Chromatographic Method ^(10,22)
108	TPH (C ₉ -C ₉)	1) Purge and Trap, Gas Chromatographic Method ^(12,21) 2) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
109	TPH (C ₉ -C ₁₂)	Ultrasonic Extraction, Gas Chromatographic Method ^(10,22)
110	TPH (C ₁₀ -C ₃₃)	Ultrasonic Extraction, Gas Chromatographic Method ^(10,22)
111	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)

ลำดับ	สารมลพิษ	วิธีวิเคราะห์
112	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
113	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
114	Trichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
115	2,4,5-Trichlorophenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
116	2,4,6-Trichlorophenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26)
117	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
118	Vanadium	Digestion, Inductively Coupled Plasma Method ^(7,23)
119	Vinyl acetate	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
120	Vinyl chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
121	m-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
122	o-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
123	p-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
124	Xylene (Total)	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(12,25)
125	Zinc	1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,14) 2) Digestion, Inductively Coupled Plasma Method ^(7,23)

เอกสารอ้างอิง

- กระทรวงอุตสาหกรรม. ประกาศกระทรวงอุตสาหกรรม, พ.ศ. 2549, เรื่อง กำหนดค่าปริมาณรวมค่าควันที่เจือปนในอากาศที่ระบายออกจากปล่องของหม้อไอน้ำที่ใช้ถ่านหินเป็นเชื้อเพลิง
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3. สมาคมวิศวกรรม...

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