

ภาคผนวก ก

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รายงานผลการติดตามตรวจสอบผลกระทบสิ่งแวดล้อม



ภาคผนวก ก1

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ผลการติดตามตรวจสอบคุณภาพน้ำทะเล



## ANALYSIS REPORT

**CUSTOMER NAME** : THAI OIL PUBLIC COMPANY LIMITED  
**ADDRESS** : 555/1 ENERGY COMPLEX BUILDING A, ELEVENTH FLOOR VIBHAVADI RANGSIT ROAD CHATUCHAK CHATUCHAK BANGKOK 10900  
**CONTACT INFORMATION** : TEL : 0 3840 8500 EXT. 10502 e-mail : kitiya@thaioilgroup.com  
**SAMPLING SOURCE** : IN FRONT OF THAI OIL PUBLIC COMPANY LIMITED (42/1 MOO 1, SUKHUMVIT ROAD KM.124, TUNGSUKLA, SRIRACHA, CHONBURI 20230.)  
**SAMPLE TYPE** : SEAWATER  
**SAMPLING DATE** : APRIL 11, 2022  
**SAMPLING TIME** : 10:30 HOUR  
**SAMPLING METHOD** : COMPOSITE, STERILE TECHNIQUE  
**SAMPLING BY** : MR ANUSART SUAYDEE  
**ANALYZED BY** : MR WEERAYUT SARAPAGDEE

**RECEIVED DATE** : APRIL 11, 2022  
**ANALYTICAL DATE** : APRIL 11-26, 2022  
**REPORT NO.** : 2022-U030755  
**WORK NO.** : 2021-003222  
**ANALYSIS NO.** : T22AG944-0001

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			บริเวณห่างจากท่าเทียบเรือ หมายเลข 7 และ 8 ไปทางทิศตะวันตกเฉียงใต้ 3 กิโลเมตร T22AG944-0001	
pH <sup>a</sup>	-	ELECTROMETRIC METHOD AT SITE (SM:4500-H <sup>+</sup> B)	8.1 (30°C)	-
TEMPERATURE <sup>c</sup>	°C	THERMOMETER AT SITE (SM: 2550 B)	30	-
SALINITY <sup>c</sup>	ppt	ELECTRICAL CONDUCTIVITY METHOD AT SITE (SM: 2520 B)	33.5	0.1
DISSOLVED OXYGEN <sup>c</sup>	mg/L	MEMBRANE ELECTRODE METHOD AT SITE (SM: 4500-O G)	4.9	0.5
SUSPENDED SOLIDS <sup>c</sup>	mg/L	GRAVIMETRIC METHOD (SM: 2540 D)	ND	1.0
TOTAL DISSOLVED SOLIDS <sup>c</sup>	mg/L	TOTAL DISSOLVED SOLIDS DRIED AT 180 °C (SM: 2540 C)	38,444	25
TOTAL AMMONIA <sup>a b</sup>	µg/L N	IN-HOUSE METHOD: UAE.TP.WAT.001 BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA&WEF, 23rd ED., 2017, PART 4500-NH <sub>3</sub> H	278	10.0
PHENOLS <sup>c</sup>	mg/L	DISTILLATION, 4-AMINOANTIPYRINE METHOD (SM: 5530 B AND 5530 C)	0.007	0.005
SULPHIDE <sup>c</sup>	µg/L	METHYLENE BLUE COLOURIMETRIC METHOD (METHOD OF SEAWATER ANALYSIS, GRASSHOFF, 1999, CHAPTER 5)	ND	10
FAT, OIL AND GREASE <sup>c</sup>	mg/L	SOXHLET EXTRACTION METHOD (SM: 5520 D)	ND	3
PETROLEUM HYDROCARBON <sup>b</sup>	µg/L	INTERGOVERNMENT OCEANOGRAPHIC COMMISSION, MANUAL FOR MONITORING OIL AND DISSOLVED/ DISPERSED PETROLEUM HYDROCARBONS IN MARINE WATERS AND ON BEACHES, 1984	0.26	0.02
<b>METALS</b>				
LEAD <sup>c</sup>	µg/L Pb	PRE-CONCENTRATION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (BASED ON METHOD OF SEAWATER ANALYSIS, GRASSHOFF, 1999, CHAPTER 12)	ND	0.100



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			บริเวณห่างจากท่าเทียบเรือ หมายเลข 7 และ 8 ไปทาง ทิศตะวันตกเฉียงใต้ 3 กิโลเมตร T22AG944-0001	
MICROBIOLOGY				
COLIFORM BACTERIA* <sup>b</sup>	MPN/100 mL	MULTIPLE-TUBE FERMENTATION TECHNIQUE (SM: 9221 B)	< 1.8	1.8
FAECAL COLIFORM BACTERIA* <sup>c</sup>	CFU/100 mL	MEMBRANE FILTER TECHNIQUE (SM: 9222 D)	< 1	1
SAMPLE CONDITION				
WATER'S COLOUR/TURBID			COLOURLESS/CLEAR	
SEDIMENT			YELLOW	

<sup>a</sup> : ISO/IEC 17025 ACCREDITED BY THAI INDUSTRIAL STANDARDS INSTITUTE (TISI)

<sup>b</sup> : ISO/IEC 17025 ACCREDITED BY DEPARTMENT OF SCIENCE SERVICE (DSS)

<sup>c</sup> : VERIFIED BY OWN LABORATORY QUALITY SYSTEM, BUT STILL NOT ACCREDITED

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

ND : NON-DETECTABLE.

\* : COLLECTED THE SAMPLE AT 30 CENTIMETRES UNDER THE WATER SURFACE LEVEL.

^ : SAMPLING AT 11:40 HOUR ON APRIL 29, 2022, ANALYSIS NO. T22AI119-0001 (ANALYTICAL DATE : APRIL 29 - MAY 10, 2022)

*Piyapat S.*

(MRS PIYAPAT SUTTAMANUTWONG)  
LABORATORY SUPERVISOR

MAY 19, 2022

## ANALYSIS REPORT

**CUSTOMER NAME** : THAI OIL PUBLIC COMPANY LIMITED  
**ADDRESS** : 555/1 ENERGY COMPLEX BUILDING A, ELEVENTH FLOOR VIBHAVADI RANGSIT ROAD CHATUCHAK CHATUCHAK BANGKOK 10900  
**CONTACT INFORMATION** : TEL : 0 3840 8500 EXT. 10502 e-mail : kitiya@thaioilgroup.com  
**SAMPLING SOURCE** : IN FRONT OF THAI OIL PUBLIC COMPANY LIMITED (42/1 MOO 1, SUKHUMVIT ROAD KM.124, TUNGSAKULA, SRIRACHA, CHONBURI 20230.)  
**SAMPLE TYPE** : SEAWATER  
**SAMPLING DATE** : APRIL 11, 2022  
**SAMPLING TIME** : 11:05 HOUR  
**SAMPLING METHOD** : COMPOSITE, STERILE TECHNIQUE  
**SAMPLING BY** : MR ANUSART SUAYDEE  
**ANALYZED BY** : MR WEERAYUT SARAPAGDEE

**RECEIVED DATE** : APRIL 11, 2022  
**ANALYTICAL DATE** : APRIL 11-26, 2022  
**REPORT NO.** : 2022-U030756  
**WORK NO.** : 2021-003222  
**ANALYSIS NO.** : T22AG944-0002

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			บริเวณห่างจากท่าเทียบเรือ หมายเลข 7 และ 8 ไปทางทิศใต้ 500 เมตร T22AG944-0002	
pH <sup>a</sup>	-	ELECTROMETRIC METHOD AT SITE (SM:4500-H <sup>+</sup> B)	8.1 (30°C)	-
TEMPERATURE <sup>c</sup>	°C	THERMOMETER AT SITE (SM: 2550 B)	30	-
SALINITY <sup>c</sup>	ppt	ELECTRICAL CONDUCTIVITY METHOD AT SITE (SM: 2520 B)	33.4	0.1
DISSOLVED OXYGEN <sup>c</sup>	mg/L	MEMBRANE ELECTRODE METHOD AT SITE (SM: 4500-O G)	5.1	0.5
SUSPENDED SOLIDS <sup>c</sup>	mg/L	GRAVIMETRIC METHOD (SM: 2540 D)	2.5	1.0
TOTAL DISSOLVED SOLIDS <sup>c</sup>	mg/L	TOTAL DISSOLVED SOLIDS DRIED AT 180 °C (SM: 2540 C)	38,333	25
TOTAL AMMONIA <sup>b</sup>	µg/L N	IN-HOUSE METHOD: UAE.TP.WAT.001 BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA&WEF, 23rd ED., 2017, PART 4500-NH <sub>3</sub> H	472	10.0
PHENOLS <sup>c</sup>	mg/L	DISTILLATION, 4-AMINOANTIPYRINE METHOD (SM: 5530 B AND 5530 C)	0.007	0.005
SULPHIDE <sup>c</sup>	µg/L	METHYLENE BLUE COLOURIMETRIC METHOD (METHOD OF SEAWATER ANALYSIS, GRASSHOFF, 1999, CHAPTER 5)	ND	10
FAT, OIL AND GREASE <sup>c</sup>	mg/L	SOXHLET EXTRACTION METHOD (SM: 5520 D)	ND	3
PETROLEUM HYDROCARBON <sup>b</sup>	µg/L	INTERGOVERNMENT OCEANOGRAPHIC COMMISSION, MANUAL FOR MONITORING OIL AND DISSOLVED/ DISPERSED PETROLEUM HYDROCARBONS IN MARINE WATERS AND ON BEACHES, 1984	0.37	0.02
<b>METALS</b>				
LEAD <sup>c</sup>	µg/L Pb	PRE-CONCENTRATION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (BASED ON METHOD OF SEAWATER ANALYSIS, GRASSHOFF, 1999, CHAPTER 12)	ND	0.100



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			บริเวณห่างจากท่าเทียบเรือ หมายเลข 7 และ 8 ไปทาง ทิศใต้ 500 เมตร T22AG944-0002	
MICROBIOLOGY				
COLIFORM BACTERIA* <sup>b</sup>	MPN/100 mL	MULTIPLE-TUBE FERMENTATION TECHNIQUE (SM: 9221 B)	< 1.8	1.8
FAECAL COLIFORM BACTERIA* <sup>c</sup>	CFU/100 mL	MEMBRANE FILTER TECHNIQUE (SM: 9222 D)	1	1
SAMPLE CONDITION				
WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLEAR YELLOW	

<sup>a</sup> : ISO/IEC 17025 ACCREDITED BY THAI INDUSTRIAL STANDARDS INSTITUTE (TISI)

<sup>b</sup> : ISO/IEC 17025 ACCREDITED BY DEPARTMENT OF SCIENCE SERVICE (DSS)

<sup>c</sup> : VERIFIED BY OWN LABORATORY QUALITY SYSTEM, BUT STILL NOT ACCREDITED

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

ND : NON-DETECTABLE.

\* : COLLECTED THE SAMPLE AT 30 CENTIMETRES UNDER THE WATER SURFACE LEVEL.

*Piyapat S.*

(MRS PIYAPAT SUTTAMANUTWONG)  
LABORATORY SUPERVISOR

APRIL 28, 2022

## ANALYSIS REPORT

**CUSTOMER NAME** : THAI OIL PUBLIC COMPANY LIMITED

**ADDRESS** : 555/1 ENERGY COMPLEX BUILDING A, ELEVENTH FLOOR VIBHAVADI RANGSIT ROAD CHATUCHAK CHATUCHAK BANGKOK 10900

**CONTACT INFORMATION** : TEL : 0 3840 8500 EXT. 10502 e-mail : kitiya@thaioilgroup.com

**SAMPLING SOURCE** : IN FRONT OF THAI OIL PUBLIC COMPANY LIMITED  
(42/1 MOO 1, SUKHUMVIT ROAD KM.124, TUNGSAKULA, SRIRACHA, CHONBURI 20230.)

**SAMPLE TYPE** : SEAWATER

**SAMPLING DATE** : APRIL 11, 2022

**SAMPLING TIME** : 11:35 HOUR

**SAMPLING METHOD** : COMPOSITE, STERILE TECHNIQUE

**SAMPLING BY** : MR ANUSART SUAYDEE

**ANALYZED BY** : MR WEERAYUT SARAPAGDEE

**RECEIVED DATE** : APRIL 11, 2022

**ANALYTICAL DATE** : APRIL 11-26, 2022

**REPORT NO.** : 2022-U030757

**WORK NO.** : 2021-003222

**ANALYSIS NO.** : T22AG944-0003

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			บริเวณห่างจากท่าเทียบเรือ หมายเลข 7 และ 8 ไปทางทิศตะวันออก 500 เมตร T22AG944-0003	
pH <sup>a</sup>	-	ELECTROMETRIC METHOD AT SITE (SM:4500-H <sup>+</sup> B)	8.1 (30°C)	-
TEMPERATURE <sup>c</sup>	°C	THERMOMETER AT SITE (SM: 2550 B)	30	-
SALINITY <sup>c</sup>	ppt	ELECTRICAL CONDUCTIVITY METHOD AT SITE (SM: 2520 B)	33.5	0.1
DISSOLVED OXYGEN <sup>c</sup>	mg/L	MEMBRANE ELECTRODE METHOD AT SITE (SM: 4500-O G)	5.0	0.5
SUSPENDED SOLIDS <sup>c</sup>	mg/L	GRAVIMETRIC METHOD (SM: 2540 D)	3.7	1.0
TOTAL DISSOLVED SOLIDS <sup>c</sup>	mg/L	TOTAL DISSOLVED SOLIDS DRIED AT 180 °C (SM: 2540 C)	38,275	25
TOTAL AMMONIA <sup>b</sup>	µg/L N	IN-HOUSE METHOD: UAE.TP.WAT.001 BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA&WEF, 23rd ED., 2017, PART 4500-NH <sub>3</sub> H	550	10.0
PHENOLS <sup>c</sup>	mg/L	DISTILLATION, 4-AMINOANTIPYRINE METHOD (SM: 5530 B AND 5530 C)	0.007	0.005
SULPHIDE <sup>c</sup>	µg/L	METHYLENE BLUE COLOURIMETRIC METHOD (METHOD OF SEAWATER ANALYSIS, GRASSHOFF, 1999, CHAPTER 5)	ND	10
FAT, OIL AND GREASE <sup>c</sup>	mg/L	SOXHLET EXTRACTION METHOD (SM: 5520 D)	ND	3
PETROLEUM HYDROCARBON <sup>b</sup>	µg/L	INTERGOVERNMENT OCEANOGRAPHIC COMMISSION, MANUAL FOR MONITORING OIL AND DISSOLVED/ DISPERSED PETROLEUM HYDROCARBONS IN MARINE WATERS AND ON BEACHES, 1984	0.38	0.02
<b>METALS</b>				
LEAD <sup>c</sup>	µg/L Pb	PRE-CONCENTRATION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (BASED ON METHOD OF SEAWATER ANALYSIS, GRASSHOFF, 1999, CHAPTER 12)	0.130	0.100





PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			บริเวณห่างจากท่าเทียบเรือหมายเลข 7 และ 8 ไปทางทิศตะวันออก 500 เมตร T22AG944-0003	
MICROBIOLOGY				
COLIFORM BACTERIA* <sup>b</sup>	MPN/100 mL	MULTIPLE-TUBE FERMENTATION TECHNIQUE (SM: 9221 B)	< 1.8	1.8
FAECAL COLIFORM BACTERIA* <sup>c</sup>	CFU/100 mL	MEMBRANE FILTER TECHNIQUE (SM: 9222 D)	< 1	1
SAMPLE CONDITION				
WATER'S COLOUR/TURBID			COLOURLESS/CLEAR	
SEDIMENT			YELLOW	

<sup>a</sup> : ISO/IEC 17025 ACCREDITED BY THAI INDUSTRIAL STANDARDS INSTITUTE (TISI)

<sup>b</sup> : ISO/IEC 17025 ACCREDITED BY DEPARTMENT OF SCIENCE SERVICE (DSS)

<sup>c</sup> : VERIFIED BY OWN LABORATORY QUALITY SYSTEM, BUT STILL NOT ACCREDITED

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

ND : NON-DETECTABLE.

\* : COLLECTED THE SAMPLE AT 30 CENTIMETRES UNDER THE WATER SURFACE LEVEL.

*Piyapat S.*

(MRS PIYAPAT SUTTAMANUTWONG)  
LABORATORY SUPERVISOR

APRIL 28, 2022



## ANALYSIS REPORT

**CUSTOMER NAME** : THAI OIL PUBLIC COMPANY LIMITED

**ADDRESS** : 555/1 ENERGY COMPLEX BUILDING A, ELEVENTH FLOOR VIBHAVADI RANGSIT ROAD CHATUCHAK CHATUCHAK BANGKOK 10900

**CONTACT INFORMATION** : TEL : 0 3840 8500 EXT. 10502 e-mail : kitiya@thaioilgroup.com

**SAMPLING SOURCE** : IN FRONT OF THAI OIL PUBLIC COMPANY LIMITED  
(42/1 MOO 1, SUKHUMVIT ROAD KM.124, TUNGSUKLA, SRIRACHA, CHONBURI 20230.)

**SAMPLE TYPE** : SEAWATER

**SAMPLING DATE** : APRIL 11, 2022

**SAMPLING TIME** : 11:50 HOUR

**SAMPLING METHOD** : COMPOSITE, STERILE TECHNIQUE

**SAMPLING BY** : MR ANUSART SUAYDEE

**ANALYZED BY** : MR WEERAYUT SARAPAGDEE

**RECEIVED DATE** : APRIL 11, 2022

**ANALYTICAL DATE** : APRIL 11-26, 2022

**REPORT NO.** : 2022-U030758

**WORK NO.** : 2021-003222

**ANALYSIS NO.** : T22AG944-0004

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			บริเวณห่างจากท่าเทียบเรือ หมายเลข 7 และ 8 ไปทาง ทิศตะวันตก 500 เมตร T22AG944-0004	
pH <sup>a</sup>	-	ELECTROMETRIC METHOD AT SITE (SM:4500-H <sup>+</sup> B)	8.1 (30°C)	-
TEMPERATURE <sup>c</sup>	°C	THERMOMETER AT SITE (SM: 2550 B)	30	-
SALINITY <sup>c</sup>	ppt	ELECTRICAL CONDUCTIVITY METHOD AT SITE (SM: 2520 B)	33.4	0.1
DISSOLVED OXYGEN <sup>c</sup>	mg/L	MEMBRANE ELECTRODE METHOD AT SITE (SM: 4500-O G)	4.9	0.5
SUSPENDED SOLIDS <sup>c</sup>	mg/L	GRAVIMETRIC METHOD (SM: 2540 D)	2.4	1.0
TOTAL DISSOLVED SOLIDS <sup>c</sup>	mg/L	TOTAL DISSOLVED SOLIDS DRIED AT 180 °C (SM: 2540 C)	38,429	25
TOTAL AMMONIA <sup>b</sup>	µg/L N	IN-HOUSE METHOD: UAE.TP.WAT.001 BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA&WEF, 23rd ED., 2017, PART 4500-NH <sub>3</sub> H	373	10.0
PHENOLS <sup>c</sup>	mg/L	DISTILLATION, 4-AMINOANTIPYRINE METHOD (SM: 5530 B AND 5530 C)	0.007	0.005
SULPHIDE <sup>c</sup>	µg/L	METHYLENE BLUE COLOURIMETRIC METHOD (METHOD OF SEAWATER ANALYSIS, GRASSHOFF, 1999, CHAPTER 5)	ND	10
FAT, OIL AND GREASE <sup>c</sup>	mg/L	SOXHLET EXTRACTION METHOD (SM: 5520 D)	ND	3
PETROLEUM HYDROCARBON <sup>b</sup>	µg/L	INTERGOVERNMENT OCEANOGRAPHIC COMMISSION, MANUAL FOR MONITORING OIL AND DISSOLVED/ DISPERSED PETROLEUM HYDROCARBONS IN MARINE WATERS AND ON BEACHES, 1984	0.63	0.02
<b>METALS</b>				
LEAD <sup>c</sup>	µg/L Pb	PRE-CONCENTRATION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (BASED ON METHOD OF SEAWATER ANALYSIS, GRASSHOFF, 1999, CHAPTER 12)	ND	0.100



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			บริเวณห่างจากท่าเทียบเรือ หมายเลข 7 และ 8 ไปทาง ทิศตะวันตก 500 เมตร T22AG944-0004	
MICROBIOLOGY				
COLIFORM BACTERIA* <sup>b</sup>	MPN/100 mL	MULTIPLE-TUBE FERMENTATION TECHNIQUE (SM: 9221 B)	< 1.8	1.8
FAECAL COLIFORM BACTERIA* <sup>c</sup>	CFU/100 mL	MEMBRANE FILTER TECHNIQUE (SM: 9222 D)	< 1	1
SAMPLE CONDITION				
WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLEAR YELLOW	

<sup>a</sup> : ISO/IEC 17025 ACCREDITED BY THAI INDUSTRIAL STANDARDS INSTITUTE (TISI)

<sup>b</sup> : ISO/IEC 17025 ACCREDITED BY DEPARTMENT OF SCIENCE SERVICE (DSS)

<sup>c</sup> : VERIFIED BY OWN LABORATORY QUALITY SYSTEM, BUT STILL NOT ACCREDITED

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

ND : NON-DETECTABLE.

\* : COLLECTED THE SAMPLE AT 30 CENTIMETRES UNDER THE WATER SURFACE LEVEL.

*Piyapat S.*

(MRS PIYAPAT SUTTAMANUTWONG)  
LABORATORY SUPERVISOR

APRIL 28, 2022

## ANALYSIS REPORT

**CUSTOMER NAME** : THAI OIL PUBLIC COMPANY LIMITED

**ADDRESS** : 555/1 ENERGY COMPLEX BUILDING A, ELEVENTH FLOOR VIBHAVADI RANGSIT ROAD CHATUCHAK CHATUCHAK BANGKOK 10900

**CONTACT INFORMATION** : TEL : 0 3840 8500 EXT. 10502 e-mail : kitiya@thaioilgroup.com

**SAMPLING SOURCE** : IN FRONT OF THAI OIL PUBLIC COMPANY LIMITED  
(42/1 MOO 1, SUKHUMVIT ROAD KM.124, TUNGSUKLA, SRIRACHA, CHONBURI 20230.)

**SAMPLE TYPE** : SEAWATER

**SAMPLING DATE** : APRIL 11, 2022

**SAMPLING TIME** : 11:30 HOUR

**SAMPLING METHOD** : COMPOSITE, STERILE TECHNIQUE

**SAMPLING BY** : MR ANUSART SUAYDEE

**ANALYZED BY** : MR WEERAYUT SARAPAGDEE

**RECEIVED DATE** : APRIL 11, 2022

**ANALYTICAL DATE** : APRIL 11-26, 2022

**REPORT NO.** : 2022-U030759

**WORK NO.** : 2021-003222

**ANALYSIS NO.** : T22AG944-0005

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			บริเวณทางจากท่าเทียบเรือ หมายเลข 7 และ 8 ไปทาง ทิศเหนือ 500 เมตร T22AG944-0005	
pH <sup>a</sup>	-	ELECTROMETRIC METHOD AT SITE (SM:4500-H <sup>+</sup> B)	8.1 (30°C)	-
TEMPERATURE <sup>c</sup>	°C	THERMOMETER AT SITE (SM: 2550 B)	30	-
SALINITY <sup>c</sup>	ppt	ELECTRICAL CONDUCTIVITY METHOD AT SITE (SM: 2520 B)	33.4	0.1
DISSOLVED OXYGEN <sup>c</sup>	mg/L	MEMBRANE ELECTRODE METHOD AT SITE (SM: 4500-O G)	5.0	0.5
SUSPENDED SOLIDS <sup>c</sup>	mg/L	GRAVIMETRIC METHOD (SM: 2540 D)	1.4	1.0
TOTAL DISSOLVED SOLIDS <sup>c</sup>	mg/L	TOTAL DISSOLVED SOLIDS DRIED AT 180 °C (SM: 2540 C)	39,725	25
TOTAL AMMONIA <sup>b</sup>	µg/L N	IN-HOUSE METHOD: UAE.TP.WAT.001 BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA&WEF, 23rd ED., 2017, PART 4500-NH <sub>3</sub> H	404	10.0
PHENOLS <sup>c</sup>	mg/L	DISTILLATION, 4-AMINOANTIPYRINE METHOD (SM: 5530 B AND 5530 C)	0.006	0.005
SULPHIDE <sup>c</sup>	µg/L	METHYLENE BLUE COLOURIMETRIC METHOD (METHOD OF SEAWATER ANALYSIS, GRASSHOFF, 1999, CHAPTER 5)	ND	10
FAT, OIL AND GREASE <sup>c</sup>	mg/L	SOXHLET EXTRACTION METHOD (SM: 5520 D)	ND	3
PETROLEUM HYDROCARBON <sup>b</sup>	µg/L	INTERGOVERNMENT OCEANOGRAPHIC COMMISSION, MANUAL FOR MONITORING OIL AND DISSOLVED/ DISPERSED PETROLEUM HYDROCARBONS IN MARINE WATERS AND ON BEACHES, 1984	0.45	0.02
<b>METALS</b>				
LEAD <sup>c</sup>	µg/L Pb	PRE-CONCENTRATION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (BASED ON METHOD OF SEAWATER ANALYSIS, GRASSHOFF, 1999, CHAPTER 12)	ND	0.100



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			บริเวณห่างจากท่าเทียบเรือหมายเลข 7 และ 8 ไปทางทิศเหนือ 500 เมตร T22AG944-0005	
MICROBIOLOGY				
COLIFORM BACTERIA* <sup>b</sup>	MPN/100 mL	MULTIPLE-TUBE FERMENTATION TECHNIQUE (SM: 9221 B)	< 1.8	1.8
FAECAL COLIFORM BACTERIA* <sup>c</sup>	CFU/100 mL	MEMBRANE FILTER TECHNIQUE (SM: 9222 D)	1	1
SAMPLE CONDITION				
WATER'S COLOUR/TURBID			COLOURLESS/CLEAR	
SEDIMENT			YELLOW	

<sup>a</sup> : ISO/IEC 17025 ACCREDITED BY THAI INDUSTRIAL STANDARDS INSTITUTE (TISI)

<sup>b</sup> : ISO/IEC 17025 ACCREDITED BY DEPARTMENT OF SCIENCE SERVICE (DSS)

<sup>c</sup> : VERIFIED BY OWN LABORATORY QUALITY SYSTEM, BUT STILL NOT ACCREDITED

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

ND : NON-DETECTABLE.

\* : COLLECTED THE SAMPLE AT 30 CENTIMETRES UNDER THE WATER SURFACE LEVEL.

*Piyapat S.*

(MRS PIYAPAT SUTTAMANUTWONG)  
LABORATORY SUPERVISOR

APRIL 28, 2022

## ANALYSIS REPORT

**CUSTOMER NAME** : THAI OIL PUBLIC COMPANY LIMITED  
**ADDRESS** : 555/1 ENERGY COMPLEX BUILDING A, ELEVENTH FLOOR VIBHAVADI RANGSIT ROAD CHATUCHAK CHATUCHAK BANGKOK 10900  
**CONTACT INFORMATION** : TEL : 0 3840 8500 EXT. 10502 e-mail : kitiya@thaioilgroup.com  
**SAMPLING SOURCE** : IN FRONT OF THAI OIL PUBLIC COMPANY LIMITED  
(42/1 MOO 1, SUKHUMVIT ROAD KM.124, TUNGSUKLA, SRIRACHA, CHONBURI 20230.)  
**SAMPLE TYPE** : SEAWATER  
**SAMPLING DATE** : APRIL 12, 2022  
**SAMPLING TIME** : 12:00 HOUR  
**SAMPLING METHOD** : COMPOSITE, STERILE TECHNIQUE  
**SAMPLING BY** : MR ANUSART SUAYDEE  
**ANALYZED BY** : MISS KANNIKAR SUMLEETHA

**RECEIVED DATE** : APRIL 12, 2022  
**ANALYTICAL DATE** : APRIL 12-26, 2022  
**REPORT NO.** : 2022-U030805  
**WORK NO.** : 2021-003222  
**ANALYSIS NO.** : T22AH087-0003

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			CONVENTIONAL BUOY MOORING T22AH087-0003	
pH <sup>a</sup>	-	ELECTROMETRIC METHOD AT SITE (SM:4500-H* B)	8.2 (30°C)	-
TEMPERATURE <sup>c</sup>	°C	THERMOMETER AT SITE (SM: 2550 B)	30	-
SALINITY <sup>c</sup>	ppt	ELECTRICAL CONDUCTIVITY METHOD AT SITE (SM: 2520 B)	33.8	0.1
DISSOLVED OXYGEN <sup>c</sup>	mg/L	MEMBRANE ELECTRODE METHOD AT SITE (SM: 4500-O G)	5.2	0.5
SUSPENDED SOLIDS <sup>c</sup>	mg/L	GRAVIMETRIC METHOD (SM: 2540 D)	3.6	1.0
TOTAL DISSOLVED SOLIDS <sup>c</sup>	mg/L	TOTAL DISSOLVED SOLIDS DRIED AT 180 °C (SM: 2540 C)	35,675	25
TOTAL AMMONIA <sup>b</sup>	µg/L N	IN-HOUSE METHOD: UAE.TP.WAT.001 BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA&WEF, 23rd ED., 2017, PART 4500-NH <sub>3</sub> H	134	10.0
PHENOLS <sup>c</sup>	mg/L	DISTILLATION, 4-AMINOANTIPYRINE METHOD (SM: 5530 B AND 5530 C)	0.007	0.005
SULPHIDE <sup>c</sup>	µg/L	METHYLENE BLUE COLOURIMETRIC METHOD (METHOD OF SEAWATER ANALYSIS, GRASSHOFF, 1999, CHAPTER 5)	ND	10
FAT, OIL AND GREASE <sup>c</sup>	mg/L	SOXHLET EXTRACTION METHOD (SM: 5520 D)	ND	3
PETROLEUM HYDROCARBON <sup>b</sup>	µg/L	INTERGOVERNMENT OCEANOGRAPHIC COMMISSION, MANUAL FOR MONITORING OIL AND DISSOLVED/ DISPERSED PETROLEUM HYDROCARBONS IN MARINE WATERS AND ON BEACHES, 1984	0.40	0.02
<b>METALS</b>				
LEAD <sup>c</sup>	µg/L Pb	PRE-CONCENTRATION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (BASED ON METHOD OF SEAWATER ANALYSIS, GRASSHOFF, 1999, CHAPTER 12)	ND	0.100



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			CONVENTIONAL BUOY MOORING T22AH087-0003	
MICROBIOLOGY				
COLIFORM BACTERIA* <sup>b</sup>	MPN/100 mL	MULTIPLE-TUBE FERMENTATION TECHNIQUE (SM: 9221 B)	< 1.8	1.8
FAECAL COLIFORM BACTERIA* <sup>c</sup>	CFU/100 mL	MEMBRANE FILTER TECHNIQUE (SM: 9222 D)	1	1
SAMPLE CONDITION				
WATER'S COLOUR/TURBID			COLOURLESS/CLEAR	
SEDIMENT			YELLOW	

<sup>a</sup> : ISO/IEC 17025 ACCREDITED BY THAI INDUSTRIAL STANDARDS INSTITUTE (TISI)

<sup>b</sup> : ISO/IEC 17025 ACCREDITED BY DEPARTMENT OF SCIENCE SERVICE (DSS)

<sup>c</sup> : VERIFIED BY OWN LABORATORY QUALITY SYSTEM, BUT STILL NOT ACCREDITED

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

ND : NON-DETECTABLE.

\* : COLLECTED THE SAMPLE AT 30 CENTIMETRES UNDER THE WATER SURFACE LEVEL.

*Paewena Ch.*

(MISS PAWEENA CHARASCHOTEPINIT)  
LABORATORY SUPERVISOR

APRIL 28, 2022



## ANALYSIS REPORT

**CUSTOMER NAME** : THAI OIL PUBLIC COMPANY LIMITED

**ADDRESS** : 555/1 ENERGY COMPLEX BUILDING A, ELEVENTH FLOOR VIBHAVADI RANGSIT ROAD CHATUCHAK CHATUCHAK BANGKOK 10900

**CONTACT INFORMATION** : TEL : 0 3840 8500 EXT. 10502 e-mail : kitiya@thaioilgroup.com

**SAMPLING SOURCE** : IN FRONT OF THAI OIL PUBLIC COMPANY LIMITED  
(42/1 MOO 1, SUKHUMVIT ROAD KM.124, TUNGSUKLA, SRIRACHA, CHONBURI 20230.)

**SAMPLE TYPE** : SEAWATER

**SAMPLING DATE** : APRIL 12, 2022

**SAMPLING TIME** : 12:45 HOUR

**SAMPLING METHOD** : COMPOSITE, STERILE TECHNIQUE

**SAMPLING BY** : MR ANUSART SUAYDEE

**ANALYZED BY** : MISS KANNIKAR SUMLEETHA

**RECEIVED DATE** : APRIL 12, 2022

**ANALYTICAL DATE** : APRIL 12-26, 2022

**REPORT NO.** : 2022-U030803

**WORK NO.** : 2021-003222

**ANALYSIS NO.** : T22AH087-0001

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			JETTY # 3 T22AH087-0001	
pH <sup>a</sup>	-	ELECTROMETRIC METHOD AT SITE (SM:4500-H <sup>+</sup> B)	8.2 (30°C)	-
TEMPERATURE °	°C	THERMOMETER AT SITE (SM: 2550 B)	30	-
SALINITY °	ppt	ELECTRICAL CONDUCTIVITY METHOD AT SITE (SM: 2520 B)	33.8	0.1
DISSOLVED OXYGEN °	mg/L	MEMBRANE ELECTRODE METHOD AT SITE (SM: 4500-O G)	5.2	0.5
SUSPENDED SOLIDS °	mg/L	GRAVIMETRIC METHOD (SM: 2540 D)	4.5	1.0
TOTAL DISSOLVED SOLIDS °	mg/L	TOTAL DISSOLVED SOLIDS DRIED AT 180 °C (SM: 2540 C)	36,950	25
TOTAL AMMONIA <sup>b</sup>	µg/L N	IN-HOUSE METHOD: UAE.TP.WAT.001 BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA&WEF, 23rd ED., 2017, PART 4500-NH <sub>3</sub> H	162	10.0
PHENOLS °	mg/L	DISTILLATION, 4-AMINOANTIPYRINE METHOD (SM: 5530 B AND 5530 C)	0.008	0.005
SULPHIDE °	µg/L	METHYLENE BLUE COLOURIMETRIC METHOD (METHOD OF SEAWATER ANALYSIS, GRASSHOFF, 1999, CHAPTER 5)	ND	10
FAT, OIL AND GREASE °	mg/L	SOXHLET EXTRACTION METHOD (SM: 5520 D)	ND	3
PETROLEUM HYDROCARBON <sup>b</sup>	µg/L	INTERGOVERNMENT OCEANOGRAPHIC COMMISSION, MANUAL FOR MONITORING OIL AND DISSOLVED/ DISPERSED PETROLEUM HYDROCARBONS IN MARINE WATERS AND ON BEACHES, 1984	0.43	0.02
<b>METALS</b>				
LEAD °	µg/L Pb	PRE-CONCENTRATION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (BASED ON METHOD OF SEAWATER ANALYSIS, GRASSHOFF, 1999, CHAPTER 12)	ND	0.100





PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			JETTY # 3 T22AH087-0001	
MICROBIOLOGY				
COLIFORM BACTERIA* <sup>b</sup>	MPN/100 mL	MULTIPLE-TUBE FERMENTATION TECHNIQUE (SM: 9221 B)	< 1.8	1.8
FAECAL COLIFORM BACTERIA* <sup>c</sup>	CFU/100 mL	MEMBRANE FILTER TECHNIQUE (SM: 9222 D)	< 1	1
SAMPLE CONDITION				
WATER'S COLOUR/TURBID			COLOURLESS/CLEAR	
SEDIMENT			YELLOW	

<sup>a</sup> : ISO/IEC 17025 ACCREDITED BY THAI INDUSTRIAL STANDARDS INSTITUTE (TISI)

<sup>b</sup> : ISO/IEC 17025 ACCREDITED BY DEPARTMENT OF SCIENCE SERVICE (DSS)

<sup>c</sup> : VERIFIED BY OWN LABORATORY QUALITY SYSTEM, BUT STILL NOT ACCREDITED

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

ND : NON-DETECTABLE.

\* : COLLECTED THE SAMPLE AT 30 CENTIMETRES UNDER THE WATER SURFACE LEVEL.

*Paweena Ch.*

(MISS PAWEENA CHARASCHOTEPINIT)  
LABORATORY SUPERVISOR

APRIL 28, 2022

## ANALYSIS REPORT

**CUSTOMER NAME** : THAI OIL PUBLIC COMPANY LIMITED

**ADDRESS** : 555/1 ENERGY COMPLEX BUILDING A, ELEVENTH FLOOR VIBHAVADI RANGSIT ROAD CHATUCHAK CHATUCHAK BANGKOK 10900

**CONTACT INFORMATION** : TEL : 0 3840 8500 EXT. 10502 e-mail : kitiya@thaioilgroup.com

**SAMPLING SOURCE** : IN FRONT OF THAI OIL PUBLIC COMPANY LIMITED  
(42/1 MOO 1, SUKHUMVIT ROAD KM.124, TUNGSAKULA, SRIRACHA, CHONBURI 20230.)

**SAMPLE TYPE** : SEAWATER

**SAMPLING DATE** : APRIL 12, 2022

**SAMPLING TIME** : 13:20 HOUR

**SAMPLING METHOD** : COMPOSITE, STERILE TECHNIQUE

**SAMPLING BY** : MR ANUSART SUAYDEE

**ANALYZED BY** : MISS KANNIKAR SUMLEETHA

**RECEIVED DATE** : APRIL 12, 2022

**ANALYTICAL DATE** : APRIL 12-26, 2022

**REPORT NO.** : 2022-U030811

**WORK NO.** : 2021-003222

**ANALYSIS NO.** : T22AH087-0005

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			REFINERY OUTFALL T22AH087-0005	
pH <sup>a</sup>	-	ELECTROMETRIC METHOD AT SITE (SM:4500-H* B)	8.1 (32°C)	-
TEMPERATURE °	°C	THERMOMETER AT SITE (SM: 2550 B)	32	-
SALINITY °	ppt	ELECTRICAL CONDUCTIVITY METHOD AT SITE (SM: 2520 B)	34.8	0.1
DISSOLVED OXYGEN °	mg/L	MEMBRANE ELECTRODE METHOD AT SITE (SM: 4500-O G)	5.0	0.5
SUSPENDED SOLIDS °	mg/L	GRAVIMETRIC METHOD (SM: 2540 D)	21.7	1.0
TOTAL DISSOLVED SOLIDS °	mg/L	TOTAL DISSOLVED SOLIDS DRIED AT 180 °C (SM: 2540 C)	32,933	25
TOTAL AMMONIA <sup>b</sup>	µg/L N	IN-HOUSE METHOD: UAE.TP.WAT.001 BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA&WEF, 23rd ED., 2017, PART 4500-NH <sub>3</sub> H	125	10.0
PHENOLS °	mg/L	DISTILLATION, 4-AMINOANTIPYRINE METHOD (SM: 5530 B AND 5530 C)	0.007	0.005
SULPHIDE °	µg/L	METHYLENE BLUE COLOURIMETRIC METHOD (METHOD OF SEAWATER ANALYSIS, GRASSHOFF, 1999, CHAPTER 5)	ND	10
FAT, OIL AND GREASE °	mg/L	SOXHLET EXTRACTION METHOD (SM: 5520 D)	ND	3
PETROLEUM HYDROCARBON <sup>b</sup>	µg/L	INTERGOVERNMENT OCEANOGRAPHIC COMMISSION, MANUAL FOR MONITORING OIL AND DISSOLVED/ DISPERSED PETROLEUM HYDROCARBONS IN MARINE WATERS AND ON BEACHES, 1984	0.57	0.02
<b>METALS</b>				
LEAD °	µg/L Pb	PRE-CONCENTRATION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (BASED ON METHOD OF SEAWATER ANALYSIS, GRASSHOFF, 1999, CHAPTER 12)	0.430	0.100



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			REFINERY OUTFALL T22AH087-0005	
MICROBIOLOGY				
COLIFORM BACTERIA* <sup>b</sup>	MPN/100 mL	MULTIPLE-TUBE FERMENTATION TECHNIQUE (SM: 9221 B)	1.8	1.8
FAECAL COLIFORM BACTERIA* <sup>c</sup>	CFU/100 mL	MEMBRANE FILTER TECHNIQUE (SM: 9222 D)	10	1
SAMPLE CONDITION				
WATER'S COLOUR/TURBID			COLOURLESS/CLEAR	
SEDIMENT			YELLOW	

<sup>a</sup> : ISO/IEC 17025 ACCREDITED BY THAI INDUSTRIAL STANDARDS INSTITUTE (TISI)

<sup>b</sup> : ISO/IEC 17025 ACCREDITED BY DEPARTMENT OF SCIENCE SERVICE (DSS)

<sup>c</sup> : VERIFIED BY OWN LABORATORY QUALITY SYSTEM, BUT STILL NOT ACCREDITED

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

ND : NON-DETECTABLE.

\* : COLLECTED THE SAMPLE AT 30 CENTIMETRES UNDER THE WATER SURFACE LEVEL.

*Paewena Ch.*

(MISS PAWEENA CHARASCHOTEPINIT)  
LABORATORY SUPERVISOR

APRIL 28, 2022

## ANALYSIS REPORT

**CUSTOMER NAME** : THAI OIL PUBLIC COMPANY LIMITED

**ADDRESS** : 555/1 ENERGY COMPLEX BUILDING A, ELEVENTH FLOOR VIBHAVADI RANGSIT ROAD CHATUCHAK CHATUCHAK BANGKOK 10900

**CONTACT INFORMATION** : TEL : 0 3840 8500 EXT. 10502 e-mail : kitiya@thaioilgroup.com

**SAMPLING SOURCE** : IN FRONT OF THAI OIL PUBLIC COMPANY LIMITED  
(42/1 MOO 1, SUKHUMVIT ROAD KM.124, TUNGSUKLA, SRIRACHA, CHONBURI 20230.)

**SAMPLE TYPE** : SEAWATER

**SAMPLING DATE** : APRIL 12, 2022

**SAMPLING TIME** : 11:30 HOUR

**SAMPLING METHOD** : COMPOSITE, STERILE TECHNIQUE

**SAMPLING BY** : MR ANUSART SUAYDEE

**ANALYZED BY** : MISS KANNIKAR SUMLEETHA

**RECEIVED DATE** : APRIL 12, 2022

**ANALYTICAL DATE** : APRIL 12-26, 2022

**REPORT NO.** : 2022-U030808

**WORK NO.** : 2021-003222

**ANALYSIS NO.** : T22AH087-0004

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			SINGLE BUOY MOORING 1 T22AH087-0004	
pH <sup>a</sup>	-	ELECTROMETRIC METHOD AT SITE (SM:4500-H* B)	8.1 (30°C)	-
TEMPERATURE °	°C	THERMOMETER AT SITE (SM: 2550 B)	30	-
SALINITY °	ppt	ELECTRICAL CONDUCTIVITY METHOD AT SITE (SM: 2520 B)	33.4	0.1
DISSOLVED OXYGEN °	mg/L	MEMBRANE ELECTRODE METHOD AT SITE (SM: 4500-O G)	4.9	0.5
SUSPENDED SOLIDS °	mg/L	GRAVIMETRIC METHOD (SM: 2540 D)	3.6	1.0
TOTAL DISSOLVED SOLIDS °	mg/L	TOTAL DISSOLVED SOLIDS DRIED AT 180 °C (SM: 2540 C)	33,800	25
TOTAL AMMONIA <sup>b</sup>	µg/L N	IN-HOUSE METHOD: UAE.TP.WAT.001 BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA&WEF, 23rd ED., 2017, PART 4500-NH <sub>3</sub> H	106	10.0
PHENOLS °	mg/L	DISTILLATION, 4-AMINOANTIPYRINE METHOD (SM: 5530 B AND 5530 C)	0.006	0.005
SULPHIDE °	µg/L	METHYLENE BLUE COLOURIMETRIC METHOD (METHOD OF SEAWATER ANALYSIS, GRASSHOFF, 1999, CHAPTER 5)	ND	10
FAT, OIL AND GREASE °	mg/L	SOXHLET EXTRACTION METHOD (SM: 5520 D)	ND	3
PETROLEUM HYDROCARBON <sup>b</sup>	µg/L	INTERGOVERNMENT OCEANOGRAPHIC COMMISSION, MANUAL FOR MONITORING OIL AND DISSOLVED/ DISPERSED PETROLEUM HYDROCARBONS IN MARINE WATERS AND ON BEACHES, 1984	0.41	0.02
<b>METALS</b>				
LEAD °	µg/L Pb	PRE-CONCENTRATION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (BASED ON METHOD OF SEAWATER ANALYSIS, GRASSHOFF, 1999, CHAPTER 12)	ND	0.100



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			SINGLE BUOY MOORING 1 T22AH087-0004	
MICROBIOLOGY				
COLIFORM BACTERIA* <sup>b</sup>	MPN/100 mL	MULTIPLE-TUBE FERMENTATION TECHNIQUE (SM: 9221 B)	< 1.8	1.8
FAECAL COLIFORM BACTERIA* <sup>c</sup>	CFU/100 mL	MEMBRANE FILTER TECHNIQUE (SM: 9222 D)	< 1	1
SAMPLE CONDITION				
WATER'S COLOUR/TURBID			COLOURLESS/CLEAR	
SEDIMENT			YELLOW	

<sup>a</sup> : ISO/IEC 17025 ACCREDITED BY THAI INDUSTRIAL STANDARDS INSTITUTE (TISI)

<sup>b</sup> : ISO/IEC 17025 ACCREDITED BY DEPARTMENT OF SCIENCE SERVICE (DSS)

<sup>c</sup> : VERIFIED BY OWN LABORATORY QUALITY SYSTEM, BUT STILL NOT ACCREDITED

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

ND : NON-DETECTABLE.

\* : COLLECTED THE SAMPLE AT 30 CENTIMETRES UNDER THE WATER SURFACE LEVEL.

*Paewana Ch.*

(MISS PAWEENA CHARASCHOTEPINIT)  
LABORATORY SUPERVISOR

APRIL 28, 2022

## ANALYSIS REPORT

**CUSTOMER NAME** : THAI OIL PUBLIC COMPANY LIMITED  
**ADDRESS** : 555/1 ENERGY COMPLEX BUILDING A, ELEVENTH FLOOR VIBHAVADI RANGSIT ROAD CHATUCHAK CHATUCHAK BANGKOK 10900  
**CONTACT INFORMATION** : TEL : 0 3840 8500 EXT. 10502 e-mail : kitiya@thaioilgroup.com  
**SAMPLING SOURCE** : IN FRONT OF THAI OIL PUBLIC COMPANY LIMITED  
(42/1 MOO 1, SUKHUMVIT ROAD KM.124, TUNGSUKLA, SRIRACHA, CHONBURI 20230.)  
**SAMPLE TYPE** : SEAWATER  
**SAMPLING DATE** : APRIL 12, 2022  
**SAMPLING TIME** : 13:00 HOUR  
**SAMPLING METHOD** : COMPOSITE, STERILE TECHNIQUE  
**SAMPLING BY** : MR ANUSART SUAYDEE  
**ANALYZED BY** : MISS KANNIKAR SUMLEETHA  
**RECEIVED DATE** : APRIL 12, 2022  
**ANALYTICAL DATE** : APRIL 12-26, 2022  
**REPORT NO.** : 2022-U030813  
**WORK NO.** : 2021-003222  
**ANALYSIS NO.** : T22AH087-0006

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			JETTY 1/2 NORTH 100 m T22AH087-0006	
pH <sup>a</sup>	-	ELECTROMETRIC METHOD AT SITE (SM:4500-H <sup>+</sup> B)	8.2 (31°C)	-
TEMPERATURE <sup>c</sup>	°C	THERMOMETER AT SITE (SM: 2550 B)	31	-
SALINITY <sup>c</sup>	ppt	ELECTRICAL CONDUCTIVITY METHOD AT SITE (SM: 2520 B)	33.7	0.1
DISSOLVED OXYGEN <sup>c</sup>	mg/L	MEMBRANE ELECTRODE METHOD AT SITE (SM: 4500-O G)	5.0	0.5
SUSPENDED SOLIDS <sup>c</sup>	mg/L	GRAVIMETRIC METHOD (SM: 2540 D)	5.8	1.0
TOTAL DISSOLVED SOLIDS <sup>c</sup>	mg/L	TOTAL DISSOLVED SOLIDS DRIED AT 180 °C (SM: 2540 C)	36,000	25
TOTAL AMMONIA <sup>b</sup>	µg/L N	IN-HOUSE METHOD: UAE.TP.WAT.001 BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA&WEF, 23rd ED., 2017, PART 4500-NH <sub>3</sub> H	156	10.0
PHENOLS <sup>c</sup>	mg/L	DISTILLATION, 4-AMINOANTIPYRINE METHOD (SM: 5530 B AND 5530 C)	0.009	0.005
SULPHIDE <sup>c</sup>	µg/L	METHYLENE BLUE COLOURIMETRIC METHOD (METHOD OF SEAWATER ANALYSIS, GRASSHOFF, 1999, CHAPTER 5)	ND	10
FAT, OIL AND GREASE <sup>c</sup>	mg/L	SOXHLET EXTRACTION METHOD (SM: 5520 D)	ND	3
PETROLEUM HYDROCARBON <sup>b</sup>	µg/L	INTERGOVERNMENT OCEANOGRAPHIC COMMISSION, MANUAL FOR MONITORING OIL AND DISSOLVED/ DISPERSED PETROLEUM HYDROCARBONS IN MARINE WATERS AND ON BEACHES, 1984	0.37	0.02
<b>METALS</b>				
LEAD <sup>c</sup>	µg/L Pb	PRE-CONCENTRATION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (BASED ON METHOD OF SEAWATER ANALYSIS, GRASSHOFF, 1999, CHAPTER 12)	ND	0.100



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			JETTY 1/2 NORTH 100 m T22AH087-0006	
MICROBIOLOGY				
COLIFORM BACTERIA* <sup>b</sup>	MPN/100 mL	MULTIPLE-TUBE FERMENTATION TECHNIQUE (SM: 9221 B)	< 1.8	1.8
FAECAL COLIFORM BACTERIA* <sup>c</sup>	CFU/100 mL	MEMBRANE FILTER TECHNIQUE (SM: 9222 D)	1	1
SAMPLE CONDITION				
WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLEAR YELLOW	

<sup>a</sup> : ISO/IEC 17025 ACCREDITED BY THAI INDUSTRIAL STANDARDS INSTITUTE (TISI)

<sup>b</sup> : ISO/IEC 17025 ACCREDITED BY DEPARTMENT OF SCIENCE SERVICE (DSS)

<sup>c</sup> : VERIFIED BY OWN LABORATORY QUALITY SYSTEM, BUT STILL NOT ACCREDITED

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

ND : NON-DETECTABLE.

\* : COLLECTED THE SAMPLE AT 30 CENTIMETRES UNDER THE WATER SURFACE LEVEL.

*Paewana Ch.*

(MISS PAWEENA CHARASCHOTEPINIT)  
LABORATORY SUPERVISOR

APRIL 28, 2022



## ANALYSIS REPORT

**CUSTOMER NAME** : THAI OIL PUBLIC COMPANY LIMITED

**ADDRESS** : 555/1 ENERGY COMPLEX BUILDING A, ELEVENTH FLOOR VIBHAVADI RANGSIT ROAD CHATUCHAK CHATUCHAK BANGKOK 10900

**CONTACT INFORMATION** : TEL : 0 3840 8500 EXT. 10502 e-mail : kitiya@thaioilgroup.com

**SAMPLING SOURCE** : IN FRONT OF THAI OIL PUBLIC COMPANY LIMITED  
(42/1 MOO 1, SUKHUMVIT ROAD KM.124, TUNGSUKLA, SRIRACHA, CHONBURI 20230.)

**SAMPLE TYPE** : SEAWATER

**SAMPLING DATE** : APRIL 12, 2022

**SAMPLING TIME** : 12:45 HOUR

**SAMPLING METHOD** : COMPOSITE, STERILE TECHNIQUE

**SAMPLING BY** : MR ANUSART SUAYDEE

**ANALYZED BY** : MISS KANNIKAR SUMLEETHA

**RECEIVED DATE** : APRIL 12, 2022

**ANALYTICAL DATE** : APRIL 12-26, 2022

**REPORT NO.** : 2022-U030815

**WORK NO.** : 2021-003222

**ANALYSIS NO.** : T22AH087-0007

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			JETTY 4 EAST 100 m T22AH087-0007	
pH <sup>a</sup>	-	ELECTROMETRIC METHOD AT SITE (SM:4500-H <sup>a</sup> B)	8.2 (31°C)	-
TEMPERATURE °	°C	THERMOMETER AT SITE (SM: 2550 B)	31	-
SALINITY °	ppt	ELECTRICAL CONDUCTIVITY METHOD AT SITE (SM: 2520 B)	33.8	0.1
DISSOLVED OXYGEN °	mg/L	MEMBRANE ELECTRODE METHOD AT SITE (SM: 4500-O G)	5.2	0.5
SUSPENDED SOLIDS °	mg/L	GRAVIMETRIC METHOD (SM: 2540 D)	8.0	1.0
TOTAL DISSOLVED SOLIDS °	mg/L	TOTAL DISSOLVED SOLIDS DRIED AT 180 °C (SM: 2540 C)	35,775	25
TOTAL AMMONIA <sup>b</sup>	µg/L N	IN-HOUSE METHOD: UAE.TP.WAT.001 BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA&WEF, 23rd ED., 2017, PART 4500-NH <sub>3</sub> H	170	10.0
PHENOLS °	mg/L	DISTILLATION, 4-AMINOANTIPYRINE METHOD (SM: 5530 B AND 5530 C)	0.009	0.005
SULPHIDE °	µg/L	METHYLENE BLUE COLOURIMETRIC METHOD (METHOD OF SEAWATER ANALYSIS, GRASSHOFF, 1999, CHAPTER 5)	ND	10
FAT, OIL AND GREASE °	mg/L	SOXHLET EXTRACTION METHOD (SM: 5520 D)	ND	3
PETROLEUM HYDROCARBON <sup>b</sup>	µg/L	INTERGOVERNMENT OCEANOGRAPHIC COMMISSION, MANUAL FOR MONITORING OIL AND DISSOLVED/ DISPERSED PETROLEUM HYDROCARBONS IN MARINE WATERS AND ON BEACHES, 1984	0.37	0.02
<b>METALS</b>				
LEAD °	µg/L Pb	PRE-CONCENTRATION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (BASED ON METHOD OF SEAWATER ANALYSIS, GRASSHOFF, 1999, CHAPTER 12)	0.100	0.100



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			JETTY 4 EAST 100 m T22AH087-0007	
MICROBIOLOGY				
COLIFORM BACTERIA* <sup>b</sup>	MPN/100 mL	MULTIPLE-TUBE FERMENTATION TECHNIQUE (SM: 9221 B)	< 1.8	1.8
FAECAL COLIFORM BACTERIA* <sup>c</sup>	CFU/100 mL	MEMBRANE FILTER TECHNIQUE (SM: 9222 D)	1	1
SAMPLE CONDITION				
WATER'S COLOUR/TURBID			COLOURLESS/CLEAR	
SEDIMENT			YELLOW	

<sup>a</sup> : ISO/IEC 17025 ACCREDITED BY THAI INDUSTRIAL STANDARDS INSTITUTE (TISI)

<sup>b</sup> : ISO/IEC 17025 ACCREDITED BY DEPARTMENT OF SCIENCE SERVICE (DSS)

<sup>c</sup> : VERIFIED BY OWN LABORATORY QUALITY SYSTEM, BUT STILL NOT ACCREDITED

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

ND : NON-DETECTABLE.

\* : COLLECTED THE SAMPLE AT 30 CENTIMETRES UNDER THE WATER SURFACE LEVEL.

*Pa-weena Ch.*

(MISS PAWEENA CHARASCHOTEPINIT)  
LABORATORY SUPERVISOR

APRIL 28, 2022

## ANALYSIS REPORT

**CUSTOMER NAME** : THAI OIL PUBLIC COMPANY LIMITED  
**ADDRESS** : 555/1 ENERGY COMPLEX BUILDING A, ELEVENTH FLOOR VIBHAVADI RANGSIT ROAD CHATUCHAK CHATUCHAK BANGKOK 10900  
**CONTACT INFORMATION** : TEL : 0 3840 8500 EXT. 10502 e-mail : kitiya@thaioilgroup.com  
**SAMPLING SOURCE** : IN FRONT OF THAI OIL PUBLIC COMPANY LIMITED (42/1 MOO 1, SUKHUMVIT ROAD KM.124, TUNGSUKLA, SRIRACHA, CHONBURI 20230.)  
**SAMPLE TYPE** : SEAWATER  
**SAMPLING DATE** : APRIL 12, 2022  
**SAMPLING TIME** : 12:30 HOUR  
**SAMPLING METHOD** : COMPOSITE, STERILE TECHNIQUE  
**SAMPLING BY** : MR ANUSART SUAYDEE  
**ANALYZED BY** : MISS KANNIKAR SUMLEETHA  
**RECEIVED DATE** : APRIL 12, 2022  
**ANALYTICAL DATE** : APRIL 12-26, 2022  
**REPORT NO.** : 2022-U030817  
**WORK NO.** : 2021-003222  
**ANALYSIS NO.** : T22AH087-0008

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			JETTY 5/6 SOUTH 100 m T22AH087-0008	
pH <sup>a</sup>	-	ELECTROMETRIC METHOD AT SITE (SM:4500-H <sup>+</sup> B)	8.1 (31°C)	-
TEMPERATURE °	°C	THERMOMETER AT SITE (SM: 2550 B)	31	-
SALINITY °	ppt	ELECTRICAL CONDUCTIVITY METHOD AT SITE (SM: 2520 B)	33.8	0.1
DISSOLVED OXYGEN °	mg/L	MEMBRANE ELECTRODE METHOD AT SITE (SM: 4500-O G)	5.1	0.5
SUSPENDED SOLIDS °	mg/L	GRAVIMETRIC METHOD (SM: 2540 D)	4.6	1.0
TOTAL DISSOLVED SOLIDS °	mg/L	TOTAL DISSOLVED SOLIDS DRIED AT 180 °C (SM: 2540 C)	34,600	25
TOTAL AMMONIA <sup>b</sup>	µg/L N	IN-HOUSE METHOD: UAE.TP.WAT.001 BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA&WEF, 23rd ED., 2017, PART 4500-NH <sub>3</sub> H	156	10.0
PHENOLS °	mg/L	DISTILLATION, 4-AMINOANTIPYRINE METHOD (SM: 5530 B AND 5530 C)	0.010	0.005
SULPHIDE °	µg/L	METHYLENE BLUE COLOURIMETRIC METHOD (METHOD OF SEAWATER ANALYSIS, GRASSHOFF, 1999, CHAPTER 5)	ND	10
FAT, OIL AND GREASE °	mg/L	SOXHLET EXTRACTION METHOD (SM: 5520 D)	ND	3
PETROLEUM HYDROCARBON <sup>b</sup>	µg/L	INTERGOVERNMENT OCEANOGRAPHIC COMMISSION, MANUAL FOR MONITORING OIL AND DISSOLVED/ DISPERSED PETROLEUM HYDROCARBONS IN MARINE WATERS AND ON BEACHES, 1984	0.43	0.02
<b>METALS</b>				
LEAD °	µg/L Pb	PRE-CONCENTRATION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (BASED ON METHOD OF SEAWATER ANALYSIS, GRASSHOFF, 1999, CHAPTER 12)	ND	0.100



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			JETTY 5/6 SOUTH 100 m T22AH087-0008	
MICROBIOLOGY				
COLIFORM BACTERIA* <sup>b</sup>	MPN/100 mL	MULTIPLE-TUBE FERMENTATION TECHNIQUE (SM: 9221 B)	< 1.8	1.8
FAECAL COLIFORM BACTERIA* <sup>c</sup>	CFU/100 mL	MEMBRANE FILTER TECHNIQUE (SM: 9222 D)	1	1
SAMPLE CONDITION				
WATER'S COLOUR/TURBID			COLOURLESS/CLEAR	
SEDIMENT			YELLOW	

<sup>a</sup> : ISO/IEC 17025 ACCREDITED BY THAI INDUSTRIAL STANDARDS INSTITUTE (TISI)

<sup>b</sup> : ISO/IEC 17025 ACCREDITED BY DEPARTMENT OF SCIENCE SERVICE (DSS)

<sup>c</sup> : VERIFIED BY OWN LABORATORY QUALITY SYSTEM, BUT STILL NOT ACCREDITED

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

ND : NON-DETECTABLE.

\* : COLLECTED THE SAMPLE AT 30 CENTIMETRES UNDER THE WATER SURFACE LEVEL.

*Paueena Ch.*

(MISS PAWEENA CHARASCHOTEPINIT)  
LABORATORY SUPERVISOR

APRIL 28, 2022

## ANALYSIS REPORT

**CUSTOMER NAME** : THAI OIL PUBLIC COMPANY LIMITED

**ADDRESS** : 555/1 ENERGY COMPLEX BUILDING A, ELEVENTH FLOOR VIBHAVADI RANGSIT ROAD CHATUCHAK CHATUCHAK BANGKOK 10900

**CONTACT INFORMATION** : TEL : 0 3840 8500 EXT. 10502 e-mail : kitiya@thaioilgroup.com

**SAMPLING SOURCE** : IN FRONT OF THAI OIL PUBLIC COMPANY LIMITED  
(42/1 MOO 1, SUKHUMVIT ROAD KM.124, TUNG SUKLA, SRIRACHA, CHONBURI 20230.)

**SAMPLE TYPE** : SEAWATER

**SAMPLING DATE** : APRIL 12, 2022

**SAMPLING TIME** : 12:10 HOUR

**SAMPLING METHOD** : COMPOSITE, STERILE TECHNIQUE

**SAMPLING BY** : MR ANUSART SUAYDEE

**ANALYZED BY** : MISS KANNIKAR SUMLEETHA

**RECEIVED DATE** : APRIL 12, 2022

**ANALYTICAL DATE** : APRIL 12-26, 2022

**REPORT NO.** : 2022-U030818

**WORK NO.** : 2021-003222

**ANALYSIS NO.** : T22AH087-0009

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			CBM NORTH 100 m T22AH087-0009	
pH <sup>a</sup>	-	ELECTROMETRIC METHOD AT SITE (SM:4500-H* B)	8.2 (30°C)	-
TEMPERATURE °	°C	THERMOMETER AT SITE (SM: 2550 B)	30	-
SALINITY °	ppt	ELECTRICAL CONDUCTIVITY METHOD AT SITE (SM: 2520 B)	33.8	0.1
DISSOLVED OXYGEN °	mg/L	MEMBRANE ELECTRODE METHOD AT SITE (SM: 4500-O G)	5.2	0.5
SUSPENDED SOLIDS °	mg/L	GRAVIMETRIC METHOD (SM: 2540 D)	2.8	1.0
TOTAL DISSOLVED SOLIDS °	mg/L	TOTAL DISSOLVED SOLIDS DRIED AT 180 °C (SM: 2540 C)	34,325	25
TOTAL AMMONIA <sup>b</sup>	µg/L N	IN-HOUSE METHOD: UAE.TP.WAT.001 BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA&WEF, 23rd ED., 2017, PART 4500-NH <sub>3</sub> H	120	10.0
PHENOLS °	mg/L	DISTILLATION, 4-AMINOANTIPYRINE METHOD (SM: 5530 B AND 5530 C)	0.009	0.005
SULPHIDE °	µg/L	METHYLENE BLUE COLOURIMETRIC METHOD (METHOD OF SEAWATER ANALYSIS, GRASSHOFF, 1999, CHAPTER 5)	ND	10
FAT, OIL AND GREASE °	mg/L	SOXHLET EXTRACTION METHOD (SM: 5520 D)	ND	3
PETROLEUM HYDROCARBON <sup>b</sup>	µg/L	INTERGOVERNMENT OCEANOGRAPHIC COMMISSION, MANUAL FOR MONITORING OIL AND DISSOLVED/ DISPERSED PETROLEUM HYDROCARBONS IN MARINE WATERS AND ON BEACHES, 1984	0.36	0.02
<b>METALS</b>				
LEAD °	µg/L Pb	PRE-CONCENTRATION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (BASED ON METHOD OF SEAWATER ANALYSIS, GRASSHOFF, 1999, CHAPTER 12)	ND	0.100



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			CBM NORTH 100 m T22AH087-0009	
MICROBIOLOGY				
COLIFORM BACTERIA* <sup>b</sup>	MPN/100 mL	MULTIPLE-TUBE FERMENTATION TECHNIQUE (SM: 9221 B)	< 1.8	1.8
FAECAL COLIFORM BACTERIA* <sup>c</sup>	CFU/100 mL	MEMBRANE FILTER TECHNIQUE (SM: 9222 D)	< 1	1
SAMPLE CONDITION				
WATER'S COLOUR/TURBID			COLOURLESS/CLEAR	
SEDIMENT			YELLOW	

<sup>a</sup> : ISO/IEC 17025 ACCREDITED BY THAI INDUSTRIAL STANDARDS INSTITUTE (TISI)

<sup>b</sup> : ISO/IEC 17025 ACCREDITED BY DEPARTMENT OF SCIENCE SERVICE (DSS)

<sup>c</sup> : VERIFIED BY OWN LABORATORY QUALITY SYSTEM, BUT STILL NOT ACCREDITED

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

ND : NON-DETECTABLE.

\* : COLLECTED THE SAMPLE AT 30 CENTIMETRES UNDER THE WATER SURFACE LEVEL.

*Paewena Ch.*

(MISS PAWEENA CHARASCHOTEPINIT)  
LABORATORY SUPERVISOR

APRIL 28, 2022



## ANALYSIS REPORT

**CUSTOMER NAME** : THAI OIL PUBLIC COMPANY LIMITED

**ADDRESS** : 555/1 ENERGY COMPLEX BUILDING A, ELEVENTH FLOOR VIBHAVADI RANGSIT ROAD CHATUCHAK CHATUCHAK  
BANGKOK 10900

**CONTACT INFORMATION** : TEL : 0 3840 8500 EXT. 10502 e-mail : kitiya@thaioilgroup.com

**SAMPLING SOURCE** : IN FRONT OF THAI OIL PUBLIC COMPANY LIMITED  
(42/1 MOO 1, SUKHUMVIT ROAD KM.124, TUNGSUKLA, SRIRACHA, CHONBURI 20230.)

**SAMPLE TYPE** : SEAWATER

**SAMPLING DATE** : APRIL 12, 2022

**SAMPLING TIME** : 12:20 HOUR

**SAMPLING METHOD** : COMPOSITE, STERILE TECHNIQUE

**SAMPLING BY** : MR ANUSART SUAYDEE

**ANALYZED BY** : MISS KANNIKAR SUMLEETHA

**RECEIVED DATE** : APRIL 12, 2022

**ANALYTICAL DATE** : APRIL 12-26, 2022

**REPORT NO.** : 2022-U030820

**WORK NO.** : 2021-003222

**ANALYSIS NO.** : T22AH087-0010

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			CBM SOUTH 100 m T22AH087-0010	
pH <sup>a</sup>	-	ELECTROMETRIC METHOD AT SITE (SM:4500-H* B)	8.1 (31°C)	-
TEMPERATURE °	°C	THERMOMETER AT SITE (SM: 2550 B)	31	-
SALINITY °	ppt	ELECTRICAL CONDUCTIVITY METHOD AT SITE (SM: 2520 B)	33.7	0.1
DISSOLVED OXYGEN °	mg/L	MEMBRANE ELECTRODE METHOD AT SITE (SM: 4500-O G)	5.2	0.5
SUSPENDED SOLIDS °	mg/L	GRAVIMETRIC METHOD (SM: 2540 D)	3.2	1.0
TOTAL DISSOLVED SOLIDS °	mg/L	TOTAL DISSOLVED SOLIDS DRIED AT 180 °C (SM: 2540 C)	32,750	25
TOTAL AMMONIA <sup>b</sup>	µg/L N	IN-HOUSE METHOD: UAE.TP.WAT.001 BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA&WEF, 23rd ED., 2017, PART 4500-NH <sub>3</sub> H	123	10.0
PHENOLS °	mg/L	DISTILLATION, 4-AMINOANTIPYRINE METHOD (SM: 5530 B AND 5530 C)	0.009	0.005
SULPHIDE °	µg/L	METHYLENE BLUE COLOURIMETRIC METHOD (METHOD OF SEAWATER ANALYSIS, GRASSHOFF, 1999, CHAPTER 5)	ND	10
FAT, OIL AND GREASE °	mg/L	SOXHLET EXTRACTION METHOD (SM: 5520 D)	ND	3
PETROLEUM HYDROCARBON <sup>b</sup>	µg/L	INTERGOVERNMENT OCEANOGRAPHIC COMMISSION, MANUAL FOR MONITORING OIL AND DISSOLVED/ DISPERSED PETROLEUM HYDROCARBONS IN MARINE WATERS AND ON BEACHES, 1984	0.51	0.02
<b>METALS</b>				
LEAD °	µg/L Pb	PRE-CONCENTRATION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (BASED ON METHOD OF SEAWATER ANALYSIS, GRASSHOFF, 1999, CHAPTER 12)	0.280	0.100





PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			CBM SOUTH 100 m T22AH087-0010	
MICROBIOLOGY				
COLIFORM BACTERIA* <sup>b</sup>	MPN/100 mL	MULTIPLE-TUBE FERMENTATION TECHNIQUE (SM: 9221 B)	< 1.8	1.8
FAECAL COLIFORM BACTERIA* <sup>c</sup>	CFU/100 mL	MEMBRANE FILTER TECHNIQUE (SM: 9222 D)	< 1	1
SAMPLE CONDITION				
WATER'S COLOUR/TURBID			COLOURLESS/CLEAR	
SEDIMENT			YELLOW	

<sup>a</sup> : ISO/IEC 17025 ACCREDITED BY THAI INDUSTRIAL STANDARDS INSTITUTE (TISI)

<sup>b</sup> : ISO/IEC 17025 ACCREDITED BY DEPARTMENT OF SCIENCE SERVICE (DSS)

<sup>c</sup> : VERIFIED BY OWN LABORATORY QUALITY SYSTEM, BUT STILL NOT ACCREDITED

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

ND : NON-DETECTABLE.

\* : COLLECTED THE SAMPLE AT 30 CENTIMETRES UNDER THE WATER SURFACE LEVEL.

*Paewena Ch.*

(MISS PAWEENA CHARASCHOTEPINIT)  
LABORATORY SUPERVISOR

APRIL 28, 2022

## ANALYSIS REPORT

**CUSTOMER NAME** : THAI OIL PUBLIC COMPANY LIMITED

**ADDRESS** : 555/1 ENERGY COMPLEX BUILDING A, ELEVENTH FLOOR VIBHAVADI RANGSIT ROAD CHATUCHAK CHATUCHAK BANGKOK 10900

**CONTACT INFORMATION** : TEL : 0 3840 8500 EXT. 10502 e-mail : kitiya@thaioilgroup.com

**SAMPLING SOURCE** : IN FRONT OF THAI OIL PUBLIC COMPANY LIMITED  
(42/1 MOO 1, SUKHUMVIT ROAD KM.124, TUNGSUKLA, SRIRACHA, CHONBURI 20230.)

**SAMPLE TYPE** : SEAWATER

**SAMPLING DATE** : APRIL 12, 2022

**SAMPLING TIME** : 10:45 HOUR

**SAMPLING METHOD** : COMPOSITE, STERILE TECHNIQUE

**SAMPLING BY** : MR ANUSART SUAYDEE

**ANALYZED BY** : MISS KANNIKAR SUMLEETHA

**RECEIVED DATE** : APRIL 12, 2022

**ANALYTICAL DATE** : APRIL 12-26, 2022

**REPORT NO.** : 2022-U030804

**WORK NO.** : 2021-003222

**ANALYSIS NO.** : T22AH087-0002

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			SINGLE BUOY MOORING 2 T22AH087-0002	
pH <sup>a</sup>	-	ELECTROMETRIC METHOD AT SITE (SM:4500-H <sup>+</sup> B)	8.1 (30°C)	-
TEMPERATURE <sup>c</sup>	°C	THERMOMETER AT SITE (SM: 2550 B)	30	-
SALINITY <sup>c</sup>	ppt	ELECTRICAL CONDUCTIVITY METHOD AT SITE (SM: 2520 B)	33.4	0.1
DISSOLVED OXYGEN <sup>c</sup>	mg/L	MEMBRANE ELECTRODE METHOD AT SITE (SM: 4500-O G)	4.8	0.5
SUSPENDED SOLIDS <sup>c</sup>	mg/L	GRAVIMETRIC METHOD (SM: 2540 D)	1.9	1.0
TOTAL DISSOLVED SOLIDS <sup>c</sup>	mg/L	TOTAL DISSOLVED SOLIDS DRIED AT 180 °C (SM: 2540 C)	33,175	25
TOTAL AMMONIA <sup>b</sup>	µg/L N	IN-HOUSE METHOD: UAE.TP.WAT.001 BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA&WEF, 23rd ED., 2017, PART 4500-NH <sub>3</sub> H	155	10.0
PHENOLS <sup>c</sup>	mg/L	DISTILLATION, 4-AMINOANTIPYRINE METHOD (SM: 5530 B AND 5530 C)	0.007	0.005
SULPHIDE <sup>c</sup>	µg/L	METHYLENE BLUE COLOURIMETRIC METHOD (METHOD OF SEAWATER ANALYSIS, GRASSHOFF, 1999, CHAPTER 5)	ND	10
FAT, OIL AND GREASE <sup>c</sup>	mg/L	SOXHLET EXTRACTION METHOD (SM: 5520 D)	ND	3
PETROLEUM HYDROCARBON <sup>b</sup>	µg/L	INTERGOVERNMENT OCEANOGRAPHIC COMMISSION, MANUAL FOR MONITORING OIL AND DISSOLVED/ DISPERSED PETROLEUM HYDROCARBONS IN MARINE WATERS AND ON BEACHES, 1984	0.40	0.02
<b>METALS</b>				
LEAD <sup>c</sup>	µg/L Pb	PRE-CONCENTRATION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (BASED ON METHOD OF SEAWATER ANALYSIS, GRASSHOFF, 1999, CHAPTER 12)	ND	0.100



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			SINGLE BUOY MOORING 2 T22AH087-0002	
MICROBIOLOGY				
COLIFORM BACTERIA* <sup>b</sup>	MPN/100 mL	MULTIPLE-TUBE FERMENTATION TECHNIQUE (SM: 9221 B)	< 1.8	1.8
FAECAL COLIFORM BACTERIA* <sup>c</sup>	CFU/100 mL	MEMBRANE FILTER TECHNIQUE (SM: 9222 D)	< 1	1
SAMPLE CONDITION				
WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLEAR YELLOW	

<sup>a</sup> : ISO/IEC 17025 ACCREDITED BY THAI INDUSTRIAL STANDARDS INSTITUTE (TISI)

<sup>b</sup> : ISO/IEC 17025 ACCREDITED BY DEPARTMENT OF SCIENCE SERVICE (DSS)

<sup>c</sup> : VERIFIED BY OWN LABORATORY QUALITY SYSTEM, BUT STILL NOT ACCREDITED

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

ND : NON-DETECTABLE.

\* : COLLECTED THE SAMPLE AT 30 CENTIMETRES UNDER THE WATER SURFACE LEVEL.

*Paweena Ch.*

(MISS PAWEENA CHARASCHOTEPINIT)  
LABORATORY SUPERVISOR

APRIL 28, 2022

## ANALYSIS REPORT

**CUSTOMER NAME** : THAI OIL PUBLIC COMPANY LIMITED

**ADDRESS** : 555/1 ENERGY COMPLEX BUILDING A, ELEVENTH FLOOR VIBHAVADI RANGSIT ROAD CHATUCHAK CHATUCHAK  
BANGKOK 10900

**CONTACT INFORMATION** : TEL : 0 3840 8500 EXT. 10502 e-mail : kitiya@thaioilgroup.com

**SAMPLING SOURCE** : -

**SAMPLE TYPE** : BLANK (SEAWATER)

**SAMPLING DATE** : -

**SAMPLING TIME** : -

**SAMPLING METHOD** : -

**SAMPLING BY** : -

**ANALYZED BY** : MISS KANNIKAR SUMLEETHA

**RECEIVED DATE** : APRIL 12, 2022

**ANALYTICAL DATE** : APRIL 12-26, 2022

**REPORT NO.** : 2022-U030825

**WORK NO.** : 2021-003222

**ANALYSIS NO.** : 2022-FB0385, 2022-TB0367

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT		DETECTION LIMIT
			1 2022-FB0385	2 2022-TB0367	
SUSPENDED SOLIDS	mg/L	GRAVIMETRIC METHOD (SM: 2540 D)	ND	ND	1.0
TOTAL DISSOLVED SOLIDS	mg/L	TOTAL DISSOLVED SOLIDS DRIED AT 180 °C (SM: 2540 C)	ND	ND	25
TOTAL AMMONIA	µg/L N	IN-HOUSE METHOD: UAE.TP.WAT.001 BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA&WEF, 23rd ED., 2017, PART 4500-NH <sub>3</sub> H	ND	ND	10.0
PHENOLS	mg/L	DISTILLATION, 4-AMINOANTIPYRINE METHOD (SM: 5530 B AND 5530 C)	ND	ND	0.005
SULPHIDE	µg/L	METHYLENE BLUE COLOURIMETRIC METHOD (METHOD OF SEAWATER ANALYSIS, GRASSHOFF, 1999, CHAPTER 5)	ND	ND	10
FAT, OIL AND GREASE	mg/L	SOXHLET EXTRACTION METHOD (SM: 5520 D)	ND	ND	3
PETROLEUM HYDROCARBON	µg/L	INTERGOVERNMENT OCEANOGRAPHIC COMMISSION, MANUAL FOR MONITORING OIL AND DISSOLVED/ DISPERSED PETROLEUM HYDROCARBONS IN MARINE WATERS AND ON BEACHES, 1984	ND	ND	0.02
<b>METALS</b>					
LEAD	µg/L Pb	PRE-CONCENTRATION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (BASED ON METHOD OF SEAWATER ANALYSIS, GRASSHOFF, 1999, CHAPTER 12)	ND	ND	0.100



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT		DETECTION LIMIT
			1 2022-FB0385	2 2022-TB0367	
MICROBIOLOGY					
COLIFORM BACTERIA	MPN/100 mL	MULTIPLE-TUBE FERMENTATION TECHNIQUE (SM: 9221B)	< 1.8	< 1.8	1.8
FAECAL COLIFORM BACTERIA	CFU/100 mL	MEMBRANE FILTER TECHNIQUE (SM: 9222 D)	< 1	< 1	1
SAMPLE CONDITION					
WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLEAR -	COLOURLESS/CLEAR -	

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

RESULT 1 : FIELD BLANK

RESULT 2 : TRIP BLANK

ND : NON-DETECTABLE.

*Paewana Ch.*

(MISS PAWEENA CHARASCHOTEPINIT)  
LABORATORY SUPERVISOR

APRIL 28, 2022

ภาคผนวก ก2

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ผลการติดตามตรวจสอบนิเวศวิทยาทางทะเล



## ANALYSIS REPORT

**CUSTOMER NAME** : THAI OIL PUBLIC COMPANY LIMITED

**ADDRESS** : 555/1 ENERGY COMPLEX BUILDING A, 11TH FLOOR VIBHAVADI RANGSIT ROAD CHATUCHAK CHATUCHAK BANGKOK 10900

**CONTACT INFORMATION** : TEL : 0 3840 8500 EXT. 10502 e-mail : kitiya@thaioilgroup.com

**SAMPLING SOURCE** : IN FRONT OF THAI OIL PUBLIC COMPANY LIMITED  
(42/1 MOO 1, SUKHUMVIT ROAD KM.124, TUNGSUKLA, SRIRACHA, CHONBURI 20230.)

**SAMPLE TYPE** : SEAWATER **RECEIVED DATE** : APRIL 11, 2022

**SAMPLING DATE** : APRIL 11, 2022 **ANALYTICAL DATE** : APRIL 11-25, 2022

**SAMPLING TIME** : \* **REPORT NO.** : 2022-U030592

**SAMPLING METHOD** : PLANKTON NET **WORK NO.** : 2021-003222

**SAMPLING BY** : MR ANUSART SUAYDEE **ANALYSIS NO.** : T22AG944-0006 - T22AG944-0010

**ANALYZED BY** : MISS NAPAPORN PURATAKO

PHYTOPLANKTON (Natural Units/mL)	COUNTING UNIT	RESULT				
		SAMPLE NO. 1	SAMPLE NO. 2	SAMPLE NO. 3	SAMPLE NO. 4	SAMPLE NO. 5
		10:35 HOUR * T22AG944-0006	11:10 HOUR * T22AG944-0007	11:40 HOUR * T22AG944-0008	11:55 HOUR * T22AG944-0009	11:35 HOUR * T22AG944-0010
Division Cyanophyta						
Class Cyanophyceae						
Family Oscillatoriaceae						
<i>Oscillatoria</i> spp.	FILAMENT	1,748	1,817	1,255	1,178	446
Family Nostocaceae						
<i>Richelia intracellularis</i>	FILAMENT	5	9	0	5	0
Division Chromophyta						
Class Bacillariophyceae						
Family Thalassiosiraceae						
<i>Skeletonema</i> spp.	FILAMENT	0	9	0	0	0
<i>Thalassiosira</i> spp.	CELL	47	74	47	26	34
Family Melosiraceae						
<i>Paralia sulcata</i>	CELL	16	22	64	32	18
Family Leptocylindraceae						
<i>Corethron criophilum</i>	CELL	20	13	5	22	5
Family Coscinodiscaceae						
<i>Coscinodiscus</i> spp.	CELL	63	61	114	47	69
<i>Palmeria hardmaniana</i>	CELL	16	18	34	16	24
Family Rhizosoleniaceae						
<i>Guinardia</i> spp.	CELL	310	826	586	898	866
<i>Rhizosolenia</i> spp.	CELL	94	153	687	1,186	1,162
Family Hemiaulaceae						
<i>Climacodium</i> spp.	CELL	31	24	30	0	12
<i>Eucampia</i> spp.	CELL	41	46	37	41	64
<i>Hemiaulus</i> spp.	CELL	27	28	49	37	32
Family Biddulphiaceae						
<i>Biddulphia bidduphiana</i>	CELL	0	0	5	0	0





PHYTOPLANKTON (Natural Units/mL)	COUNTING UNIT	RESULT				
		SAMPLE NO. 1	SAMPLE NO. 2	SAMPLE NO. 3	SAMPLE NO. 4	SAMPLE NO. 5
		10:35 HOUR *	11:10 HOUR *	11:40 HOUR *	11:55 HOUR *	11:35 HOUR *
		T22AG944-0006	T22AG944-0007	T22AG944-0008	T22AG944-0009	T22AG944-0010
Family Chaetocerotaceae						
<i>Bacteriastrum</i> spp.	FILAMENT	375	382	455	468	372
<i>Chaetoceros</i> spp.	FILAMENT	97	1,128	1,377	1,264	678
Family Lithodismaceae						
<i>Ditylum</i> spp.	CELL	12	16	39	42	10
<i>Helicotheca tamesis</i>	CELL	22	40	26	22	51
Family Eupodiscaceae						
<i>Odontella</i> spp.	CELL	23	23	57	52	43
Family Thalassionemataceae						
<i>Thalassionema frauenfeldii</i>	CELL	152	191	30	52	57
<i>T. nitzschioides</i>	CELL	173	162	70	31	124
<i>Thalassiothrix</i> spp.	CELL	79	81	13	18	17
Family Naviculaceae						
<i>Amphora</i> spp.	CELL	62	64	80	60	62
<i>Diploneis</i> spp.	CELL	36	39	28	10	14
<i>Meuniera membranacea</i>	CELL	24	18	17	27	3
<i>Navicula</i> spp.	CELL	96	107	82	55	36
<i>Pleurosigma</i> spp.	CELL	86	80	166	153	79
<i>Trachyneis</i> spp.	CELL	25	24	17	16	40
Family Bacillariaceae						
<i>Bacillaria paxillifer</i>	CELL	0	12	65	74	0
<i>Nitzschia</i> spp.	CELL	24	23	5	7	9
<i>Pseudo-nitzschia</i> spp.	CELL	4,264	440	248	53	70
Family Surirellaceae						
<i>Surirella</i> spp.	CELL	28	27	62	60	47
Class Dictyochophyceae						
Family Dictyochophyceae						
<i>Dictyocha</i> spp.	CELL	13	10	0	9	11
Class Dinophyceae						
Family Prorocentraceae						
<i>Prorocentrum</i> spp.	CELL	34	43	49	63	37
Family Dinophysiaceae						
<i>Dinophysis</i> spp.	CELL	27	16	23	19	22
<i>Ornithocercus</i> spp.	CELL	6	6	0	0	3
Family Noctilucaeae						
<i>Noctiluca</i> spp.	CELL	0	0	16	9	0
Family Ceratiaceae						
<i>Ceratium</i> spp.	CELL	18	14	28	12	16
<i>C. furca</i>	CELL	40	33	42	24	30

PHYTOPLANKTON (Natural Units/mL)	COUNTING UNIT	RESULT				
		SAMPLE NO. 1	SAMPLE NO. 2	SAMPLE NO. 3	SAMPLE NO. 4	SAMPLE NO. 5
		10:35 HOUR *	11:10 HOUR *	11:40 HOUR *	11:55 HOUR *	11:35 HOUR *
		T22AG944-0006	T22AG944-0007	T22AG944-0008	T22AG944-0009	T22AG944-0010
Family Goniadomaceae <i>Gonyaulax</i> spp.	CELL	0	0	27	6	16
Family Pyrophacaceae <i>Pyrophacus</i> spp.	CELL	41	40	62	102	60
Family Peridiniaceae <i>Peridinium</i> spp.	CELL	86	83	67	67	62
Family Protoperidiniaceae <i>Protoperidinium</i> spp.	CELL	31	33	73	57	63
TOTAL ABUNDANCE (Natural Units/mL)		8,292	6,235	6,137	6,320	4,764
AMOUNT OF SPECIES		38	40	39	39	38
SAMPLE VOLUME (mL)		204	210	184	210	188
SAMPLE CONDITION						
WATER'S COLOUR/TURBID		COLOURLESS/CLEAR	COLOURLESS/CLEAR	COLOURLESS/CLEAR	COLOURLESS/CLEAR	COLOURLESS/CLEAR
SEDIMENT		GREEN	GREEN	GREEN	GREEN	GREEN

REMARK : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF 23<sup>rd</sup> EDITION, 2017 PART 10200 F.

- SAMPLE NO. 1 บริเวณห่างจากท่าเทียบเรือหมายเลข 7 และ 8 ไปทางทิศตะวันตกเฉียงใต้ 3 กิโลเมตร
- SAMPLE NO. 2 บริเวณห่างจากท่าเทียบเรือหมายเลข 7 และ 8 ไปทางทิศใต้ 500 เมตร
- SAMPLE NO. 3 บริเวณห่างจากท่าเทียบเรือหมายเลข 7 และ 8 ไปทางทิศตะวันออก 500 เมตร
- SAMPLE NO. 4 บริเวณห่างจากท่าเทียบเรือหมายเลข 7 และ 8 ไปทางทิศตะวันตก 500 เมตร
- SAMPLE NO. 5 บริเวณห่างจากท่าเทียบเรือหมายเลข 7 และ 8 ไปทางทิศเหนือ 500 เมตร

  
.....  
(MISS CHAWEEVAN BOONLA)  
LABORATORY SUPERVISOR

APRIL 29, 2022

## ANALYSIS REPORT

**CUSTOMER NAME** : THAI OIL PUBLIC COMPANY LIMITED  
**ADDRESS** : 555/1 ENERGY COMPLEX BUILDING A, 11TH FLOOR VIBHAVADI RANGSIT ROAD CHATUCHAK CHATUCHAK BANGKOK 10900  
**CONTACT INFORMATION** : TEL : 0 3840 8500 EXT. 10502 e-mail : kitiya@thaioilgroup.com  
**SAMPLING SOURCE** : IN FRONT OF THAI OIL PUBLIC COMPANY LIMITED  
(42/1 MOO 1, SUKHUMVIT ROAD KM.124, TUNGSUKLA, SRIRACHA, CHONBURI 20230.)  
**SAMPLE TYPE** : SEAWATER **RECEIVED DATE** : APRIL 11, 2022  
**SAMPLING DATE** : APRIL 11, 2022 **ANALYTICAL DATE** : APRIL 11-25, 2022  
**SAMPLING TIME** : \* **REPORT NO.** : 2022-U030593  
**SAMPLING METHOD** : PLANKTON NET **WORK NO.** : 2021-003222  
**SAMPLING BY** : MR ANUSART SUAYDEE **ANALYSIS NO.** : T22AG944-0006 - T22AG944-0010  
**ANALYZED BY** : MISS NAPAPORN PURATAKO

ZOOPLANKTON (UNITS/m <sup>3</sup> )	COUNTING UNIT	RESULT				
		SAMPLE NO. 1	SAMPLE NO. 2	SAMPLE NO. 3	SAMPLE NO. 4	SAMPLE NO. 5
		10:35 HOUR * T22AG944-0006	11:10 HOUR * T22AG944-0007	11:40 HOUR * T22AG944-0008	11:55 HOUR * T22AG944-0009	11:35 HOUR * T22AG944-0010
Phylum Protozoa						
Class Ciliata						
Family Codonellidae						
<i>Tintinnopsis</i> sp.	CELL	708	3,659	601	1,557	0
Family Codonellopsidae						
<i>Codonellopsis</i> sp.	CELL	238	1,373	0	0	0
Phylum Chaetognatha						
Class Sagittoidea						
Family Sagittidae						
<i>Sagitta</i> sp.	INDIVIDUAL	0	0	1,498	522	666
Phylum Annelida						
Class Polychaeta						
Polychaete Larva	INDIVIDUAL	471	2,060	2,986	7,785	1,777
Phylum Arthropoda						
Class Crustacea						
Cyclopoid Copepod	INDIVIDUAL	3,539	5,719	8,068	4,671	1,551
Calanoid Copepod	INDIVIDUAL	19,463	30,206	23,012	18,941	15,082
Harpacticoid Copepod	INDIVIDUAL	708	6,405	2,089	0	0
Nauplius of Copepod	INDIVIDUAL	42,817	56,292	69,026	84,077	81,381
Cerripedia Nauplius	INDIVIDUAL	0	1,373	1,793	0	446
Zoea	INDIVIDUAL	0	0	897	0	220
Phylum Mollusca						
Class Gastropoda						
Gastropod Larva	INDIVIDUAL	354	687	601	1,814	885
Class Bivalvia						
Bivalvia Larva	INDIVIDUAL	22,293	69,562	49,009	25,947	31,048
Phylum Echinodermata						
Class Echinoidea						
Echinopluteus Larva	INDIVIDUAL	3,302	1,600	0	779	0



ZOOPLANKTON (UNITS/m <sup>3</sup> )	COUNTING UNIT	RESULT				
		SAMPLE NO. 1 10:35 HOUR *	SAMPLE NO. 2 11:10 HOUR *	SAMPLE NO. 3 11:40 HOUR *	SAMPLE NO. 4 11:55 HOUR *	SAMPLE NO. 5 11:35 HOUR *
		T22AG944-0006	T22AG944-0007	T22AG944-0008	T22AG944-0009	T22AG944-0010
Phylum Chordata Class Larvacea Family Oikopleuridae <i>Oikopleura</i> sp.	INDIVIDUAL	4,838	8,925	8,669	16,606	6,653
TOTAL ABUNDANCE (UNITS/m <sup>3</sup> )		98,731	187,861	168,249	162,699	139,709
AMOUNT OF SPECIES		11	12	12	10	10
SAMPLE CONDITION						
WATER'S COLOUR/TURBID		COLOURLESS/CLEAR	COLOURLESS/CLEAR	COLOURLESS/CLEAR	COLOURLESS/CLEAR	COLOURLESS/CLEAR
SEDIMENT		GREEN	GREEN	GREEN	GREEN	GREEN

REMARK : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF 23<sup>rd</sup> EDITION, 2017 PART 10200 F.

- SAMPLE NO. 1 บริเวณห่างจากท่าเทียบเรือหมายเลข 7 และ 8 ไปทางทิศตะวันตกเฉียงใต้ 3 กิโลเมตร  
 SAMPLE NO. 2 บริเวณห่างจากท่าเทียบเรือหมายเลข 7 และ 8 ไปทางทิศใต้ 500 เมตร  
 SAMPLE NO. 3 บริเวณห่างจากท่าเทียบเรือหมายเลข 7 และ 8 ไปทางทิศตะวันออก 500 เมตร  
 SAMPLE NO. 4 บริเวณห่างจากท่าเทียบเรือหมายเลข 7 และ 8 ไปทางทิศตะวันตก 500 เมตร  
 SAMPLE NO. 5 บริเวณห่างจากท่าเทียบเรือหมายเลข 7 และ 8 ไปทางทิศเหนือ 500 เมตร

  
 (MISS CHAWEEVAN BOONLA)  
 LABORATORY SUPERVISOR

APRIL 29, 2022

## ANALYSIS REPORT

**CUSTOMER NAME** : THAI OIL PUBLIC COMPANY LIMITED  
**ADDRESS** : 555/1 ENERGY COMPLEX BUILDING A, 11TH FLOOR VIBHAVADI RANGSIT ROAD CHATUCHAK CHATUCHAK BANGKOK 10900  
**CONTACT INFORMATION** : TEL : 0 3840 8500 EXT. 10502 e-mail : kitiya@thaioilgroup.com  
**SAMPLING SOURCE** : THAI OIL PUBLIC COMPANY LIMITED  
 (42/1 MOO 1, SUKHUMVIT ROAD KM.124, TUNGSUKLA, SRIRACHA, CHONBURI 20230.)  
**SAMPLE TYPE** : SEAWATER **RECEIVED DATE** : APRIL 12, 2022  
**SAMPLING DATE** : APRIL 12, 2022 **ANALYTICAL DATE** : APRIL 12-27, 2022  
**SAMPLING TIME** : \* **REPORT NO.** : 2022-U031516  
**SAMPLING METHOD** : PLANKTON NET **WORK NO.** : 2021-003222  
**SAMPLING BY** : MR ANUSART SUAYDEE **ANALYSIS NO.** : T22AH087-0011 - T22AH087-0015  
**ANALYZED BY** : MISS NAPAPORN PURATAKO

PHYTOPLANKTON (Natural Units/mL)	COUNTING UNIT	RESULT				
		SAMPLE NO. 1	SAMPLE NO. 2	SAMPLE NO. 3	SAMPLE NO. 4	SAMPLE NO. 5
		12:05 HOUR * T22AH087-0011	12:50 HOUR * T22AH087-0012	11:35 HOUR * T22AH087-0013	13:25 HOUR * T22AH087-0014	10:50 HOUR * T22AH087-0015
Division Cyanophyta						
Class Cyanophyceae						
Family Oscillatoriaceae						
<i>Oscillatoria</i> spp.	FILAMENT	2,236	562	1,662	47	276
Division Chromophyta						
Class Bacillariophyceae						
Family Thalassiosiraceae						
<i>Planktoniella</i> spp.	CELL	0	0	0	0	5
<i>Thalassiosira</i> spp.	CELL	81	184	40	14	50
Family Melosiraceae						
<i>Paralia sulcata</i>	CELL	27	52	18	43	30
Family Leptocylindraceae						
<i>Corethron criophilum</i>	CELL	0	5	17	5	29
Family Coscinodiscaceae						
<i>Coscinodiscus</i> spp.	CELL	46	52	82	70	73
<i>Palmeria hardmaniana</i>	CELL	7	12	26	34	15
Family Rhizosoleniaceae						
<i>Guinardia</i> spp.	CELL	5,086	10,307	486	1,862	390
<i>Rhizosolenia</i> spp.	CELL	1,421	1,225	526	1,368	465
Family Hemiaulaceae						
<i>Climacodium</i> spp.	CELL	0	0	26	0	16
<i>Eucampia</i> spp.	CELL	714	779	62	32	59
<i>Hemiaulus</i> spp.	CELL	143	213	62	49	80
Family Chaetocerotaceae						
<i>Bacteriastrum</i> spp.	FILAMENT	338	303	80	282	75
<i>Chaetoceros</i> spp.	FILAMENT	10,534	15,527	67	16,075	194



PHYTOPLANKTON (Natural Units/mL)	COUNTING UNIT	RESULT				
		SAMPLE NO. 1	SAMPLE NO. 2	SAMPLE NO. 3	SAMPLE NO. 4	SAMPLE NO. 5
		12:05 HOUR *	12:50 HOUR *	11:35 HOUR *	13:25 HOUR *	10:50 HOUR *
		T22AH087-0011	T22AH087-0012	T22AH087-0013	T22AH087-0014	T22AH087-0015
Family Lithodesmaceae						
<i>Ditylum</i> spp.	CELL	362	354	9	60	19
<i>Helicotheca tamesis</i>	CELL	415	506	0	27	0
Family Eupodiscaceae						
<i>Odontella</i> spp.	CELL	34	42	12	25	41
Family Thalassionemataceae						
<i>Thalassionema frauenfeldii</i>	CELL	221	298	34	26	255
<i>T. nitzschioides</i>	CELL	44	58	51	43	479
<i>Thalassiothrix</i> spp.	CELL	44	38	12	32	13
Family Naviculaceae						
<i>Amphora</i> spp.	CELL	9	24	53	32	56
<i>Diploneis</i> spp.	CELL	0	7	12	14	35
<i>Meuniera membranacea</i>	CELL	9	18	13	5	21
<i>Navicula</i> spp.	CELL	48	45	16	47	55
<i>Pinnularia</i> spp.	CELL	13	12	0	0	0
<i>Pleurosigma</i> spp.	CELL	882	875	73	43	295
<i>Trachyneis</i> spp.	CELL	9	22	32	24	28
Family Bacillariaceae						
<i>Bacillaria paxillifer</i>	CELL	405	422	0	87	0
<i>Nitzschia</i> spp.	CELL	5	5	5	18	38
<i>N. longissima</i>	CELL	13	19	0	0	0
<i>Pseudo-nitzschia</i> spp.	CELL	542	242	53	43	118
Family Surirellaceae						
<i>Entomoneis</i> spp.	CELL	13	15	0	0	0
<i>Surirella</i> spp.	CELL	20	18	38	73	36
Class Dictyochophyceae						
Family Dictyochophyceae						
<i>Dictyocha</i> spp.	CELL	8	5	16	14	11
Class Dinophyceae						
Family Prorocentraceae						
<i>Prorocentrum</i> spp.	CELL	30	42	37	9	27
Family Dinophysiaceae						
<i>Dinophysis</i> spp.	CELL	9	17	16	0	7
<i>Omithocercus</i> spp.	CELL	0	0	4	0	12
<i>Phalacroma</i> spp.	CELL	0	5	0	0	0
Family Ceratiaceae						
<i>Ceratium</i> spp.	CELL	38	60	10	12	0
<i>C. furca</i>	CELL	30	49	12	32	24

PHYTOPLANKTON (Natural Units/mL)	COUNTING UNIT	RESULT				
		SAMPLE NO. 1	SAMPLE NO. 2	SAMPLE NO. 3	SAMPLE NO. 4	SAMPLE NO. 5
		12:05 HOUR *	12:50 HOUR *	11:35 HOUR *	13:25 HOUR *	10:50 HOUR *
		T22AH087-0011	T22AH087-0012	T22AH087-0013	T22AH087-0014	T22AH087-0015
Family Pyrophacaceae <i>Pyrophacus</i> spp.	CELL	49	58	21	28	25
Family Peridiniaceae <i>Peridinium</i> spp.	CELL	66	59	62	52	47
Family Protoperidiniaceae <i>Protoperidinium</i> spp.	CELL	61	50	42	40	64
TOTAL ABUNDANCE (Natural Units/mL)		24,012	32,586	3,787	20,667	3,463
AMOUNT OF SPECIES		37	40	36	35	36
SAMPLE VOLUME (mL)		228	220	214	216	220
SAMPLE CONDITION						
WATER'S COLOUR/TURBID		COLOURLESS/CLEAR	COLOURLESS/CLEAR	COLOURLESS/CLEAR	COLOURLESS/CLEAR	COLOURLESS/CLEAR
SEDIMENT		GREEN	GREEN	GREEN	BROWN	YELLOW

REMARK : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF 23<sup>rd</sup> EDITION, 2017 PART 10200 F.

SAMPLE NO. 1 CONVENTIONAL BUOY MOORING

SAMPLE NO. 2 JETTY # 3

SAMPLE NO. 3 SINGLE BUOY MOORING 1

SAMPLE NO. 4 REFINERY OUTFALL

SAMPLE NO. 5 SINGLE BUOY MOORING 2

  
(MISS CHAWEEVAN BOONLA)  
LABORATORY SUPERVISOR

APRIL 29, 2022



## ANALYSIS REPORT

**CUSTOMER NAME** : THAI OIL PUBLIC COMPANY LIMITED  
**ADDRESS** : 555/1 ENERGY COMPLEX BUILDING A, 11TH FLOOR VIBHAVADI RANGSIT ROAD CHATUCHAK CHATUCHAK BANGKOK 10900  
**CONTACT INFORMATION** : TEL : 0 3840 8500 EXT. 10502 e-mail : kitiya@thaioilgroup.com  
**SAMPLING SOURCE** : THAI OIL PUBLIC COMPANY LIMITED  
(42/1 MOO 1, SUKHUMVIT ROAD KM.124, TUNGSUKLA, SRIRACHA, CHONBURI 20230.)  
**SAMPLE TYPE** : SEAWATER **RECEIVED DATE** : APRIL 12, 2022  
**SAMPLING DATE** : APRIL 12, 2022 **ANALYTICAL DATE** : APRIL 12-26, 2022  
**SAMPLING TIME** : \* **REPORT NO.** : 2022-U031517  
**SAMPLING METHOD** : PLANKTON NET **WORK NO.** : 2021-003222  
**SAMPLING BY** : MR ANUSART SUAYDEE **ANALYSIS NO.** : T22AH087-0011 - T22AH087-0015  
**ANALYZED BY** : MISS NAPAPORN PURATAKO

ZOOPLANKTON (UNITS/m <sup>3</sup> )	COUNTING UNIT	RESULT				
		SAMPLE NO. 1	SAMPLE NO. 2	SAMPLE NO. 3	SAMPLE NO. 4	SAMPLE NO. 5
		12:05 HOUR * T22AH087-0011	12:50 HOUR * T22AH087-0012	11:35 HOUR * T22AH087-0013	13:25 HOUR * T22AH087-0014	10:50 HOUR * T22AH087-0015
Phylum Protozoa						
Class Sarcodina						
Foraminifera	CELL	0	2,672	0	972	0
Family Sticholonchidae						
<i>Sticholonche</i> sp.	CELL	0	0	0	0	116
Family Actinommidiae						
<i>Actinomma leptoderma</i>	CELL	260	0	0	1,973	235
Class Ciliata						
Family Vorticellidae						
<i>Vorticella</i> sp.	CELL	78,816	33,589	5,945	0	13,663
Family Rhabdonellidae						
<i>Rhabdonella</i> sp.	CELL	0	0	0	0	116
Family Codonellidae						
<i>Tintinnopsis</i> sp.	CELL	0	1,072	164	0	4,555
Family Codonellopsidae						
<i>Codonellopsis</i> sp.	CELL	527	0	0	0	1,286
Family Cyttarocylindae						
<i>Favella</i> sp.	CELL	1,045	4,799	332	0	0
Phylum Chaetognatha						
Class Sagittoidea						
Family Sagittidae						
<i>Sagitta</i> sp.	INDIVIDUAL	0	0	0	0	817
Phylum Annelida						
Class Polychaeta						
Polychaete Larva	INDIVIDUAL	3,402	0	0	10,805	936



ZOOPLANKTON (UNITS/m <sup>3</sup> )	COUNTING UNIT	RESULT				
		SAMPLE NO. 1	SAMPLE NO. 2	SAMPLE NO. 3	SAMPLE NO. 4	SAMPLE NO. 5
		12:05 HOUR *	12:50 HOUR *	11:35 HOUR *	13:25 HOUR *	10:50 HOUR *
		T22AH087-0011	T22AH087-0012	T22AH087-0013	T22AH087-0014	T22AH087-0015
<b>Phylum Arthropoda</b>						
Class Crustacea						
Cyclopoid Copepod	INDIVIDUAL	11,525	27,719	5,118	71,630	6,306
Calanoid Copepod	INDIVIDUAL	19,113	29,862	4,296	25,526	5,956
Harpacticoid Copepod	INDIVIDUAL	1,831	17,066	496	13,749	2,218
Nauplius of Copepod	INDIVIDUAL	70,175	168,469	34,183	318,934	19,384
Cerripedia Nauplius	INDIVIDUAL	527	0	0	46,134	0
Zoea	INDIVIDUAL	0	0	0	0	235
<b>Phylum Mollusca</b>						
Class Gastropoda						
Gastropod Larva	INDIVIDUAL	2,884	2,128	0	3,916	0
Class Bivalvia						
Bivalvia Larva	INDIVIDUAL	14,400	27,191	0	0	0
<b>Phylum Echinodermata</b>						
Class Echinoidea						
Echinopluteus Larva	INDIVIDUAL	527	0	332	0	351
<b>Phylum Chordata</b>						
Class Larvacea						
Family Oikopleuridae						
<i>Oikopleura</i> sp.	INDIVIDUAL	13,614	38,915	3,136	6,860	2,919
<b>TOTAL ABUNDANCE (UNITS/m<sup>3</sup>)</b>		<b>218,646</b>	<b>353,482</b>	<b>54,002</b>	<b>500,499</b>	<b>59,093</b>
<b>AMOUNT OF SPECIES</b>		<b>14</b>	<b>11</b>	<b>9</b>	<b>10</b>	<b>15</b>
<b>SAMPLE CONDITION</b>						
WATER'S COLOUR/TURBID		COLOURLESS/CLEAR	COLOURLESS/CLEAR	COLOURLESS/CLEAR	COLOURLESS/CLEAR	COLOURLESS/CLEAR
SEDIMENT		GREEN	GREEN	GREEN	BROWN	YELLOW

REMARK : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF 23<sup>rd</sup> EDITION, 2017 PART 10200 F.


SAMPLE NO. 1 CONVENTIONAL BUOY MOORING

SAMPLE NO. 2 JETTY # 3

SAMPLE NO. 3 SINGLE BUOY MOORING 1

SAMPLE NO. 4 REFINERY OUTFALL

SAMPLE NO. 5 SINGLE BUOY MOORING 2

  
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(MISS CHAWEEVAN BOONLA)  
LABORATORY SUPERVISOR

APRIL 29, 2022