

ภาคผนวก ค-5  
รายงานผลการติดตามตรวจสอบคุณภาพน้ำผิวดิน

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ลำน้าอน

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## ANALYSIS REPORT

**PROJECT NAME** : โครงการโรงไฟฟ้าชีวมวล  
**CUSTOMER NAME** : THAI ROONG RUANG INDUSTRY CO., LTD.  
**ADDRESS** : 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210  
**CONTACT INFORMATION** : TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com  
**SAMPLING SOURCE** : สำนักรับน้ำดื่มจากที่ตั้งโรงงานผลิตน้ำตาลทราย (ด้านเหนือจากจุดขนถ่ายของโรงงานผลิตน้ำตาลทราย ระยะทางประมาณ 1.3 กิโลเมตร)  
**SAMPLE TYPE** : SURFACE WATER  
**SAMPLING DATE** : APRIL 25, 2024  
**SAMPLING TIME** : 14:40 HOUR  
**SAMPLING METHOD** : GRAB  
**SAMPLING BY** : MR APISIT SRIKONGKAEW  
**ANALYZED BY** : MISS NAPAPORN KHUNNOKKHUM

**RECEIVED DATE** : APRIL 26, 2024  
**ANALYTICAL DATE** : APRIL 26 - MAY 9, 2024  
**ISSUE DATE** : MAY 16, 2024  
**REPORT NO.** : 2024-U041558  
**WORK NO.** : 2023-008918  
**ANALYSIS NO.** : T24AI771-0001

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			SURFACE WATER T24AI771-0001		
pH	-	ELECTROMETRIC METHOD (AT SITE) SM: PART 4500-H <sup>+</sup> B AND 1060 B	7.7 (34°C)	5.0-9.0	-
TEMPERATURE	°C	THERMOMETER AT SITE (SM: PART 2550 B)	34	n'	-
DISSOLVED OXYGEN	mg/L	AZIDE MODIFICATION METHOD AT SITE (SM: PART 4500-O C)	6.2	≥ 4.0	0.5
BIOCHEMICAL OXYGEN DEMAND	mg/L	AZIDE MODIFICATION METHOD (SM: PART 5210 B AND PART 4500-O C)	1.3	≤ 2.0	1.0
TOTAL DISSOLVED SOLIDS	mg/L	TOTAL DISSOLVED SOLIDS DRIED AT 180 °C (SM: PART 2540 C)	147	-	25
AMMONIA-NITROGEN	mg/L NH <sub>3</sub> -N	DISTILLATION NESSLERIZATION METHOD	ND	≤ 0.5	0.5
NITRATE-NITROGEN	mg/L NO <sub>3</sub> -N	CADMIUM REDUCTION METHOD (SM: PART 4500-NO <sub>3</sub> E)	0.12	≤ 5.0	0.02
CHLORIDE	mg/L Cl <sup>-</sup>	ARGENTOMETRIC METHOD (SM: 4500-Cl <sup>-</sup> B)	53.9	-	2.0
SODIUM ADSORPTION RATIO	-	INDUCTIVELY COUPLED PLASMA (ICP) AND CALCULATION METHOD	1.47	-	-
METALS					
ARSENIC	mg/L As	HYDRIDE GENERATION AAS METHOD (SM: PART 3114 C)	0.0004	≤ 0.01	0.0003
TOTAL MERCURY	mg/L Hg	IN-HOUSE METHOD: UAE.TP.HEM.002 (COLD VAPOUR ATOMIC ABSORPTION SPECTROMETRIC METHOD); SM: PART 3112 B	ND	≤ 0.002	0.0001
CADMIUM	mg/L Cd	IN-HOUSE METHOD: UAE.TP.SW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	ND	≤ 0.005*, ≤ 0.05**	0.002
LEAD	mg/L Pb	IN-HOUSE METHOD: UAE.TP.SW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	ND	≤ 0.05	0.003
MANGANESE	mg/L Mn	IN-HOUSE METHOD: UAE.TP.SW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	0.422	≤ 1.0	0.002



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			SURFACE WATER T24AI771-0001		
SODIUM	mg/L Na	NITRIC ACID-HYDROCHLORIC ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (SM: PART 3030 F AND PART 3120 B)	17.2	-	0.005
<b>SAMPLE CONDITION</b> WATER'S COLOUR/TURBID SEDIMENT			YELLOW/TURBID BROWN		

IN-HOUSE : BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23<sup>rd</sup> EDITION, 2017.

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

REGULATORY STANDARD : SURFACE WATER QUALITY STANDARDS CLASS 3, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, NO.8, B.E. 2537 ISSUED UNDER THE ENCHANCEMENT AND CONSERVATION OF NATIONAL ENVIRONMENTAL QUALITY ACT, B.E. 2535, PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 111, PART 16, DATED FEBRUARY 24, B.E. 2537 (1994).

CLASS 3 : MEDIUM CLEAN FRESH SURFACE WATER RESOURCES USED FOR  
(1) CONSUMPTION, BUT PASSING THROUGH ON ORDINARY TREATMENT PROCESS BEFORE USING  
(2) AGRICULTURE

n<sup>o</sup> : NATURALLY BUT CHANGING NOT MORE THAN 3°C

\* : WHEN WATER HARDNESS NOT MORE THAN 100 mg/L AS CaCO<sub>3</sub>

\*\* : WHEN WATER HARDNESS MORE THAN 100 mg/L AS CaCO<sub>3</sub>

ND : NON-DETECTABLE

*Bhuchonk p.*

(MR BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR

## ANALYSIS REPORT

**PROJECT NAME** : โครงการโรงไฟฟ้าชีวมวล  
**CUSTOMER NAME** : THAI ROONG RUANG INDUSTRY CO., LTD.  
**ADDRESS** : 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210  
**CONTACT INFORMATION** : TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com  
**SAMPLING SOURCE** : สำนักรับน้ำบริเวณใกล้เขื่อนจุดผันน้ำของโรงงานผลิตน้ำตาลทราย (บริเวณจุดผันน้ำของโรงงานผลิตน้ำตาลทราย)  
**SAMPLE TYPE** : SURFACE WATER  
**SAMPLING DATE** : APRIL 25, 2024  
**SAMPLING TIME** : 12:00 HOUR  
**SAMPLING METHOD** : GRAB  
**SAMPLING BY** : MR APISIT SRIKONGKAEW  
**ANALYZED BY** : MISS NAPAPORN KHUNNOKKHUM

**RECEIVED DATE** : APRIL 26, 2024  
**ANALYTICAL DATE** : APRIL 26 - MAY 9, 2024  
**ISSUE DATE** : MAY 16, 2024  
**REPORT NO.** : 2024-U041559  
**WORK NO.** : 2023-008918  
**ANALYSIS NO.** : T24AI771-0007

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			SURFACE WATER T24AI771-0007		
pH	-	ELECTROMETRIC METHOD (AT SITE) SM: PART 4500-H <sup>+</sup> B AND 1060 B	7.4 (34°C)	5.0-9.0	-
TEMPERATURE	°C	THERMOMETER AT SITE (SM: PART 2550 B)	34	n <sup>a</sup>	-
DISSOLVED OXYGEN	mg/L	AZIDE MODIFICATION METHOD AT SITE (SM: PART 4500-O C)	6.0	≥ 4.0	0.5
BIOCHEMICAL OXYGEN DEMAND	mg/L	AZIDE MODIFICATION METHOD (SM: PART 5210 B AND PART 4500-O C)	1.1	≤ 2.0	1.0
TOTAL DISSOLVED SOLIDS	mg/L	TOTAL DISSOLVED SOLIDS DRIED AT 180 °C (SM: PART 2540 C)	141	-	25
AMMONIA-NITROGEN	mg/L NH <sub>3</sub> -N	DISTILLATION NESSLERIZATION METHOD	ND	≤ 0.5	0.5
NITRATE-NITROGEN	mg/L NO <sub>3</sub> -N	CADMIUM REDUCTION METHOD (SM: PART 4500-NO <sub>3</sub> -E)	0.11	≤ 5.0	0.02
CHLORIDE	mg/L Cl <sup>-</sup>	ARGENTOMETRIC METHOD (SM: 4500-Cl <sup>-</sup> B)	53.4	-	2.0
SODIUM ADSORPTION RATIO	-	INDUCTIVELY COUPLED PLASMA (ICP) AND CALCULATION METHOD	1.35	-	-
METALS					
ARSENIC	mg/L As	HYDRIDE GENERATION AAS METHOD (SM: PART 3114 C)	0.0004	≤ 0.01	0.0003
TOTAL MERCURY	mg/L Hg	IN-HOUSE METHOD: UAE.TP.HEM.002 (COLD VAPOUR ATOMIC ABSORPTION SPECTROMETRIC METHOD); SM: PART 3112 B	ND	≤ 0.002	0.0001
CADMIUM	mg/L Cd	IN-HOUSE METHOD: UAE.TP.SW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	ND	≤ 0.005*, ≤ 0.05**	0.002
LEAD	mg/L Pb	IN-HOUSE METHOD: UAE.TP.SW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	ND	≤ 0.05	0.003
MANGANESE	mg/L Mn	IN-HOUSE METHOD: UAE.TP.SW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	0.194	≤ 1.0	0.002



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			SURFACE WATER T24AI771-0007		
SODIUM	mg/L Na	NITRIC ACID-HYDROCHLORIC ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (SM: PART 3030 F AND PART 3120 B)	14.7	-	0.005
<b>SAMPLE CONDITION</b> WATER'S COLOUR/TURBID SEDIMENT			YELLOW/CLEAR BROWN		

IN-HOUSE : BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23<sup>rd</sup> EDITION, 2017.

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

REGULATORY STANDARD : SURFACE WATER QUALITY STANDARDS CLASS 3, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, NO.8, B.E. 2537 ISSUED UNDER THE ENCHANCEMENT AND CONSERVATION OF NATIONAL ENVIRONMENTAL QUALITY ACT, B.E. 2535, PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 111, PART 16, DATED FEBRUARY 24, B.E. 2537 (1994).

CLASS 3 : MEDIUM CLEAN FRESH SURFACE WATER RESOURCES USED FOR  
(1) CONSUMPTION, BUT PASSING THROUGH ON ORDINARY TREATMENT PROCESS BEFORE USING  
(2) AGRICULTURE

n' : NATURALLY BUT CHANGING NOT MORE THAN 3°C

\* : WHEN WATER HARDNESS NOT MORE THAN 100 mg/L AS CaCO<sub>3</sub>

\*\* : WHEN WATER HARDNESS MORE THAN 100 mg/L AS CaCO<sub>3</sub>

ND : NON-DETECTABLE.

*Bhuchonk p.*

(MR BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR

## ANALYSIS REPORT

**PROJECT NAME** : โครงการโรงไฟฟ้าชีวมวล  
**CUSTOMER NAME** : THAI ROONG RUANG INDUSTRY CO., LTD.  
**ADDRESS** : 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210  
**CONTACT INFORMATION** : TEL : 09 5665 0649 e-mail : piyawan.pan@trgroup.com  
**SAMPLING SOURCE** : สำนักรับน้ำดื่มจากที่ตั้งโรงงานผลิตน้ำตาลทราย (ด้านท้ายน้ำขึ้นจากจุดผันน้ำของโรงงานผลิตน้ำตาลทราย ระยะทางประมาณ 1 กิโลเมตร)  
**SAMPLE TYPE** : SURFACE WATER  
**SAMPLING DATE** : APRIL 25, 2024  
**SAMPLING TIME** : 10:00 HOUR  
**SAMPLING METHOD** : GRAB  
**SAMPLING BY** : MR APISIT SRIKONGKAEW  
**ANALYZED BY** : MISS NAPAPORN KHUNNOKKHUM  
**RECEIVED DATE** : APRIL 26, 2024  
**ANALYTICAL DATE** : APRIL 26 - MAY 9, 2024  
**ISSUE DATE** : MAY 16, 2024  
**REPORT NO.** : 2024-U041560  
**WORK NO.** : 2023-008918  
**ANALYSIS NO.** : T24AI771-0013

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			SURFACE WATER T24AI771-0013		
pH	-	ELECTROMETRIC METHOD (AT SITE) SM: PART 4500-H <sup>+</sup> B AND 1060 B	7.9 (33°C)	5.0-9.0	-
TEMPERATURE	°C	THERMOMETER AT SITE (SM: PART 2550 B)	33	n'	-
DISSOLVED OXYGEN	mg/L	AZIDE MODIFICATION METHOD AT SITE (SM: PART 4500-O C)	6.1	≥ 4.0	0.5
BIOCHEMICAL OXYGEN DEMAND	mg/L	AZIDE MODIFICATION METHOD (SM: PART 5210 B AND PART 4500-O C)	1.5	≤ 2.0	1.0
TOTAL DISSOLVED SOLIDS	mg/L	TOTAL DISSOLVED SOLIDS DRIED AT 180 °C (SM: PART 2540 C)	134	-	25
AMMONIA-NITROGEN	mg/L NH <sub>3</sub> -N	DISTILLATION NESSLERIZATION METHOD	ND	≤ 0.5	0.5
NITRATE-NITROGEN	mg/L NO <sub>3</sub> -N	CADMIUM REDUCTION METHOD (SM: PART 4500-NO <sub>3</sub> -E)	0.10	≤ 5.0	0.02
CHLORIDE	mg/L Cl <sup>-</sup>	ARGENTOMETRIC METHOD (SM: 4500-Cl <sup>-</sup> B)	52.5	-	2.0
SODIUM ADSORPTION RATIO	-	INDUCTIVELY COUPLED PLASMA (ICP) AND CALCULATION METHOD	1.46	-	-
METALS					
ARSENIC	mg/L As	HYDRIDE GENERATION AAS METHOD (SM: PART 3114 C)	0.0004	≤ 0.01	0.0003
TOTAL MERCURY	mg/L Hg	IN-HOUSE METHOD: UAE.TP.HEM.002 (COLD VAPOUR ATOMIC ABSORPTION SPECTROMETRIC METHOD); SM: PART 3112 B	ND	≤ 0.002	0.0001
CADMIUM	mg/L Cd	IN-HOUSE METHOD: UAE.TP.SW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	ND	≤ 0.005*, ≤ 0.05**	0.002
LEAD	mg/L Pb	IN-HOUSE METHOD: UAE.TP.SW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	ND	≤ 0.05	0.003
MANGANESE	mg/L Mn	IN-HOUSE METHOD: UAE.TP.SW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	0.182	≤ 1.0	0.002



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			SURFACE WATER T24AI771-0013		
SODIUM	mg/L Na	NITRIC ACID-HYDROCHLORIC ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (SM: PART 3030 F AND PART 3120 B)	16.7	-	0.005
<b>SAMPLE CONDITION</b> WATER'S COLOUR/TURBID SEDIMENT			YELLOW/CLEAR BROWN		

IN-HOUSE : BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23<sup>rd</sup> EDITION, 2017.

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

REGULATORY STANDARD : SURFACE WATER QUALITY STANDARDS CLASS 3, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, NO.8, B.E. 2537 ISSUED UNDER THE ENCHANCEMENT AND CONSERVATION OF NATIONAL ENVIRONMENTAL QUALITY ACT, B.E. 2535, PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 111, PART 16, DATED FEBRUARY 24, B.E. 2537 (1994).

CLASS 3 : MEDIUM CLEAN FRESH SURFACE WATER RESOURCES USED FOR  
(1) CONSUMPTION, BUT PASSING THROUGH ON ORDINARY TREATMENT PROCESS BEFORE USING  
(2) AGRICULTURE

n' : NATURALLY BUT CHANGING NOT MORE THAN 3°C

\* : WHEN WATER HARDNESS NOT MORE THAN 100 mg/L AS CaCO<sub>3</sub>

\*\* : WHEN WATER HARDNESS MORE THAN 100 mg/L AS CaCO<sub>3</sub>

ND : NON-DETECTABLE.

*Bhuchonk p.*

(MR BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR

## ANALYSIS REPORT

**PROJECT NAME** : โครงการโรงไฟฟ้าชีวมวล  
**CUSTOMER NAME** : THAI ROONG RUANG INDUSTRY CO., LTD.  
**ADDRESS** : 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210  
**CONTACT INFORMATION** : TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com  
**SAMPLING SOURCE** : สำนักรับน้ำดื่มจากที่ตั้งโรงงานผลิตน้ำตาลทราย (ด้านเหนือจากจุดคั่นน้ำของโรงงานผลิตน้ำตาลทราย ระยะทางประมาณ 1.3 กิโลเมตร)  
**SAMPLE TYPE** : SURFACE WATER  
**SAMPLING DATE** : JUNE 18, 2024  
**SAMPLING TIME** : 13:30 HOUR  
**SAMPLING METHOD** : GRAB  
**SAMPLING BY** : MR ACHITA SAENGJAN  
**ANALYZED BY** : MISS NAPAPORN KHUNNOKKHUM  
**RECEIVED DATE** : JUNE 19, 2024  
**ANALYTICAL DATE** : JUNE 19-28, 2024  
**ISSUE DATE** : JULY 8, 2024  
**REPORT NO.** : 2024-U061239  
**WORK NO.** : 2023-008918  
**ANALYSIS NO.** : T24AN583-0001

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			SURFACE WATER T24AN583-0001		
pH <sup>a</sup>	-	ELECTROMETRIC METHOD (AT SITE) SM: PART 4500-H <sup>+</sup> B AND 1060 B	6.3 (34°C)	5.0-9.0	-
TEMPERATURE <sup>c</sup>	°C	THERMOMETER (AT SITE) SM: PART 2550 B	34	n <sup>i</sup>	-
DISSOLVED OXYGEN <sup>c</sup>	mg/L	AZIDE MODIFICATION METHOD (AT SITE) SM: PART 4500-O C	4.9	≥ 4.0	0.5
BIOCHEMICAL OXYGEN DEMAND <sup>c</sup>	mg/L	AZIDE MODIFICATION METHOD (SM: PART 5210 B AND PART 4500-O C)	1.7	≤ 2.0	1.0
TOTAL DISSOLVED SOLIDS <sup>b</sup>	mg/L	TOTAL DISSOLVED SOLIDS DRIED AT 180 °C (SM: PART 2540 C)	202	-	25
AMMONIA-NITROGEN <sup>c</sup>	mg/L NH <sub>3</sub> -N	DISTILLATION NESSLERIZATION METHOD	1.21	≤ 0.5	0.5
NITRATE-NITROGEN <sup>c</sup>	mg/L NO <sub>3</sub> -N	CADMIUM REDUCTION METHOD (SM: PART 4500-NO <sub>3</sub> E)	0.16	≤ 5.0	0.02
CHLORIDE <sup>a</sup>	mg/L Cl <sup>-</sup>	ARGENTOMETRIC METHOD (SM: 4500-Cl <sup>-</sup> B)	45.2	-	2.0
SODIUM ADSORPTION RATIO <sup>c</sup>	-	INDUCTIVELY COUPLED PLASMA (ICP) AND CALCULATION METHOD	1.54	-	-
METALS					
ARSENIC <sup>c</sup>	mg/L As	HYDRIDE GENERATION AAS METHOD (SM: PART 3114 C)	ND	≤ 0.01	0.0003
TOTAL MERCURY <sup>a, b</sup>	mg/L Hg	IN-HOUSE METHOD: UAE.TP.HEM.002 BASED ON SM: PART 3112 B	ND	≤ 0.002	0.0001
CADMIUM <sup>a</sup>	mg/L Cd	UAE.TP.HEM.005 BASED ON SM: PART 3030 E AND PART 3111 B	ND	≤ 0.005*, ≤ 0.05**	0.002
LEAD <sup>a</sup>	mg/L Pb	UAE.TP.HEM.005 BASED ON SM: PART 3030 E AND PART 3111 B	ND	≤ 0.05	0.003
MANGANESE <sup>a</sup>	mg/L Mn	UAE.TP.HEM.005 BASED ON SM: PART 3030 E AND PART 3111 B	0.317	≤ 1.0	0.002



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			SURFACE WATER T24AN583-0001		
SODIUM <sup>c</sup>	mg/L Na	NITRIC ACID-HYDROCHLORIC ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (SM: PART 3030 F AND PART 3120 B)	17.3	-	0.005
<b>SAMPLE CONDITION</b> WATER'S COLOUR/TURBID SEDIMENT			YELLOW/TURBID BROWN		

<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

IN-HOUSE : BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 24<sup>th</sup> EDITION, 2023.

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 24<sup>th</sup> EDITION, 2023.

REGULATORY STANDARD : SURFACE WATER QUALITY STANDARDS CLASS 3, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, NO.8, B.E. 2537 ISSUED UNDER THE ENCHANCEMENT AND CONSERVATION OF NATIONAL ENVIRONMENTAL QUALITY ACT, B.E. 2535, PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 111, PART 16, DATED FEBRUARY 24, B.E. 2537 (1994).

CLASS 3 : MEDIUM CLEAN FRESH SURFACE WATER RESOURCES USED FOR  
(1) CONSUMPTION, BUT PASSING THROUGH ON ORDINARY TREATMENT PROCESS BEFORE USING  
(2) AGRICULTURE

n<sup>1</sup> : NATURALLY BUT CHANGING NOT MORE THAN 3°C

\* : WHEN WATER HARDNESS NOT MORE THAN 100 mg/L AS CaCO<sub>3</sub>

\*\* : WHEN WATER HARDNESS MORE THAN 100 mg/L AS CaCO<sub>3</sub>

^ : CUSTOMER INFORMATION.

ND : NOT DETECTED.

*Bhuchonk p.*

(MR BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR

## ANALYSIS REPORT

<b>PROJECT NAME</b>	: โครงการโรงไฟฟ้าชีวมวล	<b>RECEIVED DATE</b>	: JUNE 19, 2024
<b>CUSTOMER NAME</b>	: THAI ROONG RUANG INDUSTRY CO., LTD.	<b>ANALYTICAL DATE</b>	: JUNE 19-28, 2024
<b>ADDRESS</b>	: 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210	<b>ISSUE DATE</b>	: JULY 8, 2024
<b>CONTACT INFORMATION</b>	: TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com	<b>REPORT NO.</b>	: 2024-U061240
<b>SAMPLING SOURCE</b>	: สำรน้ำจืดบริเวณใกล้เคียงจุดคั่นน้ำของโรงงานผลิตน้ำตาลทราย (บริเวณจุดคั่นน้ำของโรงงานผลิตน้ำตาลทราย)	<b>WORK NO.</b>	: 2023-008918
<b>SAMPLE TYPE</b>	: SURFACE WATER	<b>ANALYSIS NO.</b>	: T24AN583-0007
<b>SAMPLING DATE</b>	: JUNE 18, 2024		
<b>SAMPLING TIME</b>	: 11:50 HOUR		
<b>SAMPLING METHOD</b>	: GRAB		
<b>SAMPLING BY</b>	: MR. ACHITA SAENGJAN		
<b>ANALYZED BY</b>	: MISS NAPAPORN KHUNNOKKHUM		

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			SURFACE WATER T24AN583-0007		
pH <sup>a</sup>	-	ELECTROMETRIC METHOD (AT SITE) SM: PART 4500-H <sup>+</sup> B AND 1060 B	6.0 (33°C)	5.0-9.0	-
TEMPERATURE <sup>c</sup>	°C	THERMOMETER (AT SITE) SM: PART 2550 B	33	n <sup>1</sup>	-
DISSOLVED OXYGEN <sup>c</sup>	mg/L	AZIDE MODIFICATION METHOD (AT SITE) SM: PART 4500-O C	4.3	≥ 4.0	0.5
BIOCHEMICAL OXYGEN DEMAND <sup>c</sup>	mg/L	AZIDE MODIFICATION METHOD (SM: PART 5210 B AND PART 4500-O C)	2.5	≤ 2.0	1.0
TOTAL DISSOLVED SOLIDS <sup>b</sup>	mg/L	TOTAL DISSOLVED SOLIDS DRIED AT 180 °C (SM: PART 2540 C)	201	-	25
AMMONIA-NITROGEN <sup>c</sup>	mg/L NH <sub>3</sub> -N	DISTILLATION NESSLERIZATION METHOD	1.48	≤ 0.5	0.5
NITRATE-NITROGEN <sup>c</sup>	mg/L NO <sub>3</sub> -N	CADMIUM REDUCTION METHOD (SM: PART 4500-NO <sub>3</sub> E)	0.24	≤ 5.0	0.02
CHLORIDE <sup>a</sup>	mg/L Cl	ARGENTOMETRIC METHOD (SM: 4500-Cl B)	48.1	-	2.0
SODIUM ADSORPTION RATIO <sup>c</sup>	-	INDUCTIVELY COUPLED PLASMA (ICP) AND CALCULATION METHOD	1.57	-	-
<b>METALS</b>					
ARSENIC <sup>c</sup>	mg/L As	HYDRIDE GENERATION AAS METHOD (SM: PART 3114 C)	ND	≤ 0.01	0.0003
TOTAL MERCURY <sup>a b</sup>	mg/L Hg	IN-HOUSE METHOD: UAE.TP.HEM.002 BASED ON SM: PART 3112 B	ND	≤ 0.002	0.0001
CADMIUM <sup>a</sup>	mg/L Cd	UAE.TP.HEM.005 BASED ON SM: PART 3030 E AND PART 3111 B	ND	≤ 0.005*, ≤ 0.05**	0.002
LEAD <sup>a</sup>	mg/L Pb	UAE.TP.HEM.005 BASED ON SM: PART 3030 E AND PART 3111 B	ND	≤ 0.05	0.003
MANGANESE <sup>a</sup>	mg/L Mn	UAE.TP.HEM.005 BASED ON SM: PART 3030 E AND PART 3111 B	0.277	≤ 1.0	0.002



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			SURFACE WATER T24AN583-0007		
SODIUM <sup>c</sup>	mg/L Na	NITRIC ACID-HYDROCHLORIC ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (SM: PART 3030 F AND PART 3120 B)	16.7	-	0.005
<b>SAMPLE CONDITION</b> WATER'S COLOUR/TURBID SEDIMENT			YELLOW/TURBID BROWN		

<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

IN-HOUSE : BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 24<sup>th</sup> EDITION, 2023.

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 24<sup>th</sup> EDITION, 2023.

REGULATORY STANDARD : SURFACE WATER QUALITY STANDARDS CLASS 3, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, NO.8, B.E. 2537 ISSUED UNDER THE ENCHANCEMENT AND CONSERVATION OF NATIONAL ENVIRONMENTAL QUALITY ACT, B.E. 2535, PUBLISHED IN THE ROYAL GOVERNMENT GAZZETTE, VOL. 111, PART 16, DATED FEBRUARY 24, B.E. 2537 (1994).

CLASS 3 : MEDIUM CLEAN FRESH SURFACE WATER RESOURCES USED FOR  
(1) CONSUMPTION, BUT PASSING THROUGH ON ORDINARY TREATMENT PROCESS BEFORE USING  
(2) AGRICULTURE

n<sup>1</sup> : NATURALLY BUT CHANGING NOT MORE THAN 3°C

\* : WHEN WATER HARDNESS NOT MORE THAN 100 mg/L AS CaCO<sub>3</sub>

\*\* : WHEN WATER HARDNESS MORE THAN 100 mg/L AS CaCO<sub>3</sub>

^ : CUSTOMER INFORMATION.

ND : NOT DETECTED.

*Bhuchonk p.*

(MR BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR

## ANALYSIS REPORT

**PROJECT NAME** : โครงการโรงไฟฟ้าชีวมวล  
**CUSTOMER NAME** : THAI ROONG RUANG INDUSTRY CO., LTD.  
**ADDRESS** : 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210  
**CONTACT INFORMATION** : TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com  
**SAMPLING SOURCE** : สำนักรับน้ำดื่มจากที่ตั้งโรงงานผลิตน้ำตาลทราย (ด้านท้ายน้ำนับจากจุดต้นน้ำของโรงงานผลิตน้ำตาลทรายระยะทางประมาณ 1 กิโลเมตร)  
**SAMPLE TYPE** : SURFACE WATER  
**SAMPLING DATE** : JUNE 18, 2024  
**SAMPLING TIME** : 10:00 HOUR  
**SAMPLING METHOD** : GRAB  
**SAMPLING BY** : MR ACHITA SAENGJAN  
**ANALYZED BY** : MISS NAPAPORN KHUNNOKKHUM  
**RECEIVED DATE** : JUNE 19, 2024  
**ANALYTICAL DATE** : JUNE 19-28, 2024  
**ISSUE DATE** : JULY 8, 2024  
**REPORT NO.** : 2024-U061241  
**WORK NO.** : 2023-008918  
**ANALYSIS NO.** : T24AN583-0013

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			SURFACE WATER T24AN583-0013		
pH <sup>a</sup>	-	ELECTROMETRIC METHOD (AT SITE) SM: PART 4500-H <sup>+</sup> B AND 1060 B	6.4 (31°C)	5.0-9.0	-
TEMPERATURE <sup>c</sup>	°C	THERMOMETER (AT SITE) SM: PART 2550 B	31	n <sup>i</sup>	-
DISSOLVED OXYGEN <sup>c</sup>	mg/L	AZIDE MODIFICATION METHOD (AT SITE) SM: PART 4500-O C	4.8	≥ 4.0	0.5
BIOCHEMICAL OXYGEN DEMAND <sup>c</sup>	mg/L	AZIDE MODIFICATION METHOD (SM: PART 5210 B AND PART 4500-O C)	2.2	≤ 2.0	1.0
TOTAL DISSOLVED SOLIDS <sup>b</sup>	mg/L	TOTAL DISSOLVED SOLIDS DRIED AT 180 °C (SM: PART 2540 C)	206	-	25
AMMONIA-NITROGEN <sup>c</sup>	mg/L NH <sub>3</sub> -N	DISTILLATION NESSLERIZATION METHOD	1.01	≤ 0.5	0.5
NITRATE-NITROGEN <sup>c</sup>	mg/L NO <sub>3</sub> -N	CADMIUM REDUCTION METHOD (SM: PART 4500-NO <sub>3</sub> E)	0.24	≤ 5.0	0.02
CHLORIDE <sup>a</sup>	mg/L Cl <sup>-</sup>	ARGENTOMETRIC METHOD (SM: 4500-Cl B)	47.1	-	2.0
SODIUM ADSORPTION RATIO <sup>c</sup>	-	INDUCTIVELY COUPLED PLASMA (ICP) AND CALCULATION METHOD	1.28	-	-
<b>METALS</b>					
ARSENIC <sup>c</sup>	mg/L As	HYDRIDE GENERATION AAS METHOD (SM: PART 3114 C)	ND	≤ 0.01	0.0003
TOTAL MERCURY <sup>a b</sup>	mg/L Hg	IN-HOUSE METHOD: UAE.TP.HEM.002 BASED ON SM: PART 3112 B	ND	≤ 0.002	0.0001
CADMIUM <sup>a</sup>	mg/L Cd	UAE.TP.HEM.005 BASED ON SM: PART 3030 E AND PART 3111 B	ND	≤ 0.005*, ≤ 0.05**	0.002
LEAD <sup>a</sup>	mg/L Pb	UAE.TP.HEM.005 BASED ON SM: PART 3030 E AND PART 3111 B	ND	≤ 0.05	0.003
MANGANESE <sup>a</sup>	mg/L Mn	UAE.TP.HEM.005 BASED ON SM: PART 3030 E AND PART 3111 B	0.266	≤ 1.0	0.002



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			SURFACE WATER T24AN583-0013		
SODIUM <sup>a</sup>	mg/L Na	NITRIC ACID-HYDROCHLORIC ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (SM: PART 3030 F AND PART 3120 B)	11.5	-	0.005
<b>SAMPLE CONDITION</b> WATER'S COLOUR/TURBID SEDIMENT			YELLOW/TURBID BROWN		

<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

IN-HOUSE : BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 24<sup>TH</sup> EDITION, 2023.

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 24<sup>TH</sup> EDITION, 2023.

REGULATORY STANDARD : SURFACE WATER QUALITY STANDARDS CLASS 3, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, NO.8,  
B.E. 2537 ISSUED UNDER THE ENHANCEMENT AND CONSERVATION OF NATIONAL ENVIRONMENTAL QUALITY  
ACT, B.E. 2535, PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 111, PART 16, DATED FEBRUARY 24,  
B.E. 2537 (1994).

CLASS 3 : MEDIUM CLEAN FRESH SURFACE WATER RESOURCES USED FOR  
(1) CONSUMPTION, BUT PASSING THROUGH ON ORDINARY TREATMENT PROCESS BEFORE USING  
(2) AGRICULTURE

n<sup>1</sup> : NATURALLY BUT CHANGING NOT MORE THAN 3°C

\* : WHEN WATER HARDNESS NOT MORE THAN 100 mg/L AS CaCO<sub>3</sub>

\*\* : WHEN WATER HARDNESS MORE THAN 100 mg/L AS CaCO<sub>3</sub>

^ : CUSTOMER INFORMATION

ND : NOT DETECTED.

*Bhuchonk p.*

(MR BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR

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## ANALYSIS REPORT

<b>PROJECT NAME</b>	: โครงการโรงไฟฟ้าชีวมวล	<b>RECEIVED DATE</b>	: APRIL 27, 2024
<b>CUSTOMER NAME</b>	: THAI ROONG RUANG INDUSTRY CO., LTD.	<b>ANALYTICAL DATE</b>	: APRIL 27 - MAY 9, 2024
<b>ADDRESS</b>	: 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210	<b>ISSUE DATE</b>	: MAY 17, 2024
<b>CONTACT INFORMATION</b>	: TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com	<b>REPORT NO.</b>	: 2024-U041747
<b>SAMPLING SOURCE</b>	: ลำห้วยเดชมบริเวณใกล้เคียงที่ตั้งโรงงานผลิตน้ำตาลทราย (ลำห้วยเดชมบริเวณฝ่ายห้วยเดชม)	<b>WORK NO.</b>	: 2023-008918
<b>SAMPLE TYPE</b>	: SURFACE WATER	<b>ANALYSIS NO.</b>	: T24AI837-0001
<b>SAMPLING DATE</b>	: APRIL 26, 2024		
<b>SAMPLING TIME</b>	: 12:00 HOUR		
<b>SAMPLING METHOD</b>	: GRAB		
<b>SAMPLING BY</b>	: MR APISIT SRIKONGKAEW		
<b>ANALYZED BY</b>	: MISS NAPAPORN KHUNNOKKHUM		

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			SURFACE WATER T24AI837-0001		
pH	-	ELECTROMETRIC METHOD (AT SITE) SM: PART 4500-H <sup>+</sup> B AND 1060 B	7.8 (34°C)	5.0-9.0	-
TEMPERATURE	°C	THERMOMETER AT SITE (SM: PART 2550 B)	33	n'	-
DISSOLVED OXYGEN	mg/L	AZIDE MODIFICATION METHOD AT SITE (SM: PART 4500-O C)	5.4	≥ 4.0	0.5
BIOCHEMICAL OXYGEN DEMAND	mg/L	AZIDE MODIFICATION METHOD (SM: PART 5210 B AND PART 4500-O C)	2.2	≤ 2.0	1.0
TOTAL DISSOLVED SOLIDS	mg/L	TOTAL DISSOLVED SOLIDS DRIED AT 180 °C (SM: PART 2540 C)	146	-	25
AMMONIA-NITROGEN	mg/L NH <sub>3</sub> -N	DISTILLATION NESSLERIZATION METHOD	0.52	≤ 0.5	0.5
NITRATE-NITROGEN	mg/L NO <sub>3</sub> <sup>-</sup> -N	CADMIUM REDUCTION METHOD (SM: PART 4500-NO <sub>3</sub> <sup>-</sup> E)	0.08	≤ 5.0	0.02
CHLORIDE	mg/L Cl <sup>-</sup>	ARGENTOMETRIC METHOD (SM: 4500-Cl <sup>-</sup> B)	17.0	-	2.0
SODIUM ADSORPTION RATIO	-	INDUCTIVELY COUPLED PLASMA (ICP) AND CALCULATION METHOD	0.590	-	-
<b>METALS</b>					
ARSENIC	mg/L As	HYDRIDE GENERATION AAS METHOD (SM: PART 3114 C)	ND	≤ 0.01	0.0003
TOTAL MERCURY	mg/L Hg	IN-HOUSE METHOD: UAE.TP.HEM.002 (COLD VAPOUR ATOMIC ABSORPTION SPECTROMETRIC METHOD); SM: PART 3112 B	ND	≤ 0.002	0.0001
CADMIUM	mg/L Cd	IN-HOUSE METHOD: UAE.TP.SW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	ND	≤ 0.005*, ≤ 0.05**	0.002
LEAD	mg/L Pb	IN-HOUSE METHOD: UAE.TP.SW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	ND	≤ 0.05	0.003
MANGANESE	mg/L Mn	IN-HOUSE METHOD: UAE.TP.SW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	0.482	≤ 1.0	0.002



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			SURFACE WATER T24AI837-0001		
SODIUM	mg/L Na	NITRIC ACID-HYDROCHLORIC ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (SM: PART 3030 F AND PART 3120 B)	7.83	-	0.005
<b>SAMPLE CONDITION</b> WATER'S COLOUR/TURBID SEDIMENT			YELLOW/TURBID BROWN		

IN-HOUSE : BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23<sup>rd</sup> EDITION, 2017.

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

REGULATORY STANDARD : SURFACE WATER QUALITY STANDARDS CLASS 3, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, NO.8, B.E. 2537 ISSUED UNDER THE ENCHANCEMENT AND CONSERVATION OF NATIONAL ENVIRONMENTAL QUALITY ACT, B.E. 2535, PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 111, PART 16, DATED FEBRUARY 24, B.E. 2537 (1994).

CLASS 3 : MEDIUM CLEAN FRESH SURFACE WATER RESOURCES USED FOR  
(1) CONSUMPTION, BUT PASSING THROUGH ON ORDINARY TREATMENT PROCESS BEFORE USING  
(2) AGRICULTURE

n<sup>o</sup> : NATURALLY BUT CHANGING NOT MORE THAN 3°C

\* : WHEN WATER HARDNESS NOT MORE THAN 100 mg/L AS CaCO<sub>3</sub>

\*\* : WHEN WATER HARDNESS MORE THAN 100 mg/L AS CaCO<sub>3</sub>

ND : NON-DETECTABLE.

*Bhuchonk*

(MR BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR

## ANALYSIS REPORT

<b>PROJECT NAME</b>	: โครงการโรงไฟฟ้าชีวมวล	<b>RECEIVED DATE</b>	: APRIL 27, 2024
<b>CUSTOMER NAME</b>	: THAI ROONG RUANG INDUSTRY CO., LTD.	<b>ANALYTICAL DATE</b>	: APRIL 27 - MAY 9, 2024
<b>ADDRESS</b>	: 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210	<b>ISSUE DATE</b>	: MAY 17, 2024
<b>CONTACT INFORMATION</b>	: TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com	<b>REPORT NO.</b>	: 2024-U041748
<b>SAMPLING SOURCE</b>	: ลำห้วยเตยด่านท้ายน้ำจากที่ตั้งโรงงานผลิตน้ำตาลทราย (ลำห้วยเตยด่านท้ายน้ำนับจากฝายห้วยเตย ระยะทางประมาณ 2 กิโลเมตร)	<b>WORK NO.</b>	: 2023-008918
<b>SAMPLE TYPE</b>	: SURFACE WATER	<b>ANALYSIS NO.</b>	: T24AI837-0007
<b>SAMPLING DATE</b>	: APRIL 26, 2024		
<b>SAMPLING TIME</b>	: 14:30 HOUR		
<b>SAMPLING METHOD</b>	: GRAB		
<b>SAMPLING BY</b>	: MR APISIT SRIKONGKAEW		
<b>ANALYZED BY</b>	: MISS NAPAPORN KHUNNOKKHUM		

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			SURFACE WATER T24AI837-0007		
pH	-	ELECTROMETRIC METHOD (AT SITE) SM: PART 4500-H <sup>+</sup> B AND 1060 B	7.8 (34°C)	5.0-9.0	-
TEMPERATURE	°C	THERMOMETER AT SITE (SM: PART 2550 B)	34	n <sup>*</sup>	-
DISSOLVED OXYGEN	mg/L	AZIDE MODIFICATION METHOD AT SITE (SM: PART 4500-O C)	6.0	≥ 4.0	0.5
BIOCHEMICAL OXYGEN DEMAND	mg/L	AZIDE MODIFICATION METHOD (SM: PART 5210 B AND PART 4500-O C)	2.6	≤ 2.0	1.0
TOTAL DISSOLVED SOLIDS	mg/L	TOTAL DISSOLVED SOLIDS DRIED AT 180 °C (SM: PART 2540 C)	155	-	25
AMMONIA-NITROGEN	mg/L NH <sub>3</sub> -N	DISTILLATION NESSLERIZATION METHOD	ND	≤ 0.5	0.5
NITRATE-NITROGEN	mg/L NO <sub>3</sub> -N	CADMIUM REDUCTION METHOD (SM: PART 4500-NO <sub>3</sub> -E)	0.08	≤ 5.0	0.02
CHLORIDE	mg/L Cl <sup>-</sup>	ARGENTOMETRIC METHOD (SM: 4500-Cl B)	10.7	-	2.0
SODIUM ADSORPTION RATIO	-	INDUCTIVELY COUPLED PLASMA (ICP) AND CALCULATION METHOD	0.615	-	-
<b>METALS</b>					
ARSENIC	mg/L As	HYDRIDE GENERATION AAS METHOD (SM: PART 3114 C)	ND	≤ 0.01	0.0003
TOTAL MERCURY	mg/L Hg	IN-HOUSE METHOD: UAE.TP.HEM.002 (COLD VAPOUR ATOMIC ABSORPTION SPECTROMETRIC METHOD); SM: PART 3112 B	ND	≤ 0.002	0.0001
CADMIUM	mg/L Cd	IN-HOUSE METHOD: UAE.TP.SW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	ND	≤ 0.005*, ≤ 0.05**	0.002
LEAD	mg/L Pb	IN-HOUSE METHOD: UAE.TP.SW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	ND	≤ 0.05	0.003
MANGANESE	mg/L Mn	IN-HOUSE METHOD: UAE.TP.SW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	0.566	≤ 1.0	0.002



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			SURFACE WATER T24A1837-0007		
SODIUM	mg/L Na	NITRIC ACID-HYDROCHLORIC ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (SM: PART 3030 F AND PART 3120 B)	7.40	-	0.005
<b>SAMPLE CONDITION</b> WATER'S COLOUR/TURBID SEDIMENT			YELLOW/TURBID BROWN		

IN-HOUSE : BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23<sup>rd</sup> EDITION, 2017.

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

REGULATORY STANDARD : SURFACE WATER QUALITY STANDARDS CLASS 3, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, NO.8, B.E. 2537 ISSUED UNDER THE ENCHANCEMENT AND CONSERVATION OF NATIONAL ENVIRONMENTAL QUALITY ACT, B.E. 2535, PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 111, PART 16, DATED FEBRUARY 24, B.E. 2537 (1994).

CLASS 3 : MEDIUM CLEAN FRESH SURFACE WATER RESOURCES USED FOR  
(1) CONSUMPTION, BUT PASSING THROUGH ON ORDINARY TREATMENT PROCESS BEFORE USING  
(2) AGRICULTURE

n' : NATURALLY BUT CHANGING NOT MORE THAN 3°C

\* : WHEN WATER HARDNESS NOT MORE THAN 100 mg/L AS CaCO<sub>3</sub>

\*\* : WHEN WATER HARDNESS MORE THAN 100 mg/L AS CaCO<sub>3</sub>

ND : NON-DETECTABLE.

*Bhuchonk p.*

(MR BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR

## ANALYSIS REPORT

**PROJECT NAME** : โครงการโรงไฟฟ้าชีวมวล  
**CUSTOMER NAME** : THAI ROONG RUANG INDUSTRY CO., LTD.  
**ADDRESS** : 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210  
**CONTACT INFORMATION** : TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com  
**SAMPLING SOURCE** : สำหรับเขตนํ้าจากที่ตั้งโรงงานผลิตนํ้าตาลทราย (สำหรับเขตนํ้าจากฝายห้วยเคย ระยะทางประมาณ 2 กิโลเมตร)  
**SAMPLE TYPE** : SURFACE WATER  
**SAMPLING DATE** : JUNE 20, 2024  
**SAMPLING TIME** : 11:45 HOUR  
**SAMPLING METHOD** : GRAB  
**SAMPLING BY** : MR ACHITA SAENGJAN  
**ANALYZED BY** : MISS CHOMTHANAN APHIPATPAPHA  
**RECEIVED DATE** : JUNE 21, 2024  
**ANALYTICAL DATE** : JUNE 21 - JULY 8, 2024  
**ISSUE DATE** : JULY 9, 2024  
**REPORT NO.** : 2024-U062238  
**WORK NO.** : 2023-008918  
**ANALYSIS NO.** : T24AN932-0001

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			SURFACE WATER T24AN932-0001		
pH <sup>a</sup>	-	ELECTROMETRIC METHOD (AT SITE) SM: PART 4500-H <sup>+</sup> B AND 1060 B	6.8 (32°C)	5.0-9.0	-
TEMPERATURE <sup>c</sup>	°C	THERMOMETER (AT SITE) SM: PART 2550 B	32	n <sup>i</sup>	-
DISSOLVED OXYGEN <sup>c</sup>	mg/L	AZIDE MODIFICATION METHOD (AT SITE) SM: PART 4500-O C	4.9	≥ 4.0	0.5
BIOCHEMICAL OXYGEN DEMAND <sup>c</sup>	mg/L	AZIDE MODIFICATION METHOD (SM: PART 5210 B AND PART 4500-O C)	1.3	≤ 2.0	1.0
TOTAL DISSOLVED SOLIDS <sup>c</sup>	mg/L	TOTAL DISSOLVED SOLIDS DRIED AT 180 °C (SM: PART 2540 C)	ND	-	25
AMMONIA-NITROGEN <sup>c</sup>	mg/L NH <sub>3</sub> -N	DISTILLATION NESSLERIZATION METHOD	ND	≤ 0.5	0.5
NITRATE-NITROGEN <sup>c</sup>	mg/L NO <sub>3</sub> -N	CADMIUM REDUCTION METHOD (SM: PART 4500-NO <sub>3</sub> E)	0.07	≤ 5.0	0.02
CHLORIDE <sup>c</sup>	mg/L Cl <sup>-</sup>	ARGENTOMETRIC METHOD (SM: 4500-Cl B)	ND	-	2.0
SODIUM ADSORPTION RATIO <sup>c</sup>	-	INDUCTIVELY COUPLED PLASMA (ICP) AND CALCULATION METHOD	0.342	-	-
<b>METALS</b>					
ARSENIC <sup>c</sup>	mg/L As	HYDRIDE GENERATION AAS METHOD (SM: PART 3114 C)	ND	≤ 0.01	0.0003
TOTAL MERCURY <sup>a b</sup>	mg/L Hg	IN-HOUSE METHOD: UAE.TP.HEM.002 BASED ON SM: PART 3112 B	ND	≤ 0.002	0.0001
CADMIUM <sup>a</sup>	mg/L Cd	UAE.TP.HEM.005 BASED ON SM: PART 3030 E AND PART 3111 B	ND	≤ 0.005*, ≤ 0.05**	0.003
LEAD <sup>a</sup>	mg/L Pb	UAE.TP.HEM.005 BASED ON SM: PART 3030 E AND PART 3111 B	ND	≤ 0.05	0.007
MANGANESE <sup>a</sup>	mg/L Mn	UAE.TP.HEM.005 BASED ON SM: PART 3030 E AND PART 3111 B	0.200	≤ 1.0	0.002



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			SURFACE WATER T24AN932-0001		
SODIUM <sup>c</sup>	mg/L Na	NITRIC ACID-HYDROCHLORIC ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (SM: PART 3030 F AND PART 3120 B)	3.06	-	0.005
<b>SAMPLE CONDITION</b> WATER'S COLOUR/TURBID SEDIMENT			YELLOW/TURBID BROWN		

<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

IN-HOUSE : BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 24<sup>th</sup> EDITION, 2023.

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 24<sup>th</sup> EDITION, 2023.

REGULATORY STANDARD : SURFACE WATER QUALITY STANDARDS CLASS 3, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, NO.8, B.E. 2537 ISSUED UNDER THE ENCHANCEMENT AND CONSERVATION OF NATIONAL ENVIRONMENTAL QUALITY ACT, B.E. 2535, PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 111, PART 16, DATED FEBRUARY 24, B.E. 2537 (1994).

CLASS 3 : MEDIUM CLEAN FRESH SURFACE WATER RESOURCES USED FOR

- (1) CONSUMPTION, BUT PASSING THROUGH ON ORDINARY TREATMENT PROCESS BEFORE USING
- (2) AGRICULTURE

n<sup>1</sup> : NATURALLY BUT CHANGING NOT MORE THAN 3°C

\* : WHEN WATER HARDNESS NOT MORE THAN 100 mg/L AS CaCO<sub>3</sub>

\*\* : WHEN WATER HARDNESS MORE THAN 100 mg/L AS CaCO<sub>3</sub>

^ : CUSTOMER INFORMATION

ND : NOT DETECTED.

*Bhuchonk p.*

(MR BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR

## ANALYSIS REPORT

**PROJECT NAME** : โครงการโรงไฟฟ้าชีวมวล  
**CUSTOMER NAME** : THAI ROONG RUANG INDUSTRY CO., LTD.  
**ADDRESS** : 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210  
**CONTACT INFORMATION** : TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com  
**SAMPLING SOURCE** : ลำห้วยเดชมบริเวณใกล้เคียงที่ตั้งโรงงานผลิตน้ำตาลทราย (ลำห้วยเดชมบริเวณฝ่ายห้วยเดชม)  
**SAMPLE TYPE** : SURFACE WATER  
**SAMPLING DATE** : JUNE 20, 2024  
**SAMPLING TIME** : 10:20 HOUR  
**SAMPLING METHOD** : GRAB  
**SAMPLING BY** : MR ACHITA SAENGJAN  
**ANALYZED BY** : MISS CHOMTHANAN APHIPATPAPHA  
**RECEIVED DATE** : JUNE 21, 2024  
**ANALYTICAL DATE** : JUNE 21-29, 2024  
**ISSUE DATE** : JULY 9, 2024  
**REPORT NO.** : 2024-U062239  
**WORK NO.** : 2023-008918  
**ANALYSIS NO.** : T24AN932-0007

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			SURFACE WATER T24AN932-0007		
pH <sup>a</sup>	-	ELECTROMETRIC METHOD (AT SITE) SM: PART 4500-H <sup>+</sup> B AND 1060 B	6.8 (31°C)	5.0-9.0	-
TEMPERATURE <sup>c</sup>	°C	THERMOMETER (AT SITE) SM: PART 2550 B	31	n <sup>i</sup>	-
DISSOLVED OXYGEN <sup>c</sup>	mg/L	AZIDE MODIFICATION METHOD (AT SITE) SM: PART 4500-O C	4.7	≥ 4.0	0.5
BIOCHEMICAL OXYGEN DEMAND <sup>c</sup>	mg/L	AZIDE MODIFICATION METHOD (SM: PART 5210 B AND PART 4500-O C)	2.1	≤ 2.0	1.0
TOTAL DISSOLVED SOLIDS <sup>b</sup>	mg/L	TOTAL DISSOLVED SOLIDS DRIED AT 180 °C (SM: PART 2540 C)	61	-	25
AMMONIA-NITROGEN <sup>c</sup>	mg/L NH <sub>3</sub> -N	DISTILLATION NESSLERIZATION METHOD	ND	≤ 0.5	0.5
NITRATE-NITROGEN <sup>c</sup>	mg/L NO <sub>3</sub> -N	CADMIUM REDUCTION METHOD (SM: PART 4500-NO <sub>3</sub> E)	0.09	≤ 5.0	0.02
CHLORIDE <sup>a</sup>	mg/L Cl <sup>-</sup>	ARGENTOMETRIC METHOD (SM: 4500-Cl <sup>-</sup> B)	3.9	-	2.0
SODIUM ADSORPTION RATIO <sup>c</sup>	-	INDUCTIVELY COUPLED PLASMA (ICP) AND CALCULATION METHOD	0.316	-	-
<b>METALS</b>					
ARSENIC <sup>c</sup>	mg/L As	HYDRIDE GENERATION AAS METHOD (SM: PART 3114 C)	ND	≤ 0.01	0.0003
TOTAL MERCURY <sup>a, b</sup>	mg/L Hg	IN-HOUSE METHOD: UAE.TP.HEM.002 BASED ON SM: PART 3112 B	ND	≤ 0.002	0.0001
CADMIUM <sup>a</sup>	mg/L Cd	UAE.TP.HEM.005 BASED ON SM: PART 3030 E AND PART 3111 B	ND	≤ 0.005*, ≤ 0.05**	0.003
LEAD <sup>a</sup>	mg/L Pb	UAE.TP.HEM.005 BASED ON SM: PART 3030 E AND PART 3111 B	ND	≤ 0.05	0.007
MANGANESE <sup>a</sup>	mg/L Mn	UAE.TP.HEM.005 BASED ON SM: PART 3030 E AND PART 3111 B	0.074	≤ 1.0	0.002



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			SURFACE WATER T24AN932-0007		
SODIUM <sup>c</sup>	mg/L Na	NITRIC ACID-HYDROCHLORIC ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (SM: PART 3030 F AND PART 3120 B)	2.97	-	0.005
<b>SAMPLE CONDITION</b> WATER'S COLOUR/TURBID SEDIMENT			YELLOW/TURBID BROWN		

<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

IN-HOUSE : BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 24<sup>th</sup> EDITION, 2023.

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 24<sup>th</sup> EDITION, 2023.

REGULATORY STANDARD : SURFACE WATER QUALITY STANDARDS CLASS 3, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, NO.8, B.E. 2537 ISSUED UNDER THE ENCHANCEMENT AND CONSERVATION OF NATIONAL ENVIRONMENTAL QUALITY ACT, B.E. 2535, PUBLISHED IN THE ROYAL GOVERNMENT GAZZETTE, VOL. 111, PART 16, DATED FEBRUARY 24, B.E. 2537 (1994).

CLASS 3 : MEDIUM CLEAN FRESH SURFACE WATER RESOURCES USED FOR  
(1) CONSUMPTION, BUT PASSING THROUGH ON ORDINARY TREATMENT PROCESS BEFORE USING  
(2) AGRICULTURE

n<sup>1</sup> : NATURALLY BUT CHANGING NOT MORE THAN 3°C

\* : WHEN WATER HARDNESS NOT MORE THAN 100 mg/L AS CaCO<sub>3</sub>

\*\* : WHEN WATER HARDNESS MORE THAN 100 mg/L AS CaCO<sub>3</sub>

^ : CUSTOMER INFORMATION

ND : NOT DETECTED.

*Bhuchonk p.*

(MR BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR

## ANALYSIS REPORT

**PROJECT NAME** : โครงการโรงไฟฟ้าชีวมวล  
**CUSTOMER NAME** : THAI ROONG RUANG INDUSTRY CO., LTD.  
**ADDRESS** : 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210  
**CONTACT INFORMATION** : TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com  
**SAMPLING SOURCE** : สำหรับเขตต้นท่ายน้ำจากที่ตั้งโรงงานผลิตน้ำตาลทราย (สำหรับเขตต้นท่ายน้ำนับจากฝายห้วยเคย ระยะทางประมาณ 2 กิโลเมตร)  
**SAMPLE TYPE** : SURFACE WATER  
**SAMPLING DATE** : JUNE 20, 2024  
**SAMPLING TIME** : 08:30 HOUR  
**SAMPLING METHOD** : GRAB  
**SAMPLING BY** : MR. ACHITA SAENGJAN  
**ANALYZED BY** : MISS CHOMTHANAN APHIPATPAPHA  
**RECEIVED DATE** : JUNE 21, 2024  
**ANALYTICAL DATE** : JUNE 21 - JULY 8, 2024  
**ISSUE DATE** : JULY 9, 2024  
**REPORT NO.** : 2024-U062240  
**WORK NO.** : 2023-008918  
**ANALYSIS NO.** : T24AN932-0013

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			SURFACE WATER T24AN932-0013		
pH <sup>a</sup>	-	ELECTROMETRIC METHOD (AT SITE) SM: PART 4500-H <sup>+</sup> B AND 1060 B	5.7 (31°C)	5.0-9.0	-
TEMPERATURE <sup>c</sup>	°C	THERMOMETER (AT SITE) SM: PART 2550 B	31	n'	-
DISSOLVED OXYGEN <sup>c</sup>	mg/L	AZIDE MODIFICATION METHOD (AT SITE) SM: PART 4500-O C	4.4	≥ 4.0	0.5
BIOCHEMICAL OXYGEN DEMAND <sup>c</sup>	mg/L	AZIDE MODIFICATION METHOD (SM: PART 5210 B AND PART 4500-O C)	1.8	≤ 2.0	1.0
TOTAL DISSOLVED SOLIDS <sup>b</sup>	mg/L	TOTAL DISSOLVED SOLIDS DRIED AT 180 °C (SM: PART 2540 C)	49	-	25
AMMONIA-NITROGEN <sup>c</sup>	mg/L NH <sub>3</sub> -N	DISTILLATION NESSLERIZATION METHOD	ND	≤ 0.5	0.5
NITRATE-NITROGEN <sup>c</sup>	mg/L NO <sub>3</sub> -N	CADMIUM REDUCTION METHOD (SM: PART 4500-NO <sub>3</sub> E)	0.10	≤ 5.0	0.02
CHLORIDE <sup>a</sup>	mg/L Cl <sup>-</sup>	ARGENTOMETRIC METHOD (SM: 4500-Cl <sup>-</sup> B)	3.4	-	2.0
SODIUM ADSORPTION RATIO <sup>c</sup>	-	INDUCTIVELY COUPLED PLASMA (ICP) AND CALCULATION METHOD	0.376	-	-
METALS					
ARSENIC <sup>c</sup>	mg/L As	HYDRIDE GENERATION AAS METHOD (SM: PART 3114 C)	ND	≤ 0.01	0.0003
TOTAL MERCURY <sup>a, b</sup>	mg/L Hg	IN-HOUSE METHOD: UAE.TP.HEM.002 BASED ON SM: PART 3112 B	ND	≤ 0.002	0.0001
CADMIUM <sup>a</sup>	mg/L Cd	UAE.TP.HEM.005 BASED ON SM: PART 3030 E AND PART 3111 B	ND	≤ 0.005*, ≤ 0.05**	0.003
LEAD <sup>a</sup>	mg/L Pb	UAE.TP.HEM.005 BASED ON SM: PART 3030 E AND PART 3111 B	ND	≤ 0.05	0.007
MANGANESE <sup>a</sup>	mg/L Mn	UAE.TP.HEM.005 BASED ON SM: PART 3030 E AND PART 3111 B	0.216	≤ 1.0	0.002



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			SURFACE WATER T24AN932-0013		
SODIUM <sup>c</sup>	mg/L Na	NITRIC ACID-HYDROCHLORIC ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (SM: PART 3030 F AND PART 3120 B)	3.41	-	0.005
<b>SAMPLE CONDITION</b> WATER'S COLOUR/TURBID SEDIMENT			YELLOW/TURBID BROWN		

<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

IN-HOUSE : BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 24<sup>th</sup> EDITION, 2023.

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 24<sup>th</sup> EDITION, 2023.

REGULATORY STANDARD : SURFACE WATER QUALITY STANDARDS CLASS 3, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, NO.8, B.E. 2537 ISSUED UNDER THE ENCHANCEMENT AND CONSERVATION OF NATIONAL ENVIRONMENTAL QUALITY ACT, B.E. 2535, PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 111, PART 16, DATED FEBRUARY 24, B.E. 2537 (1994).

CLASS 3 : MEDIUM CLEAN FRESH SURFACE WATER RESOURCES USED FOR  
(1) CONSUMPTION, BUT PASSING THROUGH ON ORDINARY TREATMENT PROCESS BEFORE USING  
(2) AGRICULTURE

n<sup>1</sup> : NATURALLY BUT CHANGING NOT MORE THAN 3°C

\* : WHEN WATER HARDNESS NOT MORE THAN 100 mg/L AS CaCO<sub>3</sub>

\*\* : WHEN WATER HARDNESS MORE THAN 100 mg/L AS CaCO<sub>3</sub>

^ : CUSTOMER INFORMATION

ND : NOT DETECTED.

*Bhuchonk p.*

(MR. BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR

ลำห้วยตาด

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## ANALYSIS REPORT

**PROJECT NAME** : โครงการโรงไฟฟ้าชีวมวล  
**CUSTOMER NAME** : THAI ROONG RUANG INDUSTRY CO., LTD.  
**ADDRESS** : 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210  
**CONTACT INFORMATION** : TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com  
**SAMPLING SOURCE** : ลำห้วยตาตบบริเวณใกล้เคียงที่ตั้งโรงงานผลิตน้ำตาลทราย (จุดกึ่งกลางทางนับจากด้านทางตามโฉนดที่ดินถึงสิ้นสุดขอบเขตที่ดินติดกับทางสาธารณะประโยชน์)  
**SAMPLE TYPE** : SURFACE WATER  
**SAMPLING DATE** : APRIL 27, 2024  
**SAMPLING TIME** : 09:00 HOUR  
**SAMPLING METHOD** : GRAB  
**SAMPLING BY** : MR APISIT SRIKONGKAEW  
**ANALYZED BY** : MISS NAPAPORN KHUNNOKKHUM

**RECEIVED DATE** : APRIL 29, 2024  
**ANALYTICAL DATE** : APRIL 29 - MAY 9, 2024  
**ISSUE DATE** : MAY 17, 2024  
**REPORT NO.** : 2024-U041833  
**WORK NO.** : 2023-008918  
**ANALYSIS NO.** : T24AI843-0001

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			SURFACE WATER T24AI843-0001		
pH	-	ELECTROMETRIC METHOD (AT SITE) SM: PART 4500-H <sup>+</sup> B AND 1060 B	7.9 (28°C)	5.0-9.0	-
TEMPERATURE	°C	THERMOMETER AT SITE (SM: PART 2550 B)	28	n'	-
DISSOLVED OXYGEN	mg/L	AZIDE MODIFICATION METHOD AT SITE (SM: PART 4500-O C)	5.9	≥ 4.0	0.5
BIOCHEMICAL OXYGEN DEMAND	mg/L	AZIDE MODIFICATION METHOD (SM: PART 5210 B AND PART 4500-O C)	1.4	≤ 2.0	1.0
TOTAL DISSOLVED SOLIDS	mg/L	TOTAL DISSOLVED SOLIDS DRIED AT 180 °C (SM: PART 2540 C)	176	-	25
AMMONIA-NITROGEN	mg/L NH <sub>3</sub> -N	DISTILLATION NESSLERIZATION METHOD	ND	≤ 0.5	0.5
NITRATE-NITROGEN	mg/L NO <sub>3</sub> -N	CADMIUM REDUCTION METHOD (SM: PART 4500-NO <sub>3</sub> -E)	0.08	≤ 5.0	0.02
CHLORIDE	mg/L Cl <sup>-</sup>	ARGENTOMETRIC METHOD (SM: 4500-Cl <sup>-</sup> B)	11.7	-	2.0
SODIUM ADSORPTION RATIO	-	INDUCTIVELY COUPLED PLASMA (ICP) AND CALCULATION METHOD	2.02	-	-
<b>METALS</b>					
ARSENIC	mg/L As	HYDRIDE GENERATION AAS METHOD (SM: PART 3114 C)	ND	≤ 0.01	0.0003
TOTAL MERCURY	mg/L Hg	IN-HOUSE METHOD: UAE.TP.HEM.002 (COLD VAPOUR ATOMIC ABSORPTION SPECTROMETRIC METHOD); SM: PART 3112 B	ND	≤ 0.002	0.0001
CADMIUM	mg/L Cd	IN-HOUSE METHOD: UAE.TP.SW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	ND	≤ 0.005*, ≤ 0.05**	0.002
LEAD	mg/L Pb	IN-HOUSE METHOD: UAE.TP.SW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	ND	≤ 0.05	0.003
MANGANESE	mg/L Mn	IN-HOUSE METHOD: UAE.TP.SW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	0.296	≤ 1.0	0.002



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			SURFACE WATER T24AI843-0001		
SODIUM	mg/L Na	NITRIC ACID-HYDROCHLORIC ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (SM: PART 3030 F AND PART 3120 B)	22.8	-	0.005
<b>SAMPLE CONDITION</b> WATER'S COLOUR/TURBID SEDIMENT			YELLOW/TURBID BROWN		

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

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

REGULATORY STANDARD : SURFACE WATER QUALITY STANDARDS CLASS 3, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, NO.8, B.E. 2537 ISSUED UNDER THE ENCHANCEMENT AND CONSERVATION OF NATIONAL ENVIRONMENTAL QUALITY ACT, B.E. 2535, PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 111, PART 16, DATED FEBRUARY 24, B.E. 2537 (1994).

CLASS 3 : MEDIUM CLEAN FRESH SURFACE WATER RESOURCES USED FOR  
(1) CONSUMPTION, BUT PASSING THROUGH ON ORDINARY TREATMENT PROCESS BEFORE USING  
(2) AGRICULTURE

n' : NATURALLY BUT CHANGING NOT MORE THAN 3°C

\* : WHEN WATER HARDNESS NOT MORE THAN 100 mg/L AS CaCO<sub>3</sub>

\*\* : WHEN WATER HARDNESS MORE THAN 100 mg/L AS CaCO<sub>3</sub>

ND : NON-DETECTABLE.

*Bhuchonk p.*

(MR BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR

## ANALYSIS REPORT

**PROJECT NAME** : โครงการโรงไฟฟ้าชีวมวล  
**CUSTOMER NAME** : THAI ROONG RUANG INDUSTRY CO., LTD.  
**ADDRESS** : 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210  
**CONTACT INFORMATION** : TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com  
**SAMPLING SOURCE** : สํานักควบคุมบริเวณใกล้เคียงที่ตั้งโรงงานผลิตน้ำตาลทราย (จุดกึ่งกลางทางนับจากถนนทางหลวงแผ่นดินถึงสิ้นสุดขอบเขตที่ดินติดกับทางสาธารณะประโยชน์)  
**SAMPLE TYPE** : SURFACE WATER  
**SAMPLING DATE** : JUNE 19, 2024  
**SAMPLING TIME** : 13:30 HOUR  
**SAMPLING METHOD** : GRAB  
**SAMPLING BY** : MR ACHITA SAENGJAN  
**ANALYZED BY** : MISS NAPAPORN KHUNNOKKHUM  
**RECEIVED DATE** : JUNE 20, 2024  
**ANALYTICAL DATE** : JUNE 20 - JULY 8, 2024  
**ISSUE DATE** : JULY 9, 2024  
**REPORT NO.** : 2024-U061986  
**WORK NO.** : 2023-008918  
**ANALYSIS NO.** : T24AN689-0001

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			SURFACE WATER T24AN689-0001		
pH <sup>a</sup>	-	ELECTROMETRIC METHOD (AT SITE) SM: PART 4500-H <sup>+</sup> B AND 1060 B	7.1 (37°C)	5.0-9.0	-
TEMPERATURE <sup>c</sup>	°C	THERMOMETER (AT SITE) SM: PART 2550 B	37	n <sup>1</sup>	-
DISSOLVED OXYGEN <sup>c</sup>	mg/L	AZIDE MODIFICATION METHOD (AT SITE) SM: PART 4500-O C	5.2	≥ 4.0	0.5
BIOCHEMICAL OXYGEN DEMAND <sup>c</sup>	mg/L	AZIDE MODIFICATION METHOD (SM: PART 5210 B AND PART 4500-O C)	1.1	≤ 2.0	1.0
TOTAL DISSOLVED SOLIDS <sup>b</sup>	mg/L	TOTAL DISSOLVED SOLIDS DRIED AT 180 °C (SM: PART 2540 C)	153	-	25
AMMONIA-NITROGEN <sup>c</sup>	mg/L NH <sub>3</sub> -N	DISTILLATION NESSLERIZATION METHOD	ND	≤ 0.5	0.5
NITRATE-NITROGEN <sup>c</sup>	mg/L NO <sub>3</sub> -N	CADMIUM REDUCTION METHOD (SM: PART 4500-NO <sub>3</sub> <sup>-</sup> E)	0.17	≤ 5.0	0.02
CHLORIDE <sup>a</sup>	mg/L Cl	ARGENTOMETRIC METHOD (SM: 4500-Cl B)	9.9	-	2.0
SODIUM ADSORPTION RATIO <sup>c</sup>	-	INDUCTIVELY COUPLED PLASMA (ICP) AND CALCULATION METHOD	129	-	-
METALS					
ARSENIC <sup>c</sup>	mg/L As	HYDRIDE GENERATION AAS METHOD (SM: PART 3114 C)	ND	≤ 0.01	0.0003
TOTAL MERCURY <sup>a, b</sup>	mg/L Hg	IN-HOUSE METHOD: UAE.TP.HEM.002 BASED ON SM: PART 3112 B	ND	≤ 0.002	0.0001
CADMIUM <sup>a</sup>	mg/L Cd	UAE.TP.HEM.005 BASED ON SM: PART 3030 E AND PART 3111 B	ND	≤ 0.005*, ≤ 0.05**	0.003
LEAD <sup>a</sup>	mg/L Pb	UAE.TP.HEM.005 BASED ON SM: PART 3030 E AND PART 3111 B	ND	≤ 0.05	0.007
MANGANESE <sup>a</sup>	mg/L Mn	UAE.TP.HEM.005 BASED ON SM: PART 3030 E AND PART 3111 B	1.12	≤ 1.0	0.002



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			SURFACE WATER T24AN689-0001		
SODIUM <sup>c</sup>	mg/L Na	NITRIC ACID-HYDROCHLORIC ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (SM: PART 3030 F AND PART 3120 B)	17.5	-	0.005
<b>SAMPLE CONDITION</b> WATER'S COLOUR/TURBID SEDIMENT			YELLOW/TURBID BROWN		

<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

IN-HOUSE : BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 24<sup>th</sup> EDITION, 2023.

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 24<sup>th</sup> EDITION, 2023.

REGULATORY STANDARD : SURFACE WATER QUALITY STANDARDS CLASS 3, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, NO.8,  
B.E. 2537 ISSUED UNDER THE ENCHANCEMENT AND CONSERVATION OF NATIONAL ENVIRONMENTAL QUALITY  
ACT, B.E. 2535, PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 111, PART 16, DATED FEBRUARY 24,  
B.E. 2537 (1994).

CLASS 3 : MEDIUM CLEAN FRESH SURFACE WATER RESOURCES USED FOR  
(1) CONSUMPTION, BUT PASSING THROUGH ON ORDINARY TREATMENT PROCESS BEFORE USING  
(2) AGRICULTURE

n' : NATURALLY BUT CHANGING NOT MORE THAN 3°C

\* : WHEN WATER HARDNESS NOT MORE THAN 100 mg/L AS CaCO<sub>3</sub>

\*\* : WHEN WATER HARDNESS MORE THAN 100 mg/L AS CaCO<sub>3</sub>

^ : CUSTOMER INFORMATION

ND : NOT DETECTED.

*Bhuchonk*

(MR. BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR

หนองกุง

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## ANALYSIS REPORT

**PROJECT NAME** : โครงการโรงไฟฟ้าชีวมวล  
**CUSTOMER NAME** : THAI ROONG RUANG INDUSTRY CO., LTD.  
**ADDRESS** : 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210  
**CONTACT INFORMATION** : TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com  
**SAMPLING SOURCE** : ไทยรุ่งเรือง-ไฟฟ้า-สกลนคร  
**SAMPLE TYPE** : SURFACE WATER  
**SAMPLING DATE** : APRIL 26, 2024  
**SAMPLING TIME** : 09:30 HOUR  
**SAMPLING METHOD** : GRAB  
**SAMPLING BY** : MR APISIT SRIKONGKAEW  
**ANALYZED BY** : MISS NAPAPORN KHUNNOKKHUM

**RECEIVED DATE** : APRIL 27, 2024  
**ANALYTICAL DATE** : APRIL 27 - MAY 9, 2024  
**ISSUE DATE** : MAY 17, 2024  
**REPORT NO.** : 2024-U041801  
**WORK NO.** : 2023-008918  
**ANALYSIS NO.** : T24AI838-0001

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			บริเวณหนองจอกที่ 1 T24AI838-0001		
pH	-	ELECTROMETRIC METHOD (AT SITE) SM: PART 4500-H <sup>+</sup> B AND 1060 B	7.6 (32°C)	5.0-9.0	-
TEMPERATURE	°C	THERMOMETER AT SITE (SM: PART 2550 B)	32	n <sup>a</sup>	-
DISSOLVED OXYGEN	mg/L	AZIDE MODIFICATION METHOD AT SITE (SM: PART 4500-O C)	6.3	≥ 4.0	0.5
BIOCHEMICAL OXYGEN DEMAND	mg/L	AZIDE MODIFICATION METHOD (SM: PART 5210 B AND PART 4500-O C)	4.2	≤ 2.0	1.0
TOTAL DISSOLVED SOLIDS	mg/L	TOTAL DISSOLVED SOLIDS DRIED AT 180 °C (SM: PART 2540 C)	76	-	25
AMMONIA-NITROGEN	mg/L NH <sub>3</sub> -N	DISTILLATION NESSLERIZATION METHOD	ND	≤ 0.5	0.5
NITRATE-NITROGEN	mg/L NO <sub>3</sub> -N	CADMIUM REDUCTION METHOD (SM: PART 4500-NO <sub>3</sub> E)	0.08	≤ 5.0	0.02
CHLORIDE	mg/L Cl <sup>-</sup>	ARGENTOMETRIC METHOD (SM: 4500-Cl <sup>-</sup> B)	6.8	-	2.0
SODIUM ADSORPTION RATIO	-	INDUCTIVELY COUPLED PLASMA (ICP) AND CALCULATION METHOD	0.422	-	-
METALS					
ARSENIC	mg/L As	HYDRIDE GENERATION AAS METHOD (SM: PART 3114 C)	ND	≤ 0.01	0.0003
TOTAL MERCURY	mg/L Hg	IN-HOUSE METHOD: UAE.TP.HEM.002 (COLD VAPOUR ATOMIC ABSORPTION SPECTROMETRIC METHOD); SM: PART 3112 B	ND	≤ 0.002	0.0001
CADMIUM	mg/L Cd	IN-HOUSE METHOD: UAE.TP.SW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	ND	≤ 0.005*, ≤ 0.05**	0.002
LEAD	mg/L Pb	IN-HOUSE METHOD: UAE.TP.SW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	ND	≤ 0.05	0.003
MANGANESE	mg/L Mn	IN-HOUSE METHOD: UAE.TP.SW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	0.027	≤ 1.0	0.002



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			บริเวณหนองฯ จุดที่ 1 T24AI838-0001		
SODIUM	mg/L Na	NITRIC ACID-HYDROCHLORIC ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (SM: PART 3030 F AND PART 3120 B)	3.28	-	0.005
<b>SAMPLE CONDITION</b> WATER'S COLOUR/TURBID SEDIMENT			YELLOW/TURBID BROWN		

IN-HOUSE : BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23<sup>rd</sup> EDITION, 2017.

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

REGULATORY STANDARD : SURFACE WATER QUALITY STANDARDS CLASS 3, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, NO.8, B.E. 2537 ISSUED UNDER THE ENCHANCEMENT AND CONSERVATION OF NATIONAL ENVIRONMENTAL QUALITY ACT, B.E. 2535, PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 111, PART 16, DATED FEBRUARY 24, B.E. 2537 (1994).

CLASS 3 : MEDIUM CLEAN FRESH SURFACE WATER RESOURCES USED FOR  
(1) CONSUMPTION, BUT PASSING THROUGH ON ORDINARY TREATMENT PROCESS BEFORE USING  
(2) AGRICULTURE

n° : NATURALLY BUT CHANGING NOT MORE THAN 3°C

\* : WHEN WATER HARDNESS NOT MORE THAN 100 mg/L AS CaCO<sub>3</sub>

\*\* : WHEN WATER HARDNESS MORE THAN 100 mg/L AS CaCO<sub>3</sub>

ND : NON-DETECTABLE

*Bhuchonk p.*

(MR BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR

## ANALYSIS REPORT

<b>PROJECT NAME</b>	: โครงการโรงไฟฟ้าชีวมวล	<b>RECEIVED DATE</b>	: JUNE 20, 2024
<b>CUSTOMER NAME</b>	: THAI ROONG RUANG INDUSTRY CO., LTD.	<b>ANALYTICAL DATE</b>	: JUNE 20 - JULY 8, 2024
<b>ADDRESS</b>	: 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210	<b>ISSUE DATE</b>	: JULY 9, 2024
<b>CONTACT INFORMATION</b>	: TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com	<b>REPORT NO.</b>	: 2024-U061987
<b>SAMPLING SOURCE</b>	: บริเวณหนองงู จดที่ 1	<b>WORK NO.</b>	: 2023-008918
<b>SAMPLE TYPE</b>	: SURFACE WATER	<b>ANALYSIS NO.</b>	: T24AN690-0001
<b>SAMPLING DATE</b>	: JUNE 19, 2024		
<b>SAMPLING TIME</b>	: 10:10 HOUR		
<b>SAMPLING METHOD</b>	: GRAB		
<b>SAMPLING BY</b>	: MR. ACHITA SAENGJAN		
<b>ANALYZED BY</b>	: MISS NAPAPORN KHUNNOKKHUM		

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			SURFACE WATER T24AN690-0001		
pH <sup>a</sup>	-	ELECTROMETRIC METHOD (AT SITE) SM: PART 4500-H <sup>+</sup> B AND 1060 B	5.5 (33°C)	5.0-9.0	-
TEMPERATURE <sup>c</sup>	°C	THERMOMETER (AT SITE) SM: PART 2550 B	33	n <sup>i</sup>	-
DISSOLVED OXYGEN <sup>c</sup>	mg/L	AZIDE MODIFICATION METHOD (AT SITE) SM: PART 4500-O C	4.9	≥ 4.0	0.5
BIOCHEMICAL OXYGEN DEMAND <sup>c</sup>	mg/L	AZIDE MODIFICATION METHOD (SM: PART 5210 B AND PART 4500-O C)	1.2	≤ 2.0	1.0
TOTAL DISSOLVED SOLIDS <sup>b</sup>	mg/L	TOTAL DISSOLVED SOLIDS DRIED AT 180 °C (SM: PART 2540 C)	170	-	25
AMMONIA-NITROGEN <sup>c</sup>	mg/L NH <sub>3</sub> -N	DISTILLATION NESSLERIZATION METHOD	0.50	≤ 0.5	0.5
NITRATE-NITROGEN <sup>c</sup>	mg/L NO <sub>3</sub> -N	CADMIUM REDUCTION METHOD (SM: PART 4500-NO <sub>3</sub> E)	0.31	≤ 5.0	0.02
CHLORIDE <sup>a</sup>	mg/L Cl <sup>-</sup>	ARGENTOMETRIC METHOD (SM: 4500-Cl <sup>-</sup> B)	4.0	-	2.0
SODIUM ADSORPTION RATIO <sup>c</sup>	-	INDUCTIVELY COUPLED PLASMA (ICP) AND CALCULATION METHOD	0.236	-	-
<b>METALS</b>					
ARSENIC <sup>c</sup>	mg/L As	HYDRIDE GENERATION AAS METHOD (SM: PART 3114 C)	ND	≤ 0.01	0.0003
TOTAL MERCURY <sup>a b</sup>	mg/L Hg	IN-HOUSE METHOD: UAE.TP.HEM.002 BASED ON SM: PART 3112 B	ND	≤ 0.002	0.0001
CADMIUM <sup>a</sup>	mg/L Cd	UAE.TP.HEM.005 BASED ON SM: PART 3030 E AND PART 3111 B	ND	≤ 0.005*, ≤ 0.05**	0.003
LEAD <sup>a</sup>	mg/L Pb	UAE.TP.HEM.005 BASED ON SM: PART 3030 E AND PART 3111 B	ND	≤ 0.05	0.007
MANGANESE <sup>a</sup>	mg/L Mn	UAE.TP.HEM.005 BASED ON SM: PART 3030 E AND PART 3111 B	0.046	≤ 1.0	0.002



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			SURFACE WATER T24AN690-0001		
SODIUM <sup>c</sup>	mg/L Na	NITRIC ACID-HYDROCHLORIC ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (SM: PART 3030 F AND PART 3120 B)	194	-	0.005
<b>SAMPLE CONDITION</b> WATER'S COLOUR/TURBID SEDIMENT			YELLOW/TURBID BROWN		

<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

IN-HOUSE : BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 24<sup>th</sup> EDITION, 2023.

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 24<sup>th</sup> EDITION, 2023.

REGULATORY STANDARD : SURFACE WATER QUALITY STANDARDS CLASS 3, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, NO.8,  
B.E. 2537 ISSUED UNDER THE ENCHANCEMENT AND CONSERVATION OF NATIONAL ENVIRONMENTAL QUALITY  
ACT, B.E. 2535, PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 111, PART 16, DATED FEBRUARY 24,  
B.E. 2537 (1994).

CLASS 3 : MEDIUM CLEAN FRESH SURFACE WATER RESOURCES USED FOR  
(1) CONSUMPTION, BUT PASSING THROUGH ON ORDINARY TREATMENT PROCESS BEFORE USING  
(2) AGRICULTURE

n<sup>1</sup> : NATURALLY BUT CHANGING NOT MORE THAN 3°C

\* : WHEN WATER HARDNESS NOT MORE THAN 100 mg/L AS CaCO<sub>3</sub>

\*\* : WHEN WATER HARDNESS MORE THAN 100 mg/L AS CaCO<sub>3</sub>

^ : CUSTOMER INFORMATION

ND : NOT DETECTED.

*Bhuchonk p.*

(MR BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR

## ANALYSIS REPORT

<b>PROJECT NAME</b>	: โครงการโรงไฟฟ้าชีวมวล	<b>RECEIVED DATE</b>	: JUNE 20, 2024
<b>CUSTOMER NAME</b>	: THAI ROONG RUANG INDUSTRY CO., LTD.	<b>ANALYTICAL DATE</b>	: JUNE 20 - JULY 8, 2024
<b>ADDRESS</b>	: 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210	<b>ISSUE DATE</b>	: JULY 9, 2024
<b>CONTACT INFORMATION</b>	: TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com	<b>REPORT NO.</b>	: 2024-U061988
<b>SAMPLING SOURCE</b>	: บริเวณหนองกุง จุดที่ 2	<b>WORK NO.</b>	: 2023-008918
<b>SAMPLE TYPE</b>	: SURFACE WATER	<b>ANALYSIS NO.</b>	: T24AN690-0007
<b>SAMPLING DATE</b>	: JUNE 19, 2024		
<b>SAMPLING TIME</b>	: 11:50 HOUR		
<b>SAMPLING METHOD</b>	: GRAB		
<b>SAMPLING BY</b>	: MR. ACHITA SAENGJAN		
<b>ANALYZED BY</b>	: MISS NAPAPORN KHUNNOKKHUM		

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			SURFACE WATER T24AN690-0007		
pH <sup>a</sup>	-	ELECTROMETRIC METHOD (AT SITE) SM: PART 4500-H <sup>+</sup> B AND 1060 B	6.0 (34°C)	5.0-9.0	-
TEMPERATURE <sup>c</sup>	°C	THERMOMETER (AT SITE) SM: PART 2550 B	34	n <sup>i</sup>	-
DISSOLVED OXYGEN <sup>c</sup>	mg/L	AZIDE MODIFICATION METHOD (AT SITE) SM: PART 4500-O C	2.5	≥ 4.0	0.5
BIOCHEMICAL OXYGEN DEMAND <sup>c</sup>	mg/L	AZIDE MODIFICATION METHOD (SM: PART 5210 B AND PART 4500-O C)	11.2	≤ 2.0	1.0
TOTAL DISSOLVED SOLIDS <sup>b</sup>	mg/L	TOTAL DISSOLVED SOLIDS DRIED AT 180 °C (SM: PART 2540 C)	130	-	25
AMMONIA-NITROGEN <sup>c</sup>	mg/L NH <sub>3</sub> -N	DISTILLATION NESSLERIZATION METHOD	ND	≤ 0.5	0.5
NITRATE-NITROGEN <sup>c</sup>	mg/L NO <sub>3</sub> -N	CADMIUM REDUCTION METHOD (SM: PART 4500-NO <sub>3</sub> E)	0.29	≤ 5.0	0.02
CHLORIDE <sup>a</sup>	mg/L Cl <sup>-</sup>	ARGENTOMETRIC METHOD (SM: 4500-Cl <sup>-</sup> B)	9.4	-	2.0
SODIUM ADSORPTION RATIO <sup>c</sup>	-	INDUCTIVELY COUPLED PLASMA (ICP) AND CALCULATION METHOD	0.132	-	-
<b>METALS</b>					
ARSENIC <sup>c</sup>	mg/L As	HYDRIDE GENERATION AAS METHOD (SM: PART 3114 C)	0.0015	≤ 0.01	0.0003
TOTAL MERCURY <sup>a, b</sup>	mg/L Hg	IN-HOUSE METHOD: UAE.TP.HEM.002 BASED ON SM: PART 3112 B	ND	≤ 0.002	0.0001
CADMIUM <sup>a</sup>	mg/L Cd	UAE.TP.HEM.005 BASED ON SM: PART 3030 E AND PART 3111 B	ND	≤ 0.005*, ≤ 0.05**	0.003
LEAD <sup>a</sup>	mg/L Pb	UAE.TP.HEM.005 BASED ON SM: PART 3030 E AND PART 3111 B	ND	≤ 0.05	0.007
MANGANESE <sup>a</sup>	mg/L Mn	UAE.TP.HEM.005 BASED ON SM: PART 3030 E AND PART 3111 B	1.35	≤ 1.0	0.002



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			SURFACE WATER T24AN690-0007		
SODIUM <sup>c</sup>	mg/L Na	NITRIC ACID-HYDROCHLORIC ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (SM: PART 3030 F AND PART 3120 B)	1.57	-	0.005
<b>SAMPLE CONDITION</b> WATER'S COLOUR/TURBID SEDIMENT			BROWN/TURBID BROWN		

<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

IN-HOUSE : BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 24<sup>th</sup> EDITION, 2023.

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 24<sup>th</sup> EDITION, 2023.

REGULATORY STANDARD : SURFACE WATER QUALITY STANDARDS CLASS 3, NOTIFICATION OF THE NATIONAL ENVIRONMENT BOARD, NO.8, B.E. 2537 ISSUED UNDER THE ENCHANCEMENT AND CONSERVATION OF NATIONAL ENVIRONMENTAL QUALITY ACT, B.E. 2535, PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL. 111, PART 16, DATED FEBRUARY 24, B.E. 2537 (1994).

CLASS 3 : MEDIUM CLEAN FRESH SURFACE WATER RESOURCES USED FOR  
(1) CONSUMPTION, BUT PASSING THROUGH ON ORDINARY TREATMENT PROCESS BEFORE USING  
(2) AGRICULTURE

n<sup>1</sup> : NATURALLY BUT CHANGING NOT MORE THAN 3°C

\* : WHEN WATER HARDNESS NOT MORE THAN 100 mg/L AS CaCO<sub>3</sub>

\*\* : WHEN WATER HARDNESS MORE THAN 100 mg/L AS CaCO<sub>3</sub>

^ : CUSTOMER INFORMATION

ND : NOT DETECTED.

*Bhuchonk p.*

(MR BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR

ภาคผนวก ค-6  
รายงานผลการติดตามตรวจสอบคุณภาพน้ำทิ้ง

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บ่อปรับสภาพน้ำเสีย (W1)

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## ANALYSIS REPORT

<b>PROJECT NAME</b>	: โครงการโรงไฟฟ้าชีวมวล	<b>RECEIVED DATE</b>	: JANUARY 19, 2024
<b>CUSTOMER NAME</b>	: THAI ROONG RUANG INDUSTRY CO., LTD.	<b>ANALYTICAL DATE</b>	: JANUARY 19-27, 2024
<b>ADDRESS</b>	: 89 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210	<b>ISSUE DATE</b>	: FEBRUARY 2, 2024
<b>CONTACT INFORMATION</b>	: TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com	<b>REPORT NO.</b>	: 2024-U008843
<b>SAMPLING SOURCE</b>	: โรงไฟฟ้าชีวมวล สกลนคร	<b>WORK NO.</b>	: 2023-008918
<b>SAMPLE TYPE</b>	: EFFLUENT	<b>ANALYSIS NO.</b>	: T24AB167-0001
<b>SAMPLING DATE</b>	: JANUARY 18, 2024		
<b>SAMPLING TIME</b>	: 08:45 HOUR		
<b>SAMPLING METHOD</b>	: GRAB		
<b>SAMPLING BY</b>	: MR APISIT SRIKONGKAEW		
<b>ANALYZED BY</b>	: MISS AKSARIN BUNKONG		

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			ไม่รับสภาพน้ำเสีย (W1) T24AB167-0001	
pH <sup>a</sup>	-	ELECTROMETRIC METHOD AT SITE (SM: PART 4500-H <sup>+</sup> B)	8.5 (24°C)	-
TEMPERATURE <sup>c</sup>	°C	LABORATORY AND FIELD METHODS (SM: PART 2550 B)	24	-
ELECTRICAL CONDUCTIVITY <sup>c</sup>	µS/cm	ELECTRICAL CONDUCTIVITY METHOD AT SITE (SM: PART 2510 B)	344 (24°C)	0.1
BIOCHEMICAL OXYGEN DEMAND <sup>a</sup>	mg/L	5-DAY BOD TEST, MEMBRANE ELECTRODE METHOD (SM: PART 5210 B AND PART 4500-O <sub>2</sub> G)	3.9	2.0
CHEMICAL OXYGEN DEMAND <sup>a</sup>	mg/L	CLOSED REFLUX, COLOURIMETRIC METHOD (SM: PART 5220 D)	57.4	25.0
TOTAL DISSOLVED SOLIDS <sup>b</sup>	mg/L	DRIED AT 180 °C (SM: PART 2540 C)	229	25
HYDROGEN SULPHIDE <sup>c</sup>	mg/L H <sub>2</sub> S	ZnS PRECIPITATION, IODOMETRIC METHOD (SM: PART 4500-S <sub>2</sub> F)	< 0.53	0.53
TOTAL KJELDAHL NITROGEN <sup>c</sup>	mg/L	DIGESTION, DISTILLATION, TITRIMETRIC METHOD (SM: PART 4500-Norg C)	< LOQ	1.5
OIL AND GREASE <sup>c</sup>	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM: PART 5520 B)	ND	3
SODIUM ADSORPTION RATIO <sup>d</sup>	-	INDUCTIVELY COUPLED PLASMA (ICP) AND CALCULATION METHOD	0.261	-
<b>METALS</b>				
ARSENIC <sup>c</sup>	mg/L As	DIGESTION, HYDRIDE GENERATION/ATOMIC ABSORPTION SPECTROMETRIC METHOD (SM: PART 3114 C)	0.0007	0.0003
CADMIUM <sup>c</sup>	mg/L Cd	DIGESTION, DIRECT AIR-ACETYLENE FLAME METHOD (SM: PART 3030 E AND PART 3111 B)	ND	0.002
LEAD <sup>c</sup>	mg/L Pb	DIGESTION, DIRECT AIR-ACETYLENE FLAME METHOD (SM: PART 3030 E AND PART 3111 B)	ND	0.015



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			นอปรินสภาพน้ำเสีย (W1) T24AB167-0001	
MERCURY <sup>c</sup>	mg/L Hg	DIGESTION, COLD-VAPOUR ATOMIC ABSORPTION SPECTROMETRIC METHOD (SM: PART 3112 B)	0.0007	0.0005
<b>SAMPLE CONDITION</b> WATER'S COLOUR/TURBID SEDIMENT			YELLOW/TURBID BROWN	

<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

< LOQ : < LIMIT OF QUANTITATION (TOTAL KJELDAHL NITROGEN  $\geq 1.5$  AND < 5.0 mg/L).

*Bhuchonk p.*

(MR BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR

FEBRUARY 7, 2024

## ANALYSIS REPORT

<b>PROJECT NAME</b>	: โครงการโรงไฟฟ้าชีวมวล	<b>RECEIVED DATE</b>	: FEBRUARY 15, 2024
<b>CUSTOMER NAME</b>	: THAI ROONG RUANG INDUSTRY CO., LTD.	<b>ANALYTICAL DATE</b>	: FEBRUARY 15-27, 2024
<b>ADDRESS</b>	: 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210	<b>ISSUE DATE</b>	: MARCH 5, 2024
<b>CONTACT INFORMATION</b>	: TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com	<b>REPORT NO.</b>	: 2024-U017601
<b>SAMPLING SOURCE</b>	: โรงไฟฟ้าชีวมวล สกลนคร	<b>WORK NO.</b>	: 2023-008918
<b>SAMPLE TYPE</b>	: EFFLUENT	<b>ANALYSIS NO.</b>	: T24AD045-0001
<b>SAMPLING DATE</b>	: FEBRUARY 14, 2024		
<b>SAMPLING TIME</b>	: 09:20 HOUR		
<b>SAMPLING METHOD</b>	: GRAB		
<b>SAMPLING BY</b>	: MR APISIT SRIKONGKAEW		
<b>ANALYZED BY</b>	: MISS KALLAYA SOMPHONG		

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			ข้อปรีภสภพน้ำเสียม (W1) T24AD045-0001	
pH <sup>a</sup>	-	ELECTROMETRIC METHOD AT SITE (SM: PART 4500-H <sup>+</sup> B)	8.5 (25°C)	-
TEMPERATURE <sup>c</sup>	°C	LABORATORY AND FIELD METHODS (SM: PART 2550 B)	25	-
ELECTRICAL CONDUCTIVITY <sup>c</sup>	µS/cm	ELECTRICAL CONDUCTIVITY METHOD AT SITE (SM: PART 2510 B)	364 (25°C)	0.1
BIOCHEMICAL OXYGEN DEMAND <sup>a</sup>	mg/L	5-DAY BOD TEST, MEMBRANE ELECTRODE METHOD (SM: PART 5210 B AND PART 4500-O G)	4.0	2.0
CHEMICAL OXYGEN DEMAND <sup>a</sup>	mg/L	CLOSED REFLUX, COLOURIMETRIC METHOD (SM: PART 5220 D)	41.4	25.0
TOTAL DISSOLVED SOLIDS <sup>b</sup>	mg/L	DRIED AT 180 °C (SM: PART 2540 C)	265	25
HYDROGEN SULPHIDE <sup>c</sup>	mg/L H <sub>2</sub> S	ZnS PRECIPITATION, IODOMETRIC METHOD (SM: PART 4500-S <sup>2-</sup> F)	< 0.53	0.53
SODIUM ADSORPTION RATIO <sup>c</sup>	-	INDUCTIVELY COUPLED PLASMA (ICP) AND CALCULATION METHOD	0.232	-
TOTAL KJELDAHL NITROGEN <sup>c</sup>	mg/L	DIGESTION, DISTILLATION, TITRIMETRIC METHOD (SM: PART 4500-Norg C)	< LOQ	1.5
OIL AND GREASE <sup>c</sup>	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM: PART 5520 B)	ND	3
<b>METALS</b>				
ARSENIC <sup>c</sup>	mg/L As	DIGESTION, HYDRIDE GENERATION/ATOMIC ABSORPTION SPECTROMETRIC METHOD (SM: PART 3114 C)	0.0005	0.0003
CADMIUM <sup>c</sup>	mg/L Cd	DIGESTION, DIRECT AIR-ACETYLENE FLAME METHOD (SM: PART 3030 E AND PART 3111 B)	ND	0.002
LEAD <sup>c</sup>	mg/L Pb	DIGESTION, DIRECT AIR-ACETYLENE FLAME METHOD (SM: PART 3030 E AND PART 3111 B)	ND	0.015



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			บ่อปรับสภาพน้ำเสีย (W1) T24AD045-0001	
MERCURY <sup>c</sup>	mg/L Hg	DIGESTION, COLD-VAPOUR ATOMIC ABSORPTION SPECTROMETRIC METHOD (SM: PART 3112 B)	ND	0.0005
<b>SAMPLE CONDITION</b> WATER'S COLOUR/TURBID SEDIMENT			YELLOW/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.

< LOQ : < LIMIT OF QUANTITATION (TOTAL KJELDAHL NITROGEN  $\geq$  1.5 AND < 5.0 mg/L).

*Bhuchonk p.*

(MR BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR

MARCH 5, 2024

## ANALYSIS REPORT

<b>PROJECT NAME</b>	: โครงการโรงไฟฟ้าชีวมวล	<b>RECEIVED DATE</b>	: MARCH 13, 2024
<b>CUSTOMER NAME</b>	: THAI ROONG RUANG INDUSTRY CO., LTD.	<b>ANALYTICAL DATE</b>	: MARCH 13-30, 2024
<b>ADDRESS</b>	: 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210	<b>ISSUE DATE</b>	: APRIL 5, 2024
<b>CONTACT INFORMATION</b>	: TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com	<b>REPORT NO.</b>	: 2024-U028926
<b>SAMPLING SOURCE</b>	: โรงไฟฟ้าชีวมวล สกลนคร	<b>WORK NO.</b>	: 2023-008918
<b>SAMPLE TYPE</b>	: EFFLUENT	<b>ANALYSIS NO.</b>	: T24AF191-0001
<b>SAMPLING DATE</b>	: MARCH 12, 2024		
<b>SAMPLING TIME</b>	: 10:00 HOUR		
<b>SAMPLING METHOD</b>	: GRAB		
<b>SAMPLING BY</b>	: MR APISIT SRIKONGKAEW		
<b>ANALYZED BY</b>	: MISS AKSARIN BUNKONG		

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			ไม่พบรับสภาพน้ำเสีย (W1) T24AF191-0001	
pH <sup>a</sup>	-	ELECTROMETRIC METHOD AT SITE (SM: PART 4500-H <sup>+</sup> B)	8.3 (25°C)	-
TEMPERATURE <sup>c</sup>	°C	LABORATORY AND FIELD METHODS (SM: PART 2550 B)	25	-
ELECTRICAL CONDUCTIVITY <sup>c</sup>	µS/cm	ELECTRICAL CONDUCTIVITY METHOD AT SITE (SM: PART 2510 B)	317 (25°C)	0.1
BIOCHEMICAL OXYGEN DEMAND <sup>a</sup>	mg/L	5-DAY BOD TEST, MEMBRANE ELECTRODE METHOD (SM: PART 5210 B AND PART 4500-O G)	< 2.0	2.0
CHEMICAL OXYGEN DEMAND <sup>a</sup>	mg/L	CLOSED REFLUX, COLOURIMETRIC METHOD (SM: PART 5220 D)	54.5	25.0
TOTAL DISSOLVED SOLIDS <sup>b</sup>	mg/L	DRIED AT 180 °C (SM: PART 2540 C)	215	25
HYDROGEN SULPHIDE <sup>c</sup>	mg/L H <sub>2</sub> S	ZnS PRECIPITATION, IODOMETRIC METHOD (SM: PART 4500-S <sup>2-</sup> F)	< 0.53	0.53
SODIUM ADSORPTION RATIO <sup>c</sup>	-	INDUCTIVELY COUPLED PLASMA (ICP) AND CALCULATION METHOD	0.206	-
TOTAL KJELDAHL NITROGEN <sup>c</sup>	mg/L	DIGESTION, DISTILLATION, TITRIMETRIC METHOD (SM: PART 4500-Norg C)	< LOQ	1.5
OIL AND GREASE <sup>c</sup>	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM: PART 5520 B)	ND	3
<b>METALS</b>				
ARSENIC <sup>c</sup>	mg/L As	DIGESTION, HYDRIDE GENERATION/ATOMIC ABSORPTION SPECTROMETRIC METHOD (SM: PART 3114 C)	0.0010	0.0003
CADMIUM <sup>c</sup>	mg/L Cd	DIGESTION, DIRECT AIR-ACETYLENE FLAME METHOD (SM: PART 3030 E AND PART 3111 B)	ND	0.002
LEAD <sup>c</sup>	mg/L Pb	DIGESTION, DIRECT AIR-ACETYLENE FLAME METHOD (SM: PART 3030 E AND PART 3111 B)	ND	0.015



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			ไม่พบสารปนเปื้อน (W1) T24AF191-0001	
MERCURY <sup>c</sup>	mg/L Hg	DIGESTION, COLD-VAPOUR ATOMIC ABSORPTION SPECTROMETRIC METHOD (SM: PART 3112 B)	ND	0.0005
<b>SAMPLE CONDITION</b>				
WATER'S COLOUR/TURBID SEDIMENT			YELLOW/TURBID BROWN	

<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.

< LOQ : < LIMIT OF QUANTITATION (TOTAL KJELDAHL NITROGEN  $\geq 1.5$  AND  $< 5.0$  mg/L).

*Bhuchonk p.*

(MR BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR

APRIL 8, 2024

## ANALYSIS REPORT

**PROJECT NAME** : โครงการโรงไฟฟ้าชีวมวล  
**CUSTOMER NAME** : THAI ROONG RUANG INDUSTRY CO., LTD.  
**ADDRESS** : 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210  
**CONTACT INFORMATION** : TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com  
**SAMPLING SOURCE** : โรงไฟฟ้าชีวมวล สกลนคร  
**SAMPLE TYPE** : EFFLUENT  
**SAMPLING DATE** : APRIL 9, 2024  
**SAMPLING TIME** : 09:30 HOUR  
**SAMPLING METHOD** : GRAB  
**SAMPLING BY** : MR APISIT SRIKONGKAEW  
**ANALYZED BY** : MISS AKSARIN BUNKONG  
**RECEIVED DATE** : APRIL 10, 2024  
**ANALYTICAL DATE** : APRIL 10-26, 2024  
**ISSUE DATE** : MAY 2, 2024  
**REPORT NO.** : 2024-U036510  
**WORK NO.** : 2023-008918  
**ANALYSIS NO.** : T24AH647-0001

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			ม่อรับสภาพน้ำเสีย (W1) T24AH647-0001	
pH <sup>a</sup>	-	ELECTROMETRIC METHOD AT SITE (SM: PART 4500-H <sup>+</sup> B)	8.7 (31°C)	-
TEMPERATURE <sup>c</sup>	°C	LABORATORY AND FIELD METHODS (SM: PART 2550 B)	31	-
ELECTRICAL CONDUCTIVITY <sup>c</sup>	µS/cm	ELECTRICAL CONDUCTIVITY METHOD AT SITE (SM: PART 2510 B)	309 (31°C)	0.1
BIOCHEMICAL OXYGEN DEMAND <sup>a</sup>	mg/L	5-DAY BOD TEST, MEMBRANE ELECTRODE METHOD (SM: PART 5210 B AND PART 4500-O G)	2.6	2.0
CHEMICAL OXYGEN DEMAND <sup>a</sup>	mg/L	CLOSED REFLUX, COLOURIMETRIC METHOD (SM: PART 5220 D)	52.0	25.0
TOTAL DISSOLVED SOLIDS <sup>b</sup>	mg/L	DRIED AT 180 °C (SM: PART 2540 C)	268	25
HYDROGEN SULPHIDE <sup>c</sup>	mg/L H <sub>2</sub> S	ZnS PRECIPITATION, IODOMETRIC METHOD (SM: PART 4500-S <sup>2-</sup> F)	< 0.53	0.53
SODIUM ADSORPTION RATIO <sup>c</sup>	-	INDUCTIVELY COUPLED PLASMA (ICP) AND CALCULATION METHOD	0.271	-
TOTAL KJELDAHL NITROGEN <sup>c</sup>	mg/L	DIGESTION, DISTILLATION, TITRIMETRIC METHOD (SM: PART 4500-Norg C)	< LOQ	1.5
OIL AND GREASE <sup>c</sup>	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM: PART 5520 B)	ND	3
<b>METALS</b>				
ARSENIC <sup>c</sup>	mg/L As	DIGESTION, HYDRIDE GENERATION/ATOMIC ABSORPTION SPECTROMETRIC METHOD (SM: PART 3114 C)	0.0010	0.0003
CADMIUM <sup>c</sup>	mg/L Cd	DIGESTION, DIRECT AIR-ACETYLENE FLAME METHOD (SM: PART 3030 E AND PART 3111 B)	ND	0.002
LEAD <sup>c</sup>	mg/L Pb	DIGESTION, DIRECT AIR-ACETYLENE FLAME METHOD (SM: PART 3030 E AND PART 3111 B)	ND	0.015



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			บ่อปรับสภาพน้ำเสีย (W1) T24AH647-0001	
MERCURY <sup>c</sup>	mg/L Hg	DIGESTION, COLD-VAPOUR ATOMIC ABSORPTION SPECTROMETRIC METHOD (SM: PART 3112 B)	ND	0.0005
<b>SAMPLE CONDITION</b> WATER'S COLOUR/TURBID SEDIMENT			YELLOW/TURBID BROWN	

<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

< LOQ : < LIMIT OF QUANTITATION (TOTAL KJELDAHL NITROGEN  $\geq$  1.5 AND < 5.0 mg/L).

*Bhuchonk p.*

(MR BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR

## ANALYSIS REPORT

**PROJECT NAME** : โครงการโรงไฟฟ้าชีวมวล  
**CUSTOMER NAME** : THAI ROONG RUANG INDUSTRY CO., LTD.  
**ADDRESS** : 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210  
**CONTACT INFORMATION** : TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com  
**SAMPLING SOURCE** : โรงไฟฟ้าชีวมวล สกลนคร  
**SAMPLE TYPE** : EFFLUENT  
**SAMPLING DATE** : MAY 15, 2024  
**SAMPLING TIME** : 09:00 HOUR  
**SAMPLING METHOD** : GRAB  
**SAMPLING BY** : MR TEERAPONG SRIKAMHANG  
**ANALYZED BY** : MISS AKSARIN BUNKONG

**RECEIVED DATE** : MAY 16, 2024  
**ANALYTICAL DATE** : MAY 16-31, 2024  
**ISSUE DATE** : JUNE 7, 2024  
**REPORT NO.** : 2024-U048446  
**WORK NO.** : 2023-008918  
**ANALYSIS NO.** : T24AK356-0001

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			บ่อปรับสภาพน้ำเสีย (W1) T24AK356-0001	
pH	-	ELECTROMETRIC METHOD AT SITE (SM: PART 4500-H <sup>+</sup> B)	6.7 (30°C)	-
TEMPERATURE	°C	LABORATORY AND FIELD METHODS (SM: PART 2550 B)	30	-
ELECTRICAL CONDUCTIVITY	µS/cm	ELECTRICAL CONDUCTIVITY METHOD AT SITE (SM: PART 2510 B)	303 (30°C)	0.1
BIOCHEMICAL OXYGEN DEMAND	mg/L	5-DAY BOD TEST, MEMBRANE ELECTRODE METHOD (SM: PART 5210 B AND PART 4500-O G)	118	2.0
CHEMICAL OXYGEN DEMAND	mg/L	CLOSED REFLUX, COLOURIMETRIC METHOD (SM: PART 5220 D)	281	25.0
TOTAL DISSOLVED SOLIDS	mg/L	DRIED AT 180 °C (SM: PART 2540 C)	115	25
HYDROGEN SULPHIDE	mg/L H <sub>2</sub> S	ZnS PRECIPITATION, IODOMETRIC METHOD (SM: PART 4500-S <sup>2-</sup> F)	< 0.53	0.53
SODIUM ADSORPTION RATIO	-	INDUCTIVELY COUPLED PLASMA (ICP) AND CALCULATION METHOD	0.286	-
TOTAL KJELDAHL NITROGEN	mg/L	DIGESTION, DISTILLATION, TITRIMETRIC METHOD (SM: PART 4500-Norg C)	9.0	1.5
OIL AND GREASE	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM: PART 5520 B)	ND	3
METALS				
ARSENIC	mg/L As	DIGESTION, HYDRIDE GENERATION/ATOMIC ABSORPTION SPECTROMETRIC METHOD (SM: PART 3114 C)	0.0017	0.0003
CADMIUM	mg/L Cd	DIGESTION, DIRECT AIR-ACETYLENE FLAME METHOD (SM: PART 3030 E AND PART 3111 B)	ND	0.002
LEAD	mg/L Pb	DIGESTION, DIRECT AIR-ACETYLENE FLAME METHOD (SM: PART 3030 E AND PART 3111 B)	ND	0.015



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			บ่อปรับสภาพน้ำเสีย (W1) T24AK356-0001	
MERCURY	mg/L Hg	DIGESTION, COLD-VAPOUR ATOMIC ABSORPTION SPECTROMETRIC METHOD (SM: PART 3112 B)	ND	0.0005
<b>SAMPLE CONDITION</b> WATER'S COLOUR/TURBID SEDIMENT			GREY/TURBID GREY	

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

ND : NON-DETECTABLE.

*Bhuchonk p.*

(MR BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR

## ANALYSIS REPORT

<b>PROJECT NAME</b>	: โครงการโรงไฟฟ้าชีวมวล	<b>RECEIVED DATE</b>	: JUNE 13, 2024
<b>CUSTOMER NAME</b>	: THAI ROONG RUANG INDUSTRY CO., LTD.	<b>ANALYTICAL DATE</b>	: JUNE 13-28, 2024
<b>ADDRESS</b>	: 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210	<b>ISSUE DATE</b>	: JULY 1, 2024
<b>CONTACT INFORMATION</b>	: TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com	<b>REPORT NO.</b>	: 2024-U059030
<b>SAMPLING SOURCE</b>	: โรงไฟฟ้าชีวมวล สกลนคร	<b>WORK NO.</b>	: 2023-008918
<b>SAMPLE TYPE</b>	: EFFLUENT	<b>ANALYSIS NO.</b>	: T24AM983-0001
<b>SAMPLING DATE</b>	: JUNE 12, 2024		
<b>SAMPLING TIME</b>	: 09:30 HOUR		
<b>SAMPLING METHOD</b>	: GRAB		
<b>SAMPLING BY</b>	: MR. TEERAPONG SRIKAMHANG		
<b>ANALYZED BY</b>	: MISS AKSARIN BUNKONG		

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			บอปปรับสภาพน้ำเสีย (W1) T24AM983-0001	
pH <sup>a</sup>	-	ELECTROMETRIC METHOD (AT SITE) SM: PART 4500 -H <sup>+</sup> B AND 1060 B	6.5 (31°C)	-
TEMPERATURE <sup>c</sup>	°C	LABORATORY AND FIELD METHODS (SM: PART 2550 B)	31	-
ELECTRICAL CONDUCTIVITY <sup>b</sup>	µS/cm	ELECTRICAL CONDUCTIVITY METHOD (AT SITE) SM: PART 2510 B AND 1060 B	190 (31°C)	0.1
BIOCHEMICAL OXYGEN DEMAND <sup>a</sup>	mg/L	5-DAY BOD TEST, MEMBRANE ELECTRODE METHOD (SM: PART 5210 B AND PART 4500-O G)	60.9	2.0
CHEMICAL OXYGEN DEMAND <sup>a</sup>	mg/L	CLOSED REFLUX, COLOURIMETRIC METHOD (SM: PART 5220 D)	142	25.0
TOTAL DISSOLVED SOLIDS <sup>b</sup>	mg/L	DRIED AT 180 °C (SM: PART 2540 C)	170	25
HYDROGEN SULPHIDE <sup>c</sup>	mg/L H <sub>2</sub> S	IODOMETRIC METHOD (SM: PART 4500-S <sup>2</sup> F)	< 0.53	0.53
TOTAL KJELDAHL NITROGEN <sup>c</sup>	mg/L	SEMI-MICRO-KJELDAHL METHOD (SM: PART 4500-Norg C)	< LOQ	1.5
OIL AND GREASE <sup>c</sup>	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM: PART 5520 B)	ND	3
SODIUM ADSORPTION RATIO <sup>c</sup>	-	INDUCTIVELY COUPLED PLASMA (ICP) AND CALCULATION METHOD	0.226	-
<b>METALS</b>				
ARSENIC <sup>c</sup>	mg/L As	DIGESTION, HYDRIDE GENERATION/ATOMIC ABSORPTION SPECTROMETRIC METHOD (SM: PART 3114 C)	0.0006	0.0003
CADMIUM <sup>c</sup>	mg/L Cd	DIGESTION, DIRECT AIR-ACETYLENE FLAME METHOD (SM: PART 3030 E AND PART 3111 B)	ND	0.005
LEAD <sup>c</sup>	mg/L Pb	DIGESTION, DIRECT AIR-ACETYLENE FLAME METHOD (SM: PART 3030 E AND PART 3111 B)	ND	0.020



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			บอประสิทธิภาพน้ำเสีย (W1) T24AM983-0001	
MERCURY <sup>c</sup>	mg/L Hg	DIGESTION, COLD-VAPOUR ATOMIC ABSORPTION SPECTROMETRIC METHOD (SM: PART 3112 B)	0.0005	0.0005
<b>SAMPLE CONDITION</b> WATER'S COLOUR/TURBID SEDIMENT			BROWN/TURBID BROWN	

<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, 24<sup>th</sup> EDITION, 2023.

ND : NOT DETECTED.

< LOQ : < LIMIT OF QUANTITATION (TOTAL KJELDAHL NITROGEN  $\geq 1.5$  AND < 5.0 mg/L).

*Bhuchonk p.*

(MR. BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR

บ่อบำบัดน้ำเสียแบบไร้อากาศบ่อแรก (W2)

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## ANALYSIS REPORT

**PROJECT NAME** : โครงการโรงไฟฟ้าชีวมวล  
**CUSTOMER NAME** : THAI ROONG RUANG INDUSTRY CO., LTD.  
**ADDRESS** : 89 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210  
**CONTACT INFORMATION** : TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com  
**SAMPLING SOURCE** : โรงไฟฟ้าชีวมวล สกลนคร  
**SAMPLE TYPE** : EFFLUENT  
**SAMPLING DATE** : JANUARY 18, 2024  
**SAMPLING TIME** : 09:00 HOUR  
**SAMPLING METHOD** : GRAB  
**SAMPLING BY** : MR APISIT SRIKONGKAEW  
**ANALYZED BY** : MISS AKSARIN BUNKONG  
**RECEIVED DATE** : JANUARY 19, 2024  
**ANALYTICAL DATE** : JANUARY 19-27, 2024  
**ISSUE DATE** : FEBRUARY 1, 2024  
**REPORT NO.** : 2024-U008844  
**WORK NO.** : 2023-008918  
**ANALYSIS NO.** : T24AB167-0002

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			บ่อบำบัดน้ำเสียแบบไร้อากาศบ่อแรก (W2) T24AB167-0002	
pH <sup>a</sup>	-	ELECTROMETRIC METHOD AT SITE (SM: PART 4500-H <sup>+</sup> B)	8.4 (24°C)	-
TEMPERATURE <sup>c</sup>	°C	LABORATORY AND FIELD METHODS (SM: PART 2550 B)	24	-
ELECTRICAL CONDUCTIVITY <sup>c</sup>	µS/cm	ELECTRICAL CONDUCTIVITY METHOD AT SITE (SM: PART 2510 B)	341 (24°C)	0.1
BIOCHEMICAL OXYGEN DEMAND <sup>a</sup>	mg/L	5-DAY BOD TEST, MEMBRANE ELECTRODE METHOD (SM: PART 5210 B AND PART 4500-O G)	3.9	2.0
CHEMICAL OXYGEN DEMAND <sup>a</sup>	mg/L	CLOSED REFLUX, COLOURIMETRIC METHOD (SM: PART 5220 D)	56.4	25.0
TOTAL DISSOLVED SOLIDS <sup>b</sup>	mg/L	DRIED AT 180 °C (SM: PART 2540 C)	229	25
HYDROGEN SULPHIDE <sup>c</sup>	mg/L H <sub>2</sub> S	ZnS PRECIPITATION, IODOMETRIC METHOD (SM: PART 4500-S <sub>2</sub> F)	< 0.53	0.53
TOTAL KJELDAHL NITROGEN <sup>c</sup>	mg/L	DIGESTION, DISTILLATION, TITRIMETRIC METHOD (SM: PART 4500-Norg C)	< LOQ	1.5
OIL AND GREASE <sup>c</sup>	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM: PART 5520 B)	ND	3
SODIUM ADSORPTION RATIO <sup>c</sup>	-	INDUCTIVELY COUPLED PLASMA (ICP) AND CALCULATION METHOD	0.253	-
<b>METALS</b>				
ARSENIC <sup>c</sup>	mg/L As	DIGESTION, HYDRIDE GENERATION/ATOMIC ABSORPTION SPECTROMETRIC METHOD (SM: PART 3114 C)	0.0007	0.0003
CADMIUM <sup>c</sup>	mg/L Cd	DIGESTION, DIRECT AIR-ACETYLENE FLAME METHOD (SM: PART 3030 E AND PART 3111 B)	ND	0.002
LEAD <sup>c</sup>	mg/L Pb	DIGESTION, DIRECT AIR-ACETYLENE FLAME METHOD (SM: PART 3030 E AND PART 3111 B)	ND	0.015



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			บ่งชี้ค่าที่เลือกแบบวิธี อากาศบ่อแรก (W2) T24AB167-0002	
MERCURY <sup>c</sup>	mg/L Hg	DIGESTION, COLD-VAPOUR ATOMIC ABSORPTION SPECTROMETRIC METHOD (SM: PART 3112 B)	ND	0.0005
<b>SAMPLE CONDITION</b> WATER'S COLOUR/TURBID SEDIMENT			YELLOW/TURBID BROWN	

<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.

< LOQ : < LIMIT OF QUANTITATION (TOTAL KJELDAHL NITROGEN  $\geq 1.5$  AND < 5.0 mg/L).

*Bhuchonk p.*

(MR BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR

FEBRUARY 7, 2024

## ANALYSIS REPORT

<b>PROJECT NAME</b>	: โครงการโรงไฟฟ้าชีวมวล	<b>RECEIVED DATE</b>	: FEBRUARY 15, 2024
<b>CUSTOMER NAME</b>	: THAI ROONG RUANG INDUSTRY CO., LTD.	<b>ANALYTICAL DATE</b>	: FEBRUARY 15-27, 2024
<b>ADDRESS</b>	: 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210	<b>ISSUE DATE</b>	: MARCH 5, 2024
<b>CONTACT INFORMATION</b>	: TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com	<b>REPORT NO.</b>	: 2024-U017602
<b>SAMPLING SOURCE</b>	: โรงไฟฟ้าชีวมวล สกลนคร	<b>WORK NO.</b>	: 2023-008918
<b>SAMPLE TYPE</b>	: EFFLUENT	<b>ANALYSIS NO.</b>	: T24AD045-0002
<b>SAMPLING DATE</b>	: FEBRUARY 14, 2024		
<b>SAMPLING TIME</b>	: 09:30 HOUR		
<b>SAMPLING METHOD</b>	: GRAB		
<b>SAMPLING BY</b>	: MR. APISIT SRIKONGKAEW		
<b>ANALYZED BY</b>	: MISS KALLAYA SOMPHONG		

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			นํ้าบํ้าบัดน้ำเสียแบบใช้ อากาศบ่อแรก (W2) T24AD045-0002	
pH <sup>a</sup>	-	ELECTROMETRIC METHOD AT SITE (SM: PART 4500-H <sup>+</sup> B)	8.5 (25°C)	-
TEMPERATURE <sup>c</sup>	°C	LABORATORY AND FIELD METHODS (SM: PART 2550 B)	25	-
ELECTRICAL CONDUCTIVITY <sup>c</sup>	µS/cm	ELECTRICAL CONDUCTIVITY METHOD AT SITE (SM: PART 2510 B)	327 (25°C)	0.1
BIOCHEMICAL OXYGEN DEMAND <sup>a</sup>	mg/L	5-DAY BOD TEST, MEMBRANE ELECTRODE METHOD (SM: PART 5210 B AND PART 4500-O G)	2.7	2.0
CHEMICAL OXYGEN DEMAND <sup>a</sup>	mg/L	CLOSED REFLUX, COLOURIMETRIC METHOD (SM: PART 5220 D)	41.6	25.0
TOTAL DISSOLVED SOLIDS <sup>b</sup>	mg/L	DRIED AT 180 °C (SM: PART 2540 C)	244	25
HYDROGEN SULPHIDE <sup>c</sup>	mg/L H <sub>2</sub> S	ZnS PRECIPITATION, IODOMETRIC METHOD (SM: PART 4500-S <sup>2-</sup> F)	< 0.53	0.53
SODIUM ADSORPTION RATIO <sup>c</sup>	-	INDUCTIVELY COUPLED PLASMA (ICP) AND CALCULATION METHOD	0.253	-
TOTAL KJELDAHL NITROGEN <sup>c</sup>	mg/L	DIGESTION, DISTILLATION, TITRIMETRIC METHOD (SM: PART 4500-Norg C)	< LOQ	1.5
OIL AND GREASE <sup>c</sup>	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM: PART 5520 B)	ND	3
<b>METALS</b>				
ARSENIC <sup>c</sup>	mg/L As	DIGESTION, HYDRIDE GENERATION/ATOMIC ABSORPTION SPECTROMETRIC METHOD (SM: PART 3114 C)	0.0005	0.0003
CADMIUM <sup>c</sup>	mg/L Cd	DIGESTION, DIRECT AIR-ACETYLENE FLAME METHOD (SM: PART 3030 E AND PART 3111 B)	ND	0.002
LEAD <sup>c</sup>	mg/L Pb	DIGESTION, DIRECT AIR-ACETYLENE FLAME METHOD (SM: PART 3030 E AND PART 3111 B)	ND	0.015



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			ม่อนำบดน้ำเสียแบบไร้ อากาศบ่อแรก (W2) T24AD045-0002	
MERCURY <sup>c</sup>	mg/L Hg	DIGESTION, COLD-VAPOUR ATOMIC ABSORPTION SPECTROMETRIC METHOD (SM: PART 3112 B)	ND	0.0005
<b>SAMPLE CONDITION</b> WATER'S COLOUR/TURBID SEDIMENT			YELLOW/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.

< LOQ : < LIMIT OF QUANTITATION (TOTAL KJELDAHL NITROGEN  $\geq 1.5$  AND < 5.0 mg/L).

*Bhuchonk p.*

(MR BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR

MARCH 5, 2024

## ANALYSIS REPORT

<b>PROJECT NAME</b>	: โครงการโรงไฟฟ้าชีวมวล	<b>RECEIVED DATE</b>	: MARCH 13, 2024
<b>CUSTOMER NAME</b>	: THAI ROONG RUANG INDUSTRY CO., LTD.	<b>ANALYTICAL DATE</b>	: MARCH 13-30, 2024
<b>ADDRESS</b>	: 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210	<b>ISSUE DATE</b>	: APRIL 5, 2024
<b>CONTACT INFORMATION</b>	: TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com	<b>REPORT NO.</b>	: 2024-U028927
<b>SAMPLING SOURCE</b>	: โรงไฟฟ้าชีวมวล สกลนคร	<b>WORK NO.</b>	: 2023-008918
<b>SAMPLE TYPE</b>	: EFFLUENT	<b>ANALYSIS NO.</b>	: T24AF191-0002
<b>SAMPLING DATE</b>	: MARCH 12, 2024		
<b>SAMPLING TIME</b>	: 10:30 HOUR		
<b>SAMPLING METHOD</b>	: GRAB		
<b>SAMPLING BY</b>	: MR APISIT SRIKONGKAEW		
<b>ANALYZED BY</b>	: MISS AKSARIN BUNKONG		

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			บ่อน้ำบาดาลเสียมแม่วัว อากาศป้อนแรก (W2) T24AF191-0002	
pH <sup>a</sup>	-	ELECTROMETRIC METHOD AT SITE (SM: PART 4500-H <sup>+</sup> B)	8.4 (26°C)	-
TEMPERATURE <sup>c</sup>	°C	LABORATORY AND FIELD METHODS (SM: PART 2550 B)	26	-
ELECTRICAL CONDUCTIVITY <sup>c</sup>	µS/cm	ELECTRICAL CONDUCTIVITY METHOD AT SITE (SM: PART 2510 B)	350 (26°C)	0.1
BIOCHEMICAL OXYGEN DEMAND <sup>a</sup>	mg/L	5-DAY BOD TEST, MEMBRANE ELECTRODE METHOD (SM: PART 5210 B AND PART 4500-O G)	< 2.0	2.0
CHEMICAL OXYGEN DEMAND <sup>a</sup>	mg/L	CLOSED REFLUX, COLOURIMETRIC METHOD (SM: PART 5220 D)	48.5	25.0
TOTAL DISSOLVED SOLIDS <sup>b</sup>	mg/L	DRIED AT 180 °C (SM: PART 2540 C)	245	25
HYDROGEN SULPHIDE <sup>c</sup>	mg/L H <sub>2</sub> S	ZnS PRECIPITATION, IODOMETRIC METHOD (SM: PART 4500-S <sup>2-</sup> F)	< 0.53	0.53
SODIUM ADSORPTION RATIO <sup>c</sup>	-	INDUCTIVELY COUPLED PLASMA (ICP) AND CALCULATION METHOD	0.274	-
TOTAL KJELDAHL NITROGEN <sup>c</sup>	mg/L	DIGESTION, DISTILLATION, TITRIMETRIC METHOD (SM: PART 4500-Norg C)	< LOQ	1.5
OIL AND GREASE <sup>c</sup>	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM: PART 5520 B)	ND	3
<b>METALS</b>				
ARSENIC <sup>c</sup>	mg/L As	DIGESTION, HYDRIDE GENERATION/ATOMIC ABSORPTION SPECTROMETRIC METHOD (SM: PART 3114 C)	0.0007	0.0003
CADMIUM <sup>c</sup>	mg/L Cd	DIGESTION, DIRECT AIR-ACETYLENE FLAME METHOD (SM: PART 3030 E AND PART 3111 B)	ND	0.002
LEAD <sup>c</sup>	mg/L Pb	DIGESTION, DIRECT AIR-ACETYLENE FLAME METHOD (SM: PART 3030 E AND PART 3111 B)	ND	0.015



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			บ่อน้ำบาดาลเสียแบบไร้ อากาศป้อนแรก (W2) T24AF191-0002	
MERCURY <sup>c</sup>	mg/L Hg	DIGESTION, COLD-VAPOUR ATOMIC ABSORPTION SPECTROMETRIC METHOD (SM: PART 3112 B)	ND	0.0005
<b>SAMPLE CONDITION</b> WATER'S COLOUR/TURBID SEDIMENT			YELLOW/TURBID BROWN	

<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

< LOQ : < LIMIT OF QUANTITATION (TOTAL KJELDAHL NITROGEN  $\geq 1.5$  AND  $< 5.0$  mg/L).

*Bhuchonk p.*

(MR BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR

APRIL 8, 2024

## ANALYSIS REPORT

**PROJECT NAME** : โครงการโรงไฟฟ้าชีวมวล  
**CUSTOMER NAME** : THAI ROONG RUANG INDUSTRY CO., LTD.  
**ADDRESS** : 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210  
**CONTACT INFORMATION** : TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com  
**SAMPLING SOURCE** : โรงไฟฟ้าชีวมวล สกลนคร  
**SAMPLE TYPE** : EFFLUENT  
**SAMPLING DATE** : APRIL 9, 2024  
**SAMPLING TIME** : 09:00 HOUR  
**SAMPLING METHOD** : GRAB  
**SAMPLING BY** : MR APISIT SRIKONGKAEW  
**ANALYZED BY** : MISS AKSARIN BUNKONG

**RECEIVED DATE** : APRIL 10, 2024  
**ANALYTICAL DATE** : APRIL 10-26, 2024  
**ISSUE DATE** : MAY 2, 2024  
**REPORT NO.** : 2024-U036513  
**WORK NO.** : 2023-008918  
**ANALYSIS NO.** : T24AH647-0002

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			บ่อน้ำดิบน้ำเสียแบบไร้อากาศบ่อแรก (W2) T24AH647-0002	
pH <sup>a</sup>	-	ELECTROMETRIC METHOD AT SITE (SM: PART 4500-H <sup>+</sup> B)	8.8 (31°C)	-
TEMPERATURE <sup>c</sup>	°C	LABORATORY AND FIELD METHODS (SM: PART 2550 B)	31	-
ELECTRICAL CONDUCTIVITY <sup>c</sup>	µS/cm	ELECTRICAL CONDUCTIVITY METHOD AT SITE (SM: PART 2510 B)	315 (31°C)	0.1
BIOCHEMICAL OXYGEN DEMAND <sup>a</sup>	mg/L	5-DAY BOD TEST, MEMBRANE ELECTRODE METHOD (SM: PART 5210 B AND PART 4500-O <sub>2</sub> G)	2.5	2.0
CHEMICAL OXYGEN DEMAND <sup>a</sup>	mg/L	CLOSED REFLUX, COLOURIMETRIC METHOD (SM: PART 5220 D)	50.7	25.0
TOTAL DISSOLVED SOLIDS <sup>b</sup>	mg/L	DRIED AT 180 °C (SM: PART 2540 C)	227	25
HYDROGEN SULPHIDE <sup>c</sup>	mg/L H <sub>2</sub> S	ZnS PRECIPITATION, IODOMETRIC METHOD (SM: PART 4500-S <sub>2</sub> F)	< 0.53	0.53
SODIUM ADSORPTION RATIO <sup>c</sup>	-	INDUCTIVELY COUPLED PLASMA (ICP) AND CALCULATION METHOD	0.999	-
TOTAL KJELDAHL NITROGEN <sup>c</sup>	mg/L	DIGESTION, DISTILLATION, TITRIMETRIC METHOD (SM: PART 4500-Norg C)	< LOQ	1.5
OIL AND GREASE <sup>c</sup>	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM: PART 5520 B)	3	3
<b>METALS</b>				
ARSENIC <sup>c</sup>	mg/L As	DIGESTION, HYDRIDE GENERATION/ATOMIC ABSORPTION SPECTROMETRIC METHOD (SM: PART 3114 C)	0.0007	0.0003
CADMIUM <sup>c</sup>	mg/L Cd	DIGESTION, DIRECT AIR-ACETYLENE FLAME METHOD (SM: PART 3030 E AND PART 3111 B)	ND	0.002
LEAD <sup>c</sup>	mg/L Pb	DIGESTION, DIRECT AIR-ACETYLENE FLAME METHOD (SM: PART 3030 E AND PART 3111 B)	ND	0.015



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			บ่อน้ำบาดน้ำเสียแบบน้ำใส อากาศบ่อน้ำ (W2) T24AH647-0002	
MERCURY <sup>c</sup>	mg/L Hg	DIGESTION, COLD-VAPOUR ATOMIC ABSORPTION SPECTROMETRIC METHOD (SM: PART 3112 B)	ND	0.0005
<b>SAMPLE CONDITION</b> WATER'S COLOUR/TURBID SEDIMENT			YELLOW/TURBID BROWN	

<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.

< LOQ : < LIMIT OF QUANTITATION (TOTAL KJELDAHL NITROGEN  $\geq 1.5$  AND < 5.0 mg/L).

*Bhuchonk*

(MR BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR

## ANALYSIS REPORT

**PROJECT NAME** : โครงการโรงไฟฟ้าชีวมวล  
**CUSTOMER NAME** : THAI ROONG RUANG INDUSTRY CO., LTD.  
**ADDRESS** : 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210  
**CONTACT INFORMATION** : TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com  
**SAMPLING SOURCE** : โรงไฟฟ้าชีวมวล สกลนคร  
**SAMPLE TYPE** : EFFLUENT  
**SAMPLING DATE** : MAY 15, 2024  
**SAMPLING TIME** : 09:20 HOUR  
**SAMPLING METHOD** : GRAB  
**SAMPLING BY** : MR TEERAPONG SRIKAMHANG  
**ANALYZED BY** : MISS AKSARIN BUNKONG

**RECEIVED DATE** : MAY 16, 2024  
**ANALYTICAL DATE** : MAY 16-31, 2024  
**ISSUE DATE** : JUNE 7, 2024  
**REPORT NO.** : 2024-U048447  
**WORK NO.** : 2023-008918  
**ANALYSIS NO.** : T24AK356-0002

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			นํ้าบํ้าบัดน้ำเสียแบบใช้ อากาศบ่อแรก (W2) T24AK356-0002	
pH	-	ELECTROMETRIC METHOD AT SITE (SM: PART 4500-H <sup>+</sup> B)	6.6 (30°C)	-
TEMPERATURE	°C	LABORATORY AND FIELD METHODS (SM: PART 2550 B)	30	-
ELECTRICAL CONDUCTIVITY	µS/cm	ELECTRICAL CONDUCTIVITY METHOD AT SITE (SM: PART 2510 B)	297 (30°C)	0.1
BIOCHEMICAL OXYGEN DEMAND	mg/L	5-DAY BOD TEST, MEMBRANE ELECTRODE METHOD (SM: PART 5210 B AND PART 4500-O G)	116	2.0
CHEMICAL OXYGEN DEMAND	mg/L	CLOSED REFLUX, COLOURIMETRIC METHOD (SM: PART 5220 D)	248	25.0
TOTAL DISSOLVED SOLIDS	mg/L	DRIED AT 180 °C (SM: PART 2540 C)	233	25
HYDROGEN SULPHIDE	mg/L H <sub>2</sub> S	ZnS PRECIPITATION, IODOMETRIC METHOD (SM: PART 4500-S <sub>2</sub> - F)	< 0.53	0.53
SODIUM ADSORPTION RATIO	-	INDUCTIVELY COUPLED PLASMA (ICP) AND CALCULATION METHOD	0.330	-
TOTAL KJELDAHL NITROGEN	mg/L	DIGESTION, DISTILLATION, TITRIMETRIC METHOD (SM: PART 4500-Norg C)	8.5	1.5
OIL AND GREASE	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM: PART 5520 B)	ND	3
<b>METALS</b>				
ARSENIC	mg/L As	DIGESTION, HYDRIDE GENERATION/ATOMIC ABSORPTION SPECTROMETRIC METHOD (SM: PART 3114 C)	0.0016	0.0003
CADMIUM	mg/L Cd	DIGESTION, DIRECT AIR-ACETYLENE FLAME METHOD (SM: PART 3030 E AND PART 3111 B)	ND	0.002
LEAD	mg/L Pb	DIGESTION, DIRECT AIR-ACETYLENE FLAME METHOD (SM: PART 3030 E AND PART 3111 B)	ND	0.015



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			บ่อน้ำบาดาลเสียแบบไร้ อากาศพอแรก (W2) T24AK356-0002	
MERCURY	mg/L Hg	DIGESTION, COLD-VAPOUR ATOMIC ABSORPTION SPECTROMETRIC METHOD (SM: PART 3112 B)	ND	0.0005
<b>SAMPLE CONDITION</b> WATER'S COLOUR/TURBID SEDIMENT			GREY/TURBID GREY	

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

ND : NON-DETECTABLE.

*Bhuchonk p.*

(MR BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR

## ANALYSIS REPORT

<b>PROJECT NAME</b>	: โครงการโรงไฟฟ้าชีวมวล	<b>RECEIVED DATE</b>	: JUNE 13, 2024
<b>CUSTOMER NAME</b>	: THAI ROONG RUANG INDUSTRY CO., LTD.	<b>ANALYTICAL DATE</b>	: JUNE 13-28, 2024
<b>ADDRESS</b>	: 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210	<b>ISSUE DATE</b>	: JULY 1, 2024
<b>CONTACT INFORMATION</b>	: TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com	<b>REPORT NO.</b>	: 2024-U059031
<b>SAMPLING SOURCE</b>	: โรงไฟฟ้าชีวมวล สกลนคร	<b>WORK NO.</b>	: 2023-008918
<b>SAMPLE TYPE</b>	: EFFLUENT	<b>ANALYSIS NO.</b>	: T24AM983-0002
<b>SAMPLING DATE</b>	: JUNE 12, 2024		
<b>SAMPLING TIME</b>	: 10:00 HOUR		
<b>SAMPLING METHOD</b>	: GRAB		
<b>SAMPLING BY</b>	: MR TEERAPONG SRIKAMHANG		
<b>ANALYZED BY</b>	: MISS AKSARIN BUNKONG		

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			ป้อนค่าปดน้ำเสียบแบบ ใช้ภาควัดปดแรก (W2) T24AM983-0002	
pH <sup>a</sup>	-	ELECTROMETRIC METHOD (AT SITE) SM: PART 4500-H <sup>+</sup> B AND 1060 B	8.1 (33°C)	-
TEMPERATURE <sup>c</sup>	°C	LABORATORY AND FIELD METHODS (SM: PART 2550 B)	33	-
ELECTRICAL CONDUCTIVITY <sup>b</sup>	µS/cm	ELECTRICAL CONDUCTIVITY METHOD (AT SITE) SM: PART 2510 B AND 1060 B	182 (33°C)	0.1
BIOCHEMICAL OXYGEN DEMAND <sup>a</sup>	mg/L	5-DAY BOD TEST, MEMBRANE ELECTRODE METHOD (SM: PART 5210 B AND PART 4500-O G)	26.1	2.0
CHEMICAL OXYGEN DEMAND <sup>a</sup>	mg/L	CLOSED REFLUX, COLOURIMETRIC METHOD (SM: PART 5220 D)	76.8	25.0
TOTAL DISSOLVED SOLIDS <sup>b</sup>	mg/L	DRIED AT 180 °C (SM: PART 2540 C)	148	25
HYDROGEN SULPHIDE <sup>c</sup>	mg/L H <sub>2</sub> S	IODOMETRIC METHOD (SM: PART 4500-S <sup>2-</sup> F)	< 0.53	0.53
TOTAL KJELDAHL NITROGEN <sup>c</sup>	mg/L	SEM-MICRO-KJELDAHL METHOD (SM: PART 4500-Norg C)	< LOQ	1.5
OIL AND GREASE <sup>c</sup>	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM: PART 5520 B)	ND	3
SODIUM ADSORPTION RATIO <sup>c</sup>	-	INDUCTIVELY COUPLED PLASMA (ICP) AND CALCULATION METHOD	0.280	-
<b>METALS</b>				
ARSENIC <sup>c</sup>	mg/L As	DIGESTION, HYDRIDE GENERATION/ATOMIC ABSORPTION SPECTROMETRIC METHOD (SM: PART 3114 C)	ND	0.0003
CADMIUM <sup>c</sup>	mg/L Cd	DIGESTION, DIRECT AIR-ACETYLENE FLAME METHOD (SM: PART 3030 E AND PART 3111 B)	ND	0.005
LEAD <sup>c</sup>	mg/L Pb	DIGESTION, DIRECT AIR-ACETYLENE FLAME METHOD (SM: PART 3030 E AND PART 3111 B)	ND	0.020



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			ป้อนค่าปดน้ำเค็มแบบ ไพธากาสปอแรก (W2) T24AM983-0002	
MERCURY <sup>c</sup>	mg/L Hg	DIGESTION, COLD-VAPOUR ATOMIC ABSORPTION SPECTROMETRIC METHOD (SM: PART 3112 B)	ND	0.0005
<b>SAMPLE CONDITION</b> WATER'S COLOUR/TURBID SEDIMENT			YELLOW/TURBID BROWN	

<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, 24<sup>th</sup> EDITION, 2023.

ND : NOT DETECTED.

< LOQ : < LIMIT OF QUANTITATION (TOTAL KJELDAHL NITROGEN  $\geq 1.5$  AND < 5.0 mg/L).

*Bhuchonk p.*

(MR BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR

บ่อพักน้ำทิ้ง (W3)

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## ANALYSIS REPORT

**PROJECT NAME** : โครงการโรงไฟฟ้าชีวมวล  
**CUSTOMER NAME** : THAI ROONG RUANG INDUSTRY CO., LTD.  
**ADDRESS** : 89 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210  
**CONTACT INFORMATION** : TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com  
**SAMPLING SOURCE** : โรงไฟฟ้าชีวมวล สกลนคร  
**SAMPLE TYPE** : EFFLUENT  
**SAMPLING DATE** : JANUARY 18, 2024  
**SAMPLING TIME** : 09:40 HOUR  
**SAMPLING METHOD** : GRAB  
**SAMPLING BY** : MR APISIT SRIKONGKAEW  
**ANALYZED BY** : MISS AKSARIN BUNKONG  
**RECEIVED DATE** : JANUARY 19, 2024  
**ANALYTICAL DATE** : JANUARY 19-27, 2024  
**ISSUE DATE** : FEBRUARY 1, 2024  
**REPORT NO.** : 2024-U008845  
**WORK NO.** : 2023-008918  
**ANALYSIS NO.** : T24AB167-0003

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			บอพักน้ำทิ้ง (W3) T24AB167-0003		
pH <sup>a</sup>	-	ELECTROMETRIC METHOD AT SITE (SM: PART 4500-H* B)	8.5 (24°C)	5.5-9.0	-
TEMPERATURE <sup>c</sup>	°C	LABORATORY AND FIELD METHODS (SM: PART 2550 B)	24	≤ 40	-
ELECTRICAL CONDUCTIVITY <sup>c</sup>	µS/cm	ELECTRICAL CONDUCTIVITY METHOD AT SITE (SM: PART 2510 B)	236 (24°C)	-	0.1
BIOCHEMICAL OXYGEN DEMAND <sup>a</sup>	mg/L	5-DAY BOD TEST, MEMBRANE ELECTRODE METHOD (SM: PART 5210 B AND PART 4500-O G)	3.2	≤ 20	2.0
CHEMICAL OXYGEN DEMAND <sup>a</sup>	mg/L	CLOSED REFLUX, COLOURIMETRIC METHOD (SM: PART 5220 D)	51.8	≤ 120	25.0
TOTAL DISSOLVED SOLIDS <sup>b</sup>	mg/L	DRIED AT 180 °C (SM: PART 2540 C)	149	≤ 3,000	25
HYDROGEN SULPHIDE <sup>c</sup>	mg/L H <sub>2</sub> S	ZnS PRECIPITATION, IODOMETRIC METHOD (SM: PART 4500-S <sup>2</sup> - F)	< 0.53	-	0.53
TOTAL KJELDAHL NITROGEN <sup>c</sup>	mg/L	DIGESTION, DISTILLATION, TITRIMETRIC METHOD (SM: PART 4500-Norg C)	< LOQ	≤ 100	1.5
OIL AND GREASE <sup>c</sup>	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM: PART 5520 B)	ND	≤ 5	3
SODIUM ADSORPTION RATIO <sup>a</sup>	-	INDUCTIVELY COUPLED PLASMA (ICP) AND CALCULATION METHOD	0.159	-	-
METALS					
ARSENIC <sup>c</sup>	mg/L As	DIGESTION, HYDRIDE GENERATION/ATOMIC ABSORPTION SPECTROMETRIC METHOD (SM: PART 3114 C)	0.0007	≤ 0.25	0.0003
CADMIUM <sup>c</sup>	mg/L Cd	DIGESTION, DIRECT AIR-ACETYLENE FLAME METHOD (SM: PART 3030 E AND PART 3111 B)	ND	≤ 0.03	0.002
LEAD <sup>c</sup>	mg/L Pb	DIGESTION, DIRECT AIR-ACETYLENE FLAME METHOD (SM: PART 3030 E AND PART 3111 B)	ND	≤ 0.2	0.015



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			บอพักน้ำหัง (W3) T24AB167-0003		
MERCURY <sup>c</sup>	mg/L Hg	DIGESTION, COLD-VAPOUR ATOMIC ABSORPTION SPECTROMETRIC METHOD (SM: PART 3112 B)	ND	≤ 0.005	0.0005
<b>SAMPLE CONDITION</b> WATER'S COLOUR/TURBID SEDIMENT			YELLOW/TURBID BROWN		

<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.

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 ≥ 1.5 AND < 5.0 mg/L).

*Bhuchonk p.*

(MR BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR

FEBRUARY 5, 2024

## ANALYSIS REPORT

**PROJECT NAME** : โครงการโรงไฟฟ้าชีวมวล  
**CUSTOMER NAME** : THAI ROONG RUANG INDUSTRY CO., LTD.  
**ADDRESS** : 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210  
**CONTACT INFORMATION** : TEL : 09 5665 0649 e-mail : piyawan.pan@trgroup.com  
**SAMPLING SOURCE** : โรงไฟฟ้าชีวมวล สกลนคร  
**SAMPLE TYPE** : EFFLUENT  
**SAMPLING DATE** : FEBRUARY 14, 2024  
**SAMPLING TIME** : 09:40 HOUR  
**SAMPLING METHOD** : GRAB  
**SAMPLING BY** : MR APISIT SRIKONGKAEW  
**ANALYZED BY** : MISS KALLAYA SOMPHONG

**RECEIVED DATE** : FEBRUARY 15, 2024  
**ANALYTICAL DATE** : FEBRUARY 15-27, 2024  
**ISSUE DATE** : MARCH 5, 2024  
**REPORT NO.** : 2024-U017603  
**WORK NO.** : 2023-008918  
**ANALYSIS NO.** : T24AD045-0003

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			บอพักน้ำหัง (W3) T24AD045-0003		
pH <sup>a</sup>	-	ELECTROMETRIC METHOD AT SITE (SM: PART 4500-H <sup>+</sup> B)	8.4 (24°C)	5.5-9.0	-
TEMPERATURE <sup>c</sup>	°C	LABORATORY AND FIELD METHODS (SM: PART 2550 B)	24	≤ 40	-
ELECTRICAL CONDUCTIVITY <sup>c</sup>	μS/cm	ELECTRICAL CONDUCTIVITY METHOD AT SITE (SM: PART 2510 B)	243 (24°C)	-	0.1
BIOCHEMICAL OXYGEN DEMAND <sup>a</sup>	mg/L	5-DAY BOD TEST, MEMBRANE ELECTRODE METHOD (SM: PART 5210 B AND PART 4500-O G)	15.6	≤ 20	2.0
CHEMICAL OXYGEN DEMAND <sup>a</sup>	mg/L	CLOSED REFLUX, COLOURIMETRIC METHOD (SM: PART 5220 D)	41.6	≤ 120	25.0
TOTAL DISSOLVED SOLIDS <sup>b</sup>	mg/L	DRIED AT 180 °C (SM: PART 2540 C)	149	≤ 3,000	25
HYDROGEN SULPHIDE <sup>c</sup>	mg/L H <sub>2</sub> S	ZnS PRECIPITATION, IODOMETRIC METHOD (SM: PART 4500-S <sup>2-</sup> F)	< 0.53	-	0.53
SODIUM ADSORPTION RATIO <sup>c</sup>	-	INDUCTIVELY COUPLED PLASMA (ICP) AND CALCULATION METHOD	0.189	-	-
TOTAL KJELDAHL NITROGEN <sup>c</sup>	mg/L	DIGESTION, DISTILLATION, TITRIMETRIC METHOD (SM: PART 4500-Norg C)	< LOQ	≤ 100	1.5 <sup>+</sup>
OIL AND GREASE <sup>c</sup>	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM: PART 5520 B)	ND	≤ 5	3
METALS					
ARSENIC <sup>c</sup>	mg/L As	DIGESTION, HYDRIDE GENERATION/ATOMIC ABSORPTION SPECTROMETRIC METHOD (SM: PART 3114 C)	0.0011	≤ 0.25	0.0003
CADMIUM <sup>c</sup>	mg/L Cd	DIGESTION, DIRECT AIR-ACETYLENE FLAME METHOD (SM: PART 3030 E AND PART 3111 B)	ND	≤ 0.03	0.002
LEAD <sup>c</sup>	mg/L Pb	DIGESTION, DIRECT AIR-ACETYLENE FLAME METHOD (SM: PART 3030 E AND PART 3111 B)	ND	≤ 0.2	0.015



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			บอพักน้ำหัง (W3) T24AD045-0003		
MERCURY <sup>c</sup>	mg/L Hg	DIGESTION, COLD-VAPOUR ATOMIC ABSORPTION SPECTROMETRIC METHOD (SM: PART 3112 B)	ND	≤ 0.005	0.0005
<b>SAMPLE CONDITION</b> WATER'S COLOUR/TURBID SEDIMENT			YELLOW/TURBID 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.

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 ≥ 1.5 AND < 5.0 mg/L).

*Bhuchonk p.*

(MR BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR

MARCH 5, 2024

## ANALYSIS REPORT

<b>PROJECT NAME</b>	: โครงการโรงไฟฟ้าชีวมวล	<b>RECEIVED DATE</b>	: MARCH 13, 2024
<b>CUSTOMER NAME</b>	: THAI ROONG RUANG INDUSTRY CO., LTD.	<b>ANALYTICAL DATE</b>	: MARCH 13-30, 2024
<b>ADDRESS</b>	: 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210	<b>ISSUE DATE</b>	: APRIL 5, 2024
<b>CONTACT INFORMATION</b>	: TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com	<b>REPORT NO.</b>	: 2024-U028928
<b>SAMPLING SOURCE</b>	: โรงไฟฟ้าชีวมวล สกลนคร	<b>WORK NO.</b>	: 2023-008918
<b>SAMPLE TYPE</b>	: EFFLUENT	<b>ANALYSIS NO.</b>	: T24AF191-0003
<b>SAMPLING DATE</b>	: MARCH 12, 2024		
<b>SAMPLING TIME</b>	: 11:00 HOUR		
<b>SAMPLING METHOD</b>	: GRAB		
<b>SAMPLING BY</b>	: MR APISIT SRIKONGKAEW		
<b>ANALYZED BY</b>	: MISS AKSARIN BUNKONG		

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			บอพักน้ำทิ้ง (W3) T24AF191-0003		
pH <sup>a</sup>	-	ELECTROMETRIC METHOD AT SITE (SM: PART 4500-H <sup>+</sup> B)	8.7 (26°C)	5.5-9.0	-
TEMPERATURE <sup>c</sup>	°C	LABORATORY AND FIELD METHODS (SM: PART 2550 B)	26	≤ 40	-
ELECTRICAL CONDUCTIVITY <sup>c</sup>	µS/cm	ELECTRICAL CONDUCTIVITY METHOD AT SITE (SM: PART 2510 B)	265 (26°C)	-	0.1
BIOCHEMICAL OXYGEN DEMAND <sup>a</sup>	mg/L	5-DAY BOD TEST, MEMBRANE ELECTRODE METHOD (SM: PART 5210 B AND PART 4500-O G)	2.4	≤ 20	2.0
CHEMICAL OXYGEN DEMAND <sup>a</sup>	mg/L	CLOSED REFLUX, COLOURIMETRIC METHOD (SM: PART 5220 D)	70.7	≤ 120	25.0
TOTAL DISSOLVED SOLIDS <sup>b</sup>	mg/L	DRIED AT 180 °C (SM: PART 2540 C)	166	≤ 3,000	25
HYDROGEN SULPHIDE <sup>c</sup>	mg/L H <sub>2</sub> S	ZnS PRECIPITATION, IODOMETRIC METHOD (SM: PART 4500-S <sup>2-</sup> F)	< 0.53	-	0.53
SODIUM ADSORPTION RATIO <sup>c</sup>	-	INDUCTIVELY COUPLED PLASMA (ICP) AND CALCULATION METHOD	0.185	-	-
TOTAL KJELDAHL NITROGEN <sup>c</sup>	mg/L	DIGESTION, DISTILLATION, TITRIMETRIC METHOD (SM: PART 4500-Norg C)	< LOQ	≤ 100	1.5
OIL AND GREASE <sup>c</sup>	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM: PART 5520 B)	ND	≤ 5	3
METALS					
ARSENIC <sup>c</sup>	mg/L As	DIGESTION, HYDRIDE GENERATION/ATOMIC ABSORPTION SPECTROMETRIC METHOD (SM: PART 3114 C)	0.0015	≤ 0.25	0.0003
CADMIUM <sup>c</sup>	mg/L Cd	DIGESTION, DIRECT AIR-ACETYLENE FLAME METHOD (SM: PART 3030 E AND PART 3111 B)	ND	≤ 0.03	0.002
LEAD <sup>c</sup>	mg/L Pb	DIGESTION, DIRECT AIR-ACETYLENE FLAME METHOD (SM: PART 3030 E AND PART 3111 B)	ND	≤ 0.2	0.015



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			บ่อพักน้ำทิ้ง (W3) T24AF191-0003		
MERCURY <sup>c</sup>	mg/L Hg	DIGESTION, COLD-VAPOUR ATOMIC ABSORPTION SPECTROMETRIC METHOD (SM: PART 3112 B)	ND	≤ 0.005	0.0005
<b>SAMPLE CONDITION</b> WATER'S COLOUR/TURBID SEDIMENT			YELLOW/TURBID BROWN		

<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.

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 ≥ 1.5 AND < 5.0 mg/L).

*Bhuchonk p.*

(MR BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR

APRIL 8, 2024

## ANALYSIS REPORT

**PROJECT NAME** : โครงการโรงไฟฟ้าชีวมวล  
**CUSTOMER NAME** : THAI ROONG RUANG INDUSTRY CO., LTD.  
**ADDRESS** : 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210  
**CONTACT INFORMATION** : TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com  
**SAMPLING SOURCE** : โรงไฟฟ้าชีวมวล สกลนคร  
**SAMPLE TYPE** : EFFLUENT  
**SAMPLING DATE** : APRIL 9, 2024  
**SAMPLING TIME** : 09:10 HOUR  
**SAMPLING METHOD** : GRAB  
**SAMPLING BY** : MR APISIT SRIKONGKAEW  
**ANALYZED BY** : MISS AKSARIN BUNKONG  
**RECEIVED DATE** : APRIL 10, 2024  
**ANALYTICAL DATE** : APRIL 10-26, 2024  
**ISSUE DATE** : MAY 23, 2024  
**REPORT NO.** : 2024-U042211  
**WORK NO.** : 2023-008918  
**ANALYSIS NO.** : T24AH647-0003

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			บ่อพักน้ำทิ้ง (W3) T24AH647-0003		
pH	-	ELECTROMETRIC METHOD AT SITE (SM: PART 4500-H <sup>+</sup> B)	8.7 (30°C)	5.5-9.0	-
TEMPERATURE	°C	LABORATORY AND FIELD METHODS (SM: PART 2550 B)	30	≤ 40	-
ELECTRICAL CONDUCTIVITY	µS/cm	ELECTRICAL CONDUCTIVITY METHOD AT SITE (SM: PART 2510 B)	329 (30°C)	-	0.1
BIOCHEMICAL OXYGEN DEMAND	mg/L	5-DAY BOD TEST, MEMBRANE ELECTRODE METHOD (SM: PART 5210 B AND PART 4500-O G)	14.9	≤ 20	2.0
CHEMICAL OXYGEN DEMAND <sup>A</sup>	mg/L	CLOSED REFLUX, COLOURIMETRIC METHOD (SM: PART 5220 D)	34.2	≤ 120	25.0
TOTAL DISSOLVED SOLIDS	mg/L	DRIED AT 180 °C (SM: PART 2540 C)	271	≤ 3,000	25
HYDROGEN SULPHIDE	mg/L H <sub>2</sub> S	ZnS PRECIPITATION, IODOMETRIC METHOD (SM: PART 4500-S <sup>2-</sup> F)	< 0.53	-	0.53
SODIUM ADSORPTION RATIO	-	INDUCTIVELY COUPLED PLASMA (ICP) AND CALCULATION METHOD	0.456	-	-
TOTAL KJELDAHL NITROGEN	mg/L	DIGESTION, DISTILLATION, TITRIMETRIC METHOD (SM: PART 4500-Norg C)	6.8	≤ 100	1.5
OIL AND GREASE	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM: PART 5520 B)	ND	≤ 5	3
METALS					
ARSENIC	mg/L As	DIGESTION, HYDRIDE GENERATION/ATOMIC ABSORPTION SPECTROMETRIC METHOD (SM: PART 3114 C)	0.0012	≤ 0.25	0.0003
CADMIUM	mg/L Cd	DIGESTION, DIRECT AIR-ACETYLENE FLAME METHOD (SM: PART 3030 E AND PART 3111 B)	ND	≤ 0.03	0.002
LEAD	mg/L Pb	DIGESTION, DIRECT AIR-ACETYLENE FLAME METHOD (SM: PART 3030 E AND PART 3111 B)	ND	≤ 0.2	0.015



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			บอพักน้ำหัง (W3) T24AH647-0003		
MERCURY	mg/L Hg	DIGESTION, COLD-VAPOUR ATOMIC ABSORPTION SPECTROMETRIC METHOD (SM: PART 3112 B)	ND	≤ 0.005	0.0005
<b>SAMPLE CONDITION</b> WATER'S COLOUR/TURBID SEDIMENT			YELLOW/TURBID BROWN		

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

^ : SAMPLING BY CUSTOMER RECEIVE ON MAY 3, 2024, ANALYSIS NO. T24AJ238-0001 (ANALYTICAL DATE : MAY 3-8, 2024)

THE REASON FOR ISSUING THE NEW REPORT IS SUBSTITUTE RESULT.

SUBSTITUTED REPORT FOR REPORT NO. 2024-U036515, ISSUE DATED MAY 2, 2024.

*Bhuchonk p.*

(MR BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR

## ANALYSIS REPORT

**PROJECT NAME** : โครงการโรงไฟฟ้าชีวมวล  
**CUSTOMER NAME** : THAI ROONG RUANG INDUSTRY CO., LTD.  
**ADDRESS** : 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210  
**CONTACT INFORMATION** : TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com  
**SAMPLING SOURCE** : โรงไฟฟ้าชีวมวล สกลนคร  
**SAMPLE TYPE** : EFFLUENT  
**SAMPLING DATE** : MAY 15, 2024  
**SAMPLING TIME** : 09:50 HOUR  
**SAMPLING METHOD** : GRAB  
**SAMPLING BY** : MR TEERAPONG SRIKAMHANG  
**ANALYZED BY** : MISS AKSARIN BUNKONG  
**RECEIVED DATE** : MAY 16, 2024  
**ANALYTICAL DATE** : MAY 16-31, 2024  
**ISSUE DATE** : JUNE 7, 2024  
**REPORT NO.** : 2024-U048448  
**WORK NO.** : 2023-008918  
**ANALYSIS NO.** : T24AK356-0003

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			มอพักน้ำทิ้ง (W3) T24AK356-0003		
pH	-	ELECTROMETRIC METHOD AT SITE (SM: PART 4500-H <sup>+</sup> B)	8.4 (33°C)	5.5-9.0	-
TEMPERATURE	°C	LABORATORY AND FIELD METHODS (SM: PART 2550 B)	33	≤ 40	-
ELECTRICAL CONDUCTIVITY	µS/cm	ELECTRICAL CONDUCTIVITY METHOD AT SITE (SM: PART 2510 B)	308 (33°C)	-	0.1
SODIUM ADSORPTION RATIO	-	INDUCTIVELY COUPLED PLASMA (ICP) AND CALCULATION METHOD	0.310	-	-
BIOCHEMICAL OXYGEN DEMAND	mg/L	5-DAY BOD TEST, MEMBRANE ELECTRODE METHOD (SM: PART 5210 B AND PART 4500-O G)	2.4	≤ 20	2.0
CHEMICAL OXYGEN DEMAND	mg/L	CLOSED REFLUX, COLOURIMETRIC METHOD (SM: PART 5220 D)	48.5	≤ 120	25.0
TOTAL DISSOLVED SOLIDS	mg/L	DRIED AT 180 °C (SM: PART 2540 C)	194	≤ 3,000	25
HYDROGEN SULPHIDE	mg/L H <sub>2</sub> S	ZnS PRECIPITATION, IODOMETRIC METHOD (SM: PART 4500-S <sub>2</sub> F)	< 0.53	-	0.53
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
METALS					
ARSENIC	mg/L As	DIGESTION, HYDRIDE GENERATION/ATOMIC ABSORPTION SPECTROMETRIC METHOD (SM: PART 3114 C)	0.0004	≤ 0.25	0.0003
CADMIUM	mg/L Cd	DIGESTION, DIRECT AIR-ACETYLENE FLAME METHOD (SM: PART 3030 E AND PART 3111 B)	ND	≤ 0.03	0.002
LEAD	mg/L Pb	DIGESTION, DIRECT AIR-ACETYLENE FLAME METHOD (SM: PART 3030 E AND PART 3111 B)	ND	≤ 0.2	0.015



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			มอฬักน้ำหัง (W3) T24AK356-0003		
MERCURY	mg/L Hg	DIGESTION, COLD-VAPOUR ATOMIC ABSORPTION SPECTROMETRIC METHOD (SM: PART 3112 B)	ND	≤ 0.005	0.0005
<b>SAMPLE CONDITION</b> WATER'S COLOUR/TURBID SEDIMENT			YELLOW/TURBID BROWN		

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23<sup>rd</sup> 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 ≥ 1.5 AND < 5.0 mg/L).

*Bhuchonk p.*

(MR BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR

## ANALYSIS REPORT

<b>PROJECT NAME</b>	: โครงการโรงไฟฟ้าชีวมวล	<b>RECEIVED DATE</b>	: JUNE 13, 2024
<b>CUSTOMER NAME</b>	: THAI ROONG RUANG INDUSTRY CO., LTD.	<b>ANALYTICAL DATE</b>	: JUNE 13-28, 2024
<b>ADDRESS</b>	: 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210	<b>ISSUE DATE</b>	: JULY 1, 2024
<b>CONTACT INFORMATION</b>	: TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com	<b>REPORT NO.</b>	: 2024-U059032
<b>SAMPLING SOURCE</b>	: โรงไฟฟ้าชีวมวล สกลนคร	<b>WORK NO.</b>	: 2023-008918
<b>SAMPLE TYPE</b>	: EFFLUENT	<b>ANALYSIS NO.</b>	: T24AM983-0003
<b>SAMPLING DATE</b>	: JUNE 12, 2024		
<b>SAMPLING TIME</b>	: 10:20 HOUR		
<b>SAMPLING METHOD</b>	: GRAB		
<b>SAMPLING BY</b>	: MR TEERAPONG SRIKAMHANG		
<b>ANALYZED BY</b>	: MISS AKSARIN BUNKONG		

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			ปกติหน้าห้อง (W3) T24AM983-0003		
pH <sup>a</sup>	-	ELECTROMETRIC METHOD (AT SITE) SM: PART 4500-H <sup>+</sup> B AND 1060 B	8.3 (31°C)	5.5-9.0	-
TEMPERATURE <sup>c</sup>	°C	LABORATORY AND FIELD METHODS (SM: PART 2550 B)	31	≤ 40	-
ELECTRICAL CONDUCTIVITY <sup>b</sup>	µS/cm	ELECTRICAL CONDUCTIVITY METHOD (AT SITE) SM: PART 2510 B AND 1060 B	124 (31°C)	-	0.1
BIOCHEMICAL OXYGEN DEMAND <sup>a</sup>	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 <sup>a</sup>	mg/L	CLOSED REFLUX, COLOURIMETRIC METHOD (SM: PART 5220 D)	51.0	≤ 120	25.0
TOTAL DISSOLVED SOLIDS <sup>b</sup>	mg/L	DRIED AT 180 °C (SM: PART 2540 C)	94	≤ 3,000	25
HYDROGEN SULPHIDE <sup>c</sup>	mg/L H <sub>2</sub> S	IODOMETRIC METHOD (SM: PART 4500-S <sub>2</sub> -F)	< 0.53	-	0.53
TOTAL KJELDAHL NITROGEN <sup>c</sup>	mg/L	SEMI-MICRO-KJELDAHL METHOD (SM: PART 4500-Norg C)	< LOQ	≤ 100	15
OIL AND GREASE <sup>c</sup>	mg/L	LIQUID-LIQUID, PARTITION-GRAVIMETRIC METHOD (SM: PART 5520 B)	ND	≤ 5	3
SODIUM ADSORPTION RATIO <sup>c</sup>	-	INDUCTIVELY COUPLED PLASMA (ICP) AND CALCULATION METHOD	0.357	-	-
<b>METALS</b>					
ARSENIC <sup>c</sup>	mg/L As	DIGESTION, HYDRIDE GENERATION/ATOMIC ABSORPTION SPECTROMETRIC METHOD (SM: PART 3114 C)	ND	≤ 0.25	0.0003
CADMIUM <sup>c</sup>	mg/L Cd	DIGESTION, DIRECT AIR-ACETYLENE FLAME METHOD (SM: PART 3030 E AND PART 3111 B)	ND	≤ 0.03	0.005
LEAD <sup>c</sup>	mg/L Pb	DIGESTION, DIRECT AIR-ACETYLENE FLAME METHOD (SM: PART 3030 E AND PART 3111 B)	ND	≤ 0.2	0.020





United Analyst and Engineering Consultant Co., Ltd.

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NSC-TISI-TIS 17025  
TESTING 0207



TESTING  
No. 0063

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			แปลอังกฤษ (W3) T24AM983-0003		
MERCURY <sup>c</sup>	mg/L Hg	DIGESTION, COLD-VAPOUR ATOMIC ABSORPTION SPECTROMETRIC METHOD (SM: PART 3112 B)	ND	≤ 0.005	0.0005
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			YELLOW/TURBID BROWN		

<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, 24<sup>th</sup> 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.

< LOQ : < LIMIT OF QUANTITATION (TOTAL KJELDAHL NITROGEN ≥ 1.5 AND < 5.0 mg/L).

*Bhuchonk p.*

(MR BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR

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

2/2

2024-U059032

- End of Analysis Report -

บ่อพักน้ำทิ้ง (W4)

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## ANALYSIS REPORT

**PROJECT NAME** : โครงการโรงไฟฟ้าชีวมวล  
**CUSTOMER NAME** : THAI ROONG RUANG INDUSTRY CO., LTD.  
**ADDRESS** : 89 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210  
**CONTACT INFORMATION** : TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com  
**SAMPLING SOURCE** : โรงไฟฟ้าชีวมวล สกลนคร  
**SAMPLE TYPE** : EFFLUENT  
**SAMPLING DATE** : JANUARY 18, 2024  
**SAMPLING TIME** : 09:15 HOUR  
**SAMPLING METHOD** : GRAB  
**SAMPLING BY** : MR APISIT SRIKONGKAEW  
**ANALYZED BY** : MISS NAPAPORN KHUNNOKKHUM  
**RECEIVED DATE** : JANUARY 19, 2024  
**ANALYTICAL DATE** : JANUARY 19-26, 2024  
**ISSUE DATE** : FEBRUARY 1, 2024  
**REPORT NO.** : 2024-U008846  
**WORK NO.** : 2023-008918  
**ANALYSIS NO.** : T24AB167-0004

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			ผลพิกัดน้ำทิ้ง (W4) T24AB167-0004		
pH <sup>a</sup>	-	ELECTROMETRIC METHOD AT SITE (SM: PART 4500-H <sup>+</sup> B)	8.5 (24°C)	5.5-9.0	-
TEMPERATURE <sup>c</sup>	°C	LABORATORY AND FIELD METHODS (SM: PART 2550 B)	24	≤ 40	-
ELECTRICAL CONDUCTIVITY <sup>c</sup>	µS/cm	ELECTRICAL CONDUCTIVITY METHOD AT SITE (SM: PART 2510 B)	236 (24°C)	-	0.1
TOTAL DISSOLVED SOLIDS <sup>b</sup>	mg/L	DRIED AT 180 °C (SM: PART 2540 C)	151	≤ 3,000	25
SODIUM ADSORPTION RATIO <sup>c</sup>	-	INDUCTIVELY COUPLED PLASMA (ICP) AND CALCULATION METHOD	0.155	-	-
<b>METALS</b>					
CALCIUM <sup>c</sup>	mg/L Ca	DIGESTION, INDUCTIVELY COUPLED PLASMA METHOD (SM: PART 3030 F AND PART 3120 B)	17.8	-	0.010
MAGNESIUM <sup>c</sup>	mg/L Mg	DIGESTION, INDUCTIVELY COUPLED PLASMA METHOD (SM: PART 3030 F AND PART 3120 B)	5.47	-	0.010
SODIUM <sup>c</sup>	mg/L Na	DIGESTION, INDUCTIVELY COUPLED PLASMA METHOD (SM: PART 3030 F AND PART 3120 B)	2.92	-	0.010
<b>SAMPLE CONDITION</b>					
WATER'S COLOUR/TURBID			YELLOW/TURBID		
SEDIMENT			BROWN		

<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.

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.



(MR BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR

FEBRUARY 5, 2024



## ANALYSIS REPORT

**PROJECT NAME** : โครงการโรงไฟฟ้าชีวมวล  
**CUSTOMER NAME** : THAI ROONG RUANG INDUSTRY CO., LTD.  
**ADDRESS** : 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210  
**CONTACT INFORMATION** : TEL : 09 5665 0649 e-mail : piyawan.pan@trgroup.com  
**SAMPLING SOURCE** : โรงไฟฟ้าชีวมวล สกลนคร  
**SAMPLE TYPE** : EFFLUENT  
**SAMPLING DATE** : FEBRUARY 14, 2024  
**SAMPLING TIME** : 09:50 HOUR  
**SAMPLING METHOD** : GRAB  
**SAMPLING BY** : MR APISIT SRIKONGKAEW  
**ANALYZED BY** : MISS NAPAPORN KHUNNOKKHUM

**RECEIVED DATE** : FEBRUARY 15, 2024  
**ANALYTICAL DATE** : FEBRUARY 15-23, 2024  
**ISSUE DATE** : MARCH 5, 2024  
**REPORT NO.** : 2024-U017604  
**WORK NO.** : 2023-008918  
**ANALYSIS NO.** : T24AD045-0004

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			บอพักน้ำหึ่ง (W4) T24AD045-0004		
pH <sup>a</sup>	-	ELECTROMETRIC METHOD AT SITE (SM: PART 4500-H <sup>+</sup> B)	8.3 (25°C)	5.5-9.0	-
TEMPERATURE <sup>c</sup>	°C	LABORATORY AND FIELD METHODS (SM: PART 2550 B)	25	≤ 40	-
ELECTRICAL CONDUCTIVITY <sup>c</sup>	µS/cm	ELECTRICAL CONDUCTIVITY METHOD AT SITE (SM: PART 2510 B)	272 (25°C)	-	0.1
TOTAL DISSOLVED SOLIDS <sup>b</sup>	mg/L	DRIED AT 180 °C (SM: PART 2540 C)	177	≤ 3,000	25
SODIUM ADSORPTION RATIO <sup>c</sup>	-	INDUCTIVELY COUPLED PLASMA (ICP) AND CALCULATION METHOD	0.156	-	-
METALS					
CALCIUM <sup>c</sup>	mg/L Ca	DIGESTION, INDUCTIVELY COUPLED PLASMA METHOD (SM: PART 3030 F AND PART 3120 B)	20.9	-	0.010
MAGNESIUM <sup>c</sup>	mg/L Mg	DIGESTION, INDUCTIVELY COUPLED PLASMA METHOD (SM: PART 3030 F AND PART 3120 B)	6.20	-	0.010
SODIUM <sup>c</sup>	mg/L Na	DIGESTION, INDUCTIVELY COUPLED PLASMA METHOD (SM: PART 3030 F AND PART 3120 B)	3.16	-	0.010
<b>SAMPLE CONDITION</b> WATER'S COLOUR/TURBID SEDIMENT			YELLOW/TURBID BROWN		

<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.

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.



(MR BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR

MARCH 5, 2024



## ANALYSIS REPORT

**PROJECT NAME** : โครงการโรงไฟฟ้าชีวมวล  
**CUSTOMER NAME** : THAI ROONG RUANG INDUSTRY CO., LTD.  
**ADDRESS** : 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210  
**CONTACT INFORMATION** : TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com  
**SAMPLING SOURCE** : โรงไฟฟ้าชีวมวล สกลนคร  
**SAMPLE TYPE** : EFFLUENT  
**SAMPLING DATE** : MARCH 12, 2024  
**SAMPLING TIME** : 11:30 HOUR  
**SAMPLING METHOD** : GRAB  
**SAMPLING BY** : MR APISIT SRIKONGKAEW  
**ANALYZED BY** : MISS NAPAPORN KHUNNOKKHUM  
**RECEIVED DATE** : MARCH 13, 2024  
**ANALYTICAL DATE** : MARCH 13-22, 2024  
**ISSUE DATE** : APRIL 5, 2024  
**REPORT NO.** : 2024-U028929  
**WORK NO.** : 2023-008918  
**ANALYSIS NO.** : T24AF191-0004

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			บอพักน้ำทิ้ง (W4) T24AF191-0004		
pH <sup>a</sup>	-	ELECTROMETRIC METHOD AT SITE (SM: PART 4500-H <sup>+</sup> B)	8.1 (25°C)	5.5-9.0	-
TEMPERATURE <sup>c</sup>	°C	LABORATORY AND FIELD METHODS (SM: PART 2550 B)	25	≤ 40	-
ELECTRICAL CONDUCTIVITY <sup>c</sup>	µS/cm	ELECTRICAL CONDUCTIVITY METHOD AT SITE (SM: PART 2510 B)	320 (25°C)	-	0.1
TOTAL DISSOLVED SOLIDS <sup>b</sup>	mg/L	DRIED AT 180 °C (SM: PART 2540 C)	210	≤ 3,000	25
SODIUM ADSORPTION RATIO <sup>c</sup>	-	INDUCTIVELY COUPLED PLASMA (ICP) AND CALCULATION METHOD	0.197	-	-
<b>METALS</b>					
CALCIUM <sup>c</sup>	mg/L Ca	DIGESTION, INDUCTIVELY COUPLED PLASMA METHOD (SM: PART 3030 F AND PART 3120 B)	30.5	-	0.010
MAGNESIUM <sup>c</sup>	mg/L Mg	DIGESTION, INDUCTIVELY COUPLED PLASMA METHOD (SM: PART 3030 F AND PART 3120 B)	9.89	-	0.010
SODIUM <sup>c</sup>	mg/L Na	DIGESTION, INDUCTIVELY COUPLED PLASMA METHOD (SM: PART 3030 F AND PART 3120 B)	4.89	-	0.010
<b>SAMPLE CONDITION</b> WATER'S COLOUR/TURBID SEDIMENT			YELLOW/TURBID BROWN		


<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.

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.

  
(MR BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR

APRIL 8, 2024



## ANALYSIS REPORT

**PROJECT NAME** : โครงการโรงไฟฟ้าชีวมวล  
**CUSTOMER NAME** : THAI ROONG RUANG INDUSTRY CO., LTD.  
**ADDRESS** : 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210  
**CONTACT INFORMATION** : TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com  
**SAMPLING SOURCE** : โรงไฟฟ้าชีวมวล สกลนคร  
**SAMPLE TYPE** : EFFLUENT  
**SAMPLING DATE** : APRIL 9, 2024  
**SAMPLING TIME** : 09:40 HOUR  
**SAMPLING METHOD** : GRAB  
**SAMPLING BY** : MR APISIT SRIKONGKAEW  
**ANALYZED BY** : MISS NAPAPORN KHUNNOKKHUM  
**RECEIVED DATE** : APRIL 10, 2024  
**ANALYTICAL DATE** : APRIL 10-22, 2024  
**ISSUE DATE** : MAY 2, 2024  
**REPORT NO.** : 2024-U036517  
**WORK NO.** : 2023-008918  
**ANALYSIS NO.** : T24AH647-0004

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			ผลพิกษาหึ่ง (W4) T24AH647-0004		
pH <sup>a</sup>	-	ELECTROMETRIC METHOD AT SITE (SM: PART 4500-H <sup>+</sup> B)	8.7 (31°C)	5.5-9.0	-
TEMPERATURE <sup>c</sup>	°C	LABORATORY AND FIELD METHODS (SM: PART 2550 B)	31	≤ 40	-
ELECTRICAL CONDUCTIVITY <sup>c</sup>	µS/cm	ELECTRICAL CONDUCTIVITY METHOD AT SITE (SM: PART 2510 B)	309 (31°C)	-	0.1
TOTAL DISSOLVED SOLIDS <sup>b</sup>	mg/L	DRIED AT 180 °C (SM: PART 2540 C)	235	≤ 3,000	25
SODIUM ADSORPTION RATIO <sup>c</sup>	-	INDUCTIVELY COUPLED PLASMA (ICP) AND CALCULATION METHOD	0.241	-	-
METALS					
CALCIUM <sup>c</sup>	mg/L Ca	DIGESTION, INDUCTIVELY COUPLED PLASMA METHOD (SM: PART 3030 F AND PART 3120 B)	11.8	-	0.010
MAGNESIUM <sup>c</sup>	mg/L Mg	DIGESTION, INDUCTIVELY COUPLED PLASMA METHOD (SM: PART 3030 F AND PART 3120 B)	5.90	-	0.010
SODIUM <sup>c</sup>	mg/L Na	DIGESTION, INDUCTIVELY COUPLED PLASMA METHOD (SM: PART 3030 F AND PART 3120 B)	4.06	-	0.010
<b>SAMPLE CONDITION</b>					
WATER'S COLOUR/TURBID			YELLOW/TURBID		
SEDIMENT			BROWN		

<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.

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.



(MR BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR



## ANALYSIS REPORT

**PROJECT NAME** : โครงการโรงไฟฟ้าชีวมวล  
**CUSTOMER NAME** : THAI ROONG RUANG INDUSTRY CO., LTD.  
**ADDRESS** : 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210  
**CONTACT INFORMATION** : TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com  
**SAMPLING SOURCE** : โรงไฟฟ้าชีวมวล สกลนคร  
**SAMPLE TYPE** : EFFLUENT  
**SAMPLING DATE** : MAY 15, 2024  
**SAMPLING TIME** : 10:10 HOUR  
**SAMPLING METHOD** : GRAB  
**SAMPLING BY** : MR TEERAPONG SRIKAMHANG  
**ANALYZED BY** : MISS NAPAPORN KHUNNOKKHUM

**RECEIVED DATE** : MAY 16, 2024  
**ANALYTICAL DATE** : MAY 16-24, 2024  
**ISSUE DATE** : JUNE 7, 2024  
**REPORT NO.** : 2024-U048449  
**WORK NO.** : 2023-008918  
**ANALYSIS NO.** : T24AK356-0004

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			แปลทกน้ำหึ่ง (W4) T24AK356-0004		
pH	-	ELECTROMETRIC METHOD AT SITE (SM: PART 4500-H <sup>+</sup> B)	8.4 (33°C)	5.5-9.0	-
TEMPERATURE	°C	LABORATORY AND FIELD METHODS (SM: PART 2550 B)	33	≤ 40	-
ELECTRICAL CONDUCTIVITY	µS/cm	ELECTRICAL CONDUCTIVITY METHOD AT SITE (SM: PART 2510 B)	308 (33°C)	-	0.1
TOTAL DISSOLVED SOLIDS	mg/L	DRIED AT 180 °C (SM: PART 2540 C)	183	≤ 3,000	25
SODIUM ADSORPTION RATIO	-	INDUCTIVELY COUPLED PLASMA (ICP) AND CALCULATION METHOD	0.213	-	-
<b>METALS</b>					
CALCIUM	mg/L Ca	DIGESTION, INDUCTIVELY COUPLED PLASMA METHOD (SM: PART 3030 F AND PART 3120 B)	11.5	-	0.010
MAGNESIUM	mg/L Mg	DIGESTION, INDUCTIVELY COUPLED PLASMA METHOD (SM: PART 3030 F AND PART 3120 B)	5.65	-	0.010
SODIUM	mg/L Na	DIGESTION, INDUCTIVELY COUPLED PLASMA METHOD (SM: PART 3030 F AND PART 3120 B)	3.53	-	0.010
<b>SAMPLE CONDITION</b>					
WATER'S COLOUR/TURBID			YELLOW/TURBID		
SEDIMENT			BROWN		

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



(MR BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR



## ANALYSIS REPORT

<b>PROJECT NAME</b>	: โครงการโรงไฟฟ้าชีวมวล	<b>RECEIVED DATE</b>	: JUNE 13, 2024
<b>CUSTOMER NAME</b>	: THAI ROONG RUANG INDUSTRY CO., LTD.	<b>ANALYTICAL DATE</b>	: JUNE 13-28, 2024
<b>ADDRESS</b>	: 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210	<b>ISSUE DATE</b>	: JULY 1, 2024
<b>CONTACT INFORMATION</b>	: TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com	<b>REPORT NO.</b>	: 2024-U059033
<b>SAMPLING SOURCE</b>	: โรงไฟฟ้าชีวมวล สกลนคร	<b>WORK NO.</b>	: 2023-008918
<b>SAMPLE TYPE</b>	: EFFLUENT	<b>ANALYSIS NO.</b>	: T24AM983-0004
<b>SAMPLING DATE</b>	: JUNE 12, 2024		
<b>SAMPLING TIME</b>	: 10:40 HOUR		
<b>SAMPLING METHOD</b>	: GRAB		
<b>SAMPLING BY</b>	: MR TEERAPONG SRIKAMHANG		
<b>ANALYZED BY</b>	: MISS NAPAPORN KHUNNOKKHUM		

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD	DETECTION LIMIT
			ปกติหน้าห้อง (W4) T24AM983-0004		
pH <sup>a</sup>	-	ELECTROMETRIC METHOD (AT SITE) SM: PART 4500-H <sup>+</sup> B AND 1060 B	8.1 (32°C)	5.5-9.0	-
TEMPERATURE <sup>c</sup>	°C	LABORATORY AND FIELD METHODS (SM: PART 2550 B)	32	≤ 40	-
ELECTRICAL CONDUCTIVITY <sup>b</sup>	µS/cm	ELECTRICAL CONDUCTIVITY METHOD (AT SITE) SM: PART 2510 B AND 1060 B	89.7 (32°C)	-	0.1
TOTAL DISSOLVED SOLIDS <sup>b</sup>	mg/L	DRIED AT 180 °C (SM: PART 2540 C)	58	≤ 3,000	25
SODIUM ADSORPTION RATIO <sup>c</sup>	-	INDUCTIVELY COUPLED PLASMA (ICP) AND CALCULATION METHOD	0.231	-	-
<b>METALS</b>					
CALCIUM <sup>c</sup>	mg/L Ca	DIGESTION, INDUCTIVELY COUPLED PLASMA METHOD (SM: PART 3030 F AND PART 3120 B)	5.52	-	0.010
MAGNESIUM <sup>c</sup>	mg/L Mg	DIGESTION, INDUCTIVELY COUPLED PLASMA METHOD (SM: PART 3030 F AND PART 3120 B)	1.36	-	0.010
SODIUM <sup>c</sup>	mg/L Na	DIGESTION, INDUCTIVELY COUPLED PLASMA METHOD (SM: PART 3030 F AND PART 3120 B)	2.34	-	0.010
<b>SAMPLE CONDITION</b>					
WATER'S COLOUR/TURBID			YELLOW/TURBID		
SEDIMENT			BROWN		

<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, 24<sup>th</sup> 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.



(MR BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR



ภาคผนวก ค-7

รายงานผลการติดตามตรวจสอบคุณภาพน้ำฝน

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## ANALYSIS REPORT

**PROJECT NAME** : โครงการโรงไฟฟ้าชีวมวล  
**CUSTOMER NAME** : THAI ROONG RUANG INDUSTRY CO., LTD.  
**ADDRESS** : 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210  
**CONTACT INFORMATION** : TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com  
**SAMPLING SOURCE** : ไทยรุ่งเรือง-น้ำตาล-สกลนคร  
**SAMPLE TYPE** : RAIN WATER  
**SAMPLING DATE** : MAY 15, 2024  
**SAMPLING TIME** : 11:30 HOUR  
**SAMPLING METHOD** : GRAB  
**SAMPLING BY** : MR TEERAPONG SRIKAMHANG  
**ANALYZED BY** : MISS SAMITTHA LACHIT  
**RECEIVED DATE** : MAY 16, 2024  
**ANALYTICAL DATE** : MAY 16-23, 2024  
**ISSUE DATE** : MAY 24, 2024  
**REPORT NO.** : 2024-U044874  
**WORK NO.** : 2023-008918  
**ANALYSIS NO.** : T24AK354-0001

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			บริเวณพื้นที่โครงการ T24AK354-0001	
pH	-	ELECTROMETRIC METHOD (AT SITE) SM: PART 4500 -H <sup>+</sup> B AND 1060 B	7.8 (32°C)	-
TOTAL SUSPENDED SOLIDS	mg/L	TOTAL SUSPENDED SOLIDS DRIED AT 103-105 °C (SM: PART 2540 D)	ND	5.0
SULPHATE	mg/L SO <sub>4</sub> <sup>2-</sup>	TURBIDIMETRIC METHOD (SM: PART 4500-SO <sub>4</sub> <sup>2-</sup> E)	ND	0.3
NITRATE	mg/L NO <sub>3</sub> <sup>-</sup>	CADMIUM REDUCTION METHOD (SM: PART 4500-NO <sub>3</sub> <sup>-</sup> E)	ND	0.09
<b>SAMPLE CONDITION</b> WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLEAR -	

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23<sup>RD</sup> EDITION, 2017.  
ND : NON-DETECTABLE.

*Siriphaporn*

(MISS SIRIPHAPORN MUANRAE)  
LABORATORY SUPERVISOR



## ANALYSIS REPORT

**PROJECT NAME** : โครงการโรงไฟฟ้าชีวมวล  
**CUSTOMER NAME** : THAI ROONG RUANG INDUSTRY CO., LTD.  
**ADDRESS** : 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210  
**CONTACT INFORMATION** : TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com  
**SAMPLING SOURCE** : ไทยรุ่งเรือง-น้ำตาล-สกลนคร  
**SAMPLE TYPE** : RAIN WATER  
**SAMPLING DATE** : MAY 15, 2024  
**SAMPLING TIME** : 12:00 HOUR  
**SAMPLING METHOD** : GRAB  
**SAMPLING BY** : MR. TEERAPONG SRIKAMHANG  
**ANALYZED BY** : MISS SAMITTHA LACHIT

**RECEIVED DATE** : MAY 16, 2024  
**ANALYTICAL DATE** : MAY 16-23, 2024  
**ISSUE DATE** : MAY 24, 2024  
**REPORT NO.** : 2024-U044875  
**WORK NO.** : 2023-008918  
**ANALYSIS NO.** : T24AK354-0002

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			โรงเรียนแก่งคำ ประชาสามัคคี T24AK354-0002	
pH	-	ELECTROMETRIC METHOD (AT SITE) SM: PART 4500-H <sup>+</sup> B AND 1060 B	7.7 (33°C)	-
TOTAL SUSPENDED SOLIDS	mg/L	TOTAL SUSPENDED SOLIDS DRIED AT 103-105 °C (SM: PART 2540 D)	ND	5.0
SULPHATE	mg/L SO <sub>4</sub> <sup>2-</sup>	TURBIDIMETRIC METHOD (SM: PART 4500-SO <sub>4</sub> <sup>2-</sup> E)	ND	0.3
NITRATE	mg/L NO <sub>3</sub> <sup>-</sup>	CADMIUM REDUCTION METHOD (SM: PART 4500-NO <sub>3</sub> <sup>-</sup> E)	ND	0.09
<b>SAMPLE CONDITION</b> WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLEAR	

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

*Siriphorn*

(MISS SIRIPHORN MUANRAE)  
LABORATORY SUPERVISOR



## ANALYSIS REPORT

**PROJECT NAME** : โครงการโรงไฟฟ้าชีวมวล  
**CUSTOMER NAME** : THAI ROONG RUANG INDUSTRY CO., LTD.  
**ADDRESS** : 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210  
**CONTACT INFORMATION** : TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com  
**SAMPLING SOURCE** : ไทยรุ่งเรือง-น้ำตาล-สกลนคร  
**SAMPLE TYPE** : RAIN WATER  
**SAMPLING DATE** : MAY 15, 2024  
**SAMPLING TIME** : 12:30 HOUR  
**SAMPLING METHOD** : GRAB  
**SAMPLING BY** : MR TEERAPONG SRIKAMHANG  
**ANALYZED BY** : MISS SAMITTHA LACHIT

**RECEIVED DATE** : MAY 16, 2024  
**ANALYTICAL DATE** : MAY 16-23, 2024  
**ISSUE DATE** : MAY 24, 2024  
**REPORT NO.** : 2024-U044876  
**WORK NO.** : 2023-008918  
**ANALYSIS NO.** : T24AK354-0003

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			บ้านโคกสะอาด T24AK354-0003	
pH	-	ELECTROMETRIC METHOD (AT SITE) SM: PART 4500 -H <sup>+</sup> B AND 1060 B	7.7 (36°C)	-
TOTAL SUSPENDED SOLIDS	mg/L	TOTAL SUSPENDED SOLIDS DRIED AT 103-105 °C (SM: PART 2540 D)	ND	5.0
SULPHATE	mg/L SO <sub>4</sub> <sup>2-</sup>	TURBIDIMETRIC METHOD (SM: PART 4500-SO <sub>4</sub> <sup>2-</sup> E)	ND	0.3
NITRATE	mg/L NO <sub>3</sub> <sup>-</sup>	CADMIUM REDUCTION METHOD (SM: PART 4500-NO <sub>3</sub> <sup>-</sup> E)	ND	0.09
<b>SAMPLE CONDITION</b> WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLEAR -	

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

*Siriphorn*

(MISS SIRIPHAPORN MUANRAE)  
LABORATORY SUPERVISOR



## ANALYSIS REPORT

**PROJECT NAME** : โครงการโรงไฟฟ้าชีวมวล  
**CUSTOMER NAME** : THAI ROONG RUANG INDUSTRY CO., LTD.  
**ADDRESS** : 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210  
**CONTACT INFORMATION** : TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com  
**SAMPLING SOURCE** : โทษ่วงเครื่องไฟฟ้าสกนนคร  
**SAMPLE TYPE** : RAIN WATER  
**SAMPLING DATE** : JUNE 12, 2024  
**SAMPLING TIME** : 12:30 HOUR  
**SAMPLING METHOD** : GRAB  
**SAMPLING BY** : MR TEERAPONG SRIKAMHANG  
**ANALYZED BY** : MISS SAMITTHA LACHIT  
**RECEIVED DATE** : JUNE 13, 2024  
**ANALYTICAL DATE** : JUNE 13-21, 2024  
**ISSUE DATE** : JUNE 21, 2024  
**REPORT NO.** : 2024-U055824  
**WORK NO.** : 2023-008918  
**ANALYSIS NO.** : T24AM982-0001

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			บริเวณพื้นที่โครงการ T24AM982-0001	
pH	-	ELECTROMETRIC METHOD (AT SITE) SM: PART 4500 -H <sup>+</sup> B AND 1060 B	8.4 (34°C)	-
TOTAL SUSPENDED SOLIDS	mg/L	TOTAL SUSPENDED SOLIDS DRIED AT 103-105 °C (SM: PART 2540 D)	ND	5.0
SULPHATE	mg/L SO <sub>4</sub> <sup>2-</sup>	TURBIDIMETRIC METHOD (SM: PART 4500-SO <sub>4</sub> <sup>2-</sup> E)	ND	0.3
NITRATE	mg/L NO <sub>3</sub> <sup>-</sup>	CADMIUM REDUCTION METHOD (SM: PART 4500-NO <sub>3</sub> <sup>-</sup> E)	1.06	0.09
<b>SAMPLE CONDITION</b>				
WATER'S COLOUR/TURBID			COLOURLESS/CLEAR	
SEDIMENT			BROWN	

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 24<sup>th</sup> EDITION, 2023.

ND : NOT DETECTED.

*Siripaporn*

(MISS SIRIPHAPORN MUANRAE)  
LABORATORY SUPERVISOR



## ANALYSIS REPORT

**PROJECT NAME** : โครงการโรงไฟฟ้าชีวมวล  
**CUSTOMER NAME** : THAI ROONG RUANG INDUSTRY CO., LTD.  
**ADDRESS** : 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210  
**CONTACT INFORMATION** : TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com  
**SAMPLING SOURCE** : ไทยรุ่งเรือง-ไฟฟ้า-สกลนคร  
**SAMPLE TYPE** : RAIN WATER  
**SAMPLING DATE** : JUNE 12, 2024  
**SAMPLING TIME** : 13:30 HOUR  
**SAMPLING METHOD** : GRAB  
**SAMPLING BY** : MR TEERAPONG SRIKAMHANG  
**ANALYZED BY** : MISS SAMITTHA LACHIT  
**RECEIVED DATE** : JUNE 13, 2024  
**ANALYTICAL DATE** : JUNE 13-21, 2024  
**ISSUE DATE** : JUNE 21, 2024  
**REPORT NO.** : 2024-U055825  
**WORK NO.** : 2023-008918  
**ANALYSIS NO.** : T24AM982-0002

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			โรงเรียนแก่งคำ ประชาสามัคคี T24AM982-0002	
pH	-	ELECTROMETRIC METHOD (AT SITE) SM: PART 4500 -H <sup>+</sup> B AND 1060 B	8.1 (31°C)	-
TOTAL SUSPENDED SOLIDS	mg/L	TOTAL SUSPENDED SOLIDS DRIED AT 103-105 °C (SM: PART 2540 D)	ND	5.0
SULPHATE	mg/L SO <sub>4</sub> <sup>2-</sup>	TURBIDIMETRIC METHOD (SM: PART 4500-SO <sub>4</sub> <sup>2-</sup> E)	0.6	0.3
NITRATE	mg/L NO <sub>3</sub> <sup>-</sup>	CADMIUM REDUCTION METHOD (SM: PART 4500-NO <sub>3</sub> <sup>-</sup> E)	0.89	0.09
<b>SAMPLE CONDITION</b> WATER'S COLOUR/TURBID SEDIMENT			COLOURLESS/CLEAR BROWN	

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 24<sup>th</sup> EDITION, 2023.

ND : NOT DETECTED.

*Siriphaporn*

(MISS SIRIPHAPORN MUANRAE)  
LABORATORY SUPERVISOR



## ANALYSIS REPORT

**PROJECT NAME** : โครงการโรงไฟฟ้าชีวมวล  
**CUSTOMER NAME** : THAI ROONG RUANG INDUSTRY CO., LTD.  
**ADDRESS** : 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210  
**CONTACT INFORMATION** : TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com  
**SAMPLING SOURCE** : โทษรุ่งเรือง-ไฟฟ้าสกลนคร  
**SAMPLE TYPE** : RAIN WATER  
**SAMPLING DATE** : JUNE 12, 2024  
**SAMPLING TIME** : 14:00 HOUR  
**SAMPLING METHOD** : GRAB  
**SAMPLING BY** : MR TEERAPONG SRIKAMHANG  
**ANALYZED BY** : MISS SAMITTHA LACHIT

**RECEIVED DATE** : JUNE 13, 2024  
**ANALYTICAL DATE** : JUNE 13-21, 2024  
**ISSUE DATE** : JUNE 21, 2024  
**REPORT NO.** : 2024-U055826  
**WORK NO.** : 2023-008918  
**ANALYSIS NO.** : T24AM982-0003

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			บ้านโคกสะอาด T24AM982-0003	
pH	-	ELECTROMETRIC METHOD (AT SITE) SM: PART 4500-H <sup>+</sup> B AND 1060 B	8.1 (34°C)	-
TOTAL SUSPENDED SOLIDS	mg/L	TOTAL SUSPENDED SOLIDS DRIED AT 103-105 °C (SM: PART 2540 D)	ND	5.0
SULPHATE	mg/L SO <sub>4</sub> <sup>2-</sup>	TURBIDIMETRIC METHOD (SM: PART 4500-SO <sub>4</sub> <sup>2-</sup> E)	1.3	0.3
NITRATE	mg/L NO <sub>3</sub> <sup>-</sup>	CADMIUM REDUCTION METHOD (SM: PART 4500-NO <sub>3</sub> <sup>-</sup> E)	0.89	0.09
<b>SAMPLE CONDITION</b> WATER'S COLOUR/TURBID SEDIMENT			YELLOW/CLEAR BROWN	

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 24<sup>th</sup> EDITION, 2023.

ND : NOT DETECTED.

*Siripaporn*

(MISS SIRIPHAPORN MUANRAE)  
LABORATORY SUPERVISOR



ภาคผนวก ค-8

รายงานผลการติดตามตรวจสอบคุณภาพน้ำใต้ดิน

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## ANALYSIS REPORT

**PROJECT NAME** : โครงการโรงไฟฟ้าชีวมวล  
**CUSTOMER NAME** : THAI ROONG RUANG INDUSTRY CO., LTD.  
**ADDRESS** : 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210  
**CONTACT INFORMATION** : TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com  
**SAMPLING SOURCE** : โทรงเรือ-ไฟฟ้า-สกลนคร  
**SAMPLE TYPE** : GROUNDWATER  
**SAMPLING DATE** : MARCH 13, 2024  
**SAMPLING TIME** : 11:00 HOUR  
**SAMPLING METHOD** : BAILER AND STERILE TECHNIQUE  
**SAMPLING BY** : MR NAWACHAI KLABBANKOH  
**ANALYZED BY** : MISS NAPAPORN KHUNNOKKHUM

**RECEIVED DATE** : MARCH 14, 2024  
**ANALYTICAL DATE** : MARCH 14-21, 2024  
**ISSUE DATE** : MAY 10, 2024  
**REPORT NO.** : 2024-U039209  
**WORK NO.** : 2023-008918  
**ANALYSIS NO.** : T24AF302-0001

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD		DETECTION LIMIT
			ทิศทางเหนือของ การไหลของน้ำใต้ดิน บริเวณระบบบำบัด น้ำเสียของ โรงไฟฟ้าชีวมวล T24AF302-0001	SUITABLE ALLOWANCE CONCENTRATION	MAXIMUM ALLOWABLE CONCENTRATION	
pH <sup>a</sup>	-	ELECTROMETRIC METHOD (AT SITE) SM: PART 4500-H <sup>+</sup> B AND 1060 B	7.6 (28°C)	7.0-8.5	6.5-9.2	-
TOTAL SUSPENDED SOLIDS <sup>c</sup>	mg/L	TOTAL SUSPENDED SOLIDS DRIED AT 103-105 °C (SM: PART 2540 D)	ND	-	-	5.0
ELECTRICAL CONDUCTIVITY <sup>c</sup>	µS/cm	ELECTRICAL CONDUCTIVITY METHOD AT SITE (SM: PART 2510 B)	634 (28°C)	-	-	0.1
TOTAL DISSOLVED SOLIDS <sup>b</sup>	mg/L	TOTAL DISSOLVED SOLIDS DRIED AT 180 °C (SM: PART 2540 C)	383	≤ 600	≤ 1,200	25
TOTAL HARDNESS <sup>a</sup>	mg/L as CaCO <sub>3</sub>	EDTA TITRIMETRIC METHOD (SM: PART 2340 C)	252	≤ 300	≤ 500	4.0
CHLORIDE <sup>a</sup>	mg/L Cl <sup>-</sup>	ARGENTOMETRIC METHOD (SM: PART 4500-Cl <sup>-</sup> B)	3.4	≤ 250	≤ 600	2.0
NITRATE-NITROGEN <sup>c</sup>	mg/L NO <sub>3</sub> -N	CADMIUM REDUCTION METHOD (SM: PART 4500-NO <sub>3</sub> -E)	ND	-	-	0.02
<b>METALS</b>						
ARSENIC <sup>c</sup>	mg/L As	HYDRIDE GENERATION AAS METHOD (SM: PART 3114 C)	0.0026	NONE	≤ 0.05	0.0003
COPPER <sup>c</sup>	mg/L Cu	IN-HOUSE METHOD: UAE.TP.GW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	ND	≤ 1.0	≤ 1.5	0.002
IRON <sup>c</sup>	mg/L Fe	IN-HOUSE METHOD: UAE.TP.GW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	< LOQ	≤ 0.5	≤ 1.0	0.005
LEAD <sup>a,c</sup>	mg/L Pb	IN-HOUSE METHOD: UAE.TP.GW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	ND	NONE	≤ 0.05	0.003



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD		DETECTION LIMIT
			ทิศทางการไหลของน้ำใต้ดินบริเวณระบบบำบัดน้ำเสียของโรงไฟฟ้าชีวมวล T24AF302-0001	SUITABLE ALLOWANCE CONCENTRATION	MAXIMUM ALLOWABLE CONCENTRATION	
MANGANESE <sup>c</sup>	mg/L Mn	IN-HOUSE METHOD: UAE.TP.GW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	< LOQ	≤ 0.3	≤ 0.5	0.002
MERCURY <sup>c</sup>	mg/L Hg	IN-HOUSE METHOD: UAE.TP.HEM.002 (COLD VAPOUR ATOMIC ABSORPTION SPECTROMETRIC METHOD); SM: PART 3112 B	ND	NONE	≤ 0.001	0.0001
ALUMINUM <sup>c</sup>	mg/L Al	NITRIC ACID-HYDROCHLORIC ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (SM: PART 3030 F AND PART 3120 B)	0.049	-	-	0.005
NICKEL <sup>c</sup>	mg/L Ni	IN-HOUSE METHOD: UAE.TP.GW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	ND	-	-	0.005
CALCIUM <sup>c</sup>	mg/L Ca	NITRIC ACID-HYDROCHLORIC ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (SM: PART 3030 F AND PART 3120 B)	60.3	-	-	0.005
MAGNESIUM <sup>c</sup>	mg/L Mg	NITRIC ACID-HYDROCHLORIC ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (SM: PART 3030 F AND PART 3120 B)	11.9	-	-	0.005

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD		DETECTION LIMIT
			ทิศทางเหนือน้ำของการไหลของน้ำใต้ดินบริเวณระบบบำบัดน้ำเสียของโรงไฟฟ้าชีวมวล T24AF302-0001	SUITABLE ALLOWANCE CONCENTRATION	MAXIMUM ALLOWABLE CONCENTRATION	
MICROBIOLOGY						
COLIFORM BACTERIA <sup>b</sup>	MPN/100 cm <sup>3</sup>	MULTIPLE-TUBE FERMENTATION TECHNIQUE (SM: PART 9221 B)	< 1.8	< 2.2	-	1.8
FAECAL COLIFORM BACTERIA <sup>b</sup>	MPN/100 cm <sup>3</sup>	MULTIPLE-TUBE FERMENTATION TECHNIQUE (SM: PART 9221 E)	< 1.8	-	-	1.8
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

IN-HOUSE : BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23<sup>rd</sup> EDITION, 2017.

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

REGULATORY STANDARD : GROUNDWATER QUALITY STANDARD FOR DRINKING PURPOSES, SUITABLE ALLOWANCE AND MAXIMUM ALLOWABLE ONCENTRATIONS, NOTIFICATION OF THE MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT : TECHNICAL CRITERIAS AND MEASURES TO PREVENT PUBLIC HEALTH AND ENVIRONMENT HAZARD B.E.2551 (2008), ISSUED UNDER THE GROUND WATER ACT B.E.2520 (1977), PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL.125, SPECIAL PART 85D DATED MAY 21, B.E.2551 (2008).

ND : NON-DETECTABLE.

< LOQ : < LIMIT OF QUANTITATION (IRON  $\geq$  0.005 AND < 0.050 mg/L, MANGANESE  $\geq$  0.002 AND < 0.025 mg/L).

<sup>^</sup> : SAMPLING AT 10:30 HOUR ON APRIL 9, 2024, ANALYSIS NO. T24AH776-0001 (ANALYTICAL DATE : APRIL 11-26, 2024)

THE REASON FOR ISSUING THE NEW REPORT IS SUBSTITUTE RESULT.

SUBSTITUTED REPORT FOR REPORT NO. 2024-U025213, DATED MARCH 27, 2024.

*Bhuchonk p.*

(MR BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR

## ANALYSIS REPORT

**PROJECT NAME** : โครงการโรงไฟฟ้าชีวมวล  
**CUSTOMER NAME** : THAI ROONG RUANG INDUSTRY CO., LTD.  
**ADDRESS** : 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210  
**CONTACT INFORMATION** : TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com  
**SAMPLING SOURCE** : ไทยรุ่งเรือง-ไฟฟ้า-สกลนคร  
**SAMPLE TYPE** : GROUNDWATER  
**SAMPLING DATE** : MARCH 13, 2024  
**SAMPLING TIME** : 10:00 HOUR  
**SAMPLING METHOD** : BAILER AND STERILE TECHNIQUE  
**SAMPLING BY** : MR NAWACHAI KLABBANKOH  
**ANALYZED BY** : MISS NAPAPORN KHUNNOKKHUM

**RECEIVED DATE** : MARCH 14, 2024  
**ANALYTICAL DATE** : MARCH 14-21, 2024  
**ISSUE DATE** : MAY 10, 2024  
**REPORT NO.** : 2024-U039210  
**WORK NO.** : 2023-008918  
**ANALYSIS NO.** : T24AF302-0002

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD		DETECTION LIMIT
			ทิศทางท้ายน้ำของ การไหลของน้ำใต้ดิน บริเวณระบบบำบัด น้ำเสียของ โรงไฟฟ้าชีวมวล 1 T24AF302-0002	SUITABLE ALLOWANCE CONCENTRATION	MAXIMUM ALLOWABLE CONCENTRATION	
pH <sup>a</sup>	-	ELECTROMETRIC METHOD (AT SITE) SM: PART 4500-H <sup>+</sup> B AND 1060 B	7.3 (29°C)	7.0-8.5	6.5-9.2	-
ELECTRICAL CONDUCTIVITY <sup>c</sup>	µS/cm	ELECTRICAL CONDUCTIVITY METHOD AT SITE (SM: PART 2510 B)	664 (29°C)	-	-	0.1
TOTAL SUSPENDED SOLIDS <sup>c</sup>	mg/L	TOTAL SUSPENDED SOLIDS DRIED AT 103-105 °C (SM: PART 2540 D)	ND	-	-	5.0
TOTAL DISSOLVED SOLIDS <sup>b</sup>	mg/L	TOTAL DISSOLVED SOLIDS DRIED AT 180 °C (SM: PART 2540 C)	404	≤ 600	≤ 1,200	25
TOTAL HARDNESS <sup>a</sup>	mg/L as CaCO <sub>3</sub>	EDTA TITRIMETRIC METHOD (SM: PART 2340 C)	225	≤ 300	≤ 500	4.0
CHLORIDE <sup>a</sup>	mg/L Cl <sup>-</sup>	ARGENTOMETRIC METHOD (SM: PART 4500-Cl <sup>-</sup> B)	2.9	≤ 250	≤ 600	2.0
NITRATE-NITROGEN <sup>c</sup>	mg/L NO <sub>3</sub> <sup>-</sup> -N	CADMIUM REDUCTION METHOD (SM: PART 4500-NO <sub>3</sub> <sup>-</sup> E)	ND	-	-	0.02
<b>METALS</b>						
ARSENIC <sup>c</sup>	mg/L As	HYDRIDE GENERATION AAS METHOD (SM: PART 3114 C)	0.0004	NONE	≤ 0.05	0.0003
COPPER <sup>c</sup>	mg/L Cu	IN-HOUSE METHOD: UAE.TP.GW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	ND	≤ 1.0	≤ 1.5	0.002
IRON <sup>c</sup>	mg/L Fe	IN-HOUSE METHOD: UAE.TP.GW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	0.129	≤ 0.5	≤ 1.0	0.005
LEAD <sup>a, c</sup>	mg/L Pb	IN-HOUSE METHOD: UAE.TP.GW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	ND	NONE	≤ 0.05	0.003



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD		DETECTION LIMIT
			ทิศทางท้ายน้ำของ การไหลของน้ำใต้ดิน บริเวณระบบบำบัด น้ำเสียของ โรงไฟฟ้าชีวมวล 1 T24AF302-0002	SUITABLE ALLOWANCE CONCENTRATION	MAXIMUM ALLOWABLE CONCENTRATION	
MANGANESE <sup>c</sup>	mg/L Mn	IN-HOUSE METHOD: UAE.TP.GW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	ND	≤ 0.3	≤ 0.5	0.002
MERCURY <sup>c</sup>	mg/L Hg	IN-HOUSE METHOD: UAE.TP.HEM.002 (COLD VAPOUR ATOMIC ABSORPTION SPECTROMETRIC METHOD); SM: PART 3112 B	ND	NONE	≤ 0.001	0.0001
ALUMINUM <sup>c</sup>	mg/L Al	NITRIC ACID-HYDROCHLORIC ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (SM: PART 3030 F AND PART 3120 B)	0.049	-	-	0.005
NICKEL <sup>c</sup>	mg/L Ni	IN-HOUSE METHOD: UAE.TP.GW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	ND	-	-	0.005
CALCIUM <sup>c</sup>	mg/L Ca	NITRIC ACID-HYDROCHLORIC ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (SM: PART 3030 F AND PART 3120 B)	59.9	-	-	0.005
MAGNESIUM <sup>c</sup>	mg/L Mg	NITRIC ACID-HYDROCHLORIC ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (SM: PART 3030 F AND PART 3120 B)	9.42	-	-	0.005

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD		DETECTION LIMIT
			ทิศทางการไหลของน้ำใต้ดินบริเวณระบบบำบัดน้ำเสียของโรงไฟฟ้าชีวมวล 1 T24AF302-0002	SUITABLE ALLOWANCE CONCENTRATION	MAXIMUM ALLOWABLE CONCENTRATION	
MICROBIOLOGY						
COLIFORM BACTERIA <sup>b</sup>	MPN/100 cm <sup>3</sup>	MULTIPLE-TUBE FERMENTATION TECHNIQUE (SM: PART 9221 B)	< 1.8	< 2.2	-	1.8
FAECAL COLIFORM BACTERIA <sup>b</sup>	MPN/100 cm <sup>3</sup>	MULTIPLE-TUBE FERMENTATION TECHNIQUE (SM: PART 9221 E)	< 1.8	-	-	1.8
SAMPLE CONDITION						
WATER'S COLOUR/TURBID SEDIMENT			YELLOW/CLEAR BROWN			

<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

IN-HOUSE : BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23<sup>rd</sup> EDITION, 2017.

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

REGULATORY STANDARD : GROUNDWATER QUALITY STANDARD FOR DRINKING PURPOSES, SUITABLE ALLOWANCE AND MAXIMUM ALLOWABLE ONCENTRATIONS, NOTIFICATION OF THE MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT : TECHNICAL CRITERIAS AND MEASURES TO PREVENT PUBLIC HEALTH AND ENVIRONMENT HAZARD B.E.2551 (2008), ISSUED UNDER THE GROUND WATER ACT B.E.2520 (1977), PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL.125, SPECIAL PART 85D DATED MAY 21, B.E.2551 (2008).

ND : NON-DETECTABLE.

<sup>^</sup> : SAMPLING AT 10:00 HOUR ON APRIL 9, 2024, ANALYSIS NO. T24AH776-0002 (ANALYTICAL DATE : APRIL 11-26, 2024)

THE REASON FOR ISSUING THE NEW REPORT IS SUBSTITUTE RESULT.

SUBSTITUTED REPORT FOR REPORT NO. 2024-U025214, DATED MARCH 27, 2024.

*Bhuchonk Panichlertumpi*

(MR BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR

## ANALYSIS REPORT

**PROJECT NAME** : โครงการโรงไฟฟ้าชีวมวล  
**CUSTOMER NAME** : THAI ROONG RUANG INDUSTRY CO., LTD.  
**ADDRESS** : 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210  
**CONTACT INFORMATION** : TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com  
**SAMPLING SOURCE** : ไทยรุ่งเรือง-ไฟฟ้า-สกลนคร  
**SAMPLE TYPE** : GROUNDWATER  
**SAMPLING DATE** : MARCH 13, 2024  
**SAMPLING TIME** : 10:30 HOUR  
**SAMPLING METHOD** : BAILER AND STERILE TECHNIQUE  
**SAMPLING BY** : MR NAWACHAI KLABBANKOH  
**ANALYZED BY** : MISS NAPAPORN KHUNNOKKHUM

**RECEIVED DATE** : MARCH 14, 2024  
**ANALYTICAL DATE** : MARCH 14-21, 2024  
**ISSUE DATE** : MAY 10, 2024  
**REPORT NO.** : 2024-U039211  
**WORK NO.** : 2023-008918  
**ANALYSIS NO.** : T24AF302-0003

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD		DETECTION LIMIT
			ทิศทางห้วยน้ำของ การไหลของน้ำใต้ดิน บริเวณระบบบำบัด น้ำเสียของ โรงไฟฟ้าชีวมวล 2 T24AF302-0003	SUITABLE ALLOWANCE CONCENTRATION	MAXIMUM ALLOWABLE CONCENTRATION	
pH <sup>a</sup>	-	ELECTROMETRIC METHOD (AT SITE) SM: PART 4500-H <sup>+</sup> B AND 1060 B	7.3 (28°C)	7.0-8.5	6.5-9.2	-
ELECTRICAL CONDUCTIVITY <sup>c</sup>	µS/cm	ELECTRICAL CONDUCTIVITY METHOD AT SITE (SM: PART 2510 B)	718 (28°C)	-	-	0.1
TOTAL SUSPENDED SOLIDS <sup>c</sup>	mg/L	TOTAL SUSPENDED SOLIDS DRIED AT 103-105 °C (SM: PART 2540 D)	6.9	-	-	5.0
TOTAL DISSOLVED SOLIDS <sup>b</sup>	mg/L	TOTAL DISSOLVED SOLIDS DRIED AT 180 °C (SM: PART 2540 C)	451	≤ 600	≤ 1,200	25
TOTAL HARDNESS <sup>a</sup>	mg/L as CaCO <sub>3</sub>	EDTA TITRIMETRIC METHOD (SM: PART 2340 C)	286	≤ 300	≤ 500	4.0
CHLORIDE <sup>a</sup>	mg/L Cl <sup>-</sup>	ARGENTOMETRIC METHOD (SM: PART 4500-Cl B)	3.4	≤ 250	≤ 600	2.0
NITRATE-NITROGEN <sup>c</sup>	mg/L NO <sub>3</sub> -N	CADMIUM REDUCTION METHOD (SM: PART 4500-NO <sub>3</sub> E)	ND	-	-	0.02
<b>METALS</b>						
ARSENIC <sup>a c</sup>	mg/L As	HYDRIDE GENERATION AAS METHOD (SM: PART 3114 C)	0.0004	NONE	≤ 0.05	0.0003
COPPER <sup>c</sup>	mg/L Cu	IN-HOUSE METHOD: UAE.TP.GW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	ND	≤ 1.0	≤ 1.5	0.002
IRON <sup>c</sup>	mg/L Fe	IN-HOUSE METHOD: UAE.TP.GW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	0.224	≤ 0.5	≤ 1.0	0.005
LEAD <sup>a c</sup>	mg/L Pb	IN-HOUSE METHOD: UAE.TP.GW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	ND	NONE	≤ 0.05	0.003



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD		DETECTION LIMIT
			ทิศทางก๊วยน้ำของ การไหลของน้ำใต้ดิน บริเวณระบบน้ำบาด น้ำเสียของ โรงไฟฟ้าชีวมวล 2 T24AF302-0003	SUITABLE ALLOWANCE CONCENTRATION	MAXIMUM ALLOWABLE CONCENTRATION	
MANGANESE °	mg/L Mn	IN-HOUSE METHOD: UAE.TP.GW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	0.053	≤ 0.3	≤ 0.5	0.002
MERCURY °	mg/L Hg	IN-HOUSE METHOD: UAE.TP.HEM.002 (COLD VAPOUR ATOMIC ABSORPTION SPECTROMETRIC METHOD); SM: PART 3112 B	ND	NONE	≤ 0.001	0.0001
ALUMINUM °	mg/L Al	NITRIC ACID-HYDROCHLORIC ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (SM: PART 3030 F AND PART 3120 B)	0.168	-	-	0.005
NICKEL °	mg/L Ni	IN-HOUSE METHOD: UAE.TP.GW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	ND	-	-	0.005
CALCIUM °	mg/L Ca	NITRIC ACID-HYDROCHLORIC ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (SM: PART 3030 F AND PART 3120 B)	74.9	-	-	0.005
MAGNESIUM °	mg/L Mg	NITRIC ACID-HYDROCHLORIC ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (SM: PART 3030 F AND PART 3120 B)	12.1	-	-	0.005

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD		DETECTION LIMIT
			ทิศทางภัยน้ำของ การไหลของน้ำใต้ดิน บริเวณระบบน้ำบาด น้ำเสียของ โรงไฟฟ้าชีวมวล 2 T24AF302-0003	SUITABLE ALLOWANCE CONCENTRATION	MAXIMUM ALLOWABLE CONCENTRATION	
MICROBIOLOGY						
COLIFORM BACTERIA <sup>b</sup>	MPN/100 cm <sup>3</sup>	MULTIPLE-TUBE FERMENTATION TECHNIQUE (SM: PART 9221B)	< 1.8	< 2.2	-	1.8
FAECAL COLIFORM BACTERIA <sup>b</sup>	MPN/100 cm <sup>3</sup>	MULTIPLE-TUBE FERMENTATION TECHNIQUE (SM: PART 9221E)	< 1.8	-	-	1.8
SAMPLE CONDITION WATER'S COLOUR/TURBID SEDIMENT			YELLOW/CLEAR BROWN			

<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

IN-HOUSE : BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23<sup>rd</sup> EDITION, 2017.

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

REGULATORY STANDARD : GROUNDWATER QUALITY STANDARD FOR DRINKING PURPOSES, SUITABLE ALLOWANCE AND MAXIMUM ALLOWABLE ONCENTRATIONS, NOTIFICATION OF THE MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT : TECHNICAL CRITERIAS AND MEASURES TO PREVENT PUBLIC HEALTH AND ENVIRONMENT HAZARD B.E.2551 (2008), ISSUED UNDER THE GROUND WATER ACT B.E.2520 (1977), PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL.125, SPECIAL PART 85D DATED MAY 21, B.E.2551 (2008).

ND : NON-DETECTABLE.

<sup>^</sup> : SAMPLING AT 10:15 HOUR ON APRIL 9, 2024, ANALYSIS NO. T24AH776-0003 (ANALYTICAL DATE : APRIL 11-26, 2024)

THE REASON FOR ISSUING THE NEW REPORT IS SUBSTITUTE RESULT.

SUBSTITUTED REPORT FOR REPORT NO. 2024-U025215, DATED MARCH 27, 2024.

*Bhuchonk p.*  
.....  
(MR BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR

## ANALYSIS REPORT

**PROJECT NAME** : โครงการโรงไฟฟ้าชีวมวล  
**CUSTOMER NAME** : THAI ROONG RUANG INDUSTRY CO., LTD.  
**ADDRESS** : 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210  
**CONTACT INFORMATION** : TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com  
**SAMPLING SOURCE** : ไทยรุ่งเรือง-ไฟฟ้า-สกลนคร  
**SAMPLE TYPE** : GROUNDWATER  
**SAMPLING DATE** : MARCH 13, 2024  
**SAMPLING TIME** : 11:30 HOUR  
**SAMPLING METHOD** : BAILER AND STERILE TECHNIQUE  
**SAMPLING BY** : MR NAWACHAI KLABBANKOH  
**ANALYZED BY** : MISS NAPAPORN KHUNNOKKHUM

**RECEIVED DATE** : MARCH 14, 2024  
**ANALYTICAL DATE** : MARCH 14-21, 2024  
**ISSUE DATE** : MAY 10, 2024  
**REPORT NO.** : 2024-U039212  
**WORK NO.** : 2023-008918  
**ANALYSIS NO.** : T24AF302-0004

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD		DETECTION LIMIT
			ทิศทางเหนือน้ำของ การไหลของน้ำใต้ดิน บริเวณระบบบำบัด น้ำเสียของโรงงาน ผลิตน้ำตาลทราย T24AF302-0004	SUITABLE ALLOWANCE CONCENTRATION	MAXIMUM ALLOWABLE CONCENTRATION	
pH <sup>a</sup>	-	ELECTROMETRIC METHOD (AT SITE) SM: PART 4500-H <sup>+</sup> B AND 1060 B	7.1 (29°C)	7.0-8.5	6.5-9.2	-
ELECTRICAL CONDUCTIVITY <sup>c</sup>	µS/cm	ELECTRICAL CONDUCTIVITY METHOD AT SITE (SM: PART 2510 B)	738 (29°C)	-	-	0.1
TOTAL SUSPENDED SOLIDS <sup>c</sup>	mg/L	TOTAL SUSPENDED SOLIDS DRIED AT 103-105 °C (SM: PART 2540 D)	18.0	-	-	5.0
TOTAL DISSOLVED SOLIDS <sup>b</sup>	mg/L	TOTAL DISSOLVED SOLIDS DRIED AT 180 °C (SM: PART 2540 C)	459	≤ 600	≤ 1,200	25
TOTAL HARDNESS <sup>a</sup>	mg/L as CaCO <sub>3</sub>	EDTA TITRIMETRIC METHOD (SM: PART 2340 C)	292	≤ 300	≤ 500	4.0
CHLORIDE <sup>a</sup>	mg/L Cl <sup>-</sup>	ARGENTOMETRIC METHOD (SM: PART 4500-Cl <sup>-</sup> B)	2.4	≤ 250	≤ 600	2.0
NITRATE-NITROGEN <sup>c</sup>	mg/L NO <sub>3</sub> -N	CADMIUM REDUCTION METHOD (SM: PART 4500-NO <sub>3</sub> -E)	ND	-	-	0.02
<b>METALS</b>						
ARSENIC <sup>a, c</sup>	mg/L As	HYDRIDE GENERATION AAS METHOD (SM: PART 3114 C)	ND	NONE	≤ 0.05	0.0003
COPPER <sup>c</sup>	mg/L Cu	IN-HOUSE METHOD: UAE.TP.GW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	ND	≤ 1.0	≤ 1.5	0.002
IRON <sup>c</sup>	mg/L Fe	IN-HOUSE METHOD: UAE.TP.GW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	0.412	≤ 0.5	≤ 1.0	0.005
LEAD <sup>c</sup>	mg/L Pb	IN-HOUSE METHOD: UAE.TP.GW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	< LOQ	NONE	≤ 0.05	0.003



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD		DETECTION LIMIT
			ทิศทางเหนือของ การไหลของน้ำใต้ดิน บริเวณระบบบำบัด น้ำเสียของโรงงาน ผลิตน้ำตาลทราย T24AF302-0004	SUITABLE ALLOWANCE CONCENTRATION	MAXIMUM ALLOWABLE CONCENTRATION	
MANGANESE <sup>c</sup>	mg/L Mn	IN-HOUSE METHOD: UAE.TP.GW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	< LOQ	≤ 0.3	≤ 0.5	0.002
MERCURY <sup>c</sup>	mg/L Hg	IN-HOUSE METHOD: UAE.TP.HEM.002 (COLD VAPOUR ATOMIC ABSORPTION SPECTROMETRIC METHOD); SM: PART 3112 B	ND	NONE	≤ 0.001	0.0001
ALUMINUM <sup>c</sup>	mg/L Al	NITRIC ACID-HYDROCHLORIC ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (SM: PART 3030 F AND PART 3120 B)	0.337	-	-	0.005
NICKEL <sup>c</sup>	mg/L Ni	IN-HOUSE METHOD: UAE.TP.GW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	ND	-	-	0.005
CALCIUM <sup>c</sup>	mg/L Ca	NITRIC ACID-HYDROCHLORIC ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (SM: PART 3030 F AND PART 3120 B)	81.0	-	-	0.005
MAGNESIUM <sup>c</sup>	mg/L Mg	NITRIC ACID-HYDROCHLORIC ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (SM: PART 3030 F AND PART 3120 B)	13.6	-	-	0.005

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD		DETECTION LIMIT
			ทิศทางเหนือ น้ำของ การไหลของน้ำใต้ดิน บริเวณระบบบำบัด น้ำเสียของโรงงาน ผลิตน้ำตาลทราย T24AF302-0004	SUITABLE ALLOWANCE CONCENTRATION	MAXIMUM ALLOWABLE CONCENTRATION	
MICROBIOLOGY						
COLIFORM BACTERIA <sup>b</sup>	MPN/100 cm <sup>3</sup>	MULTIPLE-TUBE FERMENTATION TECHNIQUE (SM: PART 9221 B)	< 1.8	< 2.2	-	1.8
FAECAL COLIFORM BACTERIA <sup>b</sup>	MPN/100 cm <sup>3</sup>	MULTIPLE-TUBE FERMENTATION TECHNIQUE (SM: PART 9221 E)	< 1.8	-	-	1.8
SAMPLE CONDITION						
WATER'S COLOUR/TURBID SEDIMENT			YELLOW/CLEAR BROWN			

<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

IN-HOUSE : BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23<sup>rd</sup> EDITION, 2017.

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

REGULATORY STANDARD : GROUNDWATER QUALITY STANDARD FOR DRINKING PURPOSES, SUITABLE ALLOWANCE AND MAXIMUM ALLOWABLE ONCENTRATIONS, NOTIFICATION OF THE MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT : TECHNICAL CRITERIAS AND MEASURES TO PREVENT PUBLIC HEALTH AND ENVIRONMENT HAZARD B.E.2551 (2008), ISSUED UNDER THE GROUND WATER ACT B.E.2520 (1977), PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL.125, SPECIAL PART 85D DATED MAY 21, B.E.2551 (2008).

ND : NON-DETECTABLE.

< LOQ : < LIMIT OF QUANTITATION (LEAD  $\geq$  0.003 AND < 0.100 mg/L, MANGANESE  $\geq$  0.002 AND < 0.025 mg/L).

^ : SAMPLING AT 11:40 HOUR ON APRIL 9, 2024, ANALYSIS NO. T24AH776-0004 (ANALYTICAL DATE : APRIL 11-26, 2024)

THE REASON FOR ISSUING THE NEW REPORT IS SUBSTITUTE RESULT.

SUBSTITUTED REPORT FOR REPORT NO. 2024-U025216, DATED MARCH 27, 2024.

*Bhuchonk p.*

(MR BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR

## ANALYSIS REPORT

**PROJECT NAME** : โครงการโรงไฟฟ้าชีวมวล  
**CUSTOMER NAME** : THAI ROONG RUANG INDUSTRY CO., LTD.  
**ADDRESS** : 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210  
**CONTACT INFORMATION** : TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com  
**SAMPLING SOURCE** : ไทยรุ่งเรือง-ไฟฟ้า-สกลนคร  
**SAMPLE TYPE** : GROUNDWATER  
**SAMPLING DATE** : MARCH 13, 2024  
**SAMPLING TIME** : 12:00 HOUR  
**SAMPLING METHOD** : BAILER AND STERILE TECHNIQUE  
**SAMPLING BY** : MR NAWACHAI KLABBANKOH  
**ANALYZED BY** : MISS NAPAPORN KHUNNOKKHUM

**RECEIVED DATE** : MARCH 14, 2024  
**ANALYTICAL DATE** : MARCH 14-21, 2024  
**ISSUE DATE** : MAY 10, 2024  
**REPORT NO.** : 2024-U039213  
**WORK NO.** : 2023-008918  
**ANALYSIS NO.** : T24AF302-0005

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD		DETECTION LIMIT
			ทิศทางท้ายน้ำของ การไหลของน้ำใต้ดิน บริเวณระบบบำบัด น้ำเสียของโรงงาน ผลิตน้ำตาลทราย 1 T24AF302-0005	SUITABLE ALLOWANCE CONCENTRATION	MAXIMUM ALLOWABLE CONCENTRATION	
pH <sup>a</sup>	-	ELECTROMETRIC METHOD (AT SITE) SM: PART 4500-H <sup>+</sup> B AND 1060 B	7.1 (29°C)	7.0-8.5	6.5-9.2	-
ELECTRICAL CONDUCTIVITY <sup>c</sup>	µS/cm	ELECTRICAL CONDUCTIVITY METHOD AT SITE (SM: PART 2510 B)	724 (29°C)	-	-	0.1
TOTAL SUSPENDED SOLIDS <sup>c</sup>	mg/L	TOTAL SUSPENDED SOLIDS DRIED AT 103-105 °C (SM: PART 2540 D)	10.8	-	-	5.0
TOTAL DISSOLVED SOLIDS <sup>b</sup>	mg/L	TOTAL DISSOLVED SOLIDS DRIED AT 180 °C (SM: PART 2540 C)	434	≤ 600	≤ 1,200	25
TOTAL HARDNESS <sup>a</sup>	mg/L as CaCO <sub>3</sub>	EDTA TITRIMETRIC METHOD (SM: PART 2340 C)	290	≤ 300	≤ 500	4.0
CHLORIDE <sup>c</sup>	mg/L Cl <sup>-</sup>	ARGENTOMETRIC METHOD (SM: PART 4500-Cl <sup>-</sup> B)	ND	≤ 250	≤ 600	2.0
NITRATE-NITROGEN <sup>c</sup>	mg/L NO <sub>3</sub> -N	CADMIUM REDUCTION METHOD (SM: PART 4500-NO <sub>3</sub> -E)	ND	-	-	0.02
<b>METALS</b>						
ARSENIC <sup>a, c</sup>	mg/L As	HYDRIDE GENERATION AAS METHOD (SM: PART 3114 C)	0.0005	NONE	≤ 0.05	0.0003
COPPER <sup>c</sup>	mg/L Cu	IN-HOUSE METHOD: UAE.TP.GW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	ND	≤ 1.0	≤ 1.5	0.002
IRON <sup>c</sup>	mg/L Fe	IN-HOUSE METHOD: UAE.TP.GW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	0.412	≤ 0.5	≤ 1.0	0.005
LEAD <sup>c</sup>	mg/L Pb	IN-HOUSE METHOD: UAE.TP.GW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	< LOQ	NONE	≤ 0.05	0.003



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD		DETECTION LIMIT
			ทิศทางท้ายน้ำของ การไหลของน้ำใต้ดิน บริเวณระบบบำบัด น้ำเสียของโรงงาน ผลิตน้ำตาลทราย 1 T24AF302-0005	SUITABLE ALLOWANCE CONCENTRATION	MAXIMUM ALLOWABLE CONCENTRATION	
MANGANESE °	mg/L Mn	IN-HOUSE METHOD: UAE.TP.GW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	0.044	≤ 0.3	≤ 0.5	0.002
MERCURY °	mg/L Hg	IN-HOUSE METHOD: UAE.TP.HEM.002 (COLD VAPOUR ATOMIC ABSORPTION SPECTROMETRIC METHOD); SM: PART 3112 B	ND	NONE	≤ 0.001	0.0001
ALUMINUM °	mg/L Al	NITRIC ACID-HYDROCHLORIC ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (SM: PART 3030 F AND PART 3120 B)	0.213	-	-	0.005
NICKEL °	mg/L Ni	IN-HOUSE METHOD: UAE.TP.GW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	ND	-	-	0.005
CALCIUM °	mg/L Ca	NITRIC ACID-HYDROCHLORIC ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (SM: PART 3030 F AND PART 3120 B)	76.2	-	-	0.005
MAGNESIUM °	mg/L Mg	NITRIC ACID-HYDROCHLORIC ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (SM: PART 3030 F AND PART 3120 B)	14.8	-	-	0.005

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD		DETECTION LIMIT
			ทิศทางท้ายน้ำของ การไหลของน้ำใต้ดิน บริเวณระบบบำบัด น้ำเสียของโรงงาน ผลิตน้ำตาลทราย 1 T24AF302-0005	SUITABLE ALLOWANCE CONCENTRATION	MAXIMUM ALLOWABLE CONCENTRATION	
MICROBIOLOGY						
COLIFORM BACTERIA <sup>b</sup>	MPN/100 cm <sup>3</sup>	MULTIPLE-TUBE FERMENTATION TECHNIQUE (SM: PART 9221 B)	< 1.8	< 2.2	-	1.8
FAECAL COLIFORM BACTERIA <sup>b</sup>	MPN/100 cm <sup>3</sup>	MULTIPLE-TUBE FERMENTATION TECHNIQUE (SM: PART 9221 E)	< 1.8	-	-	1.8
SAMPLE CONDITION						
WATER'S COLOUR/TURBID SEDIMENT			YELLOW/CLEAR BROWN			

<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

IN-HOUSE : BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23<sup>rd</sup> EDITION, 2017.

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

REGULATORY STANDARD : GROUNDWATER QUALITY STANDARD FOR DRINKING PURPOSES, SUITABLE ALLOWANCE AND MAXIMUM ALLOWABLE ONCENTRATIONS, NOTIFICATION OF THE MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT : TECHNICAL CRITERIAS AND MEASURES TO PREVENT PUBLIC HEALTH AND ENVIRONMENT HAZARD B.E.2551 (2008), ISSUED UNDER THE GROUND WATER ACT B.E.2520 (1977), PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL.125, SPECIAL PART 85D DATED MAY 21, B.E.2551 (2008).

ND : NON-DETECTABLE

< LOQ : < LIMIT OF QUANTITATION (LEAD  $\geq$  0.003 AND < 0.100 mg/L).

<sup>A</sup> : SAMPLING AT 11:55 HOUR ON APRIL 9, 2024, ANALYSIS NO. T24AH776-0005 (ANALYTICAL DATE : APRIL 11-26, 2024)

THE REASON FOR ISSUING THE NEW REPORT IS SUBSTITUTE RESULT.

SUBSTITUTED REPORT FOR REPORT NO. 2024-U025217, DATED MARCH 27, 2024.

*Bhuchonk p.*

(MR BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR

## ANALYSIS REPORT

**PROJECT NAME** : โครงการโรงไฟฟ้าชีวมวล  
**CUSTOMER NAME** : THAI ROONG RUANG INDUSTRY CO., LTD.  
**ADDRESS** : 90 MOO 8 UM CHAN KUSUMAN SAKON NAKHON 47210  
**CONTACT INFORMATION** : TEL : 09 5665 0649 e-mail : piyawan.pan@trrgroup.com  
**SAMPLING SOURCE** : ไทยรุ่งเรือง-ไฟฟ้า-สกลนคร  
**SAMPLE TYPE** : GROUNDWATER  
**SAMPLING DATE** : MARCH 13, 2024  
**SAMPLING TIME** : 12:30 HOUR  
**SAMPLING METHOD** : BAILER AND STERILE TECHNIQUE  
**SAMPLING BY** : MR NAWACHAI KLABBANKOH  
**ANALYZED BY** : MISS NAPAPORN KHUNNOKKHUM

**RECEIVED DATE** : MARCH 14, 2024  
**ANALYTICAL DATE** : MARCH 14-25, 2024  
**ISSUE DATE** : MAY 10, 2024  
**REPORT NO.** : 2024-U039214  
**WORK NO.** : 2023-008918  
**ANALYSIS NO.** : T24AF302-0006

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD		DETECTION LIMIT
			ทิศทางท้ายน้ำของ การไหลของน้ำใต้ดิน บริเวณระบบบำบัด น้ำเสียของโรงงาน ผลิตน้ำตาลทราย 2 T24AF302-0006	SUITABLE ALLOWANCE CONCENTRATION	MAXIMUM ALLOWABLE CONCENTRATION	
pH <sup>a</sup>	-	ELECTROMETRIC METHOD (AT SITE) SM: PART 4500-H <sup>+</sup> B AND 1060 B	7.0 (28°C)	7.0-8.5	6.5-9.2	-
ELECTRICAL CONDUCTIVITY <sup>c</sup>	µS/cm	ELECTRICAL CONDUCTIVITY METHOD AT SITE (SM: PART 2510 B)	657 (28°C)	-	-	0.1
TOTAL SUSPENDED SOLIDS <sup>c</sup>	mg/L	TOTAL SUSPENDED SOLIDS DRIED AT 103-105 °C (SM: PART 2540 D)	10.4	-	-	5.0
TOTAL DISSOLVED SOLIDS <sup>b</sup>	mg/L	TOTAL DISSOLVED SOLIDS DRIED AT 180 °C (SM: PART 2540 C)	407	≤ 600	≤ 1,200	25
TOTAL HARDNESS <sup>a c</sup>	mg/L as CaCO <sub>3</sub>	EDTA TITRIMETRIC METHOD (SM: PART 2340 C)	141	≤ 300	≤ 500	4.0
CHLORIDE <sup>c</sup>	mg/L Cl <sup>-</sup>	ARGENTOMETRIC METHOD (SM: PART 4500-Cl <sup>-</sup> B)	ND	≤ 250	≤ 600	2.0
NITRATE-NITROGEN <sup>c</sup>	mg/L NO <sub>3</sub> -N	CADMIUM REDUCTION METHOD (SM: PART 4500-NO <sub>3</sub> -E)	ND	-	-	0.02
<b>METALS</b>						
ARSENIC <sup>a c</sup>	mg/L As	HYDRIDE GENERATION AAS METHOD (SM: PART 3114 C)	ND	NONE	≤ 0.05	0.0003
COPPER <sup>c</sup>	mg/L Cu	IN-HOUSE METHOD: UAE.TP.GW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	ND	≤ 1.0	≤ 1.5	0.002
IRON <sup>c</sup>	mg/L Fe	IN-HOUSE METHOD: UAE.TP.GW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	0.319	≤ 0.5	≤ 1.0	0.005
LEAD <sup>c</sup>	mg/L Pb	IN-HOUSE METHOD: UAE.TP.GW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	< LOQ	NONE	≤ 0.05	0.003



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD		DETECTION LIMIT
			ทิศทางท้ายน้ำของ การไหลของน้ำใต้ดิน บริเวณระบบบำบัด น้ำเสียของโรงงาน ผลิตน้ำตาลทราย 2 T24AF302-0006	SUITABLE ALLOWANCE CONCENTRATION	MAXIMUM ALLOWABLE CONCENTRATION	
MANGANESE <sup>^ c</sup>	mg/L Mn	IN-HOUSE METHOD: UAE.TP.GW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	0.214	≤ 0.3	≤ 0.5	0.002
MERCURY <sup>c</sup>	mg/L Hg	IN-HOUSE METHOD: UAE.TP.HEM.002 (COLD VAPOUR ATOMIC ABSORPTION SPECTROMETRIC METHOD); SM: PART 3112 B	ND	NONE	≤ 0.001	0.0001
NICKEL <sup>c</sup>	mg/L Ni	IN-HOUSE METHOD: UAE.TP.GW.01 (NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD); SM: PART 3030 E AND PART 3111 B	ND	-	-	0.005
ALUMINUM <sup>c</sup>	mg/L Al	NITRIC ACID-HYDROCHLORIC ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (SM: PART 3030 F AND PART 3120 B)	0.150	-	-	0.005
CALCIUM <sup>c</sup>	mg/L Ca	NITRIC ACID-HYDROCHLORIC ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (SM: PART 3030 F AND PART 3120 B)	78.1	-	-	0.005
MAGNESIUM <sup>c</sup>	mg/L Mg	NITRIC ACID-HYDROCHLORIC ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (SM: PART 3030 F AND PART 3120 B)	13.3	-	-	0.005

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	REGULATORY STANDARD		DETECTION LIMIT
			ทิศทางห้วยน้ำของ การไหลของน้ำใต้ดิน บริเวณระบบบำบัด น้ำเสียของโรงงาน ผลิตน้ำตาลทราย 2 T24AF302-0006	SUITABLE ALLOWANCE CONCENTRATION	MAXIMUM ALLOWABLE CONCENTRATION	
MICROBIOLOGY						
COLIFORM BACTERIA <sup>b</sup>	MPN/100 cm <sup>3</sup>	MULTIPLE-TUBE FERMENTATION TECHNIQUE (SM: PART 9221 B)	< 1.8	< 2.2	-	1.8
FAECAL COLIFORM BACTERIA <sup>b</sup>	MPN/100 cm <sup>3</sup>	MULTIPLE-TUBE FERMENTATION TECHNIQUE (SM: PART 9221 E)	< 1.8	-	-	1.8
SAMPLE CONDITION						
WATER'S COLOUR/TURBID SEDIMENT			YELLOW/CLEAR BROWN			

<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

IN-HOUSE : BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23<sup>rd</sup> EDITION, 2017.

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

REGULATORY STANDARD : GROUNDWATER QUALITY STANDARD FOR DRINKING PURPOSES, SUITABLE ALLOWANCE AND MAXIMUM ALLOWABLE ONCENTRATIONS, NOTIFICATION OF THE MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT : TECHNICAL CRITERIAS AND MEASURES TO PREVENT PUBLIC HEALTH AND ENVIRONMENT HAZARD B.E.2551 (2008), ISSUED UNDER THE GROUND WATER ACT B.E.2520 (1977), PUBLISHED IN THE ROYAL GOVERNMENT GAZETTE, VOL.125, SPECIAL PART 85D DATED MAY 21, B.E.2551 (2008).

ND : NON-DETECTABLE

< LOQ : < LIMIT OF QUANTITATION (LEAD  $\geq$  0.003 AND < 0.100 mg/L).

<sup>A</sup> : SAMPLING AT 12:15 HOUR ON APRIL 9, 2024, ANALYSIS NO. T24AH776-0006 (ANALYTICAL DATE : APRIL 11-26, 2024)

THE REASON FOR ISSUING THE NEW REPORT IS SUBSTITUTE RESULT.

SUBSTITUTED REPORT FOR REPORT NO. 2024-U025218, DATED MARCH 27, 2024.

*Bhuchonk p.*

(MR BHUCHONK PANICHLERTUMPI)  
LABORATORY SUPERVISOR