คุณภาพน้ำทิ้ง

ระบบบำบัดน้ำเสียรวมทางชีวภาพ

Analysis / Test Report

TESTING
No.0042

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 2471204
Date Received : Jul 11, 2024
Date Reported : Jul 17, 2024
Report Number : 3032321-1

Sample Number	2471204-1
Sampled Date	Jul 11, 2024 2:14 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-IN Equalization Tank
Date Analysis Commenced	Jul 11, 2024
Condition of Sample	Contained in two BOD bottles, one amber glass bottle and eight plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, a lot of solid and some turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	16.8	≤500	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	52	≤750	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Formaldehyde	mg/L	0.03	0.1	0.3	≤1	Wastewater analysis manual, Environmental Engineering Association of Thailand, 4th ed.,2004	Rayong
Oil & Grease	mg/L	-	3	<3	≤10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	7.1	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Phenol	mg/L	0.005	0.01	Not Detected	≤1	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5530 D	Rayong
Residual Free Chlorine *	mg/L	-	0.1	<0.1	≤1	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Cl (F)	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	856	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong

Technical Management Chontichak
Chonticha Subongkoch
Scientist (3)
ทะเบียนเลขที่ ว-323-จ-9449

Approved by
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ก-9442

Analysis / Test Report

TESTING
No.0042

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 2471204
Date Received : Jul 11, 2024
Date Reported : Jul 17, 2024
Report Number : 3032321-1

Sample Number	2471204-1
Sampled Date	Jul 11, 2024 2:14 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-IN Equalization Tank
Date Analysis Commenced	Jul 11, 2024
Condition of Sample	Contained in two BOD bottles, one amber glass bottle and eight plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, a lot of solid and some turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	10.8	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Norg (C), part NH3 (D)	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	24	≤200	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Guideline : Standard of WHA Rayong Industrial Land, Maximum levels for wastewater discharging to central wastewater treatment plant.

Sampling By : Chainusorn Lertnanthakunchai ทะเบียนเลขที่ ว-323-จ-9461 , Nachakorn Hansa ทะเบียนเลขที่ ว-204-จ-0187

Remark :
- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025

Technical Management Chontichak
Chonticha Subongkoch
Scientist (3)
ทะเบียนเลขที่ ว-323-จ-9449

Approved by
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ก-9442

Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 2471204
Date Received : Jul 11, 2024
Date Reported : Jul 20, 2024
Report Number : 3032321-2

Sample Number	2471204-1
Sampled Date	Jul 11, 2024 2:14 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-IN Equalization Tank
Date Analysis Commenced	Jul 12, 2024
Condition of Sample	Contained in two BOD bottles, one amber glass bottle and eight plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, a lot of solid and some turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Copper	mg/L	0.0003	0.0005	0.02	≤2.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Lead	mg/L	0.0003	0.0005	0.002	≤0.2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Zinc	mg/L	0.003	0.005	0.33	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Water Testing							
Total Phosphorus as P *	mg/L	0.2	0.5	7.3	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-P (B, E)	Bangkok

Guideline : Standard of WHA Rayong Industrial Land, Maximum levels for wastewater discharging to central wastewater treatment plant.

Sampling By : Chainusorn Lertnanthakunchai ทะเบียนเลขที่ ว-323-จ-9461 , Nachakorn Hansa ทะเบียนเลขที่ ว-204-จ-0187

Remark :
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Technical Management Chanatt L.
Chanattagarn Imchom
Section Head
ทะเบียนเลขที่ ว-204-จ-0008

Approved by
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ก-0004

Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 2471204
Date Received : Jul 11, 2024
Date Reported : Jul 19, 2024
Report Number : 3032321-3

Sample Number	2471204-1
Sampled Date	Jul 11, 2024 2:14 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-IN Equalization Tank
Date Analysis Commenced	Jul 11, 2024
Condition of Sample	Contained in two BOD bottles, one amber glass bottle and eight plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, a lot of solid and some turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Microbiological Testing							
Total Coliform	MPN/100mL	-	-	330000.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 9221 B	Bangkok
Water Testing							
Ammonia Nitrogen *	mg/L	0.05	0.1	8.8	No Standard	In-house method based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NH3 (D)	Rayong
Dissolved Oxygen *	mg/L	-	0.1	4.7	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-O (C)	Rayong
Nitrate as N *	mg/L	0.015	0.05	12.2	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NO3 (E)	Rayong
Nitrite as N *	mg/L	0.0006	0.002	8.100	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NO2 (B)	Rayong
Total Hardness as CaCO3 *	mg/L	-	1	345	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2340 C	Rayong
Total Nitrogen as N *	mg/L	-	1.0	31.1	No Standard	Calculation	Rayong

Guideline : Standard of WHA Rayong Industrial Land, Maximum levels for wastewater discharging to central wastewater treatment plant.

Sampling By : Chainusorn Lertnanthakunchai , Nachakorn Hansa

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Approved by SithichokT.
Sithichok Thongnguen
Scientist (3)

Analysis / Test Report

TESTING
No.0042

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 2471206
Date Received : Jul 11, 2024
Date Reported : Jul 25, 2024
Report Number : 3032330-1

Sample Number	2471206-1
Sampled Date	Jul 11, 2024 2:04 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-EF Effluent
Date Analysis Commenced	Jul 11, 2024
Condition of Sample	Contained in two BOD bottles, one amber glass bottle and eight plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	11.8	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	45	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Formaldehyde	mg/L	0.03	0.1	0.3	≤1.0	Wastewater analysis manual, Environmental Engineering Association of Thailand, 4th ed.,2004	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	6.6	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Phenol	mg/L	0.005	0.01	Not Detected	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5530 D	Rayong
Residual Free Chlorine *	mg/L	-	0.1	0.1	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Cl (F)	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	1012	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong

Technical Management
Chonticha Subongkoch
Scientist (3)
ทะเบียนเลขที่ ว-323-จ-9449

Approved by
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-9442

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Analysis / Test Report

TESTING
No.0042

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 2471206
Date Received : Jul 11, 2024
Date Reported : Jul 25, 2024
Report Number : 3032330-1

Sample Number	2471206-1
Sampled Date	Jul 11, 2024 2:04 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-EF Effluent
Date Analysis Commenced	Jul 11, 2024
Condition of Sample	Contained in two BOD bottles, one amber glass bottle and eight plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	8.0	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Norg (C), part NH3 (D)	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	14	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).
Sampling By : Chainusorn Lertnanthakunchai ทะเบียนเลขที่ ว-323-จ-9461 , Nachakorn Hansa ทะเบียนเลขที่ ว-204-จ-0187

Remark :
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Technical Management
Chonticha Subongkoch
Scientist (3)
ทะเบียนเลขที่ ว-323-จ-9449

Approved by
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-9442

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 2471206
Date Received : Jul 11, 2024
Date Reported : Jul 25, 2024
Report Number : 3032330-2

Sample Number	2471206-1
Sampled Date	Jul 11, 2024 2:04 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-EF Effluent
Date Analysis Commenced	Jul 12, 2024
Condition of Sample	Contained in two BOD bottles, one amber glass bottle and eight plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Copper	mg/L	0.0003	0.0005	0.02	≤2.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Lead	mg/L	0.0003	0.0005	0.001	≤0.2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Zinc	mg/L	0.003	0.005	0.26	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Water Testing							
Total Phosphorus as P *	mg/L	0.2	0.5	7.1	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-P (B, E)	Bangkok

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).
Sampling By : Chainusorn Lertnanthakunchai ทะเบียนเลขที่ ว-323-จ-9461 , Nachakorn Hansa ทะเบียนเลขที่ ว-204-จ-0187

Remark :
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Technical Management
Chanattagarn Imchom
Section Head
ทะเบียนเลขที่ ว-204-จ-0008

Approved by
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. No part of the report may be reproduced in any form without written consent from the laboratory. ALS Laboratory Group (Thailand) strongly recommends that the report is not reproduced except in full.

Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 2471206
Date Received : Jul 11, 2024
Date Reported : Jul 25, 2024
Report Number : 3032330-3

Sample Number	2471206-1
Sampled Date	Jul 11, 2024 2:04 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-EF Effluent
Date Analysis Commenced	Jul 11, 2024
Condition of Sample	Contained in two BOD bottles, one amber glass bottle and eight plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Microbiological Testing							
Total Coliform	MPN/100mL	-	-	49000.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 9221 B	Bangkok
Water Testing							
Ammonia Nitrogen *	mg/L	0.05	0.1	6.1	No Standard	In-house method based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NH3 (D)	Rayong
Dissolved Oxygen *	mg/L	-	0.1	7.4	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-O (C)	Rayong
Nitrate as N *	mg/L	0.015	0.05	19.3	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NO3 (E)	Rayong
Nitrite as N *	mg/L	0.0006	0.002	10.60	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NO2 (B)	Rayong
Total Hardness as CaCO3 *	mg/L	-	1	389	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2340 C	Rayong
Total Nitrogen as N *	mg/L	-	1.0	37.9	No Standard	Calculation	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).
Sampling By : Chainusorn Lertnanthakunchai , Nachakorn Hansa

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Approved by
Sithichok Thongnguen
Scientist (3)

Analysis / Test Report

TESTING
No.0042

Lot ID: 2471205
Date Received : Jul 11, 2024
Date Reported : Jul 25, 2024
Report Number : 3032339-1

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Sample Number	2471205-1
Sampled Date	Jul 11, 2024 2:35 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-RP Retention Pond
Date Analysis Commenced	Jul 11, 2024
Condition of Sample	Contained in two BOD bottles, one amber glass bottle and eight plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	<25	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Formaldehyde	mg/L	0.03	0.1	<0.1	≤1.0	Wastewater analysis manual, Environmental Engineering Association of Thailand, 4th ed.,2004	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	7.4	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Phenol	mg/L	0.005	0.01	Not Detected	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5530 D	Rayong
Residual Free Chlorine *	mg/L	-	0.1	<0.1	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Cl (F)	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	56	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong

Technical Management Chontichak
Chontcha Subongkoch
Scientist (3)
ทะเบียนเลขที่ ว-323-ง-9449

Approved by Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ก-9442

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5317-161/ EMAIL S:\Reports_All GL.rpt (11:42AM)

Analysis / Test Report

TESTING
No.0042

Lot ID: 2471205
Date Received : Jul 11, 2024
Date Reported : Jul 25, 2024
Report Number : 3032339-1

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Sample Number	2471205-1
Sampled Date	Jul 11, 2024 2:35 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-RP Retention Pond
Date Analysis Commenced	Jul 11, 2024
Condition of Sample	Contained in two BOD bottles, one amber glass bottle and eight plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	<1.0	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Norg (C), part NH3 (D)	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E 2560 (2017).
Sampling By : Chainusorn Lertnanthakunchai ทะเบียนเลขที่ ว-323-ง-9461 , Nachakorn Hansa ทะเบียนเลขที่ ว-204-ง-0187

Remark :
- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management Chontichak
Chontcha Subongkoch
Scientist (3)
ทะเบียนเลขที่ ว-323-ง-9449

Approved by Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ก-9442

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Analysis / Test Report

TESTING
No.0009

Lot ID: 2471205
Date Received : Jul 11, 2024
Date Reported : Jul 25, 2024
Report Number : 3032339-2

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Sample Number	2471205-1
Sampled Date	Jul 11, 2024 2:35 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-RP Retention Pond
Date Analysis Commenced	Jul 12, 2024
Condition of Sample	Contained in two BOD bottles, one amber glass bottle and eight plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Copper	mg/L	0.0003	0.0005	0.003	≤2.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Lead	mg/L	0.0003	0.0005	0.0007	≤0.2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Zinc	mg/L	0.003	0.005	0.04	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Water Testing							
Total Phosphorus as P *	mg/L	0.2	0.5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-P (B, E)	Bangkok

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).
Sampling By : Chainusorn Lertnanthakunchai ทะเบียนเลขที่ ว-323-ง-9461 , Nachakorn Hansa ทะเบียนเลขที่ ว-204-ง-0187

Remark :
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- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
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- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management Chanattagam Imchom
Section Head
ทะเบียนเลขที่ ว-204-ง-0008

Approved by Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ก-0004

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Analysis / Test Report

TESTING
No.0009

Lot ID: 2471205
Date Received : Jul 11, 2024
Date Reported : Jul 25, 2024
Report Number : 3032339-3

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Sample Number	2471205-1
Sampled Date	Jul 11, 2024 2:35 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-RP Retention Pond
Date Analysis Commenced	Jul 11, 2024
Condition of Sample	Contained in two BOD bottles, one amber glass bottle and eight plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Microbiological Testing							
Total Coliform	MPN/100mL	-	-	4900.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 9221 B	Bangkok
Water Testing							
Ammonia Nitrogen *	mg/L	0.05	0.1	<0.1	No Standard	In-house method based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NH3 (D)	Rayong
Dissolved Oxygen *	mg/L	-	0.1	6.9	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-O (C)	Rayong
Nitrate as N *	mg/L	0.015	0.05	0.24	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NO3 (E)	Rayong
Nitrite as N *	mg/L	0.0006	0.002	0.009	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NO2 (B)	Rayong
Total Hardness as CaCO3 *	mg/L	-	1	84	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2340 C	Rayong
Total Nitrogen as N *	mg/L	-	1.0	<1.0	No Standard	Calculation	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).
Sampling By : Chainusorn Lertnanthakunchai , Nachakorn Hansa

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Approved by Sithichok T.
Sithichok Thongnguen
Scientist (3)

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Analysis / Test Report

TESTING
No.0042

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 2484792
Date Received : Aug 13, 2024
Date Reported : Aug 21, 2024
Report Number : 3063691-1

Sample Number	2484792-1
Sampled Date	Aug 13, 2024 1:42 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-IN Equalization Tank
Date Analysis Commenced	Aug 13, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle, eight plastic bottles and two BOD bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid, and a lot of turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	18.0	≤500	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	59	≤750	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Formaldehyde	mg/L	0.03	0.1	Not Detected	≤1	Wastewater analysis manual, Environmental Engineering Association of Thailand, 4th ed.,2004	Rayong
Oil & Grease	mg/L	-	3	<3	≤10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	6.9	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Phenol	mg/L	0.005	0.01	<0.010	≤1	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5530 D	Rayong
Residual Free Chlorine *	mg/L	-	0.1	<0.1	≤1	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Cl (F)	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	992	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong

Technical Management Photchana S.
Photchana Seeda
Scientist (4)
ทะเบียนเลขที่ ว-323-ง-0028

Approved by
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ง-0001

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Analysis / Test Report

TESTING
No.0042

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 2484792
Date Received : Aug 13, 2024
Date Reported : Aug 21, 2024
Report Number : 3063691-1

Sample Number	2484792-1
Sampled Date	Aug 13, 2024 1:42 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-IN Equalization Tank
Date Analysis Commenced	Aug 13, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle, eight plastic bottles and two BOD bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid, and a lot of turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	11.7	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Norg (C), part NH3 (D)	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	41	≤200	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Guideline : Standard of WHA Rayong Industrial Land, Maximum levels for wastewater discharging to central wastewater treatment plant.
Sampling By : Warunyoo Chimphalee ทะเบียนเลขที่ ว-323-ง-0020 , Samart Khumphlee ทะเบียนเลขที่ ว-204-ง-0084

Remark :
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Technical Management Photchana S.
Photchana Seeda
Scientist (4)
ทะเบียนเลขที่ ว-323-ง-0028

Approved by
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ง-0001

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 2484792
Date Received : Aug 13, 2024
Date Reported : Aug 21, 2024
Report Number : 3063691-2

Sample Number	2484792-1
Sampled Date	Aug 13, 2024 1:42 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-IN Equalization Tank
Date Analysis Commenced	Aug 14, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle, eight plastic bottles and two BOD bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid, and a lot of turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Copper	mg/L	0.0003	0.0005	0.04	≤2.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Lead	mg/L	0.0003	0.0005	0.002	≤0.2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Mercury *	mg/L	0.0001	0.0005	<0.0005	≤0.005	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3112	Bangkok
Nickel	mg/L	0.0003	0.0005	0.02	≤1	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Zinc	mg/L	0.003	0.005	0.51	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Water Testing							
Total Phosphorus as P *	mg/L	0.2	0.5	7.5	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-P (B, E)	Bangkok

Guideline : Standard of WHA Rayong Industrial Land, Maximum levels for wastewater discharging to central wastewater treatment plant.
Sampling By : Warunyoo Chimphalee ทะเบียนเลขที่ ว-323-ง-0020 , Samart Khumphlee ทะเบียนเลขที่ ว-204-ง-0084

Remark :
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Technical Management Sawitree N.
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-ง-0007

Approved by
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ง-0004

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 2484792
Date Received : Aug 13, 2024
Date Reported : Aug 21, 2024
Report Number : 3063691-2

- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management Sawitree N.
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-ง-0007

Approved by
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ง-0004

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Analysis / Test Report

TESTING
No.0009

Lot ID: 2484792
Date Received : Aug 13, 2024
Date Reported : Aug 21, 2024
Report Number : 3063691-3

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Sample Number	2484792-1
Sampled Date	Aug 13, 2024 1:42 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-IN Equalization Tank
Date Analysis Commenced	Aug 14, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle, eight plastic bottles and two BOD bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid, and a lot of turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Microbiological Testing							
Total Coliform	MPN/100mL	-	-	330000.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 9221 B	Bangkok
Water Testing							
Ammonia Nitrogen *	mg/L	0.05	0.1	5.1	No Standard	In-house method based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NH3 (D)	Rayong
Ammonium *	mg/L	-	0.05	6.52	No Standard	In-house method based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NH3 (D)	Rayong
Dissolved Oxygen *	mg/L	-	0.1	6.6	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-O (C)	Rayong
Nitrate as N *	mg/L	0.015	0.05	16.2	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NO3 (E)	Rayong
Nitrite as N *	mg/L	0.0006	0.002	8.800	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NO2 (B)	Rayong
Total Hardness as CaCO3 *	mg/L	-	1	405	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2340 C	Rayong
Total Nitrogen as N *	mg/L	-	1.0	36.6	No Standard	Calculation	Rayong

Guideline : Standard of WHA Rayong Industrial Land, Maximum levels for wastewater discharging to central wastewater treatment plant.
Sampling By : Warunyoo Chimphalee , Samart Khumphlee

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Approved by
Tuanjai Thangklang
Manager

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Analysis / Test Report
TESTING
No.0009
Lot ID: 2484792
Date Received : Aug 13, 2024
Date Reported : Aug 21, 2024
Report Number : 3063691-3
Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Remark :
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- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
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Tuanjai Thangklang
Manager
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Analysis / Test Report

TESTING
No.0042

Lot ID: 2484803
Date Received : Aug 13, 2024
Date Reported : Aug 21, 2024
Report Number : 3063704-1

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Sample Number	2484803-1
Sampled Date	Aug 13, 2024 1:53 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-EF Effluent
Date Analysis Commenced	Aug 13, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle, eight plastic bottles and two BOD bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	5.2	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	37	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Formaldehyde	mg/L	0.03	0.1	Not Detected	≤1.0	Wastewater analysis manual, Environmental Engineering Association of Thailand, 4th ed.,2004	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	7.2	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Phenol	mg/L	0.005	0.01	Not Detected	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5530 D	Rayong
Residual Free Chlorine *	mg/L	-	0.1	<0.1	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Cl (F)	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	952	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong

Technical Management
Photchana S.
Photchana Seeda
Scientist (4)
ทะเบียนเลขที่ ว-323-ง-0028

Approved by
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ก-0001

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ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Analysis / Test Report
TESTING
No.0042
Lot ID: 2484803
Date Received : Aug 13, 2024
Date Reported : Aug 21, 2024
Report Number : 3063704-1
Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Sample Number	2484803-1
Sampled Date	Aug 13, 2024 1:53 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-EF Effluent
Date Analysis Commenced	Aug 13, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle, eight plastic bottles and two BOD bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	5.6	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Norg (C), part NH3 (D)	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	18	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).
Sampling By : Warunyoo Chimphalee ทะเบียนเลขที่ ว-323-ง-0020 , Samart Khumphlee ทะเบียนเลขที่ ว-204-ง-0084

Remark :
- LOQ : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025

Technical Management
Photchana S.
Photchana Seeda
Scientist (4)
ทะเบียนเลขที่ ว-323-ง-0028
Approved by
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ก-0001
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Life Sciences www.alsglobal.com
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Analysis / Test Report

TESTING
No.0000

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 2484803
Date Received : Aug 13, 2024
Date Reported : Aug 21, 2024
Report Number : 3063704-2

Sample Number	2484803-1
Sampled Date	Aug 13, 2024 1:53 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-EF Effluent
Date Analysis Commenced	Aug 14, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle, eight plastic bottles and two BOD bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Copper	mg/L	0.0003	0.0005	0.010	≤2.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Lead	mg/L	0.0003	0.0005	0.0009	≤0.2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Mercury *	mg/L	0.0001	0.0005	<0.0005	≤0.005	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3112	Bangkok
Nickel	mg/L	0.0003	0.0005	0.02	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Zinc	mg/L	0.003	0.005	0.14	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Water Testing							
Total Phosphorus as P *	mg/L	0.2	0.5	7.1	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-P (B, E)	Bangkok

Guideline : Effluent standard for factories, Industrial estate and Industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and Industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).
Sampling By : Warunyoo Chimphalee หมายเลขบัตร 1-323-1-0020 , Samart Khumphlee หมายเลขบัตร 1-204-1-0084

Remark :
- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.

Technical Management Sawitree N.
Sawitree Noisangiam
Manager
หมายเลขบัตร 1-204-1-0007

Approved by Kanokkorn Anek
Kanokkorn Anek
Assistant General Manager
หมายเลขบัตร 1-204-1-0004

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ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 2484803
Date Received : Aug 13, 2024
Date Reported : Aug 21, 2024
Report Number : 3063704-2

- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management Sawitree N.
Sawitree Noisangiam
Manager
หมายเลขบัตร 1-204-1-0007

Approved by Kanokkorn Anek
Kanokkorn Anek
Assistant General Manager
หมายเลขบัตร 1-204-1-0004

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ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 2484803
Date Received : Aug 13, 2024
Date Reported : Aug 21, 2024
Report Number : 3063704-3

Sample Number	2484803-1
Sampled Date	Aug 13, 2024 1:53 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-EF Effluent
Date Analysis Commenced	Aug 14, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle, eight plastic bottles and two BOD bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Microbiological Testing							
Total Coliform	MPN/100mL	-	-	490.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 9221 B	Bangkok
Water Testing							
Ammonia Nitrogen *	mg/L	0.05	0.1	2.1	No Standard	In-house method based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NH3 (D)	Rayong
Ammonium *	mg/L	-	0.05	2.66	No Standard	In-house method based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NH3 (D)	Rayong
Dissolved Oxygen *	mg/L	-	0.1	8.2	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-O (C)	Rayong
Nitrate as N *	mg/L	0.015	0.05	26.2	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NO3 (E)	Rayong
Nitrite as N *	mg/L	0.0006	0.002	7.400	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NO2 (B)	Rayong
Total Hardness as CaCO3 *	mg/L	-	1	309	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2340 C	Rayong
Total Nitrogen as N *	mg/L	-	1.0	39.2	No Standard	Calculation	Rayong

Guideline : Effluent standard for factories, Industrial estate and Industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and Industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).
Sampling By : Warunyoo Chimphalee , Samart Khumphlee

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Approved by Sithichok T.
Sithichok Thongnguen
Scientist (3)

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ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 2484803
Date Received : Aug 13, 2024
Date Reported : Aug 21, 2024
Report Number : 3063704-3

Remark :
- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
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- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

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Approved by Sithichok T.
Sithichok Thongnguen
Scientist (3)

ADDRESS 104 Phaithanakan 40, Phaithanakan Rd., Khwaeng Phaithanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Analysis / Test Report

TESTING
No.0042

Lot ID: 2484806

Date Received : Aug 13, 2024
Date Reported : Aug 21, 2024
Report Number : 3063708-1

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Sample Number	2484806-1
Sampled Date	Aug 13, 2024 2:00 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-RP Retention Pond
Date Analysis Commenced	Aug 13, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle, eight plastic bottles and two BOD bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examinaiton of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	<25	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Formaldehyde	mg/L	0.03	0.1	Not Detected	≤1.0	Wastewater analysis manual, Environmental Engineering Association of Thailand, 4th ed.,2004	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	8.0	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Phenol	mg/L	0.005	0.01	Not Detected	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5530 D	Rayong
Residual Free Chlorine *	mg/L	-	0.1	<0.1	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Cl (F)	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	85	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong

Technical Management Photchana S.
Photchana Seeda
Scientist (4)
ทะเบียนเลขที่ ว-323-ง-0028

Approved by Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ก-0001

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ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Analysis / Test Report

TESTING
No.0042

Lot ID: 2484806

Date Received : Aug 13, 2024
Date Reported : Aug 21, 2024
Report Number : 3063708-1

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Sample Number	2484806-1
Sampled Date	Aug 13, 2024 2:00 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-RP Retention Pond
Date Analysis Commenced	Aug 13, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle, eight plastic bottles and two BOD bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	<1.0	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Norg (C), part NH3 (D)	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	6	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).
Sampling By : Warunyoo Chimphalee ทะเบียนเลขที่ ว-323-ง-0020 , Samart Khumphlee ทะเบียนเลขที่ ว-204-ง-0084

Remark :
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- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
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- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management Photchana S.
Photchana Seeda
Scientist (4)
ทะเบียนเลขที่ ว-323-ง-0028

Approved by Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ก-0001

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ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Analysis / Test Report

TESTING
No.0009

Lot ID: 2484806

Date Received : Aug 13, 2024
Date Reported : Aug 21, 2024
Report Number : 3063708-2

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Sample Number	2484806-1
Sampled Date	Aug 13, 2024 2:00 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-RP Retention Pond
Date Analysis Commenced	Aug 14, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle, eight plastic bottles and two BOD bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Copper	mg/L	0.0003	0.0005	0.003	≤2.0	Standard Methods for the Examinaiton of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Lead	mg/L	0.0003	0.0005	<0.0005	≤0.2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Mercury *	mg/L	0.0001	0.0005	<0.0005	≤0.005	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3112	Bangkok
Nickel	mg/L	0.0003	0.0005	0.002	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Zinc	mg/L	0.003	0.005	0.04	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Water Testing							
Total Phosphorus as P *	mg/L	0.2	0.5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-P (B, E)	Bangkok

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).
Sampling By : Warunyoo Chimphalee ทะเบียนเลขที่ ว-323-ง-0020 , Samart Khumphlee ทะเบียนเลขที่ ว-204-ง-0084

Remark :
- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.

Technical Management Sawitree N.
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-ง-0007

Approved by Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ก-0004

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ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Analysis / Test Report

TESTING
No.0009

Lot ID: 2484806

Date Received : Aug 13, 2024
Date Reported : Aug 21, 2024
Report Number : 3063708-2

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management Sawitree N.
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-ง-0007

Approved by Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ก-0004

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. No part of the report may be reproduced in any form without written consent from the laboratory ALS Laboratory Group (Thailand) strongly recommends that the report is not reproduced except in full.

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ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 2484806
Date Received : Aug 13, 2024
Date Reported : Aug 21, 2024
Report Number : 3063708-3

Sample Number	2484806-1
Sampled Date	Aug 13, 2024 2:00 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-RP Retention Pond
Date Analysis Commenced	Aug 14, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle, eight plastic bottles and two BOD bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Microbiological Testing							
Total Coliform	MPN/100mL	-	-	130.0	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 9221 B	Bangkok
Water Testing							
Ammonia Nitrogen *	mg/L	0.05	0.1	<0.1	No Standard	In-house method based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NH3 (D)	Rayong
Ammonium *	mg/L	-	0.05	0.08	No Standard	In-house method based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NH3 (D)	Rayong
Dissolved Oxygen *	mg/L	-	0.1	9.0	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-O (C)	Rayong
Nitrate as N *	mg/L	0.015	0.05	0.69	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NO3 (E)	Rayong
Nitrite as N *	mg/L	0.0006	0.002	0.135	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NO2 (B)	Rayong
Total Hardness as CaCO3 *	mg/L	-	1	30	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2340 C	Rayong
Total Nitrogen as N *	mg/L	-	1.0	1.4	No Standard	Calculation	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).
Sampling By : Warunyoo Chimphalee , Samart Khumphlee

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. No part of the report may be reproduced in any form without written consent from the laboratory. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

Approved by Sithichok T.
Sithichok Thongnguen
Scientist (3)

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 2484806
Date Received : Aug 13, 2024
Date Reported : Aug 21, 2024
Report Number : 3063708-3

Remark :
- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

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Approved by Sithichok T.
Sithichok Thongnguen
Scientist (3)

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Analysis / Test Report

TESTING
No.0042

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 2498891
Date Received : Sep 13, 2024
Date Reported : Sep 21, 2024
Report Number : 3093774-1

Sample Number	2498891-1
Sampled Date	Sep 13, 2024 3:03 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-IN Equalization Tank
Date Analysis Commenced	Sep 13, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and nine plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	20.7	≤500	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	54	≤750	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Rayong
Formaldehyde	mg/L	0.03	0.1	0.2	≤1	Wastewater analysis manual, Environmental Engineering Association of Thailand, 4th ed.,2004	Rayong
Oil & Grease	mg/L	-	3	4	≤10	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Rayong
pH at 25 degree C		-	-	7.2	5.5-9.0	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Rayong
Phenol	mg/L	0.005	0.01	0.01	≤1	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 5530 D	Rayong
Residual Free Chlorine *	mg/L	-	0.1	<0.1	≤1	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 4500-Cl (F)	Rayong
Sulfide *	mg/L	-	0.5	<0.5	≤1	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 4500-S2 (C, F)	Rayong

Technical Management Chontichak
Chonticha Subongkoch
Scientist (3)
ทะเบียนเลขที่ ว-323-ง-0031

Approved by Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ก-0001

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Analysis / Test Report

TESTING
No.0042

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 2498891
Date Received : Sep 13, 2024
Date Reported : Sep 21, 2024
Report Number : 3093774-1

Sample Number	2498891-1
Sampled Date	Sep 13, 2024 3:03 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-IN Equalization Tank
Date Analysis Commenced	Sep 13, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and nine plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Temperature *	Degree C	-	-	31.3	≤45	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	852	≤3000	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Rayong
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	13.8	≤100	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 4500-Norg (C), part NH3 (D)	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	30	≤200	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

Guideline : Standard of WHA Rayong Industrial Land, Maximum levels for wastewater discharging to central wastewater treatment plant.
Sampling By : Paramet Sattayakun ทะเบียนเลขที่ ว-323-ง-0051 , Kardbundit Kitisupavanit ทะเบียนเลขที่ ว-204-ง-0001

Remark :
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- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management Chontichak
Chonticha Subongkoch
Scientist (3)
ทะเบียนเลขที่ ว-323-ง-0031

Approved by Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ก-0001

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 2498891
Date Received : Sep 13, 2024
Date Reported : Sep 21, 2024
Report Number : 3093774-2

Sample Number	2498891-1
Sampled Date	Sep 13, 2024 3:03 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-IN Equalization Tank
Date Analysis Commenced	Sep 16, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and nine plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Copper	mg/L	0.0003	0.0005	0.03	≤2.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Lead	mg/L	0.0003	0.0005	0.003	≤0.2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Manganese	mg/L	0.0003	0.0005	0.10	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Zinc	mg/L	0.003	0.005	0.36	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Water Testing							
Total Phosphorus as P *	mg/L	0.2	0.5	8.4	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-P (B, E)	Bangkok

Guideline : Standard of WHA Rayong Industrial Land, Maximum levels for wastewater discharging to central wastewater treatment plant.

Sampling By : Paramet Sattayakun ทะเบียนเลขที่ ว-323-จ-0051 , Kardbundit Kitisupavanit ทะเบียนเลขที่ ว-204-จ-0001

Remark :
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- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
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Technical Management
Chanattagarn Imchom
Section Head
ทะเบียนเลขที่ ว-204-จ-0008

Approved by
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 2498891
Date Received : Sep 13, 2024
Date Reported : Sep 21, 2024
Report Number : 3093774-3

Sample Number	2498891-1
Sampled Date	Sep 13, 2024 3:03 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-IN Equalization Tank
Date Analysis Commenced	Sep 13, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and nine plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Microbiological Testing							
Total Coliform	MPN/100mL	-	-	140000.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 9221 B	Bangkok
Water Testing							
Ammonia Nitrogen *	mg/L	0.05	0.1	10.1	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NH3 (D)	Rayong
Conductivity at 25 Degree C *	micromhos/cm	-	0.5	1384	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2510 B	Rayong
Dissolved Oxygen *	mg/L	-	0.1	5.4	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (C)	Rayong
Nitrate as N *	mg/L	0.015	0.05	20.8	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO3 (E)	Rayong
Nitrite as N *	mg/L	0.0006	0.002	9.000	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO2 (B)	Rayong
Total Hardness as CaCO3 *	mg/L	-	1	361	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2340 C	Rayong
Total Nitrogen as N *	mg/L	-	1.0	43.6	No Standard	Calculation	Rayong

Guideline : Standard of WHA Rayong Industrial Land, Maximum levels for wastewater discharging to central wastewater treatment plant.

Sampling By : Paramet Sattayakun , Kardbundit Kitisupavanit

Remark :

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Approved by
Sithichok Thongnguen
Scientist (3)

Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 2498891
Date Received : Sep 13, 2024
Date Reported : Sep 21, 2024
Report Number : 3093774-3

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- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
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Sithichok Thongnguen
Scientist (3)

Analysis / Test Report

TESTING
No.0042

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 2498890
Date Received : Sep 13, 2024
Date Reported : Sep 21, 2024
Report Number : 3093776-1

Sample Number	2498890-1
Sampled Date	Sep 13, 2024 2:40 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-EF Effluent
Date Analysis Commenced	Sep 13, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and nine plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and a lot of turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	5.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	45	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Rayong
Formaldehyde	mg/L	0.03	0.1	<0.1	≤1.0	Wastewater analysis manual, Environmental Engineering Association of Thailand, 4th ed.,2004	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Rayong
pH at 25 degree C		-	-	6.2	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Rayong
Phenol	mg/L	0.005	0.01	<0.010	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5530 D	Rayong
Residual Free Chlorine *	mg/L	-	0.1	<0.1	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-Cl (F)	Rayong
Temperature *	Degree C	-	-	31.2	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	1036	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Rayong

Technical Management
Chontcha Subongkoch
Scientist (3)
ทะเบียนเลขที่ ว-323-จ-0031

Approved by
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-0001

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Analysis / Test Report

TESTING
No.0042

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 2498890
Date Received : Sep 13, 2024
Date Reported : Sep 21, 2024
Report Number : 3093776-1

Sample Number	2498890-1
Sampled Date	Sep 13, 2024 2:40 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-EF Effluent
Date Analysis Commenced	Sep 13, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and nine plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and a lot of turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	4.0	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-Norg (C), part NH3 (D)	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	24	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).
Sampling By : Paramet Sattayakun ทะเบียนเลขที่ ว-323-จ-0051 , Kardbundit Kitisupavanit ทะเบียนเลขที่ ว-204-จ-0001

Remark :
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- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
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- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management
Chonticha Subongkoch
Scientist (3)
ทะเบียนเลขที่ ว-323-จ-0031

Approved by
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-0001

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 2498890
Date Received : Sep 13, 2024
Date Reported : Sep 21, 2024
Report Number : 3093776-2

Sample Number	2498890-1
Sampled Date	Sep 13, 2024 2:40 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-EF Effluent
Date Analysis Commenced	Sep 16, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and nine plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and a lot of turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Copper	mg/L	0.0003	0.0005	0.02	≤2.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Lead	mg/L	0.0003	0.0005	0.002	≤0.2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Manganese	mg/L	0.0003	0.0005	0.12	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Zinc	mg/L	0.003	0.005	0.30	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Water Testing							
Total Phosphorus as P *	mg/L	0.2	0.5	8.9	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-P (B, E)	Bangkok

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).
Sampling By : Paramet Sattayakun ทะเบียนเลขที่ ว-323-จ-0051 , Kardbundit Kitisupavanit ทะเบียนเลขที่ ว-204-จ-0001

Remark :
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- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management
Chanattagarn Imchom
Section Head
ทะเบียนเลขที่ ว-204-จ-0008

Approved by
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 2498890
Date Received : Sep 13, 2024
Date Reported : Sep 21, 2024
Report Number : 3093776-3

Sample Number	2498890-1
Sampled Date	Sep 13, 2024 2:40 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-EF Effluent
Date Analysis Commenced	Sep 13, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and nine plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and a lot of turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Microbiological Testing							
Total Coliform	MPN/100mL	-	-	49000.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 9221 B	Bangkok
Water Testing							
Ammonia Nitrogen *	mg/L	0.05	0.1	2.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NH3 (D)	Rayong
Conductivity at 25 Degree C *	micromhos/cm	-	0.5	1489	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2510 B	Rayong
Dissolved Oxygen *	mg/L	-	0.1	8.9	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (C)	Rayong
Nitrate as N *	mg/L	0.015	0.05	11.6	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO3 (E)	Rayong
Nitrite as N *	mg/L	0.0006	0.002	14.90	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO2 (B)	Rayong
Sulfide *	mg/L	-	0.5	<0.5	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-S2 (C, F)	Rayong
Total Hardness as CaCO3 *	mg/L	-	1	409	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2340 C	Rayong
Total Nitrogen as N *	mg/L	-	1.0	30.5	No Standard	Calculation	Rayong

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Approved by
Sithichok Thongnguen
Scientist (3)

Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 2498890
Date Received : Sep 13, 2024
Date Reported : Sep 21, 2024
Report Number : 3093776-3

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).
Sampling By : Paramet Sattayakun , Kardbundit Kitisupavanit

Remark :
- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

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Approved by
Sithichok Thongnguen
Scientist (3)

Analysis / Test Report

TESTING
No.0042

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 2498889
Date Received : Sep 13, 2024
Date Reported : Sep 21, 2024
Report Number : 3093777-1

Sample Number	2498889-1
Sampled Date	Sep 13, 2024 3:23 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-RP Retention Pond
Date Analysis Commenced	Sep 13, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and nine plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	<25	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Rayong
Formaldehyde	mg/L	0.03	0.1	Not Detected	≤1.0	Wastewater analysis manual, Environmental Engineering Association of Thailand, 4th ed.,2004	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Rayong
pH at 25 degree C		-	-	7.5	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Rayong
Phenol	mg/L	0.005	0.01	Not Detected	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5530 D	Rayong
Residual Free Chlorine *	mg/L	-	0.1	<0.1	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-Cl (F)	Rayong
Sulfide *	mg/L	-	0.5	<0.5	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-S2 (C, F)	Rayong

Technical Management Chontichak
Chonticha Subongkoch
Scientist (3)
ทะเบียนเลขที่ ว-323-จ-0031

Approved by
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-0001

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. No part of this report may be reproduced in any form without written consent from the laboratory. ALS Laboratory Group (Thailand) strongly recommends that the report is not reproduced except in full.

Analysis / Test Report

TESTING
No.0042

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 2498889
Date Received : Sep 13, 2024
Date Reported : Sep 21, 2024
Report Number : 3093777-1

Sample Number	2498889-1
Sampled Date	Sep 13, 2024 3:23 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-RP Retention Pond
Date Analysis Commenced	Sep 13, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and nine plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Temperature *	Degree C	-	-	31.0	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	40	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Rayong
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	<1.0	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-Norg (C), part NH3 (D)	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	10	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).
Sampling By : Paramet Sattayakun ทะเบียนเลขที่ ว-323-จ-0051 , Kardbundit Kitisupavanit ทะเบียนเลขที่ ว-204-จ-0001

Remark :
- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025

Technical Management Chontichak
Chonticha Subongkoch
Scientist (3)
ทะเบียนเลขที่ ว-323-จ-0031

Approved by
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-0001

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. No part of this report may be reproduced in any form without written consent from the laboratory. ALS Laboratory Group (Thailand) strongly recommends that the report is not reproduced except in full.

Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 2498889
Date Received : Sep 13, 2024
Date Reported : Sep 21, 2024
Report Number : 3093777-2

Sample Number	2498889-1
Sampled Date	Sep 13, 2024 3:23 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-RP Retention Pond
Date Analysis Commenced	Sep 16, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and nine plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Copper	mg/L	0.0003	0.0005	0.004	≤2.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Lead	mg/L	0.0003	0.0005	0.0007	≤0.2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Manganese	mg/L	0.0003	0.0005	0.01	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Zinc	mg/L	0.003	0.005	0.04	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Water Testing							
Total Phosphorus as P *	mg/L	0.2	0.5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-P (B, E)	Bangkok

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).
Sampling By : Paramet Sattayakun ทะเบียนเลขที่ ว-323-จ-0051 , Kardbundit Kitisupavanit ทะเบียนเลขที่ ว-204-จ-0001

Remark :
- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025

Technical Management Chanatt L.
Chanattagarn Imchom
Section Head
ทะเบียนเลขที่ ว-204-จ-0008

Approved by
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. No part of this report may be reproduced in any form without written consent from the laboratory. ALS Laboratory Group (Thailand) strongly recommends that the report is not reproduced except in full.

Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 2498889
Date Received : Sep 13, 2024
Date Reported : Sep 21, 2024
Report Number : 3093777-3

Sample Number	2498889-1
Sampled Date	Sep 13, 2024 3:23 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-RP Retention Pond
Date Analysis Commenced	Sep 13, 2024
Condition of Sample	Contained in one amber glass bottle, two glass vials and nine plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Microbiological Testing							
Total Coliform	MPN/100mL	-	-	7000.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 9221 B	Bangkok
Water Testing							
Ammonia Nitrogen *	mg/L	0.05	0.1	<0.1	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NH3 (D)	Rayong
Conductivity at 25 Degree C *	micromhos/cm	-	0.5	54.6	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2510 B	Rayong
Dissolved Oxygen *	mg/L	-	0.1	6.8	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (C)	Rayong
Nitrate as N *	mg/L	0.015	0.05	0.10	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO3 (E)	Rayong
Nitrite as N *	mg/L	0.0006	0.002	0.016	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 NO2 (B)	Rayong
Total Hardness as CaCO3 *	mg/L	-	1	33	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2340 C	Rayong
Total Nitrogen as N *	mg/L	-	1.0	<1.0	No Standard	Calculation	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).
Sampling By : Paramet Sattayakun , Kardbundit Kitisupavanit

Remark :

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Approved by SithichokT.
Sithichok Thongnguen
Scientist (3)

Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 2498889
Date Received : Sep 13, 2024
Date Reported : Sep 21, 2024
Report Number : 3093777-3

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
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Approved by SithichokT.
Sithichok Thongnguen
Scientist (3)

Analysis / Test Report

TESTING
No.0042

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 2484770
Date Received : Oct 11, 2024
Date Reported : Oct 21, 2024
Report Number : 3063633-1

Sample Number	2484770-1
Sampled Date	Oct 11, 2024 2:15 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-IN Equalization Tank
Date Analysis Commenced	Oct 11, 2024
Condition of Sample	Contained in one amber glass bottle, eight plastic bottles and two BOD bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, a lot of odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	45.9	≤500	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	72	≤750	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Rayong
Formaldehyde	mg/L	0.03	0.1	Not Detected	≤1	Wastewater analysis manual, Environmental Engineering Association of Thailand, 4th ed.,2004	Rayong
Oil & Grease	mg/L	-	3	<3	≤10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Rayong
pH at 25 degree C		-	-	7.0	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Rayong
Phenol	mg/L	0.005	0.01	Not Detected	≤1	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5530 D	Rayong
Residual Free Chlorine *	mg/L	-	0.1	<0.1	≤1	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-Cl (F)	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	916	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Rayong

Technical Management PhotchanaS.
Photchana Seeda
Scientist (4)
ทะเบียนเลขที่ ว-323-ว-0028

Approved by D. Changchon
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-0001

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. No part of the report may be reproduced in any form without written consent from the laboratory. ALS Laboratory Group (Thailand) strongly recommends that the report is not reproduced except in full.

Analysis / Test Report

TESTING
No.0042

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 2484770
Date Received : Oct 11, 2024
Date Reported : Oct 21, 2024
Report Number : 3063633-1

Sample Number	2484770-1
Sampled Date	Oct 11, 2024 2:15 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-IN Equalization Tank
Date Analysis Commenced	Oct 11, 2024
Condition of Sample	Contained in one amber glass bottle, eight plastic bottles and two BOD bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, a lot of odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	16.0	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-Norg (C), part NH3 (D)	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	70	≤200	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

Guideline : Standard of WHA Rayong Industrial Land, Maximum levels for wastewater discharging to central wastewater treatment plant.

Sampling By : Sansoen Khulyoksui ทะเบียนเลขที่ ว-323-ว-0005 , Thanasoun Namakunna ทะเบียนเลขที่ ว-204-ว-0101

Remark :
- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management PhotchanaS.
Photchana Seeda
Scientist (4)
ทะเบียนเลขที่ ว-323-ว-0028

Approved by D. Changchon
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-0001

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. No part of the report may be reproduced in any form without written consent from the laboratory. ALS Laboratory Group (Thailand) strongly recommends that the report is not reproduced except in full.

Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location WHA RIL

Lot ID: 2484770
Date Received : Oct 11, 2024
Date Reported : Oct 21, 2024
Report Number : 3063633-2

Sample Number	2484770-1
Sampled Date	Oct 11, 2024 2:15 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-IN Equalization Tank
Date Analysis Commenced	Oct 12, 2024
Condition of Sample	Contained in one amber glass bottle, eight plastic bottles and two BOD bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, a lot of odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Copper	mg/L	0.0003	0.0005	0.06	≤2.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Lead	mg/L	0.0003	0.0005	0.004	≤0.2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Zinc	mg/L	0.003	0.005	0.72	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Water Testing							
Total Phosphorus as P *	mg/L	0.2	0.5	8.2	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-P (B, E)	Bangkok

Guideline : Standard of WHA Rayong Industrial Land, Maximum levels for wastewater discharging to central wastewater treatment plant.

Sampling By : Sansoen Khulyoksui ทะเบียนเลขที่ ว-323-ว-0005 , Thanasoun Namakunna ทะเบียนเลขที่ ว-204-ว-0101

Remark :
- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management Sawitree N.
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-ว-0007

Approved by Kanokkorn Anek
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. No part of the report may be reproduced in any form without written consent from the laboratory. ALS Laboratory Group (Thailand) strongly recommends that the report is not reproduced except in full.

Analysis / Test Report

TESTING
No.0009

Lot ID: 2484770

Date Received : Oct 11, 2024
Date Reported : Oct 21, 2024
Report Number : 3063633-3

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Sample Number	2484770-1
Sampled Date	Oct 11, 2024 2:15 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-IN Equalization Tank
Date Analysis Commenced	Oct 11, 2024
Condition of Sample	Contained in one amber glass bottle, eight plastic bottles and two BOD bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, a lot of odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Microbiological Testing							
Total Coliform	MPN/100mL	-	-	130000.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 9221 B	Bangkok
Water Testing							
Ammonia Nitrogen *	mg/L	0.05	0.1	11.4	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NH3 (D)	Rayong
Dissolved Oxygen *	mg/L	-	0.1	5.9	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (C)	Rayong
Nitrate as N *	mg/L	0.015	0.05	11.5	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO3 (E)	Rayong
Nitrite as N *	mg/L	0.0006	0.002	10.40	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO2 (B)	Rayong
Total Hardness as CaCO3 *	mg/L	-	1	291	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2340 C	Rayong
Total Nitrogen as N *	mg/L	-	1.0	37.9	No Standard	Calculation	Rayong

Guideline : Standard of WHA Rayong Industrial Land, Maximum levels for wastewater discharging to central wastewater treatment plant.
Sampling By : Sansoen Khuiyoksui , Thanasoun Namakunna

Remark :
- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
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Approved by
Suwannee Chuamkeaw
Section Head

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand PHONE +66 0 2760 3000 FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Analysis / Test Report

TESTING
No.0042

Lot ID: 2484771

Date Received : Oct 11, 2024
Date Reported : Oct 21, 2024
Report Number : 3063664-1

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Sample Number	2484771-1
Sampled Date	Oct 11, 2024 2:30 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-EF Effluent
Date Analysis Commenced	Oct 11, 2024
Condition of Sample	Contained in one amber glass bottle, eight plastic bottles and two BOD bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	12.1	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	52	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Rayong
Formaldehyde	mg/L	0.03	0.1	<0.1	≤1.0	Wastewater analysis manual, Environmental Engineering Association of Thailand, 4th ed.,2004	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Rayong
pH at 25 degree C		-	-	6.1	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Rayong
Phenol	mg/L	0.005	0.01	Not Detected	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5530 D	Rayong
Residual Free Chlorine *	mg/L	-	0.1	<0.1	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-Cl (F)	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	900	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Rayong

Technical Management
Chontichak
Chonticha Subongkoch
Scientist (3)
ทะเบียนเลขที่ ว-323-ง-0031

Approved by
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ก-0001

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ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Analysis / Test Report

TESTING
No.0042

Lot ID: 2484771

Date Received : Oct 11, 2024
Date Reported : Oct 21, 2024
Report Number : 3063664-1

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Sample Number	2484771-1
Sampled Date	Oct 11, 2024 2:30 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-EF Effluent
Date Analysis Commenced	Oct 11, 2024
Condition of Sample	Contained in one amber glass bottle, eight plastic bottles and two BOD bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	8.5	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-Norg (C), part NH3 (D)	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	23	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E 2560 (2017).
Sampling By : Sansoen Khuiyoksui ทะเบียนเลขที่ ว-323-ง-0005 , Thanasoun Namakunna ทะเบียนเลขที่ ว-204-ง-0101

Remark :
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Technical Management
Chontichak
Chonticha Subongkoch
Scientist (3)
ทะเบียนเลขที่ ว-323-ง-0031

Approved by
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ก-0001

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ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Analysis / Test Report

TESTING
No.0009

Lot ID: 2484771

Date Received : Oct 11, 2024
Date Reported : Oct 21, 2024
Report Number : 3063664-2

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Sample Number	2484771-1
Sampled Date	Oct 11, 2024 2:30 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-EF Effluent
Date Analysis Commenced	Oct 12, 2024
Condition of Sample	Contained in one amber glass bottle, eight plastic bottles and two BOD bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Copper	mg/L	0.0003	0.0005	0.02	≤2.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Lead	mg/L	0.0003	0.0005	0.001	≤0.2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Zinc	mg/L	0.003	0.005	0.27	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Water Testing							
Total Phosphorus as P *	mg/L	0.2	0.5	6.8	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-P (B, E)	Bangkok

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E 2560 (2017).
Sampling By : Sansoen Khuiyoksui ทะเบียนเลขที่ ว-323-ง-0005 , Thanasoun Namakunna ทะเบียนเลขที่ ว-204-ง-0101

Remark :
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Technical Management
Sawitree N.
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-ง-0007

Approved by
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ก-0004

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ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 2484771
Date Received : Oct 11, 2024
Date Reported : Oct 21, 2024
Report Number : 3063664-3

Sample Number	2484771-1
Sampled Date	Oct 11, 2024 2:30 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-EF Effluent
Date Analysis Commenced	Oct 11, 2024
Condition of Sample	Contained in one amber glass bottle, eight plastic bottles and two BOD bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Microbiological Testing							
Total Coliform	MPN/100mL	-	-	33000.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 9221 B	Bangkok
Water Testing							
Ammonia Nitrogen *	mg/L	0.05	0.1	5.8	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NH3 (D)	Rayong
Dissolved Oxygen *	mg/L	-	0.1	9.9	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (C)	Rayong
Nitrate as N *	mg/L	0.015	0.05	17.2	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO3 (E)	Rayong
Nitrite as N *	mg/L	0.0006	0.002	16.90	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO2 (B)	Rayong
Total Hardness as CaCO3 *	mg/L	-	1	340	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2340 C	Rayong
Total Nitrogen as N *	mg/L	-	1.0	44.6	No Standard	Calculation	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).
Sampling By : Sansoen Khuiyoksul , Thanasoun Namakunna

Remark :
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Approved by
Suwannee Chuamkeaw
Section Head

Analysis / Test Report

TESTING
No.0042

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 24111238
Date Received : Oct 11, 2024
Date Reported : Oct 21, 2024
Report Number : 3121136-1

Sample Number	24111238-1
Sampled Date	Oct 11, 2024 2:40 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-RP Retention Pond
Date Analysis Commenced	Oct 11, 2024
Condition of Sample	Contained in one amber glass bottle, eight plastic bottles and two BOD bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	<25	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Rayong
Formaldehyde	mg/L	0.03	0.1	Not Detected	≤1.0	Wastewater analysis manual, Environmental Engineering Association of Thailand, 4th ed.,2004	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Rayong
pH at 25 degree C		-	-	7.9	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Rayong
Phenol *	mg/L	0.005	0.01	Not Detected	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5530 D	Rayong
Residual Free Chlorine *	mg/L	-	0.1	<0.1	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-Cl (F)	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	20	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Rayong

Technical Management
Photchana Seeda
Scientist (4)
ทะเบียนเลขที่ ว-323-จ-0028

Approved by
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-0001

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Analysis / Test Report

TESTING
No.0042

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 24111238
Date Received : Oct 11, 2024
Date Reported : Oct 21, 2024
Report Number : 3121136-1

Sample Number	24111238-1
Sampled Date	Oct 11, 2024 2:40 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-RP Retention Pond
Date Analysis Commenced	Oct 11, 2024
Condition of Sample	Contained in one amber glass bottle, eight plastic bottles and two BOD bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	<1.0	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-Norg (C), part NH3 (D)	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	7	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).
Sampling By : Sansoen Khuiyoksul ทะเบียนเลขที่ ว-323-จ-0005 , Thanasoun Namakunna ทะเบียนเลขที่ ว-204-จ-0101

Remark :
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- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
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Technical Management
Photchana Seeda
Scientist (4)
ทะเบียนเลขที่ ว-323-จ-0028

Approved by
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-0001

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location WHA RIL

Lot ID: 24111238
Date Received : Oct 11, 2024
Date Reported : Oct 21, 2024
Report Number : 3121136-2

Sample Number	24111238-1
Sampled Date	Oct 11, 2024 2:40 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-RP Retention Pond
Date Analysis Commenced	Oct 12, 2024
Condition of Sample	Contained in one amber glass bottle, eight plastic bottles and two BOD bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Copper	mg/L	0.0003	0.0005	0.003	≤2.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Lead	mg/L	0.0003	0.0005	<0.0005	≤0.2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Zinc	mg/L	0.003	0.005	0.03	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Water Testing							
Total Phosphorus as P *	mg/L	0.2	0.5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-P (B, E)	Bangkok

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).
Sampling By : Sansoen Khuiyoksul ทะเบียนเลขที่ ว-323-จ-0005 , Thanasoun Namakunna ทะเบียนเลขที่ ว-204-จ-0101

Remark :
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Technical Management
Sawitree Noisanglam
Manager
ทะเบียนเลขที่ ว-204-จ-0007

Approved by
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

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Analysis / Test Report

TESTING
No.0009

Lot ID: 24111238
Date Received : Oct 11, 2024
Date Reported : Oct 21, 2024
Report Number : 3121136-3

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Sample Number	24111238-1
Sampled Date	Oct 11, 2024 2:40 PM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-RP Retention Pond
Date Analysis Commenced	Oct 11, 2024
Condition of Sample	Contained in one amber glass bottle, eight plastic bottles and two BOD bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Microbiological Testing							
Total Coliform	MPN/100mL	-	-	490.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 9221 B	Bangkok
Water Testing							
Ammonia Nitrogen *	mg/L	0.05	0.1	0.3	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NH3 (D)	Rayong
Dissolved Oxygen *	mg/L	-	0.1	9.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (C)	Rayong
Nitrate as N *	mg/L	0.015	0.05	0.20	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO3 (E)	Rayong
Nitrite as N *	mg/L	0.0006	0.002	0.024	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO2 (B)	Rayong
Total Hardness as CaCO3 *	mg/L	-	1	15	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2340 C	Rayong
Total Nitrogen as N *	mg/L	-	1.0	<1.0	No Standard	Calculation	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).
Sampling By : Sansoen Khuiyoksuil , Thanasoun Namakunna

Remark :
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- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
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Approved by
Suwannee Chuamkeaw
Section Head

Analysis / Test Report

TESTING
No.0042

Lot ID: 24124704
Date Received : Nov 14, 2024
Date Reported : Nov 22, 2024
Report Number : 3151351-1

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Sample Number	24124704-1
Sampled Date	Nov 14, 2024 10:40 AM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-IN Equalization Tank
Date Analysis Commenced	Nov 14, 2024
Condition of Sample	Contained in two BOD bottles, one amber glass bottle and eight plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, a lot of odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	59.7	≤500	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	113	≤750	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	32	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	30	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2120 F	Rayong
Formaldehyde	mg/L	0.03	0.1	Not Detected	≤1	Wastewater analysis manual, Environmental Engineering Association of Thailand, 4th ed.,2004	Rayong
Oil & Grease	mg/L	-	3	6	≤10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Rayong
pH at 25 degree C		-	-	7.8	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Rayong
Phenol	mg/L	0.005	0.01	<0.010	≤1	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5530 D	Rayong
Residual Free Chlorine *	mg/L	-	0.1	<0.1	≤1	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-Cl (F)	Rayong

Technical Management
Photchana S.
Photchana Seeda
Scientist (4)
ระเบียนเลขที่ 1-323-1-0028

Approved by
Dej Changchon
Senior Manager
ระเบียนเลขที่ 1-323-1-0001

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Analysis / Test Report

TESTING
No.0042

Lot ID: 24124704
Date Received : Nov 14, 2024
Date Reported : Nov 22, 2024
Report Number : 3151351-1

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Sample Number	24124704-1
Sampled Date	Nov 14, 2024 10:40 AM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-IN Equalization Tank
Date Analysis Commenced	Nov 14, 2024
Condition of Sample	Contained in two BOD bottles, one amber glass bottle and eight plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, a lot of odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	1008	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Rayong
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	43.1	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-Norg (C), part NH3 (D)	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	80	≤200	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

Guideline : Standard of WHA Rayong Industrial Land, Maximum levels for wastewater discharging to central wastewater treatment plant.
Sampling By : Warunyoo Chimphalee ระเบียนเลขที่ 1-323-1-0020 , Samart Khumphlee ระเบียนเลขที่ 1-204-1-0084

Remark :
- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management
Photchana S.
Photchana Seeda
Scientist (4)
ระเบียนเลขที่ 1-323-1-0028

Approved by
Dej Changchon
Senior Manager
ระเบียนเลขที่ 1-323-1-0001

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Analysis / Test Report

TESTING
No.0009

Lot ID: 24124704
Date Received : Nov 14, 2024
Date Reported : Nov 22, 2024
Report Number : 3151351-2

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Sample Number	24124704-1
Sampled Date	Nov 14, 2024 10:40 AM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-IN Equalization Tank
Date Analysis Commenced	Nov 15, 2024
Condition of Sample	Contained in two BOD bottles, one amber glass bottle and eight plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, a lot of odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Copper	mg/L	0.0003	0.0005	0.08	≤2.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Lead	mg/L	0.0003	0.0005	0.003	≤0.2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Zinc	mg/L	0.003	0.005	1.01	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Microbiological Testing							
Total Coliform	MPN/100mL	-	-	490000.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 9221 B	Bangkok
Water Testing							
Total Phosphorus as P *	mg/L	0.2	0.5	8.6	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-P (B, E)	Bangkok

Guideline : Standard of WHA Rayong Industrial Land, Maximum levels for wastewater discharging to central wastewater treatment plant.
Sampling By : Warunyoo Chimphalee ระเบียนเลขที่ 1-323-1-0020 , Samart Khumphlee ระเบียนเลขที่ 1-204-1-0084

Remark :
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- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management
Sawitree N.
Sawitree Noisangiam
Manager
ระเบียนเลขที่ 1-204-1-0007

Approved by
Kanokkorn Anek
Assistant General Manager
ระเบียนเลขที่ 1-204-1-0004

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. No part of the report may be reproduced in any form without written consent from the laboratory. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

Analysis / Test Report

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 24124704
Date Received : Nov 14, 2024
Date Reported : Nov 22, 2024
Report Number : 3151351-3

Sample Number	24124704-1
Sampled Date	Nov 14, 2024 10:40 AM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-IN Equalization Tank
Date Analysis Commenced	Nov 14, 2024
Condition of Sample	Contained in two BOD bottles, one amber glass bottle and eight plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, a lot of odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Ammonia Nitrogen	mg/L	0.05	0.1	40.4	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NH3 (D)	Rayong
Dissolved Oxygen	mg/L	-	0.1	3.2	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (C)	Rayong
Nitrate as N	mg/L	0.015	0.05	7.95	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO3 (E)	Rayong
Nitrite as N	mg/L	0.0006	0.002	1.150	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO2 (B)	Rayong
Total Hardness as CaCO3	mg/L	-	1	491	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2340 C	Rayong
Total Nitrogen as N	mg/L	-	1.0	52.2	No Standard	Calculation	Rayong

Guideline : Standard of WHA Rayong Industrial Land, Maximum levels for wastewater discharging to central wastewater treatment plant.
Sampling By : Warunyoo Chimphalee , Samart Khumphlee

Remark :
- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

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Approved by Photchana S.
Photchana Seeda
Scientist (4)

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Analysis / Test Report

TESTING
No.0042

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 24124705
Date Received : Nov 14, 2024
Date Reported : Nov 22, 2024
Report Number : 3151353-1

Sample Number	24124705-1
Sampled Date	Nov 14, 2024 10:55 AM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-EF Effluent
Date Analysis Commenced	Nov 14, 2024
Condition of Sample	Contained in two BOD bottles, one amber glass bottle and eight plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, a lot of odour, some solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	16.4	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	52	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	25	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	24	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2120 F	Rayong
Formaldehyde	mg/L	0.03	0.1	<0.1	≤1.0	Wastewater analysis manual, Environmental Engineering Association of Thailand, 4th ed.,2004	Rayong
Oil & Grease	mg/L	-	3	5	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Rayong
pH at 25 degree C		-	-	6.1	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Rayong
Phenol	mg/L	0.005	0.01	<0.010	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5530 D	Rayong
Residual Free Chlorine *	mg/L	-	0.1	<0.1	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-Cl (F)	Rayong

Technical Management Photchana S.
Photchana Seeda
Scientist (4)
ทะเบียนเลขที่ ว-323-ง-0028

Approved by Dej Changchon
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ก-0001

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Analysis / Test Report

TESTING
No.0042

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 24124705
Date Received : Nov 14, 2024
Date Reported : Nov 22, 2024
Report Number : 3151353-1

Sample Number	24124705-1
Sampled Date	Nov 14, 2024 10:55 AM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-EF Effluent
Date Analysis Commenced	Nov 14, 2024
Condition of Sample	Contained in two BOD bottles, one amber glass bottle and eight plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, a lot of odour, some solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	1048	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Rayong
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	10.4	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-Norg (C), part NH3 (D)	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	25	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

Guideline : Effluent standard for factories, Industrial estate and Industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and Industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).
Sampling By : Warunyoo Chimphalee ทะเบียนเลขที่ ว-323-ง-0020 , Samart Khumphlee ทะเบียนเลขที่ ว-204-ง-0084

Remark :
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- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
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- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management Photchana S.
Photchana Seeda
Scientist (4)
ทะเบียนเลขที่ ว-323-ง-0028

Approved by Dej Changchon
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ก-0001

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 24124705
Date Received : Nov 14, 2024
Date Reported : Nov 22, 2024
Report Number : 3151353-2

Sample Number	24124705-1
Sampled Date	Nov 14, 2024 10:55 AM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-EF Effluent
Date Analysis Commenced	Nov 15, 2024
Condition of Sample	Contained in two BOD bottles, one amber glass bottle and eight plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, a lot of odour, some solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Copper	mg/L	0.0003	0.0005	0.02	≤2.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Lead	mg/L	0.0003	0.0005	0.002	≤0.2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Zinc	mg/L	0.003	0.005	0.28	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Microbiological Testing							
Total Coliform	MPN/100mL	-	-	33000.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 9221 B	Bangkok
Water Testing							
Total Phosphorus as P *	mg/L	0.2	0.5	7.5	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-P (B, E)	Bangkok

Guideline : Effluent standard for factories, Industrial estate and Industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and Industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).
Sampling By : Warunyoo Chimphalee ทะเบียนเลขที่ ว-323-ง-0020 , Samart Khumphlee ทะเบียนเลขที่ ว-204-ง-0084

Remark :
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- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
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- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management Sawitree N.
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-ง-0007

Approved by Kanokkorn Anek
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ก-0004

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Analysis / Test Report

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 24124705
Date Received : Nov 14, 2024
Date Reported : Nov 22, 2024
Report Number : 3151353-3

Sample Number	24124705-1
Sampled Date	Nov 14, 2024 10:55 AM
Sample Description	Group 1 : Wastewater In Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-EF Effluent
Date Analysis Commenced	Nov 14, 2024
Condition of Sample	Contained in two BOD bottles, one amber glass bottle and eight plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, a lot of odour, some solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Ammonia Nitrogen	mg/L	0.05	0.1	7.1	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NH3 (D)	Rayong
Dissolved Oxygen	mg/L	-	0.1	10.2	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (C)	Rayong
Nitrate as N	mg/L	0.015	0.05	16.3	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO3 (E)	Rayong
Nitrite as N	mg/L	0.0006	0.002	16.70	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO2 (B)	Rayong
Total Hardness as CaCO3	mg/L	-	1	411	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2340 C	Rayong
Total Nitrogen as N	mg/L	-	1.0	43.4	No Standard	Calculation	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).
Sampling By : Warunyoo Chimphalee , Samart Khumphlee

Remark :
- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

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Approved by Photchana S.
Photchana Seeda
Scientist (4)

Analysis / Test Report

TESTING
No 0042

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 24124706
Date Received : Nov 14, 2024
Date Reported : Nov 22, 2024
Report Number : 3151359-1

Sample Number	24124706-1
Sampled Date	Nov 14, 2024 11:10 AM
Sample Description	Group 1 : Wastewater In Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-RP Retention Pond
Date Analysis Commenced	Nov 14, 2024
Condition of Sample	Contained in two BOD bottles, one amber glass bottle and eight plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	<25	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	6	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	6	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2120 F	Rayong
Formaldehyde	mg/L	0.03	0.1	Not Detected	≤1.0	Wastewater analysis manual, Environmental Engineering Association of Thailand, 4th ed.,2004	Rayong
Oil & Grease	mg/L	-	3	4	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Rayong
pH at 25 degree C		-	-	7.2	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Rayong
Phenol	mg/L	0.005	0.01	Not Detected	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5530 D	Rayong
Residual Free Chlorine *	mg/L	-	0.1	<0.1	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-Cl (F)	Rayong

Technical Management Photchana S.
Photchana Seeda
Scientist (4)
ทะเบียนเลขที่ ว-323-จ-0028

Approved by D. Changchon
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-0001

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Analysis / Test Report

TESTING
No 0042

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location WHA RIL

Lot ID: 24124706
Date Received : Nov 14, 2024
Date Reported : Nov 22, 2024
Report Number : 3151359-1

Sample Number	24124706-1
Sampled Date	Nov 14, 2024 11:10 AM
Sample Description	Group 1 : Wastewater In Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-RP Retention Pond
Date Analysis Commenced	Nov 14, 2024
Condition of Sample	Contained in two BOD bottles, one amber glass bottle and eight plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	43	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Rayong
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	<1.0	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-Norg (C), part NH3 (D)	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	14	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).
Sampling By : Warunyoo Chimphalee ทะเบียนเลขที่ ว-323-จ-0020 , Samart Khumphlee ทะเบียนเลขที่ ว-204-จ-0084

Remark :
- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025

Technical Management Photchana S.
Photchana Seeda
Scientist (4)
ทะเบียนเลขที่ ว-323-จ-0028

Approved by D. Changchon
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-0001

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location WHA RIL

Lot ID: 24124706
Date Received : Nov 14, 2024
Date Reported : Nov 22, 2024
Report Number : 3151359-2

Sample Number	24124706-1
Sampled Date	Nov 14, 2024 11:10 AM
Sample Description	Group 1 : Wastewater In Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-RP Retention Pond
Date Analysis Commenced	Nov 15, 2024
Condition of Sample	Contained in two BOD bottles, one amber glass bottle and eight plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Copper	mg/L	0.0003	0.0005	0.003	≤2.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Lead	mg/L	0.0003	0.0005	0.001	≤0.2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Zinc	mg/L	0.003	0.005	0.03	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Microbiological Testing							
Total Coliform	MPN/100mL	-	-	94.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 9221 B	Bangkok
Water Testing							
Total Phosphorus as P *	mg/L	0.2	0.5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-P (B, E)	Bangkok

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).
Sampling By : Warunyoo Chimphalee ทะเบียนเลขที่ ว-323-จ-0020 , Samart Khumphlee ทะเบียนเลขที่ ว-204-จ-0084

Remark :
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Technical Management Sawitree N.
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-จ-0007

Approved by Kanokkorn Anek
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

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Analysis / Test Report

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 24124706
Date Received : Nov 14, 2024
Date Reported : Nov 22, 2024
Report Number : 3151359-3

Sample Number	24124706-1
Sampled Date	Nov 14, 2024 11:10 AM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-RP Retention Pond
Date Analysis Commenced	Nov 14, 2024
Condition of Sample	Contained in two BOD bottles, one amber glass bottle and eight plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Ammonia Nitrogen	mg/L	0.05	0.1	0.1	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NH3 (D)	Rayong
Dissolved Oxygen	mg/L	-	0.1	6.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (C)	Rayong
Nitrate as N	mg/L	0.015	0.05	0.10	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO3 (E)	Rayong
Nitrite as N	mg/L	0.0006	0.002	0.065	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO2 (B)	Rayong
Total Hardness as CaCO3	mg/L	-	1	26	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2340 C	Rayong
Total Nitrogen as N	mg/L	-	1.0	<1.0	No Standard	Calculation	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).
Sampling By : Warunyoo Chimphalee , Samart Khumphlee

Remark :
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Approved by Photchana S.
Photchana Seeda
Scientist (4)

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Analysis / Test Report

TESTING
No 0042

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 24133691
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175783-1

Sample Number	24133691-1
Sampled Date	Dec 10, 2024 10:24 AM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-IN Equalization Tank
Date Analysis Commenced	Dec 10, 2024
Condition of Sample	Contained in two glass vials, three amber glass bottles, two BOD bottles and eleven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and a lot of turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	25.2	≤500	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	59	≤750	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	56	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	52	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2120 F	Rayong
Cyanide as CN	mg/L	0.001	0.005	0.007	≤0.2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-CN (C, E)	Rayong
Formaldehyde	mg/L	0.03	0.1	Not Detected	≤1	Wastewater analysis manual, Environmental Engineering Association of Thailand, 4th ed.,2004	Rayong
Oil & Grease	mg/L	-	3	<3	≤10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Rayong
pH at 25 degree C	-	-	-	7.8	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Rayong

Technical Management Photchana S.
Photchana Seeda
Scientist (4)
หมายเลขบัตร ว-323-ง-0028

Approved by
Dej Changchon
Senior Manager
หมายเลขบัตร ว-323-ก-0001

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Analysis / Test Report

TESTING
No 0042

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 24133691
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175783-1

Sample Number	24133691-1
Sampled Date	Dec 10, 2024 10:24 AM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-IN Equalization Tank
Date Analysis Commenced	Dec 10, 2024
Condition of Sample	Contained in two glass vials, three amber glass bottles, two BOD bottles and eleven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and a lot of turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Phenol	mg/L	0.005	0.01	<0.010	≤1	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5530 D	Rayong
Residual Free Chlorine *	mg/L	-	0.1	<0.1	≤1	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-Cl (F)	Rayong
Sulfide *	mg/L	-	0.5	<0.5	≤1	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-S2 (C, F)	Rayong
Temperature *	Degree C	-	-	29.8	≤45	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	1150	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Rayong
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	17.7	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-Norg (C), part NH3 (D)	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	21	≤200	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

Guideline : Standard of WHA Rayong Industrial Land, Maximum levels for wastewater discharging to central wastewater treatment plant.
Sampling By : Nattawut Athomprommarat หมายเลขบัตร ว-323-ง-0006 , Kardbundit Kittsupavanit หมายเลขบัตร ว-204-ง-0001

Remark :
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- "-" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Technical Management Photchana S.
Photchana Seeda
Scientist (4)
หมายเลขบัตร ว-323-ง-0028

Approved by
Dej Changchon
Senior Manager
หมายเลขบัตร ว-323-ก-0001

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Analysis / Test Report

TESTING
No 0042

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 24133691
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175783-1

- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management Photchana S.
Photchana Seeda
Scientist (4)
หมายเลขบัตร ว-323-ง-0028

Approved by
Dej Changchon
Senior Manager
หมายเลขบัตร ว-323-ก-0001

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 24133691
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175783-2

Sample Number	24133691-1
Sampled Date	Dec 10, 2024 10:24 AM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-IN Equalization Tank
Date Analysis Commenced	Dec 11, 2024
Condition of Sample	Contained in two glass vials, three amber glass bottles, two BOD bottles and eleven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and a lot of turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Arsenic	mg/L	0.0003	0.0005	0.004	≤0.25	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Barium	mg/L	0.0003	0.0005	0.11	≤1	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Cadmium	mg/L	0.0003	0.0005	Not Detected	≤0.03	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Copper	mg/L	0.0003	0.0005	0.01	≤2.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Hexavalent Chromium	mg/L	0.003	0.01	Not Detected	≤0.25	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3500-Cr B	Bangkok
Lead	mg/L	0.0003	0.0005	0.0008	≤0.2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Manganese	mg/L	0.0003	0.0005	0.11	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok

Technical Management Chanattagarn Imchom, Section Head, ทะเบียนเลขที่ ว-204-จ-0008

Approved by Kanokkorn Anek, Assistant General Manager, ทะเบียนเลขที่ ว-204-ค-0004

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 24133691
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175783-2

Sample Number	24133691-1
Sampled Date	Dec 10, 2024 10:24 AM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-IN Equalization Tank
Date Analysis Commenced	Dec 11, 2024
Condition of Sample	Contained in two glass vials, three amber glass bottles, two BOD bottles and eleven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and a lot of turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Mercury *	mg/L	0.0001	0.0005	Not Detected	≤0.005	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3112	Bangkok
Nickel	mg/L	0.0003	0.0005	0.02	≤1	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Selenium	mg/L	0.0003	0.0005	0.0005	≤0.02	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Trivalent Chromium *	mg/L	-	0.01	<0.01	≤0.75	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Zinc	mg/L	0.003	0.005	0.27	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Pesticides - Organochlorine Group							
2,4-DDD *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
2,4-DDE *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok

Technical Management Chanattagarn Imchom, Section Head, ทะเบียนเลขที่ ว-204-จ-0008

Approved by Kanokkorn Anek, Assistant General Manager, ทะเบียนเลขที่ ว-204-ค-0004

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 24133691
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175783-2

Sample Number	24133691-1
Sampled Date	Dec 10, 2024 10:24 AM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-IN Equalization Tank
Date Analysis Commenced	Dec 11, 2024
Condition of Sample	Contained in two glass vials, three amber glass bottles, two BOD bottles and eleven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and a lot of turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Pesticides - Organochlorine Group							
2,4-DDT *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
4,4-DDD *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
4,4-DDE *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
4,4-DDT *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Aldrin *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
alpha-BHC *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
beta-BHC *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok

Technical Management Chanattagarn Imchom, Section Head, ทะเบียนเลขที่ ว-204-จ-0008

Approved by Kanokkorn Anek, Assistant General Manager, ทะเบียนเลขที่ ว-204-ค-0004

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location WHA RIL

Lot ID: 24133691
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175783-2

Sample Number	24133691-1
Sampled Date	Dec 10, 2024 10:24 AM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-IN Equalization Tank
Date Analysis Commenced	Dec 11, 2024
Condition of Sample	Contained in two glass vials, three amber glass bottles, two BOD bottles and eleven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and a lot of turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Pesticides - Organochlorine Group							
Chlordane *	ug/L	0.02	0.04	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
delta-BHC *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Dieldrin *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Endosulfan I *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Endosulfan II *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Endrin *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Heptachlor *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok

Technical Management Chanattagarn Imchom, Section Head, ทะเบียนเลขที่ ว-204-จ-0008

Approved by Kanokkorn Anek, Assistant General Manager, ทะเบียนเลขที่ ว-204-ค-0004

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 24133691
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175783-2

Sample Number	24133691-1
Sampled Date	Dec 10, 2024 10:24 AM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-IN Equalization Tank
Date Analysis Commenced	Dec 11, 2024
Condition of Sample	Contained in two glass vials, three amber glass bottles, two BOD bottles and eleven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and a lot of turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Pesticides - Organochlorine Group							
Heptachlor-Epoxide *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Lindane (gamma-BHC) *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Methoxychlor *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Water Testing							
Total Phosphorus as P *	mg/L	0.2	0.5	5.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-P (B, E)	Bangkok

Guideline : Standard of WHA Rayong Industrial Land, Maximum levels for wastewater discharging to central wastewater treatment plant.
Sampling By : Nattawut Athomprommarat หมายเลขบัตร 1-323-1-0006 , Kardbundit Kittsupavanit หมายเลขบัตร 1-204-1-0001

Remark :
- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management Chanattagarn Imchom
Section Head
หมายเลขบัตร 1-204-1-0008

Approved by Kanokkorn Anek
Assistant General Manager
หมายเลขบัตร 1-204-1-0004

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 24133691
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175783-3

Sample Number	24133691-1
Sampled Date	Dec 10, 2024 10:24 AM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-IN Equalization Tank
Date Analysis Commenced	Dec 10, 2024
Condition of Sample	Contained in two glass vials, three amber glass bottles, two BOD bottles and eleven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and a lot of turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Iron	mg/L	0.003	0.005	0.41	≤10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Silver	mg/L	0.0003	0.0005	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Microbiological Testing							
Total Coliform	MPN/100mL	-	-	490000.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 9221 B	Bangkok
Pesticides - Organochlorine Group							
alpha-Chlordane *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
gamma-Chlordane *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Hexachlorobenzene *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Mirex *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Water Testing							

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Section Head

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 24133691
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175783-3

Sample Number	24133691-1
Sampled Date	Dec 10, 2024 10:24 AM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-IN Equalization Tank
Date Analysis Commenced	Dec 10, 2024
Condition of Sample	Contained in two glass vials, three amber glass bottles, two BOD bottles and eleven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and a lot of turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Ammonia Nitrogen *	mg/L	0.05	0.1	15.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NH3 (D)	Rayong
Ammonium *	mg/L	-	0.05	19.4	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NH3 (D)	Rayong
Conductivity at 25 Degree C *	micromhos/cm	-	0.5	2031	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2510 B	Rayong
Dissolved Oxygen *	mg/L	-	0.1	2.7	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (C)	Rayong
Nitrate as N *	mg/L	0.015	0.05	2.91	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO3 (E)	Rayong
Nitrite as N *	mg/L	0.0006	0.002	1.050	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO2 (B)	Rayong
Total Hardness as CaCO3 *	mg/L	-	1	404	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2340 C	Rayong
Total Nitrogen as N *	mg/L	-	1.0	21.7	No Standard	Calculation	Rayong

Guideline : Standard of WHA Rayong Industrial Land, Maximum levels for wastewater discharging to central wastewater treatment plant.
Sampling By : Nattawut Athomprommarat , Kardbundit Kittsupavanit

Remark :
- LOD : Limit of Detection

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Section Head

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 24133691
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175783-3

- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

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Analysis / Test Report

TESTING
No.0042

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 24133692
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175785-1

Sample Number	24133692-1
Sampled Date	Dec 10, 2024 10:09 AM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-EF Effluent
Date Analysis Commenced	Dec 10, 2024
Condition of Sample	Contained in two glass vials, three amber glass bottles, two BOD bottles and eleven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	19.4	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	70	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	43	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	41	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2120 F	Rayong
Cyanide as CN	mg/L	0.001	0.005	0.009	≤0.2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-CN (C, E)	Rayong
Formaldehyde	mg/L	0.03	0.1	<0.1	≤1.0	Wastewater analysis manual, Environmental Engineering Association of Thailand, 4th ed.,2004	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Rayong
pH at 25 degree C		-	-	6.0	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Rayong

Technical Management Photchana S.
Photchana Seeda
Scientist (4)
ทะเบียนเลขที่ ว-323-จ-0028

Approved by
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-0001

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Analysis / Test Report

TESTING
No.0042

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 24133692
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175785-1

Sample Number	24133692-1
Sampled Date	Dec 10, 2024 10:09 AM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-EF Effluent
Date Analysis Commenced	Dec 10, 2024
Condition of Sample	Contained in two glass vials, three amber glass bottles, two BOD bottles and eleven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Phenol	mg/L	0.005	0.01	<0.010	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5530 D	Rayong
Residual Free Chlorine *	mg/L	-	0.1	<0.1	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 Cl (F)	Rayong
Sulfide *	mg/L	-	0.5	<0.5	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-S2 (C, F)	Rayong
Temperature *	Degree C	-	-	29.4	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	1240	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Rayong
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	13.8	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-Norg (C), part NH3 (D)	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	28	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).
Sampling By : Nattawut Athomprommarat ทะเบียนเลขที่ ว-323-จ-0006 , Kardbundit Kitisupavanit ทะเบียนเลขที่ ว-204-จ-0001

Remark :
- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Technical Management Photchana S.
Photchana Seeda
Scientist (4)
ทะเบียนเลขที่ ว-323-จ-0028

Approved by
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-0001

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Analysis / Test Report

TESTING
No.0042

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 24133692
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175785-1

- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025

Technical Management Photchana S.
Photchana Seeda
Scientist (4)
ทะเบียนเลขที่ ว-323-จ-0028

Approved by
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-0001

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 24133692
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175785-2

Sample Number	24133692-1
Sampled Date	Dec 10, 2024 10:09 AM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-EF Effluent
Date Analysis Commenced	Dec 11, 2024
Condition of Sample	Contained in two glass vials, three amber glass bottles, two BOD bottles and eleven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Arsenic	mg/L	0.0003	0.0005	0.006	≤0.25	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Barium	mg/L	0.0003	0.0005	0.10	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Cadmium	mg/L	0.0003	0.0005	Not Detected	≤0.03	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Copper	mg/L	0.0003	0.0005	0.03	≤2.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Hexavalent Chromium	mg/L	0.003	0.01	Not Detected	≤0.25	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3500-Cr B	Bangkok
Lead	mg/L	0.0003	0.0005	0.003	≤0.2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Manganese	mg/L	0.0003	0.0005	0.16	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok

Technical Management Chanatt L.
Chanattagam Imchom
Section Head
ทะเบียนเลขที่ ว-204-จ-0008

Approved by
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 24133692
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175785-2

Sample Number	24133692-1
Sampled Date	Dec 10, 2024 10:09 AM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-EF Effluent
Date Analysis Commenced	Dec 11, 2024
Condition of Sample	Contained in two glass vials, three amber glass bottles, two BOD bottles and eleven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Mercury *	mg/L	0.0001	0.0005	Not Detected	≤0.005	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3112	Bangkok
Nickel	mg/L	0.0003	0.0005	0.03	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Selenium	mg/L	0.0003	0.0005	<0.0005	≤0.02	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Trivalent Chromium *	mg/L	-	0.01	<0.01	≤0.75	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Zinc	mg/L	0.003	0.005	0.42	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Pesticides - Organochlorine Group							
2,4-DDD *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
2,4-DDE *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok

Technical Management Chanattagarn Imchom, Section Head, ทะเบียนเลขที่ ว-204-ง-0008

Approved by Kanokkorn Anek, Assistant General Manager, ทะเบียนเลขที่ ว-204-ก-0004

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 24133692
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175785-2

Sample Number	24133692-1
Sampled Date	Dec 10, 2024 10:09 AM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-EF Effluent
Date Analysis Commenced	Dec 11, 2024
Condition of Sample	Contained in two glass vials, three amber glass bottles, two BOD bottles and eleven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Pesticides - Organochlorine Group							
2,4-DDT *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
4,4-DDD *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
4,4-DDE *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
4,4-DDT *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Aldrin *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
alpha-BHC *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
beta-BHC *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok

Technical Management Chanattagarn Imchom, Section Head, ทะเบียนเลขที่ ว-204-ง-0008

Approved by Kanokkorn Anek, Assistant General Manager, ทะเบียนเลขที่ ว-204-ก-0004

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. No part of this report may be reproduced in any form without written consent from the laboratory. ALS Laboratory Group (Thailand) strongly recommends that the report is not reproduced except in full.

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 24133692
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175785-2

Sample Number	24133692-1
Sampled Date	Dec 10, 2024 10:09 AM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-EF Effluent
Date Analysis Commenced	Dec 11, 2024
Condition of Sample	Contained in two glass vials, three amber glass bottles, two BOD bottles and eleven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Pesticides - Organochlorine Group							
Chlordane *	ug/L	0.02	0.04	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
delta-BHC *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Dieldrin *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Endosulfan I *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Endosulfan II *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Endrin *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Heptachlor *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok

Technical Management Chanattagarn Imchom, Section Head, ทะเบียนเลขที่ ว-204-ง-0008

Approved by Kanokkorn Anek, Assistant General Manager, ทะเบียนเลขที่ ว-204-ก-0004

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 24133692
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175785-2

Sample Number	24133692-1
Sampled Date	Dec 10, 2024 10:09 AM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-EF Effluent
Date Analysis Commenced	Dec 11, 2024
Condition of Sample	Contained in two glass vials, three amber glass bottles, two BOD bottles and eleven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Pesticides - Organochlorine Group							
Heptachlor-Epoxide *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Lindane (gamma-BHC) *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Methoxychlor *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Water Testing							
Total Phosphorus as P *	mg/L	0.2	0.5	7.7	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-P (B, E)	Bangkok

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).
Sampling By : Nattawut Athomprommarat ทะเบียนเลขที่ ว-323-ง-0006 , Kardbundit Kitsupavanit ทะเบียนเลขที่ ว-204-ง-0001

Remark :
- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025

Technical Management Chanattagarn Imchom, Section Head, ทะเบียนเลขที่ ว-204-ง-0008

Approved by Kanokkorn Anek, Assistant General Manager, ทะเบียนเลขที่ ว-204-ก-0004

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. No part of this report may be reproduced in any form without written consent from the laboratory. ALS Laboratory Group (Thailand) strongly recommends that the report is not reproduced except in full.

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ALS

Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 24133692
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175785-3

Sample Number	24133692-1
Sampled Date	Dec 10, 2024 10:09 AM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-EF Effluent
Date Analysis Commenced	Dec 10, 2024
Condition of Sample	Contained in two glass vials, three amber glass bottles, two BOD bottles and eleven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Iron	mg/L	0.003	0.005	2.24	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Silver	mg/L	0.0003	0.0005	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Microbiological Testing							
Total Coliform	MPN/100mL	-	-	24000.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 9221 B	Bangkok
Pesticides - Organochlorine Group							
alpha-Chlordane *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
gamma-Chlordane *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Hexachlorobenzene *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Mirex *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Water Testing							

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. No part of this report may be reproduced in any form without written consent from the laboratory. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

Approved by Chanatt L.
Chanattagarn Imchom
Section Head

ALS

Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 24133692
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175785-3

Sample Number	24133692-1
Sampled Date	Dec 10, 2024 10:09 AM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-EF Effluent
Date Analysis Commenced	Dec 10, 2024
Condition of Sample	Contained in two glass vials, three amber glass bottles, two BOD bottles and eleven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Ammonia Nitrogen *	mg/L	0.05	0.1	9.4	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NH3 (D)	Rayong
Ammonium *	mg/L	-	0.05	12.2	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NH3 (D)	Rayong
Conductivity at 25 Degree C *	micromhos/cm	-	0.5	1976	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2510 B	Rayong
Dissolved Oxygen *	mg/L	-	0.1	10.7	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (C)	Rayong
Nitrate as N *	mg/L	0.015	0.05	15.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO3 (E)	Rayong
Nitrite as N *	mg/L	0.0006	0.002	20.40	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO2 (B)	Rayong
Total Hardness as CaCO3 *	mg/L	-	1	412	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2340 C	Rayong
Total Nitrogen as N *	mg/L	-	1.0	49.2	No Standard	Calculation	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).
Sampling By : Nattawut Athomprommarat , Kardbundit Kitisupavanit

Remark :
- LOD : Limit of Detection

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. No part of this report may be reproduced in any form without written consent from the laboratory. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

Approved by Chanatt L.
Chanattagarn Imchom
Section Head

ALS

Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 24133692
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175785-3

- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025

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Approved by Chanatt L.
Chanattagarn Imchom
Section Head

ALS

Analysis / Test Report

TESTING
No.0042

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 24133695
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175789-1

Sample Number	24133695-1
Sampled Date	Dec 10, 2024 10:50 AM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-RP Retention Pond
Date Analysis Commenced	Dec 10, 2024
Condition of Sample	Contained in two glass vials, three amber glass bottles, two BOD bottles and eleven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	<25	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	5	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	5	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2120 F	Rayong
Cyanide as CN	mg/L	0.001	0.005	<0.005	≤0.2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-CN (C, E)	Rayong
Formaldehyde	mg/L	0.03	0.1	Not Detected	≤1.0	Wastewater analysis manual, Environmental Engineering Association of Thailand, 4th ed.,2004	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B	Rayong
pH at 25 degree C		-	-	7.0	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Rayong

Technical Management Photchana S.
Photchana Seeda
Scientist (4)
ทะเบียนเลขที่ ว-323-จ-0028

Approved by D. Changchon
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ก-0001

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Analysis / Test Report

TESTING
No.0042

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 24133695
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175789-1

Sample Number	24133695-1
Sampled Date	Dec 10, 2024 10:50 AM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-RP Retention Pond
Date Analysis Commenced	Dec 10, 2024
Condition of Sample	Contained in two glass vials, three amber glass bottles, two BOD bottles and eleven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Phenol	mg/L	0.005	0.01	Not Detected	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5530 D	Rayong
Residual Free Chlorine *	mg/L	-	0.1	<0.1	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-Cl (F)	Rayong
Sulfide *	mg/L	-	0.5	<0.5	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-S2 (C, F)	Rayong
Temperature *	Degree C	-	-	29.6	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	35	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	Rayong
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	<1.0	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-Norg (C), part NH3 (D)	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	11	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).
Sampling By : Nattawut Athomprommarat ทะเบียนเลขที่ ว-323-จ-0006 , Kardbundit Kitisupavanit ทะเบียนเลขที่ ว-204-จ-0001

Remark :
- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Technical Management Photchana S.
Photchana Seeda
Scientist (4)
ทะเบียนเลขที่ ว-323-จ-0028

Approved by D. Changchon
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-0001

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Analysis / Test Report

TESTING
No.0042

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 24133695
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175789-1

- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025

Technical Management Photchana S.
Photchana Seeda
Scientist (4)
ทะเบียนเลขที่ ว-323-จ-0028

Approved by D. Changchon
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-0001

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 24133695
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175789-2

Sample Number	24133695-1
Sampled Date	Dec 10, 2024 10:50 AM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-RP Retention Pond
Date Analysis Commenced	Dec 11, 2024
Condition of Sample	Contained in two glass vials, three amber glass bottles, two BOD bottles and eleven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Arsenic	mg/L	0.0003	0.0005	0.0008	≤0.25	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Barium	mg/L	0.0003	0.0005	0.02	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Cadmium	mg/L	0.0003	0.0005	Not Detected	≤0.03	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Copper	mg/L	0.0003	0.0005	0.003	≤2.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Hexavalent Chromium	mg/L	0.003	0.01	Not Detected	≤0.25	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3500-Cr B	Bangkok
Lead	mg/L	0.0003	0.0005	0.0007	≤0.2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Manganese	mg/L	0.0003	0.0005	0.02	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok

Technical Management Chanatt L.
Chanattagarn Imchom
Section Head
ทะเบียนเลขที่ ว-204-จ-0008

Approved by Kanokkorn Anek
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 24133695
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175789-2

Sample Number	24133695-1
Sampled Date	Dec 10, 2024 10:50 AM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-RP Retention Pond
Date Analysis Commenced	Dec 11, 2024
Condition of Sample	Contained in two glass vials, three amber glass bottles, two BOD bottles and eleven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Mercury *	mg/L	0.0001	0.0005	Not Detected	≤0.005	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3112	Bangkok
Nickel	mg/L	0.0003	0.0005	0.001	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Selenium	mg/L	0.0003	0.0005	Not Detected	≤0.02	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Trivalent Chromium *	mg/L	-	0.01	<0.01	≤0.75	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Zinc	mg/L	0.003	0.005	0.03	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Pesticides - Organochlorine Group							
2,4-DDD *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
2,4-DDE *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok

Technical Management Chanatt L.
Chanattagarn Imchom
Section Head
ทะเบียนเลขที่ ว-204-จ-0008

Approved by Kanokkorn Anek
Kanokkorn Anek
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-0004

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 24133695
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175789-2

Sample Number	24133695-1
Sampled Date	Dec 10, 2024 10:50 AM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-RP Retention Pond
Date Analysis Commenced	Dec 11, 2024
Condition of Sample	Contained in two glass vials, three amber glass bottles, two BOD bottles and eleven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Pesticides - Organochlorine Group							
2,4-DDT *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
4,4-DDD *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
4,4-DDE *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
4,4-DDT *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Aldrin *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
alpha-BHC *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
beta-BHC *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok

Technical Management Chanattagarn Imchom, Section Head, ทะเบียนเลขที่ ว-204-จ-0008
Approved by Kanokkorn Anek, Assistant General Manager, ทะเบียนเลขที่ ว-204-ค-0004

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 24133695
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175789-2

Sample Number	24133695-1
Sampled Date	Dec 10, 2024 10:50 AM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-RP Retention Pond
Date Analysis Commenced	Dec 11, 2024
Condition of Sample	Contained in two glass vials, three amber glass bottles, two BOD bottles and eleven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Pesticides - Organochlorine Group							
Chlordane *	ug/L	0.02	0.04	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
delta-BHC *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Dieldrin *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Endosulfan I *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Endosulfan II *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Endrin *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Heptachlor *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok

Technical Management Chanattagarn Imchom, Section Head, ทะเบียนเลขที่ ว-204-จ-0008
Approved by Kanokkorn Anek, Assistant General Manager, ทะเบียนเลขที่ ว-204-ค-0004

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 24133695
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175789-2

Sample Number	24133695-1
Sampled Date	Dec 10, 2024 10:50 AM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-RP Retention Pond
Date Analysis Commenced	Dec 11, 2024
Condition of Sample	Contained in two glass vials, three amber glass bottles, two BOD bottles and eleven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Pesticides - Organochlorine Group							
Heptachlor-Epoxide *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Lindane (gamma-BHC) *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Methoxychlor *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Water Testing							
Total Phosphorus as P *	mg/L	0.2	0.5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-P (B, E)	Bangkok

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).
Sampling By : Nattawut Athomprommarat ทะเบียนเลขที่ ว-323-จ-0006 , Kardbundit Kittisupavanit ทะเบียนเลขที่ ว-204-จ-0001

Remark :
- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025

Technical Management Chanattagarn Imchom, Section Head, ทะเบียนเลขที่ ว-204-จ-0008
Approved by Kanokkorn Anek, Assistant General Manager, ทะเบียนเลขที่ ว-204-ค-0004

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Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 24133695
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175789-3

Sample Number	24133695-1
Sampled Date	Dec 10, 2024 10:50 AM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-RP Retention Pond
Date Analysis Commenced	Dec 10, 2024
Condition of Sample	Contained in two glass vials, three amber glass bottles, two BOD bottles and eleven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Iron	mg/L	0.003	0.005	0.51	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Silver	mg/L	0.0003	0.0005	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Microbiological Testing							
Total Coliform	MPN/100mL	-	-	110.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 9221 B	Bangkok
Pesticides - Organochlorine Group							
alpha-Chlordane *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
gamma-Chlordane *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Hexachlorobenzene *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Mirex *	ug/L	0.01	0.02	Not Detected	Not Detected	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6630 D, part 6410 B	Bangkok
Water Testing							

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Approved by Chanattagarn Imchom, Section Head

Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 24133695
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175789-3

Sample Number	24133695-1
Sampled Date	Dec 10, 2024 10:50 AM
Sample Description	Group 1 : Wastewater in Center Treatment Plant (WW-Plant)
Location	WHA RIL : WW-RP Retention Pond
Date Analysis Commenced	Dec 10, 2024
Condition of Sample	Contained in two glass vials, three amber glass bottles, two BOD bottles and eleven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Ammonia Nitrogen *	mg/L	0.05	0.1	<0.1	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NH3 (D)	Rayong
Ammonium *	mg/L	-	0.05	0.11	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NH3 (D)	Rayong
Conductivity at 25 Degree C *	micromhos/cm	-	0.5	61.8	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2510 B	Rayong
Dissolved Oxygen *	mg/L	-	0.1	7.4	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (C)	Rayong
Nitrate as N *	mg/L	0.015	0.05	0.07	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO3 (E)	Rayong
Nitrite as N *	mg/L	0.0006	0.002	0.072	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-NO2 (B)	Rayong
Total Hardness as CaCO3 *	mg/L	-	1	20	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2340 C	Rayong
Total Nitrogen as N *	mg/L	-	1.0	<1.0	No Standard	Calculation	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).
Sampling By : Nattawut Athomprommarat , Kardbundit Kitsupavanit

Remark :
- LOD : Limit of Detection

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. No part of this report may be reproduced in any form without written consent from the laboratory. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

Approved by Chanatt L.
Chanattagarn Imchom
Section Head

Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglalok Rd., Nonglalok, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL

Lot ID: 24133695
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175789-3

- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025

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Approved by Chanatt L.
Chanattagarn Imchom
Section Head

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