

คุณภาพน้ำทิ้ง

ระบบบำบัดน้ำเสียรวมทางชีวภาพ



Analysis / Test Report

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



TESTING

No 0042
Lot ID: 2471204
Date Received : Jul 11, 2024
Date Reported : Jul 17, 2024
Report Number : 3032321-1

Page 1 of 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 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 (8)	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 Subongkroh
Scientist (3)
โทรศัพท์ 0-323-9-9449

Approved by

Dej Chanchon

Dej Chanchon
Senior Manager
โทรศัพท์ 0-323-9-9442

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Analysis / Test Report

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

No 0042
Lot ID: 2471204
Date Received : Jul 11, 2024
Date Reported : Jul 17, 2024
Report Number : 3032321-1

Page 2 of 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 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 1003 (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 : Chaisorn Lerthanakunchai โทรศัพท์ 0-323-9-9461, Natchakorn Hansa โทรศัพท์ 0-323-9-9487

Remark :
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Chonticha Subongkroh
Scientist (3)
โทรศัพท์ 0-323-9-9449

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Dej Chanchon

Dej Chanchon
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โทรศัพท์ 0-323-9-9442

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222 Moo 11, Bankhai-Nonglao Rd., Nonglao, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL



TESTING

No 0009
Lot ID: 2471204
Date Received : Jul 11, 2024
Date Reported : Jul 20, 2024
Report Number : 3032321-2

Page 1 of 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 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, C)	Bangkok

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

Sampling By : Chaisorn Lerthanakunchai โทรศัพท์ 0-323-9-9461, Natchakorn Hansa โทรศัพท์ 0-323-9-9487

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Technical Management

Chanatt L.

Chanattagom Imchom
Section Head
โทรศัพท์ 0-2604-0-0008

Approved by

Kanokorn Anek

Kanokorn Anek
Assistant General Manager
โทรศัพท์ 0-2604-0-0004

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Analysis / Test Report

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



TESTING

No 0009
Lot ID: 2471204
Date Received : Jul 11, 2024
Date Reported : Jul 19, 2024
Report Number : 3032321-3

Page 1 of 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
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 ₂ (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 NO ₃ (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 NO ₂ (B)	Rayong
Total Hardness as CaCO ₃ *	mg/L	-	1	345	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2140 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 : Chaisorn Lerthanakunchai , Natchakorn Hansa

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Technical Management

Sithichok T.

Sithichok Thonguen
Scientist (3)

Approved by

Sithichok T.

Sithichok Thonguen
Scientist (3)

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222 Moo 11, Bankhai-Nonglalek Rd., Nonglalek, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL



TESTING

No.0042
Lot ID: 2471206
Date Received : Jul 11, 2024
Date Reported : Jul 25, 2024
Report Number: 3032330-1

Page 1 of 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 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

Chontichak

Chonticha Subongkroh
Scientist (3)
โทรศัพท์ ๖-323-๙-9449

Approved by

D. Chongchon

Dej Chongchon
Senior Manager
โทรศัพท์ ๖-323-๙-9442

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S (Report), All GL opt (13 2349)



Analysis / Test Report

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



TESTING

No.0009
Lot ID: 2471206
Date Received : Jul 11, 2024
Date Reported : Jul 25, 2024
Report Number: 3032330-2

Page 1 of 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 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 : Chaiyusorn Lerthanakulchai โทรศัพท์ ๖-323-๙-9461, Nachakorn Hansa โทรศัพท์ ๖-304-๙-0187

Remark :
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Technical Management

Chanatt L.

Chanattaporn Jomchon
Section Head
โทรศัพท์ ๖-304-๙-0008

Approved by

Kankorn Anek

Assistant General Manager
โทรศัพท์ ๖-304-๙-0004

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Analysis / Test Report

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



TESTING

No.0042
Lot ID: 2471206
Date Received : Jul 11, 2024
Date Reported : Jul 25, 2024
Report Number: 3032330-1

Page 2 of 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 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 : Chaiyusorn Lerthanakulchai โทรศัพท์ ๖-323-๙-9461, Nachakorn Hansa โทรศัพท์ ๖-304-๙-0187

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Technical Management

Chontichak

Chonticha Subongkroh
Scientist (3)
โทรศัพท์ ๖-323-๙-9449

Approved by

D. Chongchon

Dej Chongchon
Senior Manager
โทรศัพท์ ๖-323-๙-9442

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Project Location: WHA RIL



TESTING

No.0009
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Date Received : Jul 11, 2024
Date Reported : Jul 25, 2024
Report Number: 3032330-3

Page 1 of 1

Sample Number		2471206-1						Page 1 of 2
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 (E)	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 : Chaiyusorn Lerthanakulchai , Nachakorn Hansa

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Technical Management

Sithichok T.

Sithichok Thongnuean
Scientist (3)

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222 Moo 11, Bankhai-Nonglak Rd., Nonglak, Bankhai, Rayong Thailand 21120
P/O :
Project Name :
Project Location: WHA RIL



TESTING
No.0042
Lot ID: 2471205
Date Received : Jul 11, 2024
Date Reported : Jul 25, 2024
Report Number : 3032339-1

Page 1 of 2

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

Chonticha Subongkoch
Scientist (3)
วิไลวรรณ 3-323-9-9449

Approved by

Dej Chanchong

Dej Chanchong
Senior Manager
วิไลวรรณ 3-323-9-9442

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Analysis / Test Report

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



TESTING
No.0042
Lot ID: 2471205
Date Received : Jul 11, 2024
Date Reported : Jul 25, 2024
Report Number : 3032339-1

Page 2 of 2

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 4500-N (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 : Chaiyosorn Lertnathakunchai วิไลวรรณ 3-323-9-9461, Natchakorn Hansa วิไลวรรณ 3-204-9-0167

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

Chontichak

Chonticha Subongkoch
Scientist (3)
วิไลวรรณ 3-323-9-9449

Approved by

Dej Chanchong

Dej Chanchong
Senior Manager
วิไลวรรณ 3-323-9-9442

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Analysis / Test Report

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



TESTING
No.0009
Lot ID: 2471205
Date Received : Jul 11, 2024
Date Reported : Jul 25, 2024
Report Number : 3032339-2

Page 1 of 1

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 : Chaiyosorn Lertnathakunchai วิไลวรรณ 3-323-9-9461, Natchakorn Hansa วิไลวรรณ 3-204-9-0167

Remark :

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Technical Management

Chanatt L.

Chanattagim Imchom
Section Head
วิไลวรรณ 3-204-9-0008

Approved by

Kanokorn Anek

Kanokorn Anek
Assistant General Manager
วิไลวรรณ 3-204-9-0004

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Analysis / Test Report

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



TESTING
No.0009
Lot ID: 2471205
Date Received : Jul 11, 2024
Date Reported : Jul 25, 2024
Report Number : 3032339-3

Page 1 of 1

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 REL : 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	0.0005	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 : Chaiyosorn Lertnathakunchai, Natchakorn Hansa

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Technical Management

Sithichok T.

Sithichok Thongpen
Scientist (3)

Approved by

Sithichok T.

Sithichok Thongpen
Scientist (3)

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Analysis / Test Report

TESTING

No 0042

Lot ID: 2484792

Date Received : Aug 13, 2024

Date Reported : Aug 21, 2024

Report Number : 3063691-1

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglakh Rd., Nonglakh, 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 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 5500 - 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., 2009	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 (6)	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

Photchanas S.

Photchanas Seeda
Scientist (4)
วิไลวรรณ 7-323-0-0028

Approved by

D. Chongchon

Dej Chongchon
Senior Manager
วิไลวรรณ 7-323-0-0001

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Analysis / Test Report

TESTING

No 0042

Lot ID: 2484792

Date Received : Aug 13, 2024

Date Reported : Aug 21, 2024

Report Number : 3063691-1

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglakh Rd., Nonglakh, 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 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 - Nitrogen (C), part NHI (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 : Warunyo Chimpalee วิไลวรรณ 7-323-0-0020, Samart Khumphae วิไลวรรณ 7-204-0-0084

Remark :

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Technical Management

Photchanas S.

Photchanas Seeda
Scientist (4)
วิไลวรรณ 7-323-0-0028

Approved by

D. Chongchon

Dej Chongchon
Senior Manager
วิไลวรรณ 7-323-0-0001

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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 : 3063691-2

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglakh Rd., Nonglakh, 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
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 3125 B, 3030 F	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 : Warunyo Chimpalee วิไลวรรณ 7-323-0-0020, Samart Khumphae วิไลวรรณ 7-204-0-0084

Remark :

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Technical Management

Savitree N.

Savitree Nongsam
Manager
วิไลวรรณ 7-204-0-0007

Approved by

Kankom Anek

Kankom Anek
Assistant General Manager
วิไลวรรณ 7-204-0-0004

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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 : 3063691-2

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglakh Rd., Nonglakh, 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

Savitree N.

Savitree Nongsam
Manager
วิไลวรรณ 7-204-0-0007

Approved by

Kankom Anek

Kankom Anek
Assistant General Manager
วิไลวรรณ 7-204-0-0004

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Analysis / Test Report

Client : WHA Utilities and Power Public Company Limited
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P/O :
Project Name :
Project Location : WHA RIL

TESTING
No.0009
Lot ID: 2484792
Date Received : Aug 13, 2024
Date Reported : Aug 21, 2024
Report Number : 3063691-3

Page 1 of 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-BN 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
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 9221.9
Water Testing						
Ammonia Nitrogen *	mg/L	0.05	0.1	5.3	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)
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)
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)
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)
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)
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
Total Nitrogen as N *	mg/L	-	1.0	36.6	No Standard	Calculation

Guideline : Standard of WHA Rayong Industrial Land, Maximum levels for wastewater discharging to central wastewater treatment plant.
Sampling By : Wanuyoo Chimpalee , Samart Khumplinee

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Approved by

Tuanjai Thangkiang
Manager



Analysis / Test Report

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

TESTING
No.0009
Lot ID: 2484792
Date Received : Aug 13, 2024
Date Reported : Aug 21, 2024
Report Number : 3063691-3

Page 2 of 2

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Approved by

Tuanjai Thangkiang
Manager



Analysis / Test Report

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

TESTING
No.0042
Lot ID: 2484803
Date Received : Aug 13, 2024
Date Reported : Aug 21, 2024
Report Number : 3063704-1

Page 1 of 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 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
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
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
Formaldehyde	mg/L	0.03	0.1	Not Detected	≤1.0	Wastewater analysis manual, Environmental Engineering Association of Thailand, 4th ed., 2004
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 5320 B
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)
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 5510 D
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)
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

Technical Management

Photchana S.

Photchana Seeda
Scientist (4)
โทร: 09-00000000 323-0-0028

Approved by

Dej Changchon
Senior Manager
โทร: 09-00000000 323-0-0001



Analysis / Test Report

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

TESTING
No.0042
Lot ID: 2484803
Date Received : Aug 13, 2024
Date Reported : Aug 21, 2024
Report Number : 3063704-1

Page 2 of 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 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
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-Itorg (C), part NH3 (D)
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

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 : Wanuyoo Chimpalee โทร: 09-00000000 323-0-0020 , Samart Khumplinee โทร: 09-00000000 323-0-0004

Remark :
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• <L : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
• Analyte(s) marked * were 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)
โทร: 09-00000000 323-0-0028

Approved by

Dej Changchon
Senior Manager
โทร: 09-00000000 323-0-0001



Analysis / Test Report

TESTING
No.0009

Lot ID: 2484803

Date Received : Aug 13, 2024

Date Reported : Aug 21, 2024

Report Number : 3063704-2

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

Sample Number	2484803-1					Page 1 of 2
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
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
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
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
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
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
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)

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 : Wanunyo Chimpalee วิไลวรรณ วัฒนโย -323-0020, Samart Khumplhee วิไลวรรณ วัฒนโย -204-0084

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 *Savitree N.*
Savitree Nongsiam
Manager
วิไลวรรณ วัฒนโย -204-0007

Approved by *Kanokorn Anek*
Kanokorn Anek
Assistant General Manager
วิไลวรรณ วัฒนโย -204-0004

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Analysis / Test Report

TESTING
No.0009

Lot ID: 2484803

Date Received : Aug 13, 2024

Date Reported : Aug 21, 2024

Report Number : 3063704-2

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

Sample Number	2484803-1					Page 2 of 2
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
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
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
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
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
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
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)

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 : Wanunyo Chimpalee วิไลวรรณ วัฒนโย -323-0020, Samart Khumplhee วิไลวรรณ วัฒนโย -204-0084

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

Technical Management *Savitree N.*
Savitree Nongsiam
Manager
วิไลวรรณ วัฒนโย -204-0007

Approved by *Kanokorn Anek*
Kanokorn Anek
Assistant General Manager
วิไลวรรณ วัฒนโย -204-0004

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Analysis / Test Report

TESTING
No.0009

Lot ID: 2484803

Date Received : Aug 13, 2024

Date Reported : Aug 21, 2024

Report Number : 3063704-3

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

Sample Number	2484803-1					Page 1 of 2
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
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
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-NH2 (D)
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-NH2 (D)
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-DO (C)
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)
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)
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
Total Nitrogen as N *	mg/L	-	1.0	39.2	No Standard	Calculation

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 : Wanunyo Chimpalee วิไลวรรณ วัฒนโย -323-0020, Samart Khumplhee วิไลวรรณ วัฒนโย -204-0084

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Approved by *Sithichok T.*
Sithichok Thongnuen
Scientist (J)

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Analysis / Test Report

TESTING
No.0009

Lot ID: 2484803

Date Received : Aug 13, 2024

Date Reported : Aug 21, 2024

Report Number : 3063704-3

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

Sample Number	2484803-1					Page 2 of 2
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
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
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-NH2 (D)
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-NH2 (D)
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-DO (C)
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)
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)
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
Total Nitrogen as N *	mg/L	-	1.0	39.2	No Standard	Calculation

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 : Wanunyo Chimpalee วิไลวรรณ วัฒนโย -323-0020, Samart Khumplhee วิไลวรรณ วัฒนโย -204-0084

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Approved by *Sithichok T.*
Sithichok Thongnuen
Scientist (J)

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Analysis / Test Report

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



TESTING
No 0042
Lot ID: 2484806
Date Received : Aug 13, 2024
Date Reported : Aug 21, 2024
Report Number : 3063708-1

Page 1 of 2

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 Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O ₅	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, 9th 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

Photchanas S.

Photchanas Seeda
Scientist (4)
วิศกรอาวุโส ร-323-ว-0028

Approved by

Dej Changchon

Dej Changchon
Senior Manager
วิศกรอาวุโส ร-323-ว-0001

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Analysis / Test Report

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



TESTING
No 0042
Lot ID: 2484806
Date Received : Aug 13, 2024
Date Reported : Aug 21, 2024
Report Number : 3063708-1

Page 2 of 2

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-Nitrogen (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 Chimpalae วิศกรอาวุโส ร-323-ว-0020, Samart Khumplhee วิศกรอาวุโส ร-204-ว-0084

Remark :

- LOD : Limit of Detection
- <C : 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 S.

Photchanas Seeda
Scientist (4)
วิศกรอาวุโส ร-323-ว-0028

Approved by

Dej Changchon

Dej Changchon
Senior Manager
วิศกรอาวุโส ร-323-ว-0001

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Client : WHA Utilities and Power Public Company Limited
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P/O :
Project Name :
Project Location: WHA RIL



TESTING
No 0009
Lot ID: 2484806
Date Received : Aug 13, 2024
Date Reported : Aug 21, 2024
Report Number : 3063708-2

Page 1 of 2

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 Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Lead	mg/L	0.0003	0.0005	<0.0005	≤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, C)	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 Chimpalae วิศกรอาวุโส ร-323-ว-0020, Samart Khumplhee วิศกรอาวุโส ร-204-ว-0084

Remark :

- LOD : Limit of Detection
- <C : 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

Savitree N.

Savitree Nonsangam
Manager
วิศกรอาวุโส ร-204-ว-0007

Approved by

Kanokrom Anek

Kanokrom Anek
Assistant General Manager
วิศกรอาวุโส ร-204-ว-0004

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Analysis / Test Report

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



TESTING
No 0009
Lot ID: 2484806
Date Received : Aug 13, 2024
Date Reported : Aug 21, 2024
Report Number : 3063708-2

Page 2 of 2

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

Technical Management

Savitree N.

Savitree Nonsangam
Manager
วิศกรอาวุโส ร-204-ว-0007

Approved by

Kanokrom Anek

Kanokrom Anek
Assistant General Manager
วิศกรอาวุโส ร-204-ว-0004

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Analysis / Test Report



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

TESTING
No.0009
Lot ID: 2484806
Date Received : Aug 13, 2024
Date Reported : Aug 21, 2024
Report Number : 3063709-3

Page 1 of 2

Sample Number	2484805-1					
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
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
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)
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)
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-D (C)
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)
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)
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
Total Nitrogen as N *	mg/L	-	1.0	1.4	No Standard	Calculation

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 Chimpalee , Samart Khumplee

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Approved by

Sithichok T.
Sithichok Thongnguen
Scientist (3)



Analysis / Test Report



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

TESTING
No.0009
Lot ID: 2484806
Date Received : Aug 13, 2024
Date Reported : Aug 21, 2024
Report Number : 3063709-3

Page 2 of 2

Remarks :
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- 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.

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
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)
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)
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-D (C)
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)
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)
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
Total Nitrogen as N *	mg/L	-	1.0	1.4	No Standard	Calculation

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 Chimpalee , Samart Khumplee

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Approved by

Sithichok T.
Sithichok Thongnguen
Scientist (3)



Analysis / Test Report



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

TESTING
No.0042
Lot ID: 2498891
Date Received : Sep 13, 2024
Date Reported : Sep 23, 2024
Report Number : 3093774-1

Page 1 of 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 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
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
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
Formaldehyde	mg/L	0.03	0.1	0.2	≤1	Wastewater analysis manual, Environmental Engineering Association of Thailand, 4th ed., 2008
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
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 (8)
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
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)
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)

Technical Management

Chontichok
Chonticha Subongkroh
Scientist (3)
โทร: 09-00000000-7-323-4-0031

Approved by

Dej Changchong
Senior Manager
โทร: 09-00000000-7-323-4-0001

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Analysis / Test Report



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

TESTING
No.0042
Lot ID: 2498891
Date Received : Sep 13, 2024
Date Reported : Sep 23, 2024
Report Number : 3093774-1

Page 2 of 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 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
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
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
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	13.6	≤100	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 4500-Nitrog (C), part N113 (D)
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

Guideline : Standard of WHA Rayong Industrial Land, Maximum levels for wastewater discharging to central wastewater treatment plant.
Sampling By : Paramet Sittayakun โทร: 09-00000000-7-323-4-0051, Kambundit Kiksupavanit โทร: 09-00000000-7-204-4-0001

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

Technical Management

Chontichok
Chonticha Subongkroh
Scientist (3)
โทร: 09-00000000-7-323-4-0031

Approved by

Dej Changchong
Senior Manager
โทร: 09-00000000-7-323-4-0001

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Analysis / Test Report

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P/O :
Project Name :
Project Location : WHA RIL



TESTING
No.0009
Lot ID: 2498891
Date Received : Sep 13, 2024
Date Reported : Sep 21, 2024
Report Number : 3093774-2

Page 1 of 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
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
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
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
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
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)

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

Sampling By : Paramet Sattayakun วิจัยสุวิทย์ 323-0-0051 , Kardbundi Kitsupavank วิจัยสุวิทย์ 323-0-0001

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

Technical Management

Chanatt L.

Chanattagarn Limchom
Section Head
วิจัยสุวิทย์ 323-0-0008

Approved by

Kanokom Anek

Kanokom Anek
Assistant General Manager
วิจัยสุวิทย์ 323-0-0004

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Analysis / Test Report

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



TESTING
No.0009
Lot ID: 2498891
Date Received : Sep 13, 2024
Date Reported : Sep 21, 2024
Report Number : 3093774-3

Page 2 of 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 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
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
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
Formaldehyde	mg/L	0.03	0.1	<0.1	≤1.0	Wastewater analysis manual, Environmental Engineering Association of Thailand, 4th ed., 2004
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
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)
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
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 (P)
Temperature *	Degree C	-	-	31.2	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2550 B
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

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Approved by

Sithichok T.

Sithichok Thonguen
Scientist (3)
วิจัยสุวิทย์ 323-0-0001

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Analysis / Test Report

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



TESTING
No.0009
Lot ID: 2498891
Date Received : Sep 13, 2024
Date Reported : Sep 21, 2024
Report Number : 3093774-3

Page 1 of 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 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
Microbiological Testing						
Total Coliform	MPN/100mL	-	-	14000.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 9221 B
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-NH2 (D)
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
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)
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)
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)
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 2140 C
Total Nitrogen as N *	mg/L	-	1.0	43.6	No Standard	Calculation

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

Sampling By : Paramet Sattayakun , Kardbundi Kitsupavank

Remark :

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Approved by

Sithichok T.

Sithichok Thonguen
Scientist (3)
วิจัยสุวิทย์ 323-0-0001

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Analysis / Test Report

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



TESTING
No.0042
Lot ID: 2498890
Date Received : Sep 13, 2024
Date Reported : Sep 21, 2024
Report Number : 3093776-1

Page 1 of 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 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
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
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
Formaldehyde	mg/L	0.03	0.1	<0.1	≤1.0	Wastewater analysis manual, Environmental Engineering Association of Thailand, 4th ed., 2004
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
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)
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
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 (P)
Temperature *	Degree C	-	-	31.2	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2550 B
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

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. No part of this report may be reproduced or 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

Chontichok

Chontichok Subongkoth
Scientist (3)
วิจัยสุวิทย์ 323-0-0001

ADDRESS: 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand PHONE: +66 0 2760 3000 FAX: +66 0 2760 3197
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Analysis / Test Report



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

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
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 1803 (D)
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

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 วิจัยอุตสาหกรรม-323-0051, Karbundi Kitsupavanit วิจัยอุตสาหกรรม-204-0001

Remark :
- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * were 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

Chontichok

Chonticha Subongkroh
Scientist (3)
วิจัยอุตสาหกรรม-323-0031

Approved by

D. Chongchon

Dej Chongchon
Senior Manager
วิจัยอุตสาหกรรม-204-0001

Result 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.

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Analysis / Test Report



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

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
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
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
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
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
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)

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 วิจัยอุตสาหกรรม-323-0051, Karbundi Kitsupavanit วิจัยอุตสาหกรรม-204-0001

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

Technical Management

Chanatt L.

Chanattagarn Inchoon
Section Head
วิจัยอุตสาหกรรม-204-0008

Approved by

Kanokorn Anek

Kanokorn Anek
Assistant General Manager
วิจัยอุตสาหกรรม-204-0004

Result 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.

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Analysis / Test Report



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

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
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
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)
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
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)
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)
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)
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)
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
Total Nitrogen as N *	mg/L	-	1.0	30.5	No Standard	Calculation

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Approved by

Sithichok T.

Sithichok Thongnuen
Scientist (3)

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand PHONE +66 0 2760 3000 FAX +66 0 2760 3197
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Analysis / Test Report



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

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
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
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)
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
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)
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)
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)
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)
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
Total Nitrogen as N *	mg/L	-	1.0	30.5	No Standard	Calculation

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 วิจัยอุตสาหกรรม-323-0051, Karbundi Kitsupavanit วิจัยอุตสาหกรรม-204-0001

Remark :
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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 Thongnuen
Scientist (3)

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand PHONE +66 0 2760 3000 FAX +66 0 2760 3197
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Analysis / Test Report

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



TESTING
No 0042
Lot ID: 2498889
Date Received : Sep 13, 2024
Date Reported : Sep 21, 2024
Report Number : 3093777-1

Page 1 of 2

Sample Number	2498889-1						
Sample 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 ₅	Rayong
COD	mg/L	1.5	35	<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 4500-52 (C, F)	Rayong

Technical Management

Chontichak

Chonticha Subongkroh
Scientist (3)
โทร: 09-0991 7-323-0031

Approved by

D. Chongchon

Dej Chongchon
Senior Manager
โทร: 09-0991 7-323-0001

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 this report is not reproduced except in full.

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Analysis / Test Report

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



TESTING
No 0042
Lot ID: 2498889
Date Received : Sep 13, 2024
Date Reported : Sep 21, 2024
Report Number : 3093777-1

Page 2 of 2

Sample Number	2498889-1						
Sample 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 2530 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-Nitrogen (C), part 1100 (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 โทร: 09-0991 7-323-0051, Karabundit Khasupavanit โทร: 09-0991 7-323-0001

Remarks :
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Technical Management

Chontichak

Chonticha Subongkroh
Scientist (3)
โทร: 09-0991 7-323-0031

Approved by

D. Chongchon

Dej Chongchon
Senior Manager
โทร: 09-0991 7-323-0001

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Analysis / Test Report

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



TESTING
No 0009
Lot ID: 2498889
Date Received : Sep 13, 2024
Date Reported : Sep 21, 2024
Report Number : 3093777-2

Page 1 of 1

Sample Number	2498889-1						
Sample 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	0.0003	0.0005	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 โทร: 09-0991 7-323-0051, Karabundit Khasupavanit โทร: 09-0991 7-323-0001

Remarks :
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Technical Management

Chanatt L.

Chanattagorn Imchom
Section Head
โทร: 09-0991 7-323-0008

Approved by

K. Anet

Kanokorn Anet
Assistant General Manager
โทร: 09-0991 7-323-0004

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ALSO: 104 Phatthanakan Rd., Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand TEL: +66 0 2760 3000 FAX: +66 0 2760 3197

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Analysis / Test Report

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



TESTING
No 0009
Lot ID: 2498889
Date Received : Sep 13, 2024
Date Reported : Sep 21, 2024
Report Number : 3093777-3

Page 2 of 2

Sample Number	2498889-1						
Sample 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 2440 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, Karabundit Khasupavanit

Remarks :

Technical Management

Sithichok T.

Sithichok Thongsuwan
Scientist (3)

Approved by

Sithichok T.

Sithichok Thongsuwan
Scientist (3)

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ALSO: 104 Phatthanakan Rd., Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand TEL: +66 0 2760 3000 FAX: +66 0 2760 3197

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Analysis / Test Report



TESTING

No.0009

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

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

Page 2 of 2

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- "<" : Lower than LOD (Limit of Quantitation) / LOR (Limit of Reporting)
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Analysis / Test Report



TESTING

No.0042

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglak Rd., Nonglak, 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

Page 1 of 2

Sample Number	2484770-1						
Sample 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

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Approved by

Sittichok T.

Sittichok Thongnuen
Scientist (3)

ADDRESS: 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand PHONE: +66 0 2760 3000 FAX: +66 0 2760 3197
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Technical Management

Photchanas.

Photchanas Seeda
Scientist (4)
โทรศัพท์ 0-2760-3008

Approved by

D. Chongchon

Dej Chongchon
Senior Manager
โทรศัพท์ 0-2760-3001

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Analysis / Test Report



TESTING

No.0042

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

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

Page 2 of 2

Sample Number	2484770-1						
Sample 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-Nitrog (C), part NHD (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 Khuyoksu วิเศษสุขวิทย์ 3-323-4-0005, Thanassou Namakunna วิเศษสุขวิทย์ 3-204-4-0101

Remark :
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Analysis / Test Report



TESTING

No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglak Rd., Nonglak, 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

Page 1 of 1

Sample Number	2484770-1						
Sample 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	Test 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 Khuyoksu วิเศษสุขวิทย์ 3-323-4-0005, Thanassou Namakunna วิเศษสุขวิทย์ 3-204-4-0101

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Technical Management

Photchanas.

Photchanas Seeda
Scientist (4)
โทรศัพท์ 0-2760-3008

Approved by

D. Chongchon

Dej Chongchon
Senior Manager
โทรศัพท์ 0-2760-3001

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Technical Management

Savitree N.

Savitree Nolaengam
Manager
โทรศัพท์ 0-204-4-0007

Approved by

Kanokkorn Anek

Kanokkorn Anek
Assistant General Manager
โทรศัพท์ 0-204-4-0004

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Analysis / Test Report

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



TESTING
No.0042
Lot ID: 2484771
Date Received : Oct 11, 2024
Date Reported : Oct 21, 2024
Report Number : 3063663-3

Page 1 of 1

Sample Number	2484771-1					
Sampled Date	Oct 11, 2024 2:15 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, a lot of odour, solid and turbid					
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method
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
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)
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-D (C)
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 (C)
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)
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
Total Nitrogen as N *	mg/L	-	1.0	37.9	No Standard	Calculation

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

Remark :
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Approved by

Suvannee Subongkroh
Section Head

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Analysis / Test Report

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



TESTING
No.0042
Lot ID: 2484771
Date Received : Oct 11, 2024
Date Reported : Oct 21, 2024
Report Number : 3063664-1

Page 2 of 2

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
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 4500 (D)
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

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 Khuyokul วิสณุคุณสุว ร-323-4-0005 , Thanasson Namakunna วิสณุคุณสุว ร-204-4-0101

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Technical Management

Chontichok
Chonticha Subongkroh
Scientist (3)
วิสณุคุณสุว ร-323-4-0001

Approved by

Dej Changchon
Senior Manager
วิสณุคุณสุว ร-323-4-0001

ADDRESS: 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand TEL: +66 0 2760 3000 FAX: +66 0 2760 3197
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Analysis / Test Report

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



TESTING
No.0042
Lot ID: 2484771
Date Received : Oct 11, 2024
Date Reported : Oct 21, 2024
Report Number : 3063664-1

Page 1 of 2

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
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 6900 - O G
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
Formaldehyde	mg/L	0.03	0.1	<0.1	≤1.0	Wastewater analysis manual, Environmental Engineering Association of Thailand, 9th ed., 2004
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
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)
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
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)
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

Technical Management

Chontichok
Chonticha Subongkroh
Scientist (3)
วิสณุคุณสุว ร-323-4-0001

Approved by

Dej Changchon
Senior Manager
วิสณุคุณสุว ร-323-4-0001

ADDRESS: 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand TEL: +66 0 2760 3000 FAX: +66 0 2760 3197
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Analysis / Test Report

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



TESTING
No.0009
Lot ID: 2484771
Date Received : Oct 11, 2024
Date Reported : Oct 21, 2024
Report Number : 3063664-2

Page 1 of 1

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
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
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
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
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)

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 Khuyokul วิสณุคุณสุว ร-323-4-0005 , Thanasson Namakunna วิสณุคุณสุว ร-204-4-0101

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Technical Management

Savitree N.
Savitree Nonsangam
Manager
วิสณุคุณสุว ร-204-4-0007

Approved by

Kanokorn Aek
Assistant General Manager
วิสณุคุณสุว ร-204-4-0004

ADDRESS: 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand TEL: +66 0 2760 3000 FAX: +66 0 2760 3197
ALSO AVAILABLE AT: 616/10 Moo 5 T. Maenam Khu A, Phukdaeng Rayong 21140 Thailand TEL: +66 0 3304 8555 FAX: +66 0 3304 8556
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Analysis / Test Report

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

TESTING
No.0009
Lot ID: 2411238
Date Received : Oct 11, 2024
Date Reported : Oct 21, 2024
Report Number : 3121136-3

Page 1 of 1

Sample Number 2411238-1
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 : Sanoson Khuyokul, Thanasorn Namakorn

Remark :
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Approved by

Suvannee Chumkiew
Suvannee Chumkiew
Section Head

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3121136-0004



Analysis / Test Report

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

TESTING
No.0042
Lot ID: 24124704
Date Received : Nov 14, 2024
Date Reported : Nov 22, 2024
Report Number : 3151351-1

Page 2 of 2

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-Nitrog (C), part 4500-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 : Warunyo Chimphalee วิสุธวณิช 3123-0020, Samart Khumplee วิสุธวณิช 3124-0084

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Technical Management

Photchanas S.
Photchanas Seeda
Scientist (4)
วิสุธวณิช 3123-0028

Approved by

Dej Changchon
Dej Changchon
Senior Manager
วิสุธวณิช 3123-0001

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3121136-0004

Analysis / Test Report

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

TESTING
No.0042
Lot ID: 24124704
Date Received : Nov 14, 2024
Date Reported : Nov 22, 2024
Report Number : 3151351-1

Page 1 of 2

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 5330 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

Photchanas S.
Photchanas Seeda
Scientist (4)
วิสุธวณิช 3123-0028

Approved by

Dej Changchon
Dej Changchon
Senior Manager
วิสุธวณิช 3123-0001

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Analysis / Test Report

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

TESTING
No.0009
Lot ID: 24124704
Date Received : Nov 14, 2024
Date Reported : Nov 22, 2024
Report Number : 3151351-2

Page 1 of 1

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
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, 2030 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, 2030 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, 2030 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 (6, E)	Bangkok

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

Sampling By : Warunyo Chimphalee วิสุธวณิช 3123-0020, Samart Khumplee วิสุธวณิช 3124-0084

Remark :
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Technical Management

Savitree N.
Savitree Nonsangiam
Manager
วิสุธวณิช 3123-0007

Approved by

Kanokorn Anek
Kanokorn Anek
Assistant General Manager
วิสุธวณิช 3124-0004

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3121136-0004



Analysis / Test Report

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglak Rd., Nonglak, 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 : 3151353-1

Page 1 of 1

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-EF 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 (C)	Rayong
Nitrite as N	mg/L	0.0005	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 : Warunyo Chimphalee, Samart Khumplilee

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

Approved by

Photchanas.
Photchanas Seeda
Scientist (4)



Analysis / Test Report

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

TESTING
No 0042
Lot ID: 24124705
Date Received : Nov 14, 2024
Date Reported : Nov 22, 2024
Report Number : 3151353-1

Page 1 of 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 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)	ADME	-	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)	ADME	-	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

Photchanas.
Photchanas Seeda
Scientist (4)
โทรศัพท์ 0-323-4-0028

Approved by

D. Chongchon
Dej Chongchon
Senior Manager
โทรศัพท์ 0-323-4-0001



Analysis / Test Report

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

TESTING
No 0042
Lot ID: 24124705
Date Received : Nov 14, 2024
Date Reported : Nov 22, 2024
Report Number : 3151353-1

Page 2 of 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 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	1046	≤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 : Warunyo Chimphalee โทรศัพท์ 0-323-4-0029, Samart Khumplilee โทรศัพท์ 0-323-4-0004
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Technical Management

Photchanas.
Photchanas Seeda
Scientist (4)
โทรศัพท์ 0-323-4-0028

Approved by

D. Chongchon
Dej Chongchon
Senior Manager
โทรศัพท์ 0-323-4-0001



Analysis / Test Report

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

TESTING
No 0009
Lot ID: 24124705
Date Received : Nov 14, 2024
Date Reported : Nov 22, 2024
Report Number : 3151353-2

Page 1 of 1

Page 3 of 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 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, C)	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 : Warunyo Chimphalee โทรศัพท์ 0-323-4-0029, Samart Khumplilee โทรศัพท์ 0-323-4-0004
Remark :
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Technical Management

Savitree N.
Savitree Nongsangam
Manager
โทรศัพท์ 0-204-4-0007

Approved by

Kanokkorn Anek
Kanokkorn Anek
Assistant General Manager
โทรศัพท์ 0-204-4-0004



Analysis / Test Report

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglak Rd., Nonglak, 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.2566 (2017).
Sampling By : Warunyo Chiraphalee, Samart Khumplee

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

Approved by

Photchanas S.

Photchanas Seeda
Scientist (4)

ADDRESS 616/10 Moo 5 T Maenam Khu A Phukdaeng Rayong 21140 Thailand PHONE +66 0 3304 8555 FAX +66 0 3304 8556
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Analysis / Test Report

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

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-DN 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 1910 - 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 5120 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

Photchanas S.

Photchanas Seeda
Scientist (4)
วิสุตธนาพร 3-323-0-0028

Approved by

Dej Changchon

Senior Manager
วิสุตธนาพร 3-323-0-0001

ADDRESS 616/10 Moo 5 T Maenam Khu A Phukdaeng Rayong 21140 Thailand PHONE +66 0 3304 8555 FAX +66 0 3304 8556
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Analysis / Test Report

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

TESTING
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-DN 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 5510 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 105-105 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 : Nitattawat Athomprommarat วิสุตธนาพร 3-323-0-0006, Kerdbundit Kibsupavanit วิสุตธนาพร 3-323-0-0001

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

Technical Management

Photchanas S.

Photchanas Seeda
Scientist (4)
วิสุตธนาพร 3-323-0-0028

Approved by

Dej Changchon

Senior Manager
วิสุตธนาพร 3-323-0-0001

ADDRESS 616/10 Moo 5 T Maenam Khu A Phukdaeng Rayong 21140 Thailand PHONE +66 0 3304 8555 FAX +66 0 3304 8556
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Analysis / Test Report

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

* 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.

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-DN 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 5510 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 105-105 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 : Nitattawat Athomprommarat วิสุตธนาพร 3-323-0-0006, Kerdbundit Kibsupavanit วิสุตธนาพร 3-323-0-0001

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

Technical Management

Photchanas S.

Photchanas Seeda
Scientist (4)
วิสุตธนาพร 3-323-0-0028

Approved by

Dej Changchon

Senior Manager
วิสุตธนาพร 3-323-0-0001

ADDRESS 616/10 Moo 5 T Maenam Khu A Phukdaeng Rayong 21140 Thailand PHONE +66 0 3304 8555 FAX +66 0 3304 8556
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Analysis / Test Report

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



TESTING
No.0009
Lot ID: 24133691
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175783-2

Page 1 of 5

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 3125 B,3030 F	Bangkok
Lead	mg/L	0.0003	0.0005	0.0006	≤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 *Chanatt L.* Approved by *Kanokorn Anek*
Chanattagorn Imchom
Section Head
โทรศัพท์ ๖๖๖-๖๖๖-๖๖๖๖
Kanokorn Anek
Assistant General Manager
โทรศัพท์ ๖๖๖-๖๖๖-๖๖๖๖

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Analysis / Test Report

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



TESTING
No.0009
Lot ID: 24133691
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175783-2

Page 2 of 5

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 *Chanatt L.* Approved by *Kanokorn Anek*
Chanattagorn Imchom
Section Head
โทรศัพท์ ๖๖๖-๖๖๖-๖๖๖๖
Kanokorn Anek
Assistant General Manager
โทรศัพท์ ๖๖๖-๖๖๖-๖๖๖๖

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Analysis / Test Report

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



TESTING
No.0009
Lot ID: 24133691
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175783-2

Page 3 of 5

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 *Chanatt L.* Approved by *Kanokorn Anek*
Chanattagorn Imchom
Section Head
โทรศัพท์ ๖๖๖-๖๖๖-๖๖๖๖
Kanokorn Anek
Assistant General Manager
โทรศัพท์ ๖๖๖-๖๖๖-๖๖๖๖

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Analysis / Test Report

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



TESTING
No.0009
Lot ID: 24133691
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175783-2

Page 4 of 5

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 *Chanatt L.* Approved by *Kanokorn Anek*
Chanattagorn Imchom
Section Head
โทรศัพท์ ๖๖๖-๖๖๖-๖๖๖๖
Kanokorn Anek
Assistant General Manager
โทรศัพท์ ๖๖๖-๖๖๖-๖๖๖๖

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TESTING

TESTING
No.0009
Lot ID: 24133691
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3125783-2

Page 5 of 5

Sample Number	24133691-1						
Sampled Date	Dec 10, 2024 10:24 AM						
Sample Description	Group 1 : Wastewater in Centz/ 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 (LOB)	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 3125.8,3130 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 3125.8,3130 F	Bangkok
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
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,	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

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Approved by Chantett L.
 Chantatagan Imchom
 Section Head

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

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TESTING

Lot ID: 24133691
Date Received : Dec 10, 2024
Date Reported : Dec 16, 2024
Report Number : 3175763-3

Page 2 of 3

- " $<$ " : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked " $<$ " 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.

Result appears to the examiner(s) is submitted, writes the sampling rate calculated by ALL. No part of this report may be reproduced in any form without written consent from the Laboratory. ALL Laboratory Group (Thailand) strongly recommends that the report is not translated or copy in full.

Approved by

Charatt L.
Chanatagarn Inthorn
Chief Inspector

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Approved by 
Chanatthan Inthorn
Section Head

Unit 104 Phatthanaban 40 Phatthanaban Rd., Khwaeng Phatthanaban, Khet Suan Luang, Bangkok 10250 Thailand. PH: (66) +66 0 2760 3000 FAX: +66 0 2760 3197
ALS Laboratory Group (Thailand) Limited. STD: ANALS Limited company

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Analysis / Test Report

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



TESTING
No 0042
Lot ID: 24133692
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175785-1

Page 1 of 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 pre-treatment - 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)	ADME	-	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)	ADME	-	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-CH (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 5320 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)
วิจิตรธรรมาภรณ์ 3-323-4-0028

Approved by

D. Chanchon

Dej Chanchon
Senior Manager
วิจิตรธรรมาภรณ์ 3-323-4-0001

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Analysis / Test Report

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



TESTING
No 0042
Lot ID: 24133692
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175785-1

Page 2 of 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 pre-treatment - 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 5330 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	13.6	≤100	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24th ed., 2023, part 4500-Nitrog (C), part 4603 (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 : Nattavut Athomprammarat วิจิตรธรรมาภรณ์ 3-323-4-0006 , Karabundit Kittisupavant วิจิตรธรรมาภรณ์ 3-323-4-0007

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

Technical Management

Photchana S.

Photchana Seeda
Scientist (4)
วิจิตรธรรมาภรณ์ 3-323-4-0028

Approved by

D. Chanchon

Dej Chanchon
Senior Manager
วิจิตรธรรมาภรณ์ 3-323-4-0001

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Analysis / Test Report

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



TESTING
No 0042
Lot ID: 24133692
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175785-1

Page 3 of 3

- Analyte(s) marked * were 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)
วิจิตรธรรมาภรณ์ 3-323-4-0028

Approved by

D. Chanchon

Dej Chanchon
Senior Manager
วิจิตรธรรมาภรณ์ 3-323-4-0001

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Analysis / Test Report

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



TESTING
No 0009
Lot ID: 24133692
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175785-2

Page 5 of 5

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 pre-treatment - 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 8	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.

Chanattang Imchom
Section Head
วิจิตรธรรมาภรณ์ 3-204-4-0008

Approved by

Kankorn Anck

Kankorn Anck
Assistant General Manager
วิจิตรธรรมาภรณ์ 3-204-4-0004

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Analysis / Test Report

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

TESTING
No.0009
Lot ID: 24133692
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175785-2

Page 2 of 5

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

Chanatt L.

Approved by

Kanokkom Anek

Kanokkom Anek
Assistant General Manager
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Analysis / Test Report

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

TESTING
No.0009
Lot ID: 24133692
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175785-2

Page 4 of 5

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

Chanatt L.

Approved by

Kanokkom Anek

Kanokkom Anek
Assistant General Manager
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Analysis / Test Report

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

TESTING
No.0009
Lot ID: 24133692
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175785-2

Page 3 of 5

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

Chanatt L.

Approved by

Kanokkom Anek

Kanokkom Anek
Assistant General Manager
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Analysis / Test Report

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

TESTING
No.0009
Lot ID: 24133692
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175785-2

Page 5 of 5

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 6630 D, part 6410 B	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.2566 (2023).

Sampling By : นันทวัฒน์ อภิธรรมมณเฑียร (๓๓๕๖๗๘๙ ๓-๒๐๔-๙-๐๐๐๘), กณพัฒน์ คุ้มอุปการะ (๓๓๕๖๗๘๙ ๓-๒๐๔-๙-๐๐๐๘)

Remark :

- * LOD : Limit of Detection
- * "C" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- * Analyte(s) marked * 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.

Approved by

Kanokkom Anek

Kanokkom Anek
Assistant General Manager
๓๓๕๖๗๘๙ ๓-๒๐4-๙-๐๐๐๘

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Analysis / Test Report

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



TESTING
No.0009
Lot ID: 24133692
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175785-3

Page 1 of 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							

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Approved by

Chanatt L.
Chanattagorn Inomchom
Section Head



Analysis / Test Report

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



TESTING
No.0009
Lot ID: 24133692
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175785-3

Page 2 of 3

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 2140 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.560 (2017).
Sampling By : Natnawat Ahomponnamat , Karibundit Kilsupavanat

Remark :
* LOD : Limit of Detection

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Chanatt L.
Chanattagorn Inomchom
Section Head



Analysis / Test Report

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



TESTING
No.0009
Lot ID: 24133692
Date Received : Dec 10, 2024
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Report Number : 3175785-3

Page 1 of 3

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* Analyte(s) marked * were not included in scope of Accreditation ISO/IEC 17025
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Approved by

Chanatt L.
Chanattagorn Inomchom
Section Head



Analysis / Test Report

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



TESTING
No.0042
Lot ID: 24133695
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175789-1

Page 1 of 3

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)	ADNU	-	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)	ADNU	-	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)	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 5570 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

Photchan S.
Photchan S.
Scientist (4)
WUOLUNWY 7-323-00028

Approved by

Dei Changchon
Senior Manager
WUOLUNWY 7-323-00001



Analysis / Test Report



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

TESTING
No.0042
Lot ID: 24133695
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175789-1

Page 2 of 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 (LOB)	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 NHR (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 : Natnawut Athomprommarat วิศกรสุภาวดี 3-323-4-0006, Karubandit Kibsupavanit วิศกรสุภาวดี 3-204-4-0001

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

Technical Management

Photchanas S.

Photchanas Seeda
Scientist (4)
วิศกรสุภาวดี 3-323-4-0028

Approved by

D. Changchon

Dej Changchon
Senior Manager
วิศกรสุภาวดี 3-323-4-0001

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P/O :
Project Name :
Project Location : WHA RIL

TESTING
No.0042
Lot ID: 24133695
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175789-1

Page 3 of 3

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Technical Management

Photchanas S.

Photchanas Seeda
Scientist (4)
วิศกรสุภาวดี 3-323-4-0028

Approved by

D. Changchon

Dej Changchon
Senior Manager
วิศกรสุภาวดี 3-323-4-0001

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P/O :
Project Name :
Project Location : WHA RIL

TESTING
No.0009
Lot ID: 24133695
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175789-2

Page 2 of 5

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 (LOB)	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-6	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
วิศกรสุภาวดี 3-204-4-0008

Approved by

Kanokorn Anek

Kanokorn Anek
Assistant General Manager
วิศกรสุภาวดี 3-204-4-0004

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P/O :
Project Name :
Project Location : WHA RIL

TESTING
No.0009
Lot ID: 24133695
Date Received : Dec 10, 2024
Date Reported : Dec 18, 2024
Report Number : 3175789-2

Page 2 of 5

Page 2 of 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 11, 2024						
Condition of Sample	Contained in two glass vial, 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 (LOB)	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
วิศกรสุภาวดี 3-204-4-0008

Approved by

Kanokorn Anek

Kanokorn Anek
Assistant General Manager
วิศกรสุภาวดี 3-204-4-0004

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Analysis / Test Report

TESTING

No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglajok Rd., Nonglajok, 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

Page 3 of 5

Sample Number 24133695-1
Sample 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-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-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

Chanatt L.
Chanattagarn Imchom
Section Head
โทรศัพท์ 09-204-4-0008

Approved by

Kanokorn Anek
Kanokorn Anek
Assistant General Manager
โทรศัพท์ 09-204-4-0008

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3175789-2 (ENL)



Analysis / Test Report

TESTING

No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglajok Rd., Nonglajok, 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

Page 3 of 5

Sample Number 24133695-1
Sample 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 6500 P (B, C)	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 : Natavut Athompornmarat โทรศัพท์ 09-323-4-0006, Kardsubint Kittapavank โทรศัพท์ 09-204-4-0001

Remark :
• LOD : Limit of Detection
• "C" : 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
โทรศัพท์ 09-204-4-0008

Approved by

Kanokorn Anek
Kanokorn Anek
Assistant General Manager
โทรศัพท์ 09-204-4-0008

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3175789-2 (ENL)

Analysis / Test Report

TESTING

No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglajok Rd., Nonglajok, 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

Page 4 of 5

Sample Number 24133695-1
Sample 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

Chanatt L.
Chanattagarn Imchom
Section Head
โทรศัพท์ 09-204-4-0008

Approved by

Kanokorn Anek
Kanokorn Anek
Assistant General Manager
โทรศัพท์ 09-204-4-0008

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3175789-2 (ENL)



Analysis / Test Report

TESTING

No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglajok Rd., Nonglajok, 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

Page 3 of 5

Sample Number 24133695-1
Sample 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

Chanatt L.
Chanattagarn Imchom
Section Head

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3175789-2 (ENL)



Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglaloek Rd., Nonglaloek, 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

Page 2 of 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 (LOB)	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., 2013, 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., 2013, 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., 2013, 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., 2013, 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., 2013, 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., 2013, 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., 2013, 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 : Nattavut Athomprommarat , Kanchanit Kittapavanit

Remark :
* LOD : Limit of Detection

Approved by

Chanatt L.

Chanattagarn Inmohm
Section Head

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327582/EN46

Analysis / Test Report

TESTING
No.0009

Client : WHA Utilities and Power Public Company Limited
222 Moo 11, Bankhai-Nonglaloek Rd., Nonglaloek, 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

Page 3 of 3

- * * : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- * Analyte(s) marked * refers 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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Chanattagarn Inmohm
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