เอกสารแนบ 12

ผลการตรวจวิเคราะห์คุณภาพน้ำทิ้งก่อนการบำบัด คุณภาพน้ำทิ้งหลังการบำบัด และคุณภาพน้ำที่เข้าและออกหอผึ่งเย็น

SES
บริษัท สยาม เอ็นไวรอนเมนทอล เซอร์วิส จำกัด
SIAM ENVIRONMENTAL SERVICE LIMITED
สำนักงานใหญ่ : 126 ซอยรามคำแหง 60/3 แขวงหัวหมาก เขตบางกะปิ กรุงเทพมหานคร 10240
โทรศัพท์ : 088-5542100 E-Mail : ses_1996@yahoo.com เลขประจำตัวผู้เสียภาษีอากร 0105539093789

SES-23005/WW

January 13,2023.

Analysis Report

Customer Name : Bangkok Hospital/HuaHin
Address : 888 Petchkasem Rd.,Hua Hin, Prachuapkhirikhan 77110
Type of Sampling : Wastewater
Sampling date : January 5,2023.
Sampling by : SES

Item	Description	Unit	Method	Result		Standard[1]
				ระบบบำบัดน้ำเสีย		
				น้ำเสียเข้าระบบ (Influent)*	น้ำทิ้งออกจากระบบ (Effluent)	
	Sample condition	-	-	yellow turbid slight sediment foul smell	light yellow slight sediment	-
1	pH	-	Electrometric	7.16	7.28	5.0-9.0
2	BOD (Biochemical Oxygen Demand)	mg/L	5 Days BOD Test	101	4	≤20
3	COD (Chemical Oxygen Demand)	mg/L	Close Reflux,Titrimetric	-	37	≤120[2]
4	SS (Suspended Solids)	mg/L	Dried at 103-105°C	-	<2.5	≤30
5	Settleable Solids	ml/L	Volumetric	-	<0.1	≤0.5
6	TDS (Total Dissolve Solids)	mg/L	Dried at 180°C	-	470	≤500
7	Sulfide	mg/L	Methylene Blue,Titrimetric	-	<0.01	≤1
8	TKN (Total Kjeldahl Nitrogen)	mg/L	Macro-Kjeldahl,Titrimetric	-	6.55	≤35
9	Oil & Grease	mg/L	Partition-Gravimetric	19.8	1.0	≤20
10	Total Coliform Bacteria	MPN/100ml	Multiple Tube Fermentation Technique	-	220	≤5,000[3]
11	Fecal Coliform Bacteria	MPN/100ml	Multiple Tube Fermentation Technique	-	<1.8	≤1,000[3]
12	Residual Free Chlorine	mg/L	DPD Ferrous Titrimetric	-	<0.01	≤1.0[2]

Method :Based on Standard Method for the Examination of Water and Wastewater,APHA,AWWA,WEF 23rd Edition 2017
Standard :[1]Notification of the Ministry of Natural Resources and Environment;Building(B.E.2548)
[2]Notification of the Ministry of Natural Resources and Environment(B.E.2559)
[3]Notification of the National Environment Board No.8(B.E.2537)
Remark :TDS in the effluent increase from TDS in water supply (TDS in water supply = 120 mg/L)

Thai Environmental Technic Limited
Analyst

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Approved By

Private Laboratory Registered no.3-236

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SES-23022/WW

February 10,2023.

Analysis Report

Customer Name : Bangkok Hospital/HuaHin

Address : 888 Petchkasem Rd.,Hua Hin, Prachuapkhirikhan 77110

Type of Sampling : Wastewater

Sampling date : February 1,2023.

Sampling by : SES

Item	Description	Unit	Method	Result		Standard[1]
				ระบบบำบัดน้ำเสีย		
				น้ำเสียเข้าระบบ (Influent)*	น้ำทิ้งออกจากระบบ (Effluent)	
	Sample condition	-	-	yellow turbid slight sediment foul smell	light yellow slight sediment	-
1	pH	-	Electrometric	7.24	6.92	5.0-9.0
2	BOD (Biochemical Oxygen Demand)	mg/L	5 Days BOD Test	99	5	≤20
3	COD (Chemical Oxygen Demand)	mg/L	Close Reflux,Titrimetric	-	40	≤120[2]
4	SS (Suspended Solids)	mg/L	Dried at 103-105 °C	67.16	<2.5	≤30
5	Settleable Solids	ml/L	Volumetric	-	<0.1	≤0.5
6	TDS (Total Dissolve Solids)	mg/L	Dried at 180 °C	-	412	≤500
7	Sulfide	mg/L	Methylene Blue,Titrimetric	1.49	<0.01	≤1
8	TKN (Total Kjeldahl Nitrogen)	mg/L	Macro-Kjeldahl,Titrimetric	68.51	7.82	≤35
9	Oil & Grease	mg/L	Partition-Gravimetric	17.7	1.2	≤20
10	Total Coliform Bacteria	MPN/100ml	Multiple Tube Fermentation Technique	-	$5.4x10^2$	≤5,000[3]
11	Fecal Coliform Bacteria	MPN/100ml	Multiple Tube Fermentation Technique	-	<1.8	≤1,000[3]
12	Residual Free Chlorine	mg/L	DPD Ferrous Titrimetric	-	<0.01	≤1.0[2]

Method :Based on Standard Method for the Examination of Water and Wastewater,APHA,AWWA,WEF 23rd Edition 2017

Standard :[1]Notification of the Ministry of Natural Resources and Environment;Building(B.E.2548)
[2]Notification of the Ministry of Natural Resources and Environment(B.E.2559)
[3]Notification of the National Environment Board No.8(B.E.2537)

Remark :TDS in the effluent increase from TDS in water supply (TDS in water supply = 120 mg/L)

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SES-23039/WW

March 10,2023.

Analysis Report

Customer Name : Bangkok Hospital/HuaHin

Address : 888 Petchkasem Rd.,Hua Hin, Prachuapkhirikhan 77110

Type of Sampling : Wastewater

Sampling date : March 1,2023.

Sampling by : SES

Item	Description	Unit	Method	Result		Standard[1]
				ระบบบำบัดน้ำเสีย		
				น้ำเสียเข้าระบบ (Influent)*	น้ำทิ้งออกจากระบบ (Effluent)	
	Sample condition	-	-	yellow turbid slight sediment foul smell	light yellow slight sediment	-
1	pH	-	Electrometric	7.18	7.10	5.0-9.0
2	BOD (Biochemical Oxygen Demand)	mg/L	5 Days BOD Test	83	4	≤20
3	COD (Chemical Oxygen Demand)	mg/L	Close Reflux,Titrimetric	-	37	≤120[2]
4	SS (Suspended Solids)	mg/L	Dried at 103-105 °C	46.17	<2.5	≤30
5	Settleable Solids	ml/L	Volumetric	-	<0.1	≤0.5
6	TDS (Total Dissolve Solids)	mg/L	Dried at 180 °C	-	430	≤500
7	Sulfide	mg/L	Methylene Blue,Titrimetric	1.21	<0.01	≤1
8	TKN (Total Kjeldahl Nitrogen)	mg/L	Macro-Kjeldahl,Titrimetric	69.07	4.63	≤35
9	Oil & Grease	mg/L	Partition-Gravimetric	15.8	1.0	≤20
10	Total Coliform Bacteria	MPN/100ml	Multiple Tube Fermentation Technique	-	$6.8x10^2$	≤5,000[3]
11	Fecal Coliform Bacteria	MPN/100ml	Multiple Tube Fermentation Technique	-	<1.8	≤1,000[3]
12	Residual Free Chlorine	mg/L	DPD Ferrous Titrimetric	-	<0.01	≤1.0[2]

Method :Based on Standard Method for the Examination of Water and Wastewater,APHA,AWWA,WEF 23rd Edition 2017

Standard :[1]Notification of the Ministry of Natural Resources and Environment;Building(B.E.2548)
[2]Notification of the Ministry of Natural Resources and Environment(B.E.2559)
[3]Notification of the National Environment Board No.8(B.E.2537)

Remark :TDS in the effluent increase from TDS in water supply (TDS in water supply = 140 mg/L)

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SIAM ENVIRONMENTAL SERVICE LIMITED
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SES-23060/WW

April 17,2023.

Analysis Report

Customer Name : Bangkok Hospital/HuaHin

Address : 888 Petchkasem Rd.,Hua Hin, Prachuapkhirikhan 77110

Type of Sampling : Wastewater

Sampling date : April 3,2023.

Sampling by : SES

Item	Description	Unit	Method	Result		Standard[1]
				ระบบบำบัดน้ำเสีย		
				น้ำเสียเข้าระบบ (Influent)*	น้ำทิ้งออกจากระบบ (Effluent)	
	Sample condition	-	-	yellow turbid slight sediment foul smell	light yellow slight sediment	-
1	pH	-	Electrometric	7.04	7.22	5.0-9.0
2	BOD (Biochemical Oxygen Demand)	mg/L	5 Days BOD Test	95	7	≤20
3	COD (Chemical Oxygen Demand)	mg/L	Close Reflux,Titrimetric	-	46	≤120[2]
4	SS (Suspended Solids)	mg/L	Dried at 103-105°C	44.81	<2.5	≤30
5	Settleable Solids	ml/L	Volumetric	-	<0.1	≤0.5
6	TDS (Total Dissolve Solids)	mg/L	Dried at 180°C	-	420	≤500
7	Sulfide	mg/L	Methylene Blue,Titrimetric	2.05	<0.01	≤1
8	TKN (Total Kjeldahl Nitrogen)	mg/L	Macro-Kjeldahl,Titrimetric	62.68	3.94	≤35
9	Oil & Grease	mg/L	Partition-Gravimetric	14.1	0.9	≤20
10	Total Coliform Bacteria	MPN/100ml	Multiple Tube Fermentation Technique	>1.6x10^5	920	≤5,000[3]
11	Fecal Coliform Bacteria	MPN/100ml	Multiple Tube Fermentation Technique	-	<1.8	≤1,000[3]
12	Residual Free Chlorine	mg/L	DPD Ferrous Titrimetric	-	<0.01	≤1.0[2]

Method :Based on Standard Method for the Examination of Water and Wastewater,APHA,AWWA,WEF 23rd Edition 2017

Standard :[1]Notification of the Ministry of Natural Resources and Environment;Building(B.E.2548)
[2]Notification of the Ministry of Natural Resources and Environment(B.E.2559)
[3]Notification of the National Environment Board No.8(B.E.2537)

Remark :TDS in the effluent increase from TDS in water supply (TDS in water supply = 120 mg/L)

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SES-23078/WW

May 11,2023.

Analysis Report

Customer Name : Bangkok Hospital/HuaHin

Address : 888 Petchkasem Rd.,Hua Hin, Prachuapkhirikhan 77110

Type of Sampling : Wastewater

Sampling date : May 2,2023.

Sampling by : SES

Item	Description	Unit	Method	Result		Standard[1]
				ระบบบำบัดน้ำเสีย		
				น้ำเสียเข้าระบบ (Influent)*	น้ำทิ้งออกจากระบบ (Effluent)	
	Sample condition	-	-	yellow turbid slight sediment foul smell	yellow slight sediment	-
1	pH	-	Electrometric	6.07	6.89	5.0-9.0
2	BOD (Biochemical Oxygen Demand)	mg/L	5 Days BOD Test	106	17	≤20
3	COD (Chemical Oxygen Demand)	mg/L	Close Reflux,Titrimetric	-	118	≤120[2]
4	SS (Suspended Solids)	mg/L	Dried at 103-105 ^{o}C	57.15	27.26	≤30
5	Settleable Solids	ml/L	Volumetric	-	0.5	≤0.5
6	TDS (Total Dissolve Solids)	mg/L	Dried at 180 ^{o}C	-	320	≤500
7	Sulfide	mg/L	Methylene Blue,Titrimetric	3.16	<0.01	≤1
8	TKN (Total Kjeldahl Nitrogen)	mg/L	Macro-Kjeldahl,Titrimetric	94.46	**40.28**	≤35
9	Oil & Grease	mg/L	Partition-Gravimetric	15.5	1.6	≤20
10	Total Coliform Bacteria	MPN/100ml	Multiple Tube Fermentation Technique	>1.6x10^{5}	4.1x10^{3}	≤5,000[3]
11	Fecal Coliform Bacteria	MPN/100ml	Multiple Tube Fermentation Technique	-	6.8x10^{2}	≤1,000[3]
12	Residual Free Chlorine	mg/L	DPD Ferrous Titrimetric	-	0.05	≤1.0[2]

Method :Based on Standard Method for the Examination of Water and Wastewater,APHA,AWWA,WEF 23rd Edition 2017

Standard :(1)Notification of the Ministry of Natural Resources and Environment;Building(B.E.2548)
(2)Notification of the Ministry of Natural Resources and Environment(B.E.2559)
(3)Notification of the National Environment Board No.8(B.E.2537)

Remark :TDS in the effluent increase from TDS in water supply (TDS in water supply = 124 mg/L)

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SES-23097/WW

June 12,2023.

Analysis Report

Customer Name : Bangkok Hospital/HuaHin

Address : 888 Petchkasem Rd.,Hua Hin, Prachuapkhirikhan 77110

Type of Sampling : Wastewater

Sampling date : June 1,2023.

Sampling by : SES

Item	Description	Unit	Method	Result		Standard[1]
				ระบบบำบัดน้ำเสีย		
				น้ำเสียเข้าระบบ (Influent)*	น้ำทิ้งออกจากระบบ (Effluent)	
	Sample condition	-	-	yellow turbid slight sediment foul smell	yellow slight sediment	-
1	pH	-	Electrometric	7.35	7.48	5.0-9.0
2	BOD (Biochemical Oxygen Demand)	mg/L	5 Days BOD Test	114	13	≤20
3	COD (Chemical Oxygen Demand)	mg/L	Close Reflux,Titrimetric	-	82	≤120[2]
4	SS (Suspended Solids)	mg/L	Dried at 103-105 °C	61.86	10.71	≤30
5	Settleable Solids	ml/L	Volumetric	-	<0.1	≤0.5
6	TDS (Total Dissolve Solids)	mg/L	Dried at 180 °C	-	390	≤500
7	Sulfide	mg/L	Methylene Blue,Titrimetric	3.43	<0.01	≤1
8	TKN (Total Kjeldahl Nitrogen)	mg/L	Macro-Kjeldahl,Titrimetric	106.81	**41.75**	≤35
9	Oil & Grease	mg/L	Partition-Gravimetric	17.6	1.4	≤20
10	Total Coliform Bacteria	MPN/100ml	Multiple Tube Fermentation Technique	$>1.6x10^5$	$4.8x10^3$	≤5,000[3]
11	Fecal Coliform Bacteria	MPN/100ml	Multiple Tube Fermentation Technique	-	$9.3x10^2$	≤1,000[3]
12	Residual Free Chlorine	mg/L	DPD Ferrous Titrimetric	-	<0.01	≤1.0[2]

Method :Based on Standard Method for the Examination of Water and Wastewater,APHA,AWWA,WEF 23rd Edition 2017

Standard :(1)Notification of the Ministry of Natural Resources and Environment;Building(B.E.2548)
(2)Notification of the Ministry of Natural Resources and Environment(B.E.2559)
(3)Notification of the National Environment Board No.8(B.E.2537)

Remark :TDS in the effluent increase from TDS in water supply (TDS in water supply = 140 mg/L)

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SES-23116

June 26,2023.

Analysis Report

Customer Name : Bangkok Hospital/HuaHin
Address : 888 Petchkasem Rd.,Hua Hin, Prachuapkhirikhan 77110
Type of Sampling : Wastewater
Sampling date : June 16,2023.
Sampling by : Bangkok Hospital/HuaHin

Item	Description	Unit	Method	Result	Standard
				ระบบบำบัดน้ำเสีย	
				น้ำทิ้งออกจากระบบ (Effluent)	
	Sample condition	-	-	light yellow slight sediment	-
1	TKN (Total Kjeldahl Nitrogen)	mg/L	Macro-Kjeldahl,Titrimetric	10.79	≤35

Method :Based on Standard Method for the Examination of Water and Wastewater,APHA,AWWA,WEF 23rd Edition 2017
Standard :Notification of the Ministry of Natural Resources and Environment;Building(B.E.2548)

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SES-23022/WS

February 10,2023.

Analysis Report

Customer Name : Bangkok Hospital/Hua Hin
Address : 888 Petchkasem Rd.,Hua Hin, Prachuapkhirikhan 77110
Type of Sampling : Water Supply
Sampling date : February 1,2023.
Sampling by : SES

Item	Description	Unit	Method	Result	
				Cooling Tower	
				อ่างรองรับน้ำ (น้ำเข้า)	อ่างน้ำทิ้งจากหอผึ่งเย็น (น้ำออก)
	Sample condition	-	-	clear	light yellow
1	Legionella pneumophila	CFU/1000 ml.	Direct Count	ND	ND

Method :Based on Standard Method for the Examination of Water and Wastewater,APHA,AWWA,WEF 23rd Edition 2017
Standard :ประกาศกรมอนามัย เรื่อง ข้อปฏิบัติการควบคุมเชื้อลีจิโอเนลลาในหอผึ่งเย็นของอาคารในประเทศไทย พ.ศ.2544
Remark :ND = Non-Detectable

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SES-23078/WS

May 11,2023.

Analysis Report

Customer Name : Bangkok Hospital/Hua Hin
Address : 888 Petchkasem Rd.,Hua Hin, Prachuapkhirikhan 77110
Type of Sampling : Water Supply
Sampling date : May 2,2023.
Sampling by : SES

Item	Description	Unit	Method	Result	
				Cooling Tower	
				อ่างรองรับน้ำ (น้ำเข้า)	อ่างน้ำทิ้งจากหอผึ่งเย็น (น้ำออก)
	Sample condition	-	-	clear	yellow
1	Legionella pneumophila	CFU/1000 ml.	Direct Count	ไม่พบ	ไม่พบ

Method :Based on Standard Method for the Examination of Water and Wastewater,APHA,AWWA,WEF 23rd Edition 2017
Standard :ประกาศกรมอนามัย เรื่อง ข้อปฏิบัติการควบคุมเชื้อลีจิโอเนลลาในหอผึ่งเย็นของอาคารในประเทศไทย พ.ศ.2544

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