เอกสารแนบ 12

ผลการตรวจวิเคราะห์คุณภาพน้ำทิ้งก่อนการบำบัด คุณภาพน้ำทิ้งหลังการบำบัด และคุณภาพน้ำที่เข้าและออกหอผึ่งเย็น

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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-24158/WW

July 17, 2024.

ANALYSIS REPORT

Customer : Bangkok Hospital/HuaHin

Address : 888 Petchkasem Road, HuaHin Sub District, HuaHin District, Prachuapkhirikhan 77110

Sample Type : Wastewater

Sampling Date : July 3, 2024.

Sampling By : SES

Item	Parameter	Unit	Method of Analysis	Result		Standard[1]
				Wastewater Treatment System		
				Influent *	Effluent	
	Sample Description	-	-	brown turbid sediment foul smell	yellow	-
1	pH	-	Electrometric	7.18	7.10	5.0 - 9.0
2	BOD (Biochemical Oxygen Demand)	mg/L	5 Days BOD Test	233	14	≤20
3	COD (Chemical Oxygen Demand)	mg/L	Close Reflux,Titrimetric	-	98	≤120[2]
4	SS (Suspended Solids)	mg/L	Dried at 103-105 °C	102.6	10.7	≤30
5	Settleable Solids	ml/L	Volumetric	-	<0.1	≤0.5
6	TDS (Total Dissolved Solids)	mg/L	Dried at 103-105 °C	-	322	≤500
7	Sulfide	mg/L	Iodometric	5.11	<1.0	≤1.0
8	TKN (Total Kjeldahl Nitrogen)	mg/L	Macro-Kjeldahl	147.88	15.45	≤35
9	Oil & Grease	mg/L	Liquid-Liquid, Partition-Gravimetric	19.6	3.3	≤20
10	Total Coliform Bacteria	MPN/100ml	Multiple Tube Fermentation Technique	$>1.6x10^5$	$1.7x10^3$	≤5,000[3]
11	Fecal Coliform Bacteria	MPN/100ml	Multiple Tube Fermentation Technique	-	$2.4x10^2$	≤1,000[3]
12	Residual Free Chlorine	mg/L	DPD Ferrous Titrimetric	-	0.07	≤1.0[2]

Method of analysis 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 is increase from TDS in water supply (TDS in water supply = 150 mg/L)

: * Influent no established standard

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Mr.V

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ANALYST BY : V CARE ENVIRONMENT SERVICES CO.,LTD. (PRIVATE LABORATORY REGISTERED NO.ว.210)

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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-24182/WW

August 13, 2024.

ANALYSIS REPORT

Customer : Bangkok Hospital/HuaHin

Address : 888 Petchkasem Road, HuaHin Sub District, HuaHin District, Prachuapkhirikhan 77110

Sample Type : Wastewater

Sampling Date : August 1, 2024.

Sampling By : SES

Item	Parameter	Unit	Method of Analysis	Result		Standard[1]
				Wastewater Treatment System		
				Influent *	Effluent	
	Sample Description	-	-	brown turbid sediment foul smell	yellow	-
1	pH	-	Electrometric	6.87	6.92	5.0 - 9.0
2	BOD (Biochemical Oxygen Demand)	mg/L	5 Days BOD Test	270	9	≤20
3	COD (Chemical Oxygen Demand)	mg/L	Close Reflux,Titrimetric	-	60	≤120[2]
4	SS (Suspended Solids)	mg/L	Dried at 103-105 °C	127.6	4.1	≤30
5	Settleable Solids	ml/L	Volumetric	-	<0.1	≤0.5
6	TDS (Total Dissolved Solids)	mg/L	Dried at 103-105 °C	-	194	≤500
7	Sulfide	mg/L	Iodometric	5.75	<1.0	≤1.0
8	TKN (Total Kjeldahl Nitrogen)	mg/L	Macro-Kjeldahl	129.71	10.62	≤35
9	Oil & Grease	mg/L	Liquid-Liquid, Partition-Gravimetric	18.2	<3.0	≤20
10	Total Coliform Bacteria	MPN/100ml	Multiple Tube Fermentation Technique	$>1.6x10^5$	$9.3x10^2$	≤5,000[3]
11	Fecal Coliform Bacteria	MPN/100ml	Multiple Tube Fermentation Technique	-	$1.7x10^2$	≤1,000[3]
12	Residual Free Chlorine	mg/L	DPD Ferrous Titrimetric	-	0.06	≤1.0[2]

Method of analysis 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 is increase from TDS in water supply (TDS in water supply = 110 mg/L)

: * Influent no established standard

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SIAM ENVIRONMENTAL SERVICE LIMITED
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โทรศัพท์ : 088-5542100 E-Mail : ses_1996@yahoo.com เลขประจำตัวผู้เสียภาษีอากร 0105539093789

SES-24202/WW

September 10, 2024.

ANALYSIS REPORT

Customer : Bangkok Hospital/HuaHin

Address : 888 Petchkasem Road, HuaHin Sub District, HuaHin District, Prachuapkhirikhan 77110

Sample Type : Wastewater

Sampling Date : September 2, 2024.

Sampling By : SES

Item	Parameter	Unit	Method of Analysis	Result		Standard[1]
				Wastewater Treatment System		
				Influent *	Effluent	
	Sample Description	-	-	yellow turbid foul smell	yellow	-
1	pH	-	Electrometric (pH Meter)	6.70	6.88	5.5 - 9.0
2	BOD (Biochemical Oxygen Demand)	mg/L	5 Days BOD test, Azide Modification	146	7	≤20
3	COD (Chemical Oxygen Demand)	mg/L	Close Reflux Titrimetric	-	55	≤120[2]
4	TSS (Total Suspended Solids)	mg/L	Dried at 103-105°C	93.4	2.9	≤30
5	Settleable Solids	ml/L	Volumetric	-	<0.1	-
6	TDS (Total Dissolved Solids)	mg/L	Dried at 180°C	-	164	≤1,000
7	Sulfide	mg/L	Iodometric	2.08	<1.0	≤1.0
8	TKN (Total Kjeldahl Nitrogen)	mg/L	Semi Micro Kjeldahl	102.73	9.14	≤35
9	Oil & Grease	mg/L	Liquid-Liquid, Partition-Gravimetric	15.6	<3.0	≤20
10	Total Coliform Bacteria	MPN/100ml	Multiple Tube Fermentation Technique	$>1.6x10^5$	$5.4x10^2$	≤5,000
11	Fecal Coliform Bacteria	MPN/100ml	Multiple Tube Fermentation Technique	-	<1.8	≤1,000
12	Free Chlorine	mg/L	Iodometric Electrode	-	0.05	≤1.0

Method of analysis 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.2567), ก Building

: [2] Notification of the Ministry of Natural Resources and Environment (B.E.2559)

Remark : TDS in the effluent is increase from TDS in water supply (TDS in water supply = 70 mg/L)

: * Influent no established standard

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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-24232/WW

October 10, 2024.

ANALYSIS REPORT

Customer : Bangkok Hospital/HuaHin

Address : 888 Petchkasem Road, HuaHin Sub District, HuaHin District, Prachuapkhirikhan 77110

Sample Type : Wastewater

Sampling Date : October 1, 2024.

Sampling By : SES

Item	Parameter	Unit	Method of Analysis	Result		Standard[1]
				Wastewater Treatment System		
				Influent *	Effluent	
	Sample Description	_	_	brown turbid foul smell	yellow	_
1	pH	_	Electrometric (pH Meter)	6.90	7.26	5.5 - 9.0
2	BOD (Biochemical Oxygen Demand)	mg/L	5 Days BOD test, Azide Modification	196	4	≤20
3	COD (Chemical Oxygen Demand)	mg/L	Close Reflux Titrimetric	_	36	≤120[2]
4	TSS (Total Suspended Solids)	mg/L	Dried at 103-105°C	108.5	<2.5	≤30
5	Settleable Solids	ml/L	Volumetric	_	<0.1	-
6	TDS (Total Dissolved Solids)	mg/L	Dried at 180°C	_	290	≤1,000
7	Sulfide	mg/L	Iodometric	3.11	<1.0	≤1.0
8	TKN (Total Kjeldahl Nitrogen)	mg/L	Semi Micro Kjeldahl	218.19	8.02	≤35
9	Oil & Grease	mg/L	Liquid-Liquid, Partition-Gravimetric	17.8	<3.0	≤20
10	Total Coliform Bacteria	MPN/100ml	Multiple Tube Fermentation Technique	$>1.6x10^5$	<1.8	≤5,000
11	Fecal Coliform Bacteria	MPN/100ml	Multiple Tube Fermentation Technique	_	<1.8	≤1,000
12	Free Chlorine	mg/L	Iodometric Electrode	_	0.06	≤1.0

Method of analysis 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.2567), ก Building

: [2] Notification of the Ministry of Natural Resources and Environment (B.E.2559)

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

: * Influent no established standard

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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-24252/WW

November 11, 2024.

ANALYSIS REPORT

Customer : Bangkok Hospital/HuaHin

Address : 888 Petchkasem Road, HuaHin Sub District, HuaHin District, Prachuapkhirikhan 77110

Sample Type : Wastewater

Sampling Date : November 1, 2024.

Sampling By : SES

Item	Parameter	Unit	Method of Analysis	Result		Standard[1]
				Wastewater Treatment System		
				Influent *	Effluent	
	Sample Description	_	_	brown turbid foul smell	yellow	_
1	pH	_	Electrometric (pH Meter)	6.64	6.89	5.5 - 9.0
2	BOD (Biochemical Oxygen Demand)	mg/L	5 Days BOD test, Azide Modification	188	5	≤20
3	COD (Chemical Oxygen Demand)	mg/L	Close Reflux Titrimetric	_	31	≤120[2]
4	TSS (Total Suspended Solids)	mg/L	Dried at 103-105°C	97.6	21.7	≤30
5	Settleable Solids	ml/L	Volumetric	_	<0.1	-
6	TDS (Total Dissolved Solids)	mg/L	Dried at 180°C		263	≤1,000
7	Sulfide	mg/L	Iodometric	2.87	<1.0	≤1.0
8	TKN (Total Kjeldahl Nitrogen)	mg/L	Semi Micro Kjeldahl	204.92	18.51	≤35
9	Oil & Grease	mg/L	Liquid-Liquid, Partition-Gravimetric	16.3	<3.0	≤20
10	Total Coliform Bacteria	MPN/100ml	Multiple Tube Fermentation Technique	$>1.6x10^5$	<1.8	≤5,000
11	Fecal Coliform Bacteria	MPN/100ml	Multiple Tube Fermentation Technique	_	<1.8	≤1,000
12	Free Chlorine	mg/L	Iodometric Electrode	_	0.07	≤1.0

Method of analysis 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.2567), ก Building

: [2] Notification of the Ministry of Natural Resources and Environment (B.E.2559)

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

: * Influent no established standard

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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-24272/WW

December 12, 2024.

ANALYSIS REPORT

Customer : Bangkok Hospital/HuaHin

Address : 888 Petchkasem Road, HuaHin Sub District, HuaHin District, Prachuapkhirikhan 77110

Sample Type : Wastewater

Sampling Date : December 2, 2024.

Sampling By : SES

Item	Parameter	Unit	Method of Analysis	Result		Standard[1]
				Wastewater Treatment System		
				Influent *	Effluent	
	Sample Description	_	_	brown turbid foul smell	yellow	_
1	pH	_	Electrometric (pH Meter)	6.67	6.93	5.5 - 9.0
2	BOD (Biochemical Oxygen Demand)	mg/L	5 Days BOD test, Azide Modification	176	4	≤20
3	COD (Chemical Oxygen Demand)	mg/L	Close Reflux Titrimetric	_	30	≤120[2]
4	TSS (Total Suspended Solids)	mg/L	Dried at 103-105°C	94.5	20.1	≤30
5	Settleable Solids	ml/L	Volumetric	_	<0.1	-
6	TDS (Total Dissolved Solids)	mg/L	Dried at 180°C	_	191	≤1,000
7	Sulfide	mg/L	Iodometric	2.73	<1.0	≤1.0
8	TKN (Total Kjeldahl Nitrogen)	mg/L	Semi Micro Kjeldahl	196.8	15.4	≤35
9	Oil & Grease	mg/L	Liquid-Liquid, Partition-Gravimetric	17.8	<3.0	≤20
10	Total Coliform Bacteria	MPN/100ml	Multiple Tube Fermentation Technique	$>1.6x10^5$	<1.8	≤5,000
11	Fecal Coliform Bacteria	MPN/100ml	Multiple Tube Fermentation Technique	_	<1.8	≤1,000
12	Free Chlorine	mg/L	Iodometric Electrode	_	0.02	≤1.0

Method of analysis 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.2567), ก Building

: [2] Notification of the Ministry of Natural Resources and Environment (B.E.2559)

Remark : TDS in the effluent is increase from TDS in water supply (TDS in water supply = 90 mg/L)

: * Influent no established standard

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โทรศัพท์ : 088-5542100 E-Mail : ses_1996@yahoo.com เลขประจำตัวผู้เสียภาษีอากร 0105539093789

SES-24182/WS

August 13, 2024.

ANALYSIS REPORT

Customer : Bangkok Hospital/HuaHin

Address : 888 Petchkasem Road, HuaHin Sub District, HuaHin District, Prachuapkhirikhan 77110

Sample Type : Cooling Tower

Sampling Date : August 1, 2024.

Sampling by : SES

Item	Description	Unit	Method	Result	
				Cooling Tower	
				อ่างรองรับน้ำ (น้ำเข้า)	อ่างน้ำทิ้งจากหอผึ่งเย็น (น้ำออก)
	Sample Description	-	-	Yellow	clear
1	Legionella pneumophila	CFU/1000 ml.	Direct Count	Not Detected	Not Detected

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

Standard : Notification of the Ministry of Public Health, Department of Health (B.E.2544); Legionella pneumophilla

Remark : Not Detected = ไม่พบ

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SES-24252/WS

November 11, 2024.

ANALYSIS REPORT

Customer : Bangkok Hospital/HuaHin

Address : 888 Petchkasem Road, HuaHin Sub District, HuaHin District, Prachuapkhirikhan 77110

Sample Type : Cooling Tower

Sampling Date : November 1, 2024.

Sampling by : SES

Item	Description	Unit	Method	Result	
				Cooling Tower	
				อ่างรองรับน้ำ (น้ำเข้า)	อ่างน้ำทิ้งจากหอผึ่งเย็น (น้ำออก)
	Sample Description	-	-	clear	clear
1	Legionella pneumophila	CFU/1000 ml.	Direct Count	Not-Detected	Not-Detected

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

Standard : Notification of the Ministry of Public Health, Department of Health (B.E.2544); Legionella pneumophilla

Remark : Not-Detected = ไม่พบ

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