

Report No. : 2024-500001290-13 / 003-2 (Page 1 of 1)

Issued date : October 25, 2024

CLIENT : PTTEP SP LIMITED
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 Tel. 085-642-7731 E-mail address : natthitas@pttep.com

Analysis Report

SAMPLE DESIGNATED AS : Ambient Noise Level **MEASUREMENT DATE :** September 28 – October 1, 2024
MEASUREMENT LOCATION : Boundary of GPP (N13) (UTM 48Q 0262542E, 1845113N)
MEASURED BY : Winit Khaundee
CALIBRATION DATA : Calibrator Model CR:515, CIRRUS, Serial No. 80411
 Calibration Value Reference : 94.0 dB(A) Pre Cal. : 94.0 dB(A), Post Cal. : 94.0 dB(A)
SOUND LEVEL METER NO. : Model NL-53, RION, Serial No. 00541085

Time	Noise Level [dB(A)]									Standard*
	September 28-29, 2024			September 29-30, 2024			September 30-October 1, 2024			
	Leq	Lmax	L90	Leq	Lmax	L90	Leq	Lmax	L90	
09:00-10:00	53.4	70.0	51.6	52.8	72.0	51.2	53.3	69.9	51.8	
10:00-11:00	53.1	68.9	51.4	52.4	64.1	51.5	55.8	77.6	52.0	
11:00-12:00	52.9	69.3	51.5	52.3	62.2	50.9	53.2	68.6	51.6	
12:00-13:00	53.0	66.6	51.3	52.8	71.9	51.5	53.4	71.6	51.7	
13:00-14:00	54.0	70.5	52.4	55.0	77.6	51.9	53.2	72.4	51.6	
14:00-15:00	54.1	66.7	52.3	53.7	82.8	51.8	53.9	78.2	51.5	
15:00-16:00	54.5	73.5	52.5	54.4	65.5	53.0	70.1	102.0	53.2	
16:00-17:00	54.3	76.8	52.6	54.7	74.6	52.4	60.7	83.4	55.3	
17:00-18:00	55.7	66.1	54.0	55.5	72.8	53.0	55.9	71.6	54.0	
18:00-19:00	53.4	65.7	51.2	53.8	72.3	51.6	54.2	69.1	52.1	
19:00-20:00	52.6	68.2	50.8	53.1	69.8	51.2	55.1	79.5	52.6	
20:00-21:00	52.4	66.2	50.8	52.7	68.4	51.2	53.3	70.0	51.6	
21:00-22:00	52.6	69.2	50.3	52.7	67.5	51.2	53.6	69.3	52.2	
22:00-23:00	52.1	70.0	49.8	51.3	62.9	49.8	51.9	66.7	49.7	
23:00-00:00	51.0	62.8	49.4	51.9	70.0	49.6	52.2	69.8	50.3	
00:00-01:00	50.5	66.7	49.0	50.9	64.2	49.5	51.7	69.3	50.4	
01:00-02:00	50.5	67.6	48.7	50.0	59.0	48.6	51.1	68.6	49.4	
02:00-03:00	49.9	61.1	48.3	50.0	66.7	48.7	50.2	62.0	48.8	
03:00-04:00	50.3	66.1	49.1	50.3	63.6	48.9	50.6	65.0	48.5	
04:00-05:00	50.4	66.7	49.2	50.4	66.7	49.5	50.9	71.0	49.4	
05:00-06:00	53.2	67.7	51.1	53.0	65.7	50.3	53.0	75.8	49.6	
06:00-07:00	52.6	68.0	50.8	54.0	71.2	51.8	54.2	74.5	52.1	
07:00-08:00	60.5	81.1	51.1	54.7	67.0	53.2	56.1	71.2	54.3	
08:00-09:00	52.8	63.0	51.4	53.9	71.4	52.0	54.7	70.2	52.2	
Leq-24 hrs	53.6	-	-	53.0	-	-	58.3	-	-	70
Ldn	58.4	-	-	58.3	-	-	60.8	-	-	-
Lmax	-	81.1	-	-	82.8	-	-	102.0	-	115
L90	-	-	49.8	-	-	49.8	-	-	50.3	-

Source: * Notification of the National Environment Board No.15, B.E. 2540 (1997).



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Report No. : 2024-500001290-13 / 003-6 (Page 1 of 1)

Issued date : October 25, 2024

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Noise Level **MEASUREMENT DATE :** September 28 – October 1, 2024
MEASUREMENT LOCATION : Ban Kham Yai (N12) (UTM 48Q 0261565E, 18446458N)
MEASURED BY : Winit Khaundee
CALIBRATION DATA : Calibrator Model CR:515, CIRRUS, Serial No. 80411
 Calibration Value Reference : 94.0 dB(A) Pre Cal. : 94.0 dB(A), Post Cal. : 94.0 dB(A)
SOUND LEVEL METER NO. : Model NL-53, RION, Serial No. 00541049

Duration	Specific Noise Level (L_{Aeq, T_s}) [dB(A)] ^{1/}	Background Noise Level (L_{A90}) [dB(A)] ^{2/}	Residual Noise Level ($L_{Aeq R}$) [dB(A)] ^{3/}	Disturbance Level ($L_{Aeq Tr}$) [dB(A)] ^{4/}
September 28-29, 2024				
Day Time (06:00-22:00)	47.2	38.7	45.2	7.2
Night Time (22:00-06:00)	43.0	39.7	40.9	2.1
September 29-30, 2024				
Day Time (06:00-22:00)	48.5	40.5	48.0	1.4
Night Time (22:00-06:00)	46.7	39.7	40.4	8.8
September 30-October 1, 2024				
Day Time (06:00-22:00)	49.2	42.3	47.1	5.7
Night Time (22:00-06:00)	48.3	40.5	44.8	8.2
Standard^{4/**}				Not more than 10

Remarks : ^{1/} Specific Noise Level is sound level in the existing environment which is disturbed by activities of factory, measured in term of " $L_{Aeq, 1 hr}$ " in day time and " $L_{Aeq, 5 min}$ " in night time.
^{2/} Background Noise Level is sound level in the existing environment which is not disturbed by activities of factory. Background noise Level is measured in term of " L_{A90} ".
^{3/} Residual Noise Level is sound level in the existing environment which is not disturbed by activities of factory. Residual Noise Level is measured in term of " $L_{Aeq R}$ ".
^{4/} If the Disturbance Level value exceed 10 dB(A), it will be considered as Nuisance Noise.
Source : * Notification of the National Environmental Board No. 29, B.E. 2550 (2007), Subjected "Nuisance noise", dated June 29, B.E. 2550 (2007).
 ** Calculation followed Notification of Pollution Control Committee, subjected Measurement Methods of Background Sound Level, Residual Sound Level, Measurement and Calculation of Rating Level, Calculation of Nuisance Noise Level and Record Form B.E. 2565 (2022).

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Report No. : 2024-500001290-13 / 003-7 (Page 1 of 1)

Issued date : October 25, 2024

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Analysis Report

SAMPLE DESIGNATED AS : Ambient Noise Level **MEASUREMENT DATE :** September 28 – October 1, 2024
MEASUREMENT LOCATION : Boundary of GPP (N13) (UTM 48Q 0262542E, 1845113N)
MEASURED BY : Winit Khaundee
CALIBRATION DATA : Calibrator Model CR:515, CIRRUSS, Serial No. 80411
 Calibration Value Reference : 94.0 dB(A) Pre Cal. : 94.0 dB(A), Post Cal. : 94.0 dB(A)
SOUND LEVEL METER NO. : Model NL-53, RION, Serial No. 00541085

Duration	Specific Noise Level (L_{Aeq, T_s}) [dB(A)] ^{1/}	Background Noise Level (L_{A90}) [dB(A)] ^{2/}	Residual Noise Level ($L_{Aeq R}$) [dB(A)] ^{3/}	Disturbance Level ($L_{Aeq Tr}$) [dB(A)] ^{4/}
September 28-29, 2024				
Day Time (06:00-22:00)	54.1	49.6	52.7	0.0
Night Time (22:00-06:00)	50.4	48.8	49.7	0.0
September 29-30, 2024				
Day Time (06:00-22:00)	53.7	49.8	52.1	0.0
Night Time (22:00-06:00)	51.1	49.4	50.1	0.0
September 30-October 1, 2024				
Day Time (06:00-22:00)	53.9	50.8	53.4	0.0
Night Time (22:00-06:00)	51.7	49.3	50.1	0.0
Standard**/***				Not more than 10

Remarks : ^{1/} Specific Noise Level is sound level in the existing environment which is disturbed by activities of factory, measured in term of " $L_{Aeq, 1 hr}$ " in day time and " $L_{Aeq, 5 min}$ " in night time.

^{2/} Background Noise Level is sound level in the existing environment which is not disturbed by activities of factory. Background noise Level is measured in term of " L_{A90} ".

^{3/} Residual Noise Level is sound level in the existing environment which is not disturbed by activities of factory. Residual Noise Level is measured in term of " $L_{Aeq R}$ ".

^{4/} If the Disturbance Level value exceed 10 dB(A), it will be considered as Nuisance Noise.

Source : * Notification of the National Environmental Board No. 29, B.E. 2550 (2007), Subjected "Nuisance noise", dated June 29, B.E. 2550 (2007).
 ** Calculation followed Notification of Pollution Control Committee, subjected Measurement Methods of Background Sound Level, Residual Sound Level, Measurement and Calculation of Rating Level, Calculation of Nuisance Noise Level and Record Form B.E. 2565 (2022).

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ภาคผนวก จ-4

ใบรายงานผลการวิเคราะห์คุณภาพน้ำใต้ดิน ในระยะดำเนินการ

Report No. : 2024-500001290-13/005-1 (Page 1 of 2) Issued date : October 21, 2024

CLIENT : PTTEP SP LIMITED
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Analysis Report

SAMPLE DESIGNATED AS : Groundwater Quality
SAMPLING BY : Sompong Katkhuntod
SAMPLING LOCATION : Camp site monitoring well (GW1)
 Sinphuhorm (SPH), Udonthani and Khonkaen

SAMPLING DATE : October 2, 2024
SAMPLING TIME : 11:16 hr.

Parameter	Unit	Method	Result	Standard ^{1/}	
				Optimal Value	Max. Allowable
Temperature	°C	APHA, 2550 B	29.1	-	-
pH	-	APHA 4500-H+ B	6.7	7.0-8.5	6.5-9.2
Conductivity	µs/cm	APHA 2510 B	343	-	-
Color	Pt-Co	APHA, 2120 C	<1	5	15
Salinity	ppt	APHA, 2520 B	0.16	-	-
Total Dissolved Solids (TDS)	mg/l	APHA, 2540 C	187	≥600	1,200
Oil and Grease	mg/l	APHA, 5520 B	<2	-	-
Total hardness (as CaCO ₃)	mg/L	APHA 2340 C	146	≥300	500
Hardness, Noncarbonate (as CaCO ₃)	mg/L	APHA 2340 C	<1	≥200	250
Chloride (Cl)	mg/L	APHA 4500-Cl D	3	≥250	600
Total Petroleum Hydrocarbon (TPH)	mg/L	Based on Method of Seawater analysis*	0.0002	-	-
Benzene	mg/L	APHA, 6200 B	<0.0005	-	-
Toluene	mg/L	APHA, 6200 B	<0.001	-	-
Total Xylenes	mg/L	APHA, 6200 B	<0.001	-	-
Ethylbenzene	mg/L	APHA, 6200 B	<0.001	-	-

Remark : - Analytical Methods followed to Standard Methods for the Examination of Water and Wastewater, recommended by APHA, AWWA&WEF 24th edition., 2023

* Based on Method of Seawater analysis Third Completely Revised and Extended Edition, 1999, Chapter 21

Sources : ^{1/} Notification of the Ministry of Natural Resources and Environment, B.E. 2551 (2008), published in the Royal Government Gazette, Vol. 125, Special Part 85D, dated May 21, B.E. 2551 (2008).

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Report No. : 2024-500001290-13/005-1 (Page 2 of 2) Issued date : October 21, 2024

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Analysis Report

SAMPLE DESIGNATED AS : Groundwater Quality **SAMPLING DATE :** October 2, 2024
SAMPLING BY : Sompong Katkhuntod **SAMPLING TIME :** 11:16 hr.
SAMPLING LOCATION : Camp site monitoring well (GW1)
 Sinphuhorm (SPH), Udonthani and Khonkaen

Parameter	Unit	Method	Result	Standard ^{1/}	
				Optimal Value	Max. Allowable
Arsenic (As)	mg/l	APHA 3125 B	0.004	None	0.05
Barium (Ba)	mg/l	APHA 3125 B	0.749	-	-
Cadmium (Cd)	mg/l	APHA 3125 B	<0.0001	None	0.01
Chromium (Cr)	mg/l	APHA 3125 B	<0.010	-	-
Copper (Cu)	mg/l	APHA 3125 B	0.0022	≥1.0	1.5
Nickel (Ni)	mg/l	APHA 3125 B	0.0025	-	-
Mercury (Hg)	mg/l	APHA 3112 B	<0.0005	None	0.001
Manganese (Mn)	mg/l	APHA 3125 B	0.832	≥0.3	0.5
Lead (Pb)	mg/l	APHA 3125 B	0.1349	None	0.05
Selenium (Se)	mg/l	APHA 3125 B	<0.001	None	0.01
Zinc (Zn)	mg/l	APHA 3125 B	0.010	≥5.0	15.0

Remark : - Analytical Methods followed to Standard Methods for the Examination of Water and Wastewater, recommended by APHA, AWWA&WEF 24th edition., 2023

Sources : ^{1/} Notification of the Ministry of Natural Resources and Environment, B.E. 2551 (2008), published in the Royal Government Gazette, Vol. 125, Special Part 85D, dated May 21, B.E. 2551 (2008).

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Report No. : 2024-500001290-13/005-2 (Page 1 of 2) Issued date : October 21, 2024

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 Tel. 085-642-7731 E-mail address : natthitas@pttep.com

Analysis Report

SAMPLE DESIGNATED AS : Groundwater Quality **SAMPLING DATE :** October 2, 2024
SAMPLING BY : Sompong Katkhuntod **SAMPLING TIME :** 09:55 hr.
SAMPLING LOCATION : Groundwater Well at Ban Pa Mai (GW2)
 Sinphuhorm (SPH), Udonthani and Khonkaen

Parameter	Unit	Method	Result	Standard ^{1/}	
				Optimal Value	Max. Allowable
Temperature	°C	APHA, 2550 B	27.7	-	-
pH	-	APHA 4500-H+ B	5.9	7.0-8.5	6.5-9.2
Conductivity	µs/cm	APHA 2510 B	62.6	-	-
Color	Pt-Co	APHA, 2120 C	<1	5	15
Salinity	ppt	APHA, 2520 B	0.03	-	-
Total Dissolved Solids (TDS)	mg/l	APHA, 2540 C	44	✱600	1,200
Oil and Grease	mg/l	APHA, 5520 B	<2	-	-
Total hardness (as CaCO ₃)	mg/L	APHA 2340 C	24	✱300	500
Hardness, Noncarbonate (as CaCO ₃)	mg/L	APHA 2340 C	<1	✱200	250
Chloride (Cl)	mg/l	APHA 4500-Cl D	2	✱250	600
Total Petroleum Hydrocarbon (TPH)	mg/l	Based on Method of Seawater analysis*	0.0002	-	-
Benzene	mg/L	APHA, 6200 B	<0.0005	-	-
Toluene	mg/L	APHA, 6200 B	<0.001	-	-
Total Xylenes	mg/L	APHA, 6200 B	<0.001	-	-
Ethylbenzene	mg/L	APHA, 6200 B	<0.001	-	-

Remark : - Analytical Methods followed to Standard Methods for the Examination of Water and Wastewater, recommended by APHA, AWWA&WEF 24th edition., 2023

* Based on Method of Seawater analysis Third Completely Revised and Extended Edition, 1999, Chapter 21

Sources : ^{1/} Notification of the Ministry of Natural Resources and Environment, B.E. 2551 (2008), published in the Royal Government Gazette, Vol. 125, Special Part 85D, dated May 21, B.E. 2551 (2008).

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Report No. : 2024-500001290-13/005-2 (Page 2 of 2) Issued date : October 21, 2024

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Analysis Report

SAMPLE DESIGNATED AS : Groundwater Quality **SAMPLING DATE :** October 2, 2024
SAMPLING BY : Sompong Katkhuntod **SAMPLING TIME :** 09:55 hr.
SAMPLING LOCATION : Groundwater Well at Ban Pa Mai (GW2)
 Sinphuhorm (SPH), Udonthani and Khonkaen

Parameter	Unit	Method	Result	Standard ^{1/}	
				Optimal Value	Max. Allowable
Arsenic (As)	mg/l	APHA 3125 B	<0.001	None	0.05
Barium (Ba)	mg/l	APHA 3125 B	0.052	-	-
Cadmium (Cd)	mg/l	APHA 3125 B	<0.0001	None	0.01
Chromium (Cr)	mg/l	APHA 3125 B	<0.010	-	-
Copper (Cu)	mg/l	APHA 3125 B	0.0026	>1.0	1.5
Nickel (Ni)	mg/l	APHA 3125 B	0.0047	-	-
Mercury (Hg)	mg/l	APHA 3112 B	<0.0005	None	0.001
Manganese (Mn)	mg/l	APHA 3125 B	0.275	>0.3	0.5
Lead (Pb)	mg/l	APHA 3125 B	0.0225	None	0.05
Selenium (Se)	mg/l	APHA 3125 B	<0.001	None	0.01
Zinc (Zn)	mg/l	APHA 3125 B	0.012	>5.0	15.0

Remark : - Analytical Methods followed to Standard Methods for the Examination of Water and Wastewater, recommended by APHA, AWWA&WEF 24th edition., 2023

Sources : ^{1/} Notification of the Ministry of Natural Resources and Environment, B.E. 2551 (2008), published in the Royal Government Gazette, Vol. 125, Special Part 85D, dated May 21, B.E. 2551 (2008).



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Report No. : 2024-500001290-13/005-3 (Page 1 of 2) Issued date : October 21, 2024

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Analysis Report

SAMPLE DESIGNATED AS : Groundwater Quality **SAMPLING DATE :** October 1, 2024
SAMPLING BY : Sompong Katkhuntod **SAMPLING TIME :** 14:20 hr.
SAMPLING LOCATION : Groundwater Well at Ban Kham Yai (GW5)
 Sinphuhorm (SPH), Udonthani and Khonkaen

Parameter	Unit	Method	Result	Standard ^{1/}	
				Optimal Value	Max. Allowable
Temperature	°C	APHA, 2550 B	29.2	-	-
pH	-	APHA 4500-H+ B	7.2	7.0-8.5	6.5-9.2
Conductivity	µs/cm	APHA 2510 B	673	-	-
Color	Pt-Co	APHA, 2120 C	<1	5	15
Salinity	ppt	APHA, 2520 B	0.33	-	-
Total Dissolved Solids (TDS)	mg/l	APHA, 2540 C	391	≲600	1,200
Oil and Grease	mg/l	APHA, 5520 B	<2	-	-
Total hardness (as CaCO ₃)	mg/L	APHA 2340 C	273	≲300	500
Hardness, Noncarbonate (as CaCO ₃)	mg/L	APHA 2340 C	<1	≲200	250
Chloride (Cl)	mg/l	APHA 4500-Cl D	21	≲250	600
Total Petroleum Hydrocarbon (TPH)	mg/l	Based on Method of Seawater analysis*	0.0003	-	-
Benzene	mg/L	APHA, 6200 B	<0.0005	-	-
Toluene	mg/L	APHA, 6200 B	<0.001	-	-
Total Xylenes	mg/L	APHA, 6200 B	<0.001	-	-
Ethylbenzene	mg/L	APHA, 6200 B	<0.001	-	-

Remark : - Analytical Methods followed to Standard Methods for the Examination of Water and Wastewater, recommended by APHA, AWWA&WEF 24th edition., 2023

* Based on Method of Seawater analysis Third Completely Revised and Extended Edition, 1999, Chapter 21

Sources : ^{1/} Notification of the Ministry of Natural Resources and Environment, B.E. 2551 (2008), published in the Royal Government Gazette, Vol. 125, Special Part 85D, dated May 21, B.E. 2551 (2008).



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Report No. : 2024-500001290-13/005-3 (Page 2 of 2) Issued date : October 21, 2024

CLIENT : PTTEP SP LIMITED
CONTACT : Khun Natthita Sribuhome
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 555/1 Vibhavadi Rangsit Road, Chatuchak, Bangkok 10900
 Tel. 085-642-7731 E-mail address : natthitas@pttep.com

Analysis Report

SAMPLE DESIGNATED AS : Groundwater Quality **SAMPLING DATE :** October 1, 2024
SAMPLING BY : Sompong Katkhuntod **SAMPLING TIME :** 14:20 hr.
SAMPLING LOCATION : Groundwater Well at Ban Kham Yai (GW5)
 Sinphuhorm (SPH), Udonthani and Khonkaen

Parameter	Unit	Method	Result	Standard ^{1/}	
				Optimal Value	Max. Allowable
Arsenic (As)	mg/l	APHA 3125 B	<0.001	None	0.05
Barium (Ba)	mg/l	APHA 3125 B	3.370	-	-
Cadmium (Cd)	mg/l	APHA 3125 B	<0.0001	None	0.01
Chromium (Cr)	mg/l	APHA 3125 B	<0.010	-	-
Copper (Cu)	mg/l	APHA 3125 B	0.0019	≥1.0	1.5
Nickel (Ni)	mg/l	APHA 3125 B	0.0005	-	-
Mercury (Hg)	mg/l	APHA 3112 B	<0.0005	None	0.001
Manganese (Mn)	mg/l	APHA 3125 B	0.872	≥0.3	0.5
Lead (Pb)	mg/l	APHA 3125 B	0.1057	None	0.05
Selenium (Se)	mg/l	APHA 3125 B	<0.001	None	0.01
Zinc (Zn)	mg/l	APHA 3125 B	0.018	≥5.0	15.0

Remark : - Analytical Methods followed to Standard Methods for the Examination of Water and Wastewater, recommended by APHA, AWWA&WEF 24th edition., 2023

Sources : ^{1/} Notification of the Ministry of Natural Resources and Environment, B.E. 2551 (2008) at Gazette, Vol. 125, Special Part 85D, dated May 21, B.E. 2551 (2008).



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Report No. : 2024-500001290-13/005-4 (Page 1 of 2) Issued date : October 21, 2024

CLIENT : PTTEP SP LIMITED
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 Tel. 085-642-7731 E-mail address : natthitas@pttep.com

Analysis Report

SAMPLE DESIGNATED AS : Groundwater Quality **SAMPLING DATE :** October 1, 2024
SAMPLING BY : Sompong Katkhuntod **SAMPLING TIME :** 14:47 hr.
SAMPLING LOCATION : Groundwater Well at Ban Kud Nam Sai (OW5S)
 Sinphuhorm (SPH), Udonthani and Khonkaen

Parameter	Unit	Method	Result	Standard ^{1/}	
				Optimal Value	Max. Allowable
Temperature	°C	APHA, 2550 B	29.4	-	-
pH	-	APHA 4500-H+ B	6.9	7.0-8.5	6.5-9.2
Conductivity	µs/cm	APHA 2510 B	2,820	-	-
Color	Pt-Co	APHA, 2120 C	2	5	15
Salinity	ppt	APHA, 2520 B	1.46	-	-
Total Dissolved Solids (TDS)	mg/l	APHA, 2540 C	2,071	≥600	1,200
Oil and Grease	mg/l	APHA, 5520 B	<2	-	-
Total hardness (as CaCO ₃)	mg/L	APHA 2340 C	1,060	≥300	500
Hardness, Noncarbonate (as CaCO ₃)	mg/L	APHA 2340 C	610	≥200	250
Chloride (Cl)	mg/l	APHA 4500-Cl D	685	≥250	600
Total Petroleum Hydrocarbon (TPH)	mg/l	Based on Method of Seawater analysis*	0.0003	-	-
Benzene	mg/L	APHA, 6200 B	<0.0005	-	-
Toluene	mg/L	APHA, 6200 B	<0.001	-	-
Total Xylenes	mg/L	APHA, 6200 B	<0.001	-	-
Ethylbenzene	mg/L	APHA, 6200 B	<0.001	-	-

Remark : - Analytical Methods followed to Standard Methods for the Examination of Water and Wastewater, recommended by APHA, AWWA&WEF 24th edition., 2023
 * Based on Method of Seawater analysis Third Completely Revised and Extended Edition, 1999, Chapter 21
Sources : ^{1/} Notification of the Ministry of Natural Resources and Environment, B.E. 2551 (2008). published in the Royal Government Gazette, Vol. 125, Special Part 85D, dated May 21, B.E. 2551 (2008).



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Report No. : 2024-500001290-13/005-4 (Page 2 of 2) Issued date : October 21, 2024

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 Tel. 085-642-7731 E-mail address : natthitas@pttep.com

Analysis Report

SAMPLE DESIGNATED AS : Groundwater Quality **SAMPLING DATE :** October 1, 2024
SAMPLING BY : Sompong Katkhuntod **SAMPLING TIME :** 14:47 hr.
SAMPLING LOCATION : Groundwater Well at Ban Kud Nam Sai (OW5S)
 Sinphuhorm (SPH), Udonthani and Khonkaen

Parameter	Unit	Method	Result	Standard ^{1/}	
				Optimal Value	Max. Allowable
Arsenic (As)	mg/l	APHA 3125 B	0.002	None	0.05
Barium (Ba)	mg/l	APHA 3125 B	1.806	-	-
Cadmium (Cd)	mg/l	APHA 3125 B	<0.0001	None	0.01
Chromium (Cr)	mg/l	APHA 3125 B	<0.010	-	-
Copper (Cu)	mg/l	APHA 3125 B	0.0051	≥1.0	1.5
Nickel (Ni)	mg/l	APHA 3125 B	0.0029	-	-
Mercury (Hg)	mg/l	APHA 3112 B	<0.0005	None	0.001
Manganese (Mn)	mg/l	APHA 3125 B	0.490	≥0.3	0.5
Lead (Pb)	mg/l	APHA 3125 B	0.0177	None	0.05
Selenium (Se)	mg/l	APHA 3125 B	<0.001	None	0.01
Zinc (Zn)	mg/l	APHA 3125 B	0.010	≥5.0	15.0

Remark : - Analytical Methods followed to Standard Methods for the Examination of Water and Wastewater, recommended by APHA, AWWA&WEF 24th edition., 2023
Sources : ^{1/} Notification of the Ministry of Natural Resources and Environment, B.E. 2551 (2008), published in the Royal Government Gazette, Vol. 125, Special Part 85D, dated May 21, B.E. 2551 (2008).



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Report No. : 2024-500001290-13/005-12 (Page 1 of 2) Issued date : November 29, 2024

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Analysis Report

SAMPLE DESIGNATED AS : Groundwater Quality **SAMPLING DATE :** November 15, 2024
SAMPLING BY : Sompong Katkhuntod **SAMPLING TIME :** 09:30 hr.
SAMPLING LOCATION : Groundwater Well at Ban Kam Kaen Koon Noi (OW9S)
 Sinphuhorm (SPH), Udonthani and Khonkaen

Parameter	Unit	Method	Result	Standard ^{1/}	
				Optimal Value	Max. Allowable
Temperature	°C	APHA, 2550 B	29.5	-	-
pH	-	APHA 4500-H+ B	7.5	7.0-8.5	6.5-9.2
Conductivity	µs/cm	APHA 2510 B	872	-	-
Color	Pt-Co	APHA, 2120 C	<1	5	15
Salinity	ppt	APHA, 2520 B	0.43	-	-
Total Dissolved Solids (TDS)	mg/l	APHA, 2540 C	544	≧600	1,200
Oil and Grease	mg/l	APHA, 5520 B	5	-	-
Total hardness (as CaCO ₃)	mg/L	APHA 2340 C	384	≧300	500
Hardness, Noncarbonate (as CaCO ₃)	mg/L	APHA 2340 C	<1	≧200	250
Chloride (Cl)	mg/l	APHA 4500-Cl D	10	≧250	600
Total Petroleum Hydrocarbon (TPH)	mg/L	Based on Method of Seawater analysis*	0.0004	-	-
Benzene	mg/L	APHA, 6200 B	<0.0005	-	-
Toluene	mg/L	APHA, 6200 B	<0.001	-	-
Total Xylenes	mg/L	APHA, 6200 B	<0.001	-	-
Ethylbenzene	mg/L	APHA, 6200 B	<0.001	-	-

Remark : - Analytical Methods followed to Standard Methods for the Examination of Water and Wastewater, recommended by APHA, AWWA&WEF 24th edition., 2023

* Based on Method of Seawater analysis Third Completely Revised and Extended Edition, 1999, Chapter 21

Sources : ^{1/} Notification of the Ministry of Natural Resources and Environment, B.E. 2551 (2008), published in the Royal Government Gazette, Vol. 125, Special Part 85D, dated May 21, B.E. 2551 (2008).



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Report No. : 2024-500001290-13/005-12 (Page 2 of 2) Issued date : November 29, 2024

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Analysis Report

SAMPLE DESIGNATED AS : Groundwater Quality **SAMPLING DATE :** November 15, 2024
SAMPLING BY : Sompong Katkhuntod **SAMPLING TIME :** 09:30 hr.
SAMPLING LOCATION : Groundwater Well at Ban Kam Kaen Koon Noi (OW9S)
 Sinphuhorm (SPH), Udonthani and Khonkaen

Parameter	Unit	Method	Result	Standard ^{1/}	
				Optimal Value	Max. Allowable
Arsenic (As)	mg/l	APHA 3125 B	0.001	None	0.05
Barium (Ba)	mg/l	APHA 3125 B	0.461	-	-
Cadmium (Cd)	mg/l	APHA 3125 B	<0.0001	None	0.01
Chromium (Cr)	mg/l	APHA 3125 B	<0.010	-	-
Copper (Cu)	mg/l	APHA 3125 B	0.0039	≥1.0	1.5
Nickel (Ni)	mg/l	APHA 3125 B	0.0009	-	-
Mercury (Hg)	mg/l	APHA 3112 B	<0.0005	None	0.001
Manganese (Mn)	mg/l	APHA 3125 B	0.296	≥0.3	0.5
Lead (Pb)	mg/l	APHA 3125 B	0.0062	None	0.05
Selenium (Se)	mg/l	APHA 3125 B	<0.001	None	0.01
Zinc (Zn)	mg/l	APHA 3125 B	0.018	≥5.0	15.0

Remark : - Analytical Methods followed to Standard Methods for the Examination of Water and Wastewater, recommended by APHA, AWWA&WEF 24th edition., 2023

Sources : ^{1/} Notification of the Ministry of Natural Resources and Environment, B.E. 2551 (2008), published in the Royal Government Gazette, Vol. 125, Special Part 85D, dated May 21, B.E. 2551 (2008).

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Report No. : 2024-500001290-13/005-6 (Page 1 of 2) Issued date : October 22, 2024

CLIENT : PTTEP SP LIMITED
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Analysis Report

SAMPLE DESIGNATED AS : Groundwater Quality **SAMPLING DATE :** October 1, 2024
SAMPLING BY : Sompong Katkhuntod **SAMPLING TIME :** 09:33 hr.
SAMPLING LOCATION : Monitoring well (MW1)
 Sinphuhorm (SPH), Udonthani and Khonkaen

Parameter	Unit	Method	Result	Standard ^{1/}	
				Optimal Value	Max. Allowable
Temperature	°C	APHA, 2550 B	29.8	-	-
pH	-	APHA 4500-H+ B	7.5	7.0-8.5	6.5-9.2
Conductivity	µs/cm	APHA 2510 B	1,990	-	-
Color	Pt-Co	APHA, 2120 C	<1	5	15
Salinity	ppt	APHA, 2520 B	1.01	-	-
Total Dissolved Solids (TDS)	mg/l	APHA, 2540 C	1,249	≥600	1,200
Oil and Grease	mg/l	APHA, 5520 B	<2	-	-
Total hardness (as CaCO ₃)	mg/L	APHA 2340 C	616	≥300	500
Hardness, Noncarbonate (as CaCO ₃)	mg/L	APHA 2340 C	164	≥200	250
Chloride (Cl)	mg/l	APHA 4500-Cl D	387	≥250	600
Total Petroleum Hydrocarbon (TPH)	mg/L	Based on Method of Seawater analysis*	0.0002	-	-
Benzene	mg/L	APHA, 6200 B	<0.0005	-	-
Toluene	mg/L	APHA, 6200 B	<0.001	-	-
Total Xylenes	mg/L	APHA, 6200 B	<0.001	-	-
Ethylbenzene	mg/L	APHA, 6200 B	<0.001	-	-

Remark : - Analytical Methods followed to Standard Methods for the Examination of Water and Wastewater, recommended by APHA, AWWA&WEF 24th edition., 2023

* Based on Method of Seawater analysis Third Completely Revised and Extended Edition. 1999. Chapter 21

Sources : ^{1/} Notification of the Ministry of Natural Resources and Environment, B.E. 2551 (2008), published in the Royal Government Gazette, Vol. 125, Special Part 85D, dated May 21, B.E. 2551 (2008).



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Report No. : 2024-500001290-13/005-6 (Page 2 of 2) Issued date : October 22, 2024

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Analysis Report

SAMPLE DESIGNATED AS : Groundwater Quality **SAMPLING DATE :** October 1, 2024
SAMPLING BY : Sompong Katkhuntod **SAMPLING TIME :** 09:33 hr.
SAMPLING LOCATION : Monitoring well (MW1)
 Sinphuhorm (SPH), Udonthani and Khonkaen

Parameter	Unit	Method	Result	Standard ^{1/}	
				Optimal Value	Max. Allowable
Arsenic (As)	mg/l	APHA 3125 B	<0.001	None	0.05
Barium (Ba)	mg/l	APHA 3125 B	0.546	-	-
Cadmium (Cd)	mg/l	APHA 3125 B	<0.0001	None	0.01
Chromium (Cr)	mg/l	APHA 3125 B	<0.010	-	-
Copper (Cu)	mg/l	APHA 3125 B	0.0041	≥1.0	1.5
Nickel (Ni)	mg/l	APHA 3125 B	0.0016	-	-
Mercury (Hg)	mg/l	APHA 3112 B	<0.0005	None	0.001
Manganese (Mn)	mg/l	APHA 3125 B	0.460	≥0.3	0.5
Lead (Pb)	mg/l	APHA 3125 B	0.0256	None	0.05
Selenium (Se)	mg/l	APHA 3125 B	<0.001	None	0.01
Zinc (Zn)	mg/l	APHA 3125 B	0.011	≥5.0	15.0

Remark : - Analytical Methods followed to Standard Methods for the Examination of Water and Wastewater, recommended by APHA, AWWA&WEF 24th edition., 2023

Sources : ^{1/} Notification of the Ministry of Natural Resources and Environment, B.E. 2551 (2008), published in the Royal Government Gazette, Vol. 125, Special Part 85D, dated May 21, B.E. 2551 (2008).

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Report No. : 2024-500001290-13/005-7 (Page 1 of 2) Issued date : October 22, 2024

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Analysis Report

SAMPLE DESIGNATED AS : Groundwater Quality
SAMPLING DATE : October 1, 2024
SAMPLING BY : Sompong Katkhuntod
SAMPLING TIME : 10:10 hr.
SAMPLING LOCATION : Monitoring well (MW2)
 Sinphuhorm (SPH), Udonthani and Khonkaen

Parameter	Unit	Method	Result	Standard ^{1/}	
				Optimal Value	Max. Allowable
Temperature	°C	APHA, 2550 B	29.8	-	-
pH	-	APHA 4500-H+ B	6.8	7.0-8.5	6.5-9.2
Conductivity	µs/cm	APHA 2510 B	378	-	-
Color	Pt-Co	APHA, 2120 C	<1	5	15
Salinity	ppt	APHA, 2520 B	0.18	-	-
Total Dissolved Solids (TDS)	mg/l	APHA, 2540 C	240	≥600	1,200
Oil and Grease	mg/l	APHA, 5520 B	<2	-	-
Total hardness (as CaCO ₃)	mg/L	APHA 2340 C	83	≥300	500
Hardness, Noncarbonate (as CaCO ₃)	mg/L	APHA 2340 C	<1	≥200	250
Chloride (Cl)	mg/l	APHA 4500-Cl D	48	≥250	600
Total Petroleum Hydrocarbon (TPH)	mg/l	Based on Method of Seawater analysis*	0.0003	-	-
Benzene	mg/L	APHA, 6200 B	<0.0005	-	-
Toluene	mg/L	APHA, 6200 B	<0.001	-	-
Total Xylenes	mg/L	APHA, 6200 B	<0.001	-	-
Ethylbenzene	mg/L	APHA, 6200 B	<0.001	-	-

Remark : - Analytical Methods followed to Standard Methods for the Examination of Water and Wastewater, recommended by APHA, AWWA&WEF 24th edition., 2023

* Based on Method of Seawater analysis Third Completely Revised and Extended Edition, 1999, Chapter 21

Sources : ^{1/} Notification of the Ministry of Natural Resources and Environment, B.E. 2551 (2008), published in the Royal Government Gazette, Vol. 125, Special Part 85D, dated May 21, B.E. 2551 (2008).



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Report No. : 2024-500001290-13/005-7 (Page 2 of 2) Issued date : October 22, 2024

CLIENT : PTTEP SP LIMITED
CONTACT : Khun Natthita Sribuhome
ADDRESS : Energy Complex Building A, 19th-36th Floor,
 555/1 Vibhavadi Rangsit Road, Chatuchak, Bangkok 10900
 Tel. 085-642-7731 E-mail address : natthitas@pttep.com

Analysis Report

SAMPLE DESIGNATED AS : Groundwater Quality **SAMPLING DATE :** October 1, 2024
SAMPLING BY : Sompong Katkhuntod **SAMPLING TIME :** 10:10 hr.
SAMPLING LOCATION : Monitoring well (MW2)
 Sinphuhorm (SPH), Udonthani and Khonkaen

Parameter	Unit	Method	Result	Standard ^{1/}	
				Optimal Value	Max. Allowable
Arsenic (As)	mg/l	APHA 3125 B	<0.001	None	0.05
Barium (Ba)	mg/l	APHA 3125 B	0.265	-	-
Cadmium (Cd)	mg/l	APHA 3125 B	<0.0001	None	0.01
Chromium (Cr)	mg/l	APHA 3125 B	<0.010	-	-
Copper (Cu)	mg/l	APHA 3125 B	0.0027	≥1.0	1.5
Nickel (Ni)	mg/l	APHA 3125 B	0.0118	-	-
Mercury (Hg)	mg/l	APHA 3112 B	<0.0005	None	0.001
Manganese (Mn)	mg/l	APHA 3125 B	0.034	≥0.3	0.5
Lead (Pb)	mg/l	APHA 3125 B	0.0092	None	0.05
Selenium (Se)	mg/l	APHA 3125 B	<0.001	None	0.01
Zinc (Zn)	mg/l	APHA 3125 B	0.011	≥5.0	15.0

Remark : - Analytical Methods followed to Standard Methods for the Examination of Water and Wastewater, recommended by APHA, AWWA&WEF 24th edition., 2023

Sources : ^{1/} Notification of the Ministry of Natural Resources and Environment, B.E. 2551 (2008), published in the Royal Government Gazette, Vol. 125, Special Part 85D, dated May 21, B.E. 2551 (2008).

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Report No. : 2024-500001290-13/005-8 (Page 1 of 2) Issued date : October 22, 2024

CLIENT : PTTEP SP LIMITED
CONTACT : Khun Natthita Sribuhome
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 Tel. 085-642-7731 E-mail address : natthitas@pttep.com

Analysis Report

SAMPLE DESIGNATED AS : Groundwater Quality
SAMPLING BY : Sompong Katkhuntod
SAMPLING LOCATION : Monitoring well (MW3)
 Sinphuhorm (SPH), Udonthani and Khonkaen

SAMPLING DATE : October 1, 2024
SAMPLING TIME : 10:30 hr.

Parameter	Unit	Method	Result	Standard ^{1/}	
				Optimal Value	Max. Allowable
Temperature	°C	APHA, 2550 B	29.9	-	-
pH	-	APHA 4500-H+ B	6.5	7.0-8.5	6.5-9.2
Conductivity	µs/cm	APHA 2510 B	1,150	-	-
Color	Pt-Co	APHA, 2120 C	<1	5	15
Salinity	ppt	APHA, 2520 B	0.57	-	-
Total Dissolved Solids (TDS)	mg/l	APHA, 2540 C	669	>600	1,200
Oil and Grease	mg/l	APHA, 5520 B	<2	-	-
Total hardness (as CaCO ₃)	mg/L	APHA 2340 C	287	>300	500
Hardness, Noncarbonate (as CaCO ₃)	mg/L	APHA 2340 C	13	>200	250
Chloride (Cl)	mg/l	APHA 4500-Cl D	171	>250	600
Total Petroleum Hydrocarbon (TPH)	mg/l	Based on Method of Seawater analysis*	0.0003	-	-
Benzene	mg/L	APHA, 6200 B	<0.0005	-	-
Toluene	mg/L	APHA, 6200 B	<0.001	-	-
Total Xylenes	mg/L	APHA, 6200 B	<0.001	-	-
Ethylbenzene	mg/L	APHA, 6200 B	<0.001	-	-

Remark : - Analytical Methods followed to Standard Methods for the Examination of Water and Wastewater, recommended by APHA, AWWA&WEF 24th edition., 2023

* Based on Method of Seawater analysis Third Completely Revised and Extended Edition, 1999, Chapter 21

Sources : ^{1/} Notification of the Ministry of Natural Resources and Environment, B.E. 2551 (2008), published in the Royal Government Gazette, Vol. 125, Special Part 85D, dated May 21, B.E. 2551 (2008).

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Report No. : 2024-500001290-13/005-8 (Page 2 of 2) Issued date : October 22, 2024

CLIENT : PTTEP SP LIMITED
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 Tel. 085-642-7731 E-mail address : natthitas@pttep.com

Analysis Report

SAMPLE DESIGNATED AS : Groundwater Quality **SAMPLING DATE :** October 1, 2024
SAMPLING BY : Sompong Katkhuntod **SAMPLING TIME :** 10:30 hr.
SAMPLING LOCATION : Monitoring well (MW3)
 Sinphuhorm (SPH), Udonthani and Khonkaen

Parameter	Unit	Method	Result	Standard ^{1/}	
				Optimal Value	Max. Allowable
Arsenic (As)	mg/l	APHA 3125 B	<0.001	None	0.05
Barium (Ba)	mg/l	APHA 3125 B	0.112	-	-
Cadmium (Cd)	mg/l	APHA 3125 B	<0.0001	None	0.01
Chromium (Cr)	mg/l	APHA 3125 B	<0.010	-	-
Copper (Cu)	mg/l	APHA 3125 B	0.0019	>1.0	1.5
Nickel (Ni)	mg/l	APHA 3125 B	0.0019	-	-
Mercury (Hg)	mg/l	APHA 3112 B	<0.0005	None	0.001
Manganese (Mn)	mg/l	APHA 3125 B	0.205	>0.3	0.5
Lead (Pb)	mg/l	APHA 3125 B	0.1187	None	0.05
Selenium (Se)	mg/l	APHA 3125 B	<0.001	None	0.01
Zinc (Zn)	mg/l	APHA 3125 B	0.005	>5.0	15.0

Remark : - Analytical Methods followed to Standard Methods for the Examination of Water and Wastewater, recommended by APHA, AWWA&WEF 24th edition., 2023

Sources : ^{1/} Notification of the Ministry of Natural Resources and Environment, B.E. 2551 (2008), published in the Royal Government Gazette, Vol. 125, Special Part 85D, dated May 21, B.E. 2551 (2008).

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Report No. : 2024-500001290-13/005-9 (Page 1 of 2) Issued date : October 22, 2024

CLIENT : PTTEP SP LIMITED
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Analysis Report

SAMPLE DESIGNATED AS : Groundwater Quality
SAMPLING BY : Sompong Katkhuntod
SAMPLING LOCATION : Monitoring well (MW4)
 Sinphuhorm (SPH), Udonthani and Khonkaen

SAMPLING DATE : October 1, 2024
SAMPLING TIME : 10:55 hr.

Parameter	Unit	Method	Result	Standard ^{1/}	
				Optimal Value	Max. Allowable
Temperature	°C	APHA, 2550 B	31.0	-	-
pH	-	APHA 4500-H+ B	7.2	7.0-8.5	6.5-9.2
Conductivity	µs/cm	APHA 2510 B	2,138	-	-
Color	Pt-Co	APHA, 2120 C	<1	5	15
Salinity	ppt	APHA, 2520 B	1.09	-	-
Total Dissolved Solids (TDS)	mg/l	APHA, 2540 C	1,159	≥600	1,200
Oil and Grease	mg/l	APHA, 5520 B	<2	-	-
Total hardness (as CaCO ₃)	mg/L	APHA 2340 C	282	≥300	500
Hardness, Noncarbonate (as CaCO ₃)	mg/L	APHA 2340 C	<1	≥200	250
Chloride (Cl)	mg/l	APHA 4500-Cl D	384	≥250	600
Total Petroleum Hydrocarbon (TPH)	mg/L	Based on Method of Seawater analysis*	0.0006	-	-
Benzene	mg/L	APHA, 6200 B	<0.0005	-	-
Toluene	mg/L	APHA, 6200 B	<0.001	-	-
Total Xylenes	mg/L	APHA, 6200 B	<0.001	-	-
Ethylbenzene	mg/L	APHA, 6200 B	<0.001	-	-

Remark : - Analytical Methods followed to Standard Methods for the Examination of Water and Wastewater, recommended by APHA, AWWA&WEF 24th edition., 2023

* Based on Method of Seawater analysis Third Completely Revised and Extended Edition. 1999. Chapter 21

Sources : ^{1/} Notification of the Ministry of Natural Resources and Environment, B.E. 2551 (2008), published in the Royal Government Gazette, Vol. 125, Special Part 85D, dated May 21, B.E. 2551 (2008).

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Report No. : 2024-500001290-13/005-9 (Page 2 of 2) Issued date : October 22, 2024

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 Tel. 085-642-7731 E-mail address : natthitas@pttep.com

Analysis Report

SAMPLE DESIGNATED AS : Groundwater Quality
SAMPLING BY : Sompong Katkhuntod
SAMPLING LOCATION : Monitoring well (MW4)
 Sinphuhorm (SPH), Udonthani and Khonkaen

SAMPLING DATE : October 1, 2024
SAMPLING TIME : 10:55 hr.

Parameter	Unit	Method	Result	Standard ^{1/}	
				Optimal Value	Max. Allowable
Arsenic (As)	mg/l	APHA 3125 B	0.002	None	0.05
Barium (Ba)	mg/l	APHA 3125 B	0.319	-	-
Cadmium (Cd)	mg/l	APHA 3125 B	<0.0001	None	0.01
Chromium (Cr)	mg/l	APHA 3125 B	<0.010	-	-
Copper (Cu)	mg/l	APHA 3125 B	0.0036	>1.0	1.5
Nickel (Ni)	mg/l	APHA 3125 B	0.0010	-	-
Mercury (Hg)	mg/l	APHA 3112 B	<0.0005	None	0.001
Manganese (Mn)	mg/l	APHA 3125 B	0.112	>0.3	0.5
Lead (Pb)	mg/l	APHA 3125 B	0.0103	None	0.05
Selenium (Se)	mg/l	APHA 3125 B	<0.001	None	0.01
Zinc (Zn)	mg/l	APHA 3125 B	0.004	>5.0	15.0

Remark : - Analytical Methods followed to Standard Methods for the Examination of Water and Wastewater, recommended by APHA, AWWA&WEF 24th edition., 2023

Sources : ^{1/} Notification of the Ministry of Natural Resources and Environment, B.E. 2551 (2008), published in the Royal Government Gazette, Vol. 125, Special Part 85D, dated May 21, B.E. 2551 (2008).

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Report No. : 2024-500001290-13/005-10 (Page 1 of 2) Issued date : October 22, 2024

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 Tel. 085-642-7731 E-mail address : natthitas@pttep.com

Analysis Report

SAMPLE DESIGNATED AS : Groundwater Quality
SAMPLING BY : Sompong Katkhuntod
SAMPLING LOCATION : Monitoring well (MW5)
 Sinphuhorm (SPH), Udonthani and Khonkaen

SAMPLING DATE : October 1, 2024
SAMPLING TIME : 11:20 hr.

Parameter	Unit	Method	Result	Standard ^{1/}	
				Optimal Value	Max. Allowable
Temperature	°C	APHA, 2550 B	32.9	-	-
pH	-	APHA 4500-H+ B	7.7	7.0-8.5	6.5-9.2
Conductivity	µs/cm	APHA 2510 B	2,380	-	-
Color	Pt-Co	APHA, 2120 C	<1	5	15
Salinity	ppt	APHA, 2520 B	1.22	-	-
Total Dissolved Solids (TDS)	mg/l	APHA, 2540 C	1,828	≥600	1,200
Oil and Grease	mg/l	APHA, 5520 B	<2	-	-
Total hardness (as CaCO ₃)	mg/L	APHA 2340 C	714	≥300	500
Hardness, Noncarbonate (as CaCO ₃)	mg/L	APHA 2340 C	546	≥200	250
Chloride (Cl)	mg/l	APHA 4500-Cl D	654	≥250	600
Total Petroleum Hydrocarbon (TPH)	mg/l	Based on Method of Seawater analysis*	0.0005	-	-
Benzene	mg/L	APHA, 6200 B	<0.0005	-	-
Toluene	mg/L	APHA, 6200 B	<0.001	-	-
Total Xylenes	mg/L	APHA, 6200 B	<0.001	-	-
Ethylbenzene	mg/L	APHA, 6200 B	<0.001	-	-

Remark : - Analytical Methods followed to Standard Methods for the Examination of Water and Wastewater, recommended by APHA, AWWA&WEF 24th edition., 2023

* Based on Method of Seawater analysis Third Completely Revised and Extended Edition. 1999. Chapter 21

Sources : ^{1/} Notification of the Ministry of Natural Resources and Environment, B.E. 2551 (2008), published in the Royal Government Gazette, Vol. 125, Special Part 85D, dated May 21, B.E. 2551 (2008).



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Report No. : 2024-500001290/ 005-11 (Page 1 of 2) Issued date : October 22, 2024

CLIENT : PTTEP SP LIMITED
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 Tel. 085-642-7731 E-mail address : natthitas@pttep.com

Analysis Report

SAMPLE DESIGNATED AS : Groundwater Quality
SAMPLING BY : Sompong Katkhuntod
SAMPLING LOCATION : Monitoring well (MW6)
 Sinphuhorm (SPH), Udonthani and Khonkaen

SAMPLING DATE : October 1, 2024
SAMPLING TIME : 13:20 hr.

Parameter	Unit	Method	Result	Standard ^{1/}	
				Optimal Value	Max. Allowable
Temperature	°C	APHA, 2550 B	30.0	-	-
pH	-	APHA 4500-H+ B	6.8	7.0-8.5	6.5-9.2
Conductivity	µs/cm	APHA 2510 B	6,790	-	-
Color	Pt-Co	APHA, 2120 C	<1	5	15
Salinity	ppt	APHA, 2520 B	3.72	-	-
Total Dissolved Solids (TDS)	mg/l	APHA, 2540 C	4,489	≥600	1,200
Oil and Grease	mg/l	APHA, 5520 B	<2	-	-
Total hardness (as CaCO ₃)	mg/L	APHA 2340 C	2,040	≥300	500
Hardness, Noncarbonate (as CaCO ₃)	mg/L	APHA 2340 C	1,532	≥200	250
Chloride (Cl)	mg/l	APHA 4500-Cl D	2,072	≥250	600
Total Petroleum Hydrocarbon (TPH)	mg/l	Based on Method of Seawater analysis*	0.0001	-	-
Benzene	mg/L	APHA, 6200 B	<0.0005	-	-
Toluene	mg/L	APHA, 6200 B	<0.001	-	-
Total Xylenes	mg/L	APHA, 6200 B	<0.001	-	-
Ethylbenzene	mg/L	APHA, 6200 B	<0.001	-	-

Remark : - Analytical Methods followed to Standard Methods for the Examination of Water and Wastewater, recommended by APHA, AWWA&WEF 24th edition., 2023

* Based on Method of Seawater analysis Third Completely Revised and Extended Edition. 1999. Chapter 21

Sources : ^{1/} Notification of the Ministry of Natural Resources and Environment, B.E. 2551 (2008), published in the Royal Government Gazette, Vol. 125, Special Part 85D, dated May 21, B.E. 2551 (2008).



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Report No. : 2024-500001290/ 005-11 (Page 2 of 2) Issued date : October 22, 2024

CLIENT : PTTEP SP LIMITED
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 Tel. 085-642-7731 E-mail address : natthitas@pttep.com

Analysis Report

SAMPLE DESIGNATED AS : Groundwater Quality **SAMPLING DATE :** October 1, 2024
SAMPLING BY : Sompong Katkhuntod **SAMPLING TIME :** 13:20 hr.
SAMPLING LOCATION : Monitoring well (MW6)
 Sinphuhorm (SPH), Udonthani and Khonkaen

Parameter	Unit	Method	Result	Standard ^{1/}	
				Optimal Value	Max. Allowable
Arsenic (As)	mg/l	APHA 3125 B	0.006	None	0.05
Barium (Ba)	mg/l	APHA 3125 B	1.157	-	-
Cadmium (Cd)	mg/l	APHA 3125 B	<0.0001	None	0.01
Chromium (Cr)	mg/l	APHA 3125 B	<0.010	-	-
Copper (Cu)	mg/l	APHA 3125 B	0.0011	≥1.0	1.5
Nickel (Ni)	mg/l	APHA 3125 B	0.0017	-	-
Mercury (Hg)	mg/l	APHA 3112 B	<0.0005	None	0.001
Manganese (Mn)	mg/l	APHA 3125 B	0.680	≥0.3	0.5
Lead (Pb)	mg/l	APHA 3125 B	0.0049	None	0.05
Selenium (Se)	mg/l	APHA 3125 B	<0.001	None	0.01
Zinc (Zn)	mg/l	APHA 3125 B	<0.004	≥5.0	15.0

Remark : - Analytical Methods followed to Standard Methods for the Examination of Water and Wastewater, recommended by APHA, AWWA&WEF 24th edition., 2023

Sources : ^{1/} Notification of the Ministry of Natural Resources and Environment, B.E. 2551 (2008), published in the Royal Government Gazette, Vol. 125, Special Part 85D, dated May 21, B.E. 2551 (2008).



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