

บริษัท ซีเอ็นพีซีเอชเค (ไทยแลนด์) จำกัด

รายงานผลการปฏิบัติตามมาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม และมาตรการติดตามตรวจสอบผลกระทบสิ่งแวดล้อม โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร ฉบับเดือนมกราคม - มิถุนายน พ.ศ.2568

ภาคผนวก ง

ผลการตรวจวัดคุณภาพสิ่งแวดล้อม



บริษัท ซีเอ็นพีซีเอชเค (ไทยแลนด์) จำกัด

รายงานผลการปฏิบัติตามมาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม และมาตรการติดตามตรวจสอบผลกระทบสิ่งแวดล้อม โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร ฉบับเดือนมกราคม - มิถุนายน พ.ศ.2568

ภาคผนวก ง.1

คุณภาพดิน

ระยะเจาะหลุมปิโตรเลียม

envi research
ENVIRONMENT RESEARCH & TECHNOLOGY CO., LTD.

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E-mail : envi@enviresearch.co.th
www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Soil Sampling
Sampling Point : **ฐานหลุมผลิต BY1-20 : บ่อชั่วคราวกักเก็บเศษหินจากการเจาะในช่วงบน (Top Hole Cuttings Pit)**
GPS. Coordinate : UTM (WGS84) 47Q 0581852 E, 1839489 N
Sampling Date : May 11, 2025
Sampling Time : 09:36
Sampling Method : Shovel
Sampling By : Mr.Romsea Kateh
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : -

Quotation No. : AR2025-00471
Analysis No. : 2025-AC019-001
Received Date : May 13, 2025
Analytical Date : May 13-27, 2025
Report No. : 2025-RAAK488
Report Date : May 28, 2025

Parameter	Unit	Method of Analysis	MRL	Result	Standard[1/]	
					Habitat	Commerce, Agriculture and Other Purposes
Arsenic	mg/kg ; dry weight	Digestion, Inductively Coupled Plasma (ICP-OES)	1.0	10	6	25
Lead	mg/kg ; dry weight	Digestion, Inductively Coupled Plasma (ICP-OES)	1.0	18	400	800
Conductivity	µs/cm	Electrochemical Sensor (1:5)	0.1	244	-	-

Remark : [1/] Notification of the National Environmental Board issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.138, Part 54D, dated March 11, B.E.2564 (2021).

[redacted]
(Ms.Raiwin Posit)
Laboratory Reviewer

[redacted]
(Ms.Ramita Taengthai)
Laboratory Supervisor

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Soil Sampling
Sampling Point : **ฐานหลุมผลิต BM6 : บ่อชั่วคราวกักเก็บเศษหินจากการเจาะในช่วงบน (Top Hole Cuttings Pit)**
GPS. Coordinate : UTM (WGS84) 47Q 0581852 E, 1839489 N

Sampling Date : April 10, 2025
Sampling Time : 12:39
Sampling Method : Shovel
Sampling By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : -

Quotation No. : AR2025-00471
Analysis No. : 2025-AB472-001
Received Date : April 11, 2025
Analytical Date : April 11-May 8, 2025
Report No. : 2025-RAAH962
Report Date : May 9, 2025

Parameter	Unit	Method of Analysis	MRL	Result	Standard[1/]	
					Habitat	Commerce, Agriculture and Other Purposes
Arsenic		Digestion, Inductively Coupled Plasma (ICP-OES)	1.0	8.1	6	25
Lead		Digestion, Inductively Coupled Plasma (ICP-OES)	1.0	10	400	800
Conductivity	µs/cm	Electrochemical Sensor (1:5)	0.1	264	-	-

Remark : [1/] Notification of the National Environmental Board issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.138, Part 54D, dated March 11, B.E.2564 (2021).

[redacted]

(Ms.Raiwin Posit)
Laboratory Reviewer

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(Ms.Ramita Taengthai)
Laboratory Supervisor

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บริษัท ซีเอ็นพีซีเอชเค (ไทยแลนด์) จำกัด

รายงานผลการปฏิบัติตามมาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม และมาตรการติดตามตรวจสอบผลกระทบสิ่งแวดล้อม
โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ
และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
ฉบับเดือนมกราคม - มิถุนายน พ.ศ.2568

ภาคผนวก ง.2

คุณภาพน้ำใต้ดิน

ระยะเจาะหลุมปิโตรเลียม

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E-mail : envi@enviresearch.co.th
www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BM6 : ปล่องเกตการณ์ที่ติดตั้งภายในฐานหลุมผลิตบึงม่วง 6 (BM6) (เหนือน้ำ)**
GPS. Coordinate : UTM (WGS84) 47Q 0583194 E, 1843024 N
Sampling Date : April 10, 2025 **Quotation No.** : AR2025-00471
Sampling Time : 10:53 **Analysis No.** : 2025-AB471-002
Sampling Method : Mr.Nitad Sirichad **Received Date** : April 11, 2025
Sampling By : Grab **Analytical Date** : April 11-May 5, 2025
Analyzed By : Environment Research & Technology Co., Ltd. **Report No.** : 2025-RAAH960
Physical Properties : Clear, Light Yellow, No Sediment, Odorless **Report Date** : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	5	-	-
Ethylberzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	700	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	1,000	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	10,000	-	-
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.003	None	0.01
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	-	-
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.010	1.0	≤1.0	1.5
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	0.040	0.01	None	0.05
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.450	0.5	≤0.3	0.5
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.02	-	-
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.15	5.0	≤5.0	15
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0042	0.01	None	0.05
Selenium	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	<0.0002	0.01	None	0.01
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	<0.0005	0.001	None	0.001
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	1.8	-	≤0.5	1.0
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.17	-	-	-
Temperature	°C	Certified Thermometer	-	31.6	-	-	-
pH	-	Electrometric	-	7.5	-	7.0-8.5	6.5-9.2
Total Dissolved Solids	mg/L	Dried at 180°C	50	156	-	≤600	1,200
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	258	-	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	0.1	-	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	10	-	-	-
Turbidity	NTU	Nephelometric	0.02	3.2	-	5	20

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Northaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BM6 : ปล่องเกตการณ์ที่ติดตั้งภายในฐานหลุมผลิตบึงม่วง 6 (BM6) (เหนือน้ำ)**
GPS. Coordinate : UTM (WGS84) 47Q 0583194 E, 1843024 N
Sampling Date : April 10, 2025 **Quotation No.** : AR2025-00471
Sampling Time : 10:53 **Analysis No.** : 2025-AB471-002
Sampling Method : Mr.Nitad Sirichad **Received Date** : April 11, 2025
Sampling By : Grab **Analytical Date** : April 11-May 5, 2025
Analyzed By : Environment Research & Technology Co., Ltd. **Report No.** : 2025-RAAH960
Physical Properties : Clear, Light Yellow, No Sediment, Odorless **Report Date** : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{36})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-

Remark : [1] Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
[2] Notification of the National Environment Board, No.20, B.E.2543 (2000), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.117 Part 94D, dated September 15, B.E.2543 (2000).
[3] Notification of the Ministry of Natural Resources and Environment B.E.2551 (2008), published in the Royal Government Gazette, Vol.125, Part 85D, dated May 21, B.E.2551 (2008).

[redacted] [redacted]
(Ms.Yuwadee Na Rancng) (Mr.Virat Hemvannaruku)
Laboratory Reviewer Laboratory Supervisor

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BM6 : บ่อสังเกตการณ์ที่ติดตั้งภายในฐานหลุมผลิตบึงม่วง 6 (BM6) (ท้ายน้ำ)**
GPS. Coordinate : UTM (WGS84) 47Q 0583188 E, 1843190 N
Sampling Date : April 10, 2025
Sampling Time : 11:14
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, No Sediment, Odorless

Quotation No. : AR2025-00471
Analysis No. : 2025-AB471-001
Received Date : April 11, 2025
Analytical Date : April 11-May 5, 2025
Report No. : 2025-RAAH958
Report Date : May 6, 2025

Parameter	Unit	Method of Analysis[1/]	MRL	Result	Standard[2/]	Standard[3/]	
						Suitable Allowance	Maximum Allowable
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	5	-	-
Ethylberzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	700	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	1,000	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	10,000	-	-
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.003	None	0.01
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	-	-
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.007	1.0	≤1.0	1.5
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	0.043	0.01	None	0.05
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.522	0.5	≤0.3	0.5
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.02	-	-
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.51	5.0	≤5.0	15
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0025	0.01	None	0.05
Selenium	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	<0.0002	0.01	None	0.01
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	<0.0005	0.001	None	0.001
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	1.1	-	≤0.5	1.0
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.20	-	-	-
Temperature	°C	Certified Thermometer	-	33.2	-	-	-
pH	-	Electrometric	-	7.8	-	7.0-8.5	6.5-9.2
Total Dissolved Solids	mg/L	Dried at 180°C	50	155	-	≤600	1,200
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	232	-	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	0.1	-	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	9.8	-	-	-
Turbidity	NTU	Nephelometric	0.02	1.1	-	5	20

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BM6 : บ่อสังเกตการณ์ที่ติดตั้งภายในฐานหลุมผลิตบึงม่วง 6 (BM6) (ท้ายน้ำ)**
GPS. Coordinate : UTM (WGS84) 47Q 0583188 E, 1843190 N
Sampling Date : April 10, 2025
Sampling Time : 11:14
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, No Sediment, Odorless

Quotation No. : AR2025-00471
Analysis No. : 2025-AB471-001
Received Date : April 11, 2025
Analytical Date : April 11-May 5, 2025
Report No. : 2025-RAAH958
Report Date : May 6, 2025

Parameter	Unit	Method of Analysis[1/]	MRL	Result	Standard[2/]	Standard[3/]	
						Suitable Allowance	Maximum Allowable
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{18})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{16})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-

Remark : 1/ Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
2/ Notification of the National Environment Board, No.20, B.E.2543 (2000), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.117 Part 94D, dated September 15, B.E.2543 (2000).
3/ Notification of the Ministry of Natural Resources and Environment B.E.2551 (2008), published in the Royal Government Gazette, Vol.125, Part 85D, dated May 21, B.E.2551 (2008).

[redacted] (Ms.Yuwadee Na Ranong)
Laboratory Reviewer

[redacted] (Mr.Virat Hemvannarukul)
Laboratory Supervisor

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BM6 : GW6 : ระบบประปาหมู่บ้าน หมู่ที่ 11 บ้านบึงม่วง (ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0582117 E, 1843955 N
Sampling Date : April 9, 2025
Sampling Time : 16:33
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odorless

Quotation No. : AR2025-00471
Analysis No. : 2025-AB440-001
Received Date : April 10, 2025
Analytical Date : April 10-May 5, 2025
Report No. : 2025-RAAH837
Report Date : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	5	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	700	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	1,000	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	10,000	-	-
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.003	None	0.01
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	-	-
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.046	1.0	≤1.0	1.5
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	0.003	0.01	None	0.05
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.153	0.5	≤0.3	0.5
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.02	-	-
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.02	5.0	≤5.0	15
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0017	0.01	None	0.05
Selenium	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	<0.0002	0.01	None	0.01
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	<0.0005	0.001	None	0.001
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	0.5	-	≤0.5	1.0
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.12	-	-	-
Temperature	°C	Certified Thermometer	-	31.9	-	-	-
pH	-	Electrometric	-	7.8	-	7.0-8.5	6.5-9.2
Total Dissolved Solids	mg/L	Dried at 180°C	50	114	-	≤600	1,200
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	187	-	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	<0.1	-	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	<5.0	-	-	-
Turbidity	NTU	Nephelometric	0.02	1.3	-	5	20

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BM6 : GW6 : ระบบประปาหมู่บ้าน หมู่ที่ 11 บ้านบึงม่วง (ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0582117 E, 1843955 N
Sampling Date : April 9, 2025
Sampling Time : 16:33
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odorless

Quotation No. : AR2025-00471
Analysis No. : 2025-AB440-001
Received Date : April 10, 2025
Analytical Date : April 10-May 5, 2025
Report No. : 2025-RAAH837
Report Date : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{36})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-

Remark : [1] Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
[2] Notification of the National Environment Board, No.20, B.E.2543 (2000), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.117 Part 94D, dated September 15, B.E.2543 (2000).
[3] Notification of the Ministry of Natural Resources and Environment B.E.2551 (2008), published in the Royal Government Gazette, Vol.125, Part 85D, dated May 21, B.E.2551 (2008).

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(Ms.Yuwadee Na Rancng)
Laboratory Reviewer

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(Mr.Virat Hemvannanukul)
Laboratory Supervisor

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F-RP-024 Rev. 04, September 28, 2020

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตบีโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมบีโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BM6 : GW7 : ระบบประปาหมู่บ้าน หมู่ที่ 4 บ้านบึงมาลย์ (ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0581645 E, 1841652 N
Sampling Date : April 9, 2025 **Quotation No.** : AR2025-00471
Sampling Time : 16:12 **Analysis No.** : 2025-AB440-002
Sampling Method : Mr.Nitad Sirichad **Received Date** : April 10, 2025
Sampling By : Grab **Analytical Date** : April 10-May 5, 2025
Analyzed By : Environment Research & Technology Co., Ltd. **Report No.** : 2025-RAAH839
Physical Properties : Clear, Light Yellow, Sediment, Odorless **Report Date** : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	5	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	700	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	1,000	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	10,000	-	-
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.003	None	0.01
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	-	-
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	1.0	≤1.0	1.5
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	0.003	0.01	None	0.05
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.246	0.5	≤0.3	0.5
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.02	-	-
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	<0.01	5.0	≤5.0	15
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0026	0.01	None	0.05
Selenium	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	<0.0002	0.01	None	0.01
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	<0.0005	0.001	None	0.001
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	0.4	-	≤0.5	1.0
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.19	-	-	-
Temperature	°C	Certified Thermometer	-	31.8	-	-	-
pH	-	Electrometric	-	7.4	-	7.0-8.5	6.5-9.2
Total Dissolved Solids	mg/L	Dried at 180°C	50	112	-	≤600	1,200
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	175	-	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	<0.1	-	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	<5.0	-	-	-
Turbidity	NTU	Nephelometric	0.02	0.50	-	5	20

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Northaburi 11000
Project Name : โครงการผลิตบีโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมบีโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BM6 : GW7 : ระบบประปาหมู่บ้าน หมู่ที่ 4 บ้านบึงมาลย์ (ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0581645 E, 1841652 N
Sampling Date : April 9, 2025 **Quotation No.** : AR2025-00471
Sampling Time : 16:12 **Analysis No.** : 2025-AB440-002
Sampling Method : Mr.Nitad Sirichad **Received Date** : April 10, 2025
Sampling By : Grab **Analytical Date** : April 10-May 5, 2025
Analyzed By : Environment Research & Technology Co., Ltd. **Report No.** : 2025-RAAH839
Physical Properties : Clear, Light Yellow, Sediment, Odorless **Report Date** : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{36})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-

Remark : [1] Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
[2] Notification of the National Environment Board, No.20, B.E.2543 (2000), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.117 Part 94D, dated September 15, B.E.2543 (2000).
[3] Notification of the Ministry of Natural Resources and Environment B.E.2551 (2008), published in the Royal Government Gazette, Vol.125, Part 85D, dated May 21, B.E.2551 (2008).

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(Ms.Yuwadee Na Ranong)
Laboratory Reviewer

(Mr.Virat Hemvannanukul)
Laboratory Supervisor

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BM6 : GW8 : ระบบประปาหมู่บ้าน วัดบ้านใหม่สามัคคี หมู่ที่ 6 (ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 05866078 E, 1844173 N
Sampling Date : April 9, 2025
Sampling Time : 16:55
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Colorless, No Sediment, Odorless
Quotation No. : AR2025-00471
Analysis No. : 2025-AB440-003
Received Date : April 10, 2025
Analytical Date : April 10-May 5, 2025
Report No. : 2025-RAAH842
Report Date : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[3]	Standard[3]	
						Suitable Allowance	Maximum Allowable
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	5	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	700	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	1,000	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	10,000	-	-
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.003	None	0.01
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	-	-
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	1.0	≤1.0	1.5
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	0.002	0.01	None	0.05
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.256	0.5	≤0.3	0.5
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.02	-	-
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	<0.01	5.0	≤5.0	15
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0028	0.01	None	0.05
Selenium	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0004	0.01	None	0.01
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	<0.0005	0.001	None	0.001
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	0.3	-	≤0.5	1.0
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.18	-	-	-
Temperature	°C	Certified Thermometer	-	32.3	-	-	-
pH	-	Electrometric	-	8.0	-	7.0-8.5	6.5-9.2
Total Dissolved Solids	mg/L	Dried at 180°C	50	146	-	≤600	1,200
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	201	-	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	<0.1	-	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	5.1	-	-	-
Turbidity	NTU	Nephelometric	0.02	2.6	-	5	20

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BM6 : GW8 : ระบบประปาหมู่บ้าน วัดบ้านใหม่สามัคคี หมู่ที่ 6 (ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 05866078 E, 1844173 N
Sampling Date : April 9, 2025
Sampling Time : 16:55
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Colorless, No Sediment, Odorless
Quotation No. : AR2025-00471
Analysis No. : 2025-AB440-003
Received Date : April 10, 2025
Analytical Date : April 10-May 5, 2025
Report No. : 2025-RAAH842
Report Date : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[3]	Standard[3]	
						Suitable Allowance	Maximum Allowable
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{36})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-

Remark : [1] Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
[2] Notification of the National Environment Board, No.20, B.E.2543 (2000), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.117 Part 94D, dated September 15, B.E.2543 (2000).
[3] Notification of the Ministry of Natural Resources and Environment B.E.2551 (2008), published in the Royal Government Gazette, Vol.125, Part 85D, dated May 21, B.E.2551 (2008).

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Laboratory Reviewer

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(Mr.Virat Hemvannarukul)
Laboratory Supervisor

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BY1-20 : บ่อสังเกตการณ์ที่ติดตั้งภายในฐานหลุมผลิตบึงหญ้า 1-20 (BY1-20) (เหนือน้ำ)**
GPS. Coordinate : UTM (WGS84) 47Q 0584086 E, 1846791 N
Sampling Date : May 10, 2025
Sampling Time : 13:05
Sampling Method : Mr.Romsea Kateh
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Colorless, Sediment, Odorless

Quotation No. : AR2025-00471
Analysis No. : 2025-AC019-005
Received Date : May 13, 2025
Analytical Date : May 13-23, 2025
Report No. : 2025-RAAK492
Report Date : May 28, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	5	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	700	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	1,000	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	10,000	-	-
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.003	None	0.01
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	-	-
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.007	1.0	≤1.0	1.5
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	0.002	0.01	None	0.05
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.067	0.5	≤0.3	0.5
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.02	-	-
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.03	5.0	≤5.0	15
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0012	0.01	None	0.05
Selenium	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	<0.0002	0.01	None	0.01
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	<0.0005	0.001	None	0.001
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	0.1	-	≤0.5	1.0
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.30	-	-	-
Temperature	°C	Certified Thermometer	-	30.0	-	-	-
pH	-	Electrometric	-	7.5	-	7.0-8.5	6.5-9.2
Total Dissolved Solids	mg/L	Dried at 180°C	50	238	-	≤600	1,200
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	502	-	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	0.3	-	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	<5.0	-	-	-
Turbidity	NTU	Nephelometric	0.02	1.7	-	5	20

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BY1-20 : บ่อสังเกตการณ์ที่ติดตั้งภายในฐานหลุมผลิตบึงหญ้า 1-20 (BY1-20) (เหนือน้ำ)**
GPS. Coordinate : UTM (WGS84) 47Q 0584086 E, 1846791 N
Sampling Date : May 10, 2025
Sampling Time : 13:05
Sampling Method : Mr.Romsea Kateh
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Colorless, Sediment, Odorless

Quotation No. : AR2025-00471
Analysis No. : 2025-AC019-005
Received Date : May 13, 2025
Analytical Date : May 13-23, 2025
Report No. : 2025-RAAK492
Report Date : May 28, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquic Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquic Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{36})	mg/L	Liquid-Liquic Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-

Remark : [1] Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
[2] Notification of the National Environment Board, No.20 B.E.2543 (2000), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.117 Part 94D, dated September 15, B.E.2543 (2000).
[3] Notification of the Ministry of Natural Resources and Environment B.E.2551 (2008), published in the Royal Government Gazette, Vol.125, Part 85D, dated May 21, B.E.2551 (2008).

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Laboratory Supervisor

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตบีโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมบีโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BY1-20 : บ่อสังเกตการณ์ที่ติดตั้งภายในฐานหลุมผลิตบึงหญ้า 1-20 (BY1-20) (ท้ายน้ำ)**
GPS. Coordinate : UTM (WGS84) 47Q 0584184 E, 1846750 N
Sampling Date : May 10, 2025
Sampling Time : 13:25
Sampling Method : Mr.Romsea Kateh
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Light Yellow, No Sediment, Odorless
Quotation No. : AR2025-00471
Analysis No. : 2025-AC019-006
Received Date : May 13, 2025
Analytical Date : May 13-27, 2025
Report No. : 2025-RAAK496
Report Date : May 28, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	5	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	700	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	1,000	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	10,000	-	-
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.003	None	0.01
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	-	-
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.008	1.0	≤1.0	1.5
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	<0.001	0.01	None	0.05
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.390	0.5	≤0.3	0.5
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.02	-	-
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.02	5.0	≤5.0	15
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0019	0.01	None	0.05
Selenium	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	<0.0002	0.01	None	0.01
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	<0.0005	0.001	None	0.001
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	1.9	-	≤0.5	1.0
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.12	-	-	-
Temperature	°C	Certified Thermometer	-	29.0	-	-	-
pH	-	Electrometric	-	7.6	-	7.0-8.5	6.5-9.2
Total Dissolved Solids	mg/L	Dried at 180°C	50	193	-	≤600	1,200
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	256	-	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	0.1	-	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	130	-	-	-
Turbidity	NTU	Nephelometric	0.02	49	-	5	20

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตบีโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมบีโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BY1-20 : บ่อสังเกตการณ์ที่ติดตั้งภายในฐานหลุมผลิตบึงหญ้า 1-20 (BY1-20) (ท้ายน้ำ)**
GPS. Coordinate : UTM (WGS84) 47Q 0584184 E, 1846750 N
Sampling Date : May 10, 2025
Sampling Time : 13:25
Sampling Method : Mr.Romsea Kateh
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Light Yellow, No Sediment, Odorless
Quotation No. : AR2025-00471
Analysis No. : 2025-AC019-006
Received Date : May 13, 2025
Analytical Date : May 13-27, 2025
Report No. : 2025-RAAK496
Report Date : May 28, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{36})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-

Remark : [1] Standard Method for Examination of Water and Wastwater, 24th Edition, 2023.
[2] Notification of the National Environment Board, No.20, B.E.2543 (2000), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.117 Part 94D, dated September 15, B.E.2543 (2000).
[3] Notification of the Ministry of Natural Resources and Environment B.E.2551 (2008), published in the Royal Government Gazette, Vol.125, Part 85D, dated May 21, B.E.2551 (2008).

[redacted] [redacted]

(Ms.Yuwadee Na Ranong)
Laboratory Reviewer

(Mr.Virat Hemvannanukul)
Laboratory Supervisor

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BY1-20 : GW4 : ระบบประปาหมู่บ้าน หมู่ที่ 8 บ้านนิคมพัฒนา (ตำบลหนองจิก อำเภอดีรีมาศ จังหวัดสุโขทัย)**
GPS. Coordinate : UTM (WGS84) 47Q 0583407 E, 1846508 N
Sampling Date : May 10, 2025
Sampling Time : 14:02
Sampling Method : Mr.Romsea Kateh
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Colorless, Sediment, Odorless

Quotation No. : AR2025-00471
Analysis No. : 2025-AC019-007
Received Date : May 13, 2025
Analytical Date : May 13-27, 2025
Report No. : 2025-RAAK497
Report Date : May 28, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	5	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	700	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	1,000	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	10,000	-	-
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.003	None	0.01
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	-	-
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.005	1.0	≤1.0	1.5
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	<0.001	0.01	None	0.05
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.400	0.5	≤0.3	0.5
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.02	-	-
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.02	5.0	≤5.0	15
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0018	0.01	None	0.05
Selenium	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	<0.0002	0.01	None	0.01
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	<0.0005	0.001	None	0.001
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	0.8	-	≤0.5	1.0
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.15	-	-	-
Temperature	°C	Certified Thermometer	-	30.0	-	-	-
pH	-	Electrometric	-	6.9	-	7.0-8.5	6.5-9.2
Total Dissolved Solids	mg/L	Dried at 180°C	50	161	-	≤600	1,200
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	246	-	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	0.1	-	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	<5.0	-	-	-
Turbidity	NTU	Nephelometric	0.02	4.6	-	5	20

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BY1-20 : GW4 : ระบบประปาหมู่บ้าน หมู่ที่ 8 บ้านนิคมพัฒนา (ตำบลหนองจิก อำเภอดีรีมาศ จังหวัดสุโขทัย)**
GPS. Coordinate : UTM (WGS84) 47Q 0583407 E, 1846508 N
Sampling Date : May 10, 2025
Sampling Time : 14:02
Sampling Method : Mr.Romsea Kateh
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Colorless, Sediment, Odorless

Quotation No. : AR2025-00471
Analysis No. : 2025-AC019-007
Received Date : May 13, 2025
Analytical Date : May 13-27, 2025
Report No. : 2025-RAAK497
Report Date : May 28, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquic Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquic Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{36})	mg/L	Liquid-Liquic Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-

Remark : [1] Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
[2] Notification of the National Environment Board, No.20 B.E.2543 (2000), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.117 Part 94D, dated September 15, B.E.2543 (2000).
[3] Notification of the Ministry of Natural Resources and Environment B.E.2551 (2008), published in the Royal Government Gazette, Vol.125, Part 85D, dated May 21, B.E.2551 (2008).

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(Ms.Yuwadee Na Ranong)
Laboratory Reviewer

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(Mr.Virat Hemvannanukul)
Laboratory Supervisor

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E-mail : envi@enviresearch.co.th
www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BY1-20 : GW5 : หมู่ที่ 8 บ้านนิคมพัฒนา (2) (บ้านเลขที่ 210 ตำบลหนองจิก อำเภอคีรีมาศ จังหวัดสุโขทัย)**
GPS. Coordinate : UTM (WGS84) 47Q 0584748 E, 1846767 N

Sampling Date : May 10, 2025
Sampling Time : 13:45
Sampling Method : Mr.Romsea Kateh
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Colorless, Sediment, Odorless

Quotation No. : AR2025-00471
Analysis No. : 2025-AC019-008
Received Date : May 13, 2025
Analytical Date : May 13-27, 2025
Report No. : 2025-RAAK498
Report Date : May 28, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	5	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	700	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	1,000	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	10,000	-	-
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.003	None	0.01
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	-	-
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.010	1.0	≤1.0	1.5
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	<0.001	0.01	None	0.05
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	2.8	0.5	≤0.3	0.5
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.02	-	-
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.12	5.0	≤5.0	15
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0009	0.01	None	0.05
Selenium	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	<0.0002	0.01	None	0.01
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	<0.0005	0.001	None	0.001
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	0.3	-	≤0.5	1.0
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.61	-	-	-
Temperature	°C	Certified Thermometer	-	34.0	-	-	-
pH	-	Electrometric	-	6.4	-	7.0-8.5	6.5-9.2
Total Dissolved Solids	mg/L	Dried at 180°C	50	194	-	≤600	1,200
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	365	-	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	0.2	-	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	<5.0	-	-	-
Turbidity	NTU	Nephelometric	0.02	2.0	-	5	20

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BY1-20 : GW5 : หมู่ที่ 8 บ้านนิคมพัฒนา (2) (บ้านเลขที่ 210 ตำบลหนองจิก อำเภอคีรีมาศ จังหวัดสุโขทัย)**
GPS. Coordinate : UTM (WGS84) 47Q 0584748 E, 1846767 N

Sampling Date : May 10, 2025
Sampling Time : 13:45
Sampling Method : Mr.Romsea Kateh
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Colorless, Sediment, Odorless

Quotation No. : AR2025-00471
Analysis No. : 2025-AC019-008
Received Date : May 13, 2025
Analytical Date : May 13-27, 2025
Report No. : 2025-RAAK498
Report Date : May 28, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{36})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-

Remark : [1] Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
[2] Notification of the National Environment Board, No.20, B.E.2543 (2000), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.117 Part 94D, dated September 15, B.E.2543 (2000).
[3] Notification of the Ministry of Natural Resources and Environment B.E.2551 (2008), published in the Royal Government Gazette, Vol.125, Part 85D, dated May 21, B.E.2551 (2008).

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(Mr.Virat Nemvanichkul)
Laboratory Supervisor

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ระยะผลิตปิโตรเลียม
(การผลิตปิโตรเลียม)

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www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BY1-2 : ปล่องเกดการณ์ที่ติดตั้งภายในฐานหลุมผลิต BY1-2 สถานีที่ 1**
GPS. Coordinate : UTM (WGS84) 47Q 0583522 E, 1845355 N
Sampling Date : April 8, 2025
Sampling Time : 13:54
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Colorless, Sediment, Odorless

Quotation No. : AR2025-00472
Analysis No. : 2025-AB438-004
Received Date : April 10, 2025
Analytical Date : April 10-May 2, 2025
Report No. : 2025-RAAH787
Report Date : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	5	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	700	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	1,000	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	10,000	-	-
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.003	None	0.01
Chromium Hexavalent	mg/L	Filtration, Colcrimetric	0.005	<0.005	0.05	-	-
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	1.0	≤1.0	1.5
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	0.020	0.01	None	0.05
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	1.5	0.5	≤0.3	0.5
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.02	-	-
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.03	5.0	≤5.0	15
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	<0.0002	0.01	None	0.05
Selenium	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	<0.0002	0.01	None	0.01
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	<0.0005	0.001	None	0.001
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	1.7	-	≤0.5	1.0
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.07	-	-	-
Temperature	°C	Certified Thermometer	-	33.1	-	-	-
pH	-	Electrometric	-	6.7	-	7.0-8.5	6.5-9.2
Total Dissolved Solids	mg/L	Dried at 180°C	50	356	-	≤600	1,200
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	578	-	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	0.3	-	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	10	-	-	-
Turbidity	NTU	Nephelometric	0.02	1.6	-	5	20

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BY1-2 : ปล่องเกดการณ์ที่ติดตั้งภายในฐานหลุมผลิต BY1-2 สถานีที่ 1**
GPS. Coordinate : UTM (WGS84) 47Q 0583522 E, 1845355 N
Sampling Date : April 8, 2025
Sampling Time : 13:54
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Colorless, Sediment, Odorless

Quotation No. : AR2025-00472
Analysis No. : 2025-AB438-004
Received Date : April 10, 2025
Analytical Date : April 10-May 2, 2025
Report No. : 2025-RAAH787
Report Date : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{36})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-

Remark : [1] Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
[2] Notification of the National Environment Board, No.20, B.E.2543 (2000), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.117 Part 94D, dated September 15, B.E.2543 (2000).
[3] Notification of the Ministry of Natural Resources and Environment B.E.2551 (2008), published in the Royal Government Gazette, Vol.125, Part 65D, dated May 21, B.E.2551 (2008).

[redacted] [redacted]

(Ms.Yuwadee Na Ranorg)
Laboratory Reviewer

(Mr.Virat Hemvannanukul)
Laboratory Supervisor

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตบีโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตบีโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานผลุมผลิต BY1-2 : GW5 : หมู่ที่ 8 บ้านนิคมพัฒนา (2) (บ้านเลขที่ 210 บ้านนิคมพัฒนา หมู่ที่ 8 ตำบลหนองจิก อำเภอคีรีมาศ จังหวัดสุโขทัย)**
GPS. Coordinate : UTM (WGS84) 47Q 0584748 E, 1846767 N

Sampling Date : April 8, 2025
Sampling Time : 09:44
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odor

Quotation No. : AR2025-00472
Analysis No. : 2025-AB438-002
Received Date : April 10, 2025
Analytical Date : April 10-May 2, 2025
Report No. : 2025-RAAH783
Report Date : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	5	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	700	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	1,000	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	10,000	-	-
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.003	None	0.01
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	-	-
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.005	1.0	≤1.0	1.5
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	0.008	0.01	None	0.05
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.107	0.5	≤0.3	0.5
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.02	-	-
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.04	5.0	≤5.0	15
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0004	0.01	None	0.05
Selenium	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	<0.0002	0.01	None	0.01
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	0.0005	0.001	None	0.001
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	0.5	-	≤0.5	1.0
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.03	-	-	-
Temperature	°C	Certified Thermometer	-	32.1	-	-	-
pH	-	Electrometric	-	7.7	-	7.0-8.5	6.5-9.2
Total Dissolved Solids	mg/L	Dried at 180°C	50	68	-	≤600	1,200
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	79	-	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	<0.1	-	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	39	-	-	-
Turbidity	NTU	Nephelometric	0.02	4.4	-	5	20

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตบีโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตบีโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานผลุมผลิต BY1-2 : GW5 : หมู่ที่ 8 บ้านนิคมพัฒนา (2) (บ้านเลขที่ 210 บ้านนิคมพัฒนา หมู่ที่ 8 ตำบลหนองจิก อำเภอคีรีมาศ จังหวัดสุโขทัย)**
GPS. Coordinate : UTM (WGS84) 47Q 0584748 E, 1846767 N

Sampling Date : April 8, 2025
Sampling Time : 09:44
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odor

Quotation No. : AR2025-00472
Analysis No. : 2025-AB438-002
Received Date : April 10, 2025
Analytical Date : April 10-May 2, 2025
Report No. : 2025-RAAH783
Report Date : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{36})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-

Remark : [1] Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
[2] Notification of the National Environment Board, No.20, B.E.2543 (2000), Issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.117 Part 94D, dated September 15, B.E.2543 (2000).
[3] Notification of the Ministry of Natural Resources and Environment B.E.2551 (2008), published in the Royal Government Gazette, Vol.125, Part 85D, dated May 21, B.E.2551 (2008).

[redacted]
(Ms.Yuwadee Na Ranong)
Laboratory Reviewer

[redacted]
Laboratory Supervisor

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตบีโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BY1-2 : GW6 : ระบบประปาหมู่บ้าน หมู่ที่ 11 บ้านบึงม่วง (ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0582117 E, 1843955 N
Sampling Date : April 8, 2025
Sampling Time : 12:35
Sampling Method : Mr.Ntad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Colorless, No Sediment, Odorless
Quotation No. : AR2025-00472
Analysis No. : 2025-AB438-003
Received Date : April 10, 2025
Analytical Date : April 10-May 2, 2025
Report No. : 2025-RAAH785
Report Date : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	5	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	700	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	1,000	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	10,000	-	-
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.003	None	0.01
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	-	-
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	1.0	≤1.0	1.5
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	0.001	0.01	None	0.05
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.114	0.5	≤0.3	0.5
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.02	-	-
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	<0.01	5.0	≤5.0	15
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0018	0.01	None	0.05
Selenium	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	<0.0002	0.01	None	0.01
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	<0.0005	0.001	None	0.001
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	0.3	-	≤0.5	1.0
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.12	-	-	-
Temperature	°C	Certified Thermometer	-	32.6	-	-	-
pH	-	Electrometric	-	8.1	-	7.0-8.5	6.5-9.2
Total Dissolved Solids	mg/L	Dried at 180°C	50	159	-	≤600	1,200
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	183	-	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	<0.1	-	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	<5.0	-	-	-
Turbidity	NTU	Nephelometric	0.02	1.4	-	5	20

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตบีโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BY1-2 : GW6 : ระบบประปาหมู่บ้าน หมู่ที่ 11 บ้านบึงม่วง (ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0582117 E, 1843955 N
Sampling Date : April 8, 2025
Sampling Time : 12:35
Sampling Method : Mr.Ntad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Colorless, No Sediment, Odorless
Quotation No. : AR2025-00472
Analysis No. : 2025-AB438-003
Received Date : April 10, 2025
Analytical Date : April 10-May 2, 2025
Report No. : 2025-RAAH785
Report Date : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{36})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-

Remark : [1] Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
[2] Notification of the National Environment Board, No.20, B.E.2543 (2000), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.117 Part 94D, dated September 15, B.E.2543 (2000).
[3] Notification of the Ministry of Natural Resources and Environment B.E.2551 (2008), published in the Royal Government Gazette, Vol.125, Part 85D, dated May 21, B.E.2551 (2008).

[redacted]
(Ms.Yuwadee Na Ranong)
Laboratory Reviewer

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(Mr.Virat Hemvanhanukul)
Laboratory Supervisor

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BY1-20 : บ่อสังเกตการณ์ที่ติดตั้งภายในฐานหลุมผลิต BY1-20 สถานีที่ 1**
GPS. Coordinate : UTM (WGS84) 47Q 0584086 E, 1846791 N
Sampling Date : April 8, 2025
Sampling Time : 10:51
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Colorless, Sediment, Odorless

Quotation No. : AR2025-00472
Analysis No. : 2025-AB438-001
Received Date : April 10, 2025
Analytical Date : April 10-May 2, 2025
Report No. : 2025-RAAH782
Report Date : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	5	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	700	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	1,000	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	10,000	-	-
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.003	None	0.01
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	-	-
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	1.0	≤1.0	1.5
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	0.008	0.01	None	0.05
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.076	0.5	≤0.3	0.5
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.02	-	-
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.02	5.0	≤5.0	15
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0015	0.01	None	0.05
Selenium	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	<0.0002	0.01	None	0.01
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	0.0005	0.001	None	0.001
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	0.2	-	≤0.5	1.0
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.22	-	-	-
Temperature	°C	Certified Thermometer	-	35.2	-	-	-
pH	-	Electrometric	-	7.4	-	7.0-8.5	6.5-9.2
Total Dissolved Solids	mg/L	Dried at 180°C	50	256	-	≤600	1,200
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	347	-	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	0.2	-	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	5.2	-	-	-
Turbidity	NTU	Nephelometric	0.02	1.3	-	5	20

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BY1-20 : บ่อสังเกตการณ์ที่ติดตั้งภายในฐานหลุมผลิต BY1-20 สถานีที่ 1**
GPS. Coordinate : UTM (WGS84) 47Q 0584086 E, 1846791 N
Sampling Date : April 8, 2025
Sampling Time : 10:51
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Colorless, Sediment, Odorless

Quotation No. : AR2025-00472
Analysis No. : 2025-AB438-001
Received Date : April 10, 2025
Analytical Date : April 10-May 2, 2025
Report No. : 2025-RAAH782
Report Date : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{36})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-

Remark : [1] Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
[2] Notification of the National Environment Board, No.20, B.E.2543 (2000), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.117 Part 94D, dated September 15, B.E.2543 (2000).
[3] Notification of the Ministry of Natural Resources and Environment B.E.2551 (2008), published in the Royal Government Gazette, Vol.125, Part 85D, dated May 21, B.E.2551 (2008).

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(Mr.Virat Hemvannanukul)
Laboratory Supervisor

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BY1-20 : บ่อสังเกตการณ์ที่ติดตั้งภายในฐานหลุมผลิต BY1-20 สถานีที่ 2**
GPS. Coordinate : UTM (WGS84) 47Q 0584184 E, 1846750 N
Sampling Date : April 8, 2025
Sampling Time : 11:20
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Light Yellow, Sediment, Odor
Quotation No. : AR2025-00472
Analysis No. : 2025-AB438-005
Received Date : April 10, 2025
Analytical Date : April 10-May 2, 2025
Report No. : 2025-RAAH788
Report Date : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	5	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	700	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	1,000	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	10,000	-	-
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.003	None	0.01
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	-	-
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.006	1.0	≤1.0	1.5
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	0.008	0.01	None	0.05
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.438	0.5	≤0.3	0.5
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.02	-	-
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.03	5.0	≤5.0	15
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0023	0.01	None	0.05
Selenium	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	<0.0002	0.01	None	0.01
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	<0.0005	0.001	None	0.001
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	2.7	-	≤0.5	1.0
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.13	-	-	-
Temperature	°C	Certified Thermometer	-	33.6	-	-	-
pH	-	Electrometric	-	7.9	-	7.0-8.5	6.5-9.2
Total Dissolved Solids	mg/L	Dried at 180°C	50	207	-	≤600	1,200
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	247	-	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	0.1	-	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	114	-	-	-
Turbidity	NTU	Nephelometric	0.02	53	-	5	20

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BY1-20 : บ่อสังเกตการณ์ที่ติดตั้งภายในฐานหลุมผลิต BY1-20 สถานีที่ 2**
GPS. Coordinate : UTM (WGS84) 47Q 0584184 E, 1846750 N
Sampling Date : April 8, 2025
Sampling Time : 11:20
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Light Yellow, Sediment, Odor
Quotation No. : AR2025-00472
Analysis No. : 2025-AB438-005
Received Date : April 10, 2025
Analytical Date : April 10-May 2, 2025
Report No. : 2025-RAAH788
Report Date : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{35})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-

Remark : [1] Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
[2] Notification of the National Environment Board, No.20, B.E.2543 (2000), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.117 Part 94D, dated September 15, B.E.2543 (2000).
[3] Notification of the Ministry of Natural Resources and Environment B.E.2551 (2008), published in the Royal Government Gazette, Vol.125, Part 85D, dated May 21, B.E.2551 (2008).

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Laboratory Supervisor

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตบีโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตบีโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BY1-20 : GW4 : ระบบประปาหมู่บ้าน หมู่ที่ 8 บ้านนิคมพัฒนา (ตำบลหนองจิก อำเภอคีรีมาศ จังหวัดสุโขทัย)**
GPS. Coordinate : UTM (WGS84) 47Q 0583407 E, 1846508 N
Sampling Date : April 8, 2025
Sampling Time : 15:11
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, No Sediment, Odorless
Quotation No. : AR2025-00472
Analysis No. : 2025-AB438-006
Received Date : April 10, 2025
Analytical Date : April 10-May 2, 2025
Report No. : 2025-RAAH792
Report Date : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[2]	
						Suitable Allowance	Maximum Allowable
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	5	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	700	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	1,000	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	10,000	-	-
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.003	None	0.01
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	-	-
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	1.0	≤1.0	1.5
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	0.003	0.01	None	0.05
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.404	0.5	≤0.3	0.5
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.02	-	-
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	<0.01	5.0	≤5.0	15
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0026	0.01	None	0.05
Selenium	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	<0.0002	0.01	None	0.01
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	<0.0005	0.001	None	0.001
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	1.1	-	≤0.5	1.0
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.12	-	-	-
Temperature	°C	Certified Thermometer	-	33.5	-	-	-
pH	-	Electrometric	-	7.4	-	7.0-8.5	6.5-9.2
Total Dissolved Solids	mg/L	Dried at 180°C	50	156	-	≤600	1,200
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	224	-	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	<0.1	-	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	<5.0	-	-	-
Turbidity	NTU	Nephelometric	0.02	1.4	-	5	20

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตบีโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตบีโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BY1-20 : GW4 : ระบบประปาหมู่บ้าน หมู่ที่ 8 บ้านนิคมพัฒนา (ตำบลหนองจิก อำเภอคีรีมาศ จังหวัดสุโขทัย)**
GPS. Coordinate : UTM (WGS84) 47Q 0583407 E, 1846508 N
Sampling Date : April 8, 2025
Sampling Time : 15:11
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, No Sediment, Odorless
Quotation No. : AR2025-00472
Analysis No. : 2025-AB438-006
Received Date : April 10, 2025
Analytical Date : April 10-May 2, 2025
Report No. : 2025-RAAH792
Report Date : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[2]	
						Suitable Allowance	Maximum Allowable
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{36})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-

Remark : [1] Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
[2] Notification of the National Environment Board, No.20, B.E.2543 (2000), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.117 Part 94D, dated September 15, B.E.2543 (2000).
[3] Notification of the Ministry of Natural Resources and Environment B.E.2551 (2008), published in the Royal Government Gazette, Vol.125, Part 85D, dated May 21, B.E.2551 (2008).

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Page 1/2
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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานบลุมผลิต BY1-20 : GW5 : หมู่ที่ 8 บ้านนิคมพัฒนา (2) (บ้านเลขที่ 210 บ้านนิคมพัฒนา ตำบลหนองจิก อำเภอศรีมาศ จังหวัดสุโขทัย)**
GPS. Coordinate : UTM (WGS84) 47Q 0584748 E, 1846767 N
Sampling Date : April 8, 2025
Sampling Time : 09:44
Sampling Method : Mr.Ntad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odor

Quotation No. : AR2025-00472
Analysis No. : 2025-AB438-018
Received Date : April 10, 2025
Analytical Date : April 10-May 2, 2025
Report No. : 2025-RAAH812
Report Date : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	5	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	700	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	1,000	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	10,000	-	-
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.003	None	0.01
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	-	-
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.005	1.0	≤1.0	1.5
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	0.008	0.01	None	0.05
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.107	0.5	≤0.3	0.5
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.02	-	-
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.04	5.0	≤5.0	15
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0004	0.01	None	0.05
Selenium	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	<0.0002	0.01	None	0.01
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	0.0005	0.001	None	0.001
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	0.5	-	≤0.5	1.0
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.03	-	-	-
Temperature	°C	Certified Thermometer	-	32.1	-	-	-
pH	-	Electrometric	-	7.7	-	7.0-8.5	6.5-9.2
Total Dissolved Solids	mg/L	Dried at 180°C	50		-	≤600	1,200
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	79	-	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	<0.1	-	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	39	-	-	-
Turbidity	NTU	Nephelometric	0.02	4.4	-	5	20

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานบลุมผลิต BY1-20 : GW5 : หมู่ที่ 8 บ้านนิคมพัฒนา (2) (บ้านเลขที่ 210 บ้านนิคมพัฒนา ตำบลหนองจิก อำเภอศรีมาศ จังหวัดสุโขทัย)**
GPS. Coordinate : UTM (WGS84) 47Q 0584748 E, 1846767 N
Sampling Date : April 8, 2025
Sampling Time : 09:44
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odor

Quotation No. : AR2025-00472
Analysis No. : 2025-AB438-018
Received Date : April 10, 2025
Analytical Date : April 10-May 2, 2025
Report No. : 2025-RAAH812
Report Date : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{36})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-

Remark : [1] Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
[2] Notification of the National Environment Board, No.20, B.E.2543 (2000), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.117 Part 94D, dated September 15, B.E.2543 (2000).
[3] Notification of the Ministry of Natural Resources and Environment B.E.2551 (2008), published in the Royal Government Gazette, Vol.125, Part 85D, dated May 21, B.E.2551 (2008).

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Laboratory Supervisor

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BM3 : บ่อสังเกตการณ์ที่ขุดขึ้นภายในฐานหลุมผลิต BM3 (เหนือน้ำ)**
GPS. Coordinate : UTM (WGS84) 47Q 0584480 E, 1843610 N
Sampling Date : April 8, 2025
Sampling Time : 14:20
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Colorless, Sediment, Odor

Quotation No. : AR2025-00472
Analysis No. : 2025-AB438-007
Received Date : April 10, 2025
Analytical Date : April 10-May 5, 2025
Report No. : 2025-RAAH793
Report Date : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	5	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	700	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	1,000	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	10,000	-	-
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.003	None	0.01
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	-	-
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.771	1.0	≤1.0	1.5
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	0.242	0.01	None	0.05
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.637	0.5	≤0.3	0.5
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.02	-	-
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.02	5.0	≤5.0	15
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0003	0.01	None	0.05
Selenium	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	<0.0002	0.01	None	0.01
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	<0.0005	0.001	None	0.001
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	0.2	-	≤0.5	1.0
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.18	-	-	-
Temperature	°C	Certified Thermometer	-	32.4	-	-	-
pH	-	Electrometric	-	7.6	-	7.0-8.5	6.5-9.2
Total Dissolved Solids	mg/L	Dried at 180°C	50	268	-	≤600	1,200
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	369	-	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	0.2	-	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	6.4	-	-	-
Turbidity	NTU	Nephelometric	0.02	0.98	-	5	20

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BM3 : บ่อสังเกตการณ์ที่ขุดขึ้นภายในฐานหลุมผลิต BM3 (เหนือน้ำ)**
GPS. Coordinate : UTM (WGS84) 47Q 0584480 E, 1843610 N
Sampling Date : April 8, 2025
Sampling Time : 14:20
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Colorless, Sediment, Odor

Quotation No. : AR2025-00472
Analysis No. : 2025-AB438-007
Received Date : April 10, 2025
Analytical Date : April 10-May 5, 2025
Report No. : 2025-RAAH793
Report Date : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{28}-C_{36})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-

Remark : [1] Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
[2] Notification of the National Environment Board, No.20, B.E.2543 (2000), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.117 Part 94D, dated September 15, B.E.2543 (2000).
[3] Notification of the Ministry of Natural Resources and Environment B.E.2551 (2008), published in the Royal Government Gazette, Vol.125, Part 85D, dated May 21, B.E.2551 (2008).

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BM3 : บ่อสังเกตการณ์ที่ติดตั้งภายในฐานหลุมผลิต BM3 (ท้ายน้ำ)**
GPS. Coordinate : UTM (WGS84) 47Q 0584450 E, 1843642 N
Sampling Date : April 8, 2025
Sampling Time : 14:43
Sampling Method : Mr.Ntad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odor

Quotation No. : AR2025-00472
Analysis No. : 2025-AB438-008
Received Date : April 10, 2025
Analytical Date : April 10-May 5, 2025
Report No. : 2025-RAAH794
Report Date : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	5	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	700	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	1,000	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	10,000	-	-
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.003	None	0.01
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	-	-
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.029	1.0	≤1.0	1.5
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	0.075	0.01	None	0.05
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	1.7	0.5	≤0.3	0.5
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.02	-	-
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.02	5.0	≤5.0	15
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0034	0.01	None	0.05
Selenium	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	<0.0002	0.01	None	0.01
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	<0.0005	0.001	None	0.001
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	6.9	-	≤0.5	1.0
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.11	-	-	-
Temperature	°C	Certified Thermometer	-	33.3	-	-	-
pH	-	Electrometric	-	7.0	-	7.0-8.5	6.5-9.2
Total Dissolved Solids	mg/L	Dried at 180°C	50	137	-	≤600	1,200
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	262	-	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	0.1	-	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	16	-	-	-
Turbidity	NTU	Nephelometric	0.02	22	-	5	20

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BM3 : บ่อสังเกตการณ์ที่ติดตั้งภายในฐานหลุมผลิต BM3 (ท้ายน้ำ)**
GPS. Coordinate : UTM (WGS84) 47Q 0584450 E, 1843642 N
Sampling Date : April 8, 2025
Sampling Time : 14:43
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odor

Quotation No. : AR2025-00472
Analysis No. : 2025-AB438-008
Received Date : April 10, 2025
Analytical Date : April 10-May 5, 2025
Report No. : 2025-RAAH794
Report Date : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{36})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-

Remark : [1] Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
[2] Notification of the National Environment Board, No.20, B.E.2543 (2000), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.117 Part 94D, dated September 15, B.E.2543 (2000).
[3] Notification of the Ministry of Natural Resources and Environment B.E.2551 (2008), published in the Royal Government Gazette, Vol.125, Part 85D, dated May 21, B.E.2551 (2008).

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(Ms.Yuwadee Na Ranong)
Laboratory Reviewer

[redacted]
(Mr.Virat Hemvannanukul)
Laboratory Supervisor

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BM6 : บ่อสังเกตการณ์ที่ติดตั้งภายในฐานหลุมผลิต BM6 (เหนือน้ำ)**
GPS. Coordinate : UTM (WGS84) 47Q 0583194 E, 1843024 N
Sampling Date : April 8, 2025
Sampling Time : 13:02
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Colorless, No Sediment, Odorless

Quotation No. : AR2025-00472
Analysis No. : 2025-AB438-009
Received Date : April 10, 2025
Analytical Date : April 10-May 5, 2025
Report No. : 2025-RAAH796
Report Date : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	5	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	700	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	1,000	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	10,000	-	-
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.003	None	0.01
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	-	-
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	1.0	≤1.0	1.5
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	0.054	0.01	None	0.05
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.530	0.5	≤0.3	0.5
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.02	-	-
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.51	5.0	≤5.0	15
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0031	0.01	None	0.05
Selenium	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	<0.0002	0.01	None	0.01
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	<0.0005	0.001	None	0.001
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	1.2	-	≤0.5	1.0
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.20	-	-	-
Temperature	°C	Certified Thermometer	-	28.8	-	-	-
pH	-	Electrometric	-	7.4	-	7.0-8.5	6.5-9.2
Total Dissolved Solids	mg/L	Dried at 180°C	50	176	-	≤600	1,200
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	242	-	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	0.1	-	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	13	-	-	-
Turbidity	NTU	Nephelometric	0.02	0.91	-	5	20

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BM6 : บ่อสังเกตการณ์ที่ติดตั้งภายในฐานหลุมผลิต BM6 (เหนือน้ำ)**
GPS. Coordinate : UTM (WGS84) 47Q 0583194 E, 1843024 N
Sampling Date : April 8, 2025
Sampling Time : 13:02
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Colorless, No Sediment, Odorless

Quotation No. : AR2025-00472
Analysis No. : 2025-AB438-009
Received Date : April 10, 2025
Analytical Date : April 10-May 5, 2025
Report No. : 2025-RAAH796
Report Date : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{36})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-

Remark : [1] Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
[2] Notification of the National Environment Board, No.20, B.E.2543 (2000), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.117 Part 94D, dated September 15, B.E.2543 (2000).
[3] Notification of the Ministry of Natural Resources and Environment B.E.2551 (2008), published in the Royal Government Gazette, Vol.125, Part 85D, dated May 21, B.E.2551 (2008).

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BM6 : บ่อสังเกตการณ์ที่ติดตั้งภายในฐานหลุมผลิต BM6 (ท้ายน้ำ)**
GPS. Coordinate : UTM (WGS84) 47Q 0583188 E, 1843190 N
Sampling Date : April 8, 2025
Sampling Time : 13:26
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odorless

Quotation No. : AR2025-00472
Analysis No. : 2025-AB438-010
Received Date : April 10, 2025
Analytical Date : April 10-May 5, 2025
Report No. : 2025-RAAH799
Report Date : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	5	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	700	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	1,000	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	10,000	-	-
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.003	None	0.01
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	-	-
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	1.0	≤1.0	1.5
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	0.052	0.01	None	0.05
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.463	0.5	≤0.3	0.5
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.02	-	-
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.18	5.0	≤5.0	15
Arsenic	mg/L	Digestion, Hycride Generation Atomic Absorption Spectrometry	0.0002	0.0031	0.01	None	0.05
Selenium	mg/L	Digestion, Hycride Generation Atomic Absorption Spectrometry	0.0002	<0.0002	0.01	None	0.01
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	<0.0005	0.001	None	0.001
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	1.9	-	≤0.5	1.0
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.19	-	-	-
Temperature	°C	Certified Thermometer	-	32.7	-	-	-
pH	-	Electrometric	-	7.6	-	7.0-8.5	6.5-9.2
Total Dissolved Solids	mg/L	Dried at 180°C	50	171	-	≤600	1,200
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	249	-	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	0.1	-	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	7.3	-	-	-
Turbidity	NTU	Nephelometric	0.02	2.5	-	5	20

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BM6 : บ่อสังเกตการณ์ที่ติดตั้งภายในฐานหลุมผลิต BM6 (ท้ายน้ำ)**
GPS. Coordinate : UTM (WGS84) 47Q 0583188 E, 1843190 N
Sampling Date : April 8, 2025
Sampling Time : 13:26
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odorless

Quotation No. : AR2025-00472
Analysis No. : 2025-AB438-010
Received Date : April 10, 2025
Analytical Date : April 10-May 5, 2025
Report No. : 2025-RAAH799
Report Date : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{36})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-

Remark : [1] Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
[2] Notification of the National Environment Board, No.20, B.E.2543 (2000), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.117 Part 94D, dated September 15, B.E.2543 (2000).
[3] Notification of the Ministry of Natural Resources and Environment B.E.2551 (2008), published in the Royal Government Gazette, Vol.125, Part 85D, dated May 21, B.E.2551 (2008).

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(Ms.Yuwadee Na Ranong)
Laboratory Reviewer

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Laboratory Supervisor

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตบีโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตบีโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BM3, BM6 : GW6 : ระบบประปาหมู่บ้าน หมู่ที่ 11 บ้านบึงม่วง (ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0582117 E, 1843955 N
Sampling Date : April 8, 2025
Sampling Time : 12:35
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Colorless, No Sediment, Odorless
Quotation No. : AR2025-00472
Analysis No. : 2025-AB438-019
Received Date : April 10, 2025
Analytical Date : April 10-May 2, 2025
Report No. : 2025-RAAH815
Report Date : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	5	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	700	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	1,000	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	10,000	-	-
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.003	None	0.01
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	-	-
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	1.0	≤1.0	1.5
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	0.001	0.01	None	0.05
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.114	0.5	≤0.3	0.5
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.02	-	-
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	<0.01	5.0	≤5.0	15
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0018	0.01	None	0.05
Selenium	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	<0.0002	0.01	None	0.01
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	<0.0005	0.001	None	0.001
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	0.3	-	≤0.5	1.0
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.12	-	-	-
Temperature	°C	Certified Thermometer	-	32.6	-	-	-
pH	-	Electrometric	-	8.1	-	7.0-8.5	6.5-9.2
Total Dissolved Solids	mg/L	Dried at 180°C	50	159	-	-	-
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	183	-	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	<0.1	-	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	<5.0	-	-	-
Turbidity	NTU	Nephelometric	0.02	1.4	-	5	20

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตบีโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตบีโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BM3, BM6 : GW6 : ระบบประปาหมู่บ้าน หมู่ที่ 11 บ้านบึงม่วง (ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0582117 E, 1843955 N
Sampling Date : April 8, 2025
Sampling Time : 12:35
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Colorless, No Sediment, Odorless
Quotation No. : AR2025-00472
Analysis No. : 2025-AB438-019
Received Date : April 10, 2025
Analytical Date : April 10-May 2, 2025
Report No. : 2025-RAAH815
Report Date : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{36})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-

Remark : [1] Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
[2] Notification of the National Environment Board, No.20, B.E.2543 (2000), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.117 Part 94D, dated September 15, B.E.2543 (2000).
[3] Notification of the Ministry of Natural Resources and Environment B.E.2551 (2008), published in the Royal Government Gazette, Vol.125, Part 85D, dated May 21, B.E.2551 (2008).

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตบีโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตบีโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BM3, BM6 : GW7 : ระบบประปาหมู่บ้าน หมู่ที่ 4 บ้านบึงมาลย์ (ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0581645 E, 1841652 N
Sampling Date : April 8, 2025
Sampling Time : 16:35
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Colorless, No Sediment, Odorless

Quotation No. : AR2025-00472
Analysis No. : 2025-AB438-011
Received Date : April 10, 2025
Analytical Date : April 10-May 5, 2025
Report No. : 2025-RAAH801
Report Date : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	5	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	700	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	1,000	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	10,000	-	-
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.003	None	0.01
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	-	-
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	1.0	≤1.0	1.5
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	0.002	0.01	None	0.05
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.245	0.5	≤0.3	0.5
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.02	-	-
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	<0.01	5.0	≤5.0	15
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0025	0.01	None	0.05
Selenium	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	<0.0002	0.01	None	0.01
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	<0.0005	0.001	None	0.001
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	0.4	-	≤0.5	1.0
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.19	-	-	-
Temperature	°C	Certified Thermometer	-	32.5	-	-	-
pH	-	Electrometric	-	7.6	-	7.0-8.5	6.5-9.2
Total Dissolved Solids	mg/L	Dried at 180°C	50	130	-	≤600	1,200
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	172	-	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	<0.1	-	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	<5.0	-	-	-
Turbidity	NTU	Nephelometric	0.02	0.44	-	5	20

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตบีโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตบีโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BM3, BM6 : GW7 : ระบบประปาหมู่บ้าน หมู่ที่ 4 บ้านบึงมาลย์ (ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0581645 E, 1841652 N
Sampling Date : April 8, 2025
Sampling Time : 16:35
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Colorless, No Sediment, Odorless

Quotation No. : AR2025-00472
Analysis No. : 2025-AB438-011
Received Date : April 10, 2025
Analytical Date : April 10-May 5, 2025
Report No. : 2025-RAAH801
Report Date : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{36})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-

Remark : [1] Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
[2] Notification of the National Environment Board, No.20, B.E.2543 (2000), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.117 Part 94D, dated September 15, B.E.2543 (2000).
[3] Notification of the Ministry of Natural Resources and Environment B.E.2551 (2008), published in the Royal Government Gazette, Vol.125, Part 85D, dated May 21, B.E.2551 (2008).

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BM3, BM6 : GW8 : ระบบประปาหมู่บ้าน วัดบ้านใหม่สามัคคี หมู่ที่ 6 (ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0586078 E, 1844173 N
Sampling Date : April 8, 2025
Sampling Time : 17:04
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Colorless, No Sediment, Odorless
Quotation No. : AR2025-00472
Analysis No. : 2025-AB438-012
Received Date : April 10, 2025
Analytical Date : April 10-May 5, 2025
Report No. : 2025-RAAH802
Report Date : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	5	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	700	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	1,000	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	10,000	-	-
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.003	None	0.01
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	-	-
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	1.0	≤1.0	1.5
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	0.003	0.01	None	0.05
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.251	0.5	≤0.3	0.5
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.02	-	-
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	<0.01	5.0	≤5.0	15
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0027	0.01	None	0.05
Selenium	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0004	0.01	None	0.01
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	<0.0005	0.001	None	0.001
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	0.2	-	≤0.5	1.0
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.18	-	-	-
Temperature	°C	Certified Thermometer	-	30.8	-	-	-
pH	-	Electrometric	-	7.8	-	7.0-8.5	6.5-9.2
Total Dissolved Solids	mg/L	Dried at 180°C	50	152	-	≤600	1,200
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	202	-	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	<0.1	-	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	37	-	-	-
Turbidity	NTU	Nephelometric	0.02	1.0	-	5	20

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BM3, BM6 : GW8 : ระบบประปาหมู่บ้าน วัดบ้านใหม่สามัคคี หมู่ที่ 6 (ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0586078 E, 1844173 N
Sampling Date : April 8, 2025
Sampling Time : 17:04
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Colorless, No Sediment, Odorless
Quotation No. : AR2025-00472
Analysis No. : 2025-AB438-012
Received Date : April 10, 2025
Analytical Date : April 10-May 5, 2025
Report No. : 2025-RAAH802
Report Date : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquic Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquic Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{36})	mg/L	Liquid-Liquic Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-

Remark : [1] Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
[2] Notification of the National Environment Board, No.20 B.E.2543 (2000), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.117 Part 94D, dated September 15, B.E.2543 (2000).
[3] Notification of the Ministry of Natural Resources and Environment B.E.2551 (2008), published in the Royal Government Gazette, Vol.125, Part 85D, dated May 21, B.E.2551 (2008).

[redacted]
(Ms.Yuwadee Na Ranong)
Laboratory Reviewer

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(Mr.Virat Hemvannakul)
Laboratory Supervisor

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F-RP-024 Rev. 04, September 28, 2020

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตบีโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตบีโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BMS2 : ปล่องเกตการณ์ที่ติดตั้งภายในฐานหลุมผลิต BMS2 (ท้ายน้ำ)**
GPS. Coordinate : UTM (WGS84) 47Q 0583833 E, 1840428 N
Sampling Date : April 9, 2025
Sampling Time : 08:05
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odor

Quotation No. : AR2025-00472
Analysis No. : 2025-AB438-013
Received Date : April 10, 2025
Analytical Date : April 10-May 5, 2025
Report No. : 2025-RAAH803
Report Date : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	5	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	700	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	1,000	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	10,000	-	-
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.003	None	0.01
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	-	-
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.008	1.0	≤1.0	1.5
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	0.156	0.01	None	0.05
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.538	0.5	≤0.3	0.5
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.02	-	-
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.10	5.0	≤5.0	15
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0020	0.01	None	0.05
Selenium	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0002	0.01	None	0.01
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	<0.0005	0.001	None	0.001
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	9.5	-	≤0.5	1.0
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.29	-	-	-
Temperature	°C	Certified Thermometer	-	29.8	-	-	-
pH	-	Electrometric	-	6.8	-	7.0-8.5	6.5-9.2
Total Dissolved Solids	mg/L	Dried at 180°C	50	120	-	≤600	1,200
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	202	-	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	<0.1	-	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	33	-	-	-
Turbidity	NTU	Nephelometric	0.02	12	-	5	20

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตบีโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตบีโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BMS2 : ปล่องเกตการณ์ที่ติดตั้งภายในฐานหลุมผลิต BMS2 (ท้ายน้ำ)**
GPS. Coordinate : UTM (WGS84) 47Q 0583833 E, 1840428 N
Sampling Date : April 9, 2025
Sampling Time : 08:05
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odor

Quotation No. : AR2025-00472
Analysis No. : 2025-AB438-013
Received Date : April 10, 2025
Analytical Date : April 10-May 5, 2025
Report No. : 2025-RAAH803
Report Date : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{36})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-

Remark : [1] Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
[2] Notification of the National Environment Board, No.20, B.E.2543 (2000), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.117 Part 94D, dated September 15, B.E.2543 (2000).
[3] Notification of the Ministry of Natural Resources and Environment B.E.2551 (2008), published in the Royal Government Gazette, Vol.125, Part 85D, dated May 21, B.E.2551 (2008).

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BMS2 : บ่อสังเกตการณ์ที่ติดตั้งภายในฐานหลุมผลิต BMS2 (เหนือน้ำ)**
GPS. Coordinate : UTM (WGS84) 47Q 0583966 E, 1840391 N
Sampling Date : April 9, 2025
Sampling Time : 08:24
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odor

Quotation No. : AR2025-00472
Analysis No. : 2025-AB438-014
Received Date : April 10, 2025
Analytical Date : April 10-May 5, 2025
Report No. : 2025-RAAH805
Report Date : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	5	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	700	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	1,000	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	10,000	-	-
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.003	None	0.01
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	-	-
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	1.0	≤1.0	1.5
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	0.120	0.01	None	0.05
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.360	0.5	≤0.3	0.5
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.02	-	-
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.02	5.0	≤5.0	15
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0044	0.01	None	0.05
Selenium	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	<0.0002	0.01	None	0.01
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	<0.0005	0.001	None	0.001
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	12	-	≤0.5	1.0
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.27	-	-	-
Temperature	°C	Certified Thermometer	-	30.1	-	-	-
pH	-	Electrometric	-	7.4	-	7.0-8.5	6.5-9.2
Total Dissolved Solids	mg/L	Dried at 180°C	50	129	-	≤600	1,200
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	151	-	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	<0.1	-	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	79	-	-	-
Turbidity	NTU	Nephelometric	0.02	25	-	5	20

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BMS2 : บ่อสังเกตการณ์ที่ติดตั้งภายในฐานหลุมผลิต BMS2 (เหนือน้ำ)**
GPS. Coordinate : UTM (WGS84) 47Q 0583966 E, 1840391 N
Sampling Date : April 9, 2025
Sampling Time : 08:24
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odor

Quotation No. : AR2025-00472
Analysis No. : 2025-AB438-014
Received Date : April 10, 2025
Analytical Date : April 10-May 5, 2025
Report No. : 2025-RAAH805
Report Date : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{34})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-

Remark : [1] Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
[2] Notification of the National Environment Board, No.20, B.E.2543 (2000), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.117 Part 94D, dated September 15, B.E.2543 (2000).
[3] Notification of the Ministry of Natural Resources and Environment B.E.2551 (2008), published in the Royal Government Gazette, Vol.125, Part 85D, dated May 21, B.E.2551 (2008).

[redacted]
(Ms.Yuwadee Na Ranong)
Laboratory Reviewer

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(Mr.Virat Hemvannanukul)
Laboratory Supervisor

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Page 1/2
F-RP-024 Rev. 04, September 28, 2020

envi research
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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Visior E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานจุมผลิต BMS2 : GW9 : ระบบประปาหมู่บ้าน หมู่ที่ 7 บ้านหนองไม้แดง (ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0583256 E, 1840996 N
Sampling Date : April 8, 2025
Sampling Time : 15:46
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, No Sediment, Odorless

Quotation No. : AR2025-00472
Analysis No. : 2025-AB438-015
Received Date : April 10, 2025
Analytical Date : April 10-May 5, 2025
Report No. : 2025-RAAH807
Report Date : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	5	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	700	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	1,000	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	10,000	-	-
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.003	None	0.01
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	-	-
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	1.0	≤1.0	1.5
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	0.009	0.01	None	0.05
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.631	0.5	≤0.3	0.5
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.02	-	-
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.04	5.0	≤5.0	15
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0030	0.01	None	0.05
Selenium	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	<0.0002	0.01	None	0.01
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	<0.0005	0.001	None	0.001
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	0.7	-	≤0.5	1.0
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.26	-	-	-
Temperature	°C	Certified Thermometer	-	33.7	-	-	-
pH	-	Electrometric	-	7.4	-	7.0-8.5	6.5-9.2
Total Dissolved Solids	mg/L	Dried at 180°C	50	171	-	≤600	1,200
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	252	-	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	<0.1	-	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	7.0	-	-	-
Turbidity	NTU	Nephelometric	0.02	3.0	-	5	20

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานจุมผลิต BMS2 : GW9 : ระบบประปาหมู่บ้าน หมู่ที่ 7 บ้านหนองไม้แดง (ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0583256 E, 1840996 N
Sampling Date : April 8, 2025
Sampling Time : 15:46
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, No Sediment, Odorless

Quotation No. : AR2025-00472
Analysis No. : 2025-AB438-015
Received Date : April 10, 2025
Analytical Date : April 10-May 5, 2025
Report No. : 2025-RAAH807
Report Date : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{36})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-

Remark : [1] Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
[2] Notification of the National Environment Board, No.20, B.E.2543 (2000), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.117 Part 94D, dated September 15, B.E.2543 (2000).
[3] Notification of the Ministry of Natural Resources and Environment B.E.2551 (2008), published in the Royal Government Gazette, Vol.125, Part 85D, dated May 21, B.E.2551 (2008).

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตบีโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตบีโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BMS2 : GW11 : ระบบประปาหมู่บ้าน หมู่ที่ 5 บ้านหนองหลวง (ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0585938 E, 1839424 N
Sampling Date : April 8, 2025
Sampling Time : 17:32
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, No Sediment, Odorless

Quotation No. : AR2025-00472
Analysis No. : 2025-AB438-016
Received Date : April 10, 2025
Analytical Date : April 10-May 5, 2025
Report No. : 2025-RAAH809
Report Date : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	5	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	700	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	1,000	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	10,000	-	-
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.003	None	0.01
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	-	-
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.007	1.0	≤1.0	1.5
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	0.006	0.01	None	0.05
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.355	0.5	≤0.3	0.5
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.02	-	-
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	<0.01	5.0	≤5.0	15
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0032	0.01	None	0.05
Selenium	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	<0.0002	0.01	None	0.01
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	<0.0005	0.001	None	0.001
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	0.3	-	≤0.5	1.0
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.26	-	-	-
Temperature	°C	Certified Thermometer	-	30.6	-	-	-
pH	-	Electrometric	-	7.3	-	7.0-8.5	6.5-9.2
Total Dissolved Solids	mg/L	Dried at 180°C	50	160	-	≤600	1,200
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	213	-	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	<0.1	-	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	<5.0	-	-	-
Turbidity	NTU	Nephelometric	0.02	0.47	-	5	20

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตบีโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตบีโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BMS2 : GW11 : ระบบประปาหมู่บ้าน หมู่ที่ 5 บ้านหนองหลวง (ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0585938 E, 1839424 N
Sampling Date : April 8, 2025
Sampling Time : 17:32
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, No Sediment, Odorless

Quotation No. : AR2025-00472
Analysis No. : 2025-AB438-016
Received Date : April 10, 2025
Analytical Date : April 10-May 5, 2025
Report No. : 2025-RAAH809
Report Date : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{36})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-

Remark : [1] Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
[2] Notification of the National Environment Board, No.20, B.E.2543 (2000), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.117 Part 94D, dated September 15, B.E.2543 (2000).
[3] Notification of the Ministry of Natural Resources and Environment B.E.2551 (2008), published in the Royal Government Gazette, Vol.125, Part 85D, dated May 21, B.E.2551 (2008).

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Laboratory Supervisor

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BMS1 : บ่อสังเกตการณ์ที่ติดตั้งภายในฐานหลุมผลิต BMS1 (เหนือน้ำ)**
GPS. Coordinate : UTM (WGS84) 47Q 0583667 E, 1841385 N
Sampling Date : April 8, 2025
Sampling Time : 16:09
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odor

Quotation No. : AR2025-00472
Analysis No. : 2025-AB438-017
Received Date : April 10, 2025
Analytical Date : April 10-May 5, 2025
Report No. : 2025-RAAH811
Report Date : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	5	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	700	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	1,000	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	10,000	-	-
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.003	None	0.01
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	-	-
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.006	1.0	≤1.0	1.5
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	0.549	0.01	None	0.05
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	1.3	0.5	≤0.3	0.5
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.02	-	-
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.08	5.0	≤5.0	15
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0051	0.01	None	0.05
Selenium	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	<0.0002	0.01	None	0.01
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	<0.0005	0.001	None	0.001
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	3.0	-	≤0.5	1.0
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.17	-	-	-
Temperature	°C	Certified Thermometer	-	32.7	-	-	-
pH	-	Electrometric	-	7.2	-	7.0-8.5	6.5-9.2
Total Dissolved Solids	mg/L	Dried at 180°C	50	155	-	≤600	1,200
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	215	-	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	<0.1	-	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	9.5	-	-	-
Turbidity	NTU	Nephelometric	0.02	2.5	-	5	20

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BMS1 : บ่อสังเกตการณ์ที่ติดตั้งภายในฐานหลุมผลิต BMS1 (เหนือน้ำ)**
GPS. Coordinate : UTM (WGS84) 47Q 0583667 E, 1841385 N
Sampling Date : April 8, 2025
Sampling Time : 16:09
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odor

Quotation No. : AR2025-00472
Analysis No. : 2025-AB438-017
Received Date : April 10, 2025
Analytical Date : April 10-May 5, 2025
Report No. : 2025-RAAH811
Report Date : May 6, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{36})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-

Remark : [1] Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
[2] Notification of the National Environment Board, No.20, B.E.2543 (2000), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.117 Part 94D, dated September 15, B.E.2543 (2000).
[3] Notification of the Ministry of Natural Resources and Environment B.E.2551 (2008), published in the Royal Government Gazette, Vol.125, Part 85D, dated May 21, B.E.2551 (2008).

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(Mr.Virat Hemvanhanukul)
Laboratory Supervisor

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Page 1/2
F-RP-024 Rev. 04, September 28, 2020

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BMS1 : ปล่องเกดการรถที่ติดตั้งภายในฐานหลุมผลิต BMS1 (ท้ายน้ำ)**
GPS. Coordinate : UTM (WGS84) 47Q 0583739 E, 1841499 N
Sampling Date : April 8, 2025
Sampling Time : 15:25
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Colorless, No Sediment, Odorless

Quotation No. : AR2025-00472
Analysis No. : 2025-AC958-001
Received Date : April 10, 2025
Analytical Date : April 10 - May 5, 2025
Report No. : 2025-RAAP030
Report Date : July 1, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	5	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	700	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	1,000	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	10,000	-	-
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.003	None	0.01
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	-	-
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.018	1.0	≤1.0	1.5
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	0.001	0.01	None	0.05
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.008	0.5	≤0.3	0.5
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.02	-	-
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.04	5.0	≤5.0	15
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0028	0.01	None	0.05
Selenium	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	<0.0002	0.01	None	0.01
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	<0.0005	0.001	None	0.001
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	<0.1	-	≤0.5	1.0
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.05	-	-	-
Temperature	°C	Certified Thermometer	-	31.4	-	-	-
pH	.-	Electrometric	-	7.8	-	7.0-8.5	6.5-9.2
Total Dissolved Solids	mg/L	Dried at 180°C	50	294	-	≤600	1,200
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	534	-	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	0.3	-	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	<5.0	-	-	-
Turbidity	NTU	Nephelometric	0.02	0.35	-	5	20

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : **ฐานหลุมผลิต BMS1 : ปล่องเกดการรถที่ติดตั้งภายในฐานหลุมผลิต BMS1 (ท้ายน้ำ)**
GPS. Coordinate : UTM (WGS84) 47Q 0583739 E, 1841499 N
Sampling Date : April 8, 2025
Sampling Time : 15:25
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Colorless, No Sediment, Odorless

Quotation No. : AR2025-00472
Analysis No. : 2025-AC958-001
Received Date : April 10, 2025
Analytical Date : April 10 - May 5, 2025
Report No. : 2025-RAAP030
Report Date : July 1, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	Standard[3]	
						Suitable Allowance	Maximum Allowable
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{31})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-

Remark : [1] Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
[2] Notification of the National Environment Board, No.20, B.E.2543 (2000), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.117 Part 94D, dated September 15, B.E.2543 (2000).
[3] Notification of the Ministry of Natural Resources and Environment B.E.2551 (2008), published in the Royal Government Gazette, Vol.125, Part 85D, dated May 21, B.E.2551 (2008).

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(Ms.Yuwadee Na Ranong)
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Laboratory Supervisor

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บริษัท ซีเอ็นพีซีเอชเค (ไทยแลนด์) จำกัด

รายงานผลการปฏิบัติตามมาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม และมาตรการติดตามตรวจสอบผลกระทบสิ่งแวดล้อม
โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ
และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
ฉบับเดือนมกราคม - มิถุนายน พ.ศ.2568

ภาคผนวก ง.3

คุณภาพอากาศ

ระยะเจาะหลุมปิโตรเลียม

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ambient Air Quality
Sampling Point : **ฐานหลุมผลิต BY1-20 : A4 : โรงเรียนบ้านบึงหญ้า (หมู่ที่ 8 ตำบลหนองจิก อำเภอศรีมาศ จังหวัดสุโขทัย)**
GPS. Coordinate : UTM (WGS84) 47P 0584772 E, 1846843 N
Sampling Date : May 1-4, 2025
Sampling Time : 13:40
Sampling Method : U.S. EPA 40 CFR Part 50, 53
Sampling By : Mr.Apichat Pulphon
Analyzed By : Environment Research & Technology Co., Ltd.

Quotation No. : AR2025-00471
Analysis No. : 2025-AB920
Received Date : May 7, 2025
Analytical Date : May 7-19, 2025
Report No. : 2025-RAAK353
Report Date : May 19, 2025

Parameter	Unit	Method of Analysis	Result			Standard[1]	Standard[2]
			May 1-2, 25	May 2-3, 25	May 3-4, 25		
Total Suspended Particulate (TSP) 24 Hours Average	mg/m³	High-Volume, Gravimetric	0.056	0.052	0.067	0.330	-
Particulate Size Less Than 10 Micron (PM10) 24 Hours Average	mg/m³	PM10 Size Selective, High-Volume, Gravimetric	0.028	0.027	0.035	0.120	-
Particulate Size Less Than 2.5 Micron (PM2.5) 24 Hours Average	µg/m³	PM2.5 Size Selective, Low-Volume Air Sampler, Gravimetric Method	7.4	7.6	10.1	-	37.5

Remark : [1] Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 42D dated May 25, B.E.2538 (1995) and Notification No.24, B.E.2547 (2004), published in the Royal Government Gazette No.121 Special Part 104D dated September 22, B.E.2547 (2004), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).
[2] Notification of National Environmental Board, B.E.2565 (2022), published in the Royal Government Gazette No.139 Special Part 163D dated July 8, B.E.2565 (2022) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).

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(Ms.Natnicha Sermmatiwong) (Ms.Ramita Taengthai)
Laboratory Reviewer Laboratory Supervisor

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ambient Air Quality
Sampling Point : **ฐานหลุมผลิต BY1-20 : A5 : หมู่ที่ 8 บ้านนิคมพัฒนา (2) (บ้านเลขที่ 189 หมู่ที่ 8 ตำบลหนองจิก อำเภอศรีมาศ จังหวัดสุโขทัย)**
GPS. Coordinate : UTM (WGS84) 47P 0583398 E, 1846520 N
Sampling Date : May 1-4, 2025
Sampling Time : 16:05
Sampling Method : U.S. EPA 40 CFR Part 50, 53
Sampling By : Mr.Apichat Pulphon
Analyzed By : Environment Research & Technology Co., Ltd.

Quotation No. : AR2025-00471
Analysis No. : 2025-AB920
Received Date : May 7, 2025
Analytical Date : May 7-19, 2025
Report No. : 2025-RAAK354
Report Date : May 19, 2025

Parameter	Unit	Method of Analysis	Result			Standard[1]	Standard[2]
			May 1-2, 25	May 2-3, 25	May 3-4, 25		
Total Suspended Particulate (TSP) 24 Hours Average	mg/m³	High-Volume, Gravimetric	0.062	0.056	0.087	0.330	-
Particulate Size Less Than 10 Micron (PM10) 24 Hours Average	mg/m³	PM10 Size Selective, High-Volume, Gravimetric	0.032	0.029	0.047	0.120	-
Particulate Size Less Than 2.5 Micron (PM2.5) 24 Hours Average	µg/m³	PM2.5 Size Selective, Low-Volume Air Sampler, Gravimetric Method	8.8	8.6	10.6	-	37.5

Remark : [1] Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 42D dated May 25, B.E.2538 (1995) and Notification No.24, B.E.2547 (2004), published in the Royal Government Gazette No.121 Special Part 104D dated September 22, B.E.2547 (2004), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).
[2] Notification of National Environmental Board, B.E.2565 (2022), published in the Royal Government Gazette No.139 Special Part 163D dated July 8, B.E.2565 (2022) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).

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ANALYSIS REPORT

Customer Name : Vsion E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi :1000
Project Name : โครงการผลิตบีโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมบีโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : **ฐานหลุมผลิต BY1-20 : A4 : โรงเรียนบ้านบึงหญ้า (หมู่ที่ 8 ตำบลหนองจิก อำเภอดีรีมาศ จังหวัดสุโขทัย)**
GPS. Coordinate : UTM (WGS84) 47P 0584772 E, 1846843 N
Quotation No. : AR2025-00471
Measured Date : May 1-4, 2025
Analysis No. : 2025-AB920-001
Measured By : Mr.Apichat Pulphon
Report No. : 2025-RAAK882
Analyzed By : Environment Research & Technology Co., Ltd.
Report Date : May 30, 2025
Measured Instrument : NOx Chemiluminescence Analyzer Horiba Model APNA-370 Serial Number AX7HSMEO

Interval Time	Result NO_2 (ppm)			Standard[1]
	May 1-2, 25	May 2-3, 25	May 3-4, 25	
14:00-15:00	0.0055	0.0049	0.0104	
15:00-16:00	0.0081	0.0052	0.0097	
16:00-17:00	0.0092	0.0129	0.0099	
17:00-18:00	0.0092	0.0101	0.0097	
18:00-19:00	0.0110	0.0096	0.0095	
19:00-20:00	0.0116	0.0108	0.0111	
20:00-21:00	0.0113	0.0110	0.0123	
21:00-22:00	0.0132	0.0101	0.0105	
22:00-23:00	0.0113	0.0108	0.0111	
23:00-00:00	0.0111	0.0114	0.0103	
00:00-01:00	0.0137	0.0115	0.0098	
01:00-02:00	0.0130	0.0116	0.0111	
02:00-03:00	0.0128	0.0114	0.0131	
03:00-04:00	0.0142	0.0109	0.0115	
04:00-05:00	0.0111	0.0114	0.0119	
05:00-06:00	0.0104	0.0099	0.0115	
06:00-07:00	0.0125	0.0092	0.0106	
07:00-08:00	0.0112	0.0103	0.0107	
08:00-09:00	0.0105	0.0110	0.0119	
09:00-10:00	0.0110	0.0100	0.0101	
10:00-11:00	0.0094	0.0102	0.0098	
11:00-12:00	0.0090	0.0097	0.0101	
12:00-13:00	0.0102	0.0087	0.0090	
13:00-14:00	0.0104	0.0097	0.0094	
24 Hours Average	**0.0109**	**0.0101**	**0.0106**	-
1 Hour Maximum	**0.0142**	**0.0129**	**0.0131**	**0.17**

Remark : [1] Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 42D dated May 25, B.E.2538 (1995), Notification No.28, B.E.2550 (2007), published in the Royal Government Gazette No.124 Special Part 58D dated May 14, B.E.2550 (2007) and Notification No.33, B.E.2552 (2009), published in the Royal Government Gazette No.126 Special Part 114D dated August 14, B.E.2552 (2009), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).

[redacted] [redacted]

(Ms.Piyatida Pradangkho)
Laboratory Reviewer

(Ms.Panicha Promchai)
Laboratory Supervisor

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตบีโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมบีโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : **ฐานหลุมผลิต BY1-20 : A4 : โรงเรียนบ้านบึงหญ้า (หมู่ที่ 8 ตำบลหนองจิก อำเภอดีรีมาศ จังหวัดสุโขทัย)**
GPS. Coordinate : UTM (WGS84) 47P 0584772 E, 1846843 N
Quotation No. : AR2025-00471
Measured Date : May 1-4, 2025
Analysis No. : 2025-AB920-001
Measured By : Mr.Apichat Pulphon
Report No. : 2025-RAAK883
Analyzed By : Environment Research & Technology Co., Ltd.
Report Date : May 30, 2025
Measured Instrument : SO_2 UV-Fluorescence Analyzer Thermo Model 43i Serial Number CM14430005

Interval Time	Result SO_2 (ppm)			Standard
	May 1-2, 25	May 2-3, 25	May 3-4, 25	
14:00-15:00	0.0013	0.0015	0.0013	
15:00-16:00	0.0011	0.0016	0.0014	
16:00-17:00	0.0011	0.0013	0.0012	
17:00-18:00	0.0011	0.0014	0.0014	
18:00-19:00	0.0012	0.0014	0.0014	
19:00-20:00	0.0012	0.0014	0.0015	
20:00-21:00	0.0012	0.0014	0.0015	
21:00-22:00	0.0013	0.0016	0.0014	
22:00-23:00	0.0016	0.0016	0.0015	
23:00-00:00	0.0016	0.0016	0.0015	
00:00-01:00	0.0017	0.0014	0.0017	
01:00-02:00	0.0017	0.0016	0.0015	
02:00-03:00	0.0015	0.0017	0.0018	
03:00-04:00	0.0016	0.0017	0.0016	
04:00-05:00	0.0016	0.0016	0.0017	
05:00-06:00	0.0016	0.0016	0.0017	
06:00-07:00	0.0017	0.0016	0.0018	
07:00-08:00	0.0019	0.0016	0.0017	
08:00-09:00	0.0017	0.0017	0.0016	
09:00-10:00	0.0015	0.0017	0.0018	
10:00-11:00	0.0015	0.0015	0.0017	
11:00-12:00	0.0013	0.0015	0.0013	
12:00-13:00	0.0015	0.0013	0.0013	
13:00-14:00	0.0014	0.0013	0.0012	
24 Hours Average	**0.0015**	**0.0015**	**0.0015**	**0.12[1]**
1 Hour Maximum	**0.0019**	**0.0017**	**0.0018**	**0.30[2]**

Remark : [1] Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 42D dated May 25, B.E.2538 (1995) and Notification No.24, B.E.2547 (2004), published in the Royal Government Gazette No.121 Special Part 104D dated September 22, B.E.2547 (2004), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).
[2] Notification of National Environmental Board, No.12, B.E.2538 (1995), published in the Royal Government Gazette No.112 Special Part 27D dated July 13, B.E.2538 (1995) and Notification No.21, B.E.2544 (2001), published in the Royal Government Gazette No.118 Special Part 39D dated April 30, B.E.2544 (2001), under the Enhancement and Conservation of Natio[illegible].

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(Ms.Piyatida Pradangkho)
Laboratory Reviewer

(Ms.Panicha Promchai)
Laboratory Supervisor

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : **ฐานหลุมผลิต BY1-20 : A4 : โรงเรียนบ้านบึงหญ้า (หมู่ที่ 8 ตำบลหนองจิก อำเภอคีรีมาศ จังหวัดสุโขทัย)**
GPS. Coordinate : UTM (WGS84) 47P 0584772 E, 1846843 N
Quotation No. : AR2025-00471
Measured Date : May 1-4, 2025
Analysis No. : 2025-AB920-001
Measured By : Mr.Apichat Pulphon
Report No. : 2025-RAAK884
Analyzed By : Environment Research & Technology Co., Ltd.
Report Date : May 30, 2025
Measured Instrument : CO NDIR Analyzer Horiba Model APMA-370 Serial Number WNTLD9N8

Interval Time	Result CO (ppm)						Standard[1/]
	May 1-2, 25		May 2-3, 25		May 3-4, 25		
	1 hr Avg	8 hr Avg	1 hr Avg	8 hr Avg	1 hr Avg	8 hr Avg	
14:00-15:00	0.4	-	0.4	0.6	0.7	0.5	
15:00-16:00	0.5	-	0.4	0.6	0.4	0.5	
16:00-17:00	0.6	-	0.6	0.6	0.5	0.6	
17:00-18:00	0.6	-	0.5	0.6	0.5	0.6	
18:00-19:00	0.5	-	0.5	0.5	0.4	0.6	
19:00-20:00	0.4	-	0.4	0.5	0.4	0.5	
20:00-21:00	0.4	-	0.3	0.5	0.4	0.5	
21:00-22:00	0.4	0.5	0.3	0.4	0.3	0.4	
22:00-23:00	0.4	0.5	0.3	0.4	0.4	0.4	
23:00-00:00	0.4	0.5	0.3	0.4	0.3	0.4	
00:00-01:00	0.5	0.4	0.3	0.4	0.4	0.4	
01:00-02:00	0.5	0.4	0.3	0.3	0.4	0.4	
02:00-03:00	0.5	0.4	0.4	0.3	0.4	0.4	
03:00-04:00	0.5	0.4	0.4	0.3	0.4	0.4	
04:00-05:00	0.5	0.5	0.4	0.3	0.4	0.4	
05:00-06:00	0.5	0.5	0.4	0.4	0.4	0.4	
06:00-07:00	0.5	0.5	0.4	0.4	0.4	0.4	
07:00-08:00	0.5	0.5	0.4	0.4	0.4	0.4	
08:00-09:00	0.6	0.5	0.4	0.4	0.4	0.4	
09:00-10:00	0.7	0.5	0.4	0.4	0.5	0.4	
10:00-11:00	0.7	0.6	0.4	0.4	0.3	0.4	
11:00-12:00	0.7	0.6	0.6	0.4	0.6	0.4	
12:00-13:00	0.6	0.6	0.7	0.5	0.7	0.5	
13:00-14:00	0.6	0.6	0.7	0.5	0.6	0.5	
24 Hours Average	**0.5**	-	**0.4**	-	**0.4**	-	-
1 Hour Maximum	**0.7**	-	**0.7**	-	**0.7**	-	30
8 Hours Maximum	-	**0.6**	-	**0.6**	-	**0.6**	9

Remark : 1/ Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 42D dated May 25, B.E.2538 (1995), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).

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(Ms.Piyatida Pradangkho) (Ms.Panicha Promchai)
Laboratory Reviewer Laboratory Supervisor

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : **ฐานหลุมผลิต BY1-20 : A5 : หมู่ที่ 8 บ้านนิคมพัฒนา (2) (บ้านเลขที่ 189 ตำบลหนองจิก อำเภอคีรีมาศ จังหวัดสุโขทัย)**
GPS. Coordinate : UTM (WGS84) 47P 0583398 E, 1846520 N
Quotation No. : AR2025-00471
Measured Date : May 1-4, 2025
Analysis No. : 2025-AB920-004
Measured By : Mr.Apichat Pulphon
Report No. : 2025-RAAK885
Analyzed By : Environment Research & Technology Co., Ltd.
Report Date : May 30, 2025
Measured Instrument : NOx Chemiluminescence Analyzer Horiba Model APNA-370 Serial Number NGABK8F2

Interval Time	Result NO_2 (ppm)			Standard[1/]
	May 1-2, 25	May 2-3, 25	May 3-4, 25	
16:00-17:00	0.0076	0.0048	0.0063	
17:00-18:00	0.0091	0.0065	0.0079	
18:00-19:00	0.0084	0.0112	0.0072	
19:00-20:00	0.0102	0.0104	0.0140	
20:00-21:00	0.0101	0.0089	0.0109	
21:00-22:00	0.0121	0.0090	0.0096	
22:00-23:00	0.0099	0.0088	0.0084	
23:00-00:00	0.0108	0.0088	0.0091	
00:00-01:00	0.0106	0.0083	0.0092	
01:00-02:00	0.0109	0.0089	0.0094	
02:00-03:00	0.0107	0.0078	0.0104	
03:00-04:00	0.0109	0.0057	0.0098	
04:00-05:00	0.0115	0.0057	0.0096	
05:00-06:00	0.0096	0.0054	0.0094	
06:00-07:00	0.0091	0.0056	0.0095	
07:00-08:00	0.0081	0.0063	0.0090	
08:00-09:00	0.0081	0.0061	0.0082	
09:00-10:00	0.0095	0.0062	0.0076	
10:00-11:00	0.0077	0.0062	0.0077	
11:00-12:00	0.0085	0.0063	0.0074	
12:00-13:00	0.0079	0.0077	0.0078	
13:00-14:00	0.0071	0.0072	0.0081	
14:00-15:00	0.0080	0.0076	0.0081	
15:00-16:00	0.0080	0.0076	0.0079	
24 Hours Average	**0.0094**	**0.0074**	**0.0089**	-
1 Hour Maximum	**0.0121**	**0.0112**	**0.0140**	**0.17**

Remark : 1/ Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 42D dated May 25, B.E.2538 (1995), Notification No.28, B.E.2550 (2007), published in the Royal Government Gazette No.124 Special Part 58D dated May 14, B.E.2550 (2007) and Notification No.33, B.E.2552 (2009), published in the Royal Government Gazette No.126 Special Part 1:4D dated August 14, B.E.2552 (2009), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).

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(Ms.Piyatida Pradangkho) (Ms.Panicha Promchai)
Laboratory Reviewer Laboratory Supervisor

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระและพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : **ฐานหลุมผลิต BY1-20 : A5 : หมู่ที่ 8 บ้านนิคมพัฒนา (2) (บ้านเลขที่ 189 ตำบลหนองจิก อำเภอดีรีมาศ จังหวัดสุโขทัย)**
GPS. Coordinate : UTM (WGS84) 47P 0583398 E, 1846520 N
Quotation No. : AR2025-00471
Measured Date : May 1-4, 2025
Analysis No. : 2025-AB920-004
Measured By : Mr.Apichat Pulphon
Report No. : 2025-RAAK886
Analyzed By : Environment Research & Technology Co., Ltd.
Report Date : May 30, 2025
Measured Instrument : SO_2 UV-Fluorescence Analyzer Thermo Model 43i Serial Number CM14430004

Interval Time	Result SO_2 (ppm)			Standard
	May 1-2, 25	May 2-3, 25	May 3-4, 25	
16:00-17:00	0.0016	0.0015	0.0016	
17:00-18:00	0.0017	0.0014	0.0015	
18:00-19:00	0.0016	0.0013	0.0014	
19:00-20:00	0.0014	0.0020	0.0014	
20:00-21:00	0.0015	0.0015	0.0013	
21:00-22:00	0.0020	0.0015	0.0013	
22:00-23:00	0.0018	0.0017	0.0014	
23:00-00:00	0.0017	0.0016	0.0015	
00:00-01:00	0.0017	0.0014	0.0013	
01:00-02:00	0.0019	0.0015	0.0014	
02:00-03:00	0.0020	0.0016	0.0013	
03:00-04:00	0.0020	0.0014	0.0014	
04:00-05:00	0.0019	0.0012	0.0014	
05:00-06:00	0.0017	0.0012	0.0015	
06:00-07:00	0.0018	0.0013	0.0014	
07:00-08:00	0.0018	0.0014	0.0014	
08:00-09:00	0.0017	0.0013	0.0013	
09:00-10:00	0.0014	0.0012	0.0014	
10:00-11:00	0.0015	0.0013	0.0014	
11:00-12:00	0.0017	0.0013	0.0014	
12:00-13:00	0.0014	0.0015	0.0014	
13:00-14:00	0.0014	0.0016	0.0014	
14:00-15:00	0.0015	0.0018	0.0014	
15:00-16:00	0.0016	0.0017	0.0014	
24 Hours Average	**0.0017**	**0.0015**	**0.0014**	**0.12[1]**
1 Hour Maximum	**0.0020**	**0.0020**	**0.0016**	**0.30[2]**

Remark : [1] Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 42D dated May 25, B.E.2538 (1995) and Notification No.24, B.E.2547 (2004), published in the Royal Government Gazette No.121 Special Part 104D dated September 22, B.E.2547 (2004), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).
[2] Notification of National Environmental Board, No.12, B.E.2538 (1995), published in the Royal Government Gazette No.112 Special Part 27D dated July 13, B.E.2538 (1995) and Notification No.2[redacted]vernment Gazette No.118 Special Part 39D dated April 30, B.E.2544 (2001), under the Enhancement and Conservation of [redacted]1992).

[redacted]

(Ms.Piyatida Pradangkho)
Laboratory Reviewer

(Ms.Panicha Promchai)
Laboratory Supervisor

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระและพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : **ฐานหลุมผลิต BY1-20 : A5 : หมู่ที่ 8 บ้านนิคมพัฒนา (2) (บ้านเลขที่ 189 ตำบลหนองจิก อำเภอดีรีมาศ จังหวัดสุโขทัย)**
GPS. Coordinate : UTM (WGS84) 47P 0583398 E, 1846520 N
Quotation No. : AR2025-00471
Measured Date : May 1-4, 2025
Analysis No. : 2025-AB920-004
Measured By : Mr.Apichat Pulphon
Report No. : 2025-RAAK887
Analyzed By : Environment Research & Technology Co., Ltd.
Report Date : May 30, 2025
Measured Instrument : CO NDIR Analyzer Horiba Model APMA-370 Serial Number 3VJ73T5X

Interval Time	Result CO (ppm)						Standard[1]
	May 1-2, 25		May 2-3, 25		May 3-4, 25		
	1 hr Avg	8 hr Avg	1 hr Avg	8 hr Avg	1 hr Avg	8 hr Avg	
16:00-17:00	0.4	-	0.6	0.8	0.8	0.7	
17:00-18:00	0.3	-	0.5	0.8	0.6	0.7	
18:00-19:00	0.3	-	0.7	0.8	0.5	0.7	
19:00-20:00	0.4	-	0.7	0.7	0.7	0.7	
20:00-21:00	0.4	-	0.5	0.7	0.5	0.7	
21:00-22:00	0.5	-	0.5	0.6	0.5	0.7	
22:00-23:00	0.5	-	0.5	0.6	0.6	0.6	
23:00-00:00	0.5	0.4	0.5	0.6	0.4	0.6	
00:00-01:00	0.6	0.4	0.6	0.6	0.5	0.5	
01:00-02:00	0.5	0.5	0.6	0.6	0.5	0.5	
02:00-03:00	0.6	0.5	0.6	0.6	0.5	0.5	
03:00-04:00	0.6	0.5	0.5	0.5	0.5	0.5	
04:00-05:00	0.6	0.6	0.6	0.6	0.5	0.5	
05:00-06:00	0.6	0.6	0.5	0.6	0.6	0.5	
06:00-07:00	0.7	0.6	0.5	0.6	0.6	0.5	
07:00-08:00	0.8	0.6	0.6	0.6	0.7	0.6	
08:00-09:00	1.1	0.7	0.7	0.6	0.7	0.6	
09:00-10:00	0.9	0.7	0.7	0.6	0.7	0.6	
10:00-11:00	0.8	0.8	0.6	0.6	0.7	0.6	
11:00-12:00	0.9	0.8	0.8	0.6	0.8	0.7	
12:00-13:00	0.8	0.8	0.6	0.6	0.8	0.7	
13:00-14:00	0.9	0.9	0.6	0.6	0.9	0.7	
14:00-15:00	0.9	0.9	1.0	0.7	0.8	0.8	
15:00-16:00	0.8	0.9	0.8	0.7	0.8	0.8	
24 Hours Average	**0.6**	**-**	**0.6**	**-**	**0.6**	**-**	**-**
1 Hour Maximum	**1.1**	**-**	**1.0**	**-**	**0.9**	**-**	**30**
8 Hours Maximum	**-**	**0.9**	**-**	**0.8**	**-**	**0.8**	**9**

Remark : [1] Notification of N[redacted](1995), published in the Royal Government Gazette No.112 Part 42D dated May 25, B.E.2538 (1995), under the Enhancement an[redacted]uality Act B.E.2535 ([redacted]

[redacted]

(Ms.Piyatida Pradangkho)
Laboratory Reviewer

(Ms.Panicha Promchai)
Laboratory Supervisor

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : **ฐานหลุมผลิต BY1-20 : A4 : โรงเรียนบ้านบึงหญ้า (หมู่ที่ 8 ตำบลหนองจิก อำเภอคีรีมาศ จังหวัดสุโขทัย)**
GPS. Coordinate : UTM (WGS84) 47P 0584772 E, 1846843 N
Quotation No. : AR2025-00471
Measured Date : May 1-4, 2025
Analysis No. : 2025-AB920-001
Measured By : Mr.Apichat Pulphon
Report No. : 2025-RAAK888
Analyzed By : Environment Research & Technology Co., Ltd.
Report Date : May 30, 2025

Date/Time	May 1-2, 25		May 2-3, 25		May 3-4, 25	
	WS	WD	WS	WD	WS	WD
15:00-16:00	1.3	NNE	0.4	SW	0.4	NE
16:00-17:00	2.2	NE	<0.4	Calm	<0.4	Calm
17:00-18:00	1.8	NE	<0.4	Calm	<0.4	Calm
18:00-19:00	1.8	NE	<0.4	Calm	<0.4	Calm
19:00-20:00	<0.4	Calm	0.4	W	<0.4	Calm
20:00-21:00	<0.4	Calm	0.4	NW	<0.4	Calm
21:00-22:00	<0.4	Calm	0.4	N	0.4	SSE
22:00-23:00	<0.4	Calm	<0.4	Calm	0.4	SE
23:00-00:00	<0.4	Calm	<0.4	Calm	0.4	SSE
00:00-01:00	<0.4	Calm	<0.4	Calm	0.4	SE
01:00-02:00	<0.4	Calm	0.4	W	<0.4	Calm
02:00-03:00	<0.4	Calm	0.9	NNE	<0.4	Calm
03:00-04:00	<0.4	Calm	1.3	NE	<0.4	Calm
04:00-05:00	<0.4	Calm	1.8	N	<0.4	Calm
05:00-06:00	<0.4	Calm	1.3	N	<0.4	Calm
06:00-07:00	<0.4	Calm	0.9	NE	<0.4	Calm
07:00-08:00	<0.4	Calm	0.4	NE	<0.4	Calm
08:00-09:00	0.4	N	1.3	N	0.4	ENE
09:00-10:00	0.9	N	0.9	N	0.9	E
10:00-11:00	0.9	N	0.4	N	0.9	ESE
11:00-12:00	0.9	NNE	0.4	NNE	0.4	SE
12:00-13:00	0.4	NNE	0.4	NE	0.4	E
13:00-14:00	<0.4	Calm	0.4	NNE	0.4	SE
14:00-15:00	<0.4	Calm	0.9	NE	0.4	S

Remark : WS = Wind Speed (m/s)
WD = Wind Direction
Height of wind vane and anemometer above ground 10 meters.

[redacted] [redacted]

(Ms.Piyatida Pradangkho)
Laboratory Reviewer

(Ms.Panicha Promchai)
Laboratory Supervisor

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : **ฐานหลุมผลิต BY1-20 : A4 : โรงเรียนบ้านบึงหญ้า (หมู่ที่ 8 ตำบลหนองจิก อำเภอคีรีมาศ จังหวัดสุโขทัย)**
GPS. Coordinate : UTM (WGS84) 47P 0584772 E, 1846843 N
Quotation No. : AR2025-00471
Measured Date : May 1-4, 2025
Analysis No. : 2025-AB920-001
Measured By : Mr.Apichat Pulphon
Report No. : 2025-RAAK888
Analyzed By : Environment Research & Technology Co., Ltd.
Report Date : May 30, 2025

Wind Direction	Percentage frequency of wind in each speed and direction					
	0.4-1.1	1.1-2.1	2.1-3.1	3.1-4.1	≥4.1	Total
N	8.33333	4.16667	0.00000	0.00000	0.00000	**12.50000**
NNE	6.94444	1.38889	0.00000	0.00000	0.00000	**8.33333**
NE	6.94444	4.16667	1.38889	0.00000	0.00000	**12.50000**
ENE	1.38889	0.00000	0.00000	0.00000	0.00000	**1.38889**
E	2.77778	0.00000	0.00000	0.00000	0.00000	**2.77778**
ESE	1.38889	0.00000	0.00000	0.00000	0.00000	**1.38889**
SE	5.55556	0.00000	0.00000	0.00000	0.00000	**5.55556**
SSE	2.77778	0.00000	0.00000	0.00000	0.00000	**2.77778**
S	1.38889	0.00000	0.00000	0.00000	0.00000	**1.38889**
SSW	0.00000	0.00000	0.00000	0.00000	0.00000	**0.00000**
SW	1.38889	0.00000	0.00000	0.00000	0.00000	**1.38889**
WSW	0.00000	0.00000	0.00000	0.00000	0.00000	**0.00000**
W	2.77778	0.00000	0.00000	0.00000	0.00000	**2.77778**
WNW	0.00000	0.00000	0.00000	0.00000	0.00000	**0.00000**
NW	1.38889	0.00000	0.00000	0.00000	0.00000	**1.38889**
NNW	0.00000	0.00000	0.00000	0.00000	0.00000	**0.00000**
Calm	**45.83330**					

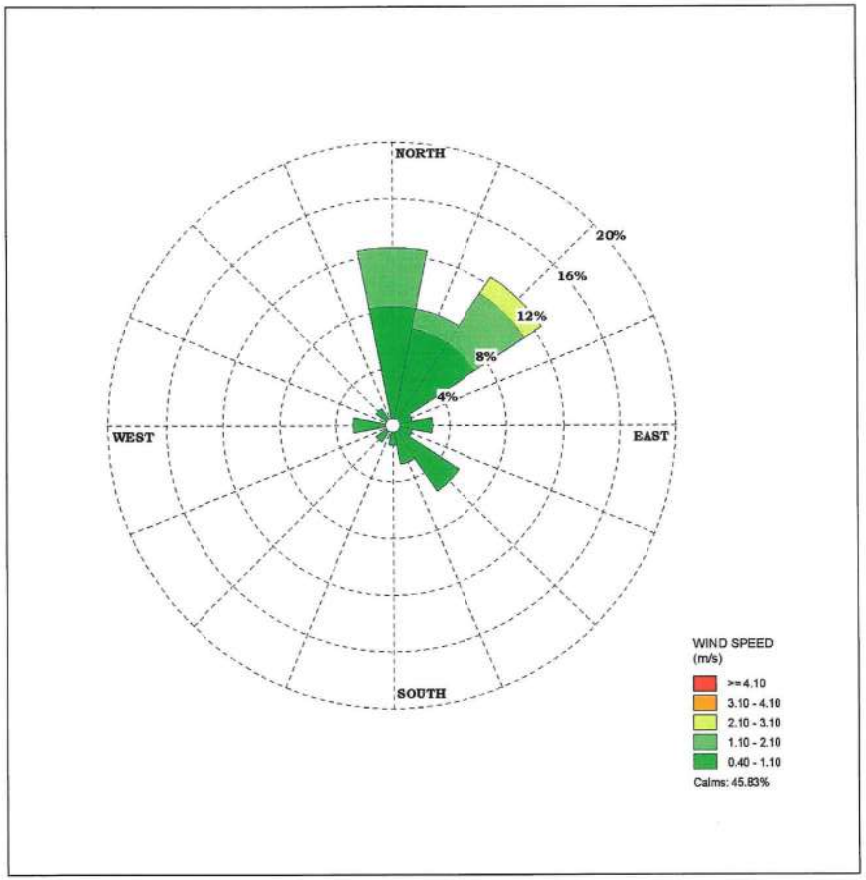
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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Measured Point : **ฐานหลุมผลิต BY1-20 : A4 : โรงเรียนบ้านบึงหญ้า (หมู่ที่ 8 ตำบลหนองจิก อำเภอคีรีมาศ จังหวัดสุโขทัย)**
Measured Date : May 1-4, 2025
Report No. : 2025-RAAK888



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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : **ฐานหลุมผลิต BY1-20 : A5 : หมู่ที่ 8 บ้านนิคมพัฒนา (2) (บ้านเลขที่ 189 ตำบลหนองจิก อำเภอคีรีมาศ จังหวัดสุโขทัย)**
GPS. Coordinate : UTM (WGS84) 47P 0583398 E, 1846520 N
Measured Date : May 1-4, 2025
Measured By : Mr.Apichat Pulphon
Analyzed By : Environment Research & Technology Co., Ltd.
Quotation No. : AR2025-00471
Analysis No. : 2025-AB920-004
Report No. : 2025-RAAK889
Report Date : May 30, 2025

Date/Time	May 1-2, 25		May 2-3, 25		May 3-4, 25	
	WS	WD	WS	WD	WS	WD
17:00-18:00	0.4	N	0.9	SE	<0.4	Calm
18:00-19:00	0.9	NE	0.4	ESE	0.4	S
19:00-20:00	0.4	ENE	0.4	N	<0.4	Calm
20:00-21:00	<0.4	Calm	0.9	NE	<0.4	Calm
21:00-22:00	<0.4	Calm	0.4	E	0.4	S
22:00-23:00	<0.4	Calm	<0.4	Calm	0.4	S
23:00-00:00	<0.4	Calm	<0.4	Calm	0.4	S
00:00-01:00	<0.4	Calm	0.4	NE	0.4	SSE
01:00-02:00	<0.4	Calm	<0.4	Calm	0.4	SSE
02:00-03:00	<0.4	Calm	0.9	NE	<0.4	Calm
03:00-04:00	<0.4	Calm	0.9	NE	<0.4	Calm
04:00-05:00	<0.4	Calm	1.3	NE	0.4	SE
05:00-06:00	<0.4	Calm	0.4	NE	0.4	SSE
06:00-07:00	<0.4	Calm	0.4	NE	<0.4	Calm
07:00-08:00	0.4	ENE	0.4	ENE	<0.4	Calm
08:00-09:00	0.4	ENE	0.9	NE	<0.4	Calm
09:00-10:00	0.9	NE	0.4	ENE	0.4	E
10:00-11:00	0.9	NE	<0.4	Calm	0.9	ESE
11:00-12:00	0.9	NE	0.4	ENE	0.4	SE
12:00-13:00	0.9	E	0.9	E	0.4	SE
13:00-14:00	1.3	SE	0.9	NE	0.4	NE
14:00-15:00	0.9	SE	0.4	E	0.4	NE
15:00-16:00	0.9	SSE	<0.4	Calm	0.9	ENE
16:00-17:00	0.9	SE	<0.4	Calm	0.4	ESE

Remark : WS = Wind Speed (m/s)
WD = Wind Direction
Height of wind vane and anemometer above ground 10 meters.

[redacted]
(Ms.Piyatida Pradangkho)
Laboratory Reviewer

[redacted]
(Ms.Panicha Promchai)
Laboratory Supervisor

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตบีโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมบีโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : **ฐานหลุมผลิต BY1-20 : A5 : หมู่ที่ 8 บ้านนิคมพัฒนา (2) (บ้านเลขที่ 189 ตำบลหนองจิก อำเภอศรีมาศ จังหวัดสุโขทัย)**
GPS. Coordinate : UTN (WGS84) 47P 0583398 E, 1846520 N
Quotation No. : AR2025-00471
Measured Date : May 1-4, 2025
Analysis No. : 2025-AB920-004
Measured By : Mr.Apichat Pulphon
Report No. : 2025-RAAK889
Analyzed By : Envronment Research & Technology Co., Ltd.
Report Date : May 30, 2025

Wind Direction	Percentage frequency of wind in each speed and direction					
	0.4-1.1	1.1-2.1	2.1-3.1	3.1-4.1	≥4.1	Total
N	2.77778	0.00000	0.00000	0.00000	0.00000	**2.77778**
NNE	0.00000	0.00000	0.00000	0.00000	0.00000	**0.00000**
NE	19.44440	1.38889	0.00000	0.00000	0.00000	**20.83329**
ENE	9.72222	0.00000	0.00000	0.00000	0.00000	**9.72222**
E	6.94444	0.00000	0.00000	0.00000	0.00000	**6.94444**
ESE	4.16667	0.00000	0.00000	0.00000	0.00000	**4.16667**
SE	8.33333	1.38889	0.00000	0.00000	0.00000	**9.72222**
SSE	5.55556	0.00000	0.00000	0.00000	0.00000	**5.55556**
S	5.55556	0.00000	0.00000	0.00000	0.00000	**5.55556**
SSW	0.00000	0.00000	0.00000	0.00000	0.00000	**0.00000**
SW	0.00000	0.00000	0.00000	0.00000	0.00000	**0.00000**
WSW	0.00000	0.00000	0.00000	0.00000	0.00000	**0.00000**
W	0.00000	0.00000	0.00000	0.00000	0.00000	**0.00000**
WNW	0.00000	0.00000	0.00000	0.00000	0.00000	**0.00000**
NW	0.00000	0.00000	0.00000	0.00000	0.00000	**0.00000**
NNW	0.00000	0.00000	0.00000	0.00000	0.00000	**0.00000**
Calm	**34.72220**					

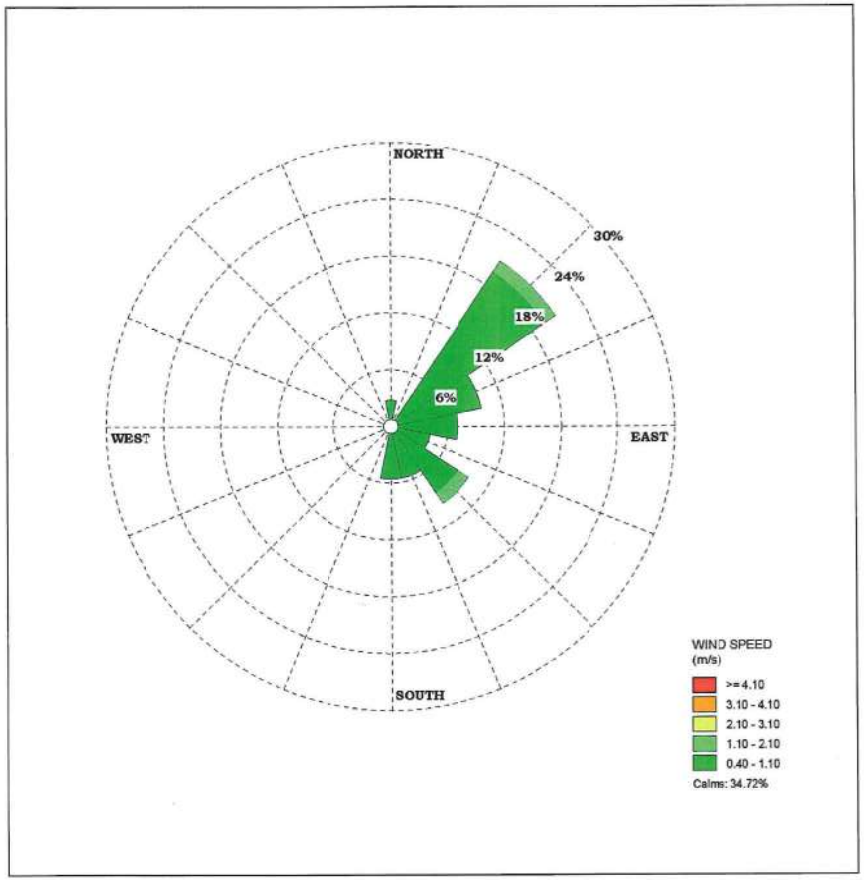
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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Project Name : โครงการผลิตบีโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมบีโตรเลียม)
Measured Point : **ฐานหลุมผลิต BY1-20 : A5 : หมู่ที่ 8 บ้านนิคมพัฒนา (2) (บ้านเลขที่ 189 ตำบลหนองจิก อำเภอศรีมาศ จังหวัดสุโขทัย)**
Measured Date : May 1-4, 2025
Report No. : 2025-RAAK889



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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปีโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปีโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ambient Air Quality
Sampling Point : **ฐานหลุมผลิต BM6 : A6 : หมู่ที่ 11 บ้านบึงม่วง (1) (บ้านเลขที่ 17/2 บ้านบึงม่วง หมู่ที่ 11 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0583275 E, 1845086 N
Sampling Date : March 27-30, 2025
Sampling Time : 10:45
Sampling Method : U.S. EPA 40 CFR Part 50, 53
Sampling By : Mr.Kunakorn Ratanawongsa
Analyzed By : Environment Research & Technology Co., Ltd.

Quotation No. : AR2025-00471
Analysis No. : 2025-AB344
Received Date : April 7, 2025
Analytical Date : April 7-23, 2025
Report No. : 2025-RAAH550
Report Date : April 23, 2025

Parameter	Unit	Method of Analysis	Result			Standard[1]	Standard[2]
			Mar 27-28, 25	Mar 28-29, 25	Mar 29-30, 25		
Total Suspended Particulate (TSP) 24 Hours Average	mg/m³	High-Volume, Gravimetric	0.114	0.109	0.131	0.330	-
Particulate Size Less Than 10 Micron (PM10) 24 Hours Average	mg/m³	PM10 Size Selective, High-Volume, Gravimetric	0.063	0.059	0.073	0.120	-
Particulate Size Less Than 2.5 Micron (PM2.5) 24 Hours Average	µg/m³	PM2.5 Size Selective, Low-Volume Air Sampler, Gravimetric Method	14.8	14.7	17.2	-	37.5

Remark : [1] Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 42D dated May 25, B.E.2538 (1995) and Notification No.24, B.E.2547 (2004), published in the Royal Government Gazette No.121 Special Part 104D dated September 22, B.E.2547 (2004), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).
[2] Notification of National Environmental Board, B.E.2565 (2022), published in the Royal Government Gazette No.139 Special Part 163D dated July 8, B.E.2565 (2022) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).

[redacted] [redacted]

(Ms.Natnicha Sermmatiwong)
Laboratory Reviewer

(Ms.Ramita Taengthai)
Laboratory Supervisor

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปีโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปีโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ambient Air Quality
Sampling Point : **ฐานหลุมผลิต BM6 : A7 : หมู่ที่ 11 บ้านบึงม่วง (2) (บ้านเลขที่ 5/1 บ้านบึงม่วง หมู่ที่ 11 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0582386 E, 1843578 N
Sampling Date : March 27-30, 2025
Sampling Time : 11:40
Sampling Method : U.S. EPA 40 CFR Part 50, 53
Sampling By : Mr.Kunakorn Ratanawongsa
Analyzed By : Environment Research & Technology Co., Ltd.

Quotation No. : AR2025-00471
Analysis No. : 2025-AB344
Received Date : April 7, 2025
Analytical Date : April 7-23, 2025
Report No. : 2025-RAAH551
Report Date : April 23, 2025

Parameter	Unit	Method of Analysis	Result			Standard[1]	Standard[2]
			Mar 27-28, 25	Mar 28-29, 25	Mar 29-30, 25		
Total Suspended Particulate (TSP) 24 Hours Average	mg/m³	High-Volume, Gravimetric	0.122	0.126	0.134	0.330	-
Particulate Size Less Than 10 Micron (PM10) 24 Hours Average	mg/m³	PM10 Size Selective, High-Volume, Gravimetric	0.068	0.071	0.075	0.120	-
Particulate Size Less Than 2.5 Micron (PM2.5) 24 Hours Average	µg/m³	PM2.5 Size Selective, Low-Volume Air Sampler, Gravimetric Method	18.6	17.2	17.9	-	37.5

Remark : [1] Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 42D dated May 25, B.E.2538 (1995) and Notification No.24, B.E.2547 (2004), published in the Royal Government Gazette No.121 Special Part 104D dated September 22, B.E.2547 (2004), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992)
[2] Notification of National Environmental Board, B.E.2565 (2022), published in the Royal Government Gazette No.139 Special Part 163D dated July 8, B.E.2565 (2022) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).

[redacted] [redacted]

(Ms.Natnicha Sermmatiwong)
Laboratory Reviewer

(Ms.Ramita Taengthai)
Laboratory Supervisor

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www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Nueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : **ฐานหลุมผลิต BM6 : A6 : หมู่ที่ 11 บ้านบึงม่วง (1) (บ้านเลขที่ 17/2 บ้านบึงม่วง หมู่ที่ 11 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0583275 E, 1845086 N
Measured Date : March 27-30, 2025
Measured By : Mr.Kunakorn Ratanawongsa
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : NOx Chemiluminescence Analyzer Horiba Model APNA-370 Serial Number XPWS7U3L

Quotation No. : AR2025-00471
Analysis No. : 2025-AB344-001
Report No. : 2025-RAAI053
Report Date : April 30, 2025

Interval Time	Result NO_2 (ppm)			Standard[1]
	Mar 27-28, 25	Mar 28-29, 25	Mar 29-30, 25	
11:00-12:00	0.0081	0.0088	0.0105	
12:00-13:00	0.0088	0.0087	0.0095	
13:00-14:00	0.0094	0.0082	0.0091	
14:00-15:00	0.0083	0.0078	0.0086	
15:00-16:00	0.0084	0.0085	0.0089	
16:00-17:00	0.0085	0.0085	0.0083	
17:00-18:00	0.0081	0.0080	0.0086	
18:00-19:00	0.0082	0.0079	0.0079	
19:00-20:00	0.0090	0.0081	0.0091	
20:00-21:00	0.0106	0.0100	0.0096	
21:00-22:00	0.0087	0.0101	0.0104	
22:00-23:00	0.0082	0.0116	0.0112	
23:00-00:00	0.0078	0.0102	0.0129	
00:00-01:00	0.0079	0.0094	0.0095	
01:00-02:00	0.0079	0.0093	0.0101	
02:00-03:00	0.0077	0.0088	0.0100	
03:00-04:00	0.0077	0.0086	0.0098	
04:00-05:00	0.0077	0.0086	0.0102	
05:00-06:00	0.0075	0.0089	0.0102	
06:00-07:00	0.0076	0.0091	0.0093	
07:00-08:00	0.0094	0.0102	0.0099	
08:00-09:00	0.0092	0.0115	0.0107	
09:00-10:00	0.0100	0.0125	0.0093	
10:00-11:00	0.0094	0.0120	0.0087	
24 Hours Average	**0.0085**	**0.0094**	**0.0097**	-
1 Hour Maximum	**0.0106**	**0.0125**	**0.0129**	**0.17**

Remark : [1] Notification of National Environmental Board, No.10, B.E.2536 (1995), published in the Royal Government Gazette No.112 Part 42D dated May 25, B.E.2538 (1995), Notification No.28, B.E.2550 (2007), published in the Royal Government Gazette No.124 Special Part 58D dated May 14, B.E.2550 (2007) and Notification No.33, B.E.2552 (2009), published in the Royal Government Gazette No.126 Special Part 114D dated August 14, B.E.2552 (2009), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).

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(Ms.Piyatida Pradangkho) Laboratory Reviewer

(Ms.Panicha Promchai) Laboratory Supervisor

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : **ฐานหลุมผลิต BM6 : A6 : หมู่ที่ 11 บ้านบึงม่วง (1) (บ้านเลขที่ 17/2 บ้านบึงม่วง หมู่ที่ 11 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0583275 E, 1845086 N
Measured Date : March 27-30, 2025
Measured By : Mr.Kunakorn Ratanawongsa
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : SO_2 UV-Fluorescence Analyzer Thermo Model 43i Serial Number CM14430003

Quotation No. : AR2025-00471
Analysis No. : 2025-AB344-001
Report No. : 2025-RAAI054
Report Date : April 30, 2025

Interval Time	Result SO_2 (ppm)			Standard
	Mar 27-28, 25	Mar 28-29, 25	Mar 29-30, 25	
11:00-12:00	0.0017	0.0016	0.0014	
12:00-13:00	0.0016	0.0015	0.0014	
13:00-14:00	0.0015	0.0015	0.0016	
14:00-15:00	0.0014	0.0013	0.0017	
15:00-16:00	0.0015	0.0013	0.0016	
16:00-17:00	0.0014	0.0014	0.0014	
17:00-18:00	0.0014	0.0013	0.0013	
18:00-19:00	0.0015	0.0014	0.0013	
19:00-20:00	0.0016	0.0013	0.0021	
20:00-21:00	0.0020	0.0016	0.0016	
21:00-22:00	0.0017	0.0016	0.0017	
22:00-23:00	0.0013	0.0015	0.0013	
23:00-00:00	0.0013	0.0016	0.0014	
00:00-01:00	0.0014	0.0015	0.0016	
01:00-02:00	0.0014	0.0014	0.0014	
02:00-03:00	0.0013	0.0014	0.0012	
03:00-04:00	0.0012	0.0015	0.0014	
04:00-05:00	0.0013	0.0015	0.0013	
05:00-06:00	0.0013	0.0013	0.0013	
06:00-07:00	0.0014	0.0014	0.0014	
07:00-08:00	0.0015	0.0015	0.0013	
08:00-09:00	0.0015	0.0017	0.0014	
09:00-10:00	0.0013	0.0015	0.0016	
10:00-11:00	0.0012	0.0012	0.0013	
24 Hours Average	**0.0014**	**0.0015**	**0.0015**	**0.12[1]**
1 Hour Maximum	**0.0020**	**0.0017**	**0.0021**	**0.30[2]**

Remark : [1] Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 42D dated May 25, B.E.2538 (1995) and Notification No.24, B.E.2547 (2004), published in the Royal Government Gazette No.121 Special Part 104D dated September 22, B.E.2547 (2004), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).
[2] Notification of National Environmental Board, No.12, B.E.2538 (1995), published in the Royal Government Gazette No.112 Special Part 27D dated July 13, B.E.2538 (1995) and Notification No.21, B.E.2544 (2001), published in the Royal Government Gazette No.118 Special Part 33D dated April 30, B.E.2544 (2001), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).

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(Ms.Piyatida Pradangkho) Laboratory Reviewer

(Ms.Panicha Promchai) Laboratory Supervisor

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name :Vision E. Consultants Co., Ltd.
Address :101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name :โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Project Location :จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source :Ambient Air Quality
Measured Point :**ฐานหลุมผลิต BM6 : A6 : หมู่ที่ 11 บ้านบึงม่วง (1) (บ้านเลขที่ 17/2 บ้านบึงม่วง หมู่ที่ 11 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate :UTM (WGS84) 47Q 0583275 E, 1845086 N
Measured Date :March 27-30, 2025
Measured By :Mr.Kunakorn Ratanawongsa
Analyzed By :Environment Research & Technology Co., Ltd.
Measured Instrument :CO NDIR Analyzer Horiba Model APMA-370 Serial Number XRP3Y7LA

Quotation No. : AR2025-00471
Analysis No. : 2025-AB344-001
Report No. : 2025-RAAI055
Report Date : April 30, 2025

Interval Time	Result CO (ppm)						Standard[1/]
	Mar 27-28, 25		Mar 28-29, 25		Mar 29-30, 25		
	1 hr Avg	8 hr Avg	1 hr Avg	8 hr Avg	1 hr Avg	8 hr Avg	
11:00-12:00	0.5	-	0.4	0.4	0.5	0.4	
12:00-13:00	0.3	-	0.5	0.4	0.5	0.4	
13:00-14:00	0.3	-	0.5	0.5	0.5	0.5	
14:00-15:00	0.3	-	0.5	0.5	0.5	0.5	
15:00-16:00	0.3	-	0.5	0.5	0.4	0.5	
16:00-17:00	0.3	-	0.5	0.5	0.3	0.4	
17:00-18:00	0.3	-	0.5	0.5	0.3	0.4	
18:00-19:00	0.4	0.3	0.5	0.5	0.4	0.4	
19:00-20:00	0.4	0.3	0.4	0.5	0.4	0.4	
20:00-21:00	0.5	0.4	0.3	0.5	0.4	0.4	
21:00-22:00	0.5	0.4	0.4	0.4	0.5	0.4	
22:00-23:00	0.5	0.4	0.3	0.4	0.4	0.4	
23:00-00:00	0.5	0.4	0.4	0.4	0.4	0.4	
00:00-01:00	0.5	0.4	0.4	0.4	0.4	0.4	
01:00-02:00	0.5	0.5	0.4	0.4	0.4	0.4	
02:00-03:00	0.5	0.5	0.5	0.4	0.3	0.4	
03:00-04:00	0.5	0.5	0.4	0.4	0.4	0.4	
04:00-05:00	0.4	0.5	0.4	0.4	0.4	0.4	
05:00-06:00	0.4	0.5	0.3	0.4	0.4	0.4	
06:00-07:00	0.4	0.5	0.4	0.4	0.4	0.4	
07:00-08:00	0.5	0.5	0.5	0.4	0.5	0.4	
08:00-09:00	0.5	0.5	0.5	0.4	0.5	0.4	
09:00-10:00	0.5	0.5	0.4	0.4	0.5	0.4	
10:00-11:00	0.4	0.4	0.4	0.4	0.6	0.5	
24 Hours Average	**0.4**	**-**	**0.4**	**-**	**0.4**	**-**	**-**
1 Hour Maximum	**0.5**	**-**	**0.5**	**-**	**0.6**	**-**	**30**
8 Hours Maximum	**-**	**0.5**	**-**	**0.5**	**-**	**0.5**	**9**

Remark : 1/ Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 42D dated May 25, B.E.2538 (1995), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (19

[redacted] [redacted]

(Ms.Piyatida Pradangkho) (Ms.Panicha Promchai)
Laboratory Reviewer Laboratory Supervisor

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www.envisearch.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name :Vision E. Consultants Co., Ltd.
Address :101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name :โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Project Location :จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source :Ambient Air Quality
Measured Point :**ฐานหลุมผลิต BM6 : A7 : หมู่ที่ 11 บ้านบึงม่วง (2) (บ้านเลขที่ 5/1 บ้านบึงม่วง หมู่ที่ 11 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate :UTM (WGS84) 47Q 0582386 E, 1843578 N
Measured Date :March 27-30, 2025
Measured By :Mr.Kunakorn Ratanawongsa
Analyzed By :Environment Research & Technology Co., Ltd.
Measured Instrument :NOx Chemiluminescence Analyzer API Model 200A Serial Number 1464

Quotation No. : AR2025-00471
Analysis No. : 2025-AB344-004
Report No. : 2025-RAAI056
Report Date : April 30, 2025

Interval Time	Result NO_2 (ppm)			Standard[1/]
	Mar 27-28, 25	Mar 28-29, 25	Mar 29-30, 25	
12:00-13:00	0.0065	0.0066	0.0064	
13:00-14:00	0.0084	0.0084	0.0067	
14:00-15:00	0.0063	0.0073	0.0073	
15:00-16:00	0.0078	0.0072	0.0069	
16:00-17:00	0.0069	0.0074	0.0072	
17:00-18:00	0.0069	0.0071	0.0069	
18:00-19:00	0.0070	0.0072	0.0075	
19:00-20:00	0.0079	0.0073	0.0091	
20:00-21:00	0.0072	0.0072	0.0102	
21:00-22:00	0.0079	0.0060	0.0074	
22:00-23:00	0.0079	0.0072	0.0074	
23:00-00:00	0.0086	0.0069	0.0073	
00:00-01:00	0.0077	0.0073	0.0095	
01:00-02:00	0.0081	0.0073	0.0073	
02:00-03:00	0.0079	0.0076	0.0090	
03:00-04:00	0.0083	0.0076	0.0091	
04:00-05:00	0.0086	0.0073	0.0092	
05:00-06:00	0.0139	0.0093	0.0094	
06:00-07:00	0.0108	0.0090	0.0096	
07:00-08:00	0.0114	0.0081	0.0110	
08:00-09:00	0.0081	0.0081	0.0092	
09:00-10:00	0.0072	0.0139	0.0091	
10:00-11:00	0.0067	0.0114	0.0076	
11:00-12:00	0.0064	0.0072	0.0073	
24 Hours Average	**0.0081**	**0.0079**	**0.0082**	**-**
1 Hour Maximum	**0.0139**	**0.0139**	**0.0110**	**0.17**

Remark : 1/ Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 42D dated May 25, B.E.2538 (1995), Notification No.28, B.E.2550 (2007), published in the Royal Government Gazette No.124 Special Part 58D dated May 14, B.E.2550 (2007) and Notification No.33, B.E.2552 (2009), published in the Royal Government Gazette No.126 Special Part 114D dated August 14, B.E.2552 (2009), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).

[redacted] [redacted]

(Ms.Piyatida Pradangkho) (Ms.Panicha Promchai)
Laboratory Reviewer Laboratory Supervisor

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E-mail : envi@enviresearch.co.th
www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name :Vision E. Consultants Co., Ltd.
Address :101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name :โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Project Location :จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source :Ambient Air Quality
Measured Point :**ฐานหลุมผลิต BM6 : A7 : หมู่ที่ 11 บ้านบึงม่วง (2) (บ้านเลขที่ 5/1 บ้านบึงม่วง หมู่ที่ 11 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate :UTM (WGS84) 47Q 0582386 E, 1843578 N
Measured Date :March 27-30, 2025
Measured By : Mr.Kunakorn Ratanawongsa
Analyzed By :Environment Research & Technology Co., Ltd.
Measured Instrument :SO_2 UV-Fluorescence Analyzer Thermo Model 43C Serial Number 0607415768

Quotation No. : AR2025-00471
Analysis No. : 2025-AB344-004
Report No. : 2025-RAAI057
Report Date : April 30, 2025

Interval Time	Result SO_2 (ppm)			Standard
	Mar 27-28, 25	Mar 28-29, 25	Mar 29-30, 25	
12:00-13:00	0.0013	0.0013	0.0014	
13:00-14:00	0.0015	0.0018	0.0017	
14:00-15:00	0.0013	0.0016	0.0017	
15:00-16:00	0.0016	0.0017	0.0018	
16:00-17:00	0.0019	0.0017	0.0019	
17:00-18:00	0.0015	0.0021	0.0019	
18:00-19:00	0.0013	0.0019	0.0021	
19:00-20:00	0.0013	0.0016	0.0023	
20:00-21:00	0.0015	0.0017	0.0020	
21:00-22:00	0.0016	0.0015	0.0021	
22:00-23:00	0.0015	0.0017	0.0016	
23:00-00:00	0.0015	0.0014	0.0015	
00:00-01:00	0.0013	0.0013	0.0015	
01:00-02:00	0.0013	0.0011	0.0014	
02:00-03:00	0.0014	0.0012	0.0017	
03:00-04:00	0.0015	0.0010	0.0017	
04:00-05:00	0.0021	0.0012	0.0016	
05:00-06:00	0.0017	0.0012	0.0019	
06:00-07:00	0.0014	0.0011	0.0017	
07:00-08:00	0.0014	0.0012	0.0015	
08:00-09:00	0.0014	0.0011	0.0016	
09:00-10:00	0.0015	0.0012	0.0013	
10:00-11:00	0.0015	0.0013	0.0012	
11:00-12:00	0.0013	0.0015	0.0013	
24 Hours Average	**0.0015**	**0.0014**	**0.0017**	**0.12[1/]**
1 Hour Maximum	**0.0021**	**0.0021**	**0.0023**	**0.30[2/]**

Remark : [1/] Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 42D dated May 25, B.E.2538 (1995) and Notification No.24, B.E.2547 (2004), published in the Royal Government Gazette No.121 Special Part 104D dated September 22, B.E.2547 (2004), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).
[2/] Notification of National Environmental Board, No.12, B.E.2538 (1995), published in the Royal Government Gazette No.112 Special Part 27D dated July 13, B.E.2538 (1995) and Notification No.21, B.E.2544 (2001), published in the Royal Government Gazette No.118 Special Part 39D dated April 30, B.E.2544 (2001), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).

[redacted] (Ms.Piyatida Pradangkho)
Laboratory Reviewer

[redacted] (Ms.Panicha Promchai)
Laboratory Supervisor

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E-mail : envi@enviresearch.co.th
www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : **ฐานหลุมผลิต BM6 : A7 : หมู่ที่ 11 บ้านบึงม่วง (2) (บ้านเลขที่ 5/1 บ้านบึงม่วง หมู่ที่ 11 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0582386 E, 1843578 N
Measured Date : March 27-30, 2025
Measured By : Mr.Kunakorn Ratanawongsa
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : CO NDIR Analyzer Horiba Model APMA-370 Serial Number GFB0BLNC

Quotation No. : AR2025-00471
Analysis No. : 2025-AB344-004
Report No. : 2025-RAAI058
Report Date : April 30, 2025

Interval Time	Result CO (ppm)						Standard[1/]
	Mar 27-28, 25		Mar 28-29, 25		Mar 29-30, 25		
	1 hr Avg	8 hr Avg	1 hr Avg	8 hr Avg	1 hr Avg	8 hr Avg	
12:00-13:00	0.4	-	0.4	0.4	0.6	0.6	
13:00-14:00	0.4	-	0.4	0.4	0.5	0.6	
14:00-15:00	0.4	-	0.4	0.4	0.5	0.6	
15:00-16:00	0.4	-	0.4	0.4	0.5	0.6	
16:00-17:00	0.4	-	0.4	0.4	0.5	0.5	
17:00-18:00	0.4	-	0.4	0.4	0.5	0.5	
18:00-19:00	0.4	-	0.4	0.4	0.5	0.5	
19:00-20:00	0.5	0.4	0.4	0.4	0.5	0.5	
20:00-21:00	0.4	0.4	0.4	0.4	0.5	0.5	
21:00-22:00	0.4	0.4	0.4	0.4	0.5	0.5	
22:00-23:00	0.4	0.4	0.4	0.4	0.5	0.5	
23:00-00:00	0.4	0.4	0.4	0.4	0.5	0.5	
00:00-01:00	0.4	0.4	0.4	0.4	0.5	0.5	
01:00-02:00	0.4	0.4	0.5	0.4	0.5	0.5	
02:00-03:00	0.5	0.4	0.5	0.4	0.5	0.5	
03:00-04:00	0.5	0.4	0.5	0.4	0.5	0.5	
04:00-05:00	0.8	0.5	0.5	0.4	0.5	0.5	
05:00-06:00	0.6	0.5	0.6	0.5	0.5	0.5	
06:00-07:00	0.4	0.5	0.8	0.5	0.5	0.5	
07:00-08:00	0.4	0.5	0.7	0.6	0.6	0.5	
08:00-09:00	0.4	0.5	0.7	0.6	0.6	0.5	
09:00-10:00	0.4	0.5	0.5	0.6	0.4	0.5	
10:00-11:00	0.4	0.5	0.6	0.6	0.4	0.5	
11:00-12:00	0.4	0.5	0.6	0.6	0.4	0.5	
24 Hours Average	**0.4**	**-**	**0.5**	**-**	**0.5**	**-**	**-**
1 Hour Maximum	**0.8**	**-**	**0.8**	**-**	**0.6**	**-**	**30**
8 Hours Maximum	**-**	**0.5**	**-**	**0.6**	**-**	**0.6**	**9**

Remark : [1/] Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 42D dated May 25, B.E.2538 (1995), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).

[redacted] (Ms.Piyatida Pradangkho)
Laboratory Reviewer

[redacted] (Ms.Panicha Promchai)
Laboratory Supervisor

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E-mail : envi@enviresearch.co.th
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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : **ฐานหลุมผลิต BM6 : A6 : หมู่ที่ 11 บ้านบึงม่วง (1) (บ้านเลขที่ 17/2 บ้านบึงม่วง หมู่ที่ 11 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0583275 E, 1845086 N
Measured Date : March 27-30, 2025
Measured By : Mr.Kunakorn Ratanawongsa
Analyzed By : Environment Research & Technology Co., Ltd.

Quotation No. : AR2025-00471
Analysis No. : 2025-AB344-001
Report No. : 2025-RAAI039
Report Date : April 30, 2025

Date/Time	Mar 27-28, 25		Mar 28-29, 25		Mar 29-30, 25	
	WS	WD	WS	WD	WS	WD
11:00-12:00	1.3	WNW	2.7	NNW	1.3	SE
12:00-13:00	1.3	WNW	1.8	WNW	1.8	E
13:00-14:00	1.3	SW	1.8	SSE	1.8	E
14:00-15:00	1.8	SW	1.8	SSW	1.3	S
15:00-16:00	2.7	SSW	1.3	SW	0.9	SSE
16:00-17:00	2.7	SSW	2.2	S	1.3	SSE
17:00-18:00	2.2	SSW	2.7	SSW	1.3	S
18:00-19:00	1.8	S	1.8	S	1.3	S
19:00-20:00	0.4	SSE	1.3	S	1.3	SSE
20:00-21:00	1.8	NW	0.9	SSE	0.9	S
21:00-22:00	2.7	NNW	<0.4	Calm	<0.4	Calm
22:00-23:00	2.7	NW	<0.4	Calm	0.4	SSW
23:00-00:00	2.7	WNW	1.3	WNW	0.4	NW
00:00-01:00	2.7	NW	0.4	WNW	1.3	NW
01:00-02:00	3.1	NW	0.9	WNW	0.4	NW
02:00-03:00	3.1	NNW	0.4	NW	<0.4	Calm
03:00-04:00	3.6	NW	1.8	NW	<0.4	Calm
04:00-05:00	4.5	NNW	0.9	N	0.4	NW
05:00-06:00	4.0	NNW	0.9	NNW	1.3	SE
06:00-07:00	4.0	NNW	0.9	ENE	1.8	SE
07:00-08:00	4.0	NNW	0.4	NE	0.4	SE
08:00-09:00	2.2	NNW	0.4	ENE	0.4	SE
09:00-10:00	3.6	NNW	0.9	ESE	1.3	SE
10:00-11:00	3.6	NNW	1.3	SE	3.1	S

Remark : WS = Wind Speed (m/s)
WD = Wind Direction
Height of wind vane and anemometer above ground 10 meters.

[redacted]
(Ms.Piyatida Pradangkhc)
Laboratory Reviewer

[redacted]
(Ms.Panicha Promchai)
Laboratory Supervisor

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E-mail : envi@enviresearch.co.th
www.enviresearch.co.th
Head Office/Tax ID 0105 542 064981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : **ฐานหลุมผลิต BM6 : A6 : หมู่ที่ 11 บ้านบึงม่วง (1) (บ้านเลขที่ 17/2 บ้านบึงม่วง หมู่ที่ 11 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0583275 E, 1845086 N
Measured Date : March 27-30, 2025
Measured By : Mr.Kunakorn Ratanawongsa
Analyzed By : Environment Research & Technology Co., Ltd.

Quotation No. : AR2025-00471
Analysis No. : 2025-AB344-001
Report No. : 2025-RAAI039
Report Date : April 30, 2025

Wind Direction	Percentage frequency of wind in each speed and direction					
	0.4-1.1	1.1-2.1	2.1-3.1	3.1-4.1	≥4.1	Total
N	1.38889	0.00000	0.00000	0.00000	0.00000	**1.38889**
NNE	0.00000	0.00000	0.00000	0.00000	0.00000	**0.00000**
NE	1.38889	0.00000	0.00000	0.00000	0.00000	**1.38889**
ENE	2.77778	0.00000	0.00000	0.00000	0.00000	**2.77778**
E	0.00000	2.77778	0.00000	0.00000	0.00000	**2.77778**
ESE	1.38889	0.00000	0.00000	0.00000	0.00000	**1.38889**
SE	2.77778	6.94444	0.00000	0.00000	0.00000	**9.72222**
SSE	4.16667	4.16667	0.00000	0.00000	0.00000	**8.33334**
S	1.38889	8.33333	1.38889	1.38889	0.00000	**12.50000**
SSW	1.38889	1.38889	5.55556	0.00000	0.00000	**8.33334**
SW	0.00000	4.16667	0.00000	0.00000	0.00000	**4.16667**
WSW	0.00000	0.00000	0.00000	0.00000	0.00000	**0.00000**
W	0.00000	0.00000	0.00000	0.00000	0.00000	**0.00000**
WNW	2.77778	5.55556	1.38889	0.00000	0.00000	**9.72223**
NW	5.55556	4.16667	2.77778	2.77778	0.00000	**15.27779**
NNW	1.38889	0.00000	4.16667	8.33333	1.38889	**15.27778**
Calm	**6.94444**					

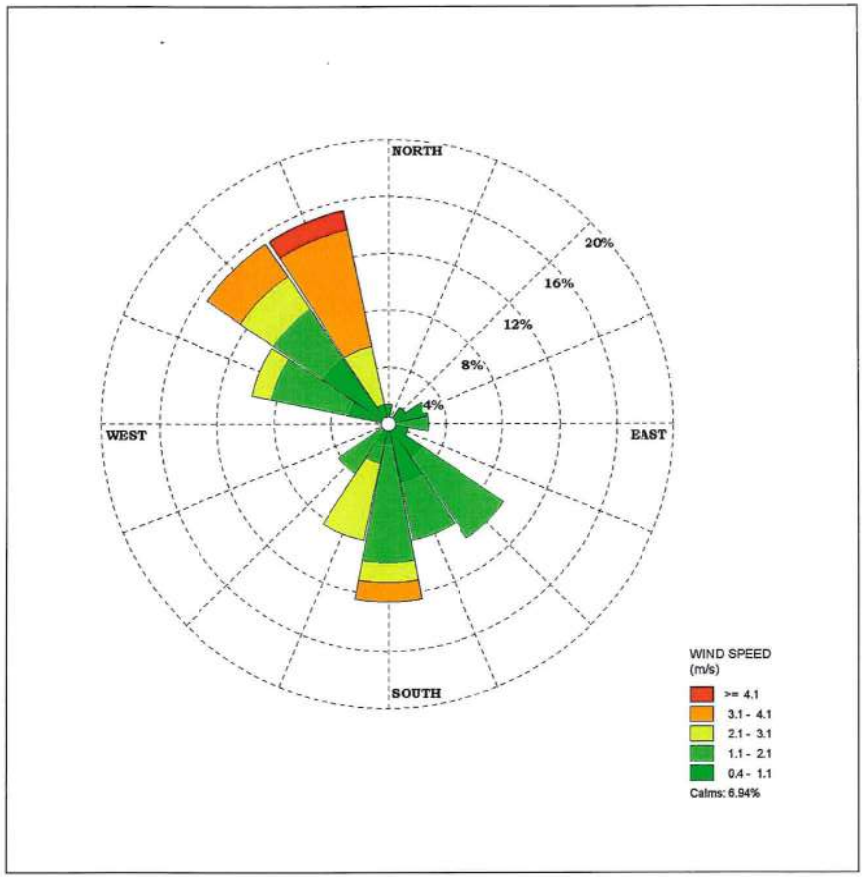
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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Measured Point : **ฐานหลุมผลิต BM6 : A6 : หมู่ที่ 11 บ้านบึงม่วง (1) (บ้านเลขที่ 17/2 บ้านบึงม่วง หมู่ที่ 11 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
Measured Date : March 27-30, 2025
Report No. : 2025-RAAI039



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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Northaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : **ฐานหลุมผลิต BM6 : A7 : หมู่ที่ 11 บ้านบึงม่วง (2) (บ้านเลขที่ 5/1 บ้านบึงม่วง หมู่ที่ 11 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0582386 E, 1843578 N
Quotation No. : AR2025-00471
Measured Date : March 27-30, 2025
Analysis No. : 2025-AB344-004
Measured By : Mr.Kunakorn Ratanawongsa
Report No. : 2025-RAAI040
Analyzed By : Environment Research & Technology Co., Ltd.
Report Date : April 30, 2025

Date/Time	Mar 27-28, 25		Mar 28-25, 25		Mar 29-30, 25	
	WS	WD	WS	WD	WS	WD
12:00-13:00	1.8	WSW	1.3	WNW	0.4	ENE
13:00-14:00	1.8	WSW	0.9	WNW	0.9	N
14:00-15:00	1.8	WSW	0.9	SSE	0.4	E
15:00-16:00	0.9	SE	1.3	SSW	0.4	ESE
16:00-17:00	1.3	S	0.4	ESE	0.4	ESE
17:00-18:00	0.4	SSW	0.9	SSW	0.4	S
18:00-19:00	<0.4	Calm	<0.4	Calm	<0.4	Calm
19:00-20:00	<0.4	Calm	<0.4	Calm	0.4	ESE
20:00-21:00	0.4	NW	<0.4	Calm	<0.4	Calm
21:00-22:00	<0.4	Calm	<0.4	Calm	<0.4	Calm
22:00-23:00	0.4	WNW	<0.4	Calm	<0.4	Calm
23:00-00:00	1.3	WNW	0.9	W	<0.4	Calm
00:00-01:00	1.8	WNW	1.3	W	<0.4	Calm
01:00-02:00	1.3	WNW	0.4	W	<0.4	Calm
02:00-03:00	1.3	WNW	<0.4	Calm	<0.4	Calm
03:00-04:00	1.8	WNW	<0.4	Calm	<0.4	Calm
04:00-05:00	1.8	WNW	<0.4	Calm	<0.4	Calm
05:00-06:00	0.9	NW	<0.4	Calm	<0.4	Calm
06:00-07:00	1.3	NW	<0.4	Calm	<0.4	Calm
07:00-08:00	0.9	NNW	<0.4	Calm	<0.4	Calm
08:00-09:00	0.4	NW	<0.4	Calm	<0.4	Calm
09:00-10:00	0.9	N	<0.4	Calm	0.9	S
10:00-11:00	1.3	WNW	<0.4	Calm	0.9	S
11:00-12:00	1.3	W	0.4	ENE	1.8	S

Remark : WS = Wind Speed (m/s)
WD = Wind Direction
Height of wind vane and anemometer above ground 10 meters.

[redacted]

(Ms.Piyatida Pradangkto)
Laboratory Reviewer

[redacted]

(Ms.Panicha Promchai)
Laboratory Supervisor

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตบิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมบิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : **ฐานหลุมผลิต BM6 : A7 : หมู่ที่ 11 บ้านบึงม่วง (2) (บ้านเลขที่ 5/1 บ้านบึงม่วง หมู่ที่ 11 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0582386 E, 1843578 N
Measured Date : March 27-30, 2025
Measured By : Mr.Kunakorn Ratanawongsa
Analyzed By : Environment Research & Technology Co., Ltd.

Quotation No. : AR2025-00471
Analysis No. : 2025-AB344-004
Report No. : 2025-RAAI040
Report Date : April 30, 2025

Wind Direction	Percentage frequency of wind in each speed and direction					
	0.4-1.1	1.1-2.1	2.1-3.1	3.1-4.1	≥4.1	Total
N	2.77778	0.00000	0.00000	0.00000	0.00000	**2.77778**
NNE	0.00000	0.00000	0.00000	0.00000	0.00000	**0.00000**
NE	0.00000	0.00000	0.00000	0.00000	0.00000	**0.00000**
ENE	2.77778	0.00000	0.00000	0.00000	0.00000	**2.77778**
E	1.38889	0.00000	0.00000	0.00000	0.00000	**1.38889**
ESE	5.55556	0.00000	0.00000	0.00000	0.00000	**5.55556**
SE	1.38889	0.00000	0.00000	0.00000	0.00000	**1.38889**
SSE	1.38889	0.00000	0.00000	0.00000	0.00000	**1.38889**
S	4.16667	2.77778	0.00000	0.00000	0.00000	**6.94445**
SSW	2.77778	1.38889	0.00000	0.00000	0.00000	**4.16667**
SW	0.00000	0.00000	0.00000	0.00000	0.00000	**0.00000**
WSW	0.00000	4.16667	0.00000	0.00000	0.00000	**4.16667**
W	2.77778	2.77778	0.00000	0.00000	0.00000	**5.55556**
WNW	2.77778	11.11110	0.00000	0.00000	0.00000	**13.88888**
NW	4.16667	1.38889	0.00000	0.00000	0.00000	**5.55556**
NNW	1.38889	0.00000	0.00000	0.00000	0.00000	**1.38889**
Calm	**43.05560**					

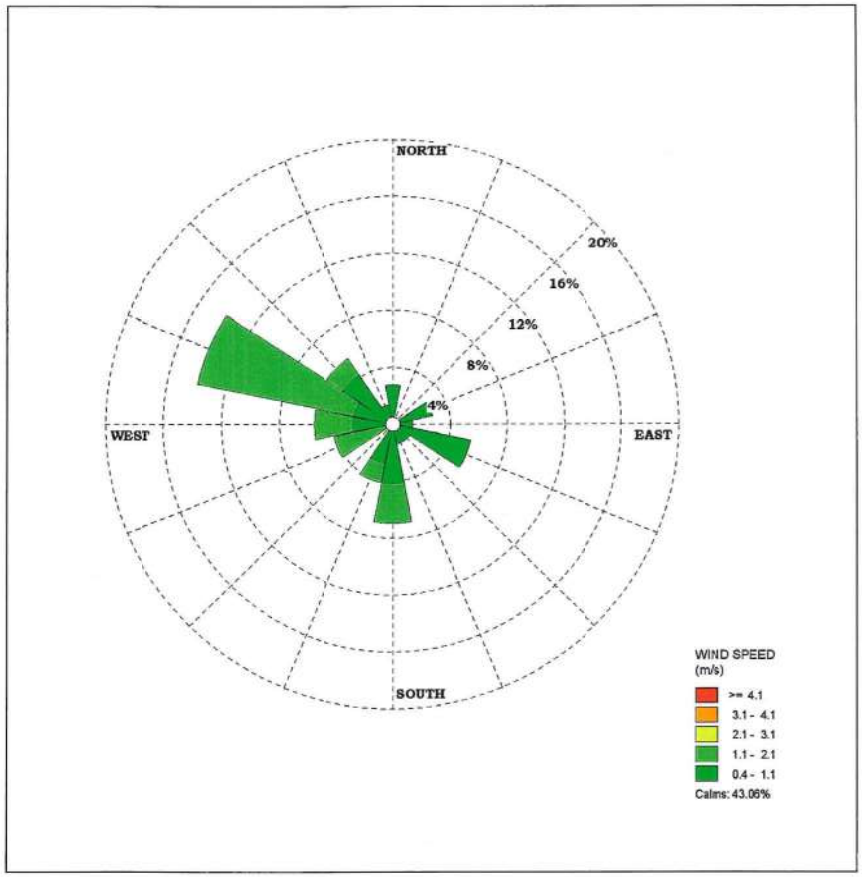
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www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Project Name : โครงการผลิตบิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมบิโตรเลียม)
Measured Point : **ฐานหลุมผลิต BM6 : A7 : หมู่ที่ 11 บ้านบึงม่วง (2) (บ้านเลขที่ 5/1 หมู่ที่ 11 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
Measured Date : March 27-30, 2025
Report No. : 2025-RAAI040



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ระยะผลิตปิโตรเลียม
(การผลิตปิโตรเลียม)

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตบีโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตบีโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ambient Air Quality
Sampling Point : **ฐานหลุมผลิต BM3 : A8 : หมู่ที่ 6 บ้านใหม่สามัคค์ (บ้านเลขที่ 99/1 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0586101 E, 1844171 N
Sampling Date : April 3-6, 2025
Sampling Time : 08:10
Sampling Method : U.S. EPA 40 CFR Part 50, 53
Sampling By : Mr.Ntad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.

Quotation No. : AR2025-00472
Analysis No. : 2025-AB525
Received Date : April 22, 2025
Analytical Date : April 22-29, 2025
Report No. : 2025-RAAI109
Report Date : April 29, 2025

Parameter	Unit	Method of Analysis	Result			Standard[1/]	Standard[2/]
			Apr 3-4, 25	Apr 4-5, 25	Apr 5-6, 25		
Total Suspended Particulate (TSP) 24 Hours Average	mg/m³	High-Volume, Gravimetric	0.150	0.136	0.110	0.330	-
Particulate Size Less Than 10 Micron (PM10) 24 Hours Average	mg/m³	PM10 Size Selective, High-Volume, Gravimetric	0.072	0.068	0.057	0.120	-
Particulate Size Less Than 2.5 Micron (PM2.5) 24 Hours Average	µg/m³	PM2.5 Size Selective, Low-Volume Air Sampler, Gravimetric Method	18.6	17.4	10.7	-	37.5

Remark : 1/ Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 42D dated May 25, B.E.2538 (1995) and Notification No.24, B.E.2547 (2004), published in the Royal Government Gazette No.121 Special Part 104D dated September 22, B.E.2547 (2004), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).
2/ Notification of National Environmental Board, B.E.2565 (2022), published in the Royal Government Gazette No.139 Special Part 163D dated July 8, B.E.2565 (2022) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).

[redacted] [redacted]

(Ms.Natnicha Sermmatiwong)
Laboratory Reviewer

(Ms.Ramita Taengthai)
Laboratory Supervisor

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตบีโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตบีโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ambient Air Quality
Sampling Point : **ฐานหลุมผลิต BM3 : A9 : โรงเรียนบ้านบึงมาลย์ (ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0583912 E, 1842790 N
Sampling Date : April 3-6, 2025
Sampling Time : 15:00
Sampling Method : U.S. EPA 40 CFR Part 50, 53
Sampling By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.

Quotation No. : AR2025-00472
Analysis No. : 2025-AB525
Received Date : April 22, 2025
Analytical Date : April 22-29, 2025
Report No. : 2025-RAAI111
Report Date : April 29, 2025

Parameter	Unit	Method of Analysis	Result			Standard[1/]	Standard[2/]
			Apr 3-4, 25	Apr 4-5, 25	Apr 5-6, 25		
Total Suspended Particulate (TSP) 24 Hours Average	mg/m³	High-Volume, Gravimetric	0.167	0.144	0.077	0.330	-
Particulate Size Less Than 10 Micron (PM10) 24 Hours Average	mg/m³	PM10 Size Selective, High-Volume, Gravimetric	0.083	0.071	0.035	0.120	-
Particulate Size Less Than 2.5 Micron (PM2.5) 24 Hours Average	µg/m³	PM2.5 Size Selective, Low-Volume Air Sampler, Gravimetric Method	18.3	17.1	9.8	-	37.5

Remark : 1/ Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 42D dated May 25, B.E.2538 (1995) and Notification No.24, B.E.2547 (2004), published in the Royal Government Gazette No.121 Special Part 104D dated September 22, B.E.2547 (2004), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).
2/ Notification of National Environmental Board, B.E.2565 (2022), published in the Royal Government Gazette No.139 Special Part 163D dated July 8, B.E.2565 (2022) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).

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(Ms.Natnicha Sermmatiwong)
Laboratory Reviewer

(Ms.Ramita Taengthai)
Laboratory Supervisor

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F-RP-020 Rev. 04, July 6, 2021

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ambient Air Quality
Sampling Point : **ฐานหลุมผลิตบึงม่วงใต้ 2 (BMS2) : A10 : หมู่ที่ 7 บ้านหนองไม้แดง (1) (บ้านเลขที่ 55/3 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0584253 E, 1840548 N
Sampling Date : April 3-6, 2025
Sampling Time : 08:30
Sampling Method : U.S. EPA 40 CFR Part 50, 53
Sampling By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.

Quotation No. : AR2025-00472
Analysis No. : 2025-AB525
Received Date : April 22, 2025
Analytical Date : April 22-29, 2025
Report No. : 2025-RAAI112
Report Date : April 29, 2025

Parameter	Unit	Method of Analysis	Result			Standard[1/]	Standard[2/]
			Apr 3-4, 25	Apr 4-5, 25	Apr 5-6, 25		
Total Suspended Particulate (TSP) 24 Hours Average	mg/m³	High-Volume, Gravimetric	0.115	0.138	0.082	0.330	-
Particulate Size Less Than 10 Micron (PM10) 24 Hours Average	mg/m³	PM10 Size Selective, High-Volume, Gravimetric	0.061	0.073	0.046	0.120	-
Particulate Size Less Than 2.5 Micron (PM2.5) 24 Hours Average	µg/m³	PM2.5 Size Selective, Low-Volume Air Sampler, Gravimetric Method	14.8	15.0	10.1	-	37.5

Remark : 1/ Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 42D dated May 25, B.E.2538 (1995) and Notification No.24, B.E.2547 (2004), published in the Royal Government Gazette No.121 Special Part 104D dated September 22, B.E.2547 (2004), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).
2/ Notification of National Environmental Board, B.E.2565 (2022), published in the Royal Government Gazette No.139 Special Part 163D dated July 8, B.E.2565 (2022) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).

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(Ms.Natnicha Sermmatiwong)
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(Ms.Ramita Taengthai)
Laboratory Supervisor

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Ambient Air Quality
Sampling Point : **ฐานหลุมผลิตบึงม่วงใต้ 2 (BMS2) : A11 : หมู่ที่ 7 บ้านหนองไม้แดง (2) (บ้านเลขที่ 74 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0582540 E, 1839038 N
Sampling Date : April 3-6, 2025
Sampling Time : 09:25
Sampling Method : U.S. EPA 40 CFR Part 50, 53
Sampling By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.

Quotation No. : AR2025-00472
Analysis No. : 2025-AB525
Received Date : April 22, 2025
Analytical Date : April 22-29, 2025
Report No. : 2025-RAAI113
Report Date : April 29, 2025

Parameter	Unit	Method of Analysis	Result			Standard[1/]
			Apr 3-4, 25	Apr 4-5, 25	Apr 5-6, 25	
Total Suspended Particulate (TSP) 24 Hours Average	mg/m³	High-Volume, Gravimetric	0.171	0.129	0.092	0.330
Particulate Size Less Than 10 Micron (PM10) 24 Hours Average	mg/m³	PM10 Size Selective, High-Volume, Gravimetric	0.084	0.063	0.045	0.120
Particulate Size Less Than 2.5 Micron (PM2.5) 24 Hours Average	µg/m³	PM2.5 Size Selective, Low-Volume Air Sampler, Gravimetric Method	18.3	15.1	9.7	-

Remark : 1/ Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 42D dated May 25, B.E.2538 (1995) and Notification No.24, B.E.2547 (2004), published in the Royal Government Gazette No.121 Special Part 104D dated September 22, B.E.2547 (2004), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).
Notification of National Environmental Board, B.E.2565 (2022), published in the Royal Government Gazette No.139Special Part 163D dated July 8, B.E.2565 (2022) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).

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(Ms.Natnicha Sermmatiworg)
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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Anbient Air Quality
Measured Point : **ฐานหลุมผลิต BM3 : A8 : หมู่ที่ 6 บ้านใหม่สามัคคี (บ้านเลขที่ 99/1 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0586101 E, 1844171 N
Measured Date : April 3-6, 2025
Measured By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : NOx Chemiluminescence Analyzer Horiba Model APNA-370 Serial Number U9LS50WU

Quotation No. : AR2025-00472
Analysis No. : 2025-AB525-001
Report No. : 2025-RAAJ603
Report Date : May 16, 2025

Interval Time	Result: NO_2 (ppm)			Standard[1/]
	Apr 3-4, 25	Apr 4-5, 25	Apr 5-6, 25	
08:00-09:00	0.0106	0.0117	0.0139	
09:00-10:00	0.0093	0.0121	0.0122	
10:00-11:00	0.0102	0.0101	0.0096	
11:00-12:00	0.0085	0.0089	0.0083	
12:00-13:00	0.0077	0.0085	0.0093	
13:00-14:00	0.0074	0.0087	0.0084	
14:00-15:00	0.0072	0.0076	0.0073	
15:00-16:00	0.0069	0.0076	0.0076	
16:00-17:00	0.0070	0.0075	0.0073	
17:00-18:00	0.0074	0.0073	0.0076	
18:00-19:00	0.0077	0.0078	0.0087	
19:00-20:00	0.0081	0.0098	0.0097	
20:00-21:00	0.0123	0.0101	0.0076	
21:00-22:00	0.0125	0.0112	0.0076	
22:00-23:00	0.0109	0.0105	0.0072	
23:00-00:00	0.0109	0.0099	0.0078	
00:00-01:00	0.0110	0.0099	0.0090	
01:00-02:00	0.0110	0.0095	0.0096	
02:00-03:00	0.0106	0.0103	0.0143	
03:00-04:00	0.0117	0.0108	0.0122	
04:00-05:00	0.0113	0.0112	0.0108	
05:00-06:00	0.0111	0.0107	0.0114	
06:00-07:00	0.0120	0.0105	0.0121	
07:00-08:00	0.0124	0.0116	0.0129	
24 Hours Average	**0.0098**	**0.0097**	**0.0097**	-
1 Hour Maximum	**0.0125**	**0.0121**	**0.0143**	**0.17**

Remark : [1/] Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 42D dated May 25, B.E.2538 (1995), Notification No.28, B.E.2550 (2007), published in the Royal Government Gazette No.124 Special Part 58D dated May 14, B.E.2550 (2007) and Notification No.33, B.E.2552 (2009), published in the Royal Government Gazette No.126 Special Part 114D dated August 14, B.E.2552 (2009), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).

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(Ms.Piyatida Pradangkho)
Laboratory Reviewer

(Ms.Panicha Promchai)
Laboratory Supervisor

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Head Office/Tax ID 0105 542 064 911

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : **ฐานหลุมผลิต BM3 : A8 : หมู่ที่ 6 บ้านใหม่สามัคคี (บ้านเลขที่ 99/1 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0586101 E, 1844171 N
Measured Date : April 3-6, 2025
Measured By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : SO_2 UV-Fluorescence Analyzer Thermo Model 43i Serial Number CN14430004

Quotation No. : AR2025-00472
Analysis No. : 2025-AB525-001
Report No. : 2025-RAAJ604
Report Date : May 16, 2025

Interval Time	Result SO_2 (ppm)			Standard
	Apr 3-4, 25	Apr 4-5, 25	Apr 5-6, 25	
08:00-09:00	0.0011	0.0012	0.0014	
09:00-10:00	0.0011	0.0013	0.0014	
10:00-11:00	0.0011	0.0015	0.0015	
11:00-12:00	0.0012	0.0015	0.0014	
12:00-13:00	0.0012	0.0017	0.0015	
13:00-14:00	0.0011	0.0016	0.0015	
14:00-15:00	0.0013	0.0017	0.0016	
15:00-16:00	0.0013	0.0018	0.0016	
16:00-17:00	0.0012	0.0017	0.0018	
17:00-18:00	0.0013	0.0016	0.0016	
18:00-19:00	0.0011	0.0018	0.0014	
19:00-20:00	0.0013	0.0015	0.0015	
20:00-21:00	0.0011	0.0016	0.0014	
21:00-22:00	0.0011	0.0014	0.0014	
22:00-23:00	0.0011	0.0016	0.0012	
23:00-00:00	0.0012	0.0014	0.0013	
00:00-01:00	0.0012	0.0015	0.0013	
01:00-02:00	0.0013	0.0016	0.0014	
02:00-03:00	0.0014	0.0016	0.0015	
03:00-04:00	0.0013	0.0015	0.0015	
04:00-05:00	0.0014	0.0016	0.0014	
05:00-06:00	0.0013	0.0015	0.0016	
06:00-07:00	0.0012	0.0014	0.0014	
07:00-08:00	0.0016	0.0016	0.0015	
24 Hours Average	**0.0012**	**0.0016**	**0.0015**	**0.12[1/]**
1 Hour Maximum	**0.0016**	**0.0018**	**0.0018**	**0.30[2/]**

Remark : [1/] Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 42D dated May 25, B.E.2538 (1995) and Notification No.24, B.E.2547 (2004), published in the Royal Government Gazette No.121 Special Part 104D dated September 22, B.E.2547 (2004), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).
[2/] Notification of National Environmental Board, No.12, B.E.2538 (1995), published in the Royal Government Gazette No.112 Special Part 27D dated July 13, B.E.2538 (1995) and Notification No.21, B.E.2544 (2001), published in the Royal Government Gazette No.118 Special Part 39D dated April 30, B.E.2544 (2001), under the Enhancement and Conservation of National E

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(Ms.Piyatida Pradangkho)
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(Ms.Panicha Promchai)
Laboratory Supervisor

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www.envisearch.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : **ฐานตรวจวัดคุณภาพอากาศ BM3 : A8 : หมู่ที่ 6 บ้านใหม่สามัคคี (บ้านเลขที่ 99/1 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0586101 E, 1844171 N
Quotation No. : AR2025-00472
Measured Date : April 3-6, 2025
Analysis No. : 2025-AB525-001
Measured By : Mr.Nitad Sirichad
Report No. : 2025-RAAJ605
Analyzed By : Environment Research & Technology Co., Ltd.
Report Date : May 16, 2025
Measured Instrument : CO NDIR Analyzer Horiba Model APMA-370 Serial Number RBBRW0L3

Interval Time	Result CO (ppm)						Standard[1/]
	Apr 3-4, 25		Apr 4-5, 25		Apr 5-6, 25		
	1 hr Avg	8 hr Avg	1 hr Avg	8 hr Avg	1 hr Avg	8 hr Avg	
08:00-09:00	0.5	-	0.7	0.7	0.6	0.6	
09:00-10:00	0.4	-	0.7	0.7	0.4	0.6	
10:00-11:00	0.4	-	0.6	0.7	0.4	0.5	
11:00-12:00	0.4	-	0.6	0.7	0.4	0.5	
12:00-13:00	0.4	-	0.5	0.6	0.4	0.5	
13:00-14:00	0.4	-	0.5	0.6	0.4	0.4	
14:00-15:00	0.4	-	0.5	0.6	0.4	0.4	
15:00-16:00	0.4	0.4	0.5	0.6	0.4	0.4	
16:00-17:00	0.4	0.4	0.5	0.6	0.5	0.4	
17:00-18:00	0.4	0.4	0.4	0.5	0.5	0.4	
18:00-19:00	0.4	0.4	0.4	0.5	0.6	0.4	
19:00-20:00	0.5	0.4	0.5	0.5	0.6	0.5	
20:00-21:00	0.6	0.4	0.6	0.5	0.4	0.5	
21:00-22:00	0.8	0.5	0.6	0.5	0.4	0.5	
22:00-23:00	0.9	0.6	0.5	0.5	0.4	0.5	
23:00-00:00	0.7	0.6	0.5	0.5	0.4	0.5	
00:00-01:00	0.6	0.6	0.5	0.5	0.4	0.5	
01:00-02:00	0.6	0.6	0.5	0.5	0.4	0.4	
02:00-03:00	0.6	0.7	0.5	0.5	0.4	0.4	
03:00-04:00	0.7	0.7	0.6	0.5	0.4	0.4	
04:00-05:00	0.7	0.7	0.8	0.6	0.4	0.4	
05:00-06:00	0.7	0.7	0.6	0.6	0.4	0.4	
06:00-07:00	0.7	0.7	0.5	0.6	0.4	0.4	
07:00-08:00	0.7	0.7	0.4	0.6	0.4	0.4	
24 Hours Average	**0.6**	**-**	**0.5**	**-**	**0.4**	**-**	**-**
1 Hour Maximum	**0.9**	**-**	**0.8**	**-**	**0.6**	**-**	**30**
8 Hours Maximum	**-**	**0.7**	**-**	**0.7**	**-**	**0.6**	**9**

Remark : [1/] Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 42D dated May 25, B.E.2538 (1995), under the Enhancement an[redacted]lity Act B.E.25[redacted]

[redacted] [redacted]

(Ms.Piyatida Pradangkho)
Laboratory Reviewer

(Ms.Panicha Promchai)
Laboratory Supervisor

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www.envisearch.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : **ฐานตรวจวัดคุณภาพอากาศ BM3 : A9 : โรงเรียนบ้านบึงมาลย์ (ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0563912 E, 1842790 N
Quotation No. : AR2025-00472
Measured Date : April 3-6, 2025
Analysis No. : 2025-AB525-004
Measured By : Mr.Nitad Sirichad
Report No. : 2025-RAAJ625
Analyzed By : Environment Research & Technology Co., Ltd.
Report Date : May 16, 2025
Measured Instrument : NOx Chemiluminescence Analyzer API Model 200A Serial Number 1464

Interval Time	Result NO_2 (ppm)			Standard[1/]
	Apr 3-4, 25	Apr 4-5, 25	Apr 5-6, 25	
15:00-16:00	0.0069	0.0072	0.0093	
16:00-17:00	0.0074	0.0076	0.0103	
17:00-18:00	0.0076	0.0076	0.0111	
18:00-19:00	0.0077	0.0087	0.0093	
19:00-20:00	0.0060	0.0093	0.0104	
20:00-21:00	0.0067	0.0093	0.0103	
21:00-22:00	0.0057	0.0101	0.0106	
22:00-23:00	0.0057	0.0101	0.0095	
23:00-00:00	0.0086	0.0103	0.0101	
00:00-01:00	0.0077	0.0104	0.0102	
01:00-02:00	0.0080	0.0094	0.0103	
02:00-03:00	0.0079	0.0092	0.0091	
03:00-04:00	0.0083	0.0094	0.0102	
04:00-05:00	0.0086	0.0101	0.0082	
05:00-06:00	0.0139	0.0110	0.0126	
06:00-07:00	0.0108	0.0110	0.0131	
07:00-08:00	0.0114	0.0068	0.0113	
08:00-09:00	0.0081	0.0064	0.0090	
09:00-10:00	0.0072	0.0087	0.0083	
10:00-11:00	0.0069	0.0069	0.0074	
11:00-12:00	0.0064	0.0068	0.0074	
12:00-13:00	0.0066	0.0065	0.0072	
13:00-14:00	0.0069	0.0065	0.0076	
14:00-15:00	0.0072	0.0071	0.0115	
24 Hours Average	**0.0078**	**0.0086**	**0.0098**	**-**
1 Hour Maximum	**0.0139**	**0.0110**	**0.0131**	**0.17**

Remark : [1/] Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 42D dated May 25, B.E.2538 (1995), Notificaton No.28, B.E.2550 (2007), published in the Royal Government Gazette No.124 Special Part 58D dated May 14, B.E.2550 (2007) and Notification No.33, B.E.2552 (2009), published in the Royal Government Gazette No.126 Special Part 114D dated August 14, B.E.2552 (2009), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).

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(Ms.Piyatida Pradangkho)
Laboratory Reviewer

(Ms.Panicha Promchai)
Laboratory Supervisor

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www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และ พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : ฐานหลุมผลิต BM3 : A9 : โรงเรียนบ้านบึงมาลย์ (ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0583912 E, 1842790 N
Measured Date : April 3-6, 2025
Measured By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : SO_2 UV-Fluorescence Analyzer Thermo Model 43C Serial Number 0607415768

Quotation No. : AR2025-00472
Analysis No. : 2025-ABS25-004
Report No. : 2025-RAAJ626
Report Date : May 16, 2025

Interval Time	Result SO_2 (ppm)			Standard
	Apr 3-4, 25	Apr 4-5, 25	Apr 5-6, 25	
15:00-16:00	0.0016	0.0017	0.0015	
16:00-17:00	0.0017	0.0017	0.0012	
17:00-18:00	0.0018	0.0019	0.0013	
18:00-19:00	0.0018	0.0019	0.0016	
19:00-20:00	0.0018	0.0019	0.0015	
20:00-21:00	0.0016	0.0018	0.0015	
21:00-22:00	0.0014	0.0017	0.0017	
22:00-23:00	0.0015	0.0017	0.0017	
23:00-00:00	0.0014	0.0016	0.0018	
00:00-01:00	0.0013	0.0015	0.0019	
01:00-02:00	0.0013	0.0013	0.0018	
02:00-03:00	0.0013	0.0015	0.0019	
03:00-04:00	0.0013	0.0014	0.0019	
04:00-05:00	0.0013	0.0012	0.0018	
05:00-06:00	0.0016	0.0013	0.0019	
06:00-07:00	0.0015	0.0015	0.0018	
07:00-08:00	0.0013	0.0015	0.0016	
08:00-09:00	0.0015	0.0014	0.0017	
09:00-10:00	0.0013	0.0015	0.0017	
10:00-11:00	0.0016	0.0013	0.0018	
11:00-12:00	0.0016	0.0014	0.0019	
12:00-13:00	0.0017	0.0018	0.0012	
13:00-14:00	0.0019	0.0015	0.0016	
14:00-15:00	0.0016	0.0015	0.0016	
24 Hours Average	**0.0015**	**0.0016**	**0.0017**	**0.12[1]**
1 Hour Maximum	**0.0019**	**0.0019**	**0.0019**	**0.30[2]**

Remark : [1] Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 42D dated May 25, B.E.2538 (1995) and Notification No.24, B.E.2547 (2004), published in the Royal Government Gazette No.121 Special Prt 104D dated September 22, B.E.2547 (2004), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).
[2] Notification of National Environmental Board, No.12, B.E.2538 (1995), published in the Royal Government Gazette No.112 Special Part 27D dated July 13, B.E.2538 (1995) and Notification No.21, B.E.2541 (2001), published in the Royal Government Gazette No.118 Special Part 39D dated April 30, B.E.2544 (2001), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).

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(Ms.Piyatida Pradangkho)
Laboratory Reviewer

(Ms.Panicha Promchai)
Laboratory Supervisor

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www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และ พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : ฐานหลุมผลิต BM3 : A9 : โรงเรียนบ้านบึงมาลย์ (ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0583912 E, 1842790 N
Measured Date : April 3-6, 2025
Measured By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : CO NDIR Analyzer Horiba Model APMA-370 Serial Number GFB0BLNC

Quotation No. : AR2025-00472
Analysis No. : 2025-ABS25-004
Report No. : 2025-RAAJ627
Report Date : May 16, 2025

Interval Time	Result CO (ppm)						Standard[1]
	Apr 3-4, 25		Apr 4-5, 25		Apr 5-6, 25		
	1 hr Avg	8 hr Avg	1 hr Avg	8 hr Avg	1 hr Avg	8 hr Avg	
15:00-16:00	0.4	-	0.5	0.6	0.3	0.4	
16:00-17:00	0.4	-	0.5	0.5	0.4	0.4	
17:00-18:00	0.4	-	0.5	0.5	0.4	0.4	
18:00-19:00	0.4	-	0.4	0.5	0.4	0.4	
19:00-20:00	0.5	-	0.5	0.5	0.4	0.4	
20:00-21:00	0.5	-	0.5	0.5	0.5	0.4	
21:00-22:00	0.6	-	0.5	0.5	0.5	0.4	
22:00-23:00	0.5	0.5	0.5	0.5	0.5	0.4	
23:00-00:00	0.6	0.5	0.5	0.5	0.5	0.4	
00:00-01:00	0.6	0.5	0.5	0.5	0.4	0.4	
01:00-02:00	0.6	0.5	0.5	0.5	0.4	0.4	
02:00-03:00	0.6	0.6	0.5	0.5	0.4	0.4	
03:00-04:00	0.6	0.6	0.5	0.5	0.4	0.4	
04:00-05:00	0.6	0.6	0.7	0.5	0.4	0.4	
05:00-06:00	0.6	0.6	0.6	0.5	0.4	0.4	
06:00-07:00	0.6	0.6	0.5	0.5	0.4	0.4	
07:00-08:00	0.7	0.6	0.4	0.5	0.5	0.4	
08:00-09:00	0.6	0.6	0.4	0.5	0.6	0.4	
09:00-10:00	0.6	0.6	0.4	0.5	0.4	0.4	
10:00-11:00	0.6	0.6	0.4	0.5	0.4	0.4	
11:00-12:00	0.6	0.6	0.4	0.5	0.5	0.4	
12:00-13:00	0.5	0.6	0.4	0.4	0.6	0.5	
13:00-14:00	0.5	0.6	0.4	0.4	0.4	0.5	
14:00-15:00	0.5	0.6	0.3	0.4	0.4	0.5	
24 Hours Average	**0.5**	**-**	**0.5**	**-**	**0.4**	**-**	**-**
1 Hour Maximum	**0.7**	**-**	**0.7**	**-**	**0.6**	**-**	**30**
8 Hours Maximum	**-**	**0.6**	**-**	**0.6**	**-**	**0.5**	**9**

Remark : [1] Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 42D dated May 25, B.E.2538 (1995), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).

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(Ms.Piyatida Pradangkho)
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Laboratory Supervisor

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : **ฐานหลุมผลิตบึงม่วงใต้ 2 (BMS2) : A10 : หมู่ที่ 7 บ้านหนองไม้แดง (1) (บ้านเลขที่ 55/3 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0584253 E, 1840548 N
Measured Date : April 3-6, 2025
Measured By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : NOx Chemiluminescence Analyzer Horiba Model APNA-370 Serial Number 4VWFEBUK

Quotation No. : AR2025-00472
Analysis No. : 2025-ABS25-007
Report No. : 2025-RAAJ628
Report Date : May 16, 2025

Interval Time	Result NO_2 (ppm)			Standard[1/]
	Apr 3-4, 25	Apr 4-5, 25	Apr 5-6, 25	
09:00-10:00	0.0094	0.0147	0.0093	
10:00-11:00	0.0100	0.0133	0.0083	
11:00-12:00	0.0098	0.0141	0.0086	
12:00-13:00	0.0085	0.0113	0.0090	
13:00-14:00	0.0066	0.0101	0.0068	
14:00-15:00	0.0082	0.0090	0.0077	
15:00-16:00	0.0065	0.0095	0.0058	
16:00-17:00	0.0062	0.0073	0.0059	
17:00-18:00	0.0066	0.0089	0.0069	
18:00-19:00	0.0074	0.0105	0.0070	
19:00-20:00	0.0118	0.0103	0.0094	
20:00-21:00	0.0137	0.0117	0.0083	
21:00-22:00	0.0131	0.0145	0.0078	
22:00-23:00	0.0152	0.0113	0.0047	
23:00-00:00	0.0140	0.0107	0.0058	
00:00-01:00	0.0160	0.0106	0.0084	
01:00-02:00	0.0125	0.0129	0.0119	
02:00-03:00	0.0131	0.0150	0.0150	
03:00-04:00	0.0125	0.0152	0.0174	
04:00-05:00	0.0117	0.0145	0.0147	
05:00-06:00	0.0124	0.0121	0.0154	
06:00-07:00	0.0109	0.0123	0.0180	
07:00-08:00	0.0123	0.0110	0.0184	
08:00-09:00	0.0135	0.0101	0.0192	
24 Hours Average	**0.0109**	**0.0117**	**0.0104**	-
1 Hour Maximum	**0.0160**	**0.0152**	**0.0192**	**0.17**

Remark : [1/] Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 42D dated May 25, B.E.2538 (1995), Notification No.28, B.E.2550 (2007), published in the Royal Government Gazette No.124 Special Part 58D dated May 14, B.E.2550 (2007) and Notification No.33, B.E.2552 (2009), published in the Royal Government Gazette No.126 Special Part 114D dated August 14, B.E.2552 (2009), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).

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Head Office/Tax ID 0105 542 064 911

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : **ฐานหลุมผลิตบึงม่วงใต้ 2 (BMS2) : A10 : หมู่ที่ 7 บ้านหนองไม้แดง (1) (บ้านเลขที่ 55/3 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0584253 E, 1840548 N
Measured Date : April 3-6, 2025
Measured By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : SO_2 UV-Fluorescence Analyzer Thermo Model 43i Serial Number CM14430005

Quotation No. : AR2025-00472
Analysis No. : 2025-ABS25-007
Report No. : 2025-RAAJ629
Report Date : May 16, 2025

Interval Time	Result SO_2 (ppm)			Standard
	Apr 3-4, 25	Apr 4-5, 25	Apr 5-6, 25	
09:00-10:00	0.0015	0.0015	0.0016	
10:00-11:00	0.0015	0.0014	0.0016	
11:00-12:00	0.0014	0.0016	0.0013	
12:00-13:00	0.0016	0.0016	0.0016	
13:00-14:00	0.0015	0.0014	0.0013	
14:00-15:00	0.0012	0.0013	0.0014	
15:00-16:00	0.0013	0.0013	0.0014	
16:00-17:00	0.0012	0.0013	0.0014	
17:00-18:00	0.0014	0.0013	0.0014	
18:00-19:00	0.0014	0.0016	0.0015	
19:00-20:00	0.0014	0.0017	0.0016	
20:00-21:00	0.0014	0.0016	0.0016	
21:00-22:00	0.0014	0.0017	0.0013	
22:00-23:00	0.0015	0.0016	0.0013	
23:00-00:00	0.0014	0.0017	0.0015	
00:00-01:00	0.0015	0.0018	0.0015	
01:00-02:00	0.0015	0.0016	0.0016	
02:00-03:00	0.0015	0.0019	0.0016	
03:00-04:00	0.0014	0.0016	0.0017	
04:00-05:00	0.0015	0.0016	0.0016	
05:00-06:00	0.0015	0.0016	0.0017	
06:00-07:00	0.0016	0.0016	0.0015	
07:00-08:00	0.0015	0.0018	0.0014	
08:00-09:00	0.0016	0.0016	0.0016	
24 Hours Average	**0.0014**	**0.0016**	**0.0015**	**0.12[1/]**
1 Hour Maximum	**0.0016**	**0.0019**	**0.0017**	**0.30[2/]**

Remark : [1/] Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 42D dated May 25, B.E.2538 (1995) and Notification No.24, B.E.2547 (2004), published in the Royal Government Gazette No.121 Special Part 104D dated September 22, B.E.2547 (2004), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).
[2/] Notification of National Environmental Board, No.12, B.E.2538 (1995), published in the Royal Government Gazette No.112 Special Part 27D dated July 13, B.E.2538 (1995) and Notification No.21, B.E.2544 (2001), published in the Royal Government Gazette No.118 Special Part 39D dated April 30, B.E.2544 (2001), under the Enhancement and Conservation of Natio[redacted]).

[redacted] [redacted]

(Ms.Piyatida Pradangkho)
Laboratory Reviewer

(Ms.Panicha Promchai)
Laboratory Supervisor

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยายแปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : **ฐานหลุมผลิตบึงม่วงใต้ 2 (BMS2) : A10 : หมู่ที่ 7 บ้านหนองไม้แดง (1) (บ้านเลขที่ 55/3 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0584253 E, 1840548 N
Quotation No. : AR2025-00472
Measured Date : April 3-6, 2025
Analysis No. : 2025-AB525-007
Measured By : Mr.Nitad Sirichad
Report No. : 2025-RAAJ630
Analyzed By : Environment Research & Technology Co., Ltd.
Report Date : May 16, 2025
Measured Instrument : CO NDIR Analyzer Horiba Model APMA-370 Serial Number Y05LRYAD

Interval Time	Result CO (ppm)						Standard[1/]
	Apr 3-4, 25		Apr 4-5, 25		Apr 5-6, 25		
	1 hr Avg	8 hr Avg	1 hr Avg	8 hr Avg	1 hr Avg	8 hr Avg	
09:00-10:00	0.6	-	0.6	0.5	0.5	0.5	
10:00-11:00	0.6	-	0.6	0.5	0.6	0.5	
11:00-12:00	0.7	-	0.6	0.6	0.6	0.5	
12:00-13:00	0.5	-	0.6	0.6	0.6	0.6	
13:00-14:00	0.4	-	0.5	0.6	0.6	0.6	
14:00-15:00	0.4	-	0.6	0.6	0.5	0.6	
15:00-16:00	0.4	-	0.5	0.6	0.5	0.6	
16:00-17:00	0.4	0.5	0.4	0.6	0.4	0.5	
17:00-18:00	0.4	0.5	0.4	0.5	0.6	0.6	
18:00-19:00	0.4	0.4	0.5	0.5	0.6	0.6	
19:00-20:00	0.4	0.4	0.4	0.5	0.6	0.6	
20:00-21:00	0.5	0.4	0.5	0.5	0.5	0.5	
21:00-22:00	0.5	0.4	0.4	0.5	0.4	0.5	
22:00-23:00	0.4	0.4	0.4	0.4	0.4	0.5	
23:00-00:00	0.4	0.4	0.4	0.4	0.4	0.5	
00:00-01:00	0.4	0.4	0.5	0.4	0.4	0.5	
01:00-02:00	0.4	0.4	0.6	0.5	0.4	0.5	
02:00-03:00	0.4	0.4	0.6	0.5	0.4	0.4	
03:00-04:00	0.5	0.4	0.6	0.5	0.4	0.4	
04:00-05:00	0.5	0.4	0.5	0.5	0.4	0.4	
05:00-06:00	0.5	0.4	0.5	0.5	0.4	0.4	
06:00-07:00	0.5	0.4	0.6	0.5	0.4	0.4	
07:00-08:00	0.5	0.5	0.5	0.6	0.5	0.4	
08:00-09:00	0.6	0.5	0.5	0.6	0.5	0.4	
24 Hours Average	**0.5**	**-**	**0.5**	**-**	**0.5**	**-**	**-**
1 Hour Maximum	**0.7**	**-**	**0.6**	**-**	**0.6**	**-**	**30**
8 Hours Maximum	**-**	**0.5**	**-**	**0.6**	**-**	**0.6**	**9**

Remark : [1/] Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 42D dated May 25, B.E.2538 (1995), under the Enhancement and [redacted] ity Act B.E.253[redacted]

[redacted] (Ms.Piyatida Pradangkho)
Laboratory Reviewer

[redacted] (Ms.Panicha Promchai)
Laboratory Supervisor

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : **ฐานหลุมผลิตบึงม่วงใต้ 2 (BMS2) : A11 : หมู่ที่ 7 บ้านหนองไม้แดง (2) (บ้านเลขที่ 74 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0582540 E, 1839038 N
Quotation No. : AR2025-00472
Measured Date : April 3-6, 2025
Analysis No. : 2025-AB525-010
Measured By : Mr.Nitad Sirichad
Report No. : 2025-RAAJ631
Analyzed By : Environment Research & Technology Co., Ltd.
Report Date : May 16, 2025
Measured Instrument : NOx Chemiluminescence Analyzer Horiba Model APNA-370 Serial Number AX7HSMEO

Interval Time	Result NO_2 (ppm)			Standard[1/]
	Apr 3-4, 25	Apr 4-5, 25	Apr 5-6, 25	
09:00-10:00	0.0122	0.0126	0.0123	
10:00-11:00	0.0108	0.0114	0.0106	
11:00-12:00	0.0101	0.0109	0.0104	
12:00-13:00	0.0109	0.0112	0.0110	
13:00-14:00	0.0097	0.0102	0.0101	
14:00-15:00	0.0097	0.0103	0.0101	
15:00-16:00	0.0109	0.0109	0.0110	
16:00-17:00	0.0101	0.0105	0.0103	
17:00-18:00	0.0102	0.0108	0.0108	
18:00-19:00	0.0108	0.0118	0.0118	
19:00-20:00	0.0112	0.0110	0.0108	
20:00-21:00	0.0115	0.0115	0.0104	
21:00-22:00	0.0147	0.0141	0.0129	
22:00-23:00	0.0128	0.0124	0.0106	
23:00-00:00	0.0126	0.0115	0.0108	
00:00-01:00	0.0132	0.0127	0.0120	
01:00-02:00	0.0112	0.0114	0.0117	
02:00-03:00	0.0116	0.0121	0.0125	
03:00-04:00	0.0135	0.0146	0.0147	
04:00-05:00	0.0132	0.0130	0.0125	
05:00-06:00	0.0123	0.0123	0.0127	
06:00-07:00	0.0153	0.0123	0.0146	
07:00-08:00	0.0130	0.0107	0.0119	
08:00-09:00	0.0121	0.0108	0.0124	
24 Hours Average	**0.0118**	**0.0117**	**0.0116**	**-**
1 Hour Maximum	**0.0153**	**0.0146**	**0.0147**	**0.17**

Remark : [1/] Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 42D dated May 25, B.E.2538 (1995), Notificaton No.28, B.E.2550 (2007), published in the Royal Government Gazette No.124 Special Part 58D dated May 14, B.E.2550 (2007) and Notification No.33, B.E.2552 (2009), published in the Royal Government Gazette No.126 Special Part 114D dated August 14, B.E.2552 (2009), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).

[redacted] (Ms.Piyatida Pradangkho)
Laboratory Reviewer

[redacted] (Ms.Panicha Promchai)
laboratory Supervisor

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www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และ พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : **ฐานหลุมผลิตบึงม่วงใต้ 2 (BMS2) : A11 : หมู่ที่ 7 บ้านหนองไม้แดง (2) (บ้านเลขที่ 74 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0582540 E, 1839038 N
Quotation No. : AR2025-00472
Measured Date : April 3-6, 2025
Analysis No. : 2025-AB525-010
Measured By : Mr.Nitad Sirichad
Report No. : 2025-RAAJ632
Analyzed By : Environment Research & Technology Co., Ltd.
Report Date : May 16, 2025
Measured Instrument : SO_2 UV-Fluorescence Analyzer Thermo Model 43C Serial Number 57469-317

Interval Time	Result: SO_2 (ppm)			Standard
	Apr 3-4, 25	Apr 4-5, 25	Apr 5-6, 25	
09:00-10:00	0.0013	0.0015	0.0011	
10:00-11:00	0.0015	0.0015	0.0013	
11:00-12:00	0.0015	0.0015	0.0013	
12:00-13:00	0.0016	0.0016	0.0013	
13:00-14:00	0.0016	0.0017	0.0014	
14:00-15:00	0.0016	0.0018	0.0014	
15:00-16:00	0.0018	0.0018	0.0015	
16:00-17:00	0.0015	0.0017	0.0016	
17:00-18:00	0.0015	0.0017	0.0016	
18:00-19:00	0.0016	0.0017	0.0014	
19:00-20:00	0.0018	0.0016	0.0014	
20:00-21:00	0.0015	0.0014	0.0012	
21:00-22:00	0.0015	0.0013	0.0011	
22:00-23:00	0.0014	0.0015	0.0012	
23:00-00:00	0.0014	0.0013	0.0011	
00:00-01:00	0.0013	0.0013	0.0012	
01:00-02:00	0.0014	0.0013	0.0011	
02:00-03:00	0.0015	0.0012	0.0012	
03:00-04:00	0.0015	0.0012	0.0010	
04:00-05:00	0.0015	0.0013	0.0012	
05:00-06:00	0.0014	0.0012	0.0011	
06:00-07:00	0.0015	0.0012	0.0011	
07:00-08:00	0.0015	0.0011	0.0011	
08:00-09:00	0.0015	0.0011	0.0011	
24 Hours Average	**0.0015**	**0.0014**	**0.0013**	**0.12[1]**
1 Hour Maximum	**0.0018**	**0.0018**	**0.0016**	**0.30[2]**

Remark : [1] Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 42D dated May 25, B.E.2538 (1995) and Notification No.24, B.E.2547 (2004), published in the Royal Government Gazette No.121 Special Part 104D dated September 22, B.E.2547 (2004), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).
[2] Notification of National Environmental Board, No.12, B.E.2538 (1995), published in the Royal Government Gazette No.112 Special Part 27D dated July 13, B.E.2538 (1995) and Notification No.21, B.E.2544 (2001), published in the Royal Government Gazette No.118 Special Part 39D dated April 30, B.E.2544 (2001), under the Enhancement and Conservation of Na[redacted]992).

[redacted]

(Ms.Piyatida Pradangkho)
Laboratory Reviewer

[redacted]

(Ms.Panicha Promchai)
Laboratory Supervisor

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Tel 0-2954-7745-6 Fax 0-2954-7747
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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และ พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : **ฐานหลุมผลิตบึงม่วงใต้2 (BMS2) : A11 : หมู่ที่ 7 บ้านหนองไม้แดง (2) (บ้านเลขที่ 74 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0582540 E, 1839038 N
Quotation No. : AR2025-00472
Measured Date : April 3-6, 2025
Analysis No. : 2025-AB525-010
Measured By : Mr.Nitad Sirichad
Report No. : 2025-RAAJ633
Analyzed By : Environment Research & Technology Co., Ltd.
Report Date : May 16, 2025
Measured Instrument : CO NDIR Analyzer Horiba Model APMA-370 Serial Number JHG8PWA8

Interval Time	Result CO (ppm)						Standard[1]
	Apr 3-4, 25		Apr 4-5, 25		Apr 5-6, 25		
	1 hr Avg	8 hr Avg	1 hr Avg	8 hr Avg	1 hr Avg	8 hr Avg	
09:00-10:00	0.6	-	0.8	0.8	0.5	0.6	
10:00-11:00	0.7	-	0.8	0.8	0.6	0.6	
11:00-12:00	0.6	-	0.7	0.8	0.5	0.6	
12:00-13:00	0.5	-	0.6	0.8	0.5	0.5	
13:00-14:00	0.5	-	0.6	0.7	0.4	0.5	
14:00-15:00	0.5	-	0.5	0.7	0.4	0.5	
15:00-16:00	0.5	-	0.5	0.7	0.4	0.5	
16:00-17:00	0.5	0.6	0.5	0.6	0.5	0.5	
17:00-18:00	0.5	0.5	0.4	0.6	0.5	0.5	
18:00-19:00	0.5	0.5	0.4	0.5	0.5	0.5	
19:00-20:00	0.7	0.5	0.5	0.5	0.6	0.5	
20:00-21:00	0.6	0.5	0.6	0.5	0.3	0.4	
21:00-22:00	0.5	0.5	0.5	0.5	0.3	0.4	
22:00-23:00	0.7	0.6	0.5	0.5	0.3	0.4	
23:00-00:00	0.7	0.6	0.5	0.5	0.4	0.4	
00:00-01:00	0.6	0.6	0.5	0.5	0.4	0.4	
01:00-02:00	0.7	0.6	0.7	0.5	0.4	0.4	
02:00-03:00	0.7	0.6	0.6	0.6	0.4	0.4	
03:00-04:00	0.7	0.6	0.7	0.6	0.4	0.4	
04:00-05:00	0.7	0.7	1.0	0.6	0.5	0.4	
05:00-06:00	0.7	0.7	0.8	0.7	0.5	0.4	
06:00-07:00	0.7	0.7	0.5	0.7	0.5	0.4	
07:00-08:00	0.8	0.7	0.4	0.6	0.6	0.5	
08:00-09:00	0.9	0.7	0.4	0.6	0.6	0.5	
24 Hours Average	**0.6**	**-**	**0.6**	**-**	**0.5**	**-**	**-**
1 Hour Maximum	**0.9**	**-**	**1.0**	**-**	**0.6**	**-**	**30**
8 Hours Maximum	**-**	**0.7**	**-**	**0.8**	**-**	**0.6**	**9**

Remark : [1] Notification of Natio[redacted]995), publishe[redacted] Act B.E.2535 Enhancement and C[redacted]

[redacted]

(Ms.Piyatida Pradangkho)
Laboratory Reviewer

[redacted]

(Ms.Panicha Promchai)
Laboratory Supervisor

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E-mail : envi@enviresearch.co.th
www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตบีโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : **ฐานตรวจวัดผลิต BM3 : A8 : หมู่ที่ 6 บ้านใหม่สามัคคี (บ้านเลขที่ 99/1 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0586101 E, 1844171 N
Measured Date : April 3-6, 2025
Measured By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.

Quotation No. : AR2025-00472
Analysis No. : 2025-AB525-001
Report No. : 2025-RAAJ634
Report Date : May 16, 2025

Date/Time	Apr 3-4, 25		Apr 4-5, 25		Apr 5-6, 25	
	WS	WD	WS	WD	WS	WD
08:00-09:00	2.2	S	0.4	SSW	2.7	SSE
09:00-10:00	2.2	S	0.9	S	3.1	SSE
10:00-11:00	2.2	SSE	2.2	S	2.7	SSE
11:00-12:00	2.7	S	2.2	S	2.2	SSE
12:00-13:00	2.2	SSE	2.7	S	1.3	S
13:00-14:00	2.2	S	2.2	S	1.8	SSE
14:00-15:00	1.8	S	2.7	S	1.3	S
15:00-16:00	1.8	S	2.2	SSE	1.8	SW
16:00-17:00	2.2	S	2.7	SSE	1.8	SW
17:00-18:00	2.2	SSE	2.2	S	0.9	WSW
18:00-19:00	1.3	SSE	2.2	SSE	1.3	W
19:00-20:00	0.4	S	0.9	W	1.3	W
20:00-21:00	0.4	S	0.4	SW	3.6	ENE
21:00-22:00	0.4	SW	<0.4	Calm	2.7	NE
22:00-23:00	<0.4	Calm	0.9	W	3.1	W
23:00-00:00	0.4	S	0.9	SW	0.9	WSW
00:00-01:00	0.9	SSE	0.4	SW	0.4	NNW
01:00-02:00	0.4	S	0.4	SW	0.9	SSE
02:00-03:00	0.4	SSE	0.9	S	1.3	SSE
03:00-04:00	<0.4	Calm	0.9	S	1.3	S
04:00-05:00	<0.4	Calm	1.3	SSE	0.4	S
05:00-06:00	0.4	SE	0.9	SSE	0.4	SSE
06:00-07:00	<0.4	Calm	1.8	SSE	<0.4	Calm
07:00-08:00	<0.4	Calm	2.2	SSE	<0.4	Calm

Remark : WS = Wind Speed (m/s)
WD = Wind Direction
Height of wind vane and anemometer above ground 10 meters.

[redacted]

(Ms.Piyatida Pradangkho)
Laboratory Reviewer

[redacted]

(Ms.Panicha Promchai)
Laboratory Supervisor

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตบีโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : **ฐานตรวจวัดผลิต BM3 : A8 : หมู่ที่ 6 บ้านใหม่สามัคคี (บ้านเลขที่ 99/1 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0586101 E, 1844171 N
Measured Date : April 3-6, 2025
Measured By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.

Quotation No. : AR2025-00472
Analysis No. : 2025-AB525-001
Report No. : 2025-RAAJ634
Report Date : May 16, 2025

Wind Direction	Percentage frequency of wind in each speed and direction					
	0.4-1.1	1.1-2.1	2.1-3.1	3.1-4.1	≥4.1	Total
N	0.00000	0.00000	0.00000	0.00000	0.00000	**0.00000**
NNE	0.00000	0.00000	0.00000	0.00000	0.00000	**0.00000**
NE	0.00000	0.00000	1.38889	0.00000	0.00000	**1.38889**
ENE	0.00000	0.00000	0.00000	1.38889	0.00000	**1.38889**
E	0.00000	0.00000	0.00000	0.00000	0.00000	**0.00000**
ESE	0.00000	0.00000	0.00000	0.00000	0.00000	**0.00000**
SE	1.38889	0.00000	0.00000	0.00000	0.00000	**1.38889**
SSE	6.94444	6.94444	13.88890	1.38889	0.00000	**29.16667**
S	11.11110	6.94444	15.27780	0.00000	0.00000	**33.33334**
SSW	1.38889	0.00000	0.00000	0.00000	0.00000	**1.38889**
SW	6.94444	2.77778	0.00000	0.00000	0.00000	**9.72222**
WSW	2.77778	0.00000	0.00000	0.00000	0.00000	**2.77778**
W	2.77778	2.77778	0.00000	1.38889	0.00000	**6.94445**
WNW	0.00000	0.00000	0.00000	0.00000	0.00000	**0.00000**
NW	0.00000	0.00000	0.00000	0.00000	0.00000	**0.00000**
NNW	1.38889	0.00000	0.00000	0.00000	0.00000	**1.38889**
Calm	**11.11110**					

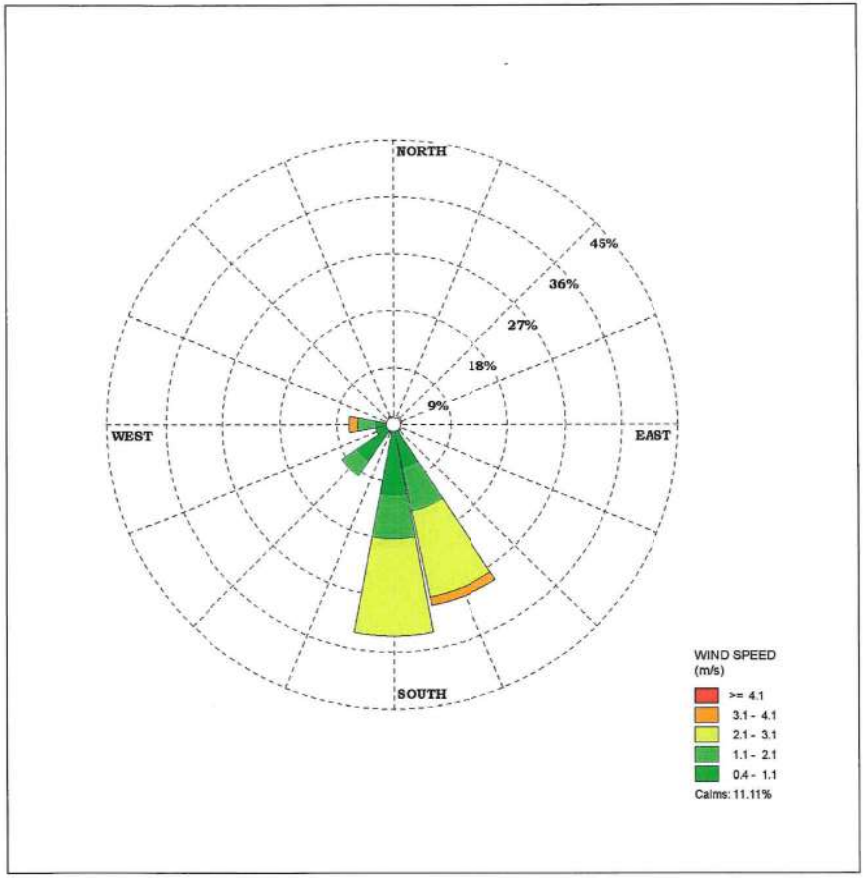
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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Measured Point : **ฐานหลุมผลิต BM3 : A8 : หมู่ที่ 6 บ้านใหม่สามัคคี (บ้านเลขที่ 99/1 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
Measured Date : April 3-6, 2025
Report No. : 2025-RAAJ634



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F-RP-007 Rev. 02, January 18, 2021

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www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : **ฐานหลุมผลิต BM3 : A9 : โรงเรียนบ้านบึงมาลย์ (ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0583512 E, 1842790 N
Measured Date : April 3-6, 2025
Measured By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.

Quotation No. : AR2025-00472
Analysis No. : 2025-ABS25-004
Report No. : 2025-RAAJ635
Report Date : May 16, 2025

Date/Time	Apr 3-4, 25		Apr 4-5, 25		Apr 5-6, 25	
	WS	WD	WS	WD	WS	WD
15:00-16:00	3.1	S	2.7	S	1.8	S
16:00-17:00	2.2	S	2.7	S	1.8	SW
17:00-18:00	2.2	S	2.2	S	0.4	WSW
18:00-19:00	1.3	S	1.8	S	1.8	W
19:00-20:00	0.4	S	0.9	WNW	2.7	WNW
20:00-21:00	0.4	SSW	<0.4	Calm	0.9	SE
21:00-22:00	<0.4	Calm	0.4	W	1.3	SW
22:00-23:00	<0.4	Calm	0.9	W	1.8	W
23:00-00:00	0.9	S	0.4	W	1.3	WSW
00:00-01:00	0.9	S	0.9	W	0.9	WNW
01:00-02:00	0.4	W	0.4	W	0.4	SSW
02:00-03:00	0.4	NE	0.9	SSW	0.9	SSE
03:00-04:00	<0.4	Calm	1.3	S	1.3	S
04:00-05:00	<0.4	Calm	0.9	S	0.9	S
05:00-06:00	<0.4	Calm	<0.4	Calm	0.4	SSE
06:00-07:00	<0.4	Calm	<0.4	Calm	<0.4	Calm
07:00-08:00	<0.4	Calm	0.4	SSE	<0.4	Calm
08:00-09:00	0.4	SW	1.3	SSE	0.4	SSE
09:00-10:00	1.8	S	2.7	S	0.9	S
10:00-11:00	2.7	S	2.2	S	1.3	S
11:00-12:00	2.7	S	1.8	S	1.8	S
12:00-13:00	2.2	S	1.8	S	1.8	S
13:00-14:00	2.7	S	1.8	S	2.2	S
14:00-15:00	2.7	S	1.8	SSW	2.2	SSE

Remark : WS = Wind Speed (m/s)
WD = Wind Direction
Height of wind vane and anemometer above ground 10 meters.

[redacted]
(Ms.Piyatida Pradangkho)
Laboratory Reviewer

[redacted]
(Ms.Panicha Promchai)
Laboratory Supervisor

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www.envisearch.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : **ฐานหลุมผลิต BM3 : A9 : โรงเรียนบ้านบึงมาลย์ (ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0583912 E, 1842790 N
Quotation No. : AR2025-00472
Measured Date : April 3-6, 2025
Analysis No. : 2025-AB525-004
Measured By : Mr.Nitad Sirichad
Report No. : 2025-RAAJ635
Analyzed By : Environment Research & Technology Co., Ltd.
Report Date : May 16, 2025

Wind Direction	Percentage frequency of wind in each speed and direction					
	0.4-1.1	1.1-2.1	2.1-3.1	3.1-4.1	≥4.1	Total
N	0.00000	0.00000	0.00000	0.00000	0.00000	**0.00000**
NNE	0.00000	0.00000	0.00000	0.00000	0.00000	**0.00000**
NE	1.38889	0.00000	0.00000	0.00000	0.00000	**1.38889**
ENE	0.00000	0.00000	0.00000	0.00000	0.00000	**0.00000**
E	0.00000	0.00000	0.00000	0.00000	0.00000	**0.00000**
ESE	0.00000	0.00000	0.00000	0.00000	0.00000	**0.00000**
SE	1.38889	0.00000	0.00000	0.00000	0.00000	**1.38889**
SSE	5.55556	1.38889	1.38889	0.00000	0.00000	**8.33334**
S	8.33333	16.66670	18.05560	1.38889	0.00000	**44.44452**
SSW	4.16667	1.38889	0.00000	0.00000	0.00000	**5.55556**
SW	1.38889	2.77778	0.00000	0.00000	0.00000	**4.16667**
WSW	1.38889	1.38889	0.00000	0.00000	0.00000	**2.77778**
W	8.33333	2.77778	0.00000	0.00000	0.00000	**11.11111**
WNW	2.77778	0.00000	1.38889	0.00000	0.00000	**4.16667**
NW	0.00000	0.00000	0.00000	0.00000	0.00000	**0.00000**
NNW	0.00000	0.00000	0.00000	0.00000	0.00000	**0.00000**
Calm	**16.66670**					

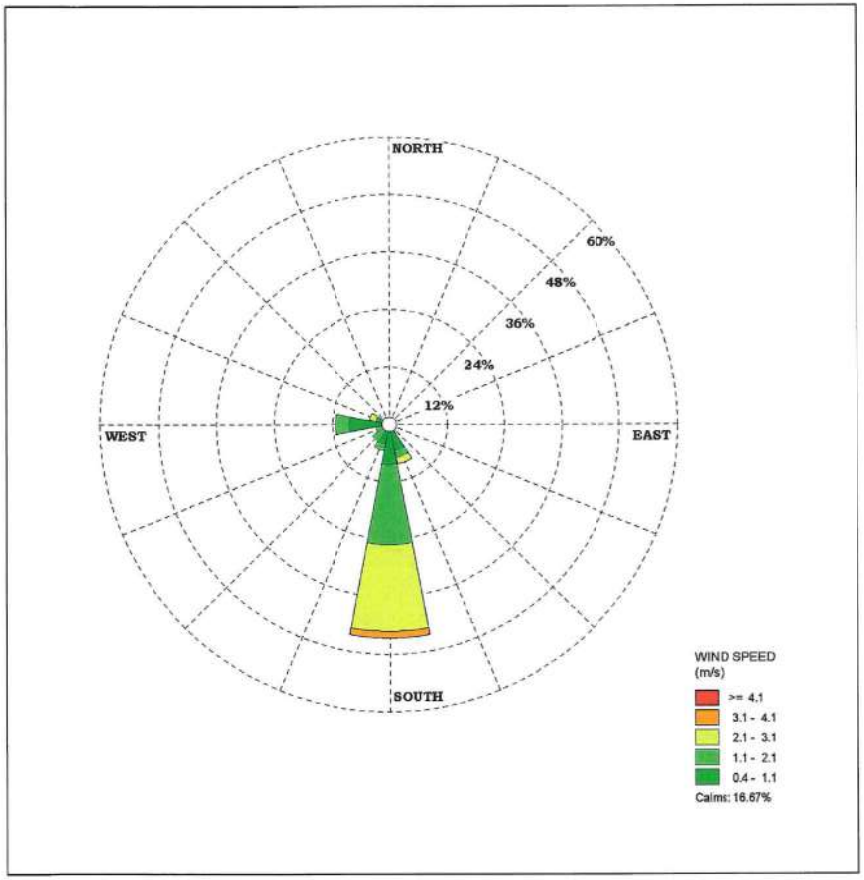
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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Measured Point : **ฐานหลุมผลิต BM3 : A9 : โรงเรียนบ้านบึงมาลย์ (ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
Measured Date : April 3-6, 2025
Report No. : 2025-RAAJ635



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www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตบิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตบิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : **ฐานผลุมผลิตบึงม่วงใต้ 2 (BMS2) : A10 : หมู่ที่ 7 บ้านหนองไม้แดง (1) (บ้านเลขที่ 55/3 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0584253 E, 1840548 N
Measured Date : April 3-6, 2025
Measured By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.

Quotation No. : AR2025-00472
Analysis No. : 2025-AB525-007
Report No. : 2025-RAAJ636
Report Date : May 14, 2025

Date/Time	Apr 3-4, 25		Apr 4-5, 25		Apr 5-6, 25	
	WS	WD	WS	WD	WS	WD
09:00-10:00	1.3	S	2.2	SSE	3.6	SSE
10:00-11:00	2.7	SSE	3.1	SSE	3.1	SSE
11:00-12:00	1.8	S	2.7	SSE	2.2	SSE
12:00-13:00	1.3	S	2.7	SSE	1.8	SSE
13:00-14:00	1.3	SSE	3.1	SSE	1.8	SE
14:00-15:00	1.8	SSE	2.7	S	1.8	SSE
15:00-16:00	1.8	SSE	3.1	SSE	2.2	SSE
16:00-17:00	1.3	SSE	2.7	SSW	1.8	WSW
17:00-18:00	2.7	SSE	2.7	SSE	0.9	WNW
18:00-19:00	1.8	SSE	2.2	SSE	1.8	WNW
19:00-20:00	1.3	S	0.9	WNW	2.7	NW
20:00-21:00	0.9	S	0.4	WNW	4.0	WNW
21:00-22:00	0.4	S	0.9	WNW	2.7	WNW
22:00-23:00	0.4	S	1.3	WNW	4.5	WNW
23:00-00:00	0.9	S	0.9	WNW	1.8	WNW
00:00-01:00	1.3	S	0.4	WNW	0.9	S
01:00-02:00	0.4	S	0.4	WNW	0.9	SSE
02:00-03:00	0.9	E	0.4	WNW	0.9	S
03:00-04:00	0.4	ESE	0.9	S	1.3	SE
04:00-05:00	0.4	ESE	1.3	SSE	0.9	N
05:00-06:00	0.9	NW	1.3	S	<0.4	Calm
06:00-07:00	0.9	SSE	1.3	SE	<0.4	Calm
07:00-08:00	0.4	NW	2.2	SE	0.4	WNW
08:00-09:00	0.4	NW	3.1	SSE	0.4	WNW

Remark : WS = Wind Speed (m/s)
WD = Wind Direction
Height of wind vane and anemometer above ground 10 meters.

[redacted]
(Ms.Piyatida Pradangkho)
Laboratory Reviewer

[redacted]
(Ms.Panicha Promchai)
Laboratory Supervisor

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตบิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตบิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : **ฐานผลุมผลิตบึงม่วงใต้ 2 (BMS2) : A10 : หมู่ที่ 7 บ้านหนองไม้แดง (1) (บ้านเลขที่ 55/3 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0584253 E, 1840548 N
Measured Date : April 3-6, 2025
Measured By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.

Quotation No. : AR2025-00472
Analysis No. : 2025-AB525-007
Report No. : 2025-RAAJ636
Report Date : May 14, 2025

Wind Direction	Percentage frequency of wind in each speed and direction					
	0.4-1.1	1.1-2.1	2.1-3.1	3.1-4.1	≥4.1	Total
N	1.38889	0.00000	0.00000	0.00000	0.00000	**1.38889**
NNE	0.00000	0.00000	0.00000	0.00000	0.00000	**0.00000**
NE	0.00000	0.00000	0.00000	0.00000	0.00000	**0.00000**
ENE	0.00000	0.00000	0.00000	0.00000	0.00000	**0.00000**
E	1.38889	0.00000	0.00000	0.00000	0.00000	**1.38889**
ESE	2.77778	0.00000	0.00000	0.00000	0.00000	**2.77778**
SE	0.00000	4.16667	1.38889	0.00000	0.00000	**5.55556**
SSE	2.77778	11.11110	12.50000	8.33333	0.00000	**34.72221**
S	11.11110	8.33333	1.38889	0.00000	0.00000	**20.83332**
SSW	0.00000	0.00000	1.38889	0.00000	0.00000	**1.38889**
SW	0.00000	0.00000	0.00000	0.00000	0.00000	**0.00000**
WSW	0.00000	1.38889	0.00000	0.00000	0.00000	**1.38889**
W	0.00000	0.00000	0.00000	0.00000	0.00000	**0.00000**
WNW	13.88890	4.16667	1.38889	1.38889	1.38889	**22.22224**
NW	4.16667	0.00000	1.38889	0.00000	0.00000	**5.55556**
NNW	0.00000	0.00000	0.00000	0.00000	0.00000	**0.00000**
Calm	**2.77778**					

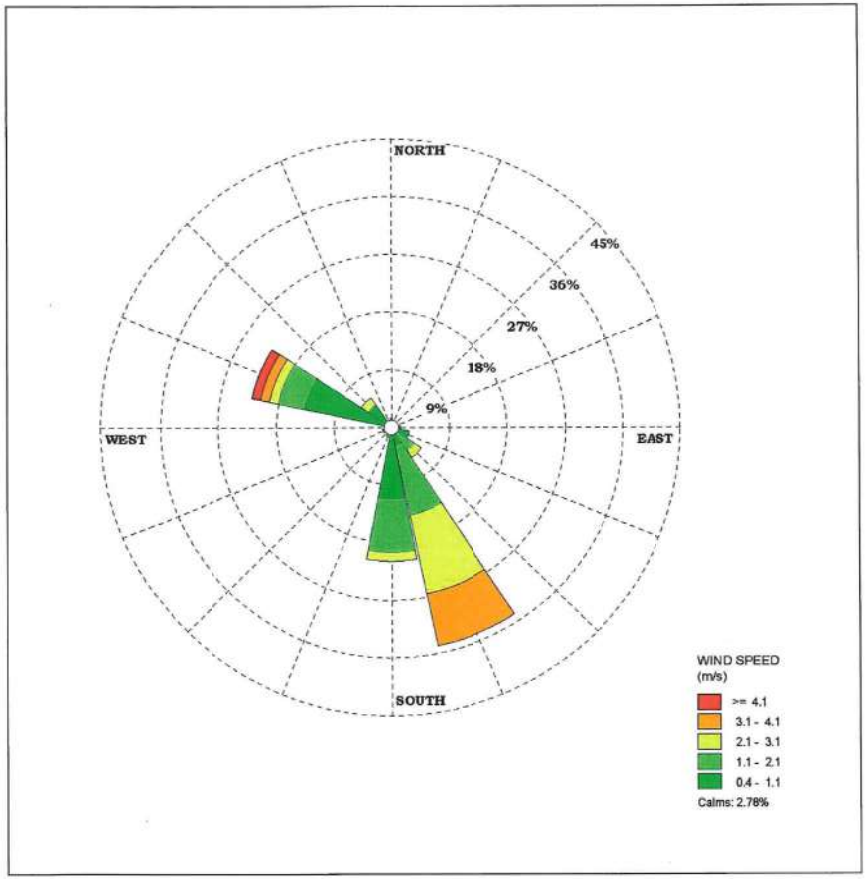
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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Project Name : โครงการผลิตบิโดรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตบิโดรเลียม)
Measured Point : **ฐานหลุมผลิตบึงม่วงใต้ 2 (BMS2) : A10 : หมู่ที่ 7 บ้านหนองไม้แดง (1) (บ้านเลขที่ 55/3 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
Measured Date : April 3-6, 2025
Report No. : 2025-RAAJ636



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E-mail : envi@enviresearch.co.th
www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตบิโดรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตบิโดรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : **ฐานหลุมผลิตบึงม่วงใต้ 2 (BMS2) : A11 : หมู่ที่ 7 บ้านหนองไม้แดง (2) (บ้านเลขที่ 74 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0582540 E, 1839038 N
Quotation No. : AR2025-00472
Measured Date : April 3-6, 2025
Analysis No. : 2025-AB525-010
Measured By : Mr.Nitad Sirichad
Report No. : 2025-RAAJ637
Analyzed By : Environment Research & Technology Co., Ltd.
Report Date : May 16, 2025

Date/Time	Apr 3-4, 25		Apr 4-5, 25		Apr 5-6, 25	
	WS	WD	WS	WD	WS	WD
09:00-10:00	2.2	SE	1.8	SE	1.8	ESE
10:00-11:00	1.8	SSE	1.3	SE	1.8	ESE
11:00-12:00	1.8	S	1.8	ESE	1.3	ESE
12:00-13:00	1.3	S	1.8	E	1.3	ENE
13:00-14:00	0.9	SSE	1.8	ESE	1.3	E
14:00-15:00	1.3	SSE	1.8	SE	1.3	E
15:00-16:00	1.3	SSE	1.8	S	2.2	SSE
16:00-17:00	0.9	SSE	1.8	SE	2.2	SSW
17:00-18:00	0.9	SE	1.8	SE	0.4	W
18:00-19:00	0.4	SSE	1.3	SE	1.8	W
19:00-20:00	0.4	SE	0.9	W	1.8	W
20:00-21:00	0.4	SE	0.4	SSW	2.2	NNE
21:00-22:00	0.4	SSW	0.4	W	2.2	N
22:00-23:00	0.9	WSW	0.9	W	3.1	WNW
23:00-00:00	0.9	WSW	0.4	W	0.9	W
00:00-01:00	0.4	S	0.4	SSW	0.9	WNW
01:00-02:00	0.4	SE	<0.4	Calm	0.4	SE
02:00-03:00	0.4	E	0.4	SSE	0.9	SSE
03:00-04:00	0.9	E	0.4	SE	0.9	SSE
04:00-05:00	0.9	ESE	0.4	SE	0.4	S
05:00-06:00	0.4	ESE	0.4	ESE	<0.4	Calm
06:00-07:00	0.4	ESE	0.9	ESE	0.4	E
07:00-08:00	0.9	SSE	1.3	ESE	0.4	N
08:00-09:00	1.3	ESE	1.8	ESE	<0.4	Calm

Remark : WS = Wind Speed (m/s)
WD = Wind Direction
Height of wind vane and anemometer above ground 10 meters.

[redacted] [redacted]

(Ms.Piyatida Pradangkho)
Laboratory Reviewer

(Ms.Panicha Promchai)
Laboratory Supervisor

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตบีโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตบีโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : **ฐานหลุมผลิตบึงม่วงไข่ 2 (BMS2) : A11 : หมู่ที่ 7 บ้านหนองไม้แดง (2) (บ้านเลขที่ 74 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0582540 E, 1839038 N
Quotation No. : AR2025-00472
Measured Date : April 3-6, 2025
Analysis No. : 2025-AB525-010
Measured By : Mr.Ntad Sirichad
Report No. : 2025-RAAJ637
Analyzed By : Environment Research & Technology Co., Ltd.
Report Date : May 16, 2025

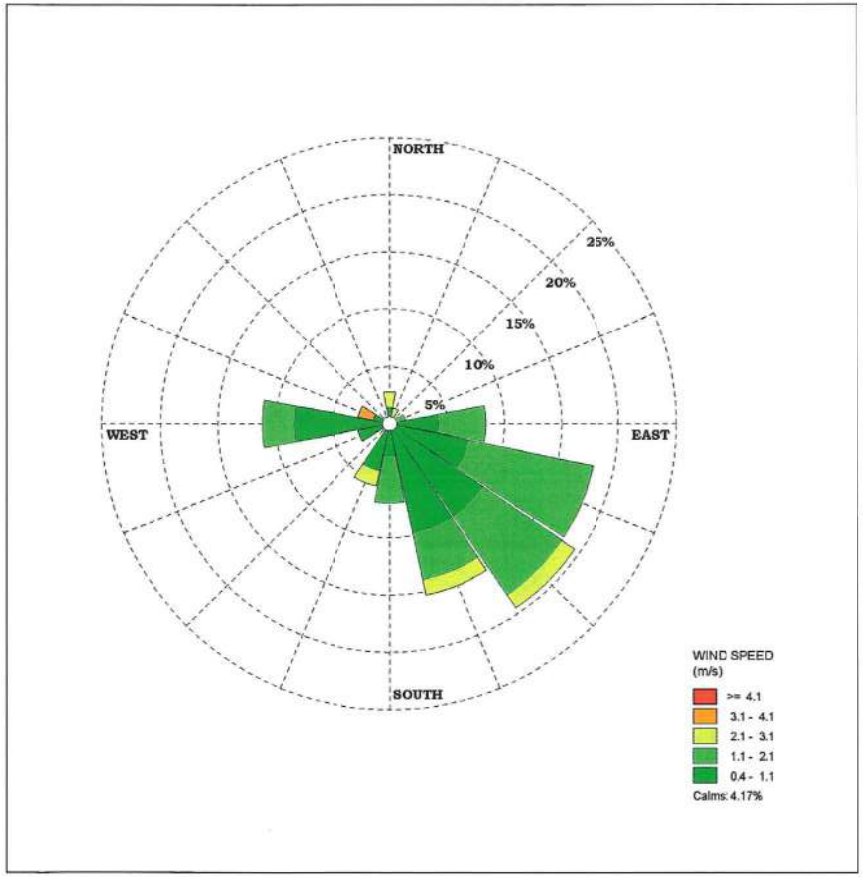
Wind Direction	Percentage frequency of wind in each speed and direction					
	0.4-1.1	1.1-2.1	2.1-3.1	3.1-4.1	≥4.1	Total
N	1.38889	0.00000	1.38889	0.00000	0.00000	**2.77778**
NNE	0.00000	0.00000	1.38889	0.00000	0.00000	**1.38889**
NE	0.00000	0.00000	0.00000	0.00000	0.00000	**0.00000**
ENE	0.00000	1.38889	0.00000	0.00000	0.00000	**1.38889**
E	4.16667	4.16667	0.00000	0.00000	0.00000	**8.33334**
ESE	6.94444	11.11110	0.00000	0.00000	0.00000	**18.05554**
SE	9.72222	8.33333	1.38889	0.00000	0.00000	**19.44444**
SSE	9.72222	4.16667	1.38889	0.00000	0.00000	**15.27778**
S	2.77778	4.16667	0.00000	0.00000	0.00000	**6.94445**
SSW	4.16667	0.00000	1.38889	0.00000	0.00000	**5.55556**
SW	0.00000	0.00000	0.00000	0.00000	0.00000	**0.00000**
WSW	2.77778	0.00000	0.00000	0.00000	0.00000	**2.77778**
W	8.33333	2.77778	0.00000	0.00000	0.00000	**11.11111**
WNW	1.38889	0.00000	0.00000	1.38889	0.00000	**2.77778**
NW	0.00000	0.00000	0.00000	0.00000	0.00000	**0.00000**
NNW	0.00000	0.00000	0.00000	0.00000	0.00000	**0.00000**
Calm	**4.16667**					

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Project Name : โครงการผลิตบีโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตบีโตรเลียม)
Measured Point : **ฐานหลุมผลิตบึงม่วงไข่ 2 (BMS2) : A11 : หมู่ที่ 7 บ้านหนองไม้แดง (2) (บ้านเลขที่ 74 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
Measured Date : April 3-6, 2025
Report No. : 2025-RAAJ637



บริษัท ซีเอ็นพีซีเอชเค (ไทยแลนด์) จำกัด

รายงานผลการปฏิบัติตามมาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม และมาตรการติดตามตรวจสอบผลกระทบสิ่งแวดล้อม โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร ฉบับเดือนมกราคม - มิถุนายน พ.ศ.2568

ภาคผนวก ง.4

ระดับเสียง

ระยะเจาะหลุมปิโตรเลียม

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ANALYSIS REPORT

Customer Name : Vsion E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi :1000
Project Name : โครงการผลิตปีโครเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปีโครเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Noise
Measured Point : **ฐานหลุมผลิต BY1-20 : N3 : ที่ทำการสายตรวจตำบลหนองจิก (ตำบลหนองจิก อำเภอคีรีมาศ จังหวัดสุโขทัย)**
GPS. Coordinate : UTM (WGS84) 47P 0584038 E, 1846274 N
Quotation No. : AR2025-00471
Measured Date : May 1-2, 2025
Analysis No. : 2025-AB920-007
Measured By : Mr.Apichat Pulphon
Report No. : 2025-RAAK880
Analyzed By : Environment Research & Technology Co., Ltd.
Report Date : May 30, 2025
Measured Instrument : Integrating Sound Level Meter RION Model NL-53 Serial Number 00251819

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
16:00-17:00	54.1	78.7	59.4	56.5	48.7	45.2
17:00-18:00	53.0	72.5	58.5	55.7	49.2	46.9
18:00-19:00	59.0	75.2	61.7	61.0	58.4	56.8
19:00-20:00	53.0	69.8	54.4	53.8	52.7	52.1
20:00-21:00	53.0	69.3	54.6	53.7	52.7	52.2
21:00-22:00	53.7	70.2	55.9	54.7	53.6	52.2
22:00-23:00	55.0	73.5	59.7	57.6	53.5	51.7
23:00-00:00	52.2	68.1	54.2	53.5	51.7	50.9
00:00-01:00	54.2	73.7	58.0	57.0	53.2	51.4
01:00-02:00	53.2	69.8	55.9	55.9	52.0	50.6
02:00-03:00	52.8	69.7	55.0	54.2	52.1	50.8
03:00-04:00	52.1	72.4	54.0	53.6	51.4	50.7
04:00-05:00	53.6	73.5	58.3	54.9	51.5	50.9
05:00-06:00	60.5	78.2	64.6	62.3	59.6	58.3
06:00-07:00	59.9	77.9	65.4	62.3	56.6	54.8
07:00-08:00	56.2	76.5	62.2	59.5	51.8	49.5
08:00-09:00	65.1	77.0	67.8	67.0	64.7	62.4
09:00-10:00	68.2	80.3	70.2	69.5	68.0	66.7
10:00-11:00	60.1	85.7	67.7	63.7	53.5	49.0
11:00-12:00	56.1	76.4	62.4	57.7	48.5	44.8
12:00-13:00	54.9	78.3	61.5	57.2	46.9	43.7
13:00-14:00	57.9	78.3	63.6	59.3	53.2	51.2
14:00-15:00	56.4	75.5	62.5	59.4	50.3	45.8
15:00-16:00	57.0	84.3	64.1	60.5	48.7	44.9
24 Hours Measurement	**59.0**	**85.7**	**63.0**	**60.9**	**57.7**	**56.1**
Standard[1/]	**70**	**115**	-	-	-	-
Ldn	**63.3**	-	-	-	-	-

Remark : [1/] Notification of National Environmental Board, No.15, B.E.2540 (1997) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Gover[illegible] (1997).

[redacted]

(Ms.Supawan Suwanrapa)
Laboratory Reviewer

[redacted]

(Ms.Thanida Bunrungrueang)
Laboratory Supervisor

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปีโครเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปีโครเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Noise
Measured Point : **ฐานหลุมผลิต BY1-20 : N3 : ที่ทำการสายตรวจตำบลหนองจิก (ตำบลหนองจิก อำเภอคีรีมาศ จังหวัดสุโขทัย)**
GPS. Coordinate : UTM (WGS84) 47P 0584038 E, 1846274 N
Quotation No. : AR2025-00471
Measured Date : May 2-3, 2025
Analysis No. : 2025-AB920-007
Measured By : Mr.Apichat Pulphon
Report No. : 2025-RAAK880
Analyzed By : Environment Research & Technology Co., Ltd.
Report Date : May 30, 2025
Measured Instrument : Integrating Sound Level Meter RION Model NL-53 Serial Number 00251819

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
16:00-17:00	57.1	79.6	62.9	59.4	50.3	46.8
17:00-18:00	59.0	86.5	63.8	59.6	51.5	49.0
18:00-19:00	60.0	84.3	66.0	62.5	55.1	52.5
19:00-20:00	54.6	86.8	59.5	55.9	50.4	49.4
20:00-21:00	52.7	73.6	56.3	52.9	51.2	50.8
21:00-22:00	54.5	72.0	55.4	54.7	53.9	53.4
22:00-23:00	54.3	75.3	55.0	54.4	51.9	50.6
23:00-00:00	54.4	77.8	57.4	54.6	53.6	53.2
00:00-01:00	54.0	72.7	55.3	54.5	53.6	53.1
01:00-02:00	53.6	75.7	55.1	54.8	53.0	52.0
02:00-03:00	55.8	73.7	56.7	56.2	55.1	54.3
03:00-04:00	55.4	69.4	56.2	56.0	55.2	54.6
04:00-05:00	56.9	74.0	60.7	60.0	54.7	53.8
05:00-06:00	53.3	83.0	56.7	54.5	51.0	49.2
06:00-07:00	56.2	77.2	61.4	58.8	52.0	47.2
07:00-08:00	60.0	79.8	66.7	62.4	51.7	47.3
08:00-09:00	62.5	79.0	67.4	64.8	60.8	58.7
09:00-10:00	62.1	82.1	67.4	64.1	59.4	55.9
10:00-11:00	59.3	88.5	63.9	59.8	51.5	48.5
11:00-12:00	57.0	76.8	63.2	59.5	50.3	45.7
12:00-13:00	59.6	85.7	65.6	60.9	52.4	47.8
13:00-14:00	57.4	79.2	64.3	60.4	49.7	46.8
14:00-15:00	55.6	76.1	61.8	57.3	49.3	44.6
15:00-16:00	59.0	82.0	66.9	61.9	49.1	44.6
24 Hours Measurement	**57.8**	**88.5**	**63.0**	**59.6**	**54.0**	**52.0**
Standard[1/]	**70**	**115**	-	-	-	-
Ldn	**62.2**	-	-	-	-	-

Remark : [1/] Notification of National Environmental Board, No.15, B.E.2540 (1997) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Governm[illegible] (1997).

[redacted]

(Ms.Supawan Suwanrapa)
Laboratory Reviewer

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(Ms.Thanida Bunrungrueang)
Laboratory Supervisor

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ANALYSIS REPORT

Customer Name	: Vision E. Consultants Co., Ltd.
Address	: 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name	: โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระและพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Project Location	: จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source	: Ambient Noise
Measured Point	: ฐานหลุมผลิต BY1-20 : N3 : ที่ทำการสายตรวจด่านลองจิก (ด้านลองจิก อำเภอศรีนคร จังหวัดสุโขทัย)
GPS. Coordinate	: UTM (WGS84) 47P 0584038 E, 1846274 N
Measured Date	: May 3-4, 2025
Measured By	: Mr.Apichat Pulphon
Analyzed By	: Environment Research & Technology Co., Ltd.
Measured Instrument	: Integrating Sound Level Meter RION Model NL-53 Serial Number 00251819

Quotation No.	: AR2025-00471
Analysis No.	: 2025-AB920-007
Report No.	: 2025-RAAK880
Report Date	: May 30, 2025

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
16:00-17:00	60.4	84.1	67.1	62.3	52.8	48.2
17:00-18:00	59.1	89.1	65.4	60.8	51.2	46.0
18:00-19:00	57.9	82.6	63.2	59.6	49.1	44.9
19:00-20:00	54.8	79.5	59.7	56.2	50.5	49.1
20:00-21:00	56.8	87.3	63.1	58.6	52.4	51.5
21:00-22:00	56.5	81.2	60.2	56.8	53.4	52.7
22:00-23:00	55.0	82.8	57.8	55.6	54.1	53.6
23:00-00:00	54.0	72.1	54.8	54.2	53.5	53.0
00:00-01:00	53.3	73.1	53.8	53.5	52.8	52.3
01:00-02:00	54.0	73.4	54.7	54.5	53.0	51.5
02:00-03:00	56.7	70.7	57.7	57.1	56.5	56.0
03:00-04:00	57.8	76.4	58.5	58.0	56.5	55.1
04:00-05:00	59.5	74.9	62.5	61.5	58.2	56.2
05:00-06:00	60.4	80.2	64.7	63.3	58.5	52.3
06:00-07:00	61.7	81.7	68.6	64.6	55.9	49.7
07:00-08:00	60.4	81.6	66.7	63.0	54.4	49.5
08:00-09:00	59.3	82.8	65.4	61.5	51.5	46.6
09:00-10:00	61.0	86.1	68.5	64.5	53.1	48.4
10:00-11:00	58.7	89.2	64.6	60.9	51.9	47.9
11:00-12:00	58.2	91.8	65.3	61.1	51.7	47.6
12:00-13:00	57.5	80.2	63.4	59.6	48.5	44.6
13:00-14:00	58.2	86.8	62.8	59.4	53.1	50.5
14:00-15:00	57.4	90.3	63.5	59.2	50.8	47.4
15:00-16:00	58.8	83.2	64.7	60.2	50.8	45.5
24 Hours Measurement	**58.4**	**91.8**	**64.0**	**60.4**	**53.9**	**51.3**
Standard[1/]	**70**	**115**	-	-	-	-
Ldn	**64.4**	-	-	-	-	-

Remark : [1/] Notification of National Environmental Board, No.15, B.E.2540 (1997) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.114 Part 27D dated April 3, B.E.2540 (1997).

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Laboratory Supervisor

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รายงานผลการตรวจวัดเสียงรบกวน

ชื่อลูกค้า : บริษัท วิชั่นอี คอนซัลแทนท์ จำกัด

ที่อยู่ลูกค้า : เลขที่ 101/22 หมู่ที่ 2 ซอยมณียา ซอย 3 ตำบลไทรม้า อำเภอเมืองนนทบุรี จังหวัดนนทบุรี 11000

ชื่อโครงการ : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)

ที่ตั้งโครงการ : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร

ประเภทของแหล่งกำเนิด : เสียงรบกวนกรณีที่ 4 เกิดจากการผลิตปิโตรเลียม

บริเวณที่ตรวจวัดเสียงขณะมีการรบกวน : ฐานหลุมผลิต BY1-20 : N3 : ที่ทำการสายตรวจด่านลองจิก UTM (WGS84) 47P 0584038 E, 1846274 N

บริเวณที่ตรวจวัดเสียงขณะไม่มีการรบกวน : จุดอ้างอิง UTM (WGS84) 47P 0585176 E, 1846447 N

ตรวจวัดโดย : นายอภิชาติ พุลพล

วิเคราะห์โดย : บริษัท เอ็นไวรอนเมนท์ รีเสริช แอนด์ เทคโนโลยี จำกัด

เครื่องมือที่ใช้ตรวจวัด : เครื่องวัดระดับเสียง RION Model NL-53 Serial Number 00251819,
เครื่องวัดระดับเสียง Scarlet Tech Model ST-11D Serial Number 820931

หมายเลขใบเสนอราคา : AR2025-00471

หมายเลขปฏิบัติการ : 2025-AB920-007

หมายเลขรายงานผล : 2025-RAAK881

วันที่รายงานผล : 30 พฤษภาคม 2568

ระดับเสียงขณะเกิดเสียงของแหล่งกำเนิด			ระดับเสียงขณะไม่มีการรบกวน				การคำนวณระดับการรบกวน[1/]					มาตรฐาน[2/]	สรุปผล
วันที่	ช่วงเวลา	ระดับเสียงเฉลี่ย ($L_{Aeq,Ts}$; dB(A))	วันที่	ช่วงเวลา	ระดับเสียงเฉลี่ย 5 นาที ($L_{Aeq,R}$; dB(A))	ระดับเสียงพื้นฐาน (L_{A90}; dB(A))	ระยะเวลาของช่วงเวลาที่แหล่งกำเนิดเกิดเสียง (Ts; นาที)	ระดับเสียงขณะมีการรบกวน ($L_{Aeq,Tr}$; dB(A))	กรณีที่ 4 บวกเพิ่ม 3 dB(A)	กรณีที่ 5 บวกเพิ่ม 5 dB(A)	ระดับการรบกวน		
1 พ.ค. 68	23:35-23:40	52.7	1 พ.ค. 68	23:25-23:30	48.7	48.0	5	50.5	53.5	-	5.5	≤10	ไม่เป็นเสียงรบกวน
3 พ.ค. 68	03:00-03:05	54.5	3 พ.ค. 68	03:00-03:05	48.9	48.4	5	53.1	56.1	-	7.7	≤10	ไม่เป็นเสียงรบกวน
4 พ.ค. 68	01:55-02:00	55.7	4 พ.ค. 68	01:15-01:20	52.8	51.9	5	52.6	55.6	-	3.7	≤10	ไม่เป็นเสียงรบกวน

หมายเหตุ : [1/] ประกาศคณะกรรมการควบคุมมลพิษ เรื่อง วิธีการตรวจวัดระดับเสียงพื้นฐาน ระดับเสียงขณะไม่มีการรบกวน การตรวจวัดและคำนวณระดับเสียงขณะมีการรบกวน การคำนวณค่าระดับการรบกวน และรูปแบบบันทึกการตรวจวัดเสียงรบกวน พ.ศ. 2565
[2/] ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 29 (พ.ศ. 2550) เรื่อง ค่าระดับเสียงรบกวน

[redacted]
(นางสาวสุภาวรรณ สุวรรณเภา)
ผู้ทบทวน

[redacted]
(นางสาวธนิตา บุญรุ่งเรือง)
ผู้ควบคุมการตรวจวัด

เอกสารฉบับนี้จะไม่รับรองหรือรายงานผลแต่เพียงบางส่วน โดยไม่ได้รับอนุญาตจากบริษัท เอ็นไวรอนเมนท์ รีเสริช แอนด์ เทคโนโลยี จำกัด เป็นลายลักษณ์อักษร
รายงานนี้รับรองเฉพาะตัวอย่างที่ได้ตรวจ รับตรวจ/ ทดสอบเท่านั้น

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ANALYSIS REPORT

Customer Name :Vision E. Consultants Co., Ltd.
Address :101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name :โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Project Location :จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source :Ambient Noise
Measured Point :**ฐานหลุมผลิต BM6 : N8 : หมู่ที่ 4 บ้านบึงมาลย์ (3) (บ้านบึงมาลย์ หมู่ที่ 4 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate :UTM (WGS84) 47Q 0583088 E, 1842837 N
Quotation No. : AR2025-00471
Measured Date :March 27-28, 2025
Analysis No. : 2025-AB344-007
Measured By :Mr.Kunakorn Ratanawongsa
Report No. : 2025-RAAI041
Analyzed By :Environment Research & Technology Co., Ltd.
Report Date : April 30, 2025
Measured Instrument :Integrating Sound Level Meter Scarlet Tech Model ST-15D Serial Number 10338009

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
10:00-11:00	52.1	76.7	57.1	55.3	48.9	46.2
11:00-12:00	51.8	70.6	56.6	54.9	49.5	45.5
12:00-13:00	52.7	74.8	57.3	55.1	50.1	46.9
13:00-14:00	51.5	68.2	55.8	54.2	49.8	47.5
14:00-15:00	52.2	70.7	57.1	54.9	49.3	45.9
15:00-16:00	51.7	69.4	56.3	54.6	49.7	45.6
16:00-17:00	53.3	76.3	57.7	55.4	49.6	46.1
17:00-18:00	51.4	72.5	56.4	54.4	48.8	44.9
18:00-19:00	52.6	76.8	57.6	55.1	49.1	47.1
19:00-20:00	49.3	80.0	51.2	49.7	47.3	46.1
20:00-21:00	48.1	71.9	50.3	48.4	46.7	45.9
21:00-22:00	47.3	65.4	49.2	48.0	46.4	45.7
22:00-23:00	47.1	69.2	48.8	47.6	46.1	45.1
23:00-00:00	46.4	67.6	47.1	46.8	46.1	45.4
00:00-01:00	45.9	62.6	46.6	46.2	45.4	45.0
01:00-02:00	44.9	52.5	45.8	45.5	44.8	44.0
02:00-03:00	45.8	55.2	46.6	46.4	45.7	45.0
03:00-04:00	45.9	61.3	46.9	46.4	45.7	45.1
04:00-05:00	45.4	58.3	47.2	46.1	45.0	44.5
05:00-06:00	46.7	68.8	52.3	48.4	44.1	43.0
06:00-07:00	56.0	75.1	61.2	59.4	53.5	49.3
07:00-08:00	55.2	73.5	60.4	58.4	52.4	47.8
08:00-09:00	54.2	75.0	59.4	57.3	51.2	47.0
09:00-10:00	53.3	75.4	58.4	56.2	50.4	46.6
24 Hours Measurement	**51.3**	**80.0**	**55.9**	**53.9**	**48.9**	**46.1**
Standard[1/]	**70**	**115**	-	-	-	-
Ldn	**56.1**	-	-	-	-	-

Remark : [1/] Notification of Nat[redacted]der the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Gove[redacted]0 (1997).

[redacted]

(Ms.Supawan Suwannapa)
Laboratory Reviewer

(Ms.Thanida Bunrungrueang)
Laboratory Supervisor

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www.envisearch.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name :Vision E. Consultants Co., Ltd.
Address :101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name :โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Project Location :จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source :Ambient Noise
Measured Point :**ฐานหลุมผลิต BM6 : N8 : หมู่ที่ 4 บ้านบึงมาลย์ (3) (บ้านบึงมาลย์ หมู่ที่ 4 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate :UTM (WGS84) 47Q 0583088 E, 1842837 N
Quotation No. : AR2025-00471
Measured Date :March 28-29, 2025
Analysis No. : 2025-AB344-007
Measured By :Mr.Kunakorn Ratanawongsa
Report No. : 2025-RAAI041
Analyzed By :Environment Research & Technology Co., Ltd.
Report Date : April 30, 2025
Measured Instrument :Integrating Sound Level Meter Scarlet Tech Model ST-15D Serial Number 10338009

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
10:00-11:00	54.1	73.4	60.2	57.7	49.8	47.2
11:00-12:00	52.3	72.6	57.7	55.8	49.0	46.1
12:00-13:00	51.1	76.4	59.7	52.8	47.1	45.6
13:00-14:00	52.9	78.8	57.6	54.2	47.8	46.0
14:00-15:00	52.4	76.7	58.4	54.3	46.8	42.7
15:00-16:00	51.5	80.3	55.6	53.7	47.7	44.4
16:00-17:00	53.0	71.0	58.4	56.0	49.8	45.6
17:00-18:00	53.7	72.2	59.4	57.1	50.4	47.1
18:00-19:00	52.9	77.2	58.4	55.4	46.8	45.0
19:00-20:00	49.3	70.0	51.1	50.1	48.6	47.9
20:00-21:00	49.7	64.7	51.4	50.4	49.3	48.3
21:00-22:00	50.8	72.6	51.7	51.4	50.5	49.7
22:00-23:00	49.9	68.7	53.5	51.2	48.8	47.9
23:00-00:00	48.8	73.1	49.9	49.1	48.3	47.3
00:00-01:00	47.8	58.5	48.6	48.3	47.6	46.8
01:00-02:00	48.3	59.4	49.1	48.9	48.1	47.5
02:00-03:00	47.4	57.4	48.1	47.9	47.3	46.7
03:00-04:00	48.0	67.9	48.8	48.5	47.9	47.3
04:00-05:00	48.8	62.3	50.0	49.5	48.6	48.0
05:00-06:00	50.8	70.7	56.6	53.7	48.4	47.4
06:00-07:00	57.1	80.1	62.7	59.5	53.2	49.9
07:00-08:00	56.2	83.6	60.8	58.3	51.7	48.4
08:00-09:00	55.3	78.5	60.3	58.0	51.8	47.6
09:00-10:00	52.7	83.1	56.3	54.8	48.7	44.7
24 Hours Measurement	**52.3**	**83.6**	**57.2**	**54.6**	**49.3**	**47.2**
Standard[1/]	**70**	**115**	-	-	-	-
Ldn	**57.7**	-	-	-	-	-

Remark : [1/] Notification of National [redacted]997).

[redacted]

(Ms.Supawan Suwannapa)
Laboratory Reviewer

(Ms.Thanida Bunrungrueang)
Laboratory Supervisor

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจขนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระและพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจขนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Noise
Measured Point : ฐานหลุมผลิต BM6 : N8 : หมู่ที่ 4 บ้านบึงมาลย์ (3) (บ้านบึงมาลย์ หมู่ที่ 4 ตำบลหนองหลวง อำเภอคลากระบือ จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0583088 E, 1842837 N
Measured Date : March 29-30, 2025
Measured By : Mr.Kunakorn Ratanawongsa
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-15D Serial Number 10338009

Quotation No. : AR2025-00471
Analysis No. : 2025-AB344-007
Report No. : 2025-RAAI041
Report Date : April 30, 2025

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
10:00-11:00	53.1	74.5	58.6	56.2	49.5	45.9
11:00-12:00	52.1	71.8	57.5	55.1	48.4	45.9
12:00-13:00	50.0	75.7	53.7	51.2	46.5	44.7
13:00-14:00	49.3	68.0	54.4	51.7	46.4	43.9
14:00-15:00	50.3	74.4	55.4	52.5	46.4	44.2
15:00-16:00	49.9	77.5	54.4	51.0	46.1	44.8
16:00-17:00	53.9	74.8	59.6	57.5	50.0	44.9
17:00-18:00	53.4	71.8	58.4	56.4	51.0	47.1
18:00-19:00	52.2	77.5	57.3	55.1	49.3	46.9
19:00-20:00	49.6	66.7	52.8	50.9	48.1	47.4
20:00-21:00	48.9	63.3	50.8	49.6	48.4	47.8
21:00-22:00	47.7	66.3	51.1	49.1	46.5	45.7
22:00-23:00	46.7	64.2	48.6	47.3	46.2	45.3
23:00-00:00	47.7	56.8	48.8	48.6	47.6	46.5
00:00-01:00	48.1	58.7	49.0	48.9	48.0	47.1
01:00-02:00	48.5	60.9	49.7	49.2	48.1	47.4
02:00-03:00	48.9	56.7	50.3	49.8	48.7	47.9
03:00-04:00	47.8	60.1	48.9	48.5	47.6	47.1
04:00-05:00	47.0	66.0	48.2	47.7	46.8	46.0
05:00-06:00	47.0	61.2	49.6	48.3	46.5	45.6
06:00-07:00	55.1	77.2	60.6	57.8	52.1	48.4
07:00-08:00	55.5	74.1	60.8	58.7	52.6	48.6
08:00-09:00	53.6	78.1	58.6	56.6	50.3	47.0
09:00-10:00	52.3	73.8	57.7	55.6	49.0	45.7
24 Hours Measurement	51.2	78.1	55.9	53.7	48.8	46.5
Standard[1]	70	115	-	-	-	-
Ldn	56.4	-	-	-	-	-

Remark : [1] Notification of National Environmental Board, No.15, B.E.2540 (1997) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.114 Part 27D dated April 3, B.E.1540 (1997).

[redacted]
(Ms.Supawan Suwannapa)
Laboratory Reviewer

[redacted]
(Ms.Thanida Bunrungrueang)
Laboratory Supervisor

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รายงานผลการตรวจวัดเสียงรบกวน

ชื่อลูกค้า : บริษัท วิชันอี คอนซัลแทนท์ จำกัด
ที่อยู่ลูกค้า : เลขที่ 101/22 หมู่ที่ 2 ซอยมณีเมีย ซอย 3 ตำบลไทรม้า อำเภอเมืองนนทบุรี จังหวัดนนทบุรี 11000
ชื่อโครงการ : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจขนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจขนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
ที่ตั้งโครงการ : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
ประเภทของแหล่งกำเนิด : เสียงรบกวนกรณีที่ 4 เกิดจากการผลิตปิโตรเลียม
บริเวณที่ตรวจวัดเสียงขณะมีการรบกวน : ฐานหลุมผลิต BM6 : N8 : หมู่ที่ 4 บ้านบึงมาลย์ (3) UTM (WGS84) 47Q 0583088 E, 1842837 N
บริเวณที่ตรวจวัดเสียงขณะไม่มีการรบกวน : จุดอ้างอิง UTM (WGS84) 47Q 0583011 E, 1842796 N
ตรวจวัดโดย : นายคุณากร รัตนวงษา
วิเคราะห์โดย : บริษัท เอ็นไวรอนเมนท์ รีเสิร์ช แอนด์ เทคโนโลยี จำกัด
เครื่องมือที่ใช้ตรวจวัด : เครื่องวัดระดับเสียง Scarlet Tech Model ST-15D Serial Number 10338009,
เครื่องวัดระดับเสียง Scarlet Tech Model ST-15D Serial Number 10338010

หมายเลขใบเสนอราคา : AR2025-00471
หมายเลขปฏิบัติการ : 2025-AB344-007
หมายเลขรายงานผล : 2025-RAAI042
วันที่รายงานผล : 30 เมษายน 2568

ระดับเสียงขณะเกิดเสียงของแหล่งกำเนิด			ระดับเสียงขณะไม่มีการรบกวน				การคำนวณระดับการรบกวน[1]					มาตรฐาน[2]	สรุปผล
วันที่	ช่วงเวลา	ระดับเสียงเฉลี่ย ($L_{Aeq,Ts}$; dB(A))	วันที่	ช่วงเวลา	ระดับเสียงเฉลี่ย 5 นาที ($L_{Aeq,R}$; dB(A))	ระดับเสียงพื้นฐาน (L_{A90}; dB(A))	ระยะเวลาของช่วงเวลาที่แหล่งกำเนิดเกิดเสียง (Ts; นาที)	ระดับเสียงขณะมีการรบกวน ($L_{Aeq,Tr}$; dB(A))	กรณีที่ 4 บวกเพิ่ม 3 dB(A)	กรณีที่ 5 บวกเพิ่ม 5 dB(A)	ระดับการรบกวน		
27 มี.ค. 68	23:40-23:45	45.3	27 มี.ค. 68	23:05-23:10	43.8	42.6	5	40.0	43.0	-	0.4	≤10	ไม่เป็นเสียงรบกวน
29 มี.ค. 68	01:25-01:30	48.4	29 มี.ค. 68	01:30-01:35	46.8	43.8	5	43.3	46.3	-	2.5	≤10	ไม่เป็นเสียงรบกวน
29 มี.ค. 68	22:25-22:30	47.6	29 มี.ค. 68	22:55-23:00	46.1	42.5	5	42.3	45.3	-	2.8	≤10	ไม่เป็นเสียงรบกวน

หมายเหตุ : [1] ประกาศคณะกรรมการควบคุมมลพิษ เรื่อง วิธีการตรวจวัดระดับเสียงพื้นฐาน รหับเสียงขณะไม่มีการรบกวน การตรวจวัดและคำนวณระดับเสียงขณะมีการรบกวน การคำนวณค่าระดับการรบกวน และแบบบันทึกการตรวจวัดเสียงรบกวน พ.ศ. 2565
[2] ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 29 (พ.ศ. 2550) เรื่อง ค่าระดับเสียงรบกวน

[redacted]
(นางสาวสุภาวรรณ สุวรรณภา)
ผู้ทบทวน

[redacted]
(นางสาวอนิดา บุญรุ่งเรือง)
ผู้ควบคุมการตรวจวัด

ห้ามคัดลอกโปรับรองหรือรายงานผลบางส่วน โดยไม่ได้รับอนุญาตจากบริษัท เอ็นไวรอนเมนท์ รีเสิร์ช แอนด์ เทคโนโลยี จำกัด เป็นหลักฐานเท่านั้น
รายงานนี้รับรองเฉพาะวัตถุตัวอย่างที่ได้ตรวจ รับรายงานผลสอบเท่านั้น

ระยะผลิตปิโตรเลียม
(การผลิตปิโตรเลียม)

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Noise
Measured Point : **ฐานหลุมผลิต BM3 : N5 : หมู่ที่ 4 บ้านบึงมาลย์ (1) (บ้านเลขที่ 6 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0584353 E, 1842952 N
Measured Date : April 3-4, 2025
Measured By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter RION Model NL-53 Serial Number 00251824

Quotation No. : AR2025-00472
Analysis No. : 2025-ABS25-013
Report No. : 2025-RAAJ586
Report Date : May 16, 2025

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
15:00-16:00	57.7	80.4	63.3	58.8	46.8	41.0
16:00-17:00	59.0	82.4	65.4	60.7	48.4	42.1
17:00-18:00	58.6	85.1	65.2	60.6	45.8	39.8
18:00-19:00	60.0	87.6	65.8	60.8	44.4	39.3
19:00-20:00	53.2	83.8	57.6	53.8	38.3	35.6
20:00-21:00	50.9	84.4	58.6	51.7	37.5	36.2
21:00-22:00	48.7	72.7	52.8	49.2	38.9	38.1
22:00-23:00	43.2	72.7	48.7	43.5	40.1	39.5
23:00-00:00	45.6	74.9	48.7	46.6	41.3	40.8
00:00-01:00	43.1	66.6	43.9	43.7	42.2	41.6
01:00-02:00	43.8	66.6	44.5	44.1	43.0	42.4
02:00-03:00	43.5	67.0	44.1	43.9	43.3	42.8
03:00-04:00	44.2	69.2	46.3	44.6	43.5	43.1
04:00-05:00	43.5	63.2	47.5	44.7	41.4	40.7
05:00-06:00	50.5	75.0	54.2	51.1	42.5	38.9
06:00-07:00	59.9	82.5	65.1	61.1	54.0	48.6
07:00-08:00	60.2	84.6	65.3	61.1	52.4	46.6
08:00-09:00	61.8	86.1	67.4	62.6	52.1	45.5
09:00-10:00	61.5	86.7	66.0	61.7	51.8	46.0
10:00-11:00	61.5	84.9	67.5	62.4	51.6	45.8
11:00-12:00	57.7	88.7	64.7	59.3	49.4	45.4
12:00-13:00	58.1	92.6	63.7	59.3	49.1	43.6
13:00-14:00	60.5	94.0	67.9	63.3	47.6	42.1
14:00-15:00	56.5	85.6	61.9	56.7	44.7	39.5
24 Hours Measurement	**57.3**	**94.0**	**63.1**	**58.5**	**47.9**	**43.1**
Standard[1/]	**70**	**115**	-	-	-	-
Ldn	**60.1**	-	-	-	-	-

Remark : [1/] Notification of National Environmental Board, No.15, B.E.2540 (1997) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.114 Part 27D dated April 3, B.E.2540 (1997).

[redacted] [redacted]

(Ms.Supawan Suwannapa)
Laboratory Reviewer

(Ms.Thanida Bunrungrueang)
Laboratory Supervisor

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Noise
Measured Point : **ฐานหลุมผลิต BM3 : N5 : หมู่ที่ 4 บ้านบึงมาลย์ (1) (บ้านเลขที่ 6 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0584353 E, 1842952 N
Measured Date : April 4-5, 2025
Measured By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter RION Model NL-53 Serial Number 00251824

Quotation No. : AR2025-00472
Analysis No. : 2025-ABS25-013
Report No. : 2025-RAAJ586
Report Date : May 16, 2025

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
15:00-16:00	56.0	86.0	63.2	57.5	45.1	39.0
16:00-17:00	59.5	82.9	64.3	60.1	48.7	42.5
17:00-18:00	60.2	88.1	65.0	60.3	48.7	41.9
18:00-19:00	57.3	85.5	62.6	57.5	46.4	40.2
19:00-20:00	54.0	78.0	59.1	54.1	40.4	36.6
20:00-21:00	56.2	82.1	63.4	56.8	42.5	41.1
21:00-22:00	47.2	76.6	49.1	47.8	40.4	39.7
22:00-23:00	47.2	81.7	48.2	47.4	39.1	38.2
23:00-00:00	46.6	77.7	50.9	46.8	38.8	38.1
00:00-01:00	44.2	69.6	47.7	44.8	40.9	39.9
01:00-02:00	43.7	70.4	44.3	44.1	42.8	42.3
02:00-03:00	44.7	76.1	47.4	45.4	44.5	43.6
03:00-04:00	43.3	68.1	44.6	43.7	42.9	42.3
04:00-05:00	42.3	77.2	44.5	42.9	41.1	40.4
05:00-06:00	49.4	75.0	56.0	52.3	40.0	37.3
06:00-07:00	57.5	84.6	64.1	59.8	52.2	47.3
07:00-08:00	60.1	82.9	65.3	61.2	52.1	46.6
08:00-09:00	60.3	81.9	66.5	62.2	51.7	46.0
09:00-10:00	58.6	82.6	64.2	59.3	50.2	45.1
10:00-11:00	60.2	85.4	65.0	60.9	50.2	44.4
11:00-12:00	58.9	91.4	63.2	59.9	48.1	42.9
12:00-13:00	59.2	85.2	64.4	59.3	46.3	41.5
13:00-14:00	58.9	87.8	65.2	60.2	48.5	42.4
14:00-15:00	58.4	86.2	64.0	59.0	48.3	42.6
24 Hours Measurement	**56.8**	**91.4**	**62.3**	**57.7**	**47.4**	**42.7**
Standard[1/]	**70**	**115**	-	-	-	-
Ldn	**59.0**	-	-	-	-	-

Remark : [1/] Notification of National Environmental Board, No.15, B.E.2540 (1997) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.114 Part 27D dated April 3, B.E.2540 (1997).

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(Ms.Supawan Suwannapa)
Laboratory Reviewer

(Ms.Thanida Bunrungrueang)
Laboratory Supervisor

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Noise
Measured Point : **ฐานหลุมผลิต BM3 : N5 : หมู่ที่ 4 บ้านบึงมาลย์ (1) (บ้านเลขที่ 6 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0584353 E, 1842952 N
Quotation No. : AR2025-00472
Measured Date : April 5-6, 2025
Analysis No. : 2025-ABS25-013
Measured By : Mr.Nitad Sirichad
Report No. : 2025-RAAJ586
Analyzed By : Environment Research & Technology Co., Ltd.
Report Date : May 16, 2025
Measured Instrument : Integrating Sound Level Meter RION Model NL-53 Serial Number 00251824

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
15:00-16:00	57.1	79.8	62.5	58.6	50.9	45.5
16:00-17:00	56.3	77.5	61.8	58.6	49.6	43.9
17:00-18:00	58.9	88.1	63.6	59.5	49.6	43.6
18:00-19:00	59.9	84.0	65.7	61.2	50.5	41.7
19:00-20:00	63.1	83.1	68.3	65.9	60.2	57.1
20:00-21:00	57.1	83.2	61.7	57.5	51.3	47.2
21:00-22:00	59.8	80.6	63.5	62.1	58.2	54.9
22:00-23:00	49.5	79.4	55.8	52.1	48.7	47.0
23:00-00:00	42.8	83.2	45.1	43.2	42.2	41.7
00:00-01:00	44.0	71.2	45.5	44.5	43.3	42.8
01:00-02:00	46.3	71.0	49.4	46.5	45.5	45.0
02:00-03:00	47.3	77.8	48.0	47.5	46.9	46.4
03:00-04:00	48.3	65.5	48.8	48.6	48.2	47.7
04:00-05:00	48.9	73.5	49.6	49.0	48.2	47.7
05:00-06:00	50.2	76.7	55.2	50.9	46.1	44.8
06:00-07:00	58.2	79.4	63.8	60.9	52.6	47.6
07:00-08:00	63.5	88.6	68.2	64.9	52.7	46.7
08:00-09:00	58.8	83.5	63.5	60.0	50.8	45.5
09:00-10:00	61.1	87.3	67.7	63.1	51.9	46.0
10:00-11:00	62.4	92.7	68.9	63.7	50.2	44.3
11:00-12:00	56.8	77.1	61.8	58.4	50.4	43.9
12:00-13:00	59.3	85.7	63.7	60.2	47.3	42.4
13:00-14:00	60.0	82.5	64.8	61.4	47.4	42.0
14:00-15:00	58.1	82.7	62.6	59.2	46.4	41.0
24 Hours Measurement	**58.3**	**92.7**	**63.6**	**60.0**	**51.8**	**48.1**
Standard[1]	**70**	**115**	-	-	-	-
Ldn	**60.4**	-	-	-	-	-

Remark : [1] Notification of National Environmental Board, No.15, B.E.2540 (1997) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.114 Part 27D dated April 3, B.E.2540 (1997).

[redacted] [redacted]

(Ms.Supawan Suwannapa)
Laboratory Reviewer

(Ms.Thanida Bunrungrueang)
Laboratory Supervisor

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E-mail : envi@enviresearch.co.th
www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Noise
Measured Point : **ฐานหลุมผลิตบึงม่วงใต้ 2 (BMS2) : N10 : หมู่ที่ 7 บ้านหนองไม้แดง (1) (บ้านเลขที่ 55/3 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0584125 E, 1840431 N
Quotation No. : AR2025-00472
Measured Date : April 3-4, 2025
Analysis No. : 2025-ABS25-014
Measured By : Mr.Nitad Sirichad
Report No. : 2025-RAAJ588
Analyzed By : Environment Research & Technology Co., Ltd.
Report Date : May 16, 2025
Measured Instrument : Integrating Sound Level Meter RION Model NL-53 Serial Number 00251825

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
10:00-11:00	53.0	75.0	58.1	55.3	48.5	45.0
11:00-12:00	50.0	71.0	55.0	53.0	47.5	44.6
12:00-13:00	49.9	68.9	54.7	52.1	47.0	44.1
13:00-14:00	48.5	66.4	53.8	51.1	46.2	44.0
14:00-15:00	46.9	62.4	51.5	49.3	45.4	42.7
15:00-16:00	48.0	68.4	52.5	49.7	44.1	40.9
16:00-17:00	44.2	66.5	47.6	46.1	42.7	40.2
17:00-18:00	45.0	65.4	50.5	48.3	41.3	39.2
18:00-19:00	43.3	65.0	47.0	45.4	41.6	39.8
19:00-20:00	42.7	64.2	46.6	44.8	40.7	39.0
20:00-21:00	44.0	62.5	48.9	47.1	41.9	39.2
21:00-22:00	49.4	73.6	53.5	51.6	46.4	42.8
22:00-23:00	51.9	73.8	56.9	54.7	48.4	44.8
23:00-00:00	52.7	74.7	58.6	57.3	47.1	43.4
00:00-01:00	50.6	75.2	55.8	52.0	46.7	43.3
01:00-02:00	50.0	67.6	55.7	53.7	46.8	43.0
02:00-03:00	48.3	65.8	53.2	51.0	45.7	41.4
03:00-04:00	47.7	67.9	52.1	50.4	45.9	41.9
04:00-05:00	46.5	71.9	50.9	49.4	44.5	40.6
05:00-06:00	52.9	77.6	60.0	57.4	46.3	40.8
06:00-07:00	49.5	71.6	54.4	52.2	46.3	41.9
07:00-08:00	52.4	78.6	57.7	54.0	46.7	42.0
08:00-09:00	58.8	73.2	63.6	62.1	57.4	50.9
09:00-10:00	51.4	77.2	56.6	53.2	48.0	44.9
24 Hours Measurement	**50.8**	**78.6**	**56.0**	**53.8**	**47.8**	**43.5**
Standard[1]	**70**	**115**	-	-	-	-
Ldn	**57.0**	-	-	-	-	-

Remark : [1] Notification of National Environmental Board, No.15, B.E.2540 (1997) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.114 Part 27D dated April 3, B.E.2540 (1997).

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Laboratory Supervisor

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ENVIRONMENT RESEARCH & TECHNOLOGY CO., LTD.

Environment Research & Technology Company Limited
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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Noise
Measured Point : **ฐานหลุมผลิตบึงม่วงใต้ 2 (BMS2) : N10 : หมู่ที่ 7 บ้านหนองไม้แดง (1) (บ้านเลขที่ 55/3 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0584125 E, 1840431 N
Quotation No. : AR2025-00472
Measured Date : April 4-5, 2025
Analysis No. : 2025-AB525-014
Measured By : Mr.Nitad Sirichad
Report No. : 2025-RAAJ588
Analyzed By : Environment Research & Technology Co., Ltd.
Report Date : May 16, 2025
Measured Instrument : Integrating Sound Level Meter RION Model NL-53 Serial Number 00251825

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
10:00-11:00	50.5	73.1	55.1	53.0	47.8	44.2
11:00-12:00	49.3	69.6	53.3	51.6	47.7	43.8
12:00-13:00	46.9	63.7	50.9	49.2	45.3	43.3
13:00-14:00	45.7	64.9	48.8	47.6	44.7	42.8
14:00-15:00	46.6	67.1	49.2	47.8	45.7	43.1
15:00-16:00	46.2	61.1	49.6	47.9	45.3	42.4
16:00-17:00	46.9	67.4	50.7	49.4	45.6	42.3
17:00-18:00	47.6	61.7	52.0	51.1	46.1	41.1
18:00-19:00	45.2	63.2	50.9	49.2	41.8	38.0
19:00-20:00	44.1	65.4	49.2	47.2	40.8	37.7
20:00-21:00	46.6	64.8	51.2	49.7	44.6	40.2
21:00-22:00	50.7	76.0	55.2	53.7	47.5	43.5
22:00-23:00	51.6	76.3	56.4	54.0	48.1	44.2
23:00-00:00	67.0	88.9	72.4	70.7	64.6	57.5
00:00-01:00	66.2	88.8	76.0	73.8	65.6	54.7
01:00-02:00	69.9	91.1	77.1	74.9	64.6	51.0
02:00-03:00	71.4	92.9	76.3	74.7	68.0	62.2
03:00-04:00	59.9	95.2	68.3	63.6	45.4	40.0
04:00-05:00	47.4	66.0	52.4	50.5	44.3	40.0
05:00-06:00	48.5	69.2	54.2	51.9	44.4	39.8
06:00-07:00	51.8	69.5	57.8	55.2	48.0	43.0
07:00-08:00	51.2	77.9	55.7	53.8	47.9	43.6
08:00-09:00	49.8	72.8	54.7	52.7	46.2	42.5
09:00-10:00	51.4	72.6	56.1	54.2	48.5	44.0
24 Hours Measurement	**61.7**	**95.2**	**68.3**	**66.3**	**58.4**	**51.0**
Standard[1/]	**70**	**115**	-	-	-	-
Ldn	**71.5**	-	-	-	-	-

Remark : [1/] Notification of National Environmental Board, No.15, B.E.2540 (1997) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No. 114 Part 27D dated April 3, B.E.2540 (1997).

[redacted] [redacted]

(Ms.Supawan Suwannapa)
Laboratory Reviewer

(Ms.Thanida Bunrungrueang)
Laboratory Supervisor

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Measured Source : Ambient Noise
Measured Point : **ฐานหลุมผลิตบึงม่วงใต้ 2 (BMS2) : N10 : หมู่ที่ 7 บ้านหนองไม้แดง (1) (บ้านเลขที่ 55/3 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)**
GPS. Coordinate : UTM (WGS84) 47Q 0584125 E, 1840431 N
Quotation No. : AR2025-00472
Measured Date : April 5-6, 2025
Analysis No. : 2025-AB525-014
Measured By : Mr.Nitad Sirichad
Report No. : 2025-RAAJ588
Analyzed By : Environment Research & Technology Co., Ltd.
Report Date : May 16, 2025
Measured Instrument : Integrating Sound Level Meter RION Model NL-53 Serial Number 00251825

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
10:00-11:00	57.0	79.2	61.0	59.8	55.8	50.0
11:00-12:00	51.1	76.1	55.2	54.0	49.2	45.8
12:00-13:00	56.9	83.5	60.1	58.2	53.6	51.3
13:00-14:00	58.8	79.6	60.4	59.7	58.2	56.9
14:00-15:00	55.7	85.1	56.9	56.6	55.4	54.4
15:00-16:00	53.3	58.3	55.1	54.7	53.1	51.8
16:00-17:00	51.9	58.1	54.4	53.4	51.4	50.0
17:00-18:00	52.0	62.4	54.3	53.6	51.6	50.7
18:00-19:00	57.2	61.0	58.7	58.4	57.1	55.5
19:00-20:00	58.4	62.6	59.9	59.6	58.2	56.7
20:00-21:00	56.7	62.4	59.1	58.7	56.4	53.7
21:00-22:00	55.3	62.7	57.8	57.2	55.0	52.1
22:00-23:00	55.0	74.8	58.8	57.4	53.2	50.7
23:00-00:00	53.5	69.5	57.8	56.2	51.7	48.5
00:00-01:00	54.0	71.4	58.9	56.2	51.8	48.4
01:00-02:00	52.4	72.0	57.5	55.5	49.5	45.7
02:00-03:00	50.9	71.2	55.6	53.5	48.1	45.4
03:00-04:00	52.0	70.8	57.2	54.9	49.0	46.4
04:00-05:00	49.6	70.1	53.9	52.2	46.9	44.1
05:00-06:00	51.3	77.3	55.9	52.7	46.5	43.8
06:00-07:00	51.0	71.8	56.6	54.3	47.7	44.4
07:00-08:00	52.4	77.5	57.4	53.5	46.6	44.0
08:00-09:00	51.1	69.9	56.1	53.8	48.0	44.6
09:00-10:00	54.1	74.9	58.5	57.0	51.7	47.9
24 Hours Measurement	**54.6**	**85.1**	**57.8**	**56.5**	**53.4**	**51.2**
Standard[1/]	**70**	**115**	-	-	-	-
Ldn	**59.5**	-	-	-	-	-

Remark : [1/] Notification of National Environmental Board, No.15, B.E.2540 (1997) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No. 114 Part 27D dated April 3, B.E.2540 (1997).

[redacted] [redacted]

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Laboratory Reviewer

(Ms.Thanida Bunrungrueang)
Laboratory Supervisor

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www.enviresearch.co.th

รายงานผลการตรวจวัดเสียงรบกวน

ชื่อลูกค้า : บริษัท วิชั่นอี คอนซัลแทนท์ จำกัด
ที่อยู่ลูกค้า : เลขที่ 101/22 หมู่ที่ 2 ซอยมณียา ซอย 3 ตำบลไทรม้า อำเภอเมืองนนทบุรี จังหวัดนนทบุรี 11000
ชื่อโครงการ : โครงการผลิตบีโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และ พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตบีโตรเลียม)
ที่ตั้งโครงการ : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
ประเภทของแหล่งกำเนิด : เสียงรบกวนกรณีที่ 4 เกิดจากการผลิตบีโตรเลียม
บริเวณที่ตรวจวัดเสียงขณะมีการรบกวน : ฐานหลุมผลิต BM3 : N5 : หมู่ที่ 4 บ้านบึงมาลย์ (1) บ้านเลขที่ 6 UTM (WGS84) 47Q 0584353 E, 1842952 N
บริเวณที่ตรวจวัดเสียงขณะไม่มีการรบกวน : จุดอ้างอิง UTM (WGS84) 47Q 0583944 E, 1842762 N
ตรวจวัดโดย : นายนิทัศน์ ศิริขาติ
วิเคราะห์โดย : บริษัท เอ็นไวรอนเมนท์ รีเสิร์ช แอนด์ เทคโนโลยี จำกัด
เครื่องมือที่ใช้ตรวจวัด : เครื่องวัดระดับเสียง RION Model NL-31 Serial Number 00803925, เครื่องวัดระดับเสียง RION Model NL-53 Serial Number 00251824

หมายเลขใบเสนอราคา :AR2025-00472
หมายเลขปฏิบัติการ :2025-AB525-013
หมายเลขรายงานผล :2025-RAAJ587
วันที่รายงานผล :16 พฤษภาคม 2568

ระดับเสียงขณะเกิดเสียงของแหล่งกำเนิด			ระดับเสียงขณะไม่มีการรบกวน				การคำนวณระดับการรบกวน[1/]					มาตรฐาน[2/]	สรุปผล
วันที่	ช่วงเวลา	ระดับเสียงเฉลี่ย ($L_{Aeq,Ts}$; dB(A))	วันที่	ช่วงเวลา	ระดับเสียงเฉลี่ย 5 นาที ($L_{Aeq,R}$; dB(A))	ระดับเสียงพื้นฐาน (L_{A90}; dB(A))	ระยะเวลาของช่วงเวลาที่แหล่งกำเนิดเกิดเสียง (Ts; นาที)	ระดับเสียงขณะมีการรบกวน ($L_{Aeq,Tr}$; dB(A))	กรณีที่ 4 บวกเพิ่ม 3 dB(A)	กรณีที่ 5 บวกเพิ่ม 5 dB(A)	ระดับการรบกวน		
4 เม.ย. 68	00:30-00:35	43.3	4 เม.ย. 68	00:50-00:55	42.0	40.0	5	37.4	40.4	-	0.4	≤10	ไม่เป็นเสียงรบกวน
5 เม.ย. 68	01:40-01:45	42.9	5 เม.ย. 68	01:30-01:35	41.5	39.8	5	37.3	40.3	-	0.5	≤10	ไม่เป็นเสียงรบกวน
6 เม.ย. 68	01:55-02:00	47.1	6 เม.ย. 68	01:50-01:55	45.8	42.4	5	41.2	44.2	-	1.8	≤10	ไม่เป็นเสียงรบกวน

หมายเหตุ : [1/] ประกาศคณะกรรมการควบคุมมลพิษ เรื่อง วิธีการตรวจวัดระดับเสียงพื้นฐาน ระดับเสียงขณะไม่มีการรบกวน การตรวจวัดและคำนวณระดับเสียงขณะมีการรบกวน การคำนวณค่าระดับการรบกวน และแบบบันทึกการตรวจวัดเสียงรบกวน พ.ศ. 2565
[2/] ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 29 (พ.ศ. 2550) เรื่อง ค่าระดับเสียงรบกวน

[redacted]
(นางสาวสุภาวรรณ สุวรรณเภา)
ผู้ทบทวน

envi research ENVIRONMENT RESEARCH & TECHNOLOGY CO., LTD.

[redacted]
(นางสาวธนิดา บุญรุ่งเรือง)
ผู้ควบคุมการตรวจวัด

ห้ามคัดถ่ายใบรับรองหรือรายงานผลแต่เพียงบางส่วน โดยไม่ได้รับอนุญาตจากบริษัท เอ็นไวรอนเมนท์ รีเสิร์ช แอนด์ เทคโนโลยี จำกัด เป็นลายลักษณ์อักษร
รายงานนี้รับรองเฉพาะวัตถุตัวอย่างที่ได้ตรวจ วิเคราะห์ ทดสอบเท่านั้น

F-RP-006 Rev. 05, January 18, 2021

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รายงานผลการตรวจวัดเสียงรบกวน

ชื่อลูกค้า : บริษัท วิชั่นอี คอนซัลแทนท์ จำกัด
ที่อยู่ลูกค้า : เลขที่ 101/22 หมู่ที่ 2 ซอยมณียา ซอย 3 ตำบลไทรม้า อำเภอเมืองนนทบุรี จังหวัดนนทบุรี 11000
ชื่อโครงการ : โครงการผลิตบีโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และ พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตบีโตรเลียม)
ที่ตั้งโครงการ : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
ประเภทของแหล่งกำเนิด : เสียงรบกวนกรณีที่ 4 เกิดจากการผลิตบีโตรเลียม
บริเวณที่ตรวจวัดเสียงขณะมีการรบกวน : ฐานหลุมผลิตบึงม่วงไต้ 2 (BMS2) : N10 : หมู่ที่ 7 บ้านหนองไม้แดง (1) บ้านเลขที่ 55/3 UTM (WGS84) 47Q 0584125 E, 1840431 N
บริเวณที่ตรวจวัดเสียงขณะไม่มีการรบกวน : จุดอ้างอิง UTM (WGS84) 47Q 0584189 E, 1840609 N
ตรวจวัดโดย : นายนิทัศน์ ศิริขาติ
วิเคราะห์โดย : บริษัท เอ็นไวรอนเมนท์ รีเสิร์ช แอนด์ เทคโนโลยี จำกัด
เครื่องมือที่ใช้ตรวจวัด : เครื่องวัดระดับเสียง RION Model NL-53 Serial Number 00251825, เครื่องวัดระดับเสียง RION Model NL-53 Serial Number 00251826

หมายเลขใบเสนอราคา :AR2025-00472
หมายเลขปฏิบัติการ :2025-AB525-014
หมายเลขรายงานผล :2025-RAAJ589
วันที่รายงานผล :16 พฤษภาคม 2568

ระดับเสียงขณะเกิดเสียงของแหล่งกำเนิด			ระดับเสียงขณะไม่มีการรบกวน				การคำนวณระดับการรบกวน[1/]					มาตรฐาน[2/]	สรุปผล
วันที่	ช่วงเวลา	ระดับเสียงเฉลี่ย ($L_{Aeq,Ts}$; dB(A))	วันที่	ช่วงเวลา	ระดับเสียงเฉลี่ย 5 นาที ($L_{Aeq,R}$; dB(A))	ระดับเสียงพื้นฐาน (L_{A90}; dB(A))	ระยะเวลาของช่วงเวลาที่แหล่งกำเนิดเกิดเสียง (Ts; นาที)	ระดับเสียงขณะมีการรบกวน ($L_{Aeq,Tr}$; dB(A))	กรณีที่ 4 บวกเพิ่ม 3 dB(A)	กรณีที่ 5 บวกเพิ่ม 5 dB(A)	ระดับการรบกวน		
3 เม.ย. 68	22:55-23:00	48.2	3 เม.ย. 68	22:45-22:50	46.1	43.0	5	44.0	47.0	-	4.0	≤10	ไม่เป็นเสียงรบกวน
5 เม.ย. 68	01:55-02:00	51.7	5 เม.ย. 68	01:55-02:00	47.3	45.3	5	49.7	52.7	-	7.4	≤10	ไม่เป็นเสียงรบกวน
6 เม.ย. 68	00:15-00:20	52.3	6 เม.ย. 68	00:35-00:40	49.2	45.9	5	49.4	52.4	-	6.5	≤10	ไม่เป็นเสียงรบกวน

หมายเหตุ : [1/] ประกาศคณะกรรมการควบคุมมลพิษ เรื่อง วิธีการตรวจวัดระดับเสียงพื้นฐาน ระดับเสียงขณะไม่มีการรบกวน การตรวจวัดและคำนวณระดับเสียงขณะมีการรบกวน การคำนวณค่าระดับการรบกวน และแบบบันทึกการตรวจวัดเสียงรบกวน พ.ศ. 2565
[2/] ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 29 (พ.ศ. 2550) เรื่อง ค่าระดับเสียงรบกวน

[redacted]
(นางสาวสุภาวรรณ สุวรรณเภา)
ผู้ทบทวน

[redacted]
(นางสาวธนิดา บุญรุ่งเรือง)
ผู้ควบคุมการตรวจวัด

ห้ามคัดถ่ายใบรับรองหรือรายงานผลแต่เพียงบางส่วน โดยไม่ได้รับอนุญาตจากบริษัท เอ็นไวรอนเมนท์ รีเสิร์ช แอนด์ เทคโนโลยี จำกัด เป็นลายลักษณ์อักษร
รายงานนี้รับรองเฉพาะวัตถุตัวอย่างที่ได้ตรวจ วิเคราะห์ ทดสอบเท่านั้น

F-RP-006 Rev. 05, January 18, 2021

บริษัท ซีเอ็นพีซีเอชเค (ไทยแลนด์) จำกัด

รายงานผลการปฏิบัติตามมาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม และมาตรการติดตามตรวจสอบผลกระทบสิ่งแวดล้อม โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร ฉบับเดือนมกราคม - มิถุนายน พ.ศ.2568

ภาคผนวก ง.5

คุณภาพน้ำผิวดิน

ระยะเจาะหลุมปิโตรเลียม

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : **ฐานหลุมผลิต BY1-20 : SW1.4 : คลองวังเฉลียง (2) (บ้านนิคมพัฒนา หมู่ที่ 8 ตำบลหนองจิก อำเภอดีรีมาศ จังหวัดสุโขทัย)**
GPS. Coordinate : UTM (WGS84) 47Q 0585782 E, 1846497 N
Sampling Date : May 10, 2025
Sampling Time : 16:20
Sampling Method : Grab
Sampling By : Mr.Romsea Kateh
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odorless
Quotation No. : AR2025-00471
Analysis No. : 2025-AC019-002
Received Date : May 13, 2025
Analytical Date : May 13-27, 2025
Report No. : 2025-RAAK489
Report Date : May 28, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	
					Class 3	Class 4
Temperature	°C	Certified Thermometer	-	37.0	n'	n'
pH	-	Electrometric	-	7.8	5.0-9.0	5.0-9.0
Dissolved Oxygen	mg/L	Azide Modificaton	1.0	6.5	≥4.0	≥2.0
Biochemical Oxygen Demand	mg/L	5-Day BOD Test, Membrane Electrode	1.0	2.7	2.0	4.0
Total Coliform Bacteria	MPN/100 mL	Most Probable Number	1.8	2.0	20,000	-
Fecal Coliform Bacteria	MPN/100 mL	Most Probable Number	1.8	<1.8	4,000	-
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.008	0.1	0.1
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.1	0.1
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.290	1.0	1.0
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.03	1.0	1.0
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.005[3]	0.005[3]
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	0.05
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	0.008	0.05	0.05
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	<0.0005	0.002	0.002
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0006	0.01	0.01
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.13	-	-
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	1.0	-	-
Selenium	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	<0.0002	-	-
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	237	-	-
Oil and Grease	mg/L	Liquid-Liquid Partition, Gravimetric	1.0	1.5	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	0.1	-	-
Total Dissolved Solids	mg/L	Dried at 180°C	50	165	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	7.2	-	-

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : **ฐานหลุมผลิต BY1-20 : SW1.4 : คลองวังเฉลียง (2) (บ้านนิคมพัฒนา หมู่ที่ 8 ตำบลหนองจิก อำเภอดีรีมาศ จังหวัดสุโขทัย)**
GPS. Coordinate : UTM (WGS84) 47Q 0585782 E, 1846497 N
Sampling Date : May 10, 2025
Sampling Time : 16:20
Sampling Method : Grab
Sampling By : Mr.Romsea Kateh
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odorless
Quotation No. : AR2025-00471
Analysis No. : 2025-AC019-002
Received Date : May 13, 2025
Analytical Date : May 13-27, 2025
Report No. : 2025-RAAK489
Report Date : May 28, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	
					Class 3	Class 4
Total Hardness as $CaCO_3$	mg/L	EDTA Titrimetric	3.0	71	-	-
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	-	-
TPH (Gasoline Range Hydrocarbons; C_8-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{36})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-

Remark : [1] Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
[2] Notification of the National Environment Board, No.8, B.E.2537 (1994), issued under the Enhancement and Conservation of National Enviromental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.111 Part 16, dated February 24, B.E.2537 (1994). (Standard Value of Surface Water for Class 3, 4)
[3] When water hardness not more than 100 mg/l as $CaCO_3$ (Hardness as $CaCO_3$ is 71 mg/l)
n' = naturally but changing not more than 3°C

[redacted] [redacted]

(Ms.Yuwadee Na Ranong)
Laboratory Reviewer

(Mr.Virat Hemvannanukul)
Laboratory Supervisor

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F-RP-026 Rev. 05, January 18, 2021

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตบีโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมบีโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : **ฐานหลุมผลิต BY1-20 : SW1.5 : คลองวังเฉลียง (3) (บ้านบึงหญ้า หมู่ที่ 5 ตำบลหนองจิก อำเภอคีรีมาศ จังหวัดสุโขทัย)**
GPS. Coordinate : UTM (WGS84) 47Q 0586741 E, 1848709 N
Sampling Date : May 10, 2025
Sampling Time : 15:40
Sampling Method : Grab
Sampling By : Mr.Romsea Kateh
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Light Yellow, Sediment, Odorless

Quotation No. : AR2025-00471
Analysis No. : 2025-AC019-003
Received Date : May 13, 2025
Analytical Date : May 13-27, 2025
Report No. : 2025-RAAK490
Report Date : May 28, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	
					Class 3	Class 4
Temperature	°C	Certified Thermometer	-	37.0	n'	n'
pH	-	Electrometric	-	8.5	5.0-9.0	5.0-9.0
Dissolved Oxygen	mg/L	Azide Modificaton	1.0	7.0	≥4.0	≥2.0
Biocherrical Oxygen Demand	mg/L	5-Day BOD Test, Membrane Electrode	1.0	8.0	2.0	4.0
Total Coliform Bacteria	MPN/100 mL	Most Probable Number	1.8	4.5	20,000	-
Fecal Coliform Bacteria	MPN/100 mL	Most Probable Number	1.8	<1.8	4,000	-
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.009	0.1	0.1
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.1	0.1
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.647	1.0	1.0
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.02	1.0	1.0
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.005[3]	0.005[3]
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	0.05
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	<0.001	0.05	0.05
Mercury	mg/L	Digestion, Cole-Vapor Atomic Absorption Spectrometry	0.0005	<0.0005	0.002	0.002
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0011	0.01	0.01
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.08	-	-
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	1.8	-	-
Selenium	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	<0.0002	-	-
Conductivity	µs/cm	Electrical Concuctivity Meter	0.1	199	-	-
Oil and Grease	mg/L	Liquid-Liquid Fartition, Gravimetric	1.0	<1.0	-	-
Salinity	ppt	Electrical Concuctivity Meter	0.1	0.1	-	-
Total Dissolved Solids	mg/L	Dried at 180°C	50	133	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	29	-	-

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตบีโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมบีโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : **ฐานหลุมผลิต BY1-20 : SW1.5 : คลองวังเฉลียง (3) (บ้านบึงหญ้า หมู่ที่ 5 ตำบลหนองจิก อำเภอคีรีมาศ จังหวัดสุโขทัย)**
GPS. Coordinate : UTM (WGS84) 47Q 0586741 E, 1848709 N
Sampling Date : May 10, 2025
Sampling Time : 15:40
Sampling Method : Grab
Sampling By : Mr.Romsea Kateh
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Light Yellow, Sediment, Odorless

Quotation No. : AR2025-00471
Analysis No. : 2025-AC019-003
Received Date : May 13, 2025
Analytical Date : May 13-27, 2025
Report No. : 2025-RAAK490
Report Date : May 28, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	
					Class 3	Class 4
Total Hardness as $CaCO_3$	mg/L	EDTA Titrimetric	3.0	27	-	-
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	-	-
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{36})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-

Remark : [1] Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
[2] Notification of the National Environment Board, No.8, B.E.2537 (1994), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.111 Part 16, dated February 24, B.E.2537 (1994). (Standard Value of Surface Water for Class 3, 4)
[3] When water hardness not more than 100 mg/l as $CaCO_3$ (Hardness as $CaCO_3$ is 27 mg/l)
n' = naturally but changing not more than 3°C

[redacted] (Ms.Yuwadee Na Ranong)
Laboratory Reviewer

[redacted] (Mr.Virat Hemvannanukul)
Laboratory Supervisor

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 1:000
Project Name : โครงการผลิตบีโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมบีโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : **ฐานหลุมผลิต BY1-20 : SW1.6 : สระใหญ่บึงหญ้า (บ้านบึงหญ้า หมู่ที่ 5 ตำบลหนองจิก อำเภอดีรีมาศ จังหวัดสุโขทัย)**
GPS. Coordinate : UTM (WGS84) 47Q 0584437 E, 1846912 N
Sampling Date : May 10, 2025
Sampling Time : 15:00
Sampling Method : Grab
Sampling By : Mr.Romsea Kateh
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Light Yellow, Sediment, Odorless

Quotation No. : AR2025-00471
Analysis No. : 2025-AC019-004
Received Date : May 13, 2025
Analytical Date : May 13-26, 2025
Report No. : 2025-RAAK491
Report Date : May 28, 2025

Parameter	Unit	Method of Analysis[1/]	MRL	Result	Standard[2/]	
					Class 3	Class 4
Temperature	°C	Certified Thermometer	-	35.0	n'	n'
pH	-	Electrometric	-	8.9	5.0-9.0	5.0-9.0
Dissolved Oxygen	mg/L	Azide Modificaton	1.0	8.9	≥4.0	≥2.0
Biochemical Oxygen Demand	mg/L	5-Day BOD Test, Membrane Electrode	1.0	5.3	2.0	4.0
Total Coliform Bacteria	MPN/100 mL	Most Probable Number	1.8	<1.8	20,000	-
Fecal Coliform Bacteria	MPN/100 mL	Most Probable Number	1.8	<1.8	4,000	-
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.008	0.1	0.1
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.1	0.1
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.135	1.0	1.0
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.02	1.0	1.0
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.005[3/]	0.005[3/]
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	0.05
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	0.001	0.05	0.05
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	<0.0005	0.002	0.002
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0005	0.01	0.01
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.06	-	-
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	0.2	-	-
Selenium	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	<0.0002	-	-
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	226	-	-
Oil and Grease	mg/L	Liquid-Liquid Partition, Gravimetric	1.0	<1.0	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	0.1	-	-
Total Dissolved Solids	mg/L	Dried at 180°C	50	143	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	13	-	-

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www.envisearch.co.th
Head Office/Tax ID 0105 542 06- 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตบีโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมบีโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : **ฐานหลุมผลิต BY1-20 : SW1.6 : สระใหญ่บึงหญ้า (บ้านบึงหญ้า หมู่ที่ 5 ตำบลหนองจิก อำเภอดีรีมาศ จังหวัดสุโขทัย)**
GPS. Coordinate : UTM (WGS84) 47Q 0584437 E, 1846912 N
Sampling Date : May 10, 2025
Sampling Time : 15:00
Sampling Method : Grab
Sampling By : Mr.Romsea Kateh
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Light Yellow, Sediment, Odorless

Quotation No. : AR2025-00471
Analysis No. : 2025-AC019-004
Received Date : May 13, 2025
Analytical Date : May 13-26, 2025
Report No. : 2025-RAAK491
Report Date : May 28, 2025

Parameter	Unit	Method of Analysis[1/]	MRL	Result	Standard[2/]	
					Class 3	Class 4
Total Hardness as $CaCO_3$	mg/L	EDTA Titrimetric	3.0	56	-	-
Benzene	µg/L	Purge and Trap, Gas Chromatographi: Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographi: Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographi: Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographi: Mass Spectrometric (GC-MS)	3.0	<3.0	-	-
TPH (Gasoline Range Hydrocarbons; C_5-C_9)	mg/L	Purge and Trap, Gas Chromatographi: (GC-FID)	0.040	<0.040	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{36})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-

Remark : 1/ Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
2/ Notification of the National Environment Board, No.8, B.E.2537 (1994), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.111 Part 16, dated February 24, B.E.2537 (1994). (Standard Vaue of Surface Water for Class 3, 4)
3/ When water hardness not more than 100 mg/l as $CaCO_3$ (Hardness as $CaCO_3$ is 56 mg/l)
n' = naturally but changing not more than 3°C

[redacted] [redacted]

(Ms.Yuwadee Na Ranorg)
Laboratory Reviewer

(Mr.Virat Hemvannanukul)
Laboratory Supervisor

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : **ฐานหลุมผลิต BM6 : SW1.7 : คลองส่งน้ำชลประทาน (3) บ้านบึงม่วง หมู่ที่ 11 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร**
GPS. Coordinate : UTM (WGS84) 47Q 0582286 E, 1843390 N
Sampling Date : April 4, 2025
Sampling Time : 12:03
Sampling Method : Grab
Sampling By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Light Yellow, Sediment, Odor

Quotation No. : AR2025-00471
Analysis No. : 2025-AB343-001
Received Date : April 7, 2025
Analytical Date : April 7-25, 2025
Report No. : 2025-RAAH141
Report Date : April 25, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	
					Class 3	Class 4
Temperature	°C	Certified Thermometer	-	32.3	n'	n'
pH	-	Electrometric	-	7.4	5.0-9.0	5.0-9.0
Dissolved Oxygen	mg/L	Azide Modification	1.0	4.8	≥4.0	≥2.0
Biochemical Oxygen Demand	mg/L	5-Day BOD Test, Membrane Electrode	1.0	2.1	2.0	4.0
Total Coliform Bacteria	MPN/100 mL	Most Probable Number	1.8	2,400	20,000	-
Fecal Coliform Bacteria	MPN/100 mL	Most Probable Number	1.8	490	4,000	-
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.007	0.1	0.1
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.1	0.1
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.570	1.0	1.0
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.03	1.0	1.0
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.005[3]	0.005[3]
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	0.05
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	<0.001	0.05	0.05
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	<0.0005	0.002	0.002
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0003	0.01	0.01
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.08	-	-
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	1.5	-	-
Selenium	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	<0.0002	-	-
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	263	-	-
Oil and Grease	mg/L	Liquid-Liquid Partition, Gravimetric	1.0	1.5	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	<0.1	-	-
Total Dissolved Solids	mg/L	Dried at 180°C	50	157	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	41	-	-
Total Hardness as $CaCO_3$	mg/L	EDTA Titrimetrc	3.0	89	-	-

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www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : **ฐานหลุมผลิต BM6 : SW1.7 : คลองส่งน้ำชลประทาน (3) บ้านบึงม่วง หมู่ที่ 11 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร**
GPS. Coordinate : UTM (WGS84) 47Q 0582286 E, 1843390 N
Sampling Date : April 4, 2025
Sampling Time : 12:03
Sampling Method : Grab
Sampling By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Light Yellow, Sediment, Odor

Quotation No. : AR2025-00471
Analysis No. : 2025-AB343-001
Received Date : April 7, 2025
Analytical Date : April 7-25, 2025
Report No. : 2025-RAAH141
Report Date : April 25, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	
					Class 3	Class 4
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	-	-
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{36})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-

Remark : [1] Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
[2] Notification of the National Environment Board, No.8 B.E.2537 (1994), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.111 Part 16, dated February 24, B.E.2537 (1994). (Standard Value of Surface Water for Class 3, 4)
[3] When water hardness not more than 100 mg/l as $CaCO_3$ (Hardness as $CaCO_3$ is 89 mg/l)
n' = naturally but changing not more than 3°C

[redacted] (Ms.Yuwadee Na Ranong)
Laboratory Reviewer

[redacted] (Mr.Virat Hemvannanukul)
Laboratory Supervisor

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมขั้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : **ฐานหลุมผลิต BM6 : SW1.8 : คลองส่งน้ำชลประทาน (4) บ้านบึงมาลย์ หมู่ที่ 4 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร**
GPS. Coordinate : UTM (WGS84) 47Q 0583367 E, 1843003 N
Sampling Date : April 4, 2025
Sampling Time : 12:50
Sampling Method : Grab
Sampling By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odor
Quotation No. : AR2025-00471
Analysis No. : 2025-AB343-002
Received Date : April 7, 2025
Analytical Date : April 7-25, 2025
Report No. : 2025-RAAH142
Report Date : April 25, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	
					Class 3	Class 4
Temperature	°C	Certified Thermometer	-	33.1	n'	n'
pH	-	Electrometric	-	7.4	5.0-9.0	5.0-9.0
Dissolved Oxygen	mg/L	Azide Modificaton	1.0	1.4	≥4.0	≥2.0
Biochemical Oxygen Demand	mg/L	5-Day BOD Test, Membrane Electrode	1.0	1.3	2.0	4.0
Total Coliform Bacteria	MPN/100 mL	Most Probable Number	1.8	220	20,000	-
Fecal Coliform Bacteria	MPN/100 mL	Most Probable Number	1.8	130	4,000	-
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.006	0.1	0.1
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.1	0.1
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.281	1.0	1.0
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.02	1.0	1.0
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.005[3]	0.005[3]
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	0.05
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	<0.001	0.05	0.05
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	0.0005	0.002	0.002
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0004	0.01	0.01
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.05	-	-
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	0.6	-	-
Selenium	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	<0.0002	-	-
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	231	-	-
Oil and Grease	mg/L	Liquid-Liquid Partition, Gravimetric	1.0	<1.0	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	<0.1	-	-
Total Dissolved Solids	mg/L	Dried at 180°C	50	141	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	9.8	-	-
Total Hardness as $CaCO_3$	mg/L	EDTA Titrimetric	3.0	89	-	-

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมขั้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : **ฐานหลุมผลิต BM6 : SW1.8 : คลองส่งน้ำชลประทาน (4) บ้านบึงมาลย์ หมู่ที่ 4 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร**
GPS. Coordinate : UTM (WGS84) 47Q 05E3367 E, 1843003 N
Sampling Date : April 4, 2025
Sampling Time : 12:50
Sampling Method : Grab
Sampling By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odor
Quotation No. : AR2025-00471
Analysis No. : 2025-AB343-002
Received Date : April 7, 2025
Analytical Date : April 7-25, 2025
Report No. : 2025-RAAH142
Report Date : April 25, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	
					Class 3	Class 4
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	-	-
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{36})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-

Remark : [1] Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
[2] Notification of the National Environment Board, No.8, B.E.2537 (1994), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.111 Part 16, dated February 24, B.E.2537 (1994). (Standard Value of Surface Water for Class 3, 4)
[3] When water hardness not more than 100 mg/l as $CaCO_3$ (Hardness as $CaCO_3$ is 89 mg/l)
n' = naturally but changing not more than 3°C

[redacted]
(Ms. Tuwadee Na Ranong)
Laboratory Reviewer

[redacted]
(Mr.Virat Hemvannanukul)
Laboratory Supervisor

ระยะผลิตปิโตรเลียม
(การผลิตปิโตรเลียม)

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : **ฐานหลุมผลิต BY1-2 : SW1.3 : คลองวังเฉลียง (1) บ้านบึงม่วง หมู่ที่ 11 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร**
GPS. Coordinate : UTM (WGS84) 47Q 0583048 E, 1845148 N
Sampling Date : April 1, 2025
Sampling Time : 15:36
Sampling Method : Grab
Sampling By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Colorless, Sediment, Odor

Quotation No. : AR2025-00472
Analysis No. : 2025-AB324-001
Received Date : April 5, 2025
Analytical Date : April 5-25, 2025
Report No. : 2025-RAAH063
Report Date : April 25, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	
					Class 3	Class 4
Temperature	°C	Certified Thermometer	-	27.6	n'	n'
pH	-	Electrometric	-	8.3	5.0-9.0	5.0-9.0
Dissolved Oxygen	mg/L	Azide Modification	1.0	6.2	≥4.0	≥2.0
Biochemical Oxygen Demand	mg/L	5-Day BOD Test, Membrane Electrode	1.0	<1.0	2.0	4.0
Total Coliform Bacteria	MPN/100 mL	Most Probable Number	1.8	78	20,000	-
Fecal Coliform Bacteria	MPN/100 mL	Most Probable Number	1.8	45	4,000	-
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.1	0.1
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.011	0.1	0.1
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.122	1.0	1.0
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.02	1.0	1.0
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.005[3]	0.005[3]
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	0.05
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	<0.001	0.05	0.05
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	<0.0005	0.002	0.002
Arsenic	mg/L	Digestion, Hydrice Generation Atomic Absorption Spectrometry	0.0002	0.0002	0.01	0.01
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.06	-	-
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	0.2	-	-
Selenium	mg/L	Digestion, Hydrice Generation Atomic Absorption Spectrometry	0.0002	<0.0002	-	-
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	224	-	-
Oil and Grease	mg/L	Liquid-Liquid Partition, Gravimetric	1.0	<1.0	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	<0.1	-	-
Total Dissolved Solids	mg/L	Dried at 180°C	50	139	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	6.7	-	-
Total Hardness as $CaCO_3$	mg/L	EDTA Titrimetric	3.0	78	-	-

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www.envisearch.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : **ฐานหลุมผลิต BY1-2 : SW1.3 : คลองวังเฉลียง (1) บ้านบึงม่วง หมู่ที่ 11 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร**
GPS. Coordinate : UTM (WGS84) 47Q 0583048 E, 1845148 N
Sampling Date : April 1, 2025
Sampling Time : 15:36
Sampling Method : Grab
Sampling By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Colorless, Sediment, Odor

Quotation No. : AR2025-00472
Analysis No. : 2025-AB324-001
Received Date : April 5, 2025
Analytical Date : April 5-25, 2025
Report No. : 2025-RAAH063
Report Date : April 25, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	
					Class 3	Class 4
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	-	-
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{36})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-

Remark : [1] Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
[2] Notification of the National Environment Board, No.8, B.E.2537 (1994), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.111 Part 16, dated February 24, B.E.2537 (1994). (Standard Value of Surface Water for Class 3, 4)
[3] When water hardness not more than 100 mg/l as $CaCO_3$ (Hardness as $CaCO_3$ is 78 mg/l)
n' = naturally but changing not more than 3°C

[redacted] (Ms.Yuwadee Na Ranong)
Laboratory Reviewer

[redacted] (Mr.Virat Hemvannanukul)
Laboratory Supervisor

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E-mail : envi@envireserach.co.th
www.envireserach.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : **ฐานหลุมผลิต BY1-2 : SW1.4 : คลองวังเฉลียง (2) บ้านนิคมพัฒนา หมู่ที่ 8 ตำบลหนองจิก อำเภอคีรีมาศ จังหวัดสุโขทัย**
GPS. Coordinate : UTM (WGS84) 47Q 0585782 E, 1846407 N

Sampling Date : April 1, 2025
Sampling Time : 12:10
Sampling Method : Grab
Sampling By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odorless

Quotation No. : AR2025-00472
Analysis No. : 2025-AB293-012
Received Date : April 4, 2025
Analytical Date : April 4-25, 2025
Report No. : 2025-RAAG781
Report Date : April 25, 2025

Parameter	Unit	Method of Analysis[1/]	MRL	Result	Standard[2/]	
					Class 3	Class 4
Temperature	°C	Certified Thermometer	-	29.6	n'	n'
pH	-	Electrometric	-	7.7	5.0-9.0	5.0-9.0
Dissolved Oxygen	mg/L	Azide Modification	1.0	2.1	≥4.0	≥2.0
Biochemical Oxygen Demand	mg/L	5-Day BOD Test, Membrane Electrode	1.0	<1.0	2.0	4.0
Total Coliform Bacteria	MPN/100 mL	Most Probable Number	1.8	78	20,000	-
Fecal Coliform Bacteria	MPN/100 mL	Most Probable Number	1.8	45	4,000	-
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.1	0.1
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.1	0.1
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.260	1.0	1.0
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.02	1.0	1.0
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.005[3/]	0.005[3/]
Chromium Hexavalent	mg/L	Filtration, Colorinetric	0.005	<0.005	0.05	0.05
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	<0.001	0.05	0.05
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	<0.0005	0.002	0.002
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	<0.0002	0.01	0.01
Barium	mg/L	Digestion, Inducively Coupled Plasma (ICP-OES)	0.01	0.06	-	-
Iron	mg/L	Digestion, Inducively Coupled Plasma (ICP-OES)	0.1	0.3	-	-
Selenium	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	<0.0002	-	-
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	220	-	-
Oil and Grease	mg/L	Liquid-Liquid Patition, Gravimetric	1.0	<1.0	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	<0.1	-	-
Total Dissolved Solids	mg/L	Dried at 180°C	50	149	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	<5.0	-	-
Total Hardness as $CaCO_3$	mg/L	EDTA Titrimetric	3.0	62	-	-

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : **ฐานหลุมผลิต BY1-2 : SW1.4 : คลองวังเฉลียง (2) บ้านนิคมพัฒนา หมู่ที่ 8 ตำบลหนองจิก อำเภอคีรีมาศ จังหวัดสุโขทัย**
GPS. Coordinate : UTM (WGS84) 47Q 0585782 E, 1846407 N

Sampling Date : April 1, 2025
Sampling Time : 12:10
Sampling Method : Grab
Sampling By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odorless

Quotation No. : AR2025-00472
Analysis No. : 2025-AB293-012
Received Date : April 4, 2025
Analytical Date : April 4-25, 2025
Report No. : 2025-RAAG781
Report Date : April 25, 2025

Parameter	Unit	Method of Analysis[1/]	MRL	Result	Standard[2/]	
					Class 3	Class 4
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	-	-
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{36})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-

Remark : 1/ Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
2/ Notification of the National Environment Board, No.8, B.E.2537 (1994), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.111 Part 16, dated February 24, B.E.2537 (1994). (Standard Value of Surface Water for Class 3, 4)
3/ When water hardness not more than 100 mg/l as $CaCO_3$ (Hardness as $CaCO_3$ is 81 mg/l)
n' = naturally but changing not more than 3°C

[redacted]
(Ms.Tawadee Na Kahong)
Laboratory Reviewer

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(Mr.Virat Hemvannakul)
Laboratory Supervisor

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Page 1/2
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E-mail : envi@envisearch.co.th
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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : **ฐานหลุมผลิต BY1-20 : SW1.4 : คลองวังเฉลียง (2) บ้านนิคมพัฒนา หมู่ที่ 8 ตำบลหนองจิก อำเภอศรีมาศ จังหวัดสุโขทัย**
GPS. Coordinate : UTM (WGS84) 47Q 0585782 E, 1846407 N

Sampling Date : Apri 1, 2025
Sampling Time : 12:10
Sampling Method : Grab
Sampling By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odorless

Quotation No. : AR2025-00472
Analysis No. : 2025-AB324-002
Received Date : April 5, 2025
Analytical Date : April 5-25, 2025
Report No. : 2025-RAAH064
Report Date : April 25, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	
					Class 3	Class 4
Temperature	°C	Certified Thermometer	-	29.6	n'	n'
pH	-	Electrometric	-	7.7	5.0-9.0	5.0-9.0
Dissolved Oxygen	mg/L	Azide Modification	1.0	2.1	≥4.0	≥2.0
Biochemical Oxygen Demand	mg/L	5-Day BOD Test, Membrane Electrode	1.0	<1.0	2.0	4.0
Total Coliform Bacteria	MPN/100 mL	Most Probable Number	1.8	78	20,000	-
Fecal Coliform Bacteria	MPN/100 mL	Most Probable Number	1.8	45	4,000	-
Copper	mg/L	Digestion, Inducively Coupled Plasma (ICP-OES)	0.005	<0.005	0.1	0.1
Nickel	mg/L	Digestion, Inducively Coupled Plasma (ICP-OES)	0.005	<0.005	0.1	0.1
Manganese	mg/L	Digestion, Inducively Coupled Plasma (ICP-OES)	0.005	0.260	1.0	1.0
Zinc	mg/L	Digestion, Inducively Coupled Plasma (ICP-OES)	0.01	0.02	1.0	1.0
Cadmium	mg/L	Digestion, Inducively Coupled Plasma (ICP-OES)	0.003	<0.003	0.005[3]	0.005[3]
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	0.05
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Specrometry	0.001	<0.001	0.05	0.05
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	<0.0005	0.002	0.002
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Specrometry	0.0002	<0.0002	0.01	0.01
Barium	mg/L	Digestion, Inducively Coupled Plasma (ICP-OES)	0.01	0.06	-	-
Iron	mg/L	Digestion, Inducively Coupled Plasma (ICP-OES)	0.1	0.3	-	-
Selenium	mg/L	Digestion, Hydride Generation Atomic Absorption Specrometry	0.0002	<0.0002	-	-
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	220	-	-
Oil and Grease	mg/L	Liquid-Liquid Partition, Gravimetric	1.0	<1.0	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	<0.1	-	-
Total Dissolved Solids	mg/L	Dried at 180°C	50	149	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	<5.0	-	-
Total Hardness as $CaCO_3$	mg/L	EDTA Titrimetric	3.0	62	-	-

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : **ฐานหลุมผลิต BY1-20 : SW1.4 : คลองวังเฉลียง (2) บ้านนิคมพัฒนา หมู่ที่ 8 ตำบลหนองจิก อำเภอศรีมาศ จังหวัดสุโขทัย**
GPS. Coordinate : UTM (WGS84) 47Q 0585782 E, 1846407 N

Sampling Date : April 1, 2025
Sampling Time : 12:10
Sampling Method : Grab
Sampling By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odorless

Quotation No. : AR2025-00472
Analysis No. : 2025-AB324-002
Receivec Date : April 5, 2025
Analytical Date : April 5-25, 2025
Report No. : 2025-RAAH064
Report Date : April 25, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	
					Class 3	Class 4
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	-	-
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{36})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-

Remark : [1] Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
[2] Notification of the National Environment Board, No.8, B.E.2537 (1994), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.111 Part 16, dated February 24, B.E.2537 (1994). (Standard Value of Surface Water for Class 3, 4)
[3] When water hardness not more than 100 mg/l as $CaCO_3$ (Hardness as $CaCO_3$ is 62 mg/l)
n' = naturally but changing not more than 3°C

[redacted] [redacted]

(Ms.Yuwadee Na Ranong)
Laboratory Reviewer

(Mr.Virat Hemvannanukul)
Laboratory Supervisor

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www.envisearch.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : **ฐานหลุมผลิต BY1-20 : SW1.5 : คลองวังเฉลียง (3) บ้านบึงหญ้า หมู่ที่ 5 ตำบลหนองจิก อำเภอคีรีมาศ จังหวัดสุโขทัย**
GPS. Coordinate : UTM (WGS84) 47Q 0586736 E, 1848695 N
Sampling Date : April 1, 2025
Sampling Time : 13:53
Sampling Method : Grab
Sampling By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odor

Quotation No. : AR2025-00472
Analysis No. : 2025-AB324-003
Received Date : April 5, 2025
Analytical Date : April 5-25, 2025
Report No. : 2025-RAAH065
Report Date : April 25, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	
					Class 3	Class 4
Temperature	°C	Certified Thermometer	-	36.5	n'	n'
pH	-	Electrometric	-	8.4	5.0-9.0	5.0-9.0
Dissolved Oxygen	mg/L	Azide Modification	1.0	6.3	≥4.0	≥2.0
Biochemical Oxygen Demand	mg/L	5-Day BOD Test, Membrane Electrode	1.0	1.2	2.0	4.0
Total Coliform Bacteria	MPN/100 mL	Most Probable Number	1.8	130	20,000	-
Fecal Coliform Bacteria	MPN/100 mL	Most Probable Number	1.8	45	4,000	-
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.1	0.1
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.1	0.1
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.530	1.0	1.0
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.08	1.0	1.0
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.005[3]	0.005[3]
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	0.05
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	<0.001	0.05	0.05
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	<0.0005	0.002	0.002
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0003	0.01	0.01
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.11	-	-
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	0.9	-	-
Selenium	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	<0.0002	-	-
Total Chromium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.007	-	-
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	236	-	-
Oil and Grease	mg/L	Liquid-Liquid Partition, Gravimetric	1.0	<1.0	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	<0.1	-	-
Total Dissolved Solids	mg/L	Dried at 180°C	50	141	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	9.8	-	-
Total Hardness as $CaCO_3$	mg/L	EDTA Titrimetric	3.0	62	-	-

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E-mail : envi@envisearch.co.th
www.envisearch.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : **ฐานหลุมผลิต BY1-20 : SW1.5 : คลองวังเฉลียง (3) บ้านบึงหญ้า หมู่ที่ 5 ตำบลหนองจิก อำเภอคีรีมาศ จังหวัดสุโขทัย**
GPS. Coordinate : UTM (WGS84) 47Q 0586736 E, 1848695 N
Sampling Date : April 1, 2025
Sampling Time : 13:53
Sampling Method : Grab
Sampling By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odor

Quotation No. : AR2025-00472
Analysis No. : 2025-AB324-003
Received Date : April 5, 2025
Analytical Date : April 5-25, 2025
Report No. : 2025-RAAH065
Report Date : April 25, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	
					Class 3	Class 4
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	-	-
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{36})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-

Remark : [1] Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
[2] Notification of the National Environment Board, No.8, B.E.2537 (1994), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.111 Part 16, dated February 24, B.E.2537 (1994). (Standard Value of Surface Water for Class 3, 4)
[3] When water hardness not more than 100 mg/l as $CaCO_3$ (Hardness as $CaCO_3$ is 62 mg/l)
n' = naturally but changing not more than 3°C

[redacted]
(Ms.Yuwadee Na Ranong)
Laboratory Reviewer

[redacted]
(Mr.Virat Hemvannanukul)
Laboratory Supervisor

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : **ฐานหลุมผลิต BY1-20 : SW1.6 : สระใหญ่บึงหญ้า บ้านนิคมพัฒนา หมู่ที่ 8 ตำบลหนองจิก อำเภอคีรีมาศ จังหวัดสุโขทัย**
GPS. Coordinate : UTM (WGS84) 47Q 0584437 E, 1846912 N
Sampling Date : April 1, 2025
Sampling Time : 13:01
Sampling Method : Grab
Sampling By : Mr.Ntad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Light Yellow, Sediment, Odor

Quotation No. : AR2025-00472
Analysis No. : 2025-AB324-004
Received Date : April 5, 2025
Analytical Date : April 5-25, 2025
Report No. : 2025-RAAH066
Report Date : April 25, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	
					Class 3	Class 4
Temperature	°C	Certified Thermometer	-	32.4	n[4]	n[4]
pH	-	Electrometric	-	7.9	5.0-9.0	5.0-9.0
Dissolved Oxygen	mg/L	Azide Modification	1.0	12.4	≥4.0	≥2.0
Biochemical Oxygen Demand	mg/L	5-Day BOD Test, Membrane Electrode	1.0	14	2.0	4.0
Total Coliform Bacteria	MPN/100 mL	Most Probable Number	1.8	78	20,000	-
Fecal Coliform Bacteria	MPN/100 mL	Most Probable Number	1.8	45	4,000	-
Copper	mg/L	Digestion, Inductvely Coupled Plasma (ICP-OES)	0.005	<0.005	0.1	0.1
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.1	0.1
Manganese	mg/L	Digestion, Inductvely Coupled Plasma (ICP-OES)	0.005	0.158	1.0	1.0
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.02	1.0	1.0
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.005[3]	0.005[3]
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	0.05
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	<0.001	0.05	0.05
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	<0.0005	0.002	0.002
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0004	0.01	0.01
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.05	-	-
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	0.4	-	-
Selenium	mg/L	Digestion, Hydrice Generation Atomic Absorption Spectrometry	0.0002	<0.0002	-	-
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	226	-	-
Oil and Grease	mg/L	Liquid-Liquid Parition, Gravimetric	1.0	1.6	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	<0.1	-	-
Total Dissolved Solids	mg/L	Dried at 180°C	50	131	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	44	-	-
Total Hardness as $CaCO_3$	mg/L	EDTA Titrimetric	3.0	49	-	-

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : **ฐานหลุมผลิต BY1-20 : SW1.6 : สระใหญ่บึงหญ้า บ้านนิคมพัฒนา หมู่ที่ 8 ตำบลหนองจิก อำเภอคีรีมาศ จังหวัดสุโขทัย**
GPS. Coordinate : UTM (WGS84) 47Q 0584437 E, 1846912 N
Sampling Date : April 1, 2025
Sampling Time : 13:01
Sampling Method : Grab
Sampling By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Light Yellow, Sediment, Odor

Quotation No. : AR2025-00472
Analysis No. : 2025-AB324-004
Received Date : April 5, 2025
Analytical Date : April 5-25, 2025
Report No. : 2025-RAAH066
Report Date : April 25, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	
					Class 3	Class 4
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	-	-
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{36})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-

Remark : [1] Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
[2] Notification of the National Environment Board, No.8, B.E.2537 (1994), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.111 Part 16, dated February 24, B.E.2537 (1994). (Standard Value of Surface Water for Class 3, 4)
[3] When water hardness not more than 100 mg/l as $CaCO_3$ (Hardness as $CaCO_3$ is 49 mg/l)
[4] = naturally but changing not more than 3°C

[redacted] [redacted]
(Ms.Yuwadee Na Ranong) (Mr.Virat Hemvannanukul)
Laboratory Reviewer Laboratory Supervisor

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตบีโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตบีโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : **ฐานหลุมผลิต BM3 : SW1.9 : คลองคณฑี (1) บ้านบึงมาลย์ หมู่ที่ 7 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร**
GPS. Coordinate : UTM (WGS84) 47Q 0584296 E, 1841814 N
Sampling Date : April 2, 2025
Sampling Time : 08:41
Sampling Method : Grab
Sampling By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odor
Quotation No. : AR2025-00472
Analysis No. : 2025-AB293-005
Received Date : April 4, 2025
Analytical Date : April 4-24, 2025
Report No. : 2025-RAAG770
Report Date : April 25, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	
					Class 3	Class 4
Temperature	°C	Certified Thermometer	-	29.5	n'	n'
pH	-	Electrometric	-	7.9	5.0-9.0	5.0-9.0
Dissolved Oxygen	mg/L	Azide Modification	1.0	3.9	≥4.0	≥2.0
Biochemical Oxygen Demand	mg/L	5-Day BOD Test, Membrane Electrode	1.0	<1.0	2.0	4.0
Total Coliform Bacteria	MPN/100 mL	Most Probable Number	1.8	170	20,000	-
Fecal Coliform Bacteria	MPN/100 mL	Most Probable Number	1.8	110	4,000	-
Copper	mg/L	Digestion, Inductvely Coupled Plasma (ICP-OES)	0.005	<0.005	0.1	0.1
Nickel	mg/L	Digestion, Inductvely Coupled Plasma (ICP-OES)	0.005	<0.005	0.1	0.1
Manganese	mg/L	Digestion, Inductvely Coupled Plasma (ICP-OES)	0.005	0.074	1.0	1.0
Zinc	mg/L	Digestion, Inductvely Coupled Plasma (ICP-OES)	0.01	0.01	1.0	1.0
Cadmium	mg/L	Digestion, Inductvely Coupled Plasma (ICP-OES)	0.003	<0.003	0.005[3]	0.005[3]
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	0.05
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	0.002	0.05	0.05
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	<0.0005	0.002	0.002
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0003	0.01	0.01
Barium	mg/L	Digestion, Inductvely Coupled Plasma (ICP-OES)	0.01	0.06	-	-
Iron	mg/L	Digestion, Inductvely Coupled Plasma (ICP-OES)	0.1	1.0	-	-
Selenium	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	<0.0002	-	-
Conductivity	µs/cm	Electrical Conducivity Meter	0.1	211	-	-
Oil and Grease	mg/L	Liquid-Liquid Partition, Gravimetric	1.0	<1.0	-	-
Salinity	ppt	Electrical Conducivity Meter	0.1	<0.1	-	-
Total Dissolved Solids	mg/L	Dried at 180°C	50	131	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	29	-	-
Total Hardness as $CaCO_3$	mg/L	EDTA Titrimetric	3.0	81	-	-

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตบีโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตบีโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : **ฐานหลุมผลิต BM3 : SW1.9 : คลองคณฑี (1) บ้านบึงมาลย์ หมู่ที่ 7 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร**
GPS. Coordinate : UTM (WGS84) 47Q 0584296 E, 1841814 N
Sampling Date : April 2, 2025
Sampling Time : 08:41
Sampling Method : Grab
Sampling By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odor
Quotation No. : AR2025-00472
Analysis No. : 2025-AB293-005
Received Date : April 4, 2025
Analytical Date : April 4-24, 2025
Report No. : 2025-RAAG770
Report Date : April 25, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	
					Class 3	Class 4
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	-	-
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{36})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-

Remark : [1] Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
[2] Notification of the National Environment Board, No.8, B.E.2537 (1994), issued under the Enhancement and Consevation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.111 Part 16, dated February 24, B.E.2537 (1994). (Standard Value of Surface Water for Class 3. 4)
[3] When water hardness not more than 100 mg/l as $CaCO_3$ (Hardness as $CaCO_3$ is 81 mg/l)
n' = naturally bit changing not more than 3°C

[redacted] [redacted]

(Ms.Yuwadee Na Ranong)
Laboratory Reviewer

(Mr.Virat Hemvannanukul)
Laboratory Supervisor

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : **ฐานหลุมผลิต BM3 : SW1.10 : คลองคณเซ (2) บ้านใหม่สามัคคี หมู่ที่ 6 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร**
GPS. Coordinate : UTM (WGS84) 47Q 0585369 E, 1843434 N

Sampling Date : April 2, 2025
Sampling Time : 07:50
Sampling Method : Grab
Sampling By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, No Sediment, Odor

Quotation No. : AR2025-00472
Analysis No. : 2025-AB293-006
Received Date : April 4, 2025
Analytical Date : April 4-24, 2025
Report No. : 2025-RAAG772
Report Date : April 25, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	
					Class 3	Class 4
Temperature	°C	Certified Thermometer	-	28.3	n'	n'
pH	-	Electrometric	-	8.0	5.0-9.0	5.0-9.0
Dissolved Oxygen	mg/L	Azide Modification	1.0	4.7	≥4.0	≥2.0
Biochemical Oxygen Demand	mg/L	5-Day BOD Test, Membrane Electrode	1.0	<1.0	2.0	4.0
Total Coliform Bacteria	MPN/100 mL	Most Probable Number	1.8	140	20,000	-
Fecal Coliform Bacteria	MPN/100 mL	Most Probable Number	1.8	78	4,000	-
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.006	0.1	0.1
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.1	0.1
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.060	1.0	1.0
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.02	1.0	1.0
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.005[3]	0.005[3]
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	0.05
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	0.002	0.05	0.05
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	<0.0005	0.002	0.002
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0003	0.01	0.01
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.06	-	-
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	0.8	-	-
Selenium	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	<0.0002	-	-
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	214	-	-
Oil and Grease	mg/L	Liquid-Liquid Partition, Gravimetric	1.0	<1.0	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	<0.1	-	-
Total Dissolved Solids	mg/L	Dried at 180°C	50	164	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	26	-	-
Total Hardness as $CaCO_3$	mg/L	EDTA Titrimetric	3.0	85	-	-

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Head Office/Tax ID 0105 542 064 911

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : **ฐานหลุมผลิต BM3 : SW1.10 : คลองคณเซ (2) บ้านใหม่สามัคคี หมู่ที่ 6 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร**
GPS. Coordinate : UTM (WGS84) 47Q 0585369 E, 1843434 N

Sampling Date : April 2, 2025
Sampling Time : 07:50
Sampling Method : Grab
Sampling By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, No Sediment, Odor

Quotation No. : AR2025-00472
Analysis No. : 2025-AB293-006
Received Date : April 4, 2025
Analytical Date : April 4-24, 2025
Report No. : 2025-RAAG772
Report Date : April 25, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	
					Class 3	Class 4
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	-	-
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{36})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-

Remark : [1] Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
[2] Notification of the National Environment Board, No.8, B.E.2537 (1994), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.111 Part 16, dated February 24, B.E.2537 (1994). (Standard Value of Surface Water for Class 3, 4)
[3] When water hardness not more than 100 mg/l as $CaCO_3$ (Hardness as $CaCO_3$ is 85 mg/l)
n' = naturally but changing not more than 3°C

[redacted] (Ms.Yuwadee Na Ranong)
Laboratory Reviewer

[redacted] (Mr.Virat Hemvannanukul)
Laboratory Supervisor

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตบีโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตบีโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : **ฐานหลุมผลิต BM6 : SW1.7 : คลองส่งน้ำชลประทาน (3) บ้านบึงม่วง หมู่ที่ 11 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร**
GPS. Coordinate : UTM (WGS84) 47Q 0582286 E, 1843390 N
Sampling Date : April 2, 2025
Sampling Time : 10:01
Sampling Method : Grab
Sampling By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odor
Quotation No. : AR2025-00472
Analysis No. : 2025-AB293-007
Received Date : April 4, 2025
Analytical Date : April 4-24, 2025
Report No. : 2025-RAAG775
Report Date : April 25, 2025

Parameter	Unit	Method of Analysis[1/]	MRL	Result	Standard[2/]	
					Class 3	Class 4
Temperature	°C	Certified Thermometer	-	32.8	n'	n'
pH	-	Electrometric	-	7.5	5.0-9.0	5.0-9.0
Dissolved Oxygen	mg/L	Azide Modification	1.0	3.6	≥4.0	≥2.0
Biochemical Oxygen Demand	mg/L	5-Day BOD Test, Membrane Electrode	1.0	2.6	2.0	4.0
Total Coliform Bacteria	MPN/100 mL	Most Probable Number	1.8	1,100	20,000	-
Fecal Coliform Bacteria	MPN/100 mL	Most Probable Number	1.8	790	4,000	-
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.1	0.1
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.1	0.1
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.566	1.0	1.0
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.03	1.0	1.0
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.005[3/]	0.005[3/]
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	0.05
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	<0.001	0.05	0.05
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	<0.0005	0.002	0.002
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0005	0.01	0.01
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.08	-	-
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	1.1	-	-
Selenium	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	<0.0002	-	-
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	253	-	-
Oil and Grease	mg/L	Liquid-Liquid Partition, Gravimetric	1.0	1.1	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	<0.1	-	-
Total Dissolved Solids	mg/L	Dried at 180°C	50	180	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	22	-	-
Total Hardness as $CaCO_3$	mg/L	EDTA Titrimetric	3.0	78	-	-

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www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตบีโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตบีโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : **ฐานหลุมผลิต BM6 : SW1.7 : คลองส่งน้ำชลประทาน (3) บ้านบึงม่วง หมู่ที่ 11 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร**
GPS. Coordinate : UTM (WGS84) 47Q 0582286 E, 1843390 N
Sampling Date : April 2, 2025
Sampling Time : 10:01
Sampling Method : Grab
Sampling By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odor
Quotation No. : AR2025-00472
Analysis No. : 2025-AB293-007
Received Date : April 4, 2025
Analytical Date : April 4-24, 2025
Report No. : 2025-RAAG775
Report Date : April 25, 2025

Parameter	Unit	Method of Analysis[1/]	MRL	Result	Standard[2/]	
					Class 3	Class 4
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	-	-
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{36})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-

Remark : 1/ Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
2/ Notification of the National Environment Board, No.8, B.E.2537 (1994), issued under the Enhancement and Consevation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.111 Part 16, dated February 24, B.E.2537 (1994). (Standard Value of Surface Water for Class 3, 4)
3/ When water hardness not more than 100 mg/l as $CaCO_3$ (Hardness as $CaCO_3$ is 78 mg/l)
n' = naturally but changing not more than 3°C

[redacted] (Ms.Yuwadee Na Ranong)
Laboratory Reviewer

[redacted] (Mr.Virat Hemvannanukul)
Laboratory Supervisor

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตบีโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตบีโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : **ฐานหลุมผลิต BM6 : SW1.8 : คลองส่งน้ำชลประทาน (4) บ้านบึงมาลย์ หมู่ที่ 4 ตำบลหนองไม้แดง อำเภอลานกระบือ จังหวัดกำแพงเพชร**
GPS. Coordinate : UTM (WGS84) 47Q 0583367 E, 1843003 N

Sampling Date : April 2, 2025
Sampling Time : 11:27
Sampling Method : Grab
Sampling By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odor

Quotation No. : AR2025-00472
Analysis No. : 2025-AB293-008
Received Date : April 4, 2025
Analytical Date : April 4-24, 2025
Report No. : 2025-RAAG776
Report Date : April 25, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	
					Class 3	Class 4
Temperature	°C	Certified Thermometer	-	34.7	n'	n'
pH	-	Electrometric	-	7.5	5.0-9.0	5.0-9.0
Dissolved Oxygen	mg/L	Azide Modification	1.0	1.4	≥4.0	≥2.0
Biochemical Oxygen Demand	mg/L	5-Day BOD Test, Membrane Electrode	1.0	1.2	2.0	4.0
Total Coliform Bacteria	MPN/100 mL	Most Probable Number	1.8	1,300	20,000	-
Fecal Coliform Bacteria	MPN/100 mL	Most Probable Number	1.8	110	4,000	-
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.1	0.1
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.1	0.1
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.554	1.0	1.0
Zinc	mg/L	Digestion, Inductvely Coupled Plasma (ICP-OES)	0.01	0.01	1.0	1.0
Cadmium	mg/L	Digestion, Inductvely Coupled Plasma (ICP-OES)	0.003	<0.003	0.005[3]	0.005[3]
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	0.05
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	<0.001	0.05	0.05
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	<0.0005	0.002	0.002
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0004	0.01	0.01
Barium	mg/L	Digestion, Inductvely Coupled Plasma (ICP-OES)	0.01	0.06	-	-
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	0.6	-	-
Selenium	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	<0.0002	-	-
Conductivity	µs/cm	Electrical Conducivity Meter	0.1	228	-	-
Oil and Grease	mg/L	Liquid-Liquid Partition, Gravimetric	1.0	<1.0	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	<0.1	-	-
Total Dissolved Solids	mg/L	Dried at 180°C	50	134	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	6.0	-	-
Total Hardness as $CaCO_3$	mg/L	EDTA Titrimetric	3.0	97	-	-

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www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตบีโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตบีโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : **ฐานหลุมผลิต BM6 : SW1.8 : คลองส่งน้ำชลประทาน (4) บ้านบึงมาลย์ หมู่ที่ 4 ตำบลหนองไม้แดง อำเภอลานกระบือ จังหวัดกำแพงเพชร**
GPS. Coordinate : UTM (WGS84) 47Q 0583367 E, 1843003 N

Sampling Date : April 2, 2025
Sampling Time : 11:27
Sampling Method : Grab
Sampling By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odor

Quotation No. : AR2025-00472
Analysis No. : 2025-AB293-008
Received Date : April 4, 2025
Analytical Date : April 4-24, 2025
Report No. : 2025-RAAG776
Report Date : April 25, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	
					Class 3	Class 4
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	-	-
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{36})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
Chloride	mg/L	Mercuric Nitrate	1.0	9.0	-	-

Remark : [1] Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
[2] Notification of the National Environment Board, No.8, B.E.2537 (1994), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.111 Part 16, dated February 24, B.E.2537 (1994). (Standard Value of Surface Water for Class 3, 4)
[3] When water hardness not more than 100 mg/l as $CaCO_3$ (Hardness as $CaCO_3$ is 97 mg/l)
n' = naturally but changing not more than 3°C

[redacted]

(Ms.Yuwadee Na Ranong)
Laboratory Reviewer

[redacted]

(Mr.Virat Hemvannanukul)
Laboratory Supervisor

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Page 1/2
F-RP-026 Rev. 05, January 18, 2021

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : **ฐานหลุมผลิต BMS2 : SW1.11 : คลองคณฑี (3) บ้านหนองไม้แดง หมู่ที่ 7 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร**
GPS. Coordinate : UTM (WGS84) 47Q 0582783 E, 1839767 N
Sampling Date : April 2, 2025
Sampling Time : 16:08
Sampling Method : Grab
Sampling By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odor

Quotation No. : AR2025-00472
Analysis No. : 2025-AB293-009
Received Date : April 4, 2025
Analytical Date : April 4-24, 2025
Report No. : 2025-RAAG778
Report Date : April 25, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	
					Class 3	Class 4
Temperature	°C	Certified Thermometer	-	23.1	n'	n'
pH	-	Electrometric	-	7.9	5.0-9.0	5.0-9.0
Dissolved Oxygen	mg/L	Azide Modification	1.0	4.9	≥4.0	≥2.0
Biochemical Oxygen Demand	mg/L	5-Day BOD Test, Membrane Electrode	1.0	1.2	2.0	4.0
Total Coliform Bacteria	MPN/100 mL	Most Probable Number	1.8	790	20,000	-
Fecal Coliform Bacteria	MPN/100 mL	Most Probable Number	1.8	220	4,000	-
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.1	0.1
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.1	0.1
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.102	1.0	1.0
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.02	1.0	1.0
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.005[3]	0.005[3]
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	0.05
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	0.002	0.05	0.05
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	<0.0005	0.002	0.002
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0003	0.01	0.01
Barium	mg/L	Digestion, Inducively Coupled Plasma (ICP-OES)	0.01	0.06	-	-
Iron	mg/L	Digestion, Inducively Coupled Plasma (ICP-OES)	0.1	1.3	-	-
Selenium	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	<0.0002	-	-
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	210	-	-
Oil and Grease	mg/L	Liquid-Liquid Partition, Gravimetric	1.0	<1.0	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	<0.1	-	-
Total Dissolved Solids	mg/L	Dried at 180°C	50	134	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	43	-	-
Total Hardness as $CaCO_3$	mg/L	EDTA Titrimetric	3.0	80	-	-

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E-mail : envi@enviresearch.co.th
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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : **ฐานหลุมผลิต BMS2 : SW1.11 : คลองคณฑี (3) บ้านหนองไม้แดง หมู่ที่ 7 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร**
GPS. Coordinate : UTM (WGS84) 47Q 0582783 E, 1839767 N
Sampling Date : April 2, 2025
Sampling Time : 16:08
Sampling Method : Grab
Sampling By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odor

Quotation No. : AR2025-00472
Analysis No. : 2025-AB293-009
Received Date : April 4, 2025
Analytical Date : April 4-24, 2025
Report No. : 2025-RAAG778
Report Date : April 25, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	
					Class 3	Class 4
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	-	-
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{36})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-

Remark : [1] Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
[2] Notification of the National Environment Board, No.8, B.E.2537 (1994), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.111 Part 16, dated February 24, B.E.2537 (1994). (Standard Value of Surface Water for Class 3, 4)
[3] When water hardness not more than 100 mg/l as $CaCO_3$ (Hardness as $CaCO_3$ is 80 mg/l)
n' = naturally but changing not more than 3°C

[redacted]

(Ms.Yuwadee Na Ranong)
Laboratory Reviewer

[redacted]

(Mr.Virat Hemvannanukul)
Laboratory Supervisor

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : **ฐานหลุมผลิต BMS2 : SW1.12 : คลองคณฑี (4) บ้านหนองไม้แดง หมู่ที่ 7 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร**
GPS. Coordinate : UTM (WGS84) 47Q 0583646 E, 1840787 N
Sampling Date : April 2, 2025
Sampling Time : 14:46
Sampling Method : Grab
Sampling By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, No Sediment, Odor

Quotation No. : AR2025-00472
Analysis No. : 2025-AB293-010
Received Date : April 4, 2025
Analytical Date : April 4-24, 2025
Report No. : 2025-RAAG780
Report Date : April 25, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	
					Class 3	Class 4
Temperature	°C	Certified Thermometer	-	37.4	n'	n'
pH	-	Electrometric	-	7.9	5.0-9.0	5.0-9.0
Dissolved Oxygen	mg/L	Azide Modification	1.0	5.9	≥4.0	≥2.0
Biochemical Oxygen Demand	mg/L	5-Day BOD Test, Membrane Electrode	1.0	<1.0	2.0	4.0
Total Coliform Bacteria	MPN/100 mL	Most Probable Number	1.8	110	20,000	-
Fecal Coliform Bacteria	MPN/100 mL	Most Probable Number	1.8	78	4,000	-
Copper	mg/L	Digestion, Inductvely Coupled Plasma (ICP-OES)	0.005	<0.005	0.1	0.1
Nickel	mg/L	Digestion, Inductvely Coupled Plasma (ICP-OES)	0.005	0.005	0.1	0.1
Manganese	mg/L	Digestion, Inductvely Coupled Plasma (ICP-OES)	0.005	0.084	1.0	1.0
Zinc	mg/L	Digestion, Inductvely Coupled Plasma (ICP-OES)	0.01	0.12	1.0	1.0
Cadmium	mg/L	Digestion, Inductvely Coupled Plasma (ICP-OES)	0.003	<0.003	0.005[3]	0.005[3]
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	0.05
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	0.002	0.05	0.05
Mercury	mg/L	Digestion, Cold-vapor Atomic Absorption Spectrometry	0.0005	<0.0005	0.002	0.002
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0004	0.01	0.01
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.06	-	-
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	1.2	-	-
Selenium	mg/L	Digestion, Hydrice Generation Atomic Absorption Spectrometry	0.0002	<0.0002	-	-
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	209	-	-
Oil and Grease	mg/L	Liquid-Liquid Partition, Gravimetric	1.0	<1.0	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	<0.1	-	-
Total Dissolved Solids	mg/L	Dried at 180°C	50	140	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	30	-	-
Total Hardness as $CaCO_3$	mg/L	EDTA Titrimetric	3.0	81	-	-

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www.enviresearch.coth
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : **ฐานหลุมผลิต BMS2 : SW1.12 : คลองคณฑี (4) บ้านหนองไม้แดง หมู่ที่ 7 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร**
GPS. Coordinate : UTM (WGS84) 47Q 0583646 E, 1840787 N
Sampling Date : April 2, 2025
Sampling Time : 14:46
Sampling Method : Grab
Sampling By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, No Sediment, Odor

Quotation No. : AR2025-00472
Analysis No. : 2025-AB293-010
Received Date : April 4, 2025
Analytical Date : April 4-24, 2025
Report No. : 2025-RAAG780
Report Date : April 25, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[3]	
					Class 3	Class 4
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	-	-
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Diesel Range Hycrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{36})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-

Remark : [1] Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
[2] Notification of the National Environment Board, No.8, B.E.2537 (1994), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.111 Part 16, dated February 24, B.E.2537 (1994). (Standard Value of Surface Water for Class 3, 4)
[3] When water hardness not more than 100 mg/l as $CaCO_3$ (Hardness as $CaCO_3$ is 81 mg/l)
n' = naturally but changing not more than 3°C

[redacted] [redacted]

(Ms.Yuwadee Na Ranong)
Laboratory Reviewer

(Mr.Virat Hemvannanukul)
Laboratory Supervisor

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E-mail : envi@enviresearch.co.th
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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : **ฐานหลุมผลิต BMS1 : SW1.9 : คลองคณเซ่ (1) บ้านบึงมาลย์ หมู่ที่ 7 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร**
GPS. Coordinate : UTM (WGS84) 47Q 0584296 E, 1841814 N
Sampling Date : April 2, 2025
Sampling Time : 08:41
Sampling Method : Grab
Sampling By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odor

Quotation No. : AR2025-00472
Analysis No. : 2025-AB293-013
Received Date : April 4, 2025
Analytical Date : April 4-24, 2025
Report No. : 2025-RAAG782
Report Date : April 25, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	
					Class 3	Class 4
Temperature	°C	Certified Thermometer	-	29.5	n'	n'
pH	-	Electrometric	-	7.9	5.0-9.0	5.0-9.0
Dissolved Oxygen	mg/L	Azide Modification	1.0	3.9	≥4.0	≥2.0
Biochemical Oxygen Demand	mg/L	5-Day BOD Test, Membrane Electrode	1.0	<1.0	2.0	4.0
Total Coliform Bacteria	MPN/100 mL	Most Probable Number	1.8	170	20,000	-
Fecal Coliform Bacteria	MPN/100 mL	Most Probable Number	1.8	110	4,000	-
Copper	mg/L	Digestion, Inductvely Coupled Plasma (ICP-OES)	0.005	<0.005	0.1	0.1
Nickel	mg/L	Digestion, Inductvely Coupled Plasma (ICP-OES)	0.005	<0.005	0.1	0.1
Manganese	mg/L	Digestion, Inductvely Coupled Plasma (ICP-OES)	0.005	0.074	1.0	1.0
Zinc	mg/L	Digestion, Inductvely Coupled Plasma (ICP-OES)	0.01	0.01	1.0	1.0
Cadmium	mg/L	Digestion, Inductvely Coupled Plasma (ICP-OES)	0.003	<0.003	0.005[3]	0.005[3]
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	0.05
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	0.002	0.05	0.05
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	<0.0005	0.002	0.002
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0003	0.01	0.01
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.06	-	-
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	1.0	-	-
Selenium	mg/L	Digestion, Hydrice Generation Atomic Absorption Spectrometry	0.0002	<0.0002	-	-
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	211	-	-
Oil and Grease	mg/L	Liquid-Liquid Paritition, Gravimetric	1.0	<1.0	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	<0.1	-	-
Total Dissolved Solids	mg/L	Dried at 180°C	50	131	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	29	-	-
Total Hardness as $CaCO_3$	mg/L	EDTA Titrimetric	3.0	81	-	-

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : **ฐานหลุมผลิต BMS1 : SW1.9 : คลองคณเซ่ (1) บ้านบึงมาลย์ หมู่ที่ 7 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร**
GPS. Coordinate : UTM (WGS84) 47Q 0584296 E, 1841814 N
Sampling Date : April 2, 2025
Sampling Time : 08:41
Sampling Method : Grab
Sampling By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odor

Quotation No. : AR2025-00472
Analysis No. : 2025-AB293-013
Received Date : April 4, 2025
Analytical Date : April 4-24, 2025
Report No. : 2025-RAAG782
Report Date : April 25, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	
					Class 3	Class 4
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	-	-
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{36})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-

Remark : [1] Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
[2] Notification of the National Environment Board, No.8, B.E.2537 (1994), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.111 Part 16, dated February 24, B.E.2537 (1994). (Standard Value of Surface Water for Class 3, 4)
[3] When water hardness not more than 100 mg/l as $CaCO_3$ (Hardness as $CaCO_3$ is 62 mg/l)
n' = naturally bit changing not more than 3°C

[redacted]
(Ms.Yuwadee Na Ranong)
Laboratory Reviewer

[redacted]
(Mr.Virat Hemvannanukul)
Laboratory Supervisor

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตบีโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตบีโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : **ฐานผลุมผลิต BMS1 : SW1.15 : คลองคณฑี (5) บ้านหนองไม้แดง หมู่ที่ 7 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร**
GPS. Coordinate : UTM (WGS84) 47Q 0583463 E, 1841017 N
Sampling Date : April 2, 2025
Sampling Time : 14:02
Sampling Method : Grab
Sampling By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Light Yellow, Sediment, Odor

Quotation No. : AR2025-00472
Analysis No. : 2025-AB324-005
Received Date : April 5, 2025
Analytical Date : April 5-25, 2025
Report No. : 2025-RAAH067
Report Date : April 25, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	
					Class 3	Class 4
Temperature	°C	Certified Thermometer	-	36.3	n'	n'
pH	-	Electrometric	-	7.7	5.0-9.0	5.0-9.0
Dissolved Oxygen	mg/L	Azide Modification	1.0	3.7	≥4.0	≥2.0
Biochemical Oxygen Demand	mg/L	5-Day BOD Test, Membrane Electrode	1.0	<1.0	2.0	4.0
Total Coliform Bacteria	MPN/100 mL	Most Probable Number	1.8	230	20,000	-
Fecal Coliform Bacteria	MPN/100 mL	Most Probable Number	1.8	78	4,000	-
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.1	0.1
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	0.1	0.1
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.121	1.0	1.0
Zinc	mg/L	Digestion, Inducively Coupled Plasma (ICP-OES)	0.01	0.04	1.0	1.0
Cadmium	mg/L	Digestion, Inducively Coupled Plasma (ICP-OES)	0.003	<0.003	0.005[3]	0.005[3]
Chromium Hexavalent	mg/L	Filtration, Colorimetric	0.005	<0.005	0.05	0.05
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Specrometry	0.001	<0.001	0.05	0.05
Mercury	mg/L	Digestion, Cold-Vapor Atomic Absorption Spectrometry	0.0005	<0.0005	0.002	0.002
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Specrometry	0.0002	0.0050	0.01	0.01
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.05	-	-
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	0.4	-	-
Selenium	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	<0.0002	-	-
Total Chromium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	-	-
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	215	-	-
Oil and Grease	mg/L	Liquid-Liquid Partition, Gravimetric	1.0	<1.0	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	<0.1	-	-
Total Dissolved Solids	mg/L	Dried at 180°C	50	136	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	7.9	-	-
Total Hardness as $CaCO_3$	mg/L	EDTA Titrimetric	3.0	81	-	-

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ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตบีโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตบีโตรเลียม)
Project Location : จังหวัดสุโขทัย และจังหวัดกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : ฐานผลุมผลิต BMS1 : SW1.15 : คลองคณฑี (5) บ้านหนองไม้แดง หมู่ที่ 7 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร
GPS. Coordinate : UTM (WGS84) 47Q 0583463 E, 1841017 N
Sampling Date : April 2, 2025
Sampling Time : 14:02
Sampling Method : Grab
Sampling By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Light Yellow, Sediment, Odor

Quotation No. : AR2025-00472
Analysis No. : 2025-AB324-005
Received Date : April 5, 2025
Analytical Date : April 5-25, 2025
Report No. : 2025-RAAH067
Report Date : April 25, 2025

Parameter	Unit	Method of Analysis[1]	MRL	Result	Standard[2]	
					Class 3	Class 4
Benzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	1.0	<1.0	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometric (GC-MS)	3.0	<3.0	-	-
TPH (Gasoline Range Hydrocarbons; C_6-C_9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-
TPH (Kerosene Range Hydrocarbons; C_{10}-C_{14})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Diesel Range Hydrocarbons; C_{15}-C_{28})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Heavy Oil Range Hydrocarbons; C_{29}-C_{36})	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-

Remark : [1] Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.
[2] Notification of the National Environment Board, No.8, B.E.2537 (1994), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.111 Part 16, dated February 24, B.E.2537 (1994). (Standard Value of Surface Water for Class 3, 4)
[3] When water hardness not more than 100 mg/l as $CaCO_3$ (Hardness as $CaCO_3$ is 81 mg/l)
n' = naturally bit changing not more than 3°C

[redacted]
(Ms.Yuwadee Na Ranong)
Laboratory Reviewer

[redacted]
(Mr.Virat Hemvannanukul)
Laboratory Supervisor

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F-RP-026 Rev. 05, January 18, 2021



บริษัท ซีเอ็นพีซีเอชเค (ไทยแลนด์) จำกัด

รายงานผลการปฏิบัติตามมาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม และมาตรการติดตามตรวจสอบผลกระทบสิ่งแวดล้อม โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร ฉบับเดือนมกราคม - มิถุนายน พ.ศ.2568

ภาคผนวก ง.6

เอกสารขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์

ที่ อก ๐๓๑๐(๑)/ ๖๔๗๖

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๐๓ กรกฎาคม ๒๕๖๗

เรื่อง ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท เอ็นไวรอนเมนท์ รีเสริช แอนด์ เทคโนโลยี จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๒๔ เมษายน ๒๕๖๗

สิ่งที่ส่งมาด้วย ๑. รายชื่อผู้ควบคุมห้องปฏิบัติการวิเคราะห์เอกชน จำนวน ๑ แผ่น
๒. รายชื่อเจ้าหน้าที่ห้องปฏิบัติการวิเคราะห์เอกชน จำนวน ๒ แผ่น
๓. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๑๔ แผ่น

ตามคำขอที่อ้างถึง บริษัท เอ็นไวรอนเมนท์ รีเสริช แอนด์ เทคโนโลยี จำกัด ขอต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๐๙๙ สถานที่ตั้งเลขที่ ๒๕/๑๑๔ หมู่ที่ ๖ ซอยชินเขต ๑ ถนนงามวงศ์วาน แขวงทุ่งสองห้อง เขตหลักสี่ กรุงเทพมหานคร ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอ็นไวรอนเมนท์ รีเสริช แอนด์ เทคโนโลยี จำกัด ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

ก. ผู้ควบคุมห้องปฏิบัติการวิเคราะห์เอกชน จำนวน ๒๐ ราย ตามสิ่งที่ส่งมาด้วย ๑
ข. เจ้าหน้าที่ห้องปฏิบัติการวิเคราะห์เอกชน ๖๑ ราย ตามสิ่งที่ส่งมาด้วย ๒
ค. ขอบข่ายชนิดสารมลพิษที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำ/น้ำเสีย น้ำใต้ดิน อากาศเสีย สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว และดิน ตามสิ่งที่ส่งมาด้วย ๓

หนังสือฉบับนี้จะหมดอายุในวันที่ ๑๘ พฤษภาคม ๒๕๗๑ หากประสงค์จะต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงานอุตสาหกรรม ภายใน ๖๐ วัน ก่อนวันสิ้นอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

[redacted]

(นายพรยศ กลั่นกรอง)
ระยอินดี ปฏิบัติราชการแทน
อธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน
กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ
โทร. ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕
โทรสาร ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๙๙
ไปรษณีย์อิเล็กทรอนิกส์ saraban@diw.mail.go.th

Green Industry
"อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"

เอกสารแนบท้ายหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เอ็นไวรอนเมนท์ รีเสริช แอนด์ เทคโนโลยี จำกัด เลขทะเบียน ว-๐๙๙
ที่ อก ๐๓๑๐(๑)/ ๖๔๗๖ ลงวันที่ ๐๓ กรกฎาคม ๒๕๖๗

ก. ผู้ควบคุมห้องปฏิบัติการวิเคราะห์เอกชน จำนวน ๒๐ ราย

๑) นางสาวสุดารัตน์ เขจรรักษ์	ทะเบียนเลขที่ ว-๐๙๙-ค-๐๐๐๑
๒) นางสาวพิชาดา เชียวนรภัย	ทะเบียนเลขที่ ว-๐๙๙-ค-๐๐๐๒
๓) นางสาววลิดา โพธิ์เจริญ	ทะเบียนเลขที่ ว-๐๙๙-ค-๐๐๐๓
๔) ว่าที่ร้อยตรีวันชนะ สีหามาตร	ทะเบียนเลขที่ ว-๐๙๙-ค-๐๐๐๔
๕) นางสาวรัชนีวรรณ ภูประเสริฐ	ทะเบียนเลขที่ ว-๐๙๙-ค-๐๐๐๕
๖) นางสาวปณิชา พรมชัย	ทะเบียนเลขที่ ว-๐๙๙-ค-๐๐๐๖
๗) นางณัฐรดา เลี้ยงรักษา	ทะเบียนเลขที่ ว-๐๙๙-ค-๐๐๐๗
๘) นายมงคล ภูรภักดิ์	ทะเบียนเลขที่ ว-๐๙๙-ค-๐๐๐๘
๙) นางสาวธนิตา บุญรุ่งเรือง	ทะเบียนเลขที่ ว-๐๙๙-ค-๐๐๐๙
๑๐) นางสาวรมิตา แตงไทย	ทะเบียนเลขที่ ว-๐๙๙-ค-๐๐๑๐
๑๑) นางสาวไรวินทร์ โพธิ์สิทธิ์	ทะเบียนเลขที่ ว-๐๙๙-ค-๐๐๑๑
๑๒) นางสาวณัฐณิชา เสริมมติวงศ์	ทะเบียนเลขที่ ว-๐๙๙-ค-๐๐๑๒
๑๓) นายนพสิทธิ์ ทวีพรประดิษฐ์	ทะเบียนเลขที่ ว-๐๙๙-ค-๐๐๑๓
๑๔) นางสาวธิดารัตน์ ปุกคะ	ทะเบียนเลขที่ ว-๐๙๙-ค-๐๐๑๔
๑๕) นายอภิชาติ พูลพล	ทะเบียนเลขที่ ว-๐๙๙-ค-๐๐๑๕
๑๖) นายนิทัศน์ ศิริชาติ	ทะเบียนเลขที่ ว-๐๙๙-ค-๐๐๑๖
๑๗) นายสุทธิชาญ สังข์ทอง	ทะเบียนเลขที่ ว-๐๙๙-ค-๐๐๑๗
๑๘) นางสาวยุวดี ณ ระนอง	ทะเบียนเลขที่ ว-๐๙๙-ค-๐๐๑๘
๑๙) นางสาวสุภาวรรณ สุวรรณภา	ทะเบียนเลขที่ ว-๐๙๙-ค-๐๐๑๙
๒๐) นางสาวนภาจรัส หมื่นวงษ์	ทะเบียนเลขที่ ว-๐๙๙-ค-๐๐๒๐

[redacted]

สิ่งที่ส่งมาด้วย ๒

เอกสารแนบท้ายหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เอ็นไวรอนเมนท์ รีเสริช แอนด์ เทคโนโลยี จำกัด เลขทะเบียน ว-๐๙๙
ที่ อก ๐๓๑๐(๑)/ ๖๔๗๖ ลงวันที่ ๐๓ กรกฎาคม ๒๕๖๗

ข. เจ้าหน้าที่ห้องปฏิบัติการวิเคราะห์เอกชน จำนวน ๖๑ ราย

๑) นางสาวณัฏฐณิชา ขาวสุทธิ์ ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๐๒
๒) นางสาวสุธิดา ทองประภา ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๐๕
๓) นายจิรยุทธ์ สามารถ ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๐๗
๔) นายอัษฎา ไชยวงค์ ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๐๘
๕) นางสาวณัฐริสา บุญหนัก ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๐๙
๖) นายนฤดม โชติกาญจน์ ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๑๒
๗) นางสาวพรทิพย์ อัมภรัตน์ ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๑๓
๘) นายอัครวัฒน์ คชบก ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๑๕
๙) นางสาวธัญพิชชา สุดเชียน ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๑๖
๑๐) นางสาวพาขวัญ นนพละ ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๑๗
๑๑) นางสาววิมลรัตน์ แปรงทอง ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๑๘
๑๒) นางสาวจรรยาวดี ขำแป้ง ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๑๙
๑๓) นางสาวธาราภรณ์ สมัยใหม่ ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๒๐
๑๔) นางสาวรัตน์ชนก ชนะค้า ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๒๑
๑๕) นางสาวกมลทิพย์ พุ่มตาก้อง ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๒๒
๑๖) นางสาวสุพัตรา ผาสุขพักตร์ ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๒๓
๑๗) นางสาวฉัตรยาลักษณ์ บรรดิษฐ ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๒๔
๑๘) นางสาวอาภัสรา หล่าสูงเนิน ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๒๕
๑๙) นางสาวพิมพิศา ทับพันธ์ ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๒๖
๒๐) นางสาวอัจฉรี แก้วเพ็ชรวงค์ ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๒๗
๒๑) นางสาวชลธิชา กันยานุช ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๒๘
๒๒) นางสาวพิชามญชุ์ ยังผ่อง ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๒๙
๒๓) นางสาวณิชารีย์ ปริญญานุวัตร ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๓๐
๒๔) นายวัชรพล บุตรตีขันธ์ ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๓๑
๒๕) นางสาวณัฐติมา ปัดชา ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๓๒
๒๖) นายวัชรพงษ์ พูลเขตกิจ ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๓๓
๒๗) นายศิวกร วงสุตาล ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๓๔
๒๘) นางสาวรวิภา จาระณะ ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๓๕
๒๙) นางสาวธัญญาภรณ์ คณะศรี ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๓๖
๓๐) นางสาวพัชรพร อนุสร ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๓๗
๓๑) นายธนากร อริยพงษ์โสภณ ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๓๘
๓๒) นางสาวบุษกร สมรักษ์ ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๓๙
๓๓) นางสาววิลาวัณย์ แก้วยม ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๔๐
๓๔) นางสาวธัญญาลักษณ์ แสงโยธา ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๔๑
๓๕) นายสุชาพงศ์ รุ่งเรือง ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๔๒
[redacted]

๓๖) นายสิทธิพร...

๓๖) นายสิทธิพร วงษ์คำ ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๔๓
๓๗) นางเตชินี สืบเสระ ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๔๔
๓๘) นางสาวธนัชพร คนแรง ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๔๕
๓๙) นายภาณุพล โพธิ์แดง ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๔๖
๔๐) นายวัชรางกูร กองแสง ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๔๗
๔๑) นางสาวสุราทิพย์ อิ่มน้อย ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๔๘
๔๒) นางสาวชมพูนุท กสิชีวิน ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๔๙
๔๓) นางสาวรวีวรรณ สุขารมย์ ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๕๐
๔๔) นางสาวกัญญาลักษณ์ กระทาง ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๕๑
๔๕) นางสาวปิยธิดา ประแดงโค ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๕๒
๔๖) นางสาวปวิตรา นาเหล็ก ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๕๓
๔๗) นางสาวทักษพร ไกรสิงห์ ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๕๔
๔๘) นางสาวเบญจวรรณ คำหงษา ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๕๕
๔๙) นางสาวพัชชา แก้วย้อย ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๕๖
๕๐) นางสาวณัฐชา สัมฤทธิ์ดี ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๕๗
๕๑) นายรอมซี กาเต๊ะ ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๕๘
๕๒) นางสาวอังคนา อุ่นตา ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๕๙
๕๓) นายสุริยะ ชูทอง ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๖๐
๕๔) นายฉันทวิชญ์ เหลวกูล ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๖๑
๕๕) นายศิวากุร ธรรมนิทา ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๖๒
๕๖) นายอนุวัฒน์ เรืองอ่อน ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๖๓
๕๗) นายฉัตรชัย โยวะผุย ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๖๔
๕๘) นายกลยุทธ์ อินทร์คำ ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๖๕
๕๙) นางสาวนันทชา เนื้อนวล ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๖๖
๖๐) นางสาวจิตตวรรณ ลิ้มสมบูรณ์ ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๖๗
๖๑) ว่าที่ร้อยตรีนัฐพล สุทธิมล ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๖๘
[redacted]

สิ่งที่ส่งมาด้วย ๓

เอกสารแนบท้ายหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เอ็นไวรอนเมนท์ รีเสริช แอนด์ เทคโนโลยี จำกัด เลขทะเบียน ว-๐๙๙
ที่ อก ๐๓๑๐(๑)/ ๖๔๗๖ ลงวันที่ ๐๓ กรกฎาคม ๒๕๖๗

ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๑๙๓ รายการ

น้ำ/น้ำเสีย จำนวน 27 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Arsenic	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[4]
		2) Digestion, Inductively Coupled Plasma Method[4]
2	Barium	Digestion, Inductively Coupled Plasma Method[4]
3	Biochemical Oxygen Demand	1) 5-Day BOD Test, Azide Modification Method[4]
		2) 5-Day BOD Test, Membrane Electrode Method[4]
4	Cadmium	Digestion, Inductively Coupled Plasma Method[4]
5	Chemical Oxygen Demand	Closed Reflux, Titrimetric Method[4]
6	Chromium	Digestion, Inductively Coupled Plasma Method[4]
7	Color	ADMI Weighted-Ordinate Spectrophotometric Method[4]
8	Copper	Digestion, Inductively Coupled Plasma Method[4]
9	Cyanide	Distillation, Colorimetric Method[4]
10	Formaldehyde	Distillation, Colorimetric Method[3]
11	Free Chlorine	1) Iodometric Method[4]
		2) DPD Colorimetric Method[4]
12	Hexavalent Chromium	Colorimetric Method[4]
13	Lead	1) Digestion, Electrothermal Atomic Absorption Spectrometric Method[4]
		2) Digestion, Inductively Coupled Plasma Method[4]
14	Manganese	Digestion, Inductively Coupled Plasma Method[4]
15	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method[4]
16	Nickel	Digestion, Inductively Coupled Plasma Method[4]
17	Oil & Grease	Liquid-Liquid, Partition-Gravimetric Method[4]
18	pH	Electrometric Method[4]
19	Phenols	Distillation, Direct Photometric Method[4]
20	Selenium	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[4]
		2) Digestion, Inductively Coupled Plasma Method[4]

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
21	Sulfide	Iodometric Method[4]
22	Temperature	Laboratory and Field Methods[4]
23	Total Dissolved Solids	Dried at 180 °C[4]
24	Total Kjeldahl Nitrogen	1) Macro-Kjeldahl Method[4]
		2) Semi-Micro-Kjeldahl Method[4]
25	Total Suspended Solids	Dried from 103 to 105 °C[4]
26	Trivalent Chromium	Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation[4]
27	Zinc	Digestion, Inductively Coupled Plasma Method[4]

น้ำใต้ดิน จำนวน 61 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acetone	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
2	Antimony	Digestion, Inductively Coupled Plasma Method[4]
3	Arsenic	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[4]
		2) Digestion, Inductively Coupled Plasma Method[4]
4	Barium	Digestion, Inductively Coupled Plasma Method[4]
5	Benzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
6	Beryllium	Digestion, Inductively Coupled Plasma Method[4]
7	Bromodichloromethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
8	Bromoform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
9	Cadmium	Digestion, Inductively Coupled Plasma Method[4]
10	Carbon disulfide	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method[4]
11	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
12	Chlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
13	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
14	Chloroform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
15	Chromium	Digestion, Inductively Coupled Plasma Method[4]
16	Chromium (III)	Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation[4]
17	Chromium (VI)	Colorimetric Method[4]
18	Cyanide	Distillation, Colorimetric Method[4]
19	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
20	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
21	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
22	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
23	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
24	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
25	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
26	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
27	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
28	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
29	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
30	Ethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4] [redacted]

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
31	Hexachloro-1,3-butadiene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
32	Lead	1) Digestion, Electrothermal Atomic Absorption Spectrometric Method[4] 2) Digestion, Inductively Coupled Plasma Method[3]
33	Manganese	Digestion, Inductively Coupled Plasma Method[4]
34	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method[4]
35	Methyl bromide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
36	Methylene chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
37	Methyl tert-butyl ether	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
38	Naphthalene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
39	Nickel	Digestion, Inductively Coupled Plasma Method[4]
40	pH	Electrometric Method[4]
41	Selenium	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[4] 2) Digestion, Inductively Coupled Plasma Method[4]
42	Silver	Digestion, Inductvely Coupled Plasma Method[4]
43	Styrene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
44	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
45	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
46	Toluene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
47	TPH (C_5-C_8)	Purge and Trap, Gas Chromatographic Method[11,19]
48	TPH ($C_{>8}$-C_{16})	Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method[9,19] [redacted]

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
49	TPH ($C_{>16}$-C_{35})	Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method[9,19]
50	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
51	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
52	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
53	Trichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
54	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
55	Vanadium	Digestion, Inductively Coupled Plasma Method[4]
56	Vinyl chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
57	m-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
59	o-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
59	p-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
60	Xylene (Total)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
61	Zinc	Digestion, Inductively Coupled Plasma Method[4]

<u>อากาศเสีย (ปล่องระบาย) จำนวน 26 รายการ</u>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Antimony	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
2	Arsenic	1) Isokinetic Sampling, Digestion, Hydride Generation/ Atomic Absorption Spectrometric Method[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]

3 Beryllium...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
3	Beryllium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
4	Cadmium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
5	Carbon Monoxide	Instrumental Analyzer Method[5]
6	Chlorine	1) Absorption Sampling, Ion Chromatographic Method[5] 2) Isokinetic Sampling, Ion Chromatographic Method[5]
7	Chromium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
8	Cobalt	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
9	Copper	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
10	Dioxins/Furans	Isokinetic Sampling[5]
11	Hydrogen Chloride	1) Absorption Sampling, Ion Chromatographic Method[5] 2) Isokinetic Sampling, Ion Chromatographic Method[5]
12	Hydrogen Fluoride	1) Absorption Sampling, Ion Chromatographic Method[5] 2) Isokinetic Sampling, Ion Chromatographic Method[5]
13	Hydrogen Sulfide	Absorption Sampling, Iodometric Method[5]
14	Lead	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5] 2) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method[5]
15	Manganese	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
16	Mercury	Isokinetic Sampling, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method[5]
17	Nickel	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
18	Opacity	Ringelmann's Method[2]
19	Oxides of Nitrogen	1) Absorption Sampling, Alkaline Permanganate/ Colorimetric Method[5] 2) Instrumental Analyzer Method[5]
20	Selenium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]

21 Sulfur Dioxide...

ลำดับที่	สารมลพิษ	วิธีวิ.เคราะห์
21	Sulfur Dioxide	1) Isokinetic Sampling, Barium-Thorin Titrimetric Method[5] 2) Absorption Sampling, Barium-Thorin Titrimetric Method[5] 3) nstrumental Analyzer Method[5]
22	Sulfuric Acid	Isokinetic Sampling, Barium-Thorin Titrimetric Method[5]
23	Tin	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
24	Total Suspended Particulate	Isckinetic Sampling, Gravimetric Method[5]
25	Vanadium	Isckinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
26	Xylene	Acsorption Sampling, Gas Chromatographic Method[5]

<u>สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน 20 รายการ</u>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Antimony	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,6,13] 2) Digestion, Inductively Coupled Plasma Method[7,13]
2	Arsenic	1) Waste Extraction, Digestion, Hydride Generation/ Atomic Absorption Spectrometric Method[1,6,14] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,6,13] 3) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[7,14] 4) Digestion, Inductively Coupled Plasma Method[7,13]
3	Barium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,6,13] 2) Digestion, Inductively Coupled Plasma Method[7,13]
4	Beryllium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,6,13] 2) Digestion, Inductively Coupled Plasma Method[7,13]
5	Cadmium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,6,13] 2) Digestion, Inductively Coupled Plasma Method[7,13]

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
6	Chromium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,6,13] 2) Digestion, Inductively Coupled Plasma Method[7,13]
7	Chromium (III)	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method; Waste Extraction, Colorimetric Method; Calculaton[1,6,13,15] 2) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation[7,8,13,15]
8	Chromium (VI)	1) Waste Extraction, Colorimetric Method[1,15] 2) Alkaline Digestion, Colorimetric Method[8,15]
9	Cobalt	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,6,13] 2) Digestion, Inductively Coupled Plasma Method[7,13]
10	Copper	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,6,13] 2) Digestion, Inductively Coupled Plasma Method[7,13]
11	Lead	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,6,13] 2) Digestion, Inductively Coupled Plasma Method[7,13]
12	Mercury	1) Waste Extraction, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method[1,6,16] 2) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method[17]
13	Molybdenum	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,6,13] 2) Digestion, Inductively Coupled Plasma Method[7,13]
14	Nickel	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,6,13] 2) Digestion, Inductively Coupled Plasma Method[7,13]
15	pH	Electrometric Method[21,22]
16	Selenium	1) Waste Extraction, Digestion, Hydride Generation/ Atomic Absorption Spectrometric Method[1,6,18] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,6,13]

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
		3) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[7,18]
		4) Digestion, Inductively Coupled Plasma Method[7,13]
17	Silver	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,6,13]
		2) Digestion, Inductively Coupled Plasma Method[7,13]
18	Thallium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,6,13]
		2) Digestion, Inductively Coupled Plasma Method[7,13]
19	Vanadium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,6,13]
		2) Digestion, Inductively Coupled Plasma Method[7,13]
20	Zinc	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,6,13]
		2) Digestion, Inductively Coupled Plasma Method[7,13]

<u>ดิน จำนวน 59 รายการ</u>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acetone	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[12,20]
2	Antimony	Digestion, Inductively Coupled Plasma Method[7,13]
3	Arsenic	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[7,14]
		2) Digestion, Inductively Coupled Plasma Method[7,13]
4	Barium	Digestion, Inductively Coupled Plasma Method[7,13]
5	Benzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[12,20]
6	Beryllium	Digestion, Inductively Coupled Plasma Method[7,13]
7	Bromodichloromethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[12,20]
8	Bromoform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[12,20]
9	Cadmium	Digestion, Inductively Coupled Plasma Method[7,13]

10 Carbon disulfide...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
10	Carbon disulfide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[12,20]
11	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[12,20]
12	Chlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[12,20]
13	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[12,20]
14	Chloroform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[12,20]
15	Chromium	Digestion, Inductively Coupled Plasma Method[7,13]
16	Chromium (III)	Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation [7,8,13,15]
17	Chromium (VI)	Alkaline Digestion, Colorimetric Method[8,15]
18	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[12,20]
19	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[12,20]
20	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[12,20]
21	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[12,20]
22	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[12,20]
23	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[12,20]
24	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[12,20]
25	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[12,20]
26	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[12,20]
27	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[12,20]

1,3-Dichloropropene...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
28	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[12,20]
29	Ethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[12,20]
30	Hexachloro-1,3-butadiene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[12,20]
31	Lead	Digestion, Inductively Coupled Plasma Method[7,13]
32	Manganese	Digestion, Inductively Coupled Plasma Method[7,13]
33	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method[17]
34	Methyl bromide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[12,20]
35	Methylene chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[12,20]
36	Methyl tert-butyl ether	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[12,20]
37	Naphthalene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[12,20]
38	Nickel	Digestion, Inductively Coupled Plasma Method[7,13]
39	Selenium	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[7,18] 2) Digestion, Inductively Coupled Plasma Method[7,13]
40	Silver	Digestion, Inductively Coupled Plasma Method[7,13]
41	Styrene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[12,20]
42	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[12,20]
43	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[12,20]
44	Toluene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[12,20]
45	TPH (C_5-C_8)	Purge and Trap, Gas Chromatographic Method[12,19]
46	TPH ($C_{>8}$-C_{16})	Ultrasonic Extraction, Gas Chromatographic Method[10,19]

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
47	TPH ($C_{>16}$-C_{35})	Ultrasonic Extraction, Gas Chromatographic Method[10,19]
48	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[12,20]
49	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[12,20]
50	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[12,20]
51	Trichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[12,20]
52	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[12,20]
53	Vanadium	Digestion, Inductively Coupled Plasma Method[7,13]
54	Vinyl chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[12,20]
55	m-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[12,20]
56	o-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[12,20]
57	p-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[12,20]
58	Xylene (Total)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[12,20]
59	Zinc	Digestion, Inductvely Coupled Plasma Method[7,13]

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ที่ อก ๐๓๑๐(๑)/ ๐๑๕๒๓

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๒๑ พฤศจิกายน ๒๕๖๗

เรื่อง เปลี่ยนแปลงบุคลากรและสารมลพิษที่วิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอ็นไวรอนเมนท์ รีเสริช แอนด์ เทคโนโลยี จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๒๓ กันยายน ๒๕๖๗

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือเปลี่ยนแปลงบุคลากรและสารมลพิษที่วิเคราะห์ บริษัท เอ็นไวรอนเมนท์ รีเสริช แอนด์ เทคโนโลยี จำกัด จำนวน ๒ แผ่น

ตามคำขอที่อ้างถึง บริษัท เอ็นไวรอนเมนท์ รีเสริช แอนด์ เทคโนโลยี จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๐๙๙ สถานที่ตั้งเลขที่ ๒๕/๑๑๔ หมู่ที่ ๖ ซอยชินเขต ๑ ถนนงามวงศ์วาน แขวงทุ่งสองห้อง เขตหลักสี่ กรุงเทพมหานคร ขอเปลี่ยนแปลงบุคลากรและสารมลพิษที่วิเคราะห์ ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้

๑. ให้ยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๒ ราย
   ๑) นางสาวกมลทิพย์ พุ่มตาก้อง ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๒๒
   ๒) นายศิวาวุธ ธรรมนิทา ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๖๒
๒. ให้เพิ่มขอบข่ายชนิดสารมลพิษที่วิเคราะห์ในน้ำ/น้ำเสีย น้ำใต้ดิน และดิน ตามสิ่งที่ส่งมาด้วย

อนึ่ง หนังสือฉบับนี้จะหมดอายุพร้อมหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ในวันที่ ๑๘ พฤษภาคม ๒๕๗๑

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

[redacted]

(นายธีรทัศน์ อิศรางกูร ณ อยุธยา)
รองอธิบดี ปฏิบัติราชการแทน
อธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน
กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ
โทร. ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕
โทรสาร ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๙๙
ไปรษณีย์อิเล็กทรอนิกส์ saraban@diw.mail.go.th

เอกสารแนบท้ายหนังสือเปลี่ยนแปลงบุคลากรและสารมลพิษที่วิเคราะห์
บริษัท เอ็นไวรอนเมนท์ รีเสริช แอนด์ เทคโนโลยี จำกัด เลขทะเบียน ว-๐๙๙
ที่ อก ๐๓๑๐(๑)/ ๐๑๕๒๓ ลงวันที่ ๒๑ พฤศจิกายน ๒๕๖๗

ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๔๗ รายการ

น้ำ/น้ำเสีย จำนวน 19 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldrin	Liquid-Liquid Extraction, Gas Chromatographic Method[1]
2	α-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method[1]
3	β-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method[1]
4	δ-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method[1]
5	γ-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method[1]
6	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic Method[1]
7	o,p'-DDT	Liquid-Liquid Extraction, Gas Chromatographic Method[1]
8	4,4'-DDD	Liquid-Liquid Extraction, Gas Chromatographic Method[1]
9	4,4'-DDE	Liquid-Liquid Extraction, Gas Chromatographic Method[1]
10	4,4'-DDT	Liquid-Liquid Extraction, Gas Chromatographic Method[1]
11	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic Method[1]
12	Endosulfan I	Liquid-Liquid Extraction, Gas Chromatographic Method[1]
13	Endosulfan II	Liquid-Liquid Extraction, Gas Chromatographic Method[1]
14	Endosulfan sulfate	Liquid-Liquid Extraction, Gas Chromatographic Method[1]
15	Endrin	Liquid-Liquid Extraction, Gas Chromatographic Method[1]
16	Endrin aldehyde	Liquid-Liquid Extraction, Gas Chromatographic Method[1]
17	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic Method[1]
18	Heptachlor epoxide	Liquid-Liquid Extraction, Gas Chromatographic Method[1]
19	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic Method[1]

น้ำใต้ดิน จำนวน 14 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldrin	Liquid-Liquid Extraction, Gas Chromatographic Method[1]
2	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic Method[1]
3	DDD	Liquid-Liquid Extraction, Gas Chromatographic Method[1]
4	DDE	Liquid-Liquid Extraction, Gas Chromatographic Method[1]
5	DDT	Liquid-Liquid Extraction, Gas Chromatographic Method[1]
6	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic Method[1]

[redacted]

7 Endosulfan..

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
7	Endosulfan	Liquid-Liquid Extraction, Gas Chromatographic Method[1]
8	Endrin	Liquid-Liquid Extraction, Gas Chromatographic Method[1]
9	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic Method[1]
10	Heptachlor epoxide	Liquid-Liquid Extraction, Gas Chromatographic Method[1]
11	α-HCH	Liquid-Liquid Extraction, Gas Chromatographic Method[1]
12	β-HCH	Liquid-Liquid Extraction, Gas Chromatographic Method[1]
13	γ-HCH	Liquid-Liquid Extraction, Gas Chromatographic Method[1]
14	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic Method[1]

<u>ดิน จำนวน 14 รายการ</u>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldrin	Ultrasonic Extraction, Gas Chromatographic Method[2,3]
2	Chlordane	Ultrasonic Extraction, Gas Chromatographic Method[2,3]
3	DDD	Ultrasonic Extraction, Gas Chromatographic Method[2,3]
4	DDE	Ultrasonic Extraction, Gas Chromatographic Method[2,3]
5	DDT	Ultrasonic Extraction, Gas Chromatographic Method[2,3]
6	Dieldrin	Ultrasonic Extraction, Gas Chromatographic Method[2,3]
7	Endosulfan	Ultrasonic Extraction, Gas Chromatographic Method[2,3]
8	Endrin	Ultrasonic Extraction, Gas Chromatographic Method[2,3]
9	Heptachlor	Ultrasonic Extraction, Gas Chromatographic Method[2,3]
10	Heptachlor epoxide	Ultrasonic Extraction, Gas Chromatographic Method[2,3]
11	α-HCH	Ultrasonic Extraction, Gas Chromatographic Method[2,3]
12	β-HCH	Ultrasonic Extraction, Gas Chromatographic Method[2,3]
13	γ-HCH	Ultrasonic Extraction, Gas Chromatographic Method[2,3]
14	Methoxychlor	Ultrasonic Extraction, Gas Chromatographic Method[2,3]

<u>เอกสารอ้างอิง</u>

1. APHA, AWWA, WEF. **Standard Methods for the Examination of Water and Wastewater.** 24th ed. Washington, DC: APHA, 2023.

2. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Ultrasonic Extraction. SW-846 Method 3550C**, 2007.

3. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Organochlorine Pesticides by Gas Chromatography. SW-846 Methoc 8081B,** 2007.

ที่ อก ๐๓๑๐(๓)/ ๑๖๐๘

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๒๘ กุมภาพันธ์ ๒๕๖๘

เรื่อง เปลี่ยนแปลงสารมลพิษที่วิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอ็นไวรอนเมนท์ รีเสริช แอนด์ เทคโนโลยี จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๒๗ มกราคม ๒๕๖๘

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือเปลี่ยนแปลงสารมลพิษที่วิเคราะห์
บริษัท เอ็นไวรอนเมนท์ รีเสริช แอนด์ เทคโนโลยี จำกัด จำนวน ๑ แผ่น

ตามคำขอที่อ้างถึง บริษัท เอ็นไวรอนเมนท์ รีเสริช แอนด์ เทคโนโลยี จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๐๙๙ สถานที่ตั้งเลขที่ ๒๕/๑๑๔ หมู่ที่ ๖ ซอยชินเขต ๑ ถนนงามวงศ์วาน แขวงทุ่งสองห้อง เขตหลักสี่ กรุงเทพมหานคร ขอเปลี่ยนแปลงสารมลพิษที่วิเคราะห์ ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอ็นไวรอนเมนท์ รีเสริช แอนด์ เทคโนโลยี จำกัด เพิ่มขอบข่ายชนิดสารมลพิษที่วิเคราะห์ในน้ำ/น้ำเสีย น้ำใต้ดิน อากาศเสีย และดิน ตามสิ่งที่ส่งมาด้วย

อนึ่ง หนังสือฉบับนี้จะสิ้นอายุพร้อมหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ในวันที่ ๑๘ พฤษภาคม ๒๕๗๑

จึงเรียนมาเพื่อทราบ

[redacted]

(นายธีรทัศน์ อิศรางกูร ณ อยุธยา)
รองอธิบดี ปฏิบัติราชการแทน
อธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน
กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ
โทร. ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕
โทรสาร ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๙๙
ไปรษณีย์อิเล็กทรอนิกส์ saraban@ciw.mail.go.th

เอกสารแนบท้ายหนังสือเปลี่ยนแปลงสารมลพิษที่วิเคราะห์
บริษัท เอ็นไวรอนเมนท์ รีเสริช แอนด์ เทคโนโลยี จำกัด เลขทะเบียน ว-๐๙๙
ที่ อก ๐๓๑๐(๑)/ ๑๖๐๘ ลงวันที่ ๒๘ กุมภาพันธ์ ๒๕๖๘

ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๔ รายการ

น้ำ/น้ำเสีย จำนวน 1 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Toxaphene	Liquid-Liquid Extraction, Gas Chromatographic Method[1]

น้ำใต้ดิน จำนวน 1 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Toxaphene	Liquid-Liquid Extraction, Gas Chromatographic Method[1]

อากาศเสีย (ปล่องระบาย) จำนวน 1 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Cresol	Adsorption Sampling, Gas Chromatographic Method[2]

ดิน จำนวน 1 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Toxaphene	Ultrasonic Extraction, Gas Chromatographic Method[3,4]

ตามนี้

เอกสารอ้างอิง

1. APHA, AWWA, WEF. **Standard Methods for the Examination of Water and Wastewater.** 24th ed. Washington, DC: APHA, 2017.

2. United States Environmental Protection Agency. **Standards of Performance for New Stationary Sources.** 40 CFR 60. Appendix A, 2023.

3. United States Environmental Protecton Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Ultrasonic Extraction. SW-846 Method 3550C,** 2007.

4. United States Environmental Protecton Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Organochlorine Pesticides by Gas Chromatography. SW-846 Method 8081B,** 2007.

บริษัท ซีเอ็นพีซีเอชเค (ไทยแลนด์) จำกัด

รายงานผลการปฏิบัติตามมาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม และมาตรการติดตามตรวจสอบผลกระทบสิ่งแวดล้อม โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร ฉบับเดือนมกราคม - มิถุนายน พ.ศ.2568

ภาคผนวก ง.7

เอกสารสอบเทียบเครื่องมือตรวจวัด

ระยะเจาะหลุมปิโตรเลียม

envi research
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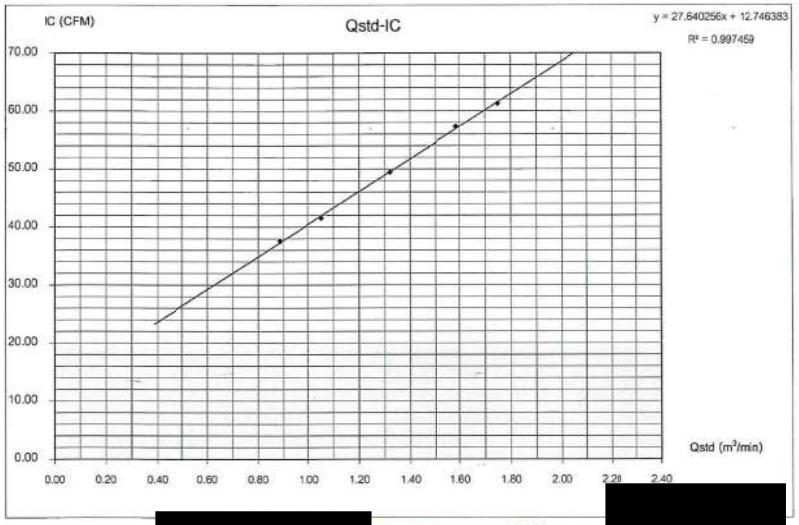
TSP HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

Quotation	2025-00471				Date	March 27, 2025
Sampler Location	ฐานตรวจวัดมลพิษ BM6 บ้านเลขที่ 17/2				Start Time	9:30 AM
Sampler Number	TSP No.A28	Transfer Standard Type		Orifice	Stop Time	9:40 AM
Instrument Model	HIVOL-BBCBE	Calibrator Model		TE-5025A		
Motor Serial Number	2217	Calibrator Serial Number		3142	Calibrated By	Mr. Auttapol Areejit
Recorder Serial Number	2134					

Plate No.	(Delta H) Pressure Drop Across Orifice (inH_2O)			(A) $[\Delta H_2O(Pa/P_{std})(T_{std}/Ta)]^{1/2}$	(X) Qstd = (1/m)[(A-b)] (m^3/min)	(I) Sample Flow Rate Indicator (ft^3/min)	(Y) IC = $[(Pa/P_{std})(T_{std}/Ta)]^{1/2}$	Temparature (°K = °C+273)	Barometric Pressure (mmHg)	Start Meter	Stop Meter
	Positive	Negative	ΔH_2O								
5	1.7	1.7	3.4	1.82381	0.88736	38.0	37.59	303.0	755.0		
7	2.4	2.4	4.8	2.16701	1.05213	42.0	41.54	303.0	755.0		
10	3.8	3.8	7.6	2.72677	1.32086	50.0	49.46	303.0	755.0		
13	5.5	5.5	11.0	3.28048	1.58670	58.0	57.37	303.0	756.0		
18	6.7	6.7	13.4	3.62071	1.75004	62.0	61.32	303.0	756.0		
Linear Regression Y ON X : Y= mX + b							Average	303.0	755.0		
1	Slope (m)			2.08293	Linear Equation			r^2	0.997459	Pstd(mmHg)	760.0
2	Intercept (b)			-0.02450	Set Point Flow Rate (X) (m^3/min)		1.133	r	0.9987287	T_{std}	298.0
3	Correlation Coefficient (r)			0.99962	Final Set Flow Rate = (I)		0	(Pa/Pstd)*(Tstd/Ta)		0.978322043	
Result								C=(Pa/Pstd)*(Tstd/Ta)^0.5		0.989101634	

COMMENT

Andersen Instruments, Inc.



Checked By [redacted]
(Mr. Prayun Detkla)
Technician

Approved By [redacted]
(Mr.Panupon Podang)
Environmental Scientist

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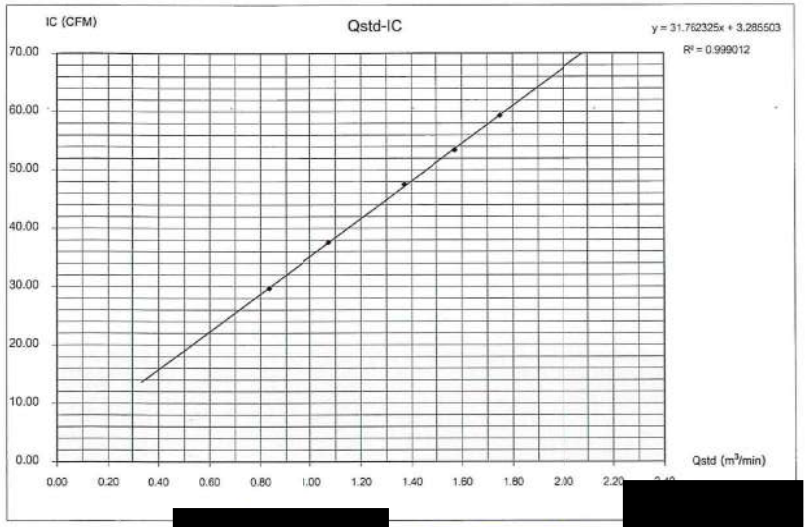
PM10 HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

Quotation	2025-00471				Date	March 27, 2025
Sampler Location	ฐานตรวจวัดมลพิษ BM6 บ้านเลขที่ 17/2				Start Time	9:40 AM
Sampler Number	PM-10 No.11	Transfer Standard Type		Orifice	Stop Time	9:50 AM
Instrument Model	HIVOL-BMBBE	Calibrator Model		TE-5025A		
Motor Serial Number	610-643	Calibrator Serial Number		3142	Calibrated By	Mr. Auttapol Areejit
Recorder Serial Number	R0411-004					

Plate No.	(Delta H) Pressure Drop Across Orifice (inH_2O)			(A) $[\Delta H_2O(Pa/P_{std})(T_{std}/Ta)]^{1/2}$	(X) Qstd = (1/m)[(A-b)] (m^3/min)	(I) Sample Flow Rate Indicator (ft^3/min)	(Y) IC = $[(Pa/P_{std})(T_{std}/Ta)]^{1/2}$	Temparature (°K = °C+273)	Barometric Pressure (mmHg)	Start Meter	Stop Meter
	Positive	Negative	ΔH_2O								
5	1.5	1.5	3.0	1.71317	0.83425	30.0	29.67	303.0	756.0		
7	2.5	2.5	5.0	2.21170	1.07358	38.0	37.59	303.0	756.0		
10	4.1	4.1	8.2	2.83236	1.37156	48.0	47.48	303.0	756.0		
13	5.4	5.4	10.8	3.25052	1.57231	54.0	53.41	303.0	756.0		
18	6.7	6.7	13.4	3.62071	1.75004	60.0	59.35	303.0	756.0		
Linear Regression Y ON X : Y= mX + b							Average	303.0	756.0		
1	Slope (m)			2.08293	Linear Equation			r^2	0.999012	Pstd(mmHg)	760.0
2	Intercept (b)			-0.02450	Set Point Flow Rate (X) (m^3/min)		1.133	r	0.9995059	T_{std}	298.0
3	Correlation Coefficient (r)			0.99962	Final Set Flow Rate = (I)		0	(Pa/Pstd)*(Tstd/Ta)		0.978322043	
Result								C=(Pa/Pstd)*(Tstd/Ta)^0.5		0.989101634	

COMMENT

Andersen Instruments, Inc.



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(Mr. Prayun Detkla)
Technician

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Head Office/Tax ID 0105 542 064 981

PM10 HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

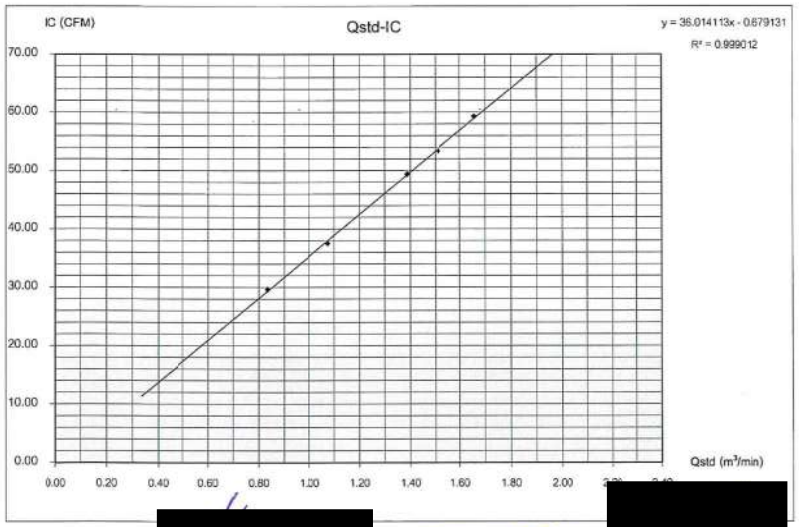
Quotation	2025-00471				*Date*	March 27, 2025
Sampler Location	ฐานตรวจน้ำมัน BM6 บ้านโตรที่ 5/1				*Start Time*	11:23 AM
Sampler Number	PM-10 No.10	Transfer Standard Type		Orifice	*Stop Time*	11:33 AM
Instrument Model	HIVOL-BMBBE	Calibrator Model		TE-5025A		
Motor Serial Number	10	Calibrator Serial Number		3142	*Calibrated By*	Mr. Auttapol Areejit
Recorder Serial Number	102940701					

Plate No.	(Delta H) Positive	Negative	ΔH_2O	(A) $[\Delta H_2O(Pa/P_{std})(T_{std}/Ta)]^{1/2}$	(X) Qstd = (1/m)[(A-b)] (m^3/min)	(I) Sample Flow Rate Indicator (ft^3/min)	(Y) IC = I[(Pa/P_{std})(T_{std}/Ta)]$^{1/2}$	Temperature (°K = °C+273)	Barometric Pressure (mmHg)	Start Meter	Stop Meter
5	1.5	1.5	3.0	1.71317	0.83425	30.0	29.67	3030	756.0		
7	2.5	2.5	5.0	2.21170	1.07358	38.0	37.59	3030	756.0		
10	4.2	4.2	8.4	2.86669	1.38804	50.0	49.46	3030	756.0		
13	5.0	5.0	10.0	3.12781	1.51340	54.0	53.41	3030	756.0		
18	6.0	6.0	12.0	3.42635	1.65673	60.0	59.35	3030	756.0		
Linear Regresstion Y ON X : Y= mX + b							Average	3030	756.0		

1	Slope (m)	2.08293	Linear Equation		r^2	0.999012	Pstd(mmHg)	760.0
2	Intercept (b)	-0.02450	Set Point Flow Rate (X) (m^3/min)	1.133	r	0.9995059	T_{std}	298.0
3	Correlation Coefficient (r)	0.99962	Final Set Flow Rate = (I)	0	(Pa/Pstd)*(Tstd/Ta)		0.978322043	
Result					C=(Pa/Pstd)*(Tstd/Ta)^0.5		0.989101634	

COMMENT

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Technician

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Environmental Scientist

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TSP HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

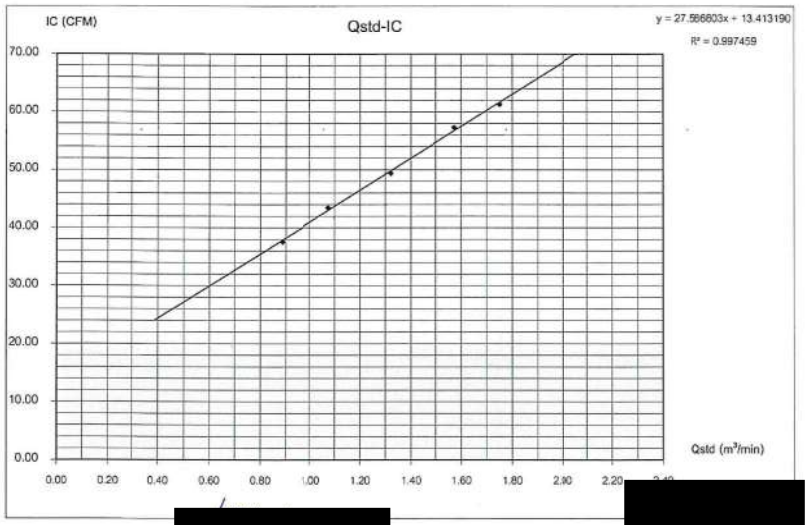
Quotation	2025-00471				*Date*	March 27, 2025
Sampler Location	ฐานตรวจน้ำมัน BM6 บ้านเตรที่ 5/1				*Start Time*	11:33 AM
Sampler Number	TSP No.A22	Transfer Standard Type		Orifice	*Stop Time*	11:43 AM
Instrument Model	HIVOL-BBCBE	Calibrator Model		TE-5025A		
Motor Serial Number	2054	Calibrator Serial Number		3142	*Calibrated By*	Mr. Auttapol Areejit
Recorder Serial Number	2187					

Plate No.	(Delta H) Positive	Negative	ΔH_2O	(A) $[\Delta H_2O(Pa/P_{std})(T_{std}/Ta)]^{1/2}$	(X) Qstd = (1/m)[(A-b)] (m^3/min)	(I) Sample Flow Rate Indicator (ft^3/min)	(Y) IC = I[(Pa/P_{std})(T_{std}/Ta)]$^{1/2}$	Temperature (°K = °C+273)	Barometric Pressure (mmHg)	Start Meter	Stop Meter
5	1.7	1.7	3.4	1.82381	0.88736	38.0	37.59	303.0	756.0		
7	2.5	2.5	5.0	2.21170	1.07358	44.0	43.52	303.0	756.0		
10	3.8	3.8	7.6	2.72677	1.32086	50.8	49.46	303.0	756.0		
13	5.4	5.4	10.8	3.25052	1.57231	58.8	57.37	303.0	756.0		
18	6.7	6.7	13.4	3.62071	1.75004	62.8	61.32	303.0	756.0		
Linear Regresstion Y ON X : Y= mX + b							Average	303.0	756.0		

1	Slope (m)	2.08293	Linear Equation		r^2	0.996187	Pstd(mmHg)	760.0
2	Intercept (b)	-0.02450	Set Point Flow Rate (X) (m^3/min)	1.133	r	0.9980917	T_{std}	298.0
3	Correlation Coefficient (r)	0.99962	Final Set Flow Rate = (I)	0	(Pa/Pstd)*(Tstd/Ta)		0.978322043	
Result					C=(Pa/Pstd)*(Tstd/Ta)^0.5		0.989101634	

COMMENT

Andersen Instruments, Inc.



Checked By [redacted]
(Mr. Prayun Detkla)
Technician

Approved By [redacted]
(Mr.Panupon Podang)
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E-mail: jnac-calibration@jiranatee.com
Web site: www.jiranatee.com

Accredited calibration laboratory
ISO/IEC 17025:2017
NSC-TISI-TIS 17025
CALIBRATION 0367

Flow measurement laboratory
Calibration services department.

NSC – TISI – TIS 17025
CALIBRATION 0367

CERTIFICATE OF CALIBRATION

Certificate No. : **COF-002-68**

MEASUREMENT ITEM	: Top Load Orifice
MANUFACTURER	: TISCH
MODEL/TYPE	: TE-5025A
SERIAL NUMBER	: 3142
ID NUMBER	: -
CONDITION AS-RECEIVED	: Used item
CUSTOMER	: Environment Research & Technology Co., Ltd. 25/114 Moo 6 Soi Chinaket 1, Ngamwongwan Road, Toongsonghong, Laksi, Bangkok 10210
RECEIVED DATE	: 24 Jan 2025
MEASUREMENT DATE	: 17 Feb 2025
ISSUE DATE	: 17 Feb 2025

ENVIRONMENTAL CONDITIONS:
Ambient condition in the laboratory are as follow:

Temperature	: 23.0 ± 3.0	°C
Relative Humidity	: 55.0 ± 15.0	%RH
Atmospheric Pressure	: 1010 ± 10	hPa

CALIBRATION CONDITION:

Preconditioning	: 24 hours at ambient conditions.
Measurement Condition	: The average values during measurementare 24.1 °C and 50.0 %RH.

NOTED: *The certificate is valid only to the item calibrated on date and place of calibration.*

TABULATION OF RESULTS:
The table on next page give the measured values.

Calibration procedure:
The Orifice gas flow device was calibrated against Standard Rotary Displacement Meter (Roots Meter) Model G65/IMC/W2-dp. The WI-CL-004 was used as a calibration guideline.

Traceability:
This certificate provides a traceability of the measurement to recognized the national standards, and to realization of the international system of units (SI) through the NIMT (National Metrology Institute of Thailand) via Certificate number: MW-0016-25.

Uncertainty of Measurement:
The reported uncertainty of measurement is based on the standard uncertainty multiplied by a coverage factor k=2, Which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty has been determined in accordance with the GUM 'Evaluation of measurement data - Guide to the expression of uncertainty in measurement'

Calibrated by:
☑ Mr. Sorawit Thachalad
☐ Miss Jittraporn Lertsomphol

Approved signatory: [redacted]
Mr. Parinya Booncharoen
Calibration Department Manager

THIS CERTIFICATE OF CALIBRATION MAY NOT BE REPRODUCED EXCEPT IN FULL UNLESS PERMISSION FORREPRODUCTION HAS BEEN OBTAINED IN WRITING FROM THE LABORATORY

JIRANATEE ASSOCIATES CO.,LTD.

Continuation of Certificate of Calibration Number COF-002-68

MEASUREMENT RESULTS:

The Orifice gas flow device was calibrated by direct comparison method with the Standard Rotary Displacement Meter (Roots Meter). The Humid air was used as a medium in the system. The standard conditions are 25°C (298.15 K) and 760 mmHg for standard temperature and standard pressure respectively.

Table 1: The results of Q Standard calibration data

Plate	Flow rate m^3/min	Pressure [Pa] mmHg	Temperature [Ta] °C	Temperature [Tm] °C	Δp_meter mmHg	Δp_Orifice inH_2O	Y	Standard Flow [Q_s] m^3/min
1	0.697	759.586	23.99	23.03	53.808	1.789	1.339	0.652
2	1.004	759.590	24.08	23.26	58.411	3.610	1.903	0.931
3	1.116	759.595	24.13	23.46	41.662	4.755	2.183	1.059
4	1.165	759.591	24.20	23.56	30.318	5.357	2.317	1.124
5	1.412	759.613	24.31	23.78	30.173	7.908	2.815	1.361

Slope (m): **2.08293**
Intercept (b): **-0.02450**
Correlation coefficient (r): **0.99962**
Uncertainty ($k=2$): **0.015** **m^3/min**

Table 2: The results of Q actual calibration data

Plate	Flow rate m^3/min	Pressure [Pa] mmHg	Temperature [Ta] °C	Temperature [Tm] °C	Δp_meter mmHg	Δp_Orifice inH_2O	Y	Standard Flow [Q_a] m^3/min
1	0.697	759.586	23.99	23.03	53.808	1.789	0.837	0.650
2	1.004	759.590	24.08	23.26	58.411	3.610	1.189	0.929
3	1.116	759.595	24.13	23.46	41.662	4.755	1.364	1.057
4	1.165	759.591	24.20	23.56	30.318	5.357	1.448	1.121
5	1.412	759.613	24.31	23.78	30.173	7.908	1.760	1.359

Slope (m): **1.30462**
Intercept (b): **-0.01530**
Correlation coefficient (r): **0.99962**
Uncertainty ($k=2$): **0.015** **m^3/min**

End of Certificate of Calibration

JIRANATEE ASSOCIATES CO.,LTD.

METTLER TOLEDO

Mettler-Toledo (Thailand) Ltd.
846/4 - 846/5 Lasalle Rd., Bangna Tai Sub-District
Bangna District, Bangkok 10260
+662 723 0382
MT-TH.ServiceSupport@mt.com

NSC-TISI-TIS 17025
CALIBRATION 0062

Accuracy Calibration Certificate

Customer

Company:	Ervironment Research & Technology Co., Ltd.		
Address:	25'114 Moo 6, Soi Chinaket 1, Ngamwongwan Rd., Toongsonghong		
City:	Laksi	**Contact:**	Ramita Taengthai
Zip / Postal:	10210		
State / Province:	Bangkok		
Order Number:			

Weighing Device

Manufacturer:	Mettler Toledo	**Instrument Type:**	Weighing Instrument
Model:	AE204-S	**Asset Number:**	ERTC-L-IN-0048
Serial No.:	1123103723	**Terminal Model:**	N/A
Building:	N/A	**Terminal Serial No.:**	N/A
Floor:	4	**Terminal Asset No.:**	N/A
Room:	406		

Range	Max. Capacity	Readability (d)
1	220 g	0.0001 g

Procedure

Calibration Guideline: EURAMET cg-18 v. 4.0 (11/2015)
METTLER TOLEDO Work Instruction: CP/W00220

This calibration certificate contains measurements for As Found calibration. No As Left calibration was performed because the device was not modified after As Found calibration. Therefore, results for As Left correspond to As Found.

The sensitivity/span of the weighing instrument was adjusted before calibration with a built-in weight.

In accordance with EURAMET cg-18 (11/2015), the test loads were selected to reflect the specific use of the weighing device or to accommodate specific calibration conditions.

	Temperature		Humidity	
As Found	Start: 23.1 °C	End: 23.3 °C	Start: 35.7 %	End: 35.2 %

As Found Calibration Date: 16-Jan-2025
As Left Calibration Date: N/A
Issue Date: 18-Jan-2025

Calibrator: [redacted]
Nithit Jongkrod

Approved Signatory: [redacted]
Technica Manager / Head of Calibration Center

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METTLER TOLEDO Service

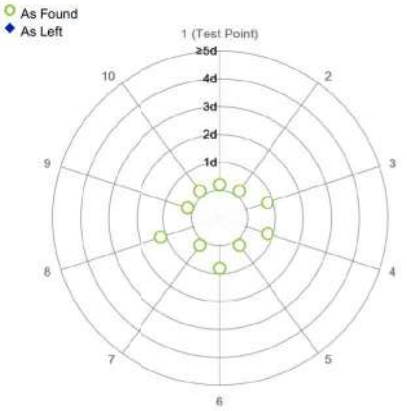
Measurement Results

Repeatability

Test Load: 100 g

	As Found	As Left
1	100.0000 g	N/A
2	100.0000 g	N/A
3	100.0001 g	N/A
4	100.0001 g	N/A
5	100.0000 g	N/A
6	100.0001 g	N/A
7	100.0000 g	N/A
8	99.9999 g	N/A
9	100.0000 g	N/A
10	100.0000 g	N/A

Standard Deviation	**0.00006 g**	**N/A**



The "d" in the graph represents the readability of the range/interval in which the test was performed.

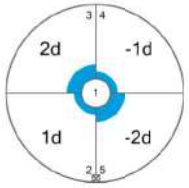
The results of this graph are based upon the absolute values of the differences from the mean value.

Eccentricity

Test Load: 100 g

Position	As Found	As Left
1	100.0000 g	N/A
2	100.0001 g	N/A
3	100.0002 g	N/A
4	99.9999 g	N/A
5	99.9998 g	N/A

Maximum Deviation	**0.0002 g**	**N/A**



As Found

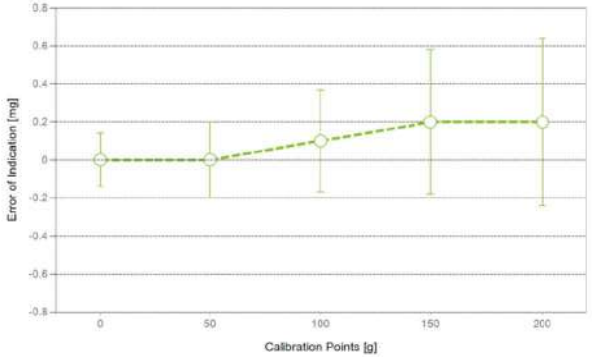
The "d" in the graph represents the readability of the range/interval in which the test was performed.

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Error of Indication

As Found

	Reference Value	Indication	Error of Indication	Expanded Uncertainty	k
1	0.0000 g	0.0000 g	0.0000 g	0.14 mg	2
2	0.0500 g	0.0500 g	0.0000 g	0.15 mg	2
3	0.1000 g	0.1000 g	0.0000 g	0.15 mg	2
4	0.5000 g	0.5000 g	0.0000 g	0.15 mg	2
5	1.0000 g	1.0000 g	0.0000 g	0.15 mg	2
6	5.0000 g	5.0000 g	0.0000 g	0.16 mg	2
7	10.0000 g	10.0000 g	0.0000 g	0.16 mg	2
8	50.0001 g	50.0001 g	0.0000 g	0.20 mg	2
9	99.9999 g	100.0000 g	0.0001 g	0.27 mg	2
10	150.0000 g	150.0002 g	0.0002 g	0.38 mg	2
11	200.0001 g	200.0003 g	0.0002 g	0.44 mg	2



As Found

As Left

For improved legibility of the graphics only increasing measurement points are shown and measurement points close to zero are not displayed.

The expanded measurement uncertainty is reported as the standard measurement uncertainty multipled by the coverage factor k such that the coverage probability corresponds to approximately 95 %.

The user is responsible for maintaining environmental conditions and the settings of the weighing instrument when it was calibrated.
The results of this calibration certificate relate only to the calibrated item.

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Test Equipment

All weights used for metrological testing are traceable to national or international standards. The weights were calibrated and certified by an accredited calibration laboratory.

Weight Set 1: OIML E2

Weight Set No.:	WS52	Date of Issue:	17-Apr-2024
Certificate Number:	191753	Calibration Due Date:	15-Oct-2025

Weight Set 2: OIML E2

Weight Set No.:	WS52-1	Date of Issue:	17-May-2024
Certificate Number:	C420107126	Calibration Due Date:	17-Oct-2025

Weight Set 3: OIML E2

Weight Set No.:	WS52-2	Date of Issue:	17-May-2024
Certificate Number:	C420107129	Calibration Due Date:	28-Oct-2025

Thermo Hygrometer

Equipment No.:	IN302	Date of Issue:	31-Oct-2024
Certificate Number:	SG-H-00908/67	Calibration Due Date:	17-Oct-2025

Remarks

Equipment conditon: Good

Next calibration according to customer's procedure

Calibration data not decide by calibration laboratory

End of Accredited Section

The information below and any attachments to this calibration certificate are not part of the accredited calibration.

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Measurement Uncertainty of the Weighing Instrument in Use

Stated is the expanded uncertainty with k=2 in use. The formula shall be used for the estimation of the uncertainty under consideration of the errors of indication. The value R represents the net load indication in the unit of measure of the device.

Temperature coefficient for the evaluation of the measurement uncertainty in use: $3.0 \cdot 10^{-6}$ / K

Temperature range on site for the evaluation of the measurement uncertainty in use: 3 K

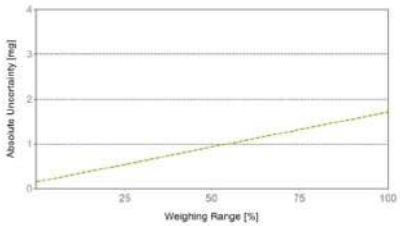
Linearization of Uncertainty Equation

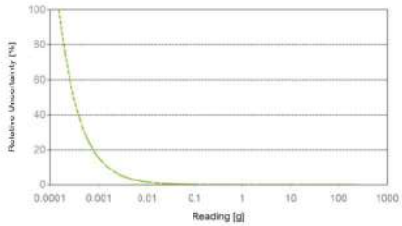
Range			As Found	As Left
	d	Max		
1	0.0001 g	220 g	U_1 = 0.15 mg + 0.00712 mg/g R	N/A

To optimize the stability of the linearization, besides of the zero load only increasing measurement points with a test load of 5% of the measurement range or larger are taken for the calculation of the linear equation.

Absolute and Relative Measurement Uncertainty in Use for Various Net Indications (Examples)

Net Indication	As Found		As Left	
0.0220 g	0.15 mg	0.68%	N/A	N/A
0.2200 g	0.15 mg	0.068%	N/A	N/A
2.2000 g	0.17 mg	0.0075%	N/A	N/A
22.0000 g	0.31 mg	0.0014%	N/A	N/A
220.0000 g	1.7 mg	0.00078%	N/A	N/A





As Found As Left

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GWP® Certificate

As Found ✓

The weighing device meets the given process requirements.

As Left ✓

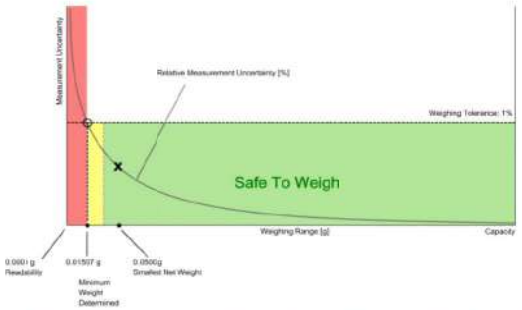
The weighing device meets the given process requirements.

Tests Performed: ☑ As Found ☐ As Left ☑ No adjustments/modifications made. As Left results correspond to As Found.

Process Requirements

Weighing Tolerance: **1%** | Smallest Net Weight: **0.0500 g** | Safety Factor: **2**

Safe Weighing Range



While the values in this graph reflect the actual calibration results, the measurement uncertainty curves are simply a visual representation. This graph reflects As Left testing, unless only As Found was performed.

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Minimum Weight

As Found Minimum Weight Table

Minimum weights for different weighing tolerances and safety factors					
	Safety Factor				
Tolerance	1	2	3	5	10
0.1%	0.15163 g	0.30546 g	0.46152 g	0.78056 g	1.62097 g
0.2%	0.07555 g	0.15163 g	0.22827 g	0.38321 g	0.78056 g
0.5%	0.03015 g	0.06039 g	0.09072 g	0.15163 g	0.30546 g
1%	0.01507 g	0.03015 g	0.04526 g	0.07555 g	0.15163 g
2%	0.00753 g	0.01507 g	0.02261 g	0.03771 g	0.07555 g
5%	0.00301 g	0.00602 g	0.00904 g	0.01507 g	0.03015 g

✓ Pass: The determined minimum weight meets the requirement for the smallest net weight.

As Left Minimum Weight Table

Minimum weights for different weighing tolerances and safety factors					
	Safety Factor				
Tolerance	1	2	3	5	10
0.1%	0.15163 g	0.30546 g	0.46152 g	0.78056 g	1.62097 g
0.2%	0.07555 g	0.15163 g	0.22827 g	0.38321 g	0.78056 g
0.5%	0.03015 g	0.06039 g	0.09072 g	0.15163 g	0.30546 g
1%	0.01507 g	0.03015 g	0.04526 g	0.07555 g	0.15163 g
2%	0.00753 g	0.01507 g	0.02261 g	0.03771 g	0.07555 g
5%	0.00301 g	0.00602 g	0.00904 g	0.01507 g	0.03015 g

✓ Pass: The determined minimum weight meets the requirement for the smallest net weight.

At these net minimum weight values, the measurement uncertainty of the weighing device is equal to or less than 1/1 (no safety factor), 1/2, 1/3, 1/5, or 1/10 of the required tolerance. The values are calculated with k = 2 and based on the linear formula of the measurement uncertainty of the weighing device in use.

The safety factor for As Found is always 1. This implies no safety factor. As Found testing looks at the behavior of the instrument from the past until test occurred. For the past, it is necessary to know that the tolerance was met, but not the safety factor. The safety factor is a proactive measure to apply for future measurements.

Notes on minimum weight values in above table:

1. If "N/A" is shown above, no appropriate value could be calculated.
2. METTLER TOLEDO is not responsible for the definition of the process requirements.

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Attachment to Calibration Certificate:
TH3067-085-011625-ACC-TH
GWP® Certificate

METTLER TOLEDO Service

Measurement Results

Results Summary

	Repeatability	Eccentricity	Error of Indication
As Found	✓	✓	✓
As Left	✓	✓	✓

✓ = Passed
✗ = Failed
⚠ = Safety Factor not met

Repeatability

Test Load: 100 g

		As Found		As Left	
Tolerance	Control Limit	Std. Deviation	Result	Std. Deviation	Result
0.1%	N/A	0.00006 g*	N/A	0.00006 g*	N/A
0.2%	0.00005 g		✗		✗
0.5%	0.00013 g		✓		✓
1%	0.00025 g		✓		✓
2%	0.00050 g		✓		✓
5%	0.00125 g		✓		✓

*The calculated standard deviation value is below the rounding error of the balance. The 0.41*d rule is used for the assessment of this repeatability test and the calculation of the minimum weight.

The weighing tolerance is met if the standard deviation is less than or equal to the corresponding control limit.

Eccentricity

Test Load: 100 g

		As Found		As Left	
Tolerance	Control Limit	Deviation	Result	Deviation	Result
0.1%	0.0500 g	0.0002 g	✓	0.0002 g	✓
0.2%	0.1000 g		✓		✓
0.5%	0.2500 g		✓		✓
1%	0.5000 g		✓		✓
2%	1.0000 g		✓		✓
5%	2.5000 g		✓		✓

The weighing tolerance is met if the deviation is less than or equal to the corresponding control limit.

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Error of Indication

As Found

		Control limits for various weighing tolerances					
Reference Value	Error	0.1%	0.2%	0.5%	1%	2%	5%
0.0000 g	0.0000 g	N/A	N/A	N/A	N/A	N/A	N/A
50.0001 g	0.0000 g	0.0250 g	0.0500 g	0.1250 g	0.2500 g	0.5000 g	1.2500 g
99.9999 g	0.0001 g	0.0500 g	0.1000 g	0.2500 g	0.5000 g	1.0000 g	2.5000 g
150.0000 g	0.0002 g	0.0750 g	0.1500 g	0.3750 g	0.7500 g	1.5000 g	3.7500 g
200.0001 g	0.0002 g	0.1000 g	0.2000 g	0.5000 g	1.0000 g	2.0000 g	5.0000 g
Result		✓	✓	✓	✓	✓	✓

As Left

		Control limits for various weighing tolerances					
Reference Value	Error	0.1%	0.2%	0.5%	1%	2%	5%
0.0000 g	0.0000 g	N/A	N/A	N/A	N/A	N/A	N/A
50.0001 g	0.0000 g	0.0250 g	0.0500 g	0.1250 g	0.2500 g	0.5000 g	1.2500 g
99.9999 g	0.0001 g	0.0500 g	0.1000 g	0.2500 g	0.5000 g	1.0000 g	2.5000 g
150.0000 g	0.0002 g	0.0750 g	0.1500 g	0.3750 g	0.7500 g	1.5000 g	3.7500 g
200.0001 g	0.0002 g	0.1000 g	0.2000 g	0.5000 g	1.0000 g	2.0000 g	5.0000 g
Result		✓	✓	✓	✓	✓	✓

The weighing tolerance is met if the error (of indication) for each test point is less than or equal to the corresponding control limit for that particular weighing tolerance. Results at or close to the zero point cannot be assessed.

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envi research
ENVIRONMENT RESEARCH & TECHNOLOGY CO., LTD.

Environment Research & Technology Company Limited
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Td 0-2954-7745-6 Fax 0-2954-7747
E-mail : envi@enviresearch.co.th
www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

Calibration Data of NOx Analyzer

Analyzer Performance Test

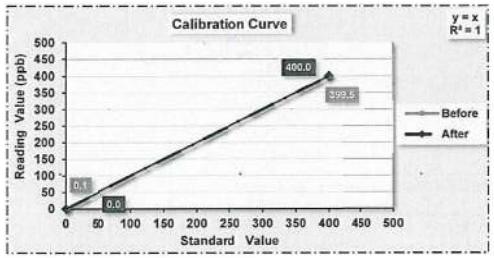
Equipment	Gas Analyzer (NOx)	**Customer Name**	วิชั่นอี คอนซัลแทนท์
Manufacture	HORIBA	**Location**	Envi Research
Model	APNA-370	**Quatation**	2025-00471
Serial No.	XPWS7U3L	**Calibration Date**	March 20, 2025
Analyzer Unit	ppb		

Instruments for Calibration

Instruments	Manufacture	Model	Serial Number
Zero Air Supply	Thermo Env.	111	0700419829
Dynamic Dilution Calibrator	Tanabyte	300	0165
Standard Gas Components	CO = 4,516 ppm		
Cylinder No : EB0123013	NO = 55.3 ppm		
Expire Date : Oct 22, 2027	SO_2 = 54.9 ppm		

Single Point Calibration

Standard Gas	Standard Gas Value	Analyzer Value								% Abs Error
		NO_x (ppb)		NO (ppb)		NO_2 (ppb)		Stability		
		Before	After	Before	After	Before	After	Before	After	
Zero	0	0.1	0.0	0.1	0.0	0.0	0.0	-	-	-
Span	400	399.4	400.0	399.5	400.0	-0.1	0.0	-	-	0.1



STATUS TEST AND VALIDATION OF NOx ANALYZER MODEL APNA-370

Parameter	Unit	Observed Value		Nominal Range
		Before Adjust	After Adjust	
Range	ppb	500	500	0 - 500 Standard
Signal NO	mV	0.7	0.8	Voltage of the measured NO value
Signal NOx	mV	10.5	10.7	Voltage of the measured NOx value
Detector	°C	423.0	42.4	43 °C ± 5 °C
Ambient	kPa	101.2	101.1	Current atmospheric pressure
DC 24V	V	23.7	23.8	24V ±0.5
DC 5V	V	5.0	5.0	5V ±0.5
NO Slope	-	0.94130	0.94250	0.50000 - 2.0000
NOx Slope	-	0.94570	0.94870	0.50000 - 2.0000

Calibrate By [redacted]
(MR.PANUPON PODANG)
March 20, 2025

Checked By : [redacted]
(MS.SUTATIP IM-NOI)
March 20, 2025

envi research
ENVIRONMENT RESEARCH & TECHNOLOGY CO., LTD.

Environment Research & Technology Company Limited
25/114 Mu6 Soi Chinnakhet 1, Ngam Wong Wan Road,
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Tel 0-2954-7745-6 Fax 0-2954-7747
E-mail : envi@enviresearch.co.th
www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

Calibration Data of NOx Analyzer

Analyzer Performance Test

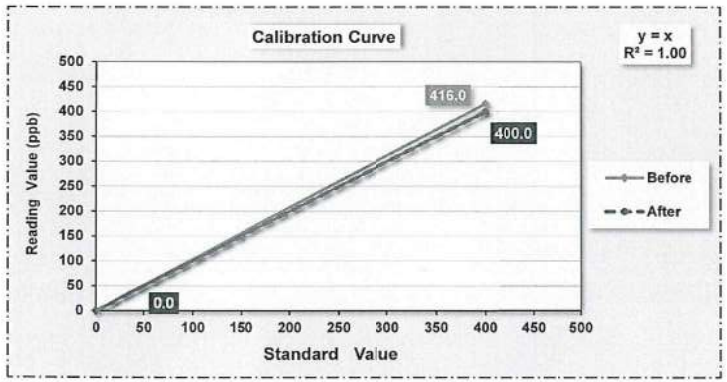
Equipment	Gas Analyzer (NOx)	Customer Name	วิชั่นอี คอนซัลแทนท์
Manufacture	API	Location	Envi Research
Model	200A	Quatation No.	2025-00471
Serial No.	1464	Calibration Date	March 16, 2025
Analyzer Unit	ppb		

Instruments for Calibration

Instruments	Manufacture	Model	Serial Number
Zero Air Supply	Thermo Env.	111	0700419829
Dynamic Dilution Calibrator	Tanabyte	3011-GD	0165
Standard Gas Components	CO = 4,516 ppm		
Cylinder No : EB0123013	NO = 55.3 ppm		
Expire Date : Oct 22, 2027	SO_2 = 54.9 ppm		

Single Point Calibration

Standard Gas	Standard Gas Value	Analyzer Value								% Abs Error
		NO_x (ppb)		NO (ppb)		NO_2 (ppb)		Stability		
		Before	After	Before	After	Before	After	Before	After	
Zero	0	-0.8	0.0	-0.2	0.0	-0.6	0.0	-	-	-
Span	400	428.3	405.0	416.0	400.0	12.3	5.0	-	-	4.0



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www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

STATUS TEST AND VALIDATION OF NOx ANALYZER MODEL 200A

Parameter	Display As	Unit	Observed Value		Nominal Range
			Before Adjust	After Adjust	
Range	RANGE	ppb	500	500	0 - 500 standard
Stability	STABIL	ppb	1	0	< 2 with zero air
Sample Flow	SAMP FL	cc / min	460	460	500 +/- 50
Ozone Flow	OZONE FL	cc / min	78	77	80 +/- 10
PMT signal	PMT	mV	103	98	0 to 5,000
Auto - Zero	AZERO	mV	77	78	-20 to 150
High Voltage Power Supply	HVPS	V	757	757	450 to 900
Reaction Cel Temperature	RCELL TEMP	°C	50	50	50 +/- 1
Box Temperature	BOX TEMP	°C	33	33	Ambient temp.+3 / -7
PMT Temperature	PMT TEMP	°C	6	6	7 +/- 1
Converter Temperature	MOLY TEMP	°C	315	316	315 +/- 5
Reaction Cel Pressure	RCEL	In - Hg - A	10	10	2 to 10 (Constant)
Sample Pressure	SAMP	In - Hg - A	30	30	Ambient - 1 (Constant)
NO_x Slope	NO_x SLOPE	-	0.932	0.822	1.000 +/- 0.300
NO_x Offset	NO_x OFFSET	mV	-1	-1	0 +/- 20
NO Slope	NO SLOPE	-	0.914	0.817	1.000 +/- 0.300
NO Offset	NO OFFSET	mV	-5	-5	0 +/- 20

Calibrate By : [redacted]
(MR.PANUPON POOANG)
March 16, 2025

Checked By : [redacted]
(MS.SUTATIP IM-NOI)
March 16, 2025

envi research
ENVIRONMENT RESEARCH & TECHNOLOGY CO., LTD.

Environment Research & Technology Company Limited
25/114 Mu 6 Soi Chinnakhet 1, Ngam Wong Wan Road,
Thung Song Hong, Lak Si, Bangkok 10210
Tel 0-2954-7745-6 Fax 0-2954-7747
E-mail : envi@envisearch.co.th
www.envisearch.co.th
Head Office/Tax ID 0105 542 064 981

Calibration Data of SO_2 Analyzer

Analyzer Performance Test

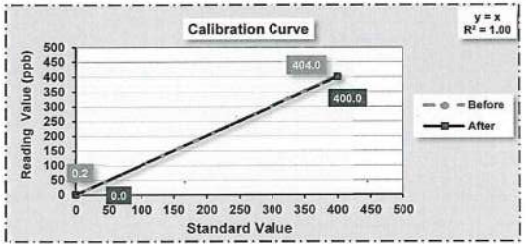
Equipment	Gas Analyzer (SO_2)	Customer Name	วิชันอี คอนซัลแทนท์
Manufacture	Thermo	Location	Envi Research
Model	43i-BNSAA	Quatation	2025-00471
Serial No.	CM14430003	Calibration Date	March 7, 2025
Analyzer Unit	ppb		

Instruments for Calibration

Instruments	Manufacture	Model	Serial Number
Zero Air Supply	Thermo Env.	111	0700419829
Dynamic Dilution Calibrator	Tanabyte	300	0165
Standard Gas Components	CO = 4,516 ppm		
Cylinder No : EB0123013	NO = 55.3 ppm		
Expire Date : Oct 22, 2027	SO_2 = 54.9 ppm		

Single Point Calibration

Standard Gas	Standard Gas Value	Analyzer Value (ppb)		Stability		% Abs Error
		Before	After	Before	After	
Zero	0	0.2	0.0	-	-	-
Span	400	404.0	400.0	-	-	1.0



STATUS TEST AND VALIDATION OF SO_2 ANALYZER MODEL 43i-BNSAA

Parameter	Display As	Unit	Observed Value		Nominal Range
			Before Adjust	After Adjust	
Range	RANGE	ppb	500	500	0 - 500 standard
Internal Temperature	INTERNAL	°c	32.9	33.8	8.0 °C to 45.0 °C
Chamber Temp	CHAMBER	°c	44.9	45.0	43.0 °C to 47.0 °C
Pressure	PRESSURE	mmHg	852.3	755.4	400.0 to 1,000
Sample Flow	SAMP FLOW	LPM	0.368	0.353	0.350 to 0.750
Lamp Intensity	LAMP INTENSITY	%	92	91	20 to 100
Lamp Voltage	LAMP VOLTAGE	V	1080	973	500 to 1200
SO2 Concentration	SO2 CONCENTRATION	ppb	2.7	2.1	0 to 10,000
Motherboard Status	MOTHERBOARD STATUS	-	OK	OK	OK
Interface Status	INTERFACE STATUS	-	OK	OK	OK

Calibrate By : [redacted] (MR.PANUPON PODANG) March 7, 2025

Checked By : [redacted] (MS.SUTATIP IM-NOI) March 7, 2025

envi research
ENVIRONMENT RESEARCH & TECHNOLOGY CO., LTD.

Environment Research & Technology Company Limited
25/114 Mu 6 Soi Chinnakhet 1, Ngam Wong Wan Road,
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Tel 0-2954-7745-6 Fax 0-2954-7747
E-mail : envi@envisearch.co.th
www.envisearch.co.th
Head Office/Tax ID 0105 542 064 981

Calibration Data of CO Analyzer

Analyzer Performance Test

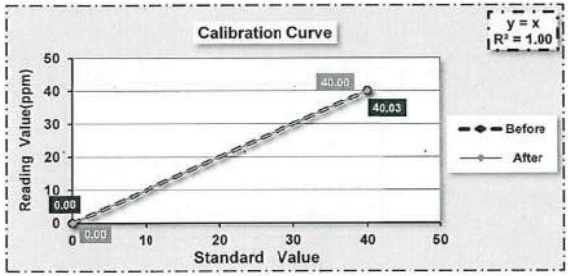
Equipment	Gas Analyzer (CO)	Customer Name	วิชันอี คอนซัลแทนท์
Manufacture	HORIBA	Location	Envi Research
Model	APMA-370	Quatation	2025-00471
Serial No.	GFB0BLNC	Calibration Date	March 20, 2025
Analyzer Unit	ppm		

Instruments for Calibration

Instruments	Manufacture	Model	Serial Number
Zero Air Supply	Thermo Env.	111	0700419829
Dynamic Dilution Calibrator	Tanabyte	300	0165
Standard Gas Components	CO = 4,487 ppm		
Cylinder No : EB0123013	NO = 46.1 ppm		
Expire Date : Oct 22, 2027	SO_2 = 46.0 ppm		

Single Point Calibration

Standard Gas	Standard Gas Value	Analyzer Value (ppm)		Stability		% Abs Error
		Before	After	Before	After	
Zero	0	0.00	0.00	-	-	-
Span	40	40.03	40.00	-	-	0.08



STATUS TEST AND VALIDATION OF CO ANALYZER MODEL APMA-370

Parameter	Unit	Observed Value		Nominal Range
		Before Adjust	After Adjust	
SIGNAL(MAIN)	mV	3.1	3.2	Voltage of the measured CO Value
SIGNAL (COMP)	mV	0.0	0.1	Voltage of the interference component Value
CELL	°C	31.3	31.4	Ambient + (5 to 10 C)
PUMP	kpa	43.5	43.4	less than 65
AMBIENT	kpa	102.1	102.0	Atmospheric pressure
DC 24V	mV	23.9	23.9	24+/- 0.5 V
DC 5V	mV	4.9	4.9	5+/- 0.5 V

Calibrate By : [redacted] (MR.PANUPON PODANG) March 20, 2025

Checked By : [redacted] (MS.SUTATIP IM-NOI) March 20, 2025

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ENVIRONMENT RESEARCH & TECHNOLOGY CO., LTD.

Environment Research & Technology Company Limited
25/114 Mu6 Soi Chinnakhet 1, Ngam Wong Wan Road,
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Tel 0-2954-7745-6 Fax 0-2954-7747
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Head Office/Tax ID 0105 542 064 981

Calibration Data of CO Analyzer

Analyzer Performance Test

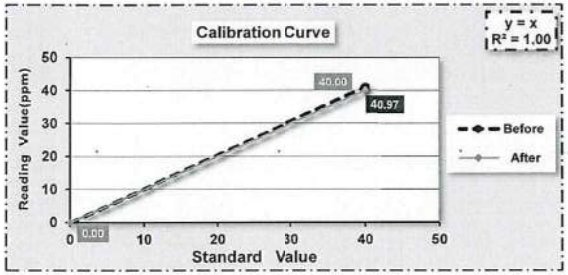
Equipment	Gas Analyzer (CO)	Customer Name	วิชันอี คอนซัลแทนท์
Manufacture	HORIBA	Location	Envi Research
Model	APMA-370	Quatation	2025-00471
Serial No.	XRP3Y7LA	Calibration Date	March 20, 2025
Analyzer Unit	ppm		

Instruments for Calibration

Instruments	Manufacture	Model	Serial Number
Zero Air Supply	Thermo Env.	111	0700419829
Dynamic Dilution Calibrator	Tanabyte	300	0165
Standard Gas Components	CO = 4,487 ppm		
Cylinder No : EB0123013	NO = 46.1 ppm		
Expire Date : Oc 22, 2027	SO_2 = 46.0 ppm		

Single Point Calibration

Standard Gas	Standard Gas Value	Analyzer Value (ppm)		Stability		% Abs Error
		Before	After	Before	After	
Zero	0	-0.19	0.00	-	-	-
Span	40	40.97	40.00	-	-	2.43



STATUS TEST AND VALIDATION OF CO ANALYZER MODEL APMA-370

Parameter	Unit	Observed Value		Nominal Range
		Before Adjust	After Adjust	
SIGNAL(MAIN)	mV	4.9	5.6	Voltage of the measured CO Value
SIGNAL (COMP)	mV	7.7	10.2	Voltage of the interference component Value
CELL	°C	29.6	30.1	Ambient + (5 to 10 C)
PUMP	kpa	54.1	54.1	less than 65
AMBIENT	kpa	101.6	101.6	Atmospheric pressure
DC 24V	mV	23.9	23.9	24+/- 0.5 V
DC 5V	mV	4.8	4.8	5+/- 0.5 V

Calibrate By : [redacted]
(MR.PANUPON PODANG)
March 20, 2025

Checked By: [redacted]
(MS.SUTATIP IM-NOI)
March 20, 2025

envi research
ENVIRONMENT RESEARCH & TECHNOLOGY CO., LTD.

Environment Research & Technology Company Limited
25/114 Mu 6 Soi Chinnakhet 1, Ngam Wong Wan Road,
Thung Song Hong, Lak Si, Bangkok 10210
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E-mail : envi@enviresearch.co.th
www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

Calibration Data of SO_2 Analyzer

Analyzer Performance Test

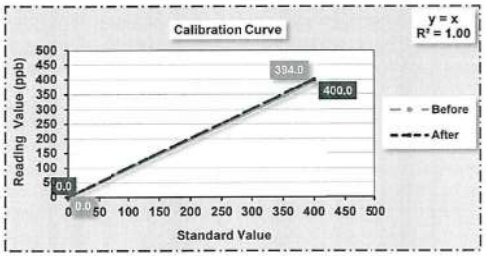
Equipment	Gas Analyzer (SO_2)	Costomer Name	วิชันอี คอนซัลแทนท์
Manufacture	Thermo	Location	Envi Research
Model	43C	Quatation	2025-00471
Serial No.	0607415768	Calibration Date	March 10, 2025
Analyzer Unit	ppb		

Instruments for Calibration

Instruments	Manufacture	Model	Serial Number
Zero Air Supply	Thermo Env.	111	0700419829
Dynamic Dilution Calibrator	Tanabyte	300	0165
Standard Gas Components	CO = 4,516 ppm		
Cylinder No : EB0123013	NO = 55.3 ppm		
Expire Date : Oct 22, 2027	SO_2 = 54.9 ppm		

Single Point Calibration

Standard Gas	Standard Gas Value	Analyzer Value (ppb)		Stability		% Abs Error
		Before	After	Before	After	
Zero	0	0.0	0.0	-	-	-
Span	400	394.0	400.0	-	-	1.5



STATUS TEST AND VALIDATION OF SO_2 ANALYZER MODEL 43C

Parameter	Display As	Unit	Observed Value		Nominal Range
			Before Adjust	After Adjust	
Range	RANGE	ppb	500	500	0 - 500 standard
Internal Temperature	INTERNAL	°c	32.0	32	8.0 °C to 47.0 °C
Chamber Temp	CHAMBER	°c	46.8	468	43.0 °C to 47.0 °C
Pressure	PRESSURE	mmHg	725.5	752.5	400.0 to 1,000
Sample Flow	SAMP FLOW	LPM	0.353	0.354	0.350 to 1.000
Lamp Intensity	INTENSITY	Hz	38,883	38,871	20,000 to 50,000
Lamp Voltage	LAMP VOLTAGE	V	871	871	750 to 1,200
SO2 Concentration	SO2 CONCENTRATION	ppb	0.1	0.9	0 to 10,000
Motherboard Status	MOTHERBOARD STATUS	-	OK	OK	OK
Interface Status	INTERFACE STATUS	-	OK	OK	OK

Calibrate By : [redacted]
(MR.PANUPON PODANG)
March 10, 2025

Checked By: [redacted]
(MS.SUTATIP IM-NOI)
March 10, 2025

Airgas
an Air Liquide company

Airgas Specialty Gases
Airgas USA, LLC
6141 Easton Road
Bldg 1
Plumsteadville, PA 189-49
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number:	E04NI99E15A0292	Reference Number:	160-401604495-1
Cylinder Number:	EB0123013	Cylinder Volume:	144.4 Cubic Feet
Laboratory:	124 - Plumsteadville - PA	Cylinder Pressure:	2015 PSIG
PGVP Number:	A12019	Valve Outlet:	660
Gas Code:	CO,NO,NOX,SO2,BALN	Certification Date:	Oct 22, 2019

Expiration Date: Oct 22, 2027

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	55.00 PPM	55.27 PPM	G1	+/- 0.8% NIST Traceable	10/14/2019, 10/22/2019
NITRIC OXIDE	55.00 PPM	55.27 PPM	G1	+/- 0.8% NIST Traceable	10/14/2019, 10/22/2019
SULFUR DIOXIDE	55.00 PPM	54.93 PPM	G1	+/- 0.9% NIST Traceable	10/14/2019, 10/22/2019
CARBON MONOXIDE	4500 PPM	4516 PPM	G1	+/- 0.6% NIST Traceable	10/14/2019
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	13010429	KAL004123	97.6 PPM NITRIC OXIDE/NITROGEN	+/- 0.8%	Jul 23, 2025
NTRM	13010429	KAL004123	97.6 PPM NOx/NITROGEN	+/- 0.8%	Jul 23, 2025
NTRM	16010235	KAL004419	97.69 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.8%	Dec 23, 2021
NTRM	08012318	KAL004620	4857 PPM CARBON MONOXIDE/NITROGEN	+/- 0.6%	Jun 07, 2024

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
MKS FTIR - CO - 000928781	FTIR	Sep 26, 2019
MKS FTIR - NO - 000928781	FTIR	Oct 18, 2019
MKS FTIR - NOx - 000928781	FTIR	Oct 18, 2019
MKS FTIR - SO2 - 000928781	FTIR	Oct 03, 2019

Triad Data Available Upon Request

NOTES: Gross Weight: 28.0 Kg, Net Weight: 4.6 Kg.

[redacted]

Approved for Release

THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

Calibration Certificate

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

Date of Issue 15 January, 2025 Cerification No. 042/25

Object : Weather Station

Manufacturer : Davis Instruments Inc.

Type : Vantage Pro 2 ID No. : No.21

Serial No. : Display AS160105017 Transmitter BE181108006

Customer : Environment Research & Technology Company Limited.
25/113-114 Moo 6 Soi Chinaket 1, Ngamwongwan Road,
Toongsonghong, Laksi, Bangkok 10210.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1014.5 hPa

NATIONAL STANDARD WIND TUNNEL :

: Micromanometer Theodor Friedrichs FC014 Serial No. 9310119

: HOOK GAGE NO 1425 Pitot Tube Theodor Friedrichs Type 0800.0000 serial 9023

N.I.S.T. Test Reference Number 731/241460 : Standard Velocity at 20 - 30 m/sec

: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)
Serial Number 110730029 (sensor 120629586)

JAPAN QUALITY ASSURANCE ORGANIZATION : Standard Velocity at 0 - 20 m/sec

STANDARD THERMOMETER : Theodor Friedrich : Dry No.8390/94 Wet No. 8389/94

: [redacted] der No.918602

Calibrated by : [redacted] Si[redacted]

Mr. Watcharapol Subwat M[redacted]

Mechanical Engineer

(Authorised Signatory)
for the Chief
Sub-Standard Instrument

METEOROLOGICAL DEPARTMENT

THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

The Result of Calibration

Certification No. 042/25

15 January, 2025

Standard	HOOK GAGE NO. 1425			**TESTED ANEMOMETER**	
Ultrasonic Anemometer	Pressure	Vacumm	Velocity	**Velocity**	**Correction**
m/sec	inches H2O	inches H2O	m/sec	**m/sec**	**m/sec**
1.00	-	-	-	0.9	0.10
3.02	-	-	-	2.7	0.32
5.00	-	-	-	4.9	0.10
7.04	-	-	-	7.0	0.04
9.02	-	-	-	8.9	0.12
11.01	-	-	-	11.0	0.01
13.01	-	-	-	13.0	0.01
15.01	-	-	-	15.0	0.01
17.02	-	-	-	17.0	0.02
20.02	-	-	-	20.0	0.02

Wind Aloft Plotting Board. US.DEPARTMENT OF COMMERCE WEATHER BUREAU	
WIND DIRETION	TESTED WIND DIRECTION
0	0
90	90
180	180
270	270

Calibrated by : [redacted]

Mr. Watcharapol Subwat

Mechanical Engineer

Calibration & Test Section

Meteorological Instruments Bureau

THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 0-2396-0156,0-2399-0469

The Result of Calibration

Certification No. 042/25

15 January, 2025

Standard	Temperature Sensor Reading	
Temp.	Reading	Correction
°C	°C	°C
48.2	48.1	0.1
30.5	30.4	0.1
15.8	15.8	0.0

Calibrated by : [redacted]

Mr. Watcharapol Subwat

Mechanical Engineer

Calibration & Test Section

Meteorological Instruments Bureau

THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

Calibration Certificate

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

Date of Issue 15 January, 2025 Certification No. 043/25

Object : Weather Station

Manufacturer : Davis Instruments Inc.

Type : Vantage Pro 2 ID No. : No.22

Serial No. : Display AS160105011 Transmitter BD181211070

Customer : Environment Research & Technology Company Limited.
25/113-114 Moo 6 Soi Chinaket 1, Ngamwongwan Road,
Toongsonghong, Laksi, Bangkok 10210.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1014.2 hPa

NATIONAL STANDARD WIND TUNNEL :

: Micromanometer Theodor Friedrichs FC014 Serial No. 9310119

: HOCK GAGE NO 1425 Pitot Tube Theodor Friedrichs Type 0800.0000 serial 9023

N.I.S.T. Test Reference Number 731/241460 : Standard Velocity at 20 - 30 m/sec

: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)

Serial Number 110730029 (sensor 120629586)

JAPAN QUALITY ASSURANCE ORGANIZATION : Standard Velocity at 0 - 20 m/sec

STANDARD THERMOMETER : Theodor Friedrich : Dry No.8390/94 Wet No. 8389/94

: Thermoschneider No.918802

Calibrated by : [redacted]

Mr. Watcharapol

Mechanical Engineer

(Authorised Signatory)
for the Chief
Sub-Standard Instrument

THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

The Result of Calibration

Certification No. 043/25

15 January, 2025

Standard	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
Ultrasonic Anemometer	Pressure	Vacumm	Velocity	Velocity	Correction
m/sec	inches H2O	inches H2O	m/sec	m/sec	m/sec
1.00	-	-	-	0.9	0.10
3.02	-	-	-	2.7	0.32
5.00	-	-	-	4.9	0.10
7.04	-	-	-	7.0	0.04
9.02	-	-	-	8.9	0.12
11.01	-	-	-	11.0	0.01
13.01	-	-	-	13.0	0.01
15.01	-	-	-	15.0	0.01
17.02	-	-	-	17.0	0.02
20.02	-	-	-	20.0	0.02

Wind Aloft Plotting Board. US.DEPARTMENT OF COMMERCE WEATHER BUREAU	
WIND DIRETION	TESTED WIND DIRECTION
0	0
90	90
180	180
270	270

Calibrated by : [redacted]

Mr. Watcharapol Subwat

Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 0-2396-0156,0-2399-0469

The Result of Calibration

Certification No. 043/25

15 January, 2025 Page : 3 of 3

Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
48.2	48.0	0.2
30.5	30.4	0.1
15.8	15.8	0.0

Calibrated by : [redacted]

Mr. Watcharapol Subwat

Mechanical Engineer

Calibration & Test Section

Meteorological Instruments Bureau

envi research
ENVIRONMENT RESEARCH & TECHNOLOGY CO., LTD.

Environment Research & Technology Company Limited
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Tel 0-2954-7745-6 Fax 0-2954-7747
E-mail : envi@envisearch.co.th
www.envisearch.co.th
Head Office/Tax ID 0105 542 064 981

Sound Level Meter Calibration Report

Support Equipment Type	:	Sound Level Calibrator
Manufacture	:	Larson Davis
Model	:	CAL200
Serial No.	:	22707
Range of Calibrator		
- Support Equipment Type	:	94.0
- Frequency	:	1,000 Hz.
Calibrated By	:	Mr.Kunakorn Ratanawongsa
Calibration Date	:	March 27, 2025
Customer Name	:	Vision E. Consultants Co., Ltd. : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ ส่วนขยาย แปลงสำรวจบนบก หมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุม)

Item	Equipment			Actual Reading (dB(A))		Status
	Brand	Model	Serial Number	Before Adjustment	After Adjustment	
1	Scarlet Tech	ST-15D	10338009	93.9	94.0	Pass
2	Scarlet Tech	ST-15D	10338010	93.9	94.0	Pass

Checked By [redacted]

Mr.Prayun Detkla

Approved By [redacted]

Ms.Sutatip Im-noi

Calibration Certificate

Certificate Number 2024009082

Customer:
Environmental Research and Technology Co Ltd Thailand
25/114 Moo 6 Soi Chinnakhet 1
Ngam Wong Wan Road
Tungsonghong,Lak si,Bangkok Thailand

Model Number	CAL200	***Procedure Number***	D0001.8386		
Serial Number	22707	***Technician***	Scott Montgomery		
Test Results	**Pass**	***Calibration Date***	20 Jun 2024		
Initial Condition	As Manufactured	***Calibration Due***			
		Temperature	20	°C	± 0.3 °C
Description	Larson Davis CAL200 Acoustic Calibrator	***Humidity***	36	%RH	± 3 %RH
		Static Pressure	101.1	kPa	± 1 kPa

Evaluation Method The data is aquired by the insert voltage calibration method using the reference microphone's open circuit sensitivity. Data reported in dB re 20 µPa.

Compliance Standards Compliant to Manufacturer Specifications per D0001.8190 and the following standards:
IEC 60942:2017 ANSI S1.40-2006

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the SI through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2017.
Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.

The quality system is registered to ISO 9001:2015.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

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Standards Used

Description	Cal Date	Cal Due	Cal Standard
Agilent 34401A DMM	06/20/2024	06/20/2025	001021
Larson Davis Model 2900 Real Time Analyzer	04/01/2024	04/01/2025	001051
Microphone Calibration System	02/22/2024	02/22/2025	005446
1/2" Preamplifier	08/16/2023	08/16/2024	006506
Larson Davis 1/2" Preamplifier 7-pin LEMO	08/04/2023	08/04/2024	006507
1/2 inch Microphone - RI - 200V	02/12/2024	02/12/2025	006510
Pressure Sensor	02/28/2024	02/28/2025	007825

Output Level

Nominal Level [dB]	Pressure [kPa]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
94	101.1	94.02	93.80	94.20	0.15	Pass
114	101.1	114.01	113.80	114.20	0.14	Pass

-- End of measurement results--

Frequency

Nominal Level [dB]	Pressure [kPa]	Test Result [Hz]	Lower limit [Hz]	Upper limit [Hz]	Expanded Uncertainty [Hz]	Result
94	101.1	1,000.08	993.00	1,007.00	0.20	Pass
114	101.1	1,000.08	993.00	1,007.00	0.20	Pass

-- End of measurement results--

Total Harmonic Distortion + Noise (THD+N)

Nominal Level [dB]	Pressure [kPa]	Test Result [%]	Lower limit [%]	Upper limit [%]	Expanded Uncertainty [%]	Result
94	101.1	0.65	0.00	2.00	0.25 ‡	Pass
114	101.1	0.64	0.00	2.00	0.25 ‡	Pass

-- End of measurement results--

Level Change Over Pressure

Tested at: 114 dB, 24 °C, 38 %RH

Nominal Pressure [kPa]	Pressure [kPa]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
108.0	108.0	-0.03	-0.25	0.25	0.04 ‡	Pass
101.3	101.2	0.00	-0.25	0.25	0.04 ‡	Pass
92.0	92.0	0.03	-0.25	0.25	0.04 ‡	Pass
83.0	83.1	0.04	-0.25	0.25	0.04 ‡	Pass
74.0	74.0	0.02	-0.25	0.25	0.04 ‡	Pass
65.0	65.1	-0.04	-0.25	0.25	0.04 ‡	Pass

-- End of measurement results--

Frequency Change Over Pressure

Tested at: 114 dB, 24 °C, 38 %RH

Nominal Pressure [kPa]	Pressure [kPa]	Test Result [Hz]	Lower limit [Hz]	Upper limit [Hz]	Expanded Uncertainty [Hz]	Result
108.0	108.0	0.00	-7.00	7.00	0.20 ‡	Pass
101.3	101.2	0.00	-7.00	7.00	0.20 ‡	Pass
92.0	92.0	0.00	-7.00	7.00	0.20 ‡	Pass
83.0	83.1	-0.01	-7.00	7.00	0.20 ‡	Pass
74.0	74.0	-0.01	-7.00	7.00	0.20 ‡	Pass
65.0	65.1	-0.01	-7.00	7.00	0.20 ‡	Pass

-- End of measurement results--

Certificate Number 2024009082

Total Harmonic Distortion + Noise (THD+N) Over Pressure

Tested at: 114 dB, 24 °C, 36 %RH

Nominal Pressure [kPa]	Pressure [kPa]	Test Result [%]	Lower limit [%]	Upper limit [%]	Expanded Uncertainty [%]	Result
108.0	108.0	0.67	0.00	2.00	0.25 ‡	Pass
101.3	101.2	0.63	0.00	2.00	0.25 ‡	Pass
92.0	92.0	0.58	0.00	2.00	0.25 ‡	Pass
83.0	83.1	0.53	0.00	2.00	0.25 ‡	Pass
74.0	74.0	0.48	0.00	2.00	0.25 ‡	Pass
65.0	65.1	0.42	0.00	2.00	0.25 ‡	Pass

-- End of measurement results--

Signatory: *Scott Montgomery*

LARSON DAVIS – A PCB DIVISION
1681 West 820 North
Provo,UT 84601 United States
716-684-0001

ACCREDITED CERT #3628

LARSON DAVIS
A PCB DIVISION

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TSP HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

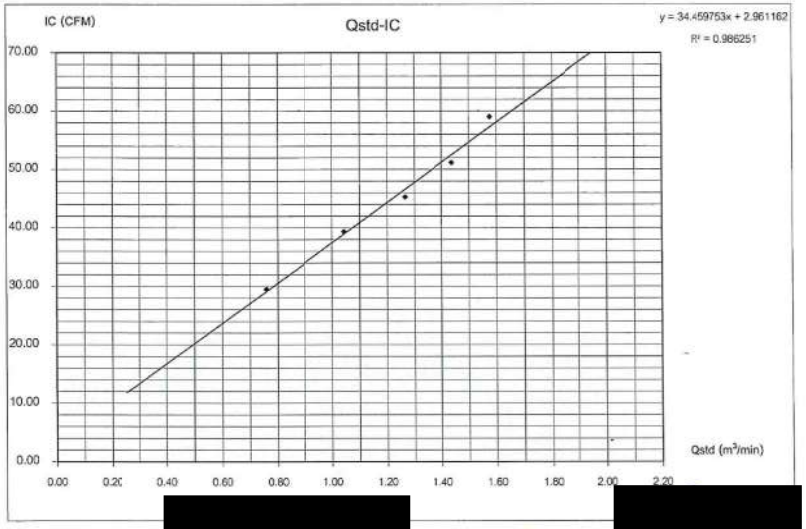
Quotation	2025-0000471			Date	May 1, 2025
Sampler Location	โรงเรียนบ้านมิตรผู้			Start Time	1:15 PM
Sampler Number	TSP No.A24	Transfer Standard Type	Orifice	Stop Time	1:25 PM
Instrument Model	HIVOL-BBCBE	Calibrator Model	TE-5025A	Calibrated By	Mr. Autlapol Areejit
Motor Serial Number	2149	Calibrator Serial Number	3382		
Recorder Serial Number	2412				

Plate No.	(Delta H) Pressure Drop Across Orifice (in H_2O) Positive	Negative	ΔH_2O	(A) $[\Delta H_2O(Pa/P_{std})(T_{std}/Ta)]^{1/2}$	(X) Qsd = (1/m)[(A-b)] (m^3/min)	(I) ample Flow Rate Indicator (ft^3/min)	(Y) IC = [(Pa/P_{std})(T_{std}/Ta]$^{1/2}$	Temparature (°K = °C+273)	Barometric Pressure (mmHg)	Start Meter	Stop Meter
5	1.2	1.2	2.4	1.52431	0.75799	30.0	29.52	307.0	758.0		
7	2.3	2.3	4.6	2.11031	1.04350	40.0	39.36	307.0	758.0		
10	3.4	3.4	6.8	2.56579	1.26543	46.0	45.26	307.0	758.0		
13	4.4	4.4	8.8	2.91883	1.43744	52.0	51.16	307.0	758.0		
18	5.3	5.3	10.6	3.20346	1.57612	60.0	59.04	307.0	758.0		
Linear Regression Y ON X: Y= mX + b							Average	307.0	758.0		

1	Slope (m)	2.05243	Linear Equation			r^2	0.98625	Pstd(mmHg)	760.0
2	Intercept (b)	-0.03141	Set Point Flow Rate (X) (m^3/min)	1.133	r	0.9931017	T_{std}	298.0
3	Correlation Coefficient (r)	0.99964	Final Set Flow Rate = (I)	0	(Pa/Pstd)*(Tstd/Ta)	0.968129007		
Result					C=(Pa/Pstd)*(Tstd/Ta)^0.5	0.983035774		

COMMENT

Andersen Instruments, Inc.



Checked By [redacted]
(Mr. Prayun Detkla)
Technician

Approved By [redacted]
(Mr.Panupon Podang)
Environmental Scientist

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PM10 HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

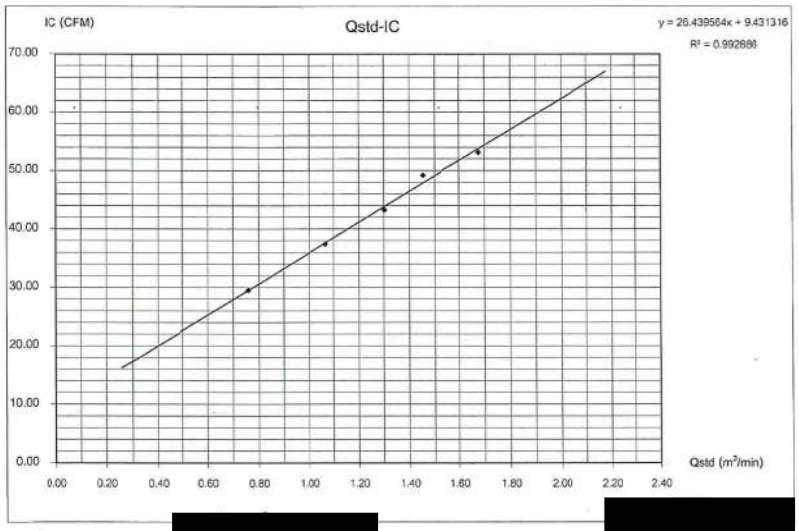
Quotation	2025-00471			Date	May 1, 2025
Sampler Location	โรงเรียนบ้านนิ่มหญ้า			Start Time	1:25 PM
Sampler Number	PM-10 No.9	Transfer Standard Type	Orifice	Stop Time	1:35 PM
Instrument Model	HIVOL-BMBBE	Calibrator Model	TE-5025A		
Motor Serial Number	2012-05	Calibrator Serial Number	3362	Calibrated By	Mr. Auttapol Areejit
Recorder Serial Number	041-003				

Plate No.	(Delta H) Pressure Drop Across Orifice ($in H_2O$)			(A) $[\Delta H_2O(Pa/P_{std})(T_{std}/Ta)]^{1/2}$	(X) Qstd = (1/m)[(A-b)]	(I) Sample Flow Rate Indicator	(Y) $IC = [(Pa/P_{std})(T_{std}/Ta)]^{1/2}$	Temperature	Barometric Pressure	Start Meter	Stop Meter
	Positive	Negative	ΔH_2O		(m^3/min)	(ft^3/min)		(°K = °C+273)	(mmHg)		
5	1.2	1.2	2.4	1.52431	0.75799	30.0	29.52	307.0	758.0		
7	2.4	2.4	4.8	2.15570	1.06562	38.0	37.39	307.0	758.0		
10	3.6	3.6	7.2	2.64018	1.30167	44.0	43.29	307.0	758.0		
13	4.5	4.5	9.0	2.95181	1.45351	50.0	49.20	307.0	758.0		
18	6.0	6.0	12.0	3.40845	1.67600	54.0	53.13	307.0	758.0		
Linear Regression Y ON X : Y= mX + b							Average	307.0	758.0		

1	Slope (m)	2.05243	Linear Equation		r^2	0.992886	Pstd(mmHg)	760.0
2	Intercept (b)	-0.03141	Set Point Flow Rate (X) (m^3/min)	1.133	r	0.9954367	T_{std}	298.0
3	Correlation Coefficient (r)	0.99984	Final Set Flow Rate = (I)	0	(Pa/Pstd)*(Tstd/Ta)		0.998126607	
Result					C=(Pa/Pstd)*(Tstd/Ta)^0.5		0.999305774	

COMMENT

Andersen Instruments, Inc.



Checked By [redacted]
(Mr. Prayun Detkla)
Technician

Approved By [redacted]
(Mr.Panupon Podang)
Environmental Scientist

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PM10 HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

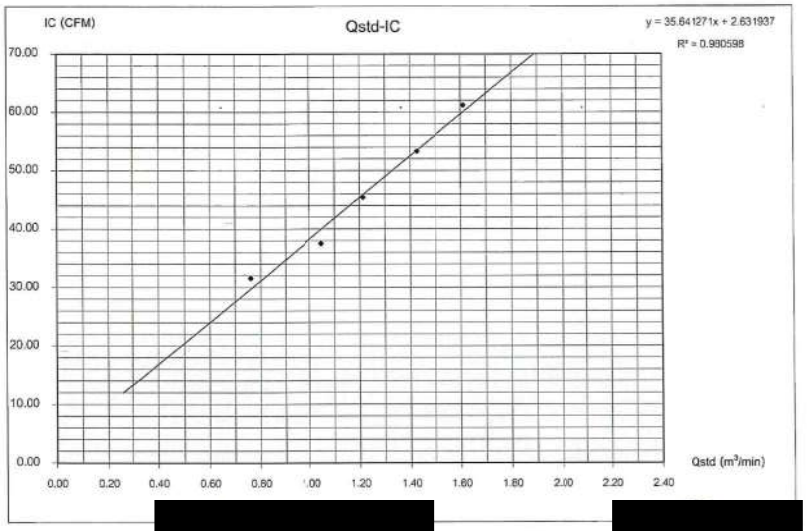
Quotation	2025-00471			Date	May 1, 2025
Sampler Location	ม.8 บ้านนิคมพัฒนา			Start Time	3:40 PM
Sampler Number	PM-10 No.17	Transfer Standard Type	Orifice	Stop Time	3:50 PM
Instrument Model	HIVOL-BMBBE	Calibrator Model	TE-5025A		
Motor Serial Number	2065	Calibrator Serial Number	3362	Calibrated By	Mr. Auttapol Areejit
Recorder Serial Number	2217				

Plate No.	(Delta H) Pressure Drop Across Orifice ($in H_2O$)			(A) $[\Delta H_2O(Pa/P_{std})(T_{std}/Ta)]^{1/2}$	(X) Qstd = (1/m)[(A-b)]	(I) Sample Flow Rate Indicator	(Y) $IC = [(Pa/P_{std})(T_{std}/Ta)]^{1/2}$	Temperature	Barometric Pressure	Start Meter	Stop Meter
	Positive	Negative	ΔH_2O		(m^3/min)	(ft^3/min)		(°K = °C+273)	(mmHg)		
5	1.2	1.2	2.4	1.52930	0.76042	32.0	31.59	305.0	758.0		
7	2.3	2.3	4.6	2.11721	1.04687	38.0	37.51	305.0	758.0		
10	3.1	3.1	6.2	2.45800	1.21291	46.0	45.41	305.0	758.0		
13	4.3	4.3	8.6	2.89491	1.42578	54.0	53.31	305.0	758.0		
18	5.5	5.5	11.0	3.27403	1.61050	62.0	61.20	305.0	758.0		
Linear Regression Y ON X: Y= mX + b							Average	305.0	758.0		

1	Slope (m)	2.05243	Linear Equation		r^2	0.980598	Pstd(mmHg)	760.0
2	Intercept (b)	-0.03141	Set Point Flow Rate (X) (m^3/min)	1.133	r	0.9902515	T_{std}	298.0
3	Correlation Coefficient (r)	0.99984	Find Set Flow Rate = (I)	0	(Pa/Pstd)*(Tstd/Ta)		0.974477998	
Result					C=(Pa/Pstd)*(Tstd/Ta)^0.5		0.987156522	

COMMENT

Andersen Instruments, Inc.



Checked By [redacted]
(Mr. Prayun Detkla)
Technician

Approved By [redacted]
(Mr.Panupon Podang)
Environmental Scientist

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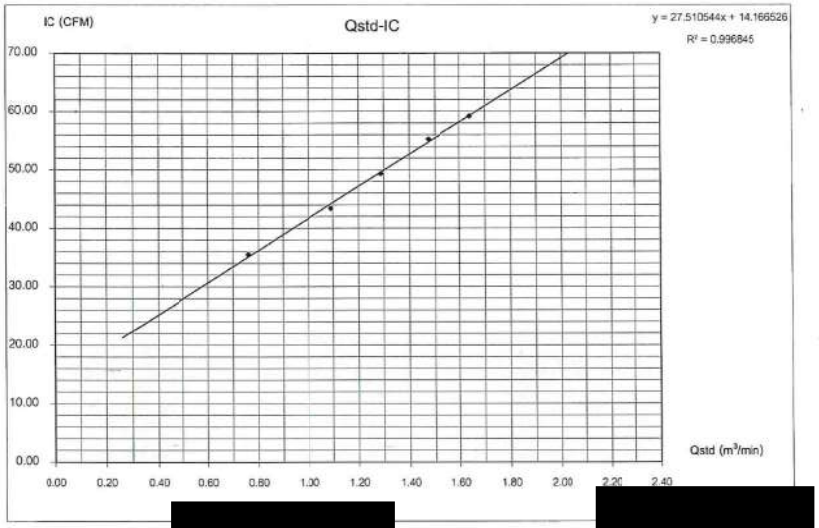
TSP HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

Quotation	2025-0000471			Date	May 1, 2025
Sampler Location	ม.8 บ้านมิตรพัฒนา			Start Time	3:50 PM
Sampler Number	TSP No.A20	Transfer Standard Type	Orifice	Stop Time	4:00 PM
Instrument Model	HIVOL-BBCBE	Calibrator Model	TE-5025A	Calibrated By	Mr. Auttapol Areelt
Motor Serial Number	2142	Calibrator Serial Number	3362		
Recorder Serial Number	2397				

Plate No.	(Delta H) Pressure Drop Across Orifice (inH_2O) Positive	Negative	ΔH_2O	(A) $[\Delta H_2O(Pa/P_{std})(T_{std}/Ta)]^{1/2}$	(X) Qstd = (1/m)[(A-b)] (m^3/min)	(I) Sample Flow Rate Indicator (ft^3/min)	(Y) $IC = [(Pa/P_{std})(T_{std}/Ta)]^{1/2}$	Temperature (°K = °C+273)	Barometric Pressure (mmHg)	Start Meter	Stop Meter
5	1.2	1.2	2.4	1.52930	0.76042	36.0	35.54	305.9	758.0		
7	2.5	2.5	5.0	2.20735	1.09078	44.0	43.43	305.9	758.0		
10	3.5	3.5	7.0	2.61177	1.28783	50.0	49.36	305.9	758.0		
13	4.6	4.6	9.2	2.99419	1.47416	56.0	55.28	305.9	758.0		
18	5.7	5.7	11.4	3.33302	1.63924	60.0	59.23	305.9	758.0		
Linear Regression Y ON X : Y= mX + b							Average	305.9	758.0		
1	Slope (m)			2.05243	Linear Equation			r^2	0.996845	P_{std}(mmHg)	760.0
2	Intercept (b)			-0.03141	Set Point Flow Rate (X) (m^3/min)		1.133	r	0.9984213	T_{std}	298.0
3	Correlation Coefficient (r)			0.99984	Final Set Flow Rate = (I)		0	(Pa/Pstd)*(Tstd/Ta)		0.974477998	
Result								C=(Pa/Pstd)*(Tstd/Ta)^0.5		0.987156522	

COMMENT

Andersen Instruments, Inc.



Checked By [redacted]
(Mr. Prayun Detkla)
Technician

Approved By [redacted]
(Mr.Panupon Podang)
Environmental Scientist

F-AB-029, Rev. 01, November 16, 2018

JNAC
JIRANATEE ASSOCIATES CO.,LTD.

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Accredited calibration laboratory
ISO/IEC 17025:2017
NSC-TISI-TIS 17025
CALIBRATION 0367

Flow measurement laboratory
Calibration services department.

ilac-MRA MC THAILAND
NSC – TISI – TIS 17025
CALIBRATION 0367

CERTIFICATE OF CALIBRATION

Certificate No. : CCF-034-67

MEASUREMENT ITEM : Top Load Orifice
MANUFACTURER : TISCH
MODEL/TYPE : TE-5025A
SERIAL NUMBER : 3362
ID NUMBER : -
CONDITION AS-RECEIVED : Used item
CUSTOMER : Environment Research & Technology Co., Ltd.
25/114 Moo 6Soi Chinaket 1, Ngamwongwan Road,
Toongsonghong, Laksi, Bangkok 10210

RECEIVED DATE : 21 Aug 2024
MEASUREMENT DATE : 23 Aug 2024
ISSUE DATE : 26 Aug 2024

Calibration procedure:
The Orifice gas flow device was calibrated against Standard Rotary Displacement Meter (Roots Meter) Model G65/IMC/W2-dp. The WI-CL-004 was used as a calibration guideline.

Traceability:
This certificate provides a traceability of the measurement to recognized the national standards, and to realization of the international system of units (SI) through the NIMT (National Metrology Institute of Thailand) via Certificate number: MW-0063-23.

Uncertainty of Measurement:
The reported uncertainty of measurement is based on the standard uncertainty multiplied by a coverage factor k=2, Which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty has been determined in accordance with the GUM 'Evaluation of measurement data - Guide to the expression of uncertainty in measurement'

ENVIRONMENTAL CONDITIONS:
Ambient condition in the laboratory are as follow:

Temperature	: 23.0 ± 3.0	°C
Relative Humidity	: 55.0 ± 15.0	%RH
Atmospheric Pressure	: 1010 ± 10	hPa

CALIBRATION CONDITION:
Preconditioning : 24 hours at ambient conditions.
Measurement Condition : The average values during measurement are 23.5 °C and 56.1 %RH.

NOTED: *The certificate is valid only to the item calibrated on date and place of calibration.*

TABULATION OF RESULTS:
The table on next page give the measured values.

Calibrated by:
☐ Mr. Sorawit Thachalad
☑ Miss Jittraporn Lertsomphol

JNAC JIRANATEE ASSOCIATES CO.,LTD.

Approved signatory [redacted]
Mr. Parinya Booncharoen
Calibration Department Manager

Jiranatee Associates Co., Ltd.

THIS CERTIFICATE REPORT MAY NOT BE REPRODUCED EXCEPT IN FULL UNLESS PERMISSION FOR REPRODUCTION HAS BEEN OBTAINED IN WRITING FROM THE LABORATORY

JIRANATEE ASSOCIATES CO.,LTD.

Continuation of Certificate of Calibration Number COF-034-67

MEASUREMENT RESULTS:

The Orifice gas flow device was calibrated by direct comparison method with the Standard Rotary Displacement Meter (Roots Meter). The Humid air was used as a medium in the system. The standard conditions are 25°C (298.15 K) and 760 mmHg for standard temperature and standard pressure respectively.

Table 1: The results of Q Standard calibration data

Plate	Flow rate m^3/min	Pressure [Pa] mmHg	Temperature [Ta] °C	Temperature [Tm] °C	Δp_meter mmHg	Δp_Orifice inH_2O	Y	Standard Flow [Q_s] m^3/min
1	0.702	757.204	23.26	22.19	54.689	1.731	1.317	0.655
2	1.005	757.142	23.31	22.53	61.174	3.482	1.868	0.928
3	1.118	757.170	23.66	22.97	42.490	4.572	2.139	1.058
4	1.170	757.200	23.84	23.24	30.416	5.191	2.279	1.125
5	1.415	757.259	23.98	23.51	30.130	7.646	2.765	1.361

Slope (m): **2.05243**

Intercept (b): **-0.03141**

Correlation coefficient (r): **0.99984**

Uncertainty ($k=2$): 0.015 m^3/min

Table 2: The results of Q actual calibration data

Plate	Flow rate m^3/min	Pressure [Pa] mmHg	Temperature [Ta] °C	Temperature [Tm] °C	Δp_meter mmHg	Δp_Orifice inH_2O	Y	Standard Flow [Q_s] m^3/min
1	0.702	757.204	23.26	22.19	54.689	1.731	0.823	0.654
2	1.005	757.142	23.31	22.53	61.174	3.482	1.168	0.926
3	1.118	757.170	23.66	22.97	42.490	4.572	1.339	1.058
4	1.170	757.200	23.84	23.24	30.416	5.191	1.427	1.125
5	1.415	757.259	23.98	23.51	30.130	7.646	1.732	1.361

Slope (m): **1.28548**

Intercept (b): **-0.01960**

Correlation coefficient (r): **0.99984**

Uncertainty ($k = 2$): 0.015 m^3/min

End of Certificate of Calibration

JIRANATEE ASSOCIATES CO.,LTD.

Jiranatee Associates Co., Ltd.

Calibration Certificate ID
TH3067-085-011625-ACC-TH

Mettler-Toledo (Thailand) Ltd.
846/4 - 846/5 Lasalle Rd. Bangna Tai Sub-District
Bangna District, Bangkok 10260
+662 723 0382
MT-TH.ServiceSupport@mt.com

METTLER TOLEDO

NSC-TISI-TIS 17025
CALIBRATION 0062

Accuracy Calibration Certificate

Customer

Company:	Environment Research & Technology Co., Ltc.		
Address:	25/114 Moo 6, Soi Chiraket 1, Ngamwongwan Rd., Toongsonghong		
City:	Laksi	**Contact:**	Ramita Tsengthai
Zip / Postal:	10210		
State / Province:	Bangkok		
Order Number:			

Weighing Device

Manufacturer:	Mettler Toledo	**Instrument Type:**	Weighing Instrument
Model:	AB204-S	**Asset Number:**	ERTC-L-IN-0048
Serial No.:	1123103723	**Terminal Model:**	N/A
Building:	N/A	**Terminal Serial No.:**	N/A
Floor:	4	**Terminal Asset No.:**	N/A
Room:	406		

Range	Max. Capacity	Readability (d)
1	220 g	0.0001 g

Procedure

Calibration Guideline: EURAMET cg-18 v. 4.0 (11/2015)

METTLER TOLEDO Work Instruction: CP/W002/20

This calibration certificate contains measurements for As Found calibration. No As Left calibration was performed because the device was not modified after As Found calibration. Therefore, results for As Left correspond to As Found.

The sensitivity/span of the weighing instrument was adjusted before calibration with a built-in weight.

In accordance with EURAMET cg-18 (11/2015), the test loads were selected to reflect the specific use of the weighing device or to accommodate specific calibration conditions.

	Temperature		Humidity	
As Found	Start: 23.1 °C	End: 23.3 °C	Start: 35.7 %	End: 35.2 %

As Found Calibration Date: 16-Jan-2025

As Left Calibration Date: N/A

Issue Date: 18-Jan-2025

Calibrator: [redacted]
Nithit Jongkrod

Approved Signatory: [redacted]
Technical Manager / Head of Calibration Center

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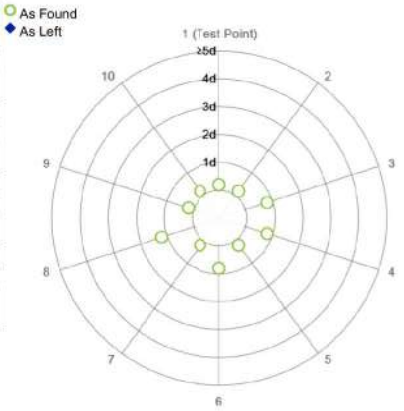
Measurement Results

Repeatability

Test Load: 100 g

	As Found	As Left
1	100.0000 g	N/A
2	100.0000 g	N/A
3	100.0001 g	N/A
4	100.0001 g	N/A
5	100.0000 g	N/A
6	100.0001 g	N/A
7	100.0000 g	N/A
8	99.9999 g	N/A
9	100.0000 g	N/A
10	100.0000 g	N/A

Standard Deviation	0.00006 g	N/A



The "d" in the graph represents the readability of the range/interval in which the test was performed.

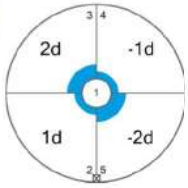
The results of this graph ars based upon the absolute values of the differences from the mean value.

Eccentricity

Test Load: 100 g

Position	As Found	As Left
1	100.0000 g	N/A
2	100.0001 g	N/A
3	100.0002 g	N/A
4	99.9999 g	N/A
5	99.9998 g	N/A

Maximum Deviation	0.0002 g	N/A



As Found

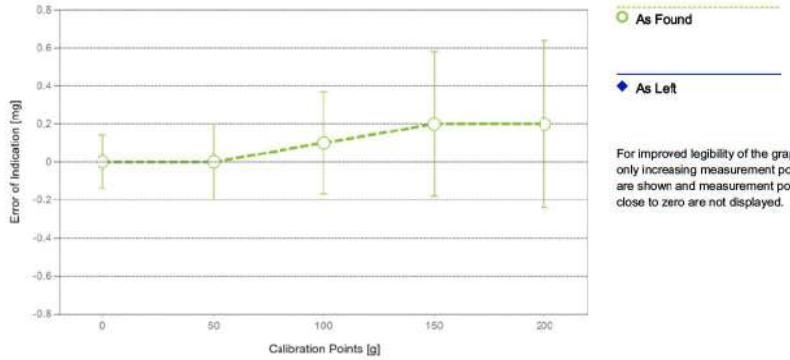
The "d" in the graph represents the readability of the range/interval in which the test was performed.

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Error of Indication

As Found

	Reference Value	Indication	Error of Indication	Expanded Uncertainty	k
1	0.0000 g	0.0000 g	0.0000 g	0.14 mg	2
2	0.0500 g	0.0500 g	0.0000 g	0.15 mg	2
3	0.1000 g	0.1000 g	0.0000 g	0.15 mg	2
4	0.5000 g	0.5000 g	0.0000 g	0.15 mg	2
5	1.0000 g	1.0000 g	0.0000 g	0.15 mg	2
6	5.0000 g	5.0000 g	0.0000 g	0.16 mg	2
7	10.0000 g	10.0000 g	0.0000 g	0.16 mg	2
8	50.0001 g	50.0001 g	0.0000 g	0.20 mg	2
9	99.9999 g	100.0000 g	0.0001 g	0.27 mg	2
10	150.0000 g	150.0002 g	0.0002 g	0.38 mg	2
11	200.0001 g	200.0003 g	0.0002 g	0.44 mg	2



For improved legibility of the graphics only increasing measurement points are shown and measurement points close to zero are not displayed.

The expanded measurement uncertainty is reported as the standard measurement uncertainty multiplied by the coverage factor k such that the coverage probability corresponds to approximately 95 %.

The user is responsible for maintaining environmental conditions and the settings of the weighing instrument when it was calibrated. The results of this calibration certificate relate only to the calibrated item.

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Test Equipment

All weights used for metrological testing are traceable to national or international standards. The weights were calibrated and certified by an accredited calibration laboratory.

Weight Set 1: OIML E2

Weight Set No.:	WS52	Date of Issue:	17-Apr-2024
Certificate Number:	191753	Calibration Due Date:	15-Oct-2025

Weight Set 2: OIML E2

Weight Set No.:	WS52-1	Date of Issue:	17-May-2024
Certificate Number:	C420107128	Calibration Due Date:	17-Oct-2025

Weight Set 3: OIML E2

Weight Set No.:	WS52-2	Date of Issue:	17-May-2024
Certificate Number:	C420107129	Calibration Due Date:	28-Oct-2025

Thermo Hygrometer

Equipment No.:	IN302	Date of Issue:	31-Oct-2024
Certificate Number:	SG-H-00908/67	Calibration Due Date:	17-Oct-2025

Remarks

Equipment condition: Good

Next calibration according to customer's procedure

Calibration data not decide by calibration laboratory

End of Accredited Section

The information below and any attachments to this calibration certificate are not part of the accredited calibration.

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Calibration Certificate ID
TH3067-085-011625-ACC-TH

METTLER TOLEDO Service

Measurement Uncertainty of the Weighing Instrument in Use

Stated is the expanded uncertainty with k=2 in use. The formula shall be used for the estimation of the uncertainty under consideration of the errors of indication. The value R represents the net load indication in the unit of measure of the device.

Temperature coefficient for the evaluation of the measurement uncertainty in use: $3.0 \cdot 10^{-6}$ / K

Temperature range on site for the evaluation of the measurement uncertainty in use: 3 K

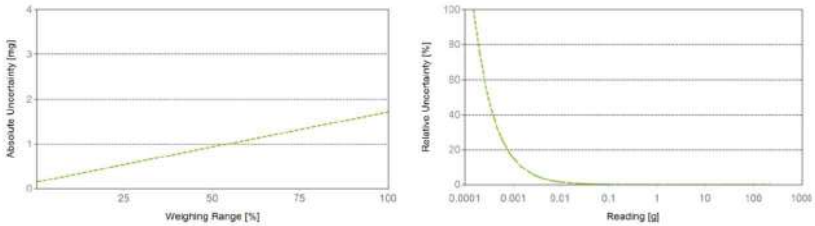
Linearization of Uncertainty Equation

	Range		As Found	As Left
	d	Max		
1	0.0001 g	220 g	U_1 = 0.15 mg + 0.00712 mg/g · R	N/A

To optimize the stability of the linearization, besides of the zero load only increasing measurement points with a test load of 5% of the measurement range or larger are taken for the calculation of the linear equation.

Absolute and Relative Measurement Uncertainty in Use for Various Net Indications (Examples)

Net Indication	As Found		As Left	
0.0220 g	0.15 mg	0.68%	N/A	N/A
0.2200 g	0.15 mg	0.069%	N/A	N/A
2.2000 g	0.17 mg	0.0075%	N/A	N/A
22.0000 g	0.31 mg	0.0014%	N/A	N/A
220.0000 g	1.7 mg	0.00078%	N/A	N/A



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GWP®
Certificate

As Found ✓

The weighing device meets the given process requirements.

As Left ✓

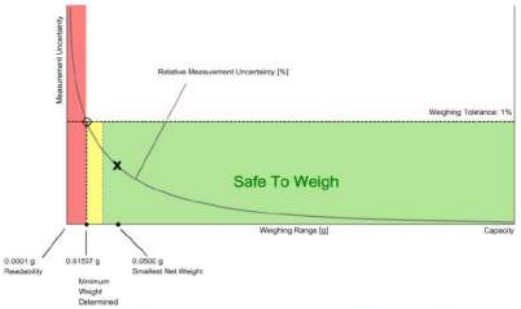
The weighing device meets the given process requirements.

Tests Performed: ☑ As Found ☐ As Left ☑ No adjustments/modifications made. As Left results correspond to As Found.

Process Requirements

Weighing Tolerance: **1%** | Smallest Net Weight: **0.0500 g** | Safety Factor: **2**

Safe Weighing Range



While the values in this graph reflect the actualcalibration results, the measurement uncertainty curves are simply a visual representation. This graph reflects As Left testing, unless only As Found was performed.

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Attachment to Calibration Certificate:
TH3067-085-011625-ACC-TH
GWP® Certificate

METTLER TOLEDO Service

Minimum Weight

As Found Minimum Weight Table

Minimum weights for different weighing tolerances and safety factors					
	Safety Factor				
Tolerance	1	2	3	5	10
0.1%	0.15163 g	0.30546 g	0.46152 g	0.78056 g	1.62097 g
0.2%	0.07555 g	0.15163 g	0.22827 g	0.38321 g	0.78056 g
0.5%	0.03015 g	0.06039 g	0.09072 g	0.15163 g	0.30546 g
1%	0.01507 g	0.03015 g	0.04526 g	0.07555 g	0.15163 g
2%	0.00753 g	0.01507 g	0.02261 g	0.03771 g	0.07555 g
5%	0.00301 g	0.00602 g	0.00904 g	0.01507 g	0.03015 g

✓ Pass: The determined minimum weight meets the requirement for the smallest net weight.

As Left Minimum Weight Table

Minimum weights for different weighing tolerances and safety factors					
	Safety Factor				
Tolerance	1	2	3	5	10
0.1%	0.15163 g	0.30546 g	0.46152 g	0.78056 g	1.62097 g
0.2%	0.07555 g	0.15163 g	0.22827 g	0.38321 g	0.78056 g
0.5%	0.03015 g	0.06039 g	0.09072 g	0.15163 g	0.30546 g
1%	0.01507 g	0.03015 g	0.04526 g	0.07555 g	0.15163 g
2%	0.00753 g	0.01507 g	0.02261 g	0.03771 g	0.07555 g
5%	0.00301 g	0.00602 g	0.00904 g	0.01507 g	0.03015 g

✓ Pass: The determined minimum weight meets the requirement for the smallest net weight.

At these net minimum weight values, the measurement uncertainty of the weighing device is ecual to or less than 1/1 (no safety factor), 1/2 1/3, 1/5, or 1/10 of the required tolerance. The values are calculated with k = 2 and based on the linear formula of the measurement uncertainty of the weighing device in use.

The safety factor for As Found is always 1. This implies no safety factor. As Found testing looks at the behavior of the instrument from the past until test occurred. For the past, it is necessary to know that the tolerance was met, but not the safety factor. The safety factor is a proactive measure to apply forfuture measurements.

Notes on minimum weight values in above table:

1. If "N/A" is shown above, no appropriate value could be calculated.
2. METTLER TOLEDO is not responsible for the definition of the process requirements.

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Measurement Results

Results Summary

	Repeatability	Eccentricity	Error of Indication
As Found	✓	✓	✓
As Left	✓	✓	✓

✓ = Passed
✗ = Failed
⚠ = Safety Factor not met

Repeatability

Test Load: 100 g

		As Found		As Left	
Tolerance	Control Limit	Std. Deviation	Result	Std. Deviation	Result
0.1%	N/A	0.00006 g*	N/A	0.00006 g*	N/A
0.2%	0.00005 g		✗		✗
0.5%	0.00013 g		✓		✓
1%	0.00025 g		✓		✓
2%	0.00050 g		✓		✓
5%	0.00125 g		✓		✓

*The calculated standard deviation value is below the rounding error of the balance. The 0.41*d rule is used for the assessment of this repeatability test and the calculation of the minimum weight.

The weighing tolerance is met if the standard deviation is less than or equal to the corresponding control limit.

Eccentricity

Test Load: 100 g

		As Found		As Left	
Tolerance	Control Limit	Deviation	Result	Deviation	Result
0.1%	0.0500 g	0.0002 g	✓	0.0002 g	✓
0.2%	0.1000 g		✓		✓
0.5%	0.2500 g		✓		✓
1%	0.5000 g		✓		✓
2%	1.0000 g		✓		✓
5%	2.5000 g		✓		✓

The weighing tolerance is met if the deviation is less than or equal to the corresponding control limit.

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Error of Indication

As Found

		Control limits for various weighing tolerances					
Reference Value	Error	0.1%	0.2%	0.5%	1%	2%	5%
0.0000 g	0.0000 g	N/A	N/A	N/A	N/A	N/A	N/A
50.0001 g	0.0000 g	0.0250 g	0.0500 g	0.1250 g	0.2500 g	0.5000 g	1.2500 g
99.9999 g	0.0001 g	0.0500 g	0.1000 g	0.2500 g	0.5000 g	1.0000 g	2.5000 g
150.0000 g	0.0002 g	0.0750 g	0.1500 g	0.3750 g	0.7500 g	1.5000 g	3.7500 g
200.0001 g	0.0002 g	0.1000 g	0.2000 g	0.5000 g	1.0000 g	2.0000 g	5.0000 g
Result		✓	✓	✓	✓	✓	✓

As Left

		Control limits for various weighing tolerances					
Reference Value	Error	0.1%	0.2%	0.5%	1%	2%	5%
0.0000 g	0.0000 g	N/A	N/A	N/A	N/A	N/A	N/A
50.0001 g	0.0000 g	0.0250 g	0.0500 g	0.1250 g	0.2500 g	0.5000 g	1.2500 g
99.9999 g	0.0001 g	0.0500 g	0.1000 g	0.2500 g	0.5000 g	1.0000 g	2.5000 g
150.0000 g	0.0002 g	0.0750 g	0.1500 g	0.3750 g	0.7500 g	1.5000 g	3.7500 g
200.0001 g	0.0002 g	0.1000 g	0.2000 g	0.5000 g	1.0000 g	2.0000 g	5.0000 g
Result		✓	✓	✓	✓	✓	✓

The weighing tolerance is met if the error (of indication) for each test point is less than or equal to the corresponding control limit for that particular weighing tolerance. Results at or close to the zero point cannot be assessed.

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www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

Calibration Data of NOx Analyzer

Analyzer Performance Test

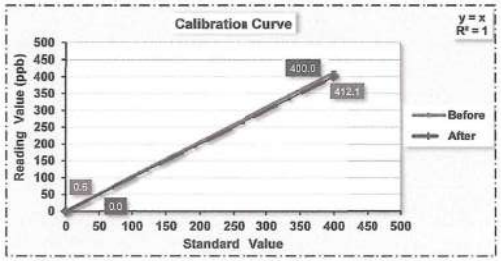
Equipment	Gas Analyzer (NOx)	Customer Name	วิชั่นอี คอนซัลแทนท์
Manufacture	HORIBA	Location	Envi Research
Model	APNA-370	Quatation	2025-00471
Serial No.	NGABK8F2	Calibration Date	April 30, 2025
Analyzer Unit	ppb		

Instruments for Calibration

Instruments	Manufacture	Model	Serial Number
Zero Air Supply	Thermo Env.	111	0700419829
Dynamic Dilution Calibrator	Tanabyte	300	0165
Standard Gas Components	CO = 4,516 ppm		
Cylinder No : EB0123013	NO = 55.3 ppm		
Expire Date : Oct 22, 2027	SO_2 = 54.9 ppm		

Single Point Calibration

Standard Gas	Standard Gas Value	Analyzer Value								% Abs Error
		NO_x (ppb)		NO (ppb)		NO_2 (ppb)		Stability		
		Before	After	Before	After	Before	After	Before	After	
Zero	0	0.8	0.0	0.6	0.0	0.2	0.0	-	-	-
Span	400	413.8	400.0	412.1	400.0	1.7	0.0	-	-	3.0



STATUS TEST AND VALIDATION OF NOx ANALYZER MODEL APNA-370

Parameter	Unit	Observed Value		Nominal Range
		Before Adjust	After Adjust	
Range	ppb	500	500	0 - 500 Standard
Signal NO	mV	0.5	0.7	Voltage of the measured NO value
Signal NOx	mV	22.0	21.3	Voltage of the measured NOx value
Detector	°C	41.2	41.3	43 °C ± 5 °C
Ambient	kPa	100.1	100.1	Current atmospheric pressure
DC 24V	V	23.7	23.7	24V ±0.5
DC 5V	V	5.0	5.0	5V ±0.5
NO Slope	-	1.32570	1.24551	0.50000 - 2.0000
NOx Slope	-	1.32450	1.23590	0.50000 - 2.0000

Calibrate By : [redacted]
(MR.PANUPON PODANG)
April 30, 2025

Checked By : [redacted]
(MS.SUTATIP IM-NOI)
April 30, 2025

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www.enviresearch.co.th
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Calibration Data of NOx Analyzer

Analyzer Performance Test

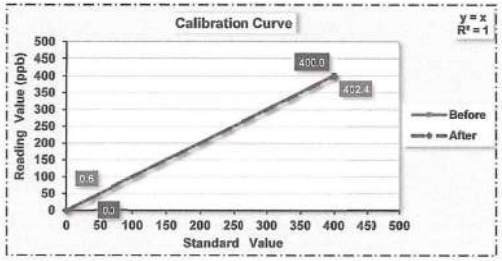
Equipment	Gas Analyzer (NOx)	Customer Name	วิชั่นอี คอนซัลแทนท์
Manufacture	HORIBA	Location	Envi Research
Model	APNA-370	Quatation	2025-00471
Serial No.	AX7HSMEO	Calibration Date	April 30, 2025
Analyzer Unit	ppb		

Instruments for Calibration

Instruments	Manufacture	Model	Serial Number
Zero Air Supply	Thermo Env.	111	0700419829
Dynamic Dilution Calibrator	Tanabyte	300	0165
Standard Gas Components	CO = 4,516 ppm		
Cylinder No : EB0123013	NO = 55.3 ppm		
Expire Date : Oct 22, 2027	SO_2 = 54.9 ppm		

Single Point Calibration

Standard Gas	Standard Gas Value	Analyzer Value								% Abs Error
		NO_x (ppb)		NO (ppb)		NO_2 (ppb)		Stability		
		Before	After	Before	After	Before	After	Before	After	
Zero	0	-0.1	0.0	0.6	0.0	-0.7	0.0	-	-	-
Span	400	404.1	400.0	402.4	400.0	1.7	0.0	-	-	0.6



STATUS TEST AND VALIDATION OF NOx ANALYZER MODEL APNA-370

Parameter	Unit	Observed Value		Nominal Range
		Before Adjust	After Adjust	
Range	ppb	500	500	0 - 500 Standard
Signal NO	mV	0.7	0.9	Voltage of the measured NO value
Signal NOx	mV	3.7	3.6	Voltage of the measured NOx value
Detector	°C	40.5	40.5	43 °C ± 5 °C
Ambient	kPa	100.7	100.7	Current atmospheric pressure
DC 24V	V	23.5	23.5	24V ±0.5
DC 5V	V	4.9	4.9	5V ±0.5
NO Slope	-	1.96520	1.95410	0.50000 - 2.0000
NOx Slope	-	1.54890	1.54680	0.50000 - 2.0000

Calibrate By : [redacted]
(MR.PANUPON PODANG)
April 30, 2025

Checked By : [redacted]
(MS.SUTATIP IM-NOI)
April 30, 2025

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Calibration Data of SO_2 Analyzer

Analyzer Performance Test

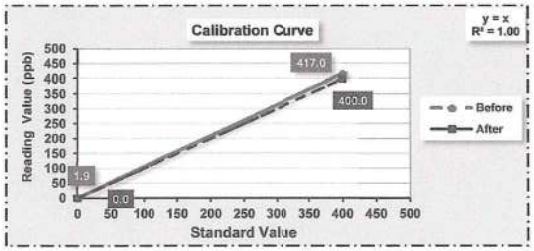
Equipment	Gas Analyzer (SO_2)	Customer Name	วิชันธี คอนซัลแทนท์
Manufacture	Thermo	Location	Envi Research
Model	43i-BNSAA	Quatation	2025-00471
Serial No.	CM14430004	Calibration Date	April 30, 2025
Analyzer Unit	ppb		

Instruments for Calibration

Instruments	Manufacture	Model	Serial Number
Zero Air Supply	Thermo Env.	111	0700419829
Dynamic Dilution Calibrator	Tanabyte	300	0165
Standard Gas Components	CO = 4,516 ppm		
Cylinder No : EB0123013	NO = 55.3 ppm		
Expire Date : Oct 22, 2027	SO_2 = 54.9 ppm		

Single Point Calibration

Standard Gas	Standard Gas Value	Analyzer Value (ppb)		Stability		% Abs Error
		Before	After	Before	After	
Zero	0	1.9	0.0	-	-	-
Span	400	417.0	400.0	-	-	4.3



STATUS TEST AND VALIDATION OF SO_2 ANALYZER MODEL 43i-BNSAA

Parameter	Display As	Unit	Observed Value		Nominal Range
			Before Adjust	After Adjust	
Range	RANGE	ppb	500	500	0 - 500 standard
Internal Temperature	INTERNAL	°c	32.7	32.7	8.0 °C to 45.0 °C
Chamber Temp	CHAMBER	°c	45.2	45.3	43.0 °C to 47.0 °C
Pressure	PRESSURE	mmHg	748.3	740.1	400.0 to 1,000
Sample Flow	SAMP FLOW	LPM	0.364	0.364	0.350 to 0.750
Lamp Intensity	LAMP INTENSITY	%	92	92	20 to 100
Lamp Voltage	LAMP VOLTAGE	V	1094	1094	500 to 1200
SO2 Concentration	SO2 CONCENTRATION	ppb	2.6	1.5	0 to 10,000
Motherboard Status	MOTHERBOARD STATUS	-	OK	OK	OK
Interface Status	INTERFACE STATUS	-	OK	OK	OK

Calibrate By : [redacted] (MR.PANUPON PODANG) April 30, 2025

Checked By : [redacted] (MS.SUTATIP IM-NOI) April 30, 2025

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Calibration Data of SO_2 Analyzer

Analyzer Performance Test

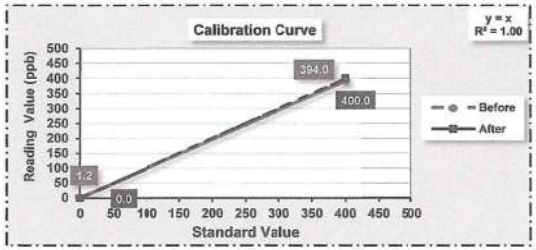
Equipment	Gas Analyzer (SO_2)	Customer Name	วิชันธี คอนซัลแทนท์
Manufacture	Thermo	Location	Envi Research
Model	43i-BNSAA	Quatation	2025-00471
Serial No.	CM14430005	Calibration Date	April 30, 2025
Analyzer Unit	ppb		

Instruments for Calibration

Instruments	Manufacture	Model	Serial Number
Zero Air Supply	Thermo Env.	111	0700419829
Dynamic Dilution Calibrator	Tanabyte	300	0165
Standard Gas Components	CO = 4,516 ppm		
Cylinder No : EB0123013	NO = 55.3 ppm		
Expire Date : Oct 22, 2027	SO_2 = 54.9 ppm		

Single Point Calibration

Standard Gas	Standard Gas Value	Analyzer Value (ppb)		Stability		% Abs Error
		Before	After	Before	After	
Zero	0	1.2	0.0	-	-	-
Span	400	394.0	400.0	-	-	1.5



STATUS TEST AND VALIDATION OF SO_2 ANALYZER MODEL 43i-BNSAA

Parameter	Display As	Unit	Observed Value		Nominal Range
			Before Adjust	After Adjust	
Range	RANGE	ppb	500	500	0 - 500 standard
Internal Temperature	INTERNAL	°c	31.9	32.0	8.0 °C to 45.0 °C
Chamber Temp	CHAMBER	°c	45.1	45.1	43.0 °C to 47.0 °C
Pressure	PRESSURE	mmHg	720.1	719.9	400.0 to 1,000
Sample Flow	SAMP FLOW	LPM	0.565	0.565	0.350 to 0.750
Lamp Intensity	LAMP INTENSITY	%	80	80	20 to 100
Lamp Voltage	LAMP VOLTAGE	V	974	974	500 to 1200
SO2 Concentration	SO2 CONCENTRATION	ppb	1.3	1.4	0 to 10,000
Motherboard Status	MOTHERBOARD STATUS	-	OK	OK	OK
Interface Status	INTERFACE STATUS	-	OK	OK	OK

Calibrate By : [redacted] (MR.PANUPON PODANG) April 30, 2025

Checked By : [redacted] (MS.SUTATIP IM-NOI) April 30, 2025

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Head Office/Tax ID 0105 542 064 981

Calibration Data of CO Analyzer

Analyzer Performance Test

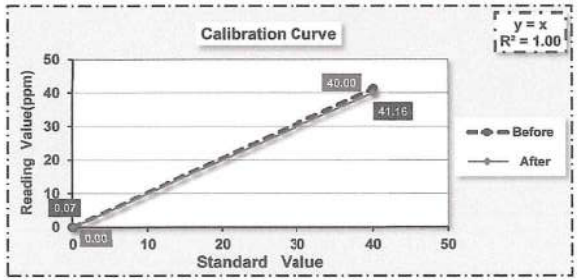
Equipment	Gas Analyzer (CO)	**Customer Name**	วิชั่นอี คอนซัลแทนท์
Manufacture	HORIBA	**Location**	Envi Research
Model	APMA-370	**Quatation**	2025-00471
Serial No.	WNTLD9N8	**Calibration Date**	April 30, 2025
Analyzer Unit	ppm		

Instruments for Calibration

Instruments	Manufacture	Model	Serial Number
Zero Air Supply	Thermo Env.	111	0700419829
Dynamic Dilution Calibrator	Tanabyte	300	0165
Standard Gas Components	CO = 4,516 ppm		
Cylinder No : EB0123013	NO = 55.3 ppm		
Expire Date : Oct 22, 2027	SO_2 = 54.9 ppm		

Single Point Calibration

Standard Gas	Standard Gas Value	Analyzer Value (ppm)		Stability		% Abs Error
		Before	After	Before	After	
Zero	0	0.07	0.00	-	-	-
Span	40	41.16	40.00	-	-	2.90



STATUS TEST AND VALIDATION OF CO ANALYZER MODEL APMA-370

Parameter	Unit	Observed Value		Nominal Range
		Before Adjust	After Adjust	
SIGNAL(MAIN)	mV	8.3	8	Voltage of the measured CO Value
SIGNAL (COMP)	mV	5.3	5.1	Voltage of the interference component Value
CELL	°C	32.7	32.7	Ambient + (5 to 10 C)
PUMP	kpa	57.4	54.3	less than 65
AMBIENT	kpa	101.4	101.3	Atmospheric pressure
DC 24V	mV	23.9	23.9	24+/- 0.5 V
DC 5V	mV	4.9	4.9	5+/- 0.5 V

Calibrate By : [redacted]
(MR.PANUPON PODANG)
April 30, 2025

Checked By : [redacted]
(MS.SUTATIP IM-NOI)
April 30, 2025

envi research
ENVIRONMENT RESEARCH & TECHNOLOGY CO., LTD.

Environment Research & Technology Company Limited
25/114 Mu 6 Soi Chinnakhet 1, Ngam Wong Wan Road,
Thung Song Hong, Lak Si, Bangkok 10210
Tel 0-2954-7745-6 Fax 0-2954-7747
E-mail : envi@enviresearch.co.th
www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

Calibration Data of CO Analyzer

Analyzer Performance Test

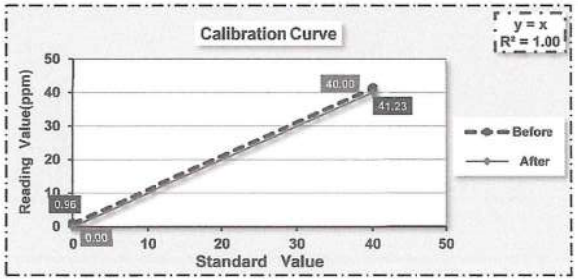
Equipment	Gas Analyzer (CO)	**Customer Name**	วิชั่นอี คอนซัลแทนท์
Manufacture	HORIBA	**Location**	Envi Research
Model	APMA-370	**Quatation**	2025-00471
Serial No.	3VJ73T6X	**Calibration Date**	April 22, 2024
Analyzer Unit	ppm		

Instruments for Calibration

Instruments	Manufacture	Model	Serial Number
Zero Air Supply	Thermo Env.	111	0700419829
Dynamic Dilution Calibrator	Tanabyte	300	0165
Standard Gas Components	CO = 4,487 ppm		
Cylinder No : EB0123013	NO = 46.1 ppm		
Expire Date : Oct 22, 2027	SO_2 = 46.0 ppm		

Single Point Calibration

Standard Gas	Standard Gas Value	Analyzer Value (ppm)		Stability		% Abs Error
		Before	After	Before	After	
Zero	0	0.96	0.00	-	-	-
Span	40	41.23	40.00	-	-	3.07



STATUS TEST AND VALIDATION OF CO ANALYZER MODEL APMA-370

Parameter	Unit	Observed Value		Nominal Range
		Before Adjust	After Adjust	
SIGNAL(MAIN)	mV	8.6	8	Voltage of the measured CO Value
SIGNAL (COMP)	mV	9.1	8.4	Voltage of the interference component Value
CELL	°C	31.1	31.0	Ambient + (5 to 10 C)
PUMP	kpa	54.2	54.1	less than 65
AMBIENT	kpa	101.5	101.4	Atmospheric pressure
DC 24V	mV	23.9	23.9	24+/- 0.5 V
DC 5V	mV	4.8	4.8	5+/- 0.5 V

Calibrate By : [redacted]
(MR.PANUPON PODANG)
April 22, 2024

Checked By : [redacted]
(MS.SUTATIP IM-NOI)
April 22, 2024

Airgas
an Air Liquide company

Airgas Specialty Gases
Airgas USA, LLC
6141 Easton Road
Bldg 1
Plumsteadville, PA 189-49
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number:	E04NI99E15A0292	Reference Number:	160-401604495-1
Cylinder Number:	EB0123013	Cylinder Volume:	144.4 Cubic Feet
Laboratory:	124 - Plumsteadville - PA	Cylinder Pressure:	2015 PSIG
PGVP Number:	A12019	Valve Outlet:	660
Gas Code:	CO,NO,NOX,SO2,BALN	Certification Date:	Oct 22, 2019

Expiration Date: Oct 22, 2027

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	55.00 PPM	55.27 PPM	G1	+/- 0.8% NIST Traceable	10/14/2019, 10/22/2019
NITRIC OXIDE	55.00 PPM	55.27 PPM	G1	+/- 0.8% NIST Traceable	10/14/2019, 10/22/2019
SULFUR DIOXIDE	55.00 PPM	54.93 PPM	G1	+/- 0.9% NIST Traceable	10/14/2019, 10/22/2019
CARBON MONOXIDE	4500 PPM	4516 PPM	G1	+/- 0.6% NIST Traceable	10/14/2019
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	13010429	KAL004123	97.6 PPM NITRIC OXIDE/NITROGEN	+/- 0.8%	Jul 23, 2025
NTRM	13010429	KAL004123	97.6 PPM NOx/NITROGEN	+/- 0.8%	Jul 23, 2025
NTRM	16010235	KAL004419	97.69 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.8%	Dec 23, 2021
NTRM	08012318	KAL004620	4857 PPM CARBON MONOXIDE/NITROGEN	+/- 0.6%	Jun 07, 2024

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
MKS FTIR - CO - 000928781	FTIR	Sep 26, 2019
MKS FTIR - NO - 000928781	FTIR	Oct 18, 2019
MKS FTIR - NOx - 000928781	FTIR	Oct 18, 2019
MKS FTIR - SO2 - 000928781	FTIR	Oct 03, 2019

Triad Data Available Upon Request

NOTES: Gross Weight: 28.0 Kg, Net Weight: 4.6 Kg.

[redacted]
Approved for Release

THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

Calibration Certificate

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

Date of Issue 15 January, 2025 Certification No. 040/25

Object : Wind speed and wind direction

Manufacturer : Davis Instruments Inc.

Type : Weather Wizard III Product No. 7425

Serial No. : WC30506A54A ID No. : No.4

Customer : Environment Research & Technology Company Limited.
25/113-114 Moo 6 Soi Chinaket 1, Ngamwongwan Road,
Toongsonghong, Laksi, Bangkok 10210.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1014.9 hPa

NATIONAL STANDARD WIND TUNNEL :
: Micromanometer Theodor Friedrichs FC014 Serial No. 9310119
: HOOK GAGE NO 1425 Pitot Tube Theodor Friedrichs Type 0800.0000 serial 9023
N.I.S.T. Test Reference Number 731/241460 : Standard Velocity at 20 - 30 m/sec
: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)
Serial Number 110730029 (sensor 120629586)
JAPAN QUALITY ASSURANCE ORGANIZATION : Standard Velocity at 0 - 20 m/sec

Calibrated by [redacted] Signe[redacted]
Mr. Watcharapol Subwat Mr. P[redacted]
Mechanical Engineer

(Authorised Signatory)
for the Chief
Sub-Standard Instrument

THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

The Result of Calibration

Certification No. 040/25

15 January, 2025 Page : 2 of 2

Standard	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
Ultrasonic Anemometer	Pressure	Vacumm	Velocity	Velocity	Correction
m/sec	inches H2O	inches H2O	m/sec	m/sec	m/sec
1.00	-	-	-	0.9	0.10
3.02	-	-	-	2.7	0.32
5.00	-	-	-	4.9	0.10
7.04	-	-	-	6.7	0.34
9.02	-	-	-	8.9	0.12
11.01	-	-	-	10.7	0.31
13.01	-	-	-	12.9	0.11
15.01	-	-	-	15.0	0.01
17.02	-	-	-	17.0	0.02
20.02	-	-	-	20.0	0.02

Wind Aloft Plotting Board. US.DEPARTMENT OF COMMERCE WEATHER BUREAU	
WIND DIRECTION	TESTED WIND DIRECTION
0	0
90	90
180	180
270	270

Calibrated by : [redacted]

Mr. Watcharapol Subwat

Mechanical Engineer

Calibration & Test Section

Meteorological Instruments Bureau

THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

Calibration Certificate

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

Date of Issue 15 January, 2025 Cerification No. 042/25

Page : 1 of 3

Object : Weather Station

Manufacturer : Davis Instruments Inc.

Type : Vantage Pro 2 ID No. : No.21

Serial No. : Display AS160105017 Transmitter BE181108006

Customer : Environment Research & Technology Company Limited.
25/113-114 Moo 6 Soi Chinaket 1, Ngamwongwan Road,
Toongsonghong, Laksi, Bangkok 10210.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1014.5 hPa

NATIONAL STANDARD WIND TUNNEL :

: Micromanometer Theodor Friedrichs FC014 Serial No. 9310119

: HOOK GAGE NO 1425 Pitot Tube Theodor Friedrichs Type 0800.0000 serial 9023

N.I.S.T. Test Reference Number 731/241460 : Standard Velocity at 20 - 30 m/sec

: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)

Serial Number 110730029 (sensor 120629586)

JAPAN QUALITY ASSURANCE ORGANIZATION : Standard Velocity at 0 - 20 m/sec

STANDARD THERMOMETER : Theodor Friedrich : Dry No.8390/94 Wet No. 8389/94

: [redacted] er No.918602

Calibrated by : [redacted]

Mr. Watcharapol Subwat

Mechanical Engineer

(Authorised Signatory)

for the Chief

Sub-Standard Instrument

THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

The Result of Calibration

Certification No. 042/25

15 January, 2025

Standard	HOOK GAGE NO. 1425			**TESTED ANEMOMETER**	
Ultrasonic Anemometer	Pressure	Vacumm	Velocity	**Velocity**	**Correction**
m/sec	inches H2O	inches H2O	m/sec	**m/sec**	**m/sec**
1.00	-	-	-	0.9	0.10
3.02	-	-	-	2.7	0.32
5.00	-	-	-	4.9	0.10
7.04	-	-	-	7.0	0.04
9.02	-	-	-	8.9	0.12
11.01	-	-	-	11.0	0.01
13.01	-	-	-	13.0	0.01
15.01	-	-	-	15.0	0.01
17.02	-	-	-	17.0	0.02
20.02	-	-	-	20.0	0.02

Wind Aloft Plotting Board. US.DEPARTMENT OF COMMERCE WEATHER BUREAU	
WIND DIRETION	TESTED WIND DIRECTION
0	0
90	90
180	180
270	270

Calibrated by : [redacted]

Mr. Watcharapol Subwat

Mechanical Engineer

Calibration & Test Section

Meteorological Instruments Bureau

THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 0-2396-0156,0-2399-0469

The Result of Calibration

Certification No. 042/25

15 January, 2025

Standard	Temperature Sensor Reading	
Temp.	Reading	Correction
°C	°C	°C
48.2	48.1	0.1
30.5	30.4	0.1
15.8	15.8	0.0

Calibrated by : [redacted]

Mr. Watcharapol Subwat

Mechanical Engineer

Calibration & Test Section

Meteorological Instruments Bureau

envi research
ENVIRONMENT RESEARCH & TECHNOLOGY CO., LTD.

Environment Research & Technology Company Limited
25/114 Mu 6 Soi Chinnakhet 1, Ngam Wong Wan Road,
Thung Song Hong, Lak Si, Bangkok 10210
Tel 0-2954-7745-6 Fax 0-2954-7747
E-mail : envi@envisearch.co.th
www.envisearch.co.th
Head Office/Tax ID 0105 542 064 981

Sound Level Meter Calibration Report

Support Equipment Type	:	Sound Level Calibrator
Manufacture	:	Larson Davis
Model	:	CA250
Serial No.	:	23394
Range of Calibrator		
- Support Equipment Type	:	94.0
- Frequency	:	1,000 Hz.
Calibrated By	:	Mr.Apichat Pulphon
Calibration Date	:	May 1, 2025
Customer Name	:	Vision E. Consultants Co., Ltd. : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะเจาะหลุมปิโตรเลียม)

Item	Equipment			Actual Reading (dB(A))		Status
	Brand	Model	Serial Number	Before Adjustment	After Adjustment	
1	Scarlet Tech	ST-11D	820931	93.8	94.0	Pass

Checked By [redacted]
Mr.Prayun Detkla
Technician

Approved By [redacted]
Ms.Sutatip Im-noi
Environmental Scientist

Calibration Certificate

Certificate Number 2025003781

Customer:
Environment Research & technology Co.,Ltd.
25/114 Moo 6 Soi Chinnakhet 1,Ngam Wong Wan road,Tungsonghorg,Lak si,Bangkok 10210 Thailand

Model Number	CAL200	***Procedure Number***	D0001.8386
Serial Number	23394	***Technician***	Scott Montgomery
Test Results	**Pass**	***Calibration Date***	2025-03-11
Initial Condition	As Manufactured	***Calibration Due***	
Description	Larson Davis CAL200 Acoustic Calibrator	***Temperature***	24 °C ± 0.3 °C
		Humidity	29 %RH ± 3 %RH
		Static Pressure	101.2 kPa ± 1 kPa

Evaluation Method The data is aquired by the insert voltage calibration method using the reference microphone's open circuit sensitivity. Data reported in dB re 20 µPa.

Compliance Standards Compliant to Manufacturer Specifications per D0001.8190 and the following standards:
IEC 60942:2017 ANSI S1.40-2006

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). The results documented in this certificate relate only to the item(s) calibrated or tested. It has been calibrated using measurement standards traceable to the SI through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2017.
Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.

The quality system is registered to ISO 9001:2015.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

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Standards Used

Description	Cal Date	Cal Due	Cal Standard
Agilent 34401A DMM	2024-06-20	2025-06-20	001021
Larson Davis Mode 2900 Real Time Analyzer	2024-04-01	2025-04-01	001051
Microphone Calibration System	2025-02-18	2026-02-18	005446
1/2" Preamplifier	2024-08-15	2025-08-15	006506
Larson Davis 1/2" Preamplifier 7-pin LEMO	2024-07-26	2025-07-26	006507
1/2 inch Microphone - Random Incidence - 200V	2024-11-12	2025-11-12	006511
Pressure Sensor	2025-02-03	2026-02-03	007824

LARSON DAVIS – A PCB DIVISION
1681 West 820 North
Provo,UT 84601 United States
716-684-0001

2025-03-17T13:38:02

LARSON DAVIS
A PCB DIVISION

D0001.8410 Rev G

Output Level

Nominal Level [dB]	Pressure [kPa]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
94	101.2	94.01	93.80	94.20	0.14	Pass
114	101.1	114.00	113.80	114.20	0.14	Pass

-- End of measurement results--

Frequency

Nominal Level [dB]	Pressure [kPa]	Test Result [Hz]	Lower limit [Hz]	Upper limit [Hz]	Expanded Uncertainty [Hz]	Result
94	101.2	1,000.29	993.00	1,007.00	0.20	Pass
114	101.1	1,000.27	993.00	1,007.00	0.20	Pass

-- End of measurement results--

Total Harmonic Distortion + Noise (THD+N)

Nominal Level [dB]	Pressure [kPa]	Test Result [%]	Lower limit [%]	Upper limit [%]	Expanded Uncertainty [%]	Result
94	101.2	0.38	0.00	2.00	0.25 ‡	Pass
114	101.1	0.34	0.00	2.00	0.25 ‡	Pass

-- End of measurement results--

Level Change Over Pressure

Tested at: 114 dB, 25 °C, 25 %RH

Nominal Pressure [kPa]	Pressure [kPa]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
108.0	107.9	-0.05	-0.25	0.25	0.04 ‡	Pass
101.3	101.3	0.00	-0.25	0.25	0.04 ‡	Pass
92.0	92.0	0.05	-0.25	0.25	0.04 ‡	Pass
83.0	82.9	0.06	-0.25	0.25	0.04 ‡	Pass
74.0	74.0	0.02	-0.25	0.25	0.04 ‡	Pass
65.0	65.0	-0.11	-0.25	0.25	0.04 ‡	Pass

-- End of measurement results--

Frequency Change Over Pressure

Tested at: 114 dB, 25 °C, 25 %RH

Nominal Pressure [kPa]	Pressure [kPa]	Test Result [Hz]	Lower limit [Hz]	Upper limit [Hz]	Expanded Uncertainty [Hz]	Result
108.0	107.9	0.00	-7.00	7.00	0.20 ‡	Pass
101.3	101.3	0.00	-7.00	7.00	0.20 ‡	Pass
92.0	92.0	0.00	-7.00	7.00	0.20 ‡	Pass
83.0	82.9	0.00	-7.00	7.00	0.20 ‡	Pass
74.0	74.0	0.00	-7.00	7.00	0.20 ‡	Pass
65.0	65.0	0.00	-7.00	7.00	0.20 ‡	Pass

-- End of measurement results--

Total Harmonic Distortion + Noise (THD+N) Over Pressure

Tested at: 114 dB, 25 °C, 25 %RH

Nominal Pressure [kPa]	Pressure [kPa]	Test Result [%]	Lower limit [%]	Upper limit [%]	Expanded Uncertainty [%]	Result
108.0	107.9	0.36	0.00	2.00	0.25 ‡	Pass
101.3	101.3	0.34	0.00	2.00	0.25 ‡	Pass
92.0	92.0	0.32	0.00	2.00	0.25 ‡	Pass
83.0	82.9	0.30	0.00	2.00	0.25 ‡	Pass
74.0	74.0	0.28	0.00	2.00	0.25 ‡	Pass
65.0	65.0	0.26	0.00	2.00	0.25 ‡	Pass

-- End of measurement results--

Signatory: *Scott Montgomery*

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL.0-2717-3000-29 FAX.0-2719-9484

Certificate of Calibration

Equipment :	pH Meter
Manufacturer :	Waterproof
Model :	pHTestr 30
Serial No. :	3195382
ID No. :	-
Condition As-Received:	Used Item
Received Date :	18 February 2025
Calibration Date :	19 February 2025
Reference :	2502-0526DN-3
Submitted by :	Environment Research & Technology Company Limited. 25/114 Moo 6, Soi Chinakat 1, Ngamwongwan Road, Toongsonghong, Laksi, Bangkok 10210
Ambient Temperature :	(25 ± 2.5) °C
Relative Humidity :	(50 ± 15) %
Calibration Procedure :	In - house method : - CP-CH5 by direct measurement with reference material (RM)
Calibrated by :	Warakorn Lerngagtrakul
Approved by :	[redacted] Approved Signatory

( ) Pornthippa Tameyakul
( ) Ponpan Paipim
(✓) Saithip Meangmai

Issue Date : 19 February 2025

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full, except with the prior written Approval of the head of Calibration and Testing Equipment Services.

Condition of this calibration result

1. Certified Reference Materials : Standard buffer solution (Traceable to NIST, U.S.A.)

Buffer Solution	Manufacturer	Lot No.	Exp. date
pH 4.01	Thermo Scientific	403/03	06 Oct 2026
pH 7.00	Thermo Scientific	402/01	07 Oct 2025
pH 10.01	Thermo Scientific	363/03	08 Sep 2026

2. This certificate is valid only to the item calibrated on date and place of calibration.

Calibration Results

Function : pH Measurement

Performing three buffers standard curve by using buffer nominal pH (4,7,10)

Unit Under Calibration	Standard pH Buffer Solution	Actual pH Reading	Actual mV Reading (mV)	Uncertainty of pH Measurement (±)	Coverage factor *k*
pH Electrode	4.01	4.01	N/A	0.012	2.00
S/N.: 3195382	7.00	7.00	N/A	0.013	2.00
	10.01	10.01	N/A	0.016	2.00

Remark - pH meter does not have voltage mode.
- Can not connect the BNC because the plug does not match with the socket.
- N/A = Not Available

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor *k*, providing a level of confidence of approximately 95 %.

-o0o-

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3 : EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL. 0-2717-3000 FAX. 0-2719-9484

Certificate of Testing

Equipment :	DO Meter
Manufacturer :	Horiba
Model :	DO210
Serial No. :	HE4C0009
ID No. :	-
Received Date :	18 February 2025
Test Date :	19 February 2025
Reference :	2502-0526DN-6
Submitted by :	Environment Research & Technology Company Limited. 25/114 Moo 6, Soi Chinaket 1, Ngamwongwan Road, Toongsonghong, Laksi, Bangkok 10210
Laboratory Condition :	Temperature (25 ± 5) °C Humidity (50 ± 20) %
Test Procedure :	In - house method : CP-CH9 by Comparison Technique with Azide Modification Method
Tested by :	Walalak Sirithean
Approved by :	[redacted] Approved Signatory

( ) Chakrit Waewwanjua
( ) Ponpan Paipim
(✓) Saithip Meangmai

Issue Date : 19 February 2025

Condition of this result of calibration

1. Reference Standard Instruments :
   This certification is traceable to the International System of Unit through the reference standards laboratory of Industrial Calibration Center, Technology Promotion Association (Thailand-Japan).

Instruments	Serial No.	ID No.	Certificate No.	Due Date
1. Burette	-	130BU10	23CG1172	22 Mar 2025
2. Balance	14233821	110RC001	24MM131	04 July 2025

2. Standard Material :-

Material	Manufacturer	Lot.No.	Assay
Sodium Thiosulfate 5-Hydrate AR	KEMAUS	2203162447	99.6%

Result : **Dissolved Oxygen Meter Adjustment With Air 100 %**
Dissolved Oxygen Probe No.: 9K3L0049

Titration Method (Azide Modification Method) (mg/L)	DO Meter Reading (mg/L)	Standard Deviation (mg/L)
8.22	8.22	0.0071

This report was certified only for the instrument we tested.It is allowable to use for study Intend to use for advertising and referral purpose is prohibited.This report may not be reproduced other in full, without written approval of the laboratory

-o0o-

Inctech Metrological Center Co.Ltd.
39/1 Soi 82, Sukhapiban 5 Rd., O ngoen,
Saimai, Bangkok 10220, Thailand
Tel. (662) 909-8820 (Auto 10 lines) www.imcinstrument.com

ilac-MRA ACCREDITED
Calibration Cert. # 3884.01
ISO/IEC 17025

Certificate of Calibration

Certificate No. : MT24-9500
Page : 1 of 2

Customer : Environment research & Technogy Co.,Ltd.
Address : 25/114 Moo6 Soi Chinaket1, Ngamwongwan Road, Toongsonghong, Laksi, Bangkok 10210

Description : Incubator
Manufacturer : Hotpack
Model : 352601
Serial No. : 73633
Identification No. : ERTC-L-In-133
Calibration Place : Customer Laboratory

Order No. : 4090/24
Received date : Nov 29, 2024
Calibration date : Nov 29, 2024
Envirorment Condition :
Temperature : (25+/-10) °C
Humidity : (50+/-30) %RH

Calibration Method : Calibration were conducted using In-house calibration procedure *CP-MT-006* According to comparison with LXI Data Acquisition Switch Unit with sensor. The calibration methods based on Euramet Calibration Guide No.20 - guidelines on the Calibration of Temperature and/or Humidity Controlled Enclosures.

Reference Standard Instruments :

Instrument	Model	Serial No.	Certificate No.	Due Date
Data Acquisition System with Sensor	DAQ970A	MY58003374	MT24-1056	Jan 05, 2025

The effect that the result relate only to the items calibrated. It was found accurate as shown on date and place of calibration only.

Traceability : This measurement are traceable to the International System of Unit (SI), through National Institute of Metrology Thailand (NIMT)

The reported expanded uncertainty of measurement was based on standard uncertainty multiplied by coverage factor k = 2, providing a level of confidence of not less than 95%

CALIBRATION LABORATORY · IMC · INCTECH METROLOGICAL CENTER CO.,LTD.

Calibrated by : Mr.Yuttakorn Jamneansri

Approved by : [redacted]

Issue date :

This calibration certificate shall not be reproduced other than in full except with the prior written approval of Inctech Metrological Center Co.,Ltd

Inctech Metrological Center Co.Ltd.
39/1 Soi 82, Sukhapiban 5 Rd., O ngoen,
Saimai, Bangkok 10220, Thailand
Tel. (662) 909-8820 (Auto 10 lines) www.imcinstrument.com

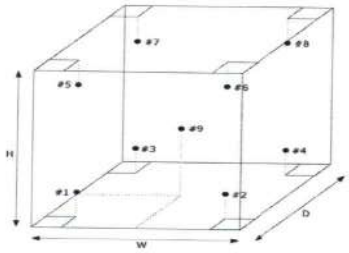
ilac-MRA ACCREDITED
Calibration Cert. # 3884.01
ISO/IEC 17025

Function : Temperature measurement
Calibration point : 20 °C

Result : Without adjustment
Resolution : 0.1 °C

Calibration point (°C)	Temperature of UUC* at each position (°C)									Uncertainty of measurement (+/- °C)
	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	Ch.9	
20	20.276	20.230	20.142	20.019	19.785	20.414	20.187	20.072	20.426	0.41

Setting temperature (°C)	Indicating Temperature (°C)	Measured stability (+/- °C)	Measured uniformity (°C)	Overall variation (°C)
20.0	20.0	0.27	0.97	1.1



Front view

#1 Lower Left Front
#2 Lower Right Front
#3 Lower Left Rear
#4 Lower Right Rear
#5 Upper Left Front
#6 Upper Right Front
#7 Upper Left Rear
#8 Upper Right Rear
#9 Geometric Center

UUC* = Unit under calibration
Uniformity = Maximum and Minimum difference of measured temperature at any probes and the measured temperature at the reference and same time.
Overall Variation = Difference of temperature value between the maximum and minimum any time.
Stability = One half of the maximum difference of measured temperatures at any one probe.

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL.0-2717-3000-29 FAX.0-2719-9484

NSC-TISI-TIS17025
CALIBRATION 0008

Certificate of Calibration

Cert. No.: 25TM35
Page : 1 of 3

Equipment :	Incubator
Manufacturer :	Memmert
Model :	IF 160
Serial No. :	D522.0070
ID No. :	ERTC-L-In-181
Submitted by :	Environment Research & Technology Company Limited 25/114 Moo 6 Soi Chinaket 1, Ngamwongwan Road, Toongsonghong, Laksi, Bangkok 10210
Location :	408/2 ห้องปฏิบัติการบ่มอาหารเลี้ยงเชื้อ
Received Order :	06 January 2025
Calibration Date :	06 - 07 January 2025
Ambient Temperature :	(26 ± 10) °C
Relative Humidity :	(50 ± 30) %
AC Line Voltage :	(220 ± 22) V
Calibrated by :	Khit Ruttanaprapachai

Approved by :

Approved Signatory

( ) Ponpan Paipim
( ) Suwit Imjai
(✓) Kunchit Promprat

Issue Date : 18 January 2025

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full, except with the prior written Approval of the head of Corporate Services 3 : Equipment Calibration and Testing Services.

Procedure Used :-

Calibration were conducted using calibration procedure CP-OT02 based on TLAS G-20 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector (RTD).
The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

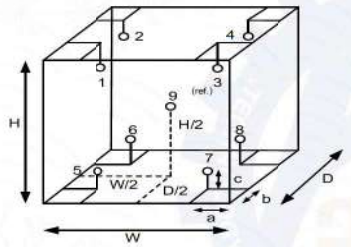
Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Data Acquisiton	MY49001451	24LM44	TPA	17 Mar 2025

2. This certificate is valid only to the item calibrated on date and place of calibration.
3. This certification is traceable to the International System of Unit.

Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

Environment during calibration		
	Beginning	**Finished**
Temp. (°C)	25	26
REL.Humid. (%)	51	55
AC Supply (Volt)	221	222



Position :	Ref. Std. ID No.:
1	19RTD-2/1
2	19RTD-2/2
3	19RTD-2/3
4	19RTD-2/4
5	19RTD-2/5
6	24-19RTD-2/6
7	19RTD-2/7
8	19RTD-2/8
9 (ref.)	19RTD-2/9

Probe Installation Details :

a =	5.0	cm
b =	5.0	cm
c =	5.0	cm

Dimension of Chamber :

D =	0.40	m
W =	0.56	m
H =	0.73	m
Capacity =	0.16	m^3

Equipment : Incubator
Condition As-Received : Used Item
Reference : 2501-0004ON-5
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

Cert. No.: 25TM35

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor *k*
35.0	35.0	35.0	0.022	0.22	0.38	2

Calibration Point	Measured Temperature (°C) Position									Uncertainty
(°C)	1	2	3	4	5	6	7	8	9 (ref.)	(±°C)
35.0	34.860	34.762	34.658	34.926	34.791	34.970	34.621	34.837	34.767	0.30

Average* : The average of 30 values in each position.
Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.
Temperature uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.
Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation.
UUC* : Unit Under Calibration
Note : The reported uncertainty of measurement was included stability and excluded uniformity .

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor ***k***, providing a level of confidence of approximately 95 %.

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL.0-2717-3000-29 FAX.0-2719-9484

ilac-MRA
NSC-TISI-TISI7025
CALIBRATION 0008

Certificate of Calibration

Cert. No.: 25TM36

Equipment : Incubator
Manufacturer : Ehret
Model : BK 4106
Serial No. : 22162
ID No. : ERTC-L-In-022
Submitted by : Environment Research & Technology Company Limited
25/114 Moo 6 Soi Chinaket 1,
Ngamwongwan Road, Toongsonghong, Laksi,
Bangkok 10210
Location : 408/2 ห้องปฏิบัติการบ่มอาหารเลี้ยงเชื้อ

Received Order : 06 January 2025
Calibration Date : 07 - 08 January 2025
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
AC Line Voltage : (220 ± 22) V

Calibrated by : Khit Ruttanaprapachai

Approved by :
Approved Signatory

( ) Ponpan Paipim
( ) Suwit Imjai
(✓) Kunchit Promprat

Issue Date : 18 January 2025

The Uncertainties are for a confidence probability of approximately 95%

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Equipment : Incubator **Cert. No.:** 25TM36
Condition As-Received : Used Item **Page :** 2 of 3
Reference : 2501-0004ON-6

Procedure Used :-

Calibration were conducted using calibration procedure CP-OT02 based on TLAS G-20 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector (RTD).

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

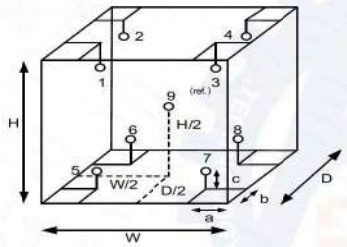
Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Data Acquisition	MY49001451	24LM44	TPA	17 Mar 2025

2. This certificate is valid only to the item calibrated on date and place of calibration.
3. This certification is traceable to the International System of Unit.

Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Not Available

Environment during calibration		
	Beginning	Finished
Temp. (°C)	26	28
REL.Humid. (%)	53	50
AC Supply (Volt)	222	221



Position :	Ref. Std. ID No.:
1	19RTD-2/1
2	19RTD-2/2
3	19RTD-2/3
4	19RTD-2/4
5	19RTD-2/5
6	24-19RTD-2/6
7	19RTD-2/7
8	19RTD-2/8
9 (ref.)	19RTD-2/9

Probe Installation Details :

a = 5.0 cm
b = 5.0 cm
c = 5.0 cm

Dimension of Chamber :

D = 0.50 m
W = 0.60 m
H = 0.50 m
Capacity = 0.15 m^3

Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Not Available

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor *k*
44.5	44.5	44.5	0.16	0.64	1.4	2

Calibration Point	Measured Temperature (°C) Position									Uncertainty
(°C)	1	2	3	4	5	6	7	8	9 (ref.)	(±°C)
44.5	44.542	44.705	44.204	44.943	43.855	44.307	44.130	44.630	44.330	0.67

Average* : The average of 30 values in each position.
Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.
Temperature uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.
Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation.
UUC* : Unit Under Calibration
Note : The reported uncertainty of measurement was included stability and excluded uniformity .

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor ***k***, providing a level of confidence of approximately 95 %.

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EQUIPMENT QUALIFICATION REPORT (EQR)

Agilent CrossLab Compliance Services



Agilent CrossLab

Agilent CrossLab Compliance

Qualification Type:	ES-OQ
System ID:	MY15330001
EQP Name:	AgilentRecommended
EQP Revision:	ES.02.50
EQP Publish Date:	March 2020
Date:	November 25, 2024 4:27:06 PM
Report Type:	Report
Org. Name:	Environment Research & Technology Co.,Ltd.
Org. Location:	25/114 Moo 6 Soi Chinaket, Ngamwongwan Rd., Bangkok 10210

Table of Contents

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Test Summary

Purpose

This section includes the Overall Qualification Status and details for each test that meets at least one of the following criteria: (1) was not scheduled; (2) was scheculed but not run; (3) was processed more than once; (4) passed recommended limits only when dual limits were selected; (5) requred deviation(s) or comment(s); (6) required integration event change(s). Tests that pass and do not meet any criteria above are rot included.

For a complete list of scheduled tests, see the table of contents. For supporting documentation, refer to the Attachments section.

NOTE: A Pass for the Overall Qualification Status indicates that all scheduled tests were run and passed; R, I, D, and C are blank if not applicable for that specific test.

R: runs
I: integration event changes
D: number of deviations submitted
C: number of comments submitted
Status: NS (not scheduled); NR (scheduled but not run); NC (unlocked but not completed)

Details

Test	Status			
	R	I	D	C

There were no repeated or re-integrated tests. All test resulted in a pass status.

Overall Qualification Status

Pass

Service Details

Purpose

This section includes local contact and delivery details for this service.

General Details

Service Order No./Request:	6007379887
EQP Name:	AgilentRecommended
EQP Revision:	ES.02.50
Report Type:	Report

Organization Details

Name:	Environment Research & Technology Co.,Ltd.
Location:	25/114 Moo 6 Soi Chinaket, Ngamwongwan Rd., Bangkok 10210

Local Contact Details

Name:	K. Raiwin Posit
Job Title:	Supervisor Scientist
Qualification Location:	ICPOES Room

Operator Details

Name:	Burn Ngamvijit
Job Title:	Field Service Engineer

Data Acquisition Details

Acquisition Software Name:	ICP Expert
Acquisition Software Revision:	7.1.0.6821
Customer Data System (CDS):	Es: ICP Expert

Instrument Details

Purpose

This section describes the as found system configuration.

Details

Spectrometer 1

Manufacturer	Agilent Technologies
Name	5100 VDV
Model Number	G8011A
Sample Introduction	Double pass glass cyclonic spraychamber and seaspray nebulizer
Serial Number	MY15330001
Firmware Revision	2994

Chiller 1

Manufacturer	Agilent Technologies
Name	Chiller
Model Number	G8481A
Serial Number	1A1560387

Autosampler 1

Manufacturer	Agilent Technologies
Name	SPS4
Model Number	G8410A
Serial Number	AU15220240

Vapor Generator 1

Manufacturer	Agilent Technologies
Name	VGA77P
Model Number	G8475A
Serial Number	MY15330002

Protocol Details

Purpose

This section lists the revisions for all test units used in this report. For complete test-specific and high-level change details, refer to the Revision History document.

Test Revision	Test
ES.02.50	Autosampler Operation
ES.02.50	Instrument Tests
ES.02.50	Preparation

Preparation

Purpose

This test records a status for each preparation task for the Agilent ICP-OES.

Configuration Details

Model/Serial No.:	G8011A	MY15330001

Results

Criteria	Observed Result	Expected Result	Status
Does the plasma ignite successfully in the first three attempts?	Yes	Yes	Pass
Was the detector calibration performed and completed successfully?	Yes	Yes	Pass
Was the instrument calibration performed and completed successfully?	Yes	Yes	Pass

Test Evidence

Image Details: Was the detector calibration performed and completed successfully?

Date and Time: November 25, 2024 4:03:36 PM

Host Name: AG-5CG3251QJK

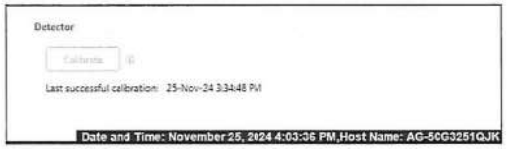
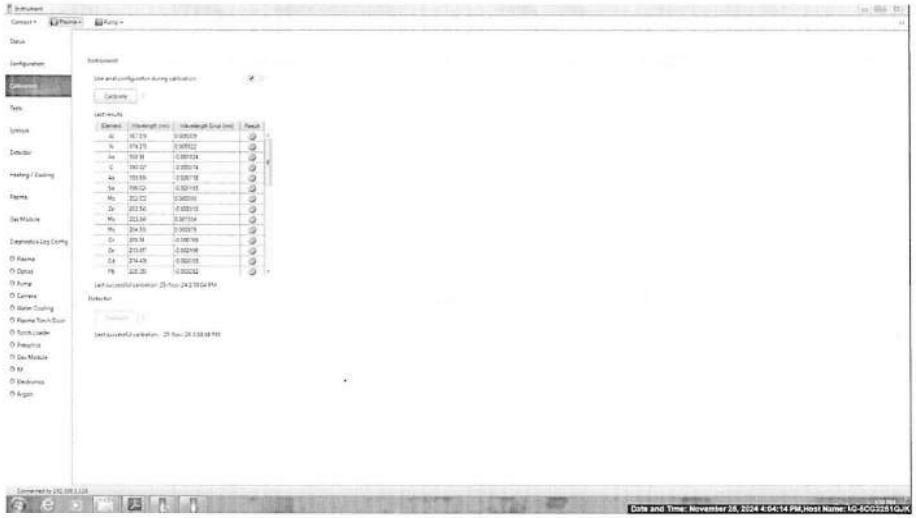


Image Details: Was the instrument calibration performed and completed successfully?

Date and Time: November 25, 2024 4:04:14 PM

Host Name: AG-5CG3251QJK



Overall Test Status

Pass	Runs: 1

Instrument Tests

Purpose

This test records a status for each of the automated tests within the Agilent ICP-OES CDS. For detailed test criteria, refer to the attached report.

Configuration Details

Model/Serial No.:	G8011A	MY15330001

Results	Observed Result	Expected Result	Status
Are the Functional Tests results within acceptance criteria?			
Subsystem Communications	Yes	Yes	Pass
Air Flow	Yes	Yes	Pass
Water Flow	Yes	Yes	Pass
Gas Flows	Yes	Yes	Pass
RF Generator	Yes	Yes	Pass
Camera	Yes	Yes	Pass
Optics	Yes	Yes	Pass
Are the Instrument Performance Tests results within acceptance criteria?			
Resolution	Yes	Yes	Pass
Sensitivity	Yes	Yes	Pass
Precision	Yes	Yes	Pass

Overall Test Status

Pass	Runs: 1

Autosampler Operation

Purpose

This test verifies that the autosampler operates properly.

Configuration Details

Model/Serial No.:	G8410A	AU15220240

Results Criteria	Observed Result	Expected Result	Status
Does the autosampler successfully move to the specified location(s)?	Yes	Yes	Pass

Overall Test Status

Pass	Runs: 1

Declaration of Change Control

This document is under change control. Revision history is maintained and printed on each document. Access to the master documents is limited to process owners. Documents receive periodic review and cannot be assigned an evergreen status.

The qualification performed according to this document refers only to the hardware/software configuration in place at the time of the qualification. Agilent Technologies recommends that instrument configuration change management procedures be in place in order to maintain the validation process. Any changes to the analytical or computer hardware or software must be clearly specified.

A change management system provides a means for determining the degree of requalification required according to the extent of the changes made. All details of the changes must be thoroughly recorded and documented, together with details of completed tests and their results.

Note: Hardware/software configuration management is the customer's responsibility.

Attachments

Training requirements note: The delivery engineer attaches an ACE technique-specific training certificate to the Equipment Qualification Report (EQR). Obtaining ACE technique-specific certification includes pre-requisite trainings for Data Integrity, General Compliance topics (GMP, GLP, ALCOA, etc.), instrument hardware and software components, and the ACE technique itself. The one certificate encompasses all pre-requisite trainings as documented in the Agilent Learning Management System called Success Factors.

Location	Category	Document Name	Page
EQR	Material	Wavelength calibration solution	13
EQR	General	Certificate of Qualification for ACE	14
EQR	General	Operator's training certificate and qualifications	15
EQR	General	Instrument's Test Report	16
EQR	General	Instrument's Test Report	19
EQR	General	Instrument's Test Report	20
EQR	General	Instrument's Test Report	21
EQR	General	Instrument's Test Report	22
EQR	General	Instrument's Test Report	23
EQR	General	Instrument's Test Report	24

Materials

This section lists details for materials added with the ACE Attachments tool.

Name:	Wavelength calibration solution	
Specification:	Agilent Technologies	
Part/Lot No.:	6610030100	1483766
Expiration Date:	July 9, 2026	

General

Document Name: Certificate of Qualification for ACE

Agilent Technologies

Agilent Compliance Engine Self Qualification

Date: November 25, 20243:39:18 PM

Drive Serial #: BC1A62DC **Platform Revision:** ACE 3.13.31

Test	Result
Preparation : 5100 SVDV	Conforms
Instrument Tests : 5100 SVDV	Conforms
Autosampler Operation : Autosampler 1 - SPS3	Conforms

Overall Qualification Status

Conforms

General

Document Name: Operator's training certificate and qualifications

Agilent Technologies

Certificate of Completion

Learner Name: Burin Ngamvijit

Title Of Course: ANV-CE-ICPOES-2-007-C: ACE ICPOES Specific Trainirg

Completion Date: March 25, 2024

Certified By Company: Learning at Agilent

All Service and Support training certificates have the following specific limitations.

A certificate for Service and Support training is only valid while employed by Agilent Technologies or while working as an Agilent-authorized service provider, through which the service employee has ongoing access to Agilent's: Safety Alerts, Service Notes, internal technical updates, update training, current documentation, technical support, current parts, and parts updates. Completion of training alone, without being employed by Agilent Technologies, does not qualify an individual to safely install, service or maintain Agilent products.

General

Document Name: Instrument's Test Report

Report Summary

Instrument Model	Agilent 5100 VDV ICP-OES
Instrument ID	G8011A
Instrument Serial Number	MY15330001
Software Version	7.1.0.6821
Firmware Version	2994
Tested By	OQ 2024_Burin Ngamvijit
Test Completed On	25-Nov-24 3:53:45 PM

Result Summary

Resolution Test	Pass
Sensitivity Test	Pass
Precision Test	Pass

Resolution Test **Pass**

Element Wavelength	Specification	Width
N (174.213 nm)	≤ 9.40	7.38
As (188.980 nm)	≤ 8.20	6.53
C (193.027 nm)	≤ 11.50	7.95
Mo (202.032 nm)	≤ 8.20	6.99
Cr (206.158 nm)	≤ 13.40	10.06
Zn (213.857 nm)	≤ 8.70	7.31
Pb (220.353 nm)	≤ 9.50	7.80
Co (228.615 nm)	≤ 17.20	10.63
Ba (230.424 nm)	≤ 9.40	7.92
Mn (257.610 nm)	≤ 13.30	9.30
Mn (260.568 nm)	≤ 20.30	15.89
Cr (267.716 nm)	≤ 11.00	9.11
Cu (324.754 nm)	≤ 25.00	17.68
Cu (327.395 nm)	≤ 14.20	12.81
Sr (338.071 nm)	≤ 33.50	27.14
Ba (455.403 nm)	≤ 44.00	31.65
Sr (460.733 nm)	≤ 36.00	20.40
Ba (493.408 nm)	≤ 36.00	29.54
Ba (614.171 nm)	≤ 42.00	29.50
Ar (675.283 nm)	≤ 74.00	65.70
K (766.491 nm)	≤ 80.00	61.36

Page 1 of 3

Document Name: Instrument's Test Report

Sensitivity Test **Pass**

Radial

Element Wavelength	Specification	Method	Ratio	Standard	Blank
As (188.980 nm)	≥ 46.0	SRBR	93.8	902.6	77.4
Se (196.026 nm)	≥ 41.0	SRBR	59.0	654.6	91.3
Zn (213.857 nm)	≥ 1421.0	SRBR	3082.0	37639.3	149.6
Pb (220.353 nm)	≥ 46.0	SRBR	154.5	2137.0	163.3
Mn (257.610 nm)	≥ 3518.0	SRBR	9444.2	205831.0	472.8
Al (396.152 nm)	≥ 3.4	SBR	6.5	29251.8	3891.4
Ba (493.408 nm)	≥ 34.0	SBR	76.6	855031.1	11021.3
K (766.491 nm)	≥ 1.8	SBR	2.4	82716.8	24314.0

Axial

Element Wavelength	Specification	Method	Ratio	Standard	Blank
As (188.980 nm)	≥ 208.0	SRBR	243.9	2566.7	102.1
Se (196.026 nm)	≥ 159.0	SRBR	172.0	2078.5	128.5
Zn (206.200 nm)	≥ 234.0	SRBR	1297.3	13097.8	100.4
Zn (213.857 nm)	≥ 1743.0	SRBR	8534.0	139946.6	267.9
Cd (214.439 nm)	≥ 4227.0	SRBR	7800.0	111649.9	204.1
Pb (220.353 nm)	≥ 320.0	SRBR	664.3	11776.3	298.6
Mn (257.610 nm)	≥ 10625.0	SRBR	38072.2	1148733.3	908.9
Cr (267.716 nm)	≥ 1048.0	SRBR	4466.9	120000.5	713.1
Cu (324.754 nm)	≥ 19.0	SBR	79.4	187702.0	2335.2
Al (396.152 nm)	≥ 6.0	SBR	27.9	184566.8	6380.2
Ba (493.408 nm)	≥ 60.0	SBR	303.2	5510982.4	18113.9
K (766.491 nm)	≥ 24.0	SBR	78.5	2564858.7	32264.7

Page 2 of 3

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Document Name: Instrument's Test Report

Precision Test **Pass**

Radial

Element Wavelength	Specification	Measured Value % RSD
As (188.980 nm)	≤ 2.60	1.15
Se (196.026 nm)	≤ 2.60	1.11
Zn (213.857 nm)	≤ 1.50	0.48
Pb (220.353 nm)	≤ 2.60	0.52
Mn (257.610 nm)	≤ 1.50	0.55
Al (396.152 nm)	≤ 1.50	0.46
Ba (493.408 nm)	≤ 1.50	0.72
K (766.491 nm)	≤ 1.50	0.35

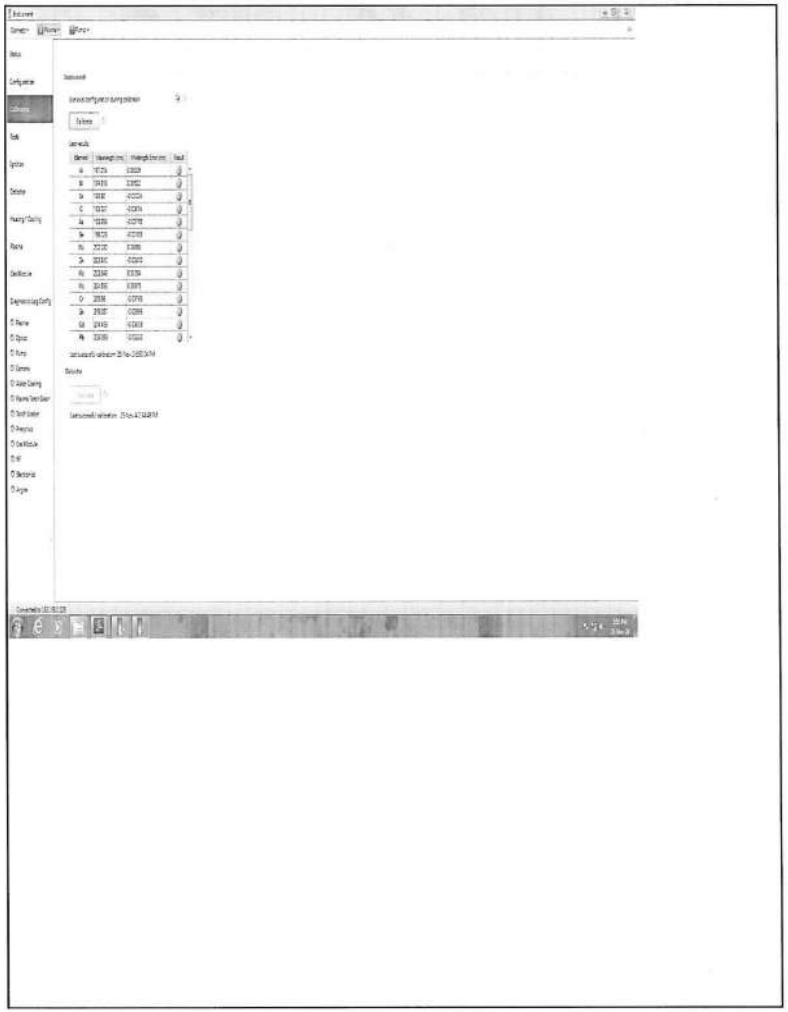
Axial

Element Wavelength	Specification	Measured Value % RSD
As (188.980 nm)	≤ 1.50	0.87
Se (196.026 nm)	≤ 1.50	0.91
Zn (206.200 nm)	≤ 1.50	0.42
Zn (213.857 nm)	≤ 1.50	0.52
Cd (214.439 nm)	≤ 1.50	0.54
Pb (220.353 nm)	≤ 1.50	0.54
Mn (257.610 nm)	≤ 1.50	0.42
Cr (267.716 nm)	≤ 1.50	0.67
Cu (324.754 nm)	≤ 1.50	0.85
Al (396.152 nm)	≤ 1.50	0.60
Ba (493.408 nm)	≤ 1.50	1.00
K (766.491 nm)	≤ 1.50	0.56

Page 3 of 3

General

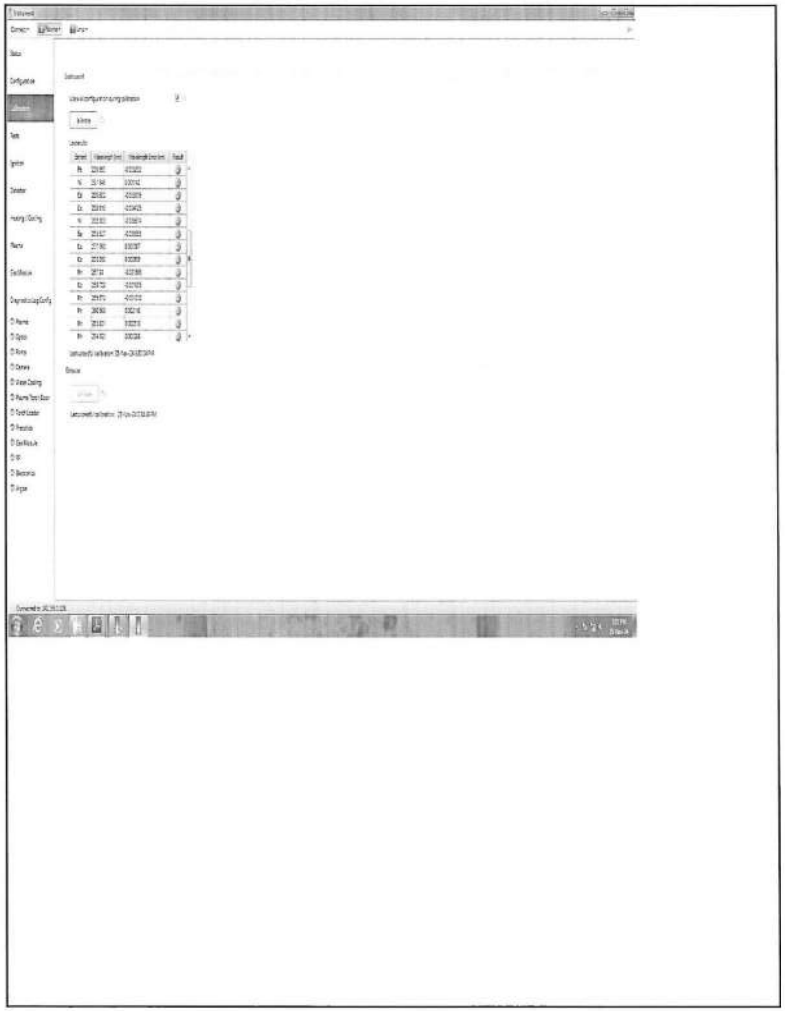
Document Name: Instrument's Test Report



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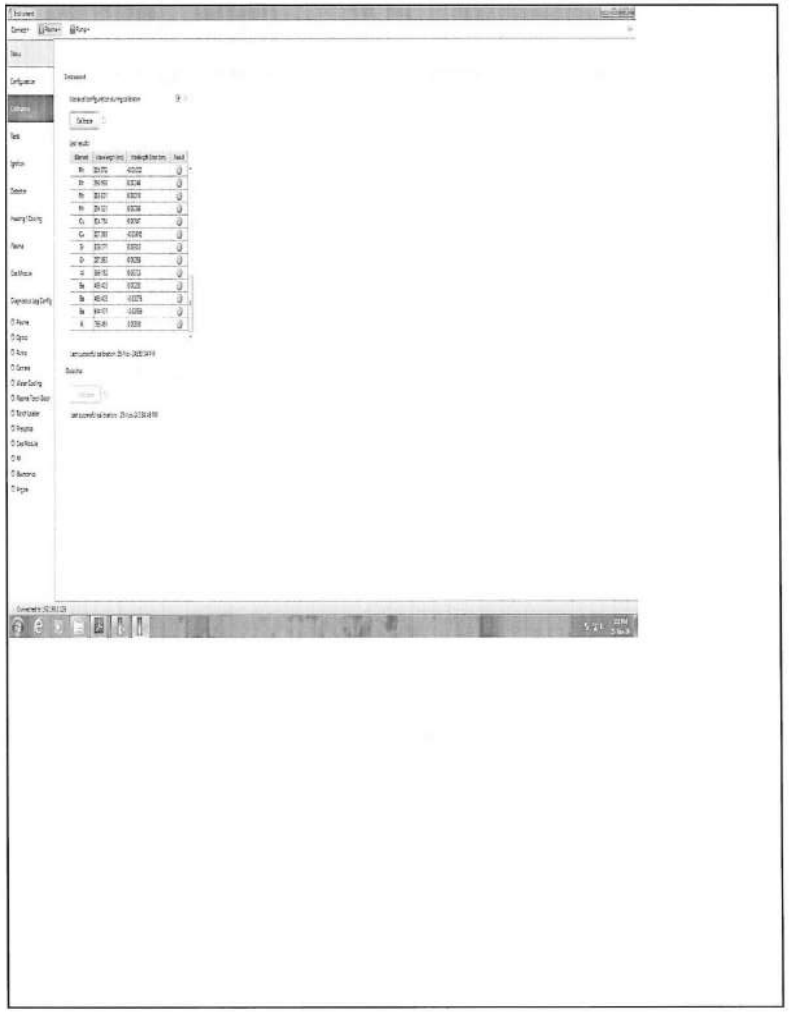
General

Document Name: Instrument's Test Report



General

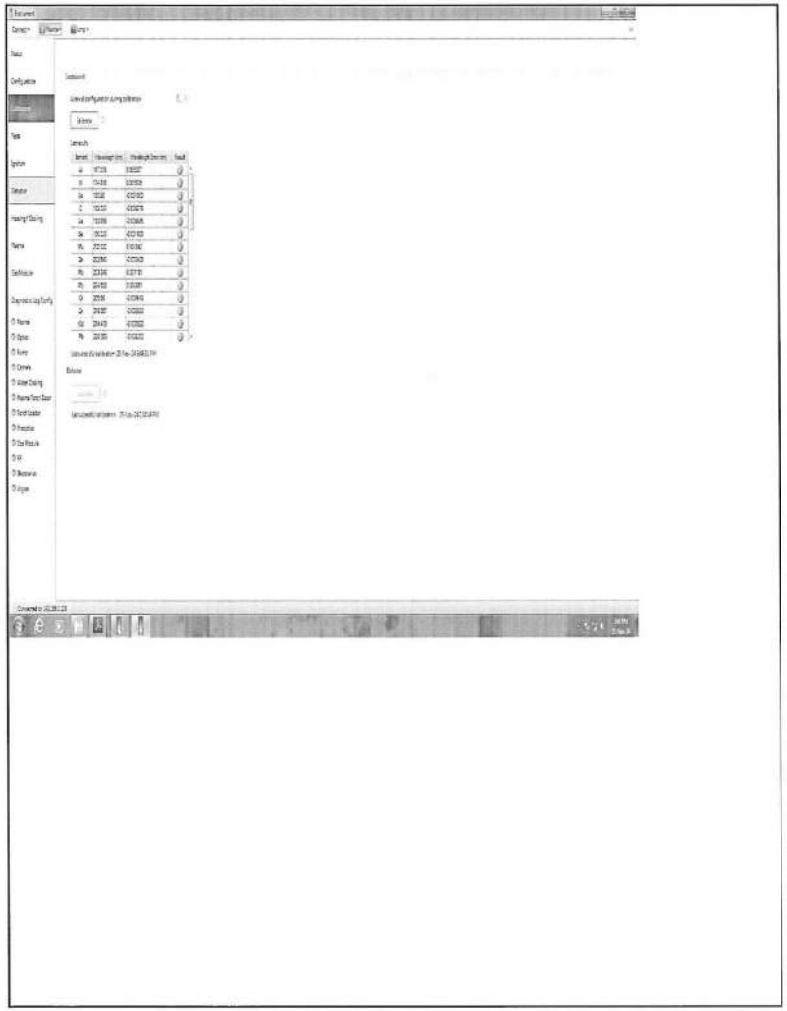
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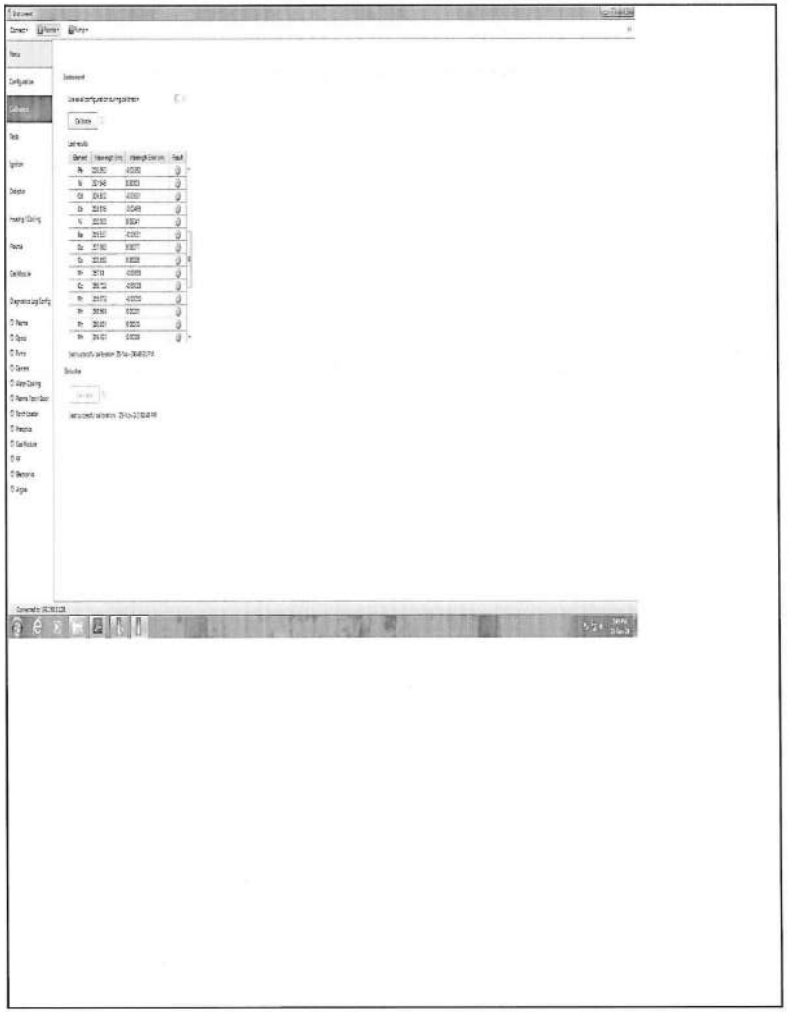
General

Document Name: Instrument's Test Report



General

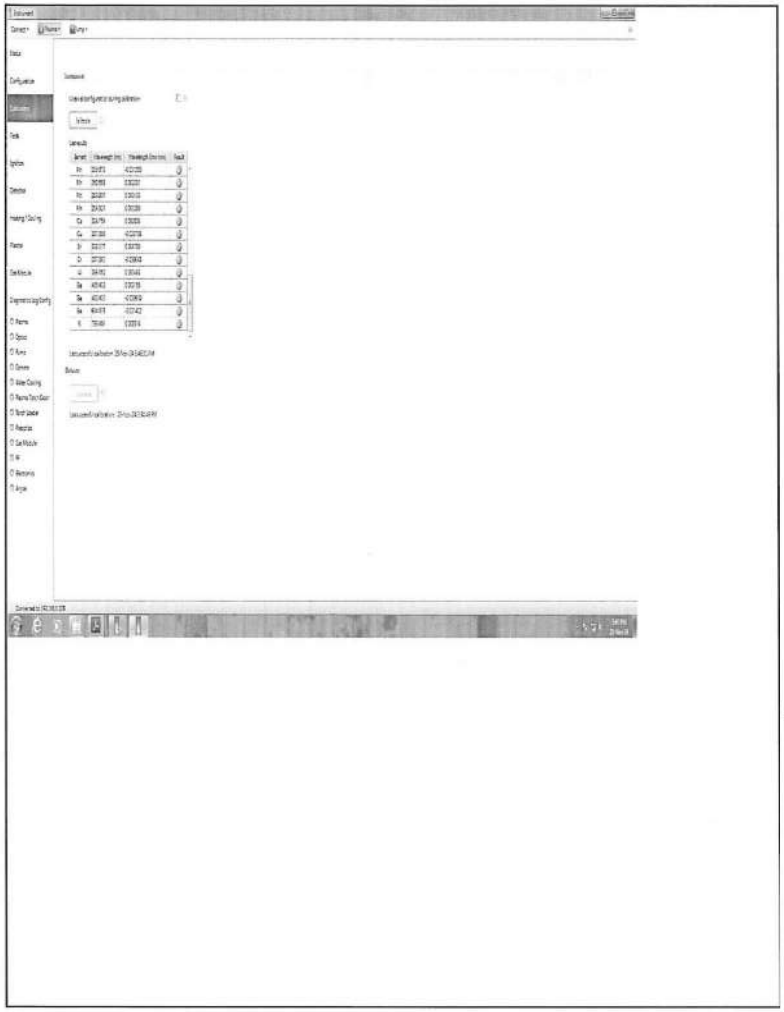
Document Name: Instrument's Test Report



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General

Document Name: Instrument's Test Report



Electronic Signature

Purpose

This signature page was created and published because the ACE sign-off action was executed, which is valid for the entire document, including attachments. The ACE sign-off is an electronic signature that requires two distinct identification components: unique username and personal password. The Agilent representative who has delivered this service understands the meaning and legal status of an electronic signature. As a trained official operator, the Agilent representative has a unique password and logon to access ACE and electronically sign this document. (Other e-signatures can be applied to this document using a Document Content Management or other suitable method defined in your data access and control procedures.)

Details

Full Name of Signer:	Burin Ngamvijit
Logged On User Name:	Burin_ngamvijit@agilent.com
Signature Creation Date:	November 25, 2024
Reason for Signature:	Published this original version of document

ACE Self Qualification Status

The installed version of ACE used to deliver this service passed qualification; the results conform with expected values. The self qualification summary report is available in the session folder location SDS\ClearStore\AceSelfQualification.

Regulatory Disclaimer

This document provides a protocol to verify and record instrument configuration and evidence of proper operation. It has been prepared from our interpretation of applicable regulations as well as industry best practices. The document is designed to provide an important component of a complete compliance package. Validation depends upon many factors and use of this protocol alone does not assure compliance. Agilent Technologies makes no promises or representations as to its sufficiency for any specific regulatory program.

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User Name: burin_ngamvijit System Id: MY15330001
Report Generated by Hostname: AG-5CG3251QJK Print Date: November 25, 2024 4:27:15 PM

OQ HW 5100ICPOES ERTC Nov2024 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
November 25, 2024 3:43:20 PM	Audit	SessionCreated	Session	Host Name: AG-5CG3251QJK, Drive Serial Number: 2AF11C98
November 25, 2024 3:43:20 PM	start	Configuration	Session	None
November 25, 2024 3:43:20 PM	Audit	Entitlement	Licensing	User is FieldEngineer and does not require an unlock code
November 25, 2024 3:45:57 PM	Audit	EqpLoaded	Session	EQP details for primary technique [Es] - File path: [ProtocolPacks/Es/Configurations/02.50/Es.02.50.eqp], EQP File Name: [Es.02.50.eqp], EQP Name: [AgilentRecommended],Protocol Revision :[Es.02.50]
November 25, 2024 3:46:05 PM	End	Configuration	Session	None
November 25, 2024 3:46:07 PM	start	Qualification	Session	OQ
November 25, 2024 3:46:07 PM	start	Execution	Preparation : 5100 VDV: Qualitative Test - No setpoints associated	None
November 25, 2024 4:04:19 PM	End	Execution	Preparation : 5100 VDV: Qualitative Test - No setpoints associated	Run Count : 1
November 25, 2024 4:04:21 PM	start	Execution	Instrument Tests : 5100 VDV: Qualitative Test - No setpoints associated	None
November 25, 2024 4:05:07 PM	End	Execution	Instrument Tests : 5100 VDV: Qualitative Test - No setpoints associated	Run Count : 1

Page 1 / 3

User Name: burin_ngamvijit System Id: MY15330001
Report Generated by Hostname: AG-5CG3251QJK Print Date: November 25, 2024 4:27:15 PM

OQ HW 5100ICPOES ERTC Nov2024 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
November 25, 2024 4:07:02 PM	start	Execution	Autosampler Operation : Autosampler 1 - SPS4: Qualitative Test - No setpoints associated	None
November 25, 2024 4:07:08 PM	End	Execution	Autosampler Operation : Autosampler 1 - SPS4: Qualitative Test - No setpoints associated	Run Count : 1
November 25, 2024 4:11:21 PM	Audit	AceRestarted	Session	Host Name: AG-5CG3251QJK, Drive Serial Number: 2AF11C98
November 25, 2024 4:11:22 PM	Audit	SessionReloaded	Session	None
November 25, 2024 4:11:23 PM	start	Qualification	Session	OQ
November 25, 2024 4:12:29 PM	End	Qualification	Session	OQ
November 25, 2024 4:12:29 PM	start	Reporting	Session	None
November 25, 2024 4:26:02 PM	Audit	Reporting	Session	Report Generated : Certificate
November 25, 2024 4:26:22 PM	Audit	Reporting	Session	Report Generated : Report

User Name: burin_ngamvijit System Id: MY15330001
Report Generated by Hostname: AG-5CG3251QJK Print Date: November 25, 2024 4:27:15 PM

OQ HW 5100ICPOES ERTC Nov2024 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
November 25, 2024 4:27:06 PM	Audit	Reporting	Session	Report Signed : Certificate PDF Name: OQ HW 5100ICPOES ERTC Nov2024_20241125_Certificate_1.pdf User Name: Burin_ngamvijit@agilent.com Full Name of Signer: Burin Ngamvijit Reason for signature: Published this original version of document

PerkinElmer
For the Better

PinAAcle 900Z
Preventive Maintenance Report

Company Name: ENVIRONMENT RESEARCH

Instrument Location: 25/114 M.6, THANON NGAMWONGWAN

THUNGSONGHONG, LAKSI, BANGKOK, 10210

Instrument Serial No.: PZAS19031401

Date: 23-Jul-2024

PinAAcle 900Z Preventive Maintenance (PM)

Company Name:	ENVIRONMENT RESEARCH		
Address (Instrument Location):	25/114 M.6, THANON NGAMWONGWAN, THUNGSONGHONG, LAKSI, BANGK		
Serial Number:	PZAS19031401	**PM Number:**	1/2
Customer Name (if applicable):	K. RAIWIN	**Telephone Number:**	099-182-9241
Customer Support Engineer Name:	Khwanchai	**Service Order Number:**	WO-02879967
Date PM Performed: (DD-MMM-YYYY)	23-Jul-2024	**Next PM Due Date:** (DD-MMM-YYY)	23-Jan-2025
Standard Labor Hours to Complete PM :		**5 hours**	

Part Number	Release	Publication Date
09370144 Rev.9	A	January 2018

Scope
The purpose of this PM is to ensure the continued functionality of the PinAAcle 900Z by inspecting and replacing any worn or damaged parts. This service should only be performed by a trained representative of PerkinElmer.
The customer should save their method before the PM begins.

General Instructions:
The customer must provide the engineer operational data to demonstrate recent instrument performance prior to starting the PM.
Always check with the customer before making any changes that may affect the customer's analysis or calibration, including a current back-up of system software and/or data files.
The completed document should be signed by an authorized PerkinElmer and customer representative and left with the customer.
Update the PM sticker and instrument logbook as required.

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Component List

Component / Specific Model	Serial #	Configuration Notes

Parts Lists

Parts Included with the PM		
Part Number (if applicable)	**Description**	**Quantity**
B0501696	Fan Filters	2
B3002013	THGA Contact Cylinders	1
B3141064	Glycerol for THGA Cooling	N/A

Additional Reagents and Standards Required for PM				
Part Number (if applicable)	**Description**	**Quality**	**Batch/Lot #**	**Expired Date (MM/YY)**
N9300244	GFAAS Mixed Standard	AR	60-004CRY1	Feb-2025

Additional Reagents and Standards Required for PM (Customer Support Solution)				
Part Number (if applicable)	**Description**	**Quantity**	**Batch/Lot #**	**Expiration Date (MM/YY)**
N/A	DI Water	250 ml.	AR	AR
N/A	0.5% HNO_3	250 ml.	AR	AR

Additional Tools Required for PM			
Part Number (if applicable)	**Description**	**Quantity**	**Serial #**
B3100652 Or N9307029	Electronic Flow Meter	1	NA
B0505495	Test Jig	1	NA
03030997	System 2 EDL Driver	1	03030997
N3050605	As System 2 EDL	1	16148
N3050121	Cu Lumina HCL	1	092216-010130
N3050109	Ba Lumina HCL	1	102416-040160
N3050139	K Lumina HCL	1	110716-010060
N3050152	Ni Lumina HCL	1	100516-030190
N3050119	Cr Lumina HCL	1	091911-020150

Procedure Checklist

Use (✓) to check off those steps in the checklist that have been completed.

1. **General:**

   ☑ Review the instrument performance with the customer and document any recent problems.
   ☑ Inspect the customer log book and make any appropriate PM entries.
   ☑ Perform general inspection of system for cleanliness.

2. **PC Instrument Software:**

   ☑ Instrument Software user files/databases archived, packed, and/or deleted as needed.

3. **Mechanical:**

   ☑ Inspect and clean all fans and filters. Replace filters if necessary
   ☑ Inspect all gas and water lines for leaks and/or wear. Replace if needed. Thoroughly inspect all quick connects. Replace the Y connector, P/N 09921079, if needed.
   ☑ Clean exterior of the instrument.
   ☑ Check the drain system for signs of wear. Replace worn or damaged parts.
   ☑ Inspect the pole pieces and clean where the pole pieces contact the furnace. Replace the pole piece p-rings as needed, P/N's B0501018 & B0501250. Grease the O-rings as needed with Apiezon L grease, P/N 09905148
   ☑ Inspect the four insulation pads on the front contact housing of the THGA in furnace. If the pads are missing replace the THGA furnace or replace the insulator pads on the furnace.
   ☑ Inspect the graphite tube and clean the contact cylinders. Replace if necessary.
   ☑ Check internal and external gas flows with the Electronic Gas Flow Meter and the Gas Flow Test Probe as described in the Service Manual. Correct if necessary.
   ☑ Check furnace open/close function.
   ☑ Verify the operation of the GFTV Camera for proper operation and viewing alignment in the furnace camera Tube View window. Align if needed.
   ☑ Check the operation of the Halogen Light ASSY for the GFTV Camera. Replace if needed.
   ☑ Check the water level/quality in the recirculation (if applicable). Add distilled water if necessary.
   ☑ Check the cooling system fluid flow rate with the FCS In-Line Flow Meter for proper levels if needed. Refer to SDB# COSY008.STN
   ☑ Perform Cooling System maintenance if needed per SDB# COSY005.STN.
   ☑ Check auto sampler operation.
   ☐ Perform an auto sampler check valve test as described in the Service Manual.
   ☑ Lubricate the spindles of the auto sampler pumps and all moving parts of the tray mechanics as described in the Service Manual.
   ☑ Inspect the auto sampler sampling capillary as described in the Service Manual. Replace if necessary.
   ☑ Inspect the four insulation pads on the front contact housing of the THGA in furnace. If the pads are missing replace the THGA furnace or replace the insulator pads on the furnace.
   ☑ Inspect the graphite tube and clean the contact cylinders. Replace if necessary.
   ☑ Check internal and external gas flows with the Electronic Gas Flow Meter and the Gas Flow Test Probe as described in the Service Manual. Correct if necessary.
   ☑ Check furnace open/close function

4. **Electrical:**

   ☑ Inspect PC boards. Clean if necessary.
   ☑ Check instrument firmware revisions upgrade to current levels (if necessary)
   ☑ Run Diagnostics Test within the Advanced function of the Spectrometer page. Check the results in the service log folder in the Spectrometer BM Log Viewer.

5. **Optics:**

   ☑ Inspect and clean the sample compartment windows, if needed.
   ☑ Inspect and clean the furnace windows, if needed.
   ☑ Inspect and clean the GFTV camera lens, if needed.
   ☑ Inspect optics. Clean or replace if necessary,

6. **Gasses:**

   ☑ Verify that the Gasses supplied to the instrument are within the pressure and purity specifications found in the PinAAcle 900 Series Pre-installation Checklist SDB.
   ☑ Verify that the air filter element is dry. Replace if necessary.

7. **After PM Performance tests [THGA]:**

7.1 Furnace Gas Flows

Description: Ensures the flow rates are within specification.

Parameter	Specification	Test Results	Pass/Fail
Internal Flow Rate	250 mL/min ± 25 mL/min	208	Passed
External Flow Rate	100 mL/min ± 10 mL/min	101	Passed

7.2 Chromium Baseline Noise

Description: Signal to noise check.

Parameter	Specification	Results	Pass/Fail
Baseline Noise	≤ 0.005 Abs.	-0.0002	Passed
Standard Deviation	≤ 0.005	0.0001	Passed

7.3 Chromium Characteristic Mass and Precision

Description: Calculate the characteristic mass using the characteristic mass tool and precision from the integrated absorbance values.

Parameter	Specification	Results	Pass/Fail
Cr m_0 Results	≤ 70 pg/0.0044 A-s	5.6	Passed
Precision	≤ 2.0 %	1.68	Passed

7.4 Copper Characteristic Mass and Zeeman Ratio

Description: Calculate the characteristic mass using the characteristic mass tool and check the Zeeman Ratio.

Parameter	Specification	Results	Pass/Fail
Cu m_0 Result	≤ 16.5 pg/0.0044 A-s	16.3	Passed
Zeeman Ratio	0.52 ± 0.04	0.53	Passed

8. Review:

☑ Review with the customer PM work performed.
☑ Review with the customer routine maintenance procedures.
☑ Discuss recommended customer supplied materials to have on hand.
☑ Attach PM sticker.

Additional Comments

Additional Comments Regarding the PM
Zeeman Ratio $= \frac{Atomic\ Signal\ (Peak\ area\ )}{Atomic\ Signal\ (Peak\ area\ ) + Background\ Signal\ (Peak\ area\ )}$ $= \frac{0.1375}{0.1375+0.1198}$ $= 0.53$

Review

The preventive maintenance checks and if applicable performance tests for PinAAcle 900Z have been completed.

This PinAAcle 900Z Passes ☑ Fails ☐ the preventive maintenance.

Review of Preventive Maintenance:		
Authorized PerkinElmer Representative:	[redacted]	Date: 23-Jul-2024 (DD-MMM-YYYY)
Authorized Customer Representative:	[redacted]	Date: 23-Jul-2024 (DD-MMM-YYYY)

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL.0-2717-3000-29 FAX.0-2719-9484

NSC-TISI-TIS17025
CALIBRATION 0008

Certificate of Calibration

Cert.No.: 25CH219
Page.: 1 of 2

Equipment :	Conductivity Meter
Manufacturer :	HM DIGITAL
Model :	COM-100
Serial No. :	P0NPE5860865
ID No. :	NO.1
Condition As-Received:	Used Item
Received Date :	18 February 2025
Calibration Date :	19 February 2025
Reference :	2502-0526DN-5
Submitted by :	Environment Research & Technology Company Limited. 25/114 Moo 6, Soi Chinaket 1, Ngamwongwan Road, Toongsonghong, Laksi, Bangkok 10210
Ambient Temperature :	(25 ± 2.5) °C
Relative Humidity :	(50 ± 15) %
Calibration Procedure:	In-house method : - CP-CH6 by direct measurement with certified reference material (CRM)
Calibrated by :	Warakorn Lerngagtrakul
Approved by :	[redacted] Approved Signatory

( ) Chakrit Waewwanjua
( ) Ponpan Paipim
(✓) Saithip Meangmai

Issue Date : 21 February 2025

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full, except with the prior written Approval of the head of Corporate Services 3 : Equipment Calibration and Testing Services.

Condition of this result of calibration

1. Reference Standard Instrument :-

Instrument	Serial No.	ID No.	Certificate No.	Due date
1) Thermometer	1963878	130RC095	241995	09 Sep 2025

- This Certification is traceable to SI Throught Technology Promotion Association (Thailand - Japan)

2. Certified Reference Materials :-
   - Conductivity calibration solution, CPA chem Ltd., The measurement results are traceable to SI through CPA chem Ltd., ANSI-ASQ National Accreditation Board, Accredited No. AR-1835
   - Conductivity calibration solution, Thermo Scientific (Traceable to NIST)

Conductivity Solution	Manufacturer	Lot No.	Exp. date
* 100 µS/cm	Thermo Scientific	134/02	29 Mar 2025
1412.9 µS/cm	CPA Chem	1005307	15 June 2025

   - Control Conductivity calibration solution temperature by Water bath (25 ± 0.1) °C

3. This certificate is valid only to the item calibrated on date and place of calibration.

Calibration results

Function : Conductivity Measurement

(*) After Adjustment at 1412.9 µS/cm

Conductivity Electrode Serial No.: P0NPE5860865

Standard Conductivity Solution	Before Adjustment UUC* Reading	After Adjustment UUC* Reading	Uncertainty of Measurement (±)	Coverage factor *k*
* 100 µS/cm	92.7 µS/cm	98.9 µS/cm	5.1 µS/cm	2.00
1412.9 µS/cm	1330 µS/cm	1410 µS/cm	11 µS/cm	2.00

Remark : **- UUC* = Unit Under Calibration**
- * = Not NSC-ONSC Accredited

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor *k*, providing a level of confidence of approximately 95 %.

-o0c-

Calibration Certificate ID
TH2093-011-011525-ACC-TH

METTLER TOLEDO

Mettler-Toledo (Thailand) Ltd.
846/4 - 846/5 Lasalle Rd., Bangna Tai Sub-District
Bangna District, Bangkok 10260
+662 723 0382
MT-TH.ServiceSupport@mt.com

NSC-TISI-TIS 17025
CALIBRATION 0062

Accuracy Calibration Certificate

Customer

Company:	Environment Research & Technology		
Address:	25/114 Moo 6, Soi Chinaket 1, Ngamwongwan Rd., Toongsonghong		
City:	Laksi	**Contact:**	Ramita Taengthai
Zip / Postal:	10210		
State / Province:	Bangkok		
Order Number:			

Weighing Device

Manufacturer:	Mettler Toledo	**Instrument Type:**	Weighing Instrument
Model:	MS204TS/00	**Asset Number:**	ERTC-L-IN-114
Serial No.:	B547728937	**Terminal Model:**	N/A
Building:	N/A	**Terminal Serial No.:**	N/A
Floor:	5	**Terminal Asset No.:**	N/A
Room:	504		

Range	Max. Capacity	Readability (d)
1	220 g	0.0001 g

Procedure

Calibration Guideline:	EURAMET cg-18 v. 4.0/CENAM-ema:2015
METTLER TOLEDO Work Instruction:	CP/W002/20

This calibration certificate contains measurements for As Found calibration. No As Left calibration was performed because the device was not modified after As Found calibration. Therefore, results for As Left correspond to As Found.

The sensitivity/span of the weighing instrument was adjusted before calibration with a built-in weight.

In accordance with EURAMET cg-18 (11/2015), the test loads were selected to reflect the specific use of the weighing device or to accommodate specific calibration conditions.

	Temperature		Humidity	
As Found	Start: 21.1 °C	End: 20.3 °C	Start: 37.8 %	End: 42.2 %

As Found Calibration Date:	15-Jan-2025
As Left Calibration Date:	N/A
Issue Date:	17-Jan-2025

Calibrator:

Approved Signatory:

Technica Manager / Head of Calibration Center

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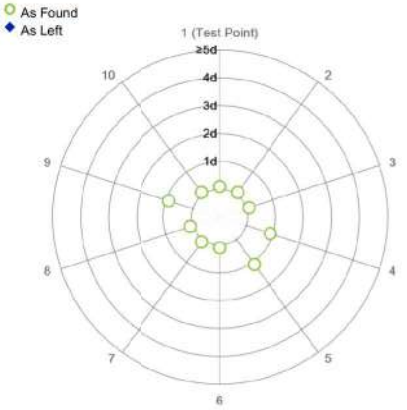
Measurement Results

Repeatability

Test Load: 100 g

	As Found	As Left
1	99.9999 g	N/A
2	99.9999 g	N/A
3	99.9999 g	N/A
4	99.9998 g	N/A
5	100.0000 g	N/A
6	99.9999 g	N/A
7	99.9999 g	N/A
8	99.9999 g	N/A
9	99.9998 g	N/A
10	99.9999 g	N/A

Standard Deviation	**0.00006 g**	**N/A**



The "d" in the graph represents the readability of the range/interval in which the test was performed.

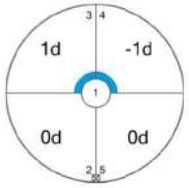
The results of this graph are based upon the absolute values of the differences from the mean value.

Eccentricity

Test Load: 100 g

Position	As Found	As Left
1	99.9999 g	N/A
2	99.9999 g	N/A
3	100.0000 g	N/A
4	99.9998 g	N/A
5	99.9999 g	N/A

Maximum Deviation	**0.0001 g**	**N/A**



As Found

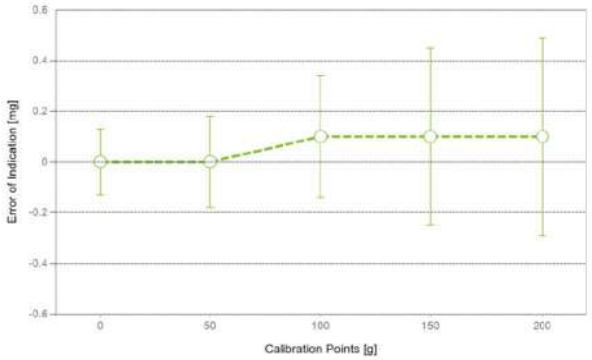
The "d" in the graph represents the readability of the range/interval in which the test was performed.

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Error of Indication

As Found

	Reference Value	Indication	Error of Indication	Expanded Uncertainty	k
1	0.0000 g	0.0000 g	0.0000 g	0.13 mg	2
2	0.0500 g	0.0500 g	0.0000 g	0.14 mg	2
3	0.1000 g	0.1000 g	0.0000 g	0.14 mg	2
4	0.5000 g	0.5000 g	0.0000 g	0.14 mg	2
5	1.0000 g	1.0000 g	0.0000 g	0.14 mg	2
6	5.0000 g	5.0000 g	0.0000 g	0.15 mg	2
7	10.0000 g	10.0000 g	0.0000 g	0.15 mg	2
8	50.0000 g	50.0000 g	0.0000 g	0.18 mg	2
9	99.9999 g	100.0000 g	0.0001 g	0.24 mg	2
10	149.9999 g	150.0000 g	0.0001 g	0.35 mg	2
11	200.0001 g	200.0002 g	0.0001 g	0.39 mg	2



As Found

As Left

For improved legibility of the graphics only increasing measurement points are shown and measurement points close to zero are not displayed.

The expanded measurement uncertainty is reported as the standard measurement uncertainty multipled by the coverage factor k such that the coverage probability corresponds to approximately 95 %.

The user is responsible for maintaining environmental conditions and the settings of the weighing instrument when it was calibrated.
The results of this calibration certificate relate only to the calibrated item.

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Test Equipment

All weights used for metrological testing are traceable to national or international standards. The weights were calibrated and certified by an accredited calibration laboratory.

Weight Set 1: OIML E2

Weight Set No.:	WS38	Date of Issue:	15-Dec-2023
Certificate Number:	189517	Calibration Due Date:	15-Jun-2025

Weight Set 2: OIML E2

Weight Set No.:	WS38-1	Date of Issue:	22-Feb-2024
Certificate Number:	C411772496	Calibration Due Date:	22-Aug-2025

Weight Set 4: OIML E2

Weight Set No.:	WS38-3	Date of Issue:	27-Feb-2024
Certificate Number:	C411772498	Calibration Due Date:	27-Aug-2025

Thermo Hygrometer

Equipment No.:	IN256	Date of Issue:	19-Jul-2024
Certificate Number:	SG-H-00636/67	Calibration Due Date:	18-Jul-2025

Remarks

FACT adjustment functionality activated

Equipment conditon: Good

Next calibration according to customer's procedure

Calibration data not decide by calibration laboratory

End of Accredited Section

The information below and any attachments to this calibration certificate are not part of the accredited calibration.

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Measurement Uncertainty of the Weighing Instrument in Use

Stated is the expanded uncertainty with k=2 in use. The formula shall be used for the estimation of the uncertainty under consideration of the errors of indication. The value R represents the net load indication in the unit of measure of the device.

Temperature coefficient for the evaluation of the measurement uncertainty in use: $3.0 \cdot 10^{-6}$ / K

Temperature range on site for the evaluation of the measurement uncertainty in use: 3 K

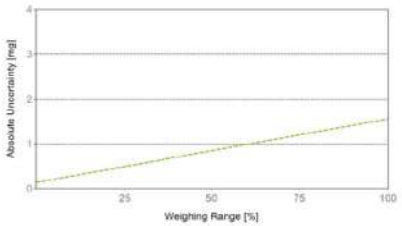
Linearization of Uncertainty Equation

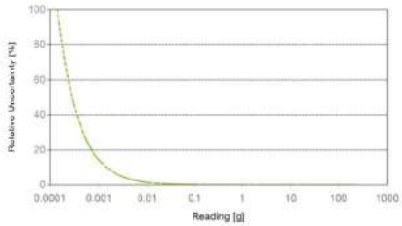
Range			As Found	As Left
	d	Max		
1	0.0001 g	220 g	U_1 = 0.14 mg + 0.00647 mg/g R	N/A

To optimize the stability of the linearization, besides of the zero load only increasing measurement points with a test load of 5% of the measurement range or larger are taken for the calculation of the linear equation.

Absolute and Relative Measurement Uncertainty in Use for Various Net Indications (Examples)

Net Indication	As Found		As Left	
0.0220 g	0.14 mg	0.64%	N/A	N/A
0.2200 g	0.14 mg	0.064%	N/A	N/A
2.2000 g	0.15 mg	0.0070%	N/A	N/A
22.0000 g	0.28 mg	0.0013%	N/A	N/A
220.0000 g	1.6 mg	0.00071%	N/A	N/A





As Found As Left

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GWP® Certificate

As Found ✓

The weighing device meets the given process requirements.

As Left ✓

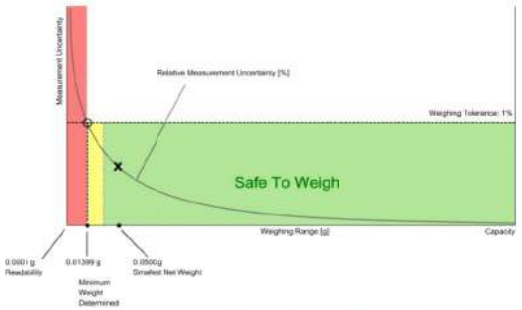
The weighing device meets the given process requirements.

Tests Performed: ☑ As Found ☐ As Left ☑ No adjustments/modifications made. As Left results correspond to As Found.

Process Requirements

Weighing Tolerance: **1%** | Smallest Net Weight: **0.0500 g** | Safety Factor: **2**

Safe Weighing Range



While the values in this graph reflect the actual calibration results, the measurement uncertainty curves are simply a visual representation. This graph reflects As Left testing, unless only As Found was performed.

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Minimum Weight

As Found Minimum Weight Table

Minimum weights for different weighing tolerances and safety factors					
	Safety Factor				
Tolerance	1	2	3	5	10
0.1%	0.14075 g	0.28335 g	0.42783 g	0.72259 g	1.49521 g
0.2%	0.07015 g	0.14075 g	0.21182 g	0.35535 g	0.72259 g
0.5%	0.02800 g	0.05608 g	0.08423 g	0.14075 g	0.28335 g
1%	0.01399 g	0.02800 g	0.04203 g	0.07015 g	0.14075 g
2%	0.00699 g	0.01399 g	0.02100 g	0.03502 g	0.07015 g
5%	0.00280 g	0.00560 g	0.00839 g	0.01399 g	0.02800 g

✓ Pass: The determined minimum weight meets the requirement for the smallest net weight.

As Left Minimum Weight Table

Minimum weights for different weighing tolerances and safety factors					
	Safety Factor				
Tolerance	1	2	3	5	10
0.1%	0.14075 g	0.28335 g	0.42783 g	0.72259 g	1.49521 g
0.2%	0.07015 g	0.14075 g	0.21182 g	0.35535 g	0.72259 g
0.5%	0.02800 g	0.05608 g	0.08423 g	0.14075 g	0.28335 g
1%	0.01399 g	0.02800 g	0.04203 g	0.07015 g	0.14075 g
2%	0.00699 g	0.01399 g	0.02100 g	0.03502 g	0.07015 g
5%	0.00280 g	0.00560 g	0.00839 g	0.01399 g	0.02800 g

✓ Pass: The determined minimum weight meets the requirement for the smallest net weight.

At these net minimum weight values, the measurement uncertainty of the weighing device is equal to or less than 1/1 (no safety factor), 1/2, 1/3, 1/5, or 1/10 of the required tolerance. The values are calculated with k= 2 and based on the linear formula of the measurement uncertainty of the weighing device in use.

The safety factor for As Found is always 1. This implies no safety factor. As Found testing looks at the behavior of the instrument from the past until test occurred. For the past, it is necessary to know that the tolerance was met, but not the safety factor. The safety factor is a proactive measure to apply for future measurements.

Notes on minimum weight values in above table:

1. If "N/A" is shown above, no appropriate value could be calculated.
2. METTLER TOLEDO is not responsible for the definition of the process requirements.

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Attachment to Calibration Certificate:
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METTLER TOLEDO Service

Measurement Results

Results Summary

	Repeatability	Eccentricity	Error of Indication
As Found	✓	✓	✓
As Left	✓	✓	✓

✓ = Passed
✗ = Failed
⚠ = Safety Factor not met

Repeatability

Test Load: 100 g

		As Found		As Left	
Tolerance	Control Limit	Std. Deviation	Result	Std. Deviation	Result
0.1%	N/A	0.00006 g*	N/A	0.00006 g*	N/A
0.2%	0.00005 g		✗		✗
0.5%	0.00013 g		✓		✓
1%	0.00025 g		✓		✓
2%	0.00050 g		✓		✓
5%	0.00125 g		✓		✓

*The calculated standard deviation value is below the rounding error of the balance. The 0.41*d rule is used for the assessment of this repeatability test and the calculation of the minimum weight.

The weighing tolerance is met if the standard deviation is less than or equal to the corresponding control limit.

Eccentricity

Test Load: 100 g

		As Found		As Left	
Tolerance	Control Limit	Deviation	Result	Deviation	Result
0.1%	0.0500 g	0.0001 g	✓	0.0001 g	✓
0.2%	0.1000 g		✓		✓
0.5%	0.2500 g		✓		✓
1%	0.5000 g		✓		✓
2%	1.0000 g		✓		✓
5%	2.5000 g		✓		✓

The weighing tolerance is met if the deviation is less than or equal to the corresponding control limit.

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Error of Indication

As Found

		Control limits for various weighing tolerances					
Reference Value	Error	0.1%	0.2%	0.5%	1%	2%	5%
0.0000 g	0.0000 g	N/A	N/A	N/A	N/A	N/A	N/A
50.0000 g	0.0000 g	0.0250 g	0.0500 g	0.1250 g	0.2500 g	0.5000 g	1.2500 g
99.9999 g	0.0001 g	0.0500 g	0.1000 g	0.2500 g	0.5000 g	1.0000 g	2.5000 g
149.9999 g	0.0001 g	0.0750 g	0.1500 g	0.3750 g	0.7500 g	1.5000 g	3.7500 g
200.0001 g	0.0001 g	0.1000 g	0.2000 g	0.5000 g	1.0000 g	2.0000 g	5.0000 g
Result		✓	✓	✓	✓	✓	✓

As Left

		Control limits for various weighing tolerances					
Reference Value	Error	0.1%	0.2%	0.5%	1%	2%	5%
0.0000 g	0.0000 g	N/A	N/A	N/A	N/A	N/A	N/A
50.0000 g	0.0000 g	0.0250 g	0.0500 g	0.1250 g	0.2500 g	0.5000 g	1.2500 g
99.9999 g	0.0001 g	0.0500 g	0.1000 g	0.2500 g	0.5000 g	1.0000 g	2.5000 g
149.9999 g	0.0001 g	0.0750 g	0.1500 g	0.3750 g	0.7500 g	1.5000 g	3.7500 g
200.0001 g	0.0001 g	0.1000 g	0.2000 g	0.5000 g	1.0000 g	2.0000 g	5.0000 g
Result		✓	✓	✓	✓	✓	✓

The weighing tolerance is met if the error (of indication) for each test point is less than or equal to the corresponding control limit for that particular weighing tolerance. Results at or close to the zero point cannot be assessed.

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Calibration Certificate ID
TH2093-012-011525-ACC-TH

METTLER TOLEDO

Mettler-Toledo (Thailand) Ltd.
846/4 - 846/5 Lasalle Rd. Bangna Tai Sub-District
Bangna District, Bangkok 10260
+662 723 0382
MT-TH.ServiceSupport@mt.com

NSC-TISI-TIS 17025
CALIBRATION 0062

Accuracy Calibration Certificate

Customer

Company:	Environment Research & Technology		
Address:	25/114 Moo 6, Soi Chiraket 1, Ngamwongwan Rd., Toongsonghong		
City:	Laksi	Contact:	Ramita Tsengthai
Zip / Postal:	10210		
State / Province:	Bangkok		
Order Number:			

Weighing Device

Manufacturer:	Mettler Toledo	Instrument Type:	Weighing Instrument
Model:	MS204S/01	Asset Number:	ERTC-L-IN-088
Serial No.:	B334691537	Terminal Model:	N/A
Building:	N/A	Terminal Serial No.:	N/A
Floor:	5	Terminal Asset No.:	N/A
Room:	504		

Range	Max. Capacity	Readability (d)
1	220 g	0.0001 g

Procedure

Calibration Guideline:	EURAMET cg-18 v. 4.0/CENAM-ema:2015
METTLER TOLEDO Work Instruction:	CP/W002/20

This calibration certificate contains measurements for As Found calibration. No As Left calibration was performed because the device was not modified after As Found calibration. Therefore, results for As Left correspond to As Found.

The sensitivity/span of the weighing instrument was adjusted before calibration with a built-in weight.

In accordance with EURAMET cg-18 (11/2015), the test loads were selected to reflect the specific use of the weighing device or to accommodate specific calibration conditions.

	Temperature		Humidity	
As Found	Start: 19.7 °C	End: 19.6 °C	Start: 40.0 %	End: 45.0 %

As Found Calibration Date:	15-Jan-2025	Calibrator:	Supt.
As Left Calibration Date:	N/A		Supapit Kruapoo
Issue Date:	17-Jan-2025	Approved Signatory:	
			Technical Manager / Head of Calibration Center

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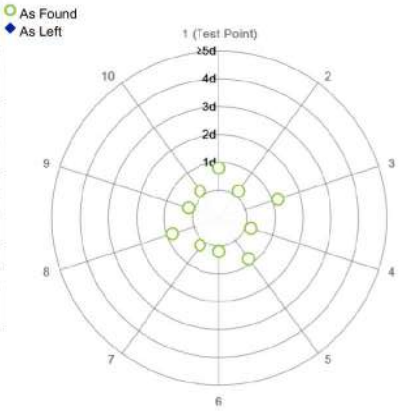
Measurement Results

Repeatability

Test Load: 100 g

	As Found	As Left
1	100.0000 g	N/A
2	100.0001 g	N/A
3	100.0002 g	N/A
4	100.0001 g	N/A
5	100.0000 g	N/A
6	100.0001 g	N/A
7	100.0001 g	N/A
8	100.0000 g	N/A
9	100.0001 g	N/A
10	100.0001 g	N/A

Standard Deviation	0.00006 g	N/A



The "d" in the graph represents the readability of the range/interval in which the test was performed.

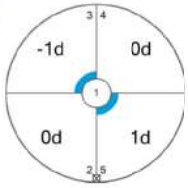
The results of this graph ars based upon the absolute values of the differences from the mean value.

Eccentricity

Test Load: 100 g

Position	As Found	As Left
1	100.0000 g	N/A
2	100.0000 g	N/A
3	99.9999 g	N/A
4	100.0000 g	N/A
5	100.0001 g	N/A

Maximum Deviation	0.0001 g	N/A



As Found

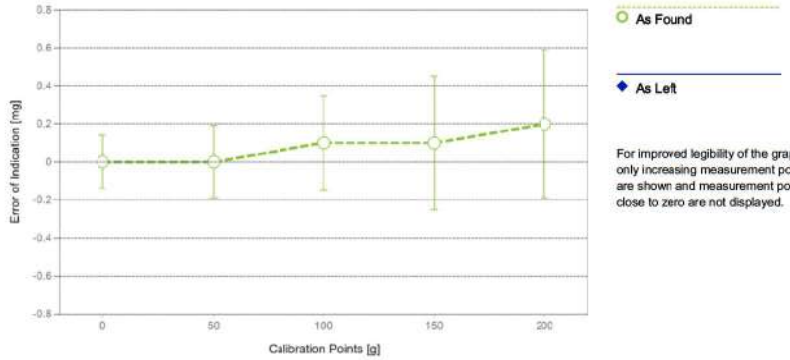
The "d" in the graph represents the readability of the range/interval in which the test was performed.

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Error of Indication

As Found

	Reference Value	Indication	Error of Indication	Expanded Uncertainty	k
1	0.0000 g	0.0000 g	0.0000 g	0.14 mg	2
2	0.0500 g	0.0500 g	0.0000 g	0.15 mg	2
3	0.1000 g	0.1000 g	0.0000 g	0.15 mg	2
4	0.5000 g	0.5000 g	0.0000 g	0.15 mg	2
5	1.0000 g	1.0000 g	0.0000 g	0.15 mg	2
6	5.0000 g	5.0000 g	0.0000 g	0.16 mg	2
7	10.0000 g	10.0001 g	0.0001 g	0.16 mg	2
8	50.0000 g	50.0000 g	0.0000 g	0.19 mg	2
9	99.9999 g	100.0000 g	0.0001 g	0.25 mg	2
10	149.9999 g	150.0000 g	0.0001 g	0.35 mg	2
11	200.0001 g	200.0003 g	0.0002 g	0.39 mg	2



For improved legibility of the graphics only increasing measurement poins are shown and measurement points close to zero are not displayed.

The expanded measurement uncertainty is reported as the standard measurement uncertainty multiplied by the coverage factor k such that the coverage probability corresponds to approximately 95 %.

The user is responsible for maintaining environmental conditions and the settings of the weighing instrument when it was calibrated. The results of this calibration certificate relate only to the calibrated item.

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Test Equipment

All weights used for metrological testing are traceable to national or international standards. The weights were calibrated and certified by an accredited calibration laboratory.

Weight Set 1: OIML E2

Weight Set No.:	WS38	Date of Issue:	15-Dec-2023
Certificate Number:	189517	Calibration Due Date:	15-Jun-2025

Weight Set 2: OIML E2

Weight Set No.:	WS38-1	Date of Issue:	22-Feb-2024
Certificate Number:	C411772496	Calibration Due Date:	22-Aug-2025

Weight Set 3: OIML E2

Weight Set No.:	WS38-3	Date of Issue:	27-Feb-2024
Certificate Number:	C411772498	Calibration Due Date:	27-Aug-2025

Thermo Hygrometer

Equipment No.:	IN256	Date of Issue:	19-Jul-2024
Certificate Number:	SG-H-00636/67	Calibration Due Date:	18-Jul-2025

Remarks

FACT adjustment functionality activated

Equipment condition: Good

Next calibration according to customer's procedure

Calibration data not decide by calibration laboratory

End of Accredited Section

The information below and any attachments to this calibration certificate are not part of the accredited calibration.

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Calibration Certificate ID
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Measurement Uncertainty of the Weighing Instrument in Use

Stated is the expanded uncertainty with k=2 in use. The formula shall be used for the estimation of the uncertainty under consideration of the errors of indication. The value R represents the net load indication in the unit of measure of the device.

Temperature coefficient for the evaluation of the measurement uncertainty in use: $1.5 \cdot 10^{-6}$ / K

Temperature range on site for the evaluation of the measurement uncertainty in use: 3 K

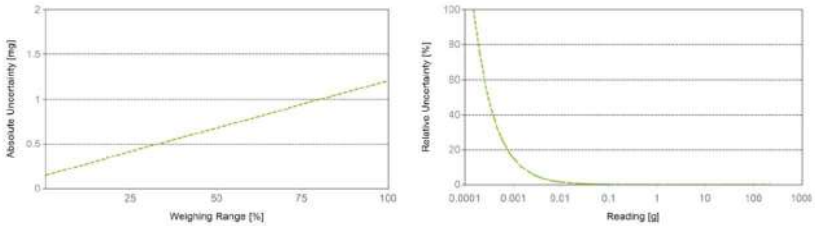
Linearization of Uncertainty Equation

Range			As Found	As Left
	d	Max		
1	0.0001 g	220 g	U_T = 0.15 mg + 0.00482 mg/g · R	N/A

To optimize the stability of the linearization, besides of the zero load only increasing measurement points with a test load of 5% of the measurement range or larger are taken for the calculation of the linear equation.

Absolute and Relative Measurement Uncertainty in Use for Various Net Indications (Examples)

Net Indication	As Found		As Left	
0.0220 g	0.15 mg	0.68%	N/A	N/A
0.2200 g	0.15 mg	0.069%	N/A	N/A
2.2000 g	0.16 mg	0.0073%	N/A	N/A
22.0000 g	0.26 mg	0.0012%	N/A	N/A
220.0000 g	1.2 mg	0.00055%	N/A	N/A



As Found

As Left

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GWP®
Certificate

As Found ✓

The weighing device meets the given process requirements.

As Left ✓

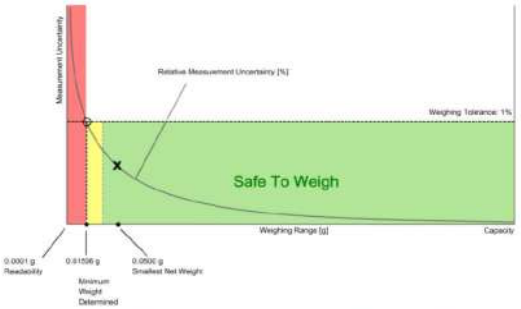
The weighing device meets the given process requirements.

Tests Performed: ☑ As Found ☐ As Left ☑ No adjustments/modifications made. As Left results correspond to As Found.

Process Requirements

Weighing Tolerance: **1%** | Smallest Net Weight: **0.0500 g** | Safety Factor: **2**

Safe Weighing Range



While the values in this graph reflect the actualcalibration results, the measurement uncertainty curves are simply a visual representation. This graph reflects As Left testing, unless only As Found was performed.

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METTLER TOLEDO Service

Minimum Weight

As Found Minimum Weight Table

Minimum weights for different weighing tolerances and safety factors					
	Safety Factor				
Tolerance	1	2	3	5	10
0.1%	0.15128 g	0.30404 g	0.45829 g	0.77136 g	1.58179 g
0.2%	0.07546 g	0.15128 g	0.22748 g	0.38098 g	0.77136 g
0.5%	0.03014 g	0.06034 g	0.09059 g	0.15128 g	0.30404 g
1%	0.01506 g	0.03014 g	0.04523 g	0.07546 g	0.15128 g
2%	0.00753 g	0.01506 g	0.02260 g	0.03768 g	0.07546 g
5%	0.00301 g	0.00602 g	0.00904 g	0.01506 g	0.03014 g

✓ Pass: The determined minimum weight meets the requirement for the smallest net weight.

As Left Minimum Weight Table

Minimum weights for different weighing tolerances and safety factors					
	Safety Factor				
Tolerance	1	2	3	5	10
0.1%	0.15128 g	0.30404 g	0.45829 g	0.77136 g	1.58179 g
0.2%	0.07546 g	0.15128 g	0.22748 g	0.38098 g	0.77136 g
0.5%	0.03014 g	0.06034 g	0.09059 g	0.15128 g	0.30404 g
1%	0.01506 g	0.03014 g	0.04523 g	0.07546 g	0.15128 g
2%	0.00753 g	0.01506 g	0.02260 g	0.03768 g	0.07546 g
5%	0.00301 g	0.00602 g	0.00904 g	0.01506 g	0.03014 g

✓ Pass: The determined minimum weight meets the requirement for the smallest net weight.

At these net minimum weight values, the measurement uncertainty of the weighing device is ecual to or less than 1/1 (no safety factor), 1/2 1/3, 1/5, or 1/10 of the required tolerance. The values are calculated with k = 2 and based on the linear formula of the measurement uncertainty of the weighing device in use.

The safety factor for As Found is always 1. This implies no safety factor. As Found testing looks at the behavior of the instrument from the past until test occurred. For the past, it is necessary to know that the tolerance was met, but not the safety factor. The safety factor is a proactive measure to apply forfuture measurements.

Notes on minimum weight values in above table:

1. If "N/A" is shown above, no appropriate value could be calculated.
2. METTLER TOLEDO is not responsible for the definition of the process requirements.

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Measurement Results

Results Summary

	Repeatability	Eccentricity	Error of Indication
As Found	✓	✓	✓
As Left	✓	✓	✓

✓ = Passed
✗ = Failed
⚠ = Safety Factor not met

Repeatability

Test Load: 100 g

		As Found		As Left	
Tolerance	Control Limit	Std. Deviation	Result	Std. Deviation	Result
0.1%	N/A	0.00006 g*	N/A	0.00006 g*	N/A
0.2%	0.00005 g		✗		✗
0.5%	0.00013 g		✓		✓
1%	0.00025 g		✓		✓
2%	0.00050 g		✓		✓
5%	0.00125 g		✓		✓

*The calculated standard deviation value is below the rounding error of the balance. The 0.41*d rule is used for the assessment of this repeatability test and the calculation of the minimum weight.

The weighing tolerance is met if the standard deviation is less than or equal to the corresponding control limit.

Eccentricity

Test Load: 100 g

		As Found		As Left	
Tolerance	Control Limit	Deviation	Result	Deviation	Result
0.1%	0.0500 g	0.0001 g	✓	0.0001 g	✓
0.2%	0.1000 g		✓		✓
0.5%	0.2500 g		✓		✓
1%	0.5000 g		✓		✓
2%	1.0000 g		✓		✓
5%	2.5000 g		✓		✓

The weighing tolerance is met if the deviation is less than or equal to the corresponding control limit.

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Error of Indication

As Found

		Control limits for various weighing tolerances					
Reference Value	Error	0.1%	0.2%	0.5%	1%	2%	5%
0.0000 g	0.0000 g	N/A	N/A	N/A	N/A	N/A	N/A
50.0000 g	0.0000 g	0.0250 g	0.0500 g	0.1250 g	0.2500 g	0.5000 g	1.2500 g
99.9999 g	0.0001 g	0.0500 g	0.1000 g	0.2500 g	0.5000 g	1.0000 g	2.5000 g
149.9999 g	0.0001 g	0.0750 g	0.1500 g	0.3750 g	0.7500 g	1.5000 g	3.7500 g
200.0001 g	0.0002 g	0.1000 g	0.2000 g	0.5000 g	1.0000 g	2.0000 g	5.0000 g
Result		✓	✓	✓	✓	✓	✓

As Left

		Control limits for various weighing tolerances					
Reference Value	Error	0.1%	0.2%	0.5%	1%	2%	5%
0.0000 g	0.0000 g	N/A	N/A	N/A	N/A	N/A	N/A
50.0000 g	0.0000 g	0.0250 g	0.0500 g	0.1250 g	0.2500 g	0.5000 g	1.2500 g
99.9999 g	0.0001 g	0.0500 g	0.1000 g	0.2500 g	0.5000 g	1.0000 g	2.5000 g
149.9999 g	0.0001 g	0.0750 g	0.1500 g	0.3750 g	0.7500 g	1.5000 g	3.7500 g
200.0001 g	0.0002 g	0.1000 g	0.2000 g	0.5000 g	1.0000 g	2.0000 g	5.0000 g
Result		✓	✓	✓	✓	✓	✓

The weighing tolerance is met if the error (of indication) for each test point is less than or equal to the corresponding control limit for that particular weighing tolerance. Results at or close to the zero point cannot be assessed.

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL.0-2717-3000-29 FAX.0-2719-9484

NSC-TISI-TIS17025
CALIBRATION 0008

Certificate of Calibration

Cert. No.: 25TM32
Page : 1 of 3

Equipment :	Hot Air Oven
Manufacturer :	Binder
Model :	FED 115 E2
Serial No. :	11-22823
ID No. :	ERTC-L-In-076
Submitted by :	Environment Research & Technology Company Limited. 25/114 Moo 6, Soi Chinaket 1, Ngamwongwan Road, Toongsonghong, Laksi, Bangkok 10210
Location :	หน้าห้อง 510
Received Order :	06 January 2025
Calibration Date :	06 January 2025
Ambient Temperature :	(26 ± 10) °C
Relative Humidity :	(50 ± 30) %
AC Line Voltage :	(220 ± 22) V
Calibrated by :	Khit Ruttanaprapachai
Approved by :	Approved Signatory

( ) Ponpan Paipim
( ) Suwit Imjai
(✓) Kunchit Promprat

Issue Date : 18 January 2025

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full, except with the prior written Approval of the head of Corporate Services 3 : Equipment Calibration and Testing Services.

Procedure Used :-

Calibration were conducted using calibration procedure CP-OT02 based on TLAS G-20 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector (RTD) and Thermocouple Type T.

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

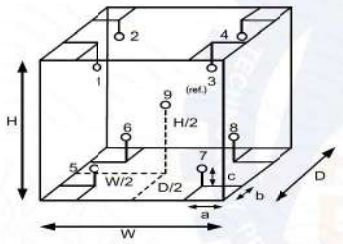
Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Data Acquisiton	MY49001451	24LM44	TPA	17 Mar 2025
2) Data Acquisiton	MY49001451	24LM79	TPA	29 May 2025

2. This certificate is valid only to the item calibrated on date and place of calibration.
3. This certification is traceable to the International System of Unit.

Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

Environment during calibration		
	Beginning	Finished
Temp. (°C)	28	27
REL.Humid. (%)	55	58
AC Supply (Volt)	222	221



Probe Installation Details :

a =	5.0	cm
b =	5.0	cm
c =	5.0	cm

Dimension of Chamber :

D =	0.40	m
W =	0.60	m
H =	0.48	m
Capacity =	0.12	m³

Position :	Ref. Std. ID No.: @ Calibration Point (104) °C	(180) °C
1	19RTD-2/1	24-19TC-01
2	19RTD-2/2	24-19TC-02
3	19RTD-2/3	24-19TC-03
4	19RTD-2/4	24-19TC-04
5	19RTD-2/5	24-19TC-05
6	24-19RTD-2/6	24-19TC-06
7	19RTD-2/7	24-19TC-07
8	19RTD-2/8	24-19TC-08
9 (ref.)	19RTD-2/9	24-19TC-09

Equipment : Hot Air Oven
Condition As-Received : Used Item
Reference : 2501-0004ON-2
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

Cert. No.: 25TM32

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor *k*
104	104	104	0.13	2.0	2.2	2
180	180	180	0.74	3.8	4.8	2

Calibration Point	Measured Temperature (°C) Position									Uncertainty
(°C)	1	2	3	4	5	6	7	8	9 (ref.)	(±°C)
104	104.727	103.435	104.430	103.878	103.258	102.923	104.882	103.647	102.939	0.80
180	178.529	178.085	181.353	181.341	179.519	177.627	181.808	179.627	178.498	1.7

Average* : The average of 30 values in each position.
Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.
Temperature uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.
Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation.
UUC* : Unit Under Calibration
Note : The reported uncertainty of measurement was included stability and excluded uniformity .

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor ***k***, providing a level of confidence of approximately 95 %.

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL.0-2717-3000-29 FAX.0-2719-9484

NSC-TISI-TISI7025
CALIBRATION 0008

Certificate of Calibration

Cert. No.: 25TM33

Equipment : Hot Air Oven
Manufacturer : Memmert
Model : UF 110
Serial No. : B414.0652
ID No. : ERTC-L-In-098
Submitted by : Environment Research & Technology Company Limited.
25/114 Moo 6, Soi Chinaket 1, Ngamwongwan Road,
Toongsonghong, Laksi,
Bangkok 10210
Location : หน้าห้อง 510

Received Order : 06 January 2025
Calibration Date : 06 January 2025
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
AC Line Voltage : (220 ± 22) V

Calibrated by : Khit Ruttanaprapachai

Approved by :
Approved Signatory

( ) Ponpan Paipim
( ) Suwit Imjai
(✓) Kunchit Promprat

Issue Date : 18 January 2025

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full, except with the prior written Approval of the head of Corporate Services 3 : Equipment Calibration and Testing Services.

Equipment : Hot Air Oven **Cert. No.:** 25TM33
Condition As-Received : Used Item **Page :** 2 of 3
Reference : 2501-0004ON-3

Procedure Used :-

Calibration were conducted using calibration procedure CP-OT02 based on TLAS G-20 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector (RTD) and Thermocouple Type T.

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

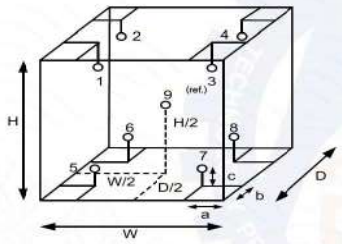
Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Data Acquisition	MY49001451	24LM44	TPA	17 Mar 2025
2) Data Acquisition	MY49001451	24LM79	TPA	29 May 2025

2. This certificate is valid only to the item calibrated on date and place of calibration.
3. This certification is traceable to the International System of Unit.

Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

Environment during calibration		
	Beginning	Finished
Temp. (°C)	28	27
REL.Humid. (%)	55	58
AC Supply (Volt)	222	221



Ref. Std. ID No.: @ Calibration Point		
Position :	(104) °C	(180) °C
1	19RTD-2/1	24-19TC-01
2	19RTD-2/2	24-19TC-02
3	19RTD-2/3	24-19TC-03
4	19RTD-2/4	24-19TC-04
5	19RTD-2/5	24-19TC-05
6	24-19RTD-2/6	24-19TC-06
7	19RTD-2/7	24-19TC-07
8	19RTD-2/8	24-19TC-08
9 (ref.)	19RTD-2/9	24-19TC-09

Probe Installation Details :

a = 5.0 cm
b = 5.0 cm
c = 5.0 cm

Dimension of Chamber :

D = 0.40 m
W = 0.56 m
H = 0.48 m
Capacity = 0.11 m³

Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor *k*
104.0	104.0	104.0	0.13	1.2	1.8	2
180.0	180.0	180.0	0.54	3.6	4.7	2

Calibration Point (°C)	Measured Temperature (°C) Position									Uncertainty (±°C)
	1	2	3	4	5	6	7	8	9 (ref.)	
104.0	104.884	103.140	103.191	103.508	104.382	103.829	104.340	103.742	104.282	0.42
180.0	181.068	177.733	178.025	179.100	181.089	180.099	181.795	180.145	181.130	1.4

Average* : The average of 30 values in each position.
Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.
Temperature uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.
Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation.
UUC* : Unit Under Calibration
Note : The reported uncertainty of measurement was included stability and excluded uniformity .

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor ***k***, providing a level of confidence of approximately 95 %.

-o0o-

Agilent CrossLab
From Insight to Outcome

Agilent CrossLab Start Up Services

Agilent 7890 Gas Chromatograph Preventive Maintenance Checklist

Agilent Preventive Maintenance provides factory recommended service for your analytical instruments to assure reliable operation and the accuracy of your results.

Delivered by highly trained and certified service engineers using genuine Agilent parts and supplies, Agilent Preventive Maintenance provides everything you need to reduce unplanned downtime and keep your systems operating at their peak. This checklist will be completed at the end of the service and provided to you as a record of the preventive maintenance activities.

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Introduction

Customer Information

- Customers should provide all necessary operating supplies upon request of the engineer.
- A customer representative should be available to the engineer while performing the preventive maintenance procedures.
- Any parts, not included in the Parts Lists section of this document, are not part of the recommended Preventive Maintenance service, nor are they included in the price of this service.
- If a system requires the use of extra or special procedures and/or parts for the maintenance service, then these must be ordered separately and charged as a repair, which may incur additional costs.

Important Customer Web Links

- For more information about ***Agilent Technologies services***, please visit our website using the following URL: http://www.agilent.com/en-us/products/crosslab-instrument-services/service-repair
- The **Agilent Community** is an excellent place to get answers, collaborate with others about applications and Agilent products, and find in-depth documents and videos relevant to Agilent technologies. Visit https://community.agilent.com/welcome.
- To access **Agilent University**, visit http://www.agilent.com/crosslab/university/ to learn about training options, which include online, classroom and onsite delivery. A training specialist can work directly with you to help determine your best options.
- A useful **Agilent Resource Center** web page is available, which includes short videos on maintenance, quick lists of consumables for new instruments, and other valuable information. Check out the Resource Page here: https://www.agilent.com/en-us/agilentresources.
- Need technical support, FAQs, supplies? – visit our **Support Home page** http://www.agilent.com/search/support.
- **Videos** about specific preparation requirements for your instrument can be found by searching the *Agilent YouTube* channel at https://www.youtube.com/user/agilent
- **7890B Manuals** are also available on Agilent.com:
  - **Safety**
    https://www.agilent.com/cs/library/usermanuals/public/7890B_Safety.pdf
  - **Installation and First Startup**
    https://www.agilent.com/cs/library/usermanuals/Public/7890B_Installation.pdf
  - **Operation Manual**
    https://www.agilent.com/cs/library/usermanuals/Public/7890B_Operation.pdf
  - **Maintaining Your GC**
    https://www.agilent.com/cs/library/usermanuals/public/G3430-90052%207890B_Maintaining%20Guide.pdf

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Service Engineer's Responsibilities

- Contact the customer and ensure that all necessary supplies are available before the preventive maintenance visit.
- Only select those pages that relate to the system or module being serviced.
- Complete empty fields with the relevant information.
- Complete the relevant checkboxes in the checklist using either a "X" or tick mark "✓".
- Check **"Section not applicable"** check boxes to indicate services/tasks not delivered, as appropriate.
- Complete the Preventive Maintenance service in the order of the tasks listed.
- Complete the Service Review section together with the customer.
- Complete the fields for page numbers at the foot of each selected page
- Complete the total number of pages field in the Service Completion section
- ***Ask the customer to sign the Service Completion section including the customer's and your signature.***

Additional Instruction Notes

- Check for any active service notes for this unit. If there are any applicable "Safety" or "Modification Recommended" Service notes, plan to implement the changes on this unit before doing any qualification service.
- Do not implement firmware updates, unless you get approval from the customer and are sure that they are compatible with the instrument control software.

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Agilent 7890 GC Preventive Maintenance Checklist

System Information

☐ Check this box if an instrument configuration report is attached instead of completing the table below.

Instrument System Name and ID	7890B/5977B
Instrument System Site and Location	Environmental Research & Technologies, Bangkok

List System Component Product Numbers		**List the Serial Numbers of each Component**
1.	G3440B	CN16493176
2.	G4513A	CN16500132
3.	G4514A	CN18330130
4.		
5.		
6.		
7.		
8.		
9.		
10.		

Preparation

☑ Discuss any specific issues with the customer before starting.
☑ Review the instrument logbook for recorded problems and comments.
☑ Save instrument control settings before starting the procedure.
☑ Perform a general inspection of the system for cleanliness.
☑ Check for proper installation of parts, assemblies, sensors etc.
☑ Check system for required installation of components, settings as defined by current Service Notes.
☑ Check for required firmware updates and verify with customers if they would like them installed.
☑ Before starting the following procedures, record the Detector Signal Output(s) in the results table. If the GC is turned OFF or in a service mode, comparing the detector outputs before and after the service is not possible.

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Preventive Maintenance Procedure

Clean and inspect GC

- ☑ Unplug power cord from the power source.
- ☑ Open GC covers and vacuum/remove any dust/debris. Pay particular attention to cooling fans.
- ☑ Inspect internal connectors for proper contact and placement.
- ☑ Reconnect Power to the GC. Power the GC on and verify the power on self-test passed.
- ☑ Verify oven motor spins freely and turns on with the oven door closed; off when the door is opened.
- ☑ Verify operation of all other fans - the inlet and EPC cooling fans.
- ☑ Verify oven intake/outlet flap assembly is operating smoothly while heating and cooling the oven

Inlet and detector consumable replacement

- ☑ For the inlets installed, perform inlet maintenance as defined in the 7890 manual – "Maintaining Your GC" - for the inlet(s) installed.
- ☑ Replace the split vent trap cartridge filter on units with these inlets: Split/Splitless Capillary (SSL), Multi-Mode Inlet (MMI), Programmed Temperature Vaporizer (PTV), Volatiles Interface (VI).
- ☑ If the inlet system is used in Split Mode with viscous samples, inspect and clean the split vent tube on the inlet and flush or replace the tubing between the inlet and the split vent trap.
- ☑ If the GC includes a Flame Ionization Detector (FID), replace the jet. If the ignitor shows any buildup of sample or corrosion, replace the ignitor. Examine the FID collector and castle assemblies for contamination – clean as necessary.

Zero Sensors and Leak test

- ☑ Zero all pressure sensors per the procedure in the 7890 "Advanced User Guide".
- ☑ Perform inlet pressure decay test(s) as defined in the 7890 "Troubleshooting Manual".
  If the PM is done in preparation for an Operational Qualification, then the pressure decay test defined within that protocol can be used for the PM.
- ☑ Record if test passed or failed in the results table.

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Agilent 7890 GC Preventive Maintenance Checklist

ALS Maintenance

- ☐ **Section NOT applicable**
- ☑ Check all cabling and configuration settings between GC, tray, and injectors.
- ☑ Vacuum or remove any dust, especially around fans.
- ☑ Check operation of all fans.
- ☑ Check syringe for smooth plunger operation.
- ☑ Check for smooth operation of the needle support – clean if necessary

Restore Instrument

- ☑ Restore the normal operating conditions or customer method using the Browser Interface or Data System.
- ☑ Purge the system with carrier flow for 15 minutes
- ☑ Bake out the system, then restore the normal operating conditions
- ☑ After equilibration, check and record the post PM detector signal output values.
  Results should be similar or lower than the detector outputs recorded prior to PM.
- ☑ Perform a chemical checkout. If this is a routine PM, inject the customer's sample using the ALS if applicable. This will act as a final checkout of both the ALS and the GC.

Note: If the PM Service is performed prior to a qualification service, then use the qualification procedure as a guide for final instrument set up and checkout.

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Signature Page

Service Review

- ☑ Attach available reports/printouts of all tests to this documentation.
- ☑ Record the Preventive Maintenance service activity in the customer's records/logbook.
- ☑ Update/reset instrument maintenance counters as appropriate.
- ☑ Affix the PM sticker to the system or instrument logbook based on the customer's request.
- ☑ Complete the Service Engineer Comments section if there are additional comments.
- ☑ Review with the customer this service, parts replaced, and test results obtained.
- ☐ If the instrument firmware was updated, record the details of the change in the Service Engineer's Comments box or if necessary, in the customer's IC records.
- ☐ Supply the customer with a copy of the Smart Alerts flyer.
- ☐ Describe Smart Alerts to the customer.
- ☐ Install Smart Alerts if requested.

7890 GC Test Results Table

Detector Signal Outputs	Before PM Service	After PM Service
Front detector output	N/A	19-2
Back detector output		N/A
AUX detector output		N/P
Pressure decay test	**Expected test result**	**Actual test result**
Front inlet pressure decay test	Pass	Pass
Back inlet pressure decay test	Pass	Pass

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Agilent 7890 GC Preventive Maintenance Checklist

7890 Parts List Table

The following kits are recommended for capillary and purged packed inlets. If this is a general PM and the customer has a preferred set of consumables, you may use the customer's consumables.

Part description	Part number	Product or model# where used	Quantity consumed
SSL Capillary Inlet PM kit, Splitless	5188-6497	7890A/B	1
SSL Capillary Inlet PM kit, split	5188-6496	7890A/B	1
SSL Capillary Ultra Inert Inlet Gold Seal with Washer	5190-6144	7890A/B	N/A
SSL Capillary Ultra Inert Inlet Splitless Liner - Single taper with Glass Wool	5190-2293	7890A/B	
SSL Capillary Ultra Inert Inlet Low Pressure Drop Split Liner - with Glass Wool	5190-2295	7890A/B	
PP Inlet PM kit	5188-6498	7890A/B	
Split vent trap PM kit, single cartridge (for MMI, PTV & VI)	5188-6495	7890A/B	
MMI Cleaning Kit	G3510-60820	7890A/B	
PTV Septumless Head Rebuild Kit	5182-9747	7890A/B	
PTV Septumless Head Teflon Guide	5182-9748	7890A/B	
Ignitor (glow plug) assembly with O-ring	19231-60680	7890A/B	1
FID Collector Rebuild/Cleaning Kit	G1531-67000	7890A/B	1
Standard .011-inch FID Jet for capillary FID base	G1531-80560	7890A/B	N/A
High Temperature .018-inch FID Jet for capillary FID base	G1531-80620	7890A/B	
Standard .018-inch FID Jet for packed column with packed FID base	18710-20119	7890A/B	
Standard .011-inch FID Jet for capillary column with packed/adaptable FID base	19244-80560	7890A/B	
High Temperature .018-inch FID Jet for capillary column with packed/adaptable FID base	19244-80620	7890A/B	
NPD Jet, universal fit, .011-inch ID	G1534-80580	7890A/B	
NPD Jet, universal fit, .011-inch ID Extended tip	G1534-80590	7890A/B	
SSL Capillary Ultra Inert Inlet Gold Seal with Washer	5190-6144	7890A/B	
SSL Capillary Ultra Inert Inlet Splitless Liner - Single taper with Glass Wool	5190-2293	7890A/B	
**FID Collector Replacement Kit, if needed	G1531-67001	7890A/B	

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Page ___ of ___

Service Engineer Comments

If there are any specific points you wish to note as part of performing the service or other items of interest for the customer, please write include them in this box.

Service Completion

Service request number 6007133139 [redacted]

Date service completed 8 Nov 2024

Agilent signature [redacted]

Customer signature [redacted]

Total number of pages in this document _____

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Agilent Preventive Maintenance Services

Agilent GCMS Preventive Maintenance

Agilent Preventive Maintenance provides factory recommended service for your analytical instruments to assure reliable operation and the accuracy of your results

Delivered by highly trained and certified service engineers using genuine Agilent parts and supplies, Agilent Preventive Maintenance provides what you need to reduce unplanned downtime and keep your systems operating at their peak performance.

This checklist is used as a guide for completing the preventive maintenance tasks. A signed copy of this checklist is provided for your records.

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Agilent CrossLab
From Insight to Outcome

Introduction

This checklist covers the following model(s):

Type	Model
SQ	5973 Series MSD
SQ	5975 Series MSD
SQ	5977 Series MSD
TQ	7000 Series MS/MS
TQ	7010 Series MS/MS
QTOF	7200 Series QTOF
QTOF	7250 Series QTOF

Customer Information

- Customers should provide all necessary operatng supplies upon request of the engineer.
- A customer representative should be available to the engineer while performing the preventive maintenance procedures. Customers are responsible for regular maintenance and are encouraged to observe the service representative.
- Any parts not included in the Parts Lists sectior of this document are not part of the recommended Preventive Maintenance service nor are they included in the price of this service.
- If a system requires the use of extra or special procedures and/or parts for the maintenance service, then these must be ordered separately and charged as a repair, which may incur additional costs.

Customer Responsibilities

Customers should ensure that all necessary operating supplies, consumables, and usage-dependent items such as gases, vials, syringes, calibrant solution and solvents required for successful preventive maintenance are available. A customer representative should be available while the preventive maintenance is being performed.

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Agilent CrossLab
From Insight to Outcome

Important notice for customers

The customer should complete the following before the Support Provider arrives on site:

- ☐ Perform an autotune and retain the printed tune report just prior to the start of the PM to verify performance of the equipment.

  Note: it is recommended to have the customer run the autotune and tune evaluation prior to the PM and then start the vent cycle so that the instrument will be ready for the service representative.

Important Customer Web Links

- To access Agilent training and education, visit http://www.agilent.com/chem/training to learn about training options, which include online, classroom and onsite delivery. A training specialist can work directly with you to help determine your best options.
- To access the **Agilent Resource Center** web page, visit https://www.agilent.com/en-us/agilentresources. The following information topics are available:
  - Sample Prep and Containment
  - Chemical Standards
  - Analysis
  - Service and Support
  - Application Workflows
- The **Agilent Community** is an excellent place to get answers, collaborate with others about applications and Agilent products, and find in-depth documents and videos relevant to Agilent technologies. Visit https://community.agilent.com/welcome
- Videos about specific preparation requirements for your instrument can be found by searching the **Agilent YouTube** channel at https://www.youtube.com/user/agilent
- **Need to place a service call?** Flexible Repair Options | Agilent

Service Engineer's Responsibilities

- Contact the customer and ensure that all necessary supplies are available before the preventive maintenance visit.
- Only select those pages that relate to the system or module being serviced.
- Complete empty fields with the relevant information.

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- Complete the relevant checkboxes in the checklist using either a "**X**" or tick mark "✓".
- Check **"Service not applicable"** check boxes to indicate services/tasks not delivered, as appropriate.
- Complete the Preventive Maintenance services in order by sections: Review, System Checks, Pump maintenance, Cleaning System and Filters, then System Post Check.
    - The tasks in each section may be completed in the most logical order relevant to the system. Complete the **Service Review** section together with the customer.
- Complete the fields for page numbers at the foot of each selected page
- Add relevant page numbers to selected pages and complete the total number of pages field in the Service Verification section
- Complete Signature Page and attach Signature Page to Service Order.

Additional Instruction Notes

- Preventive maintenance is a factory recommended procedure designed to reduce the likelihood of electromechanical failures. Failure to perform preventive maintenance may reduce the long-term reliability of certain instruments and systems. **Two preventative maintenances (PMs) per year are recommended, the Major PM Service will be performed annually with an Interim PM performed 6 months after the Major PM.**

Definition of the Task/Recommended items within the document

Task		Recommended			
Yes	No	Interim	Major	As Needed	
✓					**Yes** selected means that the task was done or the part was required
	✓				**No** selected means that the task was not done or the part was not required.
		✓			**Interim** selected means that this task is recommended to be done at 6-month intervals
			✓		**Major** selected means that this task is recommended to be done yearly; if the customer would like a service to be done at the 6-month interval then the service could be purchased
				✓	**As needed** selected means that the task was done, or the part was used as needed. For example, there could be two types of filters that could be used, and this was the one selected.

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Instrument Maintenance

Select the appropriate service to be performed.

- ☐ Interim Preventive Maintenance (when available, is typically 6 months or at the request of the customer)
- ☑ Major Preventive Maintenance (Yearly)
- ☐ Enhanced Preventive Maintenance (when available, is provided "As needed")

System Information

- ☐ Check this box if an instrument configuration report is attached instead of completing the table.

Instrument System Name and ID	7890B / G4777B
Instrument System Site and Location	Environmental Research & Technologies, Bangkok

List System Component Product Numbers	List the Serial Numbers of each Component
1. G4077B	US17031011
2.	
3.	
4.	
5.	
6.	

Preparation

- ☑ Discuss any specific issues with the customer before starting.
- ☑ Review the instrument logbook for recorded problems and comments.
- ☑ Save instrument control settings before starting the procedure.
- ☑ Perform a general inspection of the system for cleanliness.
- ☑ Check for proper installation of parts, assemblies, sensors etc.
- ☑ Check system for required installation of components and implementation of Service Notes
- ☑ Check firmware version(s). Updating to the most current versions is strongly recommended. Verify with the customer before updating.

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Preventive Maintenance Procedures

☐ Service Not Applicable

Interim / Major Preventive Maintenance – GCMS

Yes/No		Interim/Major		Description
☑	☐	☑	☑	Perform general inspection of system for cleanliness
☑	☐	☑	☑	Discuss any problems the customer is having with the instrument
☑	☐	☑	☑	Review customer maintenance records and exclude maintenance on recently serviced items
☑	☐	☑	☑	Review the most recent autotune report. This will give a starting point for evaluating spectral peaks, baseline noise, peak shape, mass assignments and resolution.

Interim / Major Preventive Maintenance – System Checks

☐ Service Not Applicable

		System Checks	
Yes/No	Interim/Major		Description
☑	☐	☑	☑ Verify that calibration peaks were seen prior to starting the PM
☑	☐	☑	☑ Vent the instrument
☑	☐	☑	☑ Inspect vacuum hoses, pump, exhaust tubing, and power cords for excessive wear.
☐	☐	☑	☑ Visually inspect calibrant levels – PFTBA PFDTD (if appl.), IRM (if appl.). Refill if available.
☑	☐	☑	☑ Look for any obvious external damage or problems.
☑	☐	☑	☑ Clean air intake(s). Cosmetic cover(s) may need to be removed.
☑	☐	☑	☑ Verify system line voltage meets instrument specifications: Yes ☑ No ☐
☐	☑	☑	☑ For HydroInert systems, verify customer is running hydrogen: Yes ☐ No ☐

Interim / Major Preventive Maintenance – Wet Mechanical vacuum pumps

☐ Service Not Applicable

Yes/No		Wet Mechanical vacuum pumps	
Yes/No	Interim/Major		Description
☑	☐	☑	☑ Check for evidence of oil leakage. Check pump gasket for leakage.
☑	☐	☐	☑ GC/MS SQ with diffusion pump; drain and replace diffusion pump oil.
☑	☐	☑	☑ Drain and replace mechanical pump oil.
☐	☑	☑	☑ Replace Oil Mist Filter if applicable.

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Yes/No		Wet Mechanical vacuum pumps	
☑	☐	☑	☑ Discuss with customer the need for more frequent oil changes if the oil is dirty
☐	☑	☑	☑ Don't use mist filters with Chemical Ionization.
☑	☐	☑	☑ Perform anti-suckback valve test. Power on until side plate is held closed, power off and check that sideplate holds closed. Visually confirm that no oil returns up vacuum hose.

Interim / Major Preventive Maintenance – Dry Mechanical vacuum pumps - Diaphragm

☑ Service Not Applicable

Yes/No		Dry Mechanical vacuum pumps - Diaphragm	
Yes/No	Interim/Major		Description
☐	☐	☑	☑ Check for evidence of poor vacuum – Turbo power demand, poor manifold vacuum, etc.
☐	☐	☑	☑ Clear air flow paths of dust.
☐	☐	☑	☑ If vacuum is poor, then replace the diaphragm pump.
☐	☐	☑	☑ Perform anti-suckback valve test. Power on until side plate is held closed, power off and check that sideplate holds closed.

Interim / Major Preventive Maintenance – Dry Mechanical vacuum pumps - Scroll

☑ Service Not Applicable

Yes/No		Dry Mechanical vacuum pumps - Scroll	
Yes/No	Interim/Major		Description
☐	☐	☑	☑ Replace the tips seal on the IDP pump.
☐	☐	☑	☑ Check for evidence of poor vacuum – Rough vac pressure, turbo power demand, poor manifold vacuum, etc.
☐	☐	☑	☑ Replace the Exhaust Filter if required.
☐	☐	☑	☑ Discuss with customer the need for more frequent changes, if needed.
☐	☐	☑	☑ Inform customer that pump gas ballast should be installed all the time.
☐	☐	☑	☑ Perform anti-suckback valve test. Power on until side plate is held closed, power off and check that sideplate holds closed.

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Interim / Major Preventive Maintenance – Cleaning System and Filters

☐ **Service Not Applicable**

				Cleaning System and Filters	
Yes/No		**Interim/Major**		**Description**	
				Fans	
☑	☐	☑	☑		Remove dust from fans and vent covers.
☑	☐	☑	☑		Verify fans are functional and that there is enough space around the instrument for proper cooling.
				Source cleaning (all sources **except** HydroInert)	
☑	☐	☐	☑		Open analyzer and remove the source.
☑	☐	☐	☑		Disassemble, Clean, Re-assemble source. (7200, also, remove and clean entrance lens)
☑	☐	☐	☑		Re-install source and close analyzer.
				HydroInert Source	
☐	☑	☐	☐		Source **NOT** to be abrasively cleaned. No cleaning required at PM. If a decrease in performance is observed, recommend to the customer that filaments, insulators (repeller and extractor), extractor lens, and repeller lens may need to be replaced to restore performance. HydroInert source should not be run with helium carrier.
				Filters	
☐	☑	☐	☑		Replace RMSH-2 Helium gas filter (collision cell gas) – if applicable.
☐	☑	☐	☑		Replace RMSN-2 Nitrogen gas filter (collision cell gas) – if applicable.
☐	☑	☐	☑		Replace RMSHY-2 Hydrogen gas filter (HydroInert and JetClean) – if applicable.
☐	☑	☐	☑		CP17973 – Gas Clean GS/MS Filter (for He, N2 or H2 carrier) – if required
☐	☑	☐	☑		5190-9071 – Methane Gas Filter (CI systems) – if applicable

Guidance: Gas filters need to be changed only if required (ie indicating traps show color change, or if Big Universal Trap are approaching saturation based on time installed or number of gas cylinders changed for that trap)

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Interim / Major Preventive Maintenance – System Post Check

☐ **Service Not Applicable**

				System post-check	
Yes/No		**Interim/Major**		**Description**	
☑	☐	☑	☑	Pump system back down. Wait until system stability has been achieved.	
☑	☐	☑	☑	Verify system vacuum reading(s) via the gauge controller.	
☑	☐	☑	☑	Leak Check	
☑	☐	☑	☑		Verify system in manual tune
☑	☐	☑	☑		Compare against previous tune file report(s)
☑	☐	☑	☑	Change to Tune and verify that all temperatures, pressures, and gas flows reach method set points	
☑	☐	☑	☑	Check manually that you have calibration peaks.	
☐	☑	☑	☑	EI Autotune Performed	

Guidance: If the PM Service is performed prior to a qualification service, then use the qualification procedure as a guide for final instrument setup and checkout.

Service Review

- ☑ Attach available reports/printouts of all tests to this documentation.
- ☑ Record the Preventive Maintenance service activity in the customer's records/logbook.
- ☑ Record the PM event in the Smart Alerts logbook, if applicable.
- ☑ Update/reset instrument maintenance counters as appropriate.
- ☑ Affix the PM sticker to the system or instrument logbook based on the customer's request.
- ☑ Complete the Service Engineer Comments section if there are additional comments.
- ☑ Review this service, parts replaced, and test results obtained with the customer.
- ☑ If the instrument firmware was updated, record the details of the change in the Service Engineer's Comments box. Systems in a compliant environment may need additional documentation.
- ☑ Complete Signature Page and attach Signature Page to Service Order.

Test Results

Test Description	Expected Test Result	Actual Test Result

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Signature Page

Service Engineer Comments (optional)

If there are any specific points you wish to note as part of performing the service review or other items of interest for the customer, please write in this box.

Service Verification

Service Request Number:

6007137135

Date of Service Completion:

8 Nov 2024

Service Engineer Name:

[redacted]

Customer Name:

[redacted]

Service Engineer Signature:

[redacted]

Total number of pages in this document:

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Parts for consumption during PM

Common Oil and MS Gas Filters – 5973/5975/5977/7000/7010/7200/7250 Series

Part Description	Part Number	Interim	Major	As Needed
Agilent AVF Platinum, 1 quart	5191-5851	✓	✓	✓
Helium gas filter* (collision cell gas) – if required	RMSH-2		✓	✓
Nitrogen gas filter*(collision cell gas) – if required	RMSN-2		✓	✓
Hydrogen gas filter* ^ (HydroInert and JetClean) – if required	RMSHY-2		✓	✓
Chemical Ionization Gas Purifier (CI systems) (Methane) – if required	5190-9071		✓	✓
Gas Clean GS/MS Filter (for He, N2 or H2) – if required	CP17973		✓	✓
# Gas Clean Filter Kit GC/MS 1/8 in (complete replacement kit - bench mounted) – if required	CP17974			✓
# Gas Clean Carrier Gas Kit for 7890 for He, N2 or H2; Bracket, Mount and Filter – if required	CP17988			✓
# Gas Clean Carrier Gas Kit for 8890 & 8860 for He, N2 or H2; Bracket, Mount and Filter – if required	CP179880			✓

Gas filters need to be changed only if required (ie indicating traps show color change, or if Big Universal Trap are approaching saturation based on time installed or number of gas cylinders changed for that trap)

* Big Universal Trap (BUT), 1/8" fittings
^ HydroInert and JetClean Systems
# Alternate Gas Clean kit part numbers. A Gas Clean filter is included in the kits. They are only necessary if replacing carrier gas Big Universal Traps with indicating traps

MS Maintenance Supplies for 5973/5975/5977 Series

Part Description	Part Number	Interim	Major	As Needed
Diffusion pump fluid (Diffusion Pump Models)	6040-0809 Qty 2		✓	✓
Exhaust oil mist trap (threaded) Edwards/Pfeiffer	G1099-80039	✓	✓	✓
DS42 Oil Mis: Eliminator 3/4G & 3/8	SR03706556	✓	✓	✓
IDP-3 Tip Seal Replacement Kit (IDP-3 Dry Scroll Pump Models – Includes tip seal, 60mm filter element, tools, mask and cleaning supplies)	G7077-67018	✓	✓	✓
IDP-3 Tip Seal Replacement Kit (no tools – CSD P/N)	5190-9561	✓	✓	✓
IDP-3 Tip Seal Replacement Kit (no tools – VPD P/N)	IDP3TS	✓	✓	✓
Filter elemen: for IDP-3 (diameter: 60mm)	REPLSLRFILTER2	✓	✓	✓

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MS Maintenance Supplies for 7000/7010 Series

Part Description	Part Number	Interim	Major	As Needed
Oil Mist Filter RV5	G6600-80043	✓	✓	✓
IDP-10 Tip Seal Replacement Kit (IDP-10 Dry Scroll Pump Models – Includes tip seal, 102mm filter element, tools, mask and cleaning supplies)	G7004-67023	✓	✓	✓
IDP-10 Tip Seal Replacement Kit (no tools etc. – VPD P/N)	X3807-67000	✓	✓	✓
Filter element for IDP-10/IDP15 (diameter: 102mm)	REPLSLRFILTER	✓	✓	✓
Filter element for IDP-10/IDP15 (diameter: 79mm)	REPLSLRFILTER1	✓	✓	✓

MS Maintenance Supplies for 7200/7250 Series

Part Description	Part Number	Interim	Major	As Needed
RIS Probe Maintenance Kit (7200 Series only)	G7005-60170		✓	✓
DS202 Oil Mist Eliminator	SR03706800	✓	✓	✓
DS202 3/8' Magnetic Plug and Gasket	SR03701824	✓	✓	✓
IDP-15 Tip Seal Replacement Kit (IDP-15 Dry Scroll Pump Models – Includes tip seal, 102mm filter element, tools, mask and cleaning supplies)	5190-9613	✓	✓	✓
IDP-15 Tip Seal Replacement Kit (no tools etc.– VPD P/N)	X3815-67000	✓	✓	✓
Filter element for IDP-10/IDP15 (diameter: 102mm)	REPLSLRFILTER	✓	✓	✓
Filter element for IDP-10/IDP15 (diameter: 79mm)	REPLSLRFILTER1	✓	✓	✓

HydroInert Source Supplies

To determine if replacement of HydroInert parts is required, please review tune history and sample signal intensity performance. If performance is decreasing, the below parts maybe use to restore performance as part of the PM.

One way to determine if the source performance on SQ is being affected is to review the gain factor history in autotune reports or tune history csv file. If the gain factor is increasing the source performance maybe degrading.

Since TQ tunes to a fixed gain factor, review PFTBA abundance. If PFTBA abundance is decreasing over time, the source performance maybe degrading.

Real sample/standard area counts are another way to determine the performance, there could also be other factors that affect compounds abundance such as inlet and column status.

Part Description	Part Number	Interim	Major	As Needed
Repeller Insulator (qty 2)	G1099-20133			✓
Lens insulator for Extractor (ring insulator)	G3870-20445			✓
HydroInert Extractor lens (9mm)	G7078-20909			✓
HydroInert Repeller	G7078-20902			✓

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Agilent GCMS Preventive Maintenance Checklist

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Common Parts Reference
(Purchased by customer, not included as part of PM)

Filaments and Calibrant Supplies 5973/5975/5977/7000/7010/7200/7250 Series

Part Description	Part Number	SQ	TQ	QTOF
EI High Temperature Filaments	G7005-60061 Qty 2	597X	7000x	N/A
HES EI Filaments	G7002-60001	5977B/C	7010x	N/A
LE-EI Filaments (7250 QTOF)	G3850-60021	N/A	N/A	7250
CI High Temperature Filament – SQ, TQ, 7200 QTOF	G7005-60072	N/A	N/A	7200A/B
Axial CI Filament, W/Re Straight (7250 QTOF)	G7250-60095	N/A	N/A	7250
PFTBA GCMS Tuning Standard calibrant	05971-60571	597X	70X0	72X0
PFDTD calibrant, 1 mL	8500-8510	597X	70X0	72X0
PFET, IRM calibrant for GC QTOF 0.5 mL (7200)	5190-0531	N/A	N/A	7200A/B

Transfer line seals and springs 5973/5975/5977/7000/7010/7200/7250 Series

Part Description	Part Number	SQ	TQ	QTOF
CI Interface tip seal (ceramic tip and spring combo) (non-captured CI tip seal interface) (5973, 5975, 7000B)	G1999-60412	5973, 5975	7000B	N/A
CI Interface tip seal (ceramic tip and spring low/non-magnetic spring combo) (non-captured CI tip seal interface) (7010A)	G7002-60412	N/A	7010A	N/A
CI Interface tip seal spring (spring only)	G1999-20023	597X	70X0	72X0
CI Interface tip seal (tip only) (captured style)	G3870-20542	5977x	70X0	72X0
Transfer-Line Tip Base, Threaded (captured style)	G3870-20548	5977x	70X0	72X0
Transfer-Line Tip Cap, Threaded (captured style)	G3870-20547	5977x	70X0	72X0
RIS Xfer Tip (7200)	G7005-20542	N/A	N/A	7200A/B
RIS Xfer Tip Spring (7200)	G7005-20024	N/A	N/A	7200A/B

MS Maintenance Supplies for Intuvo 9000 MS Series

Part Description	Part Number	SQ	TQ	QTOF
Swaged MS Tail - Packaged	G4590-60009	5977x	7000	N/A
Swaged MS Tail (HES) - Packaged	G4590-60109	5977x	7010x	N/A

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Heater/Sensor assemblies for 5973/5975/5977/7000/7010/7200/7250 Series

Part Description	Part Number	SQ	TQ	QTOF
Stainless Steel Heater/Sensor assembly (SST EI 350)	G387067180	597X	N/A	N/A
Inert Heater/Sensor assembly (inert EI 350)	G387067179	597X	7000A/B	N/A
Extractor Heater/Sensor assembly (Xtr EI 350)	G387067177	5977x	7000C/D/E	N/A
H2 EI Heater/Sensor Assembly – HydroInert (H2 EI 350)	G707867910	5977x	7000C/D/E	N/A
CI 350 Heater/Sensor Assembly (CI 350)	G387067415	597X	70X0x	N/A
Ring heater/sensor assembly (HES, RIS and LEEI) (ceramic ring)	G700260058	5977B/C	7010x	72X0

Rough pump hoses 5973/5975/5977/7000/7010/7200/7250 Series

Part Description	Part Number	SQ	TQ	QTOF
Foreline Hose - imbedded spring	G707760119	597X	70X0x	72X0

Common MS Maintenance Supplies

Part Description	Part Number	SQ	TQ	QTOF
Abrasive paper, 30 µm	5061-5896	597X	70X0	72X0
Alumina powder	393706201	597X	70X0	72X0
Cloths, clean (pkg of 15)	05980-60051	597X	70X0	72X0
Cloths, cleaning (pkg of 300)	9310-4828	597X	70X0	72X0
Cotton swabs (pkg of 100)	5080-5400	597X	70X0	72X0
Gloves, clean, large	8650-0030	597X	70X0	72X0
Gloves, clean, small	8650-0029	597X	70X0	72X0

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Teledyne Tekmar ATOMX Purge and Trap Preventive Maintenance Checklist - Standard

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Agilent Preventive Maintenance provides factory recommended service for your analytical systems to assure reliable operation and the accuracy of your results. Delivered by highly-trained and certified service engineers using genuine Agilent parts and supplies, Agilent Preventive Maintenance provides everything you need to reduce unplanned downtime and keep your systems operating at their peak.

For more information about Agilent Technologies services please visit our web site using the following URL http://www.chem.agilent.com/en-us/products/services/pages/default.aspx

Customer Information

- Customers should provide all necessary operating supplies upon request of the engineer.
- A customer representative should be available to the engineer while performing the preventive maintenance procedures.
- Any parts, not included in the Parts Lists section of this document, are not part of the recommended Preventive Maintenance service, nor are they included in the price of this service.
- If a system requires the use of additional or special procedures and/or parts for the instrument service, then these must be ordered separately and charged as a repair, which may incur additional costs.

Service Engineer's Responsibilities

- Only complete/printout pages that relate to the system or module being serviced.
- Complete empty fields with the relevant information.
- Complete the relevant checkboxes in the checklist using a "X" or tick mark "✓" in the checkbox.
- Complete Not Applicable check boxes to indicate services not delivered, as needed.
- Complete the PM service in the order of the tasks listed.
- Complete the Service Review section together with the customer.

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System Information

Guidance

☐ Check this box if an instrument configuration report is attached instead of completing the table.

Instrument system name and ID	ATOMX
Instrument system site and location	Environmental Research & Technologies, Bangkok
List system component product numbers	List the serial numbers of each component
1. TMR - ATOMX	1. US17013007
2.	2.
3.	3.
4.	4.
5.	5.
6.	6.
7.	7.
8.	8.
9.	9.
10.	10.

Preparation

☑ Discuss any specific issues with the customer prior to starting.
☑ Review the instrument logbook.
☑ Save instrument control settings before starting the procedure.
☑ Perform general inspection of system for cleanliness
☑ Check for proper installation of safety-related parts, assemblies , sensors etc
☑ Check for required firmware updates and verify with customers if they would like it installed.

Check External Supplies

☐ **Section NOT Applicable**
☑ Verify the gas source is supplying an input pressure of 50 - 100 psi to the ATOMX. If the customer is using a gas cylinder, verify the cylinder is at 500+ psi.
☑ Verify that the waste container has sufficient volume to contain the waste generated. Empty if necessary.
☑ Replace the DI water supply with fresh DI water.
  - Make sure the DI water supply is sufficient for sample analysis (1 Liter minimum)
☑ Make sure the methanol supply is sufficient for sample analysis.

Atomx Leak and Pressure Check

☐ **Section NOT Applicable**
☑ Scan through the sample log to verify that the purge pressures are staying consistent throughout the daily runs.
☑ Use the Teklink software to check the standard pressure.
☑ Run a leak check to ensure that the unit is leak tight.

Inspect ATOMX Hardware

☐ **Section NOT Applicable**
☑ Check the tray vial holes for foreign particles. Clean if necessary.
☑ Inspect the needle for particles or sample build up. Clean if necessary.
☑ Inspect the sparger glassware for damage and/or discoloration that could restrict flow or cause contamination. Replace if necessary.
☑ Inspect the drain tubing for clogging. Replace the drain line if necessary.
☑ Lubricate the ATOMX Carousel Drive. Refer to the diagram on page 6-25 of the ATOMX User Manual for lubrication points. Teledyne Tekmar recommends using DuPont Krytox lubrication.
☑ Lubricate the ATOMX Elevator. Refer to the diagram on page 6-32 of the ATOMX User Manual for lubrication points. Teledyne Tekmar recommends using DuPont Krytox lubrication.

Restore Instrument

Guidance

If the PM service is performed prior to a qualification service, then use the qualification procedure as a guide for final instrument set up and checkout.

Service Review

- ☑ Attach available reports/printouts of all tests to this documentation.
- ☑ Record the PM service activity in the customer's instrument records/logbook
- ☑ Update/reset instrument maintenance counters as appropriate
- ☑ Affix the PM sticker to the system or instrument logbook based on the customer's request.
- ☑ Complete the Service Engineer Comments section below if there are additional comments
- ☑ Review the service and any test results with the customer.
- ☑ If the Instrument firmware was updated, record the details of the change in the Service Engineer's Comments box below or if necessary, in the customer's IQ records.

Product or Product Type Test Results Table

Test Description	Expected Test Result	Actual Test Result
Leak Test	Pass	Pass

Product or Product Type Parts List Table

Part Description	Part Number	Product or Model# where used	Quantity Consumed
Sparger Glassware	Ask the customer what size sparger glassware they are using refer to the ATOMX parts list for part numbers.	TMR-ATOMX	x N/A
Lubricant, Dupont Krytok	15-0293-000	TMR-ATOMX	x N/A
Tubing, Drain, Self Retracting	15-0087-002	TMR-ATOMX	x N/A

Teledyne Tekmar ATOMX Purge and Trap
Preventive Maintenance Checklist - Standard

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Service Engineer Comments (optional)

If there are any specific points you wish to note as part of performing the service or other items of interest for the customer, please write in this box.

Other Important Customer Web Links

- ❑ How to get information on your product: Literature Library - http://www.agilent.com/chem/library
- ❑ Need to know more? - www.agilent.com/chem/education
- ❑ Need technical support, FAQs? - www.agilent.com/chem/techsupp
- ❑ Need supplies? - www.agilent.com/chem/supplies

Service Completion

Service request number 6007133135 Date service completed 8 Nov 2024

Agilent signature [redacted] Customer signature [redacted]

Number of pages in this document _____

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From Insight to Outcome

Agilent CrossLab Start Up Services

Agilent 8890 Gas Chromatograph

Preventive Maintenance Checklist

Agilent Preventive Maintenance provides factory recommended service for your analytical instruments to assure reliable operation and the accuracy of your results.

Delivered by highly trained and certified service engineers using genuine Agilent parts and supplies, Agilent Preventive Maintenance provides everything you need to reduce unplanned downtime and keep your systems operating at their peak. This checklist will be completed at the end of the service and provided to you as a record of the preventive maintenance activities.

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Introduction

Customer Information

- Customers should provide all necessary operating supplies upon request of the engineer.
- A customer representative should be available to the engineer while performing the preventive maintenance procedures.
- Any parts, not included in the Parts Lists section of this document, are not part of the recommended Preventive Maintenance service, nor are they included in the price of this service.
- If a system requires the use of extra or special procedures and/or parts for the maintenance service, then these must be ordered separately and charged as a repair, which may incur additional costs.

Important Customer Web Links

- For more information about *Agilent Technologies services*, please visit our website using the following URL: http://www.agilent.com/en-us/products/crosslab-instrument-services/service-repair
- The **Agilent Community** is an excellent place to get answers, collaborate with others about applications and Agilent products, and find in-depth documents and videos relevant to Agilent technologies. Visit https://community.agilent.com/welcome.
- To access **Agilent University**, visit http://www.agilent.com/crosslab/university/ to learn about training options, which include online, classroom and onsite delivery. A training specialist can work directly with you to help determine your best options.
- A useful **Agilent Resource Center** web page is available, which includes short videos on maintenance, quick lists of consumables for new instruments, and other valuable information. Check out the Resource Page here: https://www.agilent.com/en-us/agilentresources.
- Need technical support, FAQs, supplies? – visit our **Support Home page** http://www.agilent.com/search/support.
- Videos about specific preparation requirements for your instrument can be found by searching the *Agilent YouTube* channel at https://www.youtube.com/user/agilent.

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Service Engineer's Responsibilities

- Contact the customer and ensure that all necessary supplies are available before the preventive maintenance visit.
- Only select those pages that relate to the system or module being serviced.
- Complete empty fields with the relevant information.
- Complete the relevant checkboxes in the checklist using either a "X" or tick mark "✓".
- Check **"Section not applicable"** check boxes to indicate services/tasks not delivered, as appropriate.
- Complete the Preventive Maintenance service in the order of the tasks listed.
- Complete the Service Review section together with the customer.
- Complete the fields for page numbers at the foot of each selected page
- Complete the total number of pages field in the Service Completion section
- ***Ask the customer to sign the Service Completion section including the customer's and your signature.***

Additional Instruction Notes

- Check for any active service notes for this unit. If there are any applicable "Safety" or "Modification Recommended" Service notes, plan to implement the changes on this unit before doing any qualification service.
- Do not implement firmware updates, unless you get approval from the customer and are sure that they are compatible with the instrument control software.

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System Information

☐ Check this box if an instrument configuration report is attached instead of completing the table below.

Instrument System Name and ID	ERTC - L-in-175 / US2125A011
Instrument System Site and Location	Environment Research & Technology Co., Ltd / GC ECD

List System Component Product Numbers	List the Serial Numbers of each Component
1. G3540A	US2125A011
2. G4513A	CN21195125
3. G4514A	CN21207024
4.	
5.	
6.	
7.	
8.	
9.	
10.	

Preparation

- ☑ Discuss any specific issues with the customer before starting.
- ☑ Review the instrument logbook for recorded problems and comments.
- ☑ Save instrument control settings before starting the procedure.
- ☑ Perform a general inspection of the system for cleanliness.
- ☑ Check for proper installation of parts, assemblies, sensors etc.
- ☑ Check system for required installation of components, settings as defined by current Service Notes.
- ☑ Check for required firmware updates and verify with customers if they would like them installed.
- ☑ Before starting the following procedures, record the Detector Signal Output(s) in the results table. If the GC is turned OFF or in a service mode, comparing the detector outputs before and after the service is not possible.

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Preventive Maintenance Procedure

Clean and inspect GC

- ☑ Unplug power cord from the power source.
- ☑ Open GC covers and vacuum/remove any dust/debris. Pay particular attention to cooling fans.
- ☑ Inspect internal connectors for proper contact and placement.
- ☑ Reconnect Power to the GC. Power the GC on and verify the power on self-test passed.
- ☑ Verify oven motor spins freely and turns on with the oven door closed; off when the door is opened.
- ☑ Verify operation of all other fans - the inlet and EPC cooling fans.
- ☑ Verify oven intake/outlet flap assembly is operating smoothly while heating and cooling the oven

Inlet and detector consumable replacement

- ☑ Replace the split vent trap cartridge filter using the Maintenance procedure from either the Browser User interfaces on units with these inlets: Split/Splitless Capillary (SSL), Multi-Mode Inlet (MMI), Programmed Temperature Vaporizer (PTV), Volatiles Interface (VI).
- ☑ If the inlet system is used in Split Mode with viscous samples, inspect and clean the split vent tube on the inlet and flush or replace the tubing between the inlet and the split vent trap.
- ☑ For the inlets installed, perform inlet maintenance using the Maintenance procedure from the Browser User interfaces. Record the results. (Leak and Restriction Test)
- ☑ If the GC includes a Flame Ionization Detector (FID), replace the jet. If the ignitor shows any buildup of sample or corrosion, replace the ignitor. Examine the FID collector and castle assemblies for contamination – clean as necessary.

Zero Sensors and Leak test

- ☑ Zero all pressure sensors using the Browser interface.
- ☑ Perform inlet pressure decay test(s) from the diagnostics screen on the Browser User interface. Record if test passed or failed in the results table.

Note: If the PM is done in preparation for an Operational Qualification, then the pressure decay test defined within that protocol can be used for the PM.

ALS Maintenance

- ☐ **Section NOT applicable**
- ☑ Check all cabling and configuration settings between GC, tray, and injectors.
- ☑ Vacuum or remove any dust, especially around fans.
- ☑ Check operation of all fans.
- ☑ Check syringe for smooth plunger operation.
- ☑ Check for smooth operation of the needle support – clean if necessary

Restore Instrument

- ☑ Restore the normal operating conditions or customer method using the Browser interface or Data System.
- ☑ Purge the system with carrier flow for 15 minutes
- ☑ Bake out the system, then restore the normal operating conditions
- ☑ After equilibration, check and record the post PM detector signal output values. Results should be similar or lower than the detector outputs recorded prior to PM.
- ☑ Perform a chemical checkout. If this is a routine PM, inject the customer's sample using the ALS if applicable. This will act as a final checkout of both the ALS and the GC.

Note: If the PM Service is performed prior to a qualification service, then use the qualification procedure as a guide for final instrument set up and checkout.

PM Parts List Table

Note: The following kits are recommended for capillary and purged packed inlets. If this is a general PM and the customer has a preferred set of consumables, you may use the customer's consumables.

Part description	Part number	Product or model# where used	Quantity consumed
SSL Capillary Inlet PM kit, Splitless	5188-6497	8890 GC	CA 2
SSL Capillary Inlet PM kit, Split	5188-6496	8890 GC	~~CA~~ N/A
SSL Capillary Ultra Inert Inlet Gold Seal with Washer	5190-6144	8890 GC	N/A
SSL Capillary Ultra Inert Inlet Splitless Liner - Single taper with Glass Wool	5190-2293	8890 GC	N/A
SSL Capillary Ultra Inert Inlet Low Pressure Drop Split Liner - with Glass Wool	5190-2295	8890 GC	N/A
PP Inlet PM kit	5188-6498	8890 GC	N/A
Split vent trap PM kit, single cartridge (for MMI, PTV & VI)	5188-6495	8890 GC	N/A
MMI Cleaning Kit	G3510-60820	8890 GC	N/A
PTV Septumless Head Rebuild Kit	5182-9747	8890 GC	N/A
PTV Septumless Head Teflon Guide	5182-9748	8890 GC	N/A
Ignitor (glow plug) assembly with O-ring	19231-60680	8890 GC	1
FID Collector Rebuild/Cleaning Kit	G1531-67000	8890 GC	N/A
FID Collector Replacement Kit	G1531-67001	8890 GC	N/A
Standard .011-inch FID Jet	5200-0176	8890 GC	N/A
Universal .018-inch FID Jet	5200-0177	8890 GC	N/A

Signature Page

Service Review

- ☑ Attach available reports/printouts of all tests to this documentation.
- ☑ Record the Preventive Maintenance service activity in the customer's records/logbook.
- ☑ Update/reset instrument maintenance counters as appropriate.
- ☑ Affix the PM sticker to the system or instrument logbook based on the customer's request.
- ☑ Complete the Service Engineer Comments section if there are additional comments.
- ☑ Review with the customer this service, parts replaced, and test results obtained.
- ☐ If the instrument firmware was updated, record the details of the change in the Service Engineer's Comments box or if necessary, in the customer's IQ records.
- ☐ Supply the customer with a copy of the Smart Alerts flyer.
- ☐ Describe Smart Alerts to the customer.
- ☐ Install Smart Alerts if requested.

PM Test Results Table

Test description	Before PM Service	After PM Service
Front detector output	N/A	155.4
Back detector output	N/A	11.5
AUX 1 detector output	N/A	CA ~~155.4~~ 22.0
AUX 2 detector output	N/A	
Test description	**Expected test result**	**Actual test result**
Leak and Restriction Test after front inlet maintenance	Pass	Passed
Leak and Restriction Test after back inlet maintenance	Pass	Passed
Leak and Restriction Test after front inlet Split Vent Trap replacement	Pass	Passed
Leak and Restriction Test after back inlet Split Vent Trap replacement	Pass	Passed
Front inlet pressure decay test	Pass	Passed
Back inlet pressure decay test	Pass	Passed

Service Engineer Comments

If there are any specific points you wish to note as part of performing the service or other items of interest for the customer, please write include them in this box.

completed, All Result passed.

Service Completion

Service request number [redacted] Date service completed 05 JUN 2024

Agilent signature [redacted] Customer signature [redacted]

Total number of pages in this document 9

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ระยะผลิตปิโตรเลียม
(การผลิตปิโตรเลียม)

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TSP HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

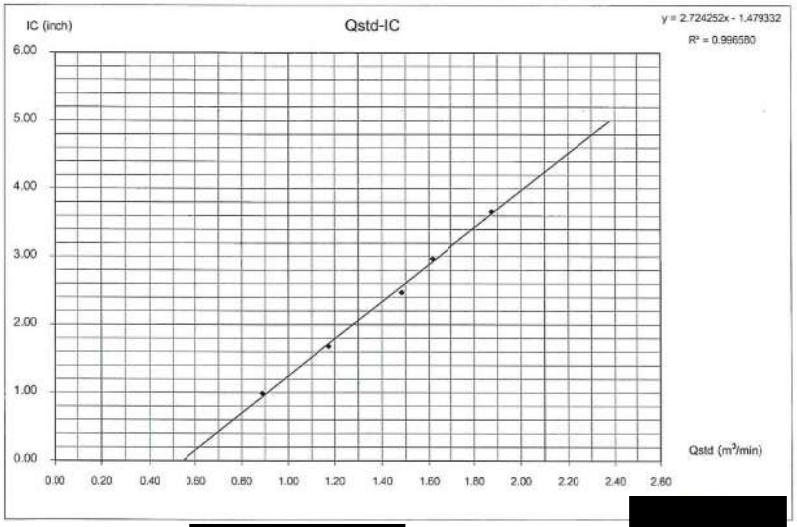
Quotation	2025-00472				*Date*	April 2, 2025
Sampler Location	บ้านใหม่สามัคคี				*Start Time*	4:40 PM
Sampler Number	TSP No.C28	Transfer Standard Type		Orifice	*Stop Time*	4:50 PM
Instrument Model	HIVOL-5BCBE	Calibrator Model		TE-5025A		
Motor Serial Number	C-28	Calibrator Serial Number		3142	*Calibrated By*	Mr. Auttapol Areejit
Recorder Serial Number	-					

Plate No.	(Delta H) Pressure Drop Across Orifice ($in H_2O$)			(A) $[\Delta H_2O(Pa/P_{std})(T_{std}/Ta)]^{1/2}$	(X) Qstd = (1/m)[(A-b)] (m^3/min)	(I) Sample Flow Rate Indicator (inch)	(Y) IC = I[(Pa/P_{std})(T_{std}/Ta)]$^{1/2}$	Temparaure (°K = °C+273)	Barometric Pressure (mmHg)	Start Meter	Stop Meter
	Positive	Negative	ΔH_2O								
5	1.7	1.7	3.4	1.82381	0.88736	1.0	0.99	303.0	756.0		
7	3.0	3.0	6.0	2.42279	1.17493	1.7	1.68	303.0	756.0		
10	4.8	4.8	9.6	3.09462	1.48306	2.5	2.47	303.0	756.0		
13	5.7	5.7	11.4	3.33959	1.61508	3.0	2.97	303.0	756.0		
18	7.7	7.7	15.4	3.88152	1.87525	3.7	3.66	303.0	756.0		
Linear Regression Y ON X : Y= mX + b							Average	303.0	756.0		

1	Slope (m)	2.08293	Linear Equation			r^2	0.999555	Pstd(mmHg)	760.0
2	Intercept (b)	-0.02450	Set Point Flow Rate (X) (m^3/min)	1.133		r	0.9997775	T_{std}	298.0
3	Correlation Coefficient (r)	0.99992	Final Set Flow Rate = (I)	0		(Pa/Pstd)*(Tstd/Ta)	0.978322		
Result						C=(Pa/Pstd)*(Tstd/Ta)^0.5	0.989101634		

COMMENT

Andersen Instruments, Inc.



Checked By [redacted]
(Mr. Prayun Detkla)
Technician

Approved By [redacted]
(Mr.Panupon Podang)
Environmental Scientist

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PM10 HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

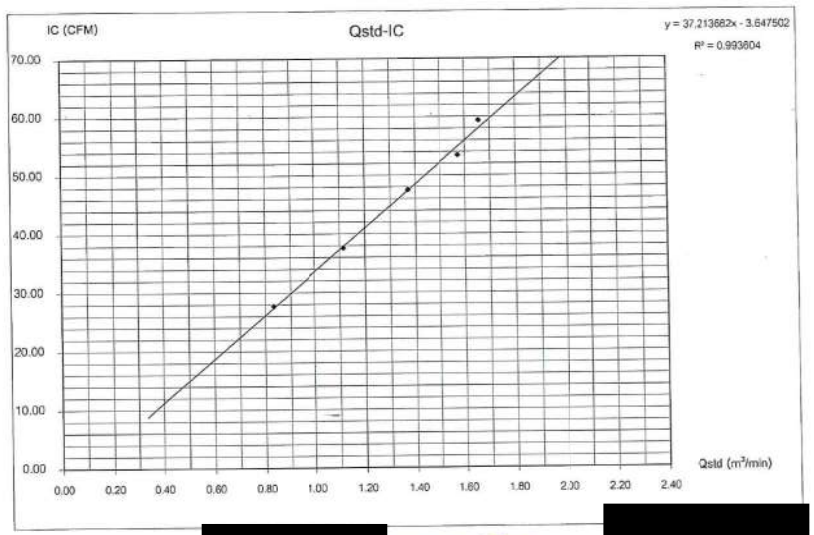
Quotation	2025-00472				*Date*	April 2, 2025
Sampler Location	บ้านใหม่สามัคคี				*Start Time*	4:30 PM
Sampler Number	PM-10 No.21	Transfer Standard Type		Orifice	*Stop Time*	4:40 PM
Instrument Model	HIVOL-BMBBE	Calibrator Model		TE-5025A		
Motor Serial Number	2132	Calibrator Serial Number		3142	*Calibrated By*	Mr. Auttapol Areejit
Recorder Serial Number	2392					

Plate No.	(Delta H) Pressure Drop Across Orifice ($in H_2O$)			(A) $[\Delta H_2O(Pa/P_{std})(T_{std}/Ta)]^{1/2}$	(X) Qstd = (1/m)[(A-b)] (m^3/min)	(I) Sample Flow Rate Indicator (ft^3/min)	(Y) IC = I[(Pa/P_{std})(T_{std}/Ta)]$^{1/2}$	Temperature (°K = °C+273)	Barometric Pressure (mmHg)	Start Meter	Stop Meter
	Positive	Negative	ΔH_2O								
5	1.5	1.5	3.0	1.71317	0.83425	28.0	27.69	303.0	756.0		
7	2.7	2.7	5.4	2.29846	1.11524	38.0	37.59	303.0	756.0		
10	4.1	4.1	8.2	2.83236	1.37156	48.0	47.48	303.0	756.0		
13	5.4	5.4	10.8	3.25052	1.57231	54.0	53.41	303.0	756.0		
18	6.0	6.0	12.0	3.42535	1.65673	60.0	59.35	303.0	756.0		
Linear Regression Y ON X :Y= mX + b							Avarage	303.0	756.0		

1	Slope (m)	2.08293	Linear Equation			r^2	0.993341	Pstd(mmHg)	760.0
2	Intercept (b)	-0.02450	Set Point Flow Rate (X) (m^3/min)	1.33		r	0.9966549	T_{std}	298.0
3	Correlation Coefficient (r)	0.99992	Fina Set Flow Rate = (I)	0		(Pa/Pstd)*(Tstd/Ta)	0.978322043		
Result						C=(Pa/Pstd)*(Tstd/Ta)^0.5	0.989101634		

COMMENT

Andersen Instruments, Inc.



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Technician

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Environmental Scientist

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TSP HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

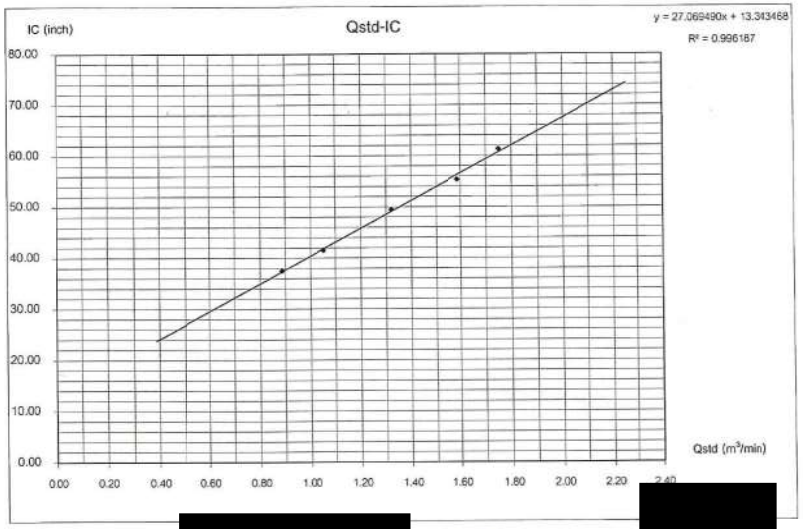
Quotation	2025-00472				*Date*	April 2, 2025
Sampler Location	บ้านหนองไม้ไผ่ ๑				*Start Time*	5:40 PM
Sampler Number	TSP No.A8	Transfer Standard Type		Orifice	*Stop Time*	5:50 PM
Instrument Model	HIVOL-BBCBE	Calibrator Model		TE-5025A		
Motor Serial Number	3560	Calibrator Serial Number		3142	*Calibrated By*	Mr. Auttapol Areejit
Recorder Serial Number	-					

Plate No.	(Delta H) Pressure Drop Across Orifice (mH_2O)			(A) $[\Delta H_2O(Pa/P_{std})(T_{std}/Ta)]^{1/2}$	(X) Qstd = (1/m)[(A-b)] (m^3/min)	(I) Sample Flow Rate Indicator (inch)	(Y) IC = I[(Pa/P_{std})(Ta/T_{std})]$^{1/2}$	Temperature (°K = °C+273)	Barometric Pressure (mmHg)	Start Meter	Stop Meter
	Positive	Negative	ΔH_2O								
5	1.7	1.7	3.4	1.82381	0.88736	38.0	37.59	303.0	756.0		
7	2.4	2.4	4.8	2.16701	1.05213	42.0	41.54	303.0	756.0		
10	3.8	3.8	7.6	2.72677	1.32086	50.0	49.46	303.0	756.0		
13	5.5	5.5	11.0	3.28048	1.56670	50.0	55.39	303.0	756.0		
18	6.7	6.7	13.4	3.62071	1.75004	62.0	61.32	303.0	756.0		
Linear Regresstion Y ON X : Y= mX + b							Average	303.0	756.0		

1	Slope (m)	2.08293	Linear Equation			r^2	0.999555	Pstd(mmHg) 760.0
2	Intercept (b)	-0.02450	Set Point Flow Rate (X) (m^3/min)		1.133	r	0.9997775	T_{std} 298.0
3	Correlation Coefficient (r)	0.99962	Final Set Flow Rate = (I)		0	(Pa/Pstd)*(Tstd/Ta)	0.978322	
Result						C=(Pa/Pstd)*(Tstd/Ta)^0.5	0.989101634	

COMMENT

Andersen Instruments, Inc.



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F-AB-028, Rev. 02, June 3, 2019

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PM10 HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

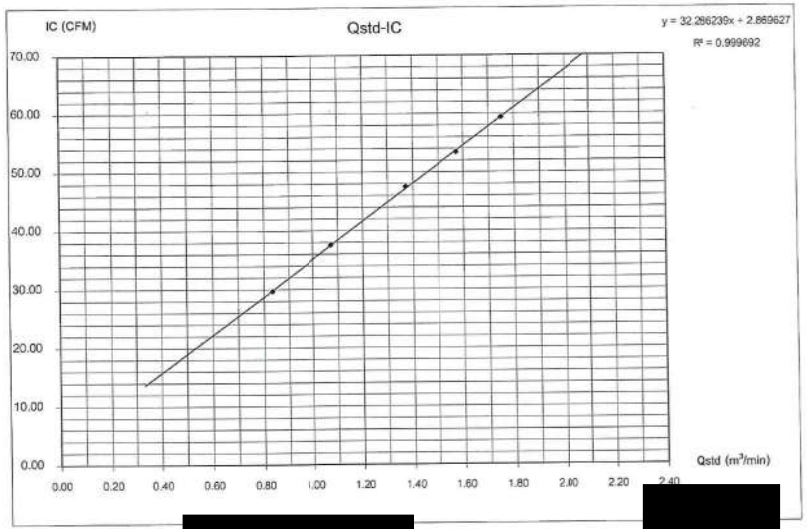
Quotation	2025-00472				*Date*	April 2, 2568
Sampler Location	บ้านหนองไม้ไผ่ ๑				*Start Time*	5:30 PM
Sampler Number	PM-10 No.19	Transfer Standard Type		Orifice	*Stop Time*	5:40 PM
Instrument Model	HIVOL-BMBBE	Calibrator Model		TE-5025A		
Motor Serial Number	2133	Calibrator Serial Number		3142	*Calibrated By*	Mr. Auttapol Areejit
Recorder Serial Number	2366					

Plate No.	(Delta H) Pressure Drop Across Orifice (mH_2O)			(A) $[\Delta H_2O(Pa/P_{std})(T_{std}/Ta)]^{1/2}$	(X) Qstc = (1/m)[(A-b)] (m^3/min)	(I) Sample Flow Rate Indicator (ft^3/min)	(Y) IC = I[(Pa/P_{std})(Ta/T_{std})]$^{1/2}$	Temperature (°K = °C+273)	Barometric Pressure (mmHg)	Start Meter	Stop Meter
	Positive	Negative	ΔH_2O								
5	1.5	1.5	3.0	1.71317	0.83425	30.0	29.67	303.0	756.0		
7	2.5	2.5	5.0	2.21170	1.07358	38.0	37.59	303.0	756.0		
10	4.1	4.1	8.2	2.83236	1.37156	48.0	47.48	303.0	756.0		
13	5.4	5.4	10.8	3.25052	1.57231	54.0	53.41	303.0	756.0		
18	6.7	6.7	13.4	3.62071	1.75004	60.0	59.35	303.0	756.0		
Linear Regresstion Y ON X : Y= mX + b							Average	303.0	756.0		

1	Slope (m)	2.08293	Linear Equation			r^2	0.993341	Pstd(mmHg) 760.0
2	Intercept (b)	-0.02450	Set Point Flow Rate (X) (m^3/min)		1.133	r	0.9966649	T_{std} 298.0
3	Correlation Coefficient (r)	0.99962	Final Set Flow Rate = (I)		0	(Pa/Pstd)*(Tstd/Ta)	0.978322043	
Result						C=(Pa/Pstd)*(Tstd/Ta)^0.5	0.989101634	

COMMENT

Andersen Instruments, Inc.



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Technician

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TSP HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

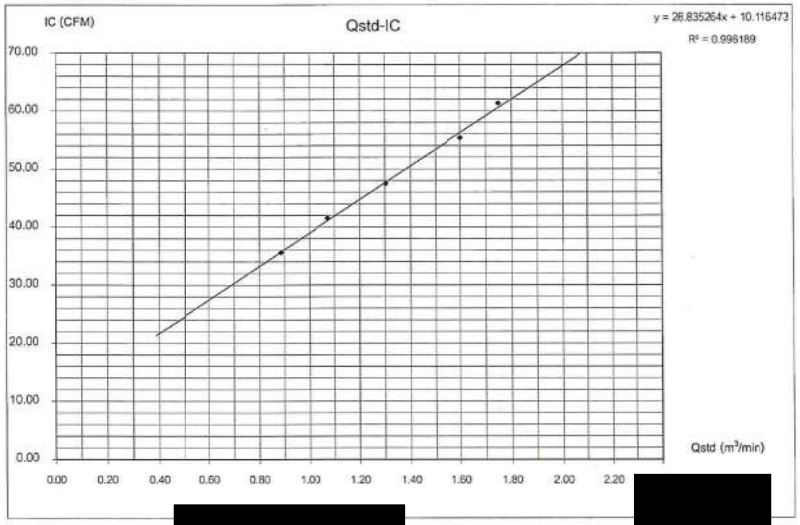
Quotation	2025-00472			*Date*	March 26, 2025
Sampler Location	บ้านแหลมใหม่ 2			*Start Time*	4:10 PM
Sampler Number	TSP No.A11	Transfer Standard Type	Orifice	*Stop Time*	4:20 PM
Instrument Model	HIVOL-BBCBE	Calibrator Model	TE-5025A		
Motor Serial Number	2141	Calibrator Serial Number	3142	*Calibrated By*	Mr. Auttapol Areejit
Recorder Serial Number	1029050701				

Plate No.	(Delta H) Pressure Drop Across Orifice (inH_2O)			(A) $[\Delta H_2O(Pa/P_{std})(T_{std}/Ta)]^{1/2}$	(X) Qstd = (1/m)[(A-b)] (m^3/min)	(I) Sample Flow Rate Indicator (ft^3/min)	(Y) IC = $[(Pa/P_{std})(T_{std}/Ta)]^{1/2}$	Temparature (°K = °C+273)	Barometric Pressure (mmHg)	Start Meter	Stop Meter
	Positive	Negative	ΔH_2O								
5	1.7	1.7	3.4	1.82381	0.88735	36.0	35.61	303.0	756.0		
7	2.5	2.5	5.0	2.21170	1.07358	42.0	41.54	303.0	756.0		
10	3.7	3.7	7.4	2.69055	1.30352	48.0	47.48	303.0	756.0		
13	5.6	5.6	11.2	3.31017	1.60095	56.0	55.39	303.0	756.0		
16	6.7	6.7	13.4	3.62071	1.75004	62.0	61.32	303.0	756.0		
Linear Regression Y ON X : Y= mX + b							Average	303.0	756.0		

1	Slope (m)	2.08293	Linear Equation		r^2	0.996187	Pstd(mmHg) 760.0
2	Intercept (b)	-0.02450	Set Point Flow Rate (X) (m^3/min)	1.133	r	0.9980517	T_{STP} 298.0
3	Correlation Coefficient (r)	0.99982	Final Set Flow Rate = (I)	0	(Pa/Pstd)*(Tstd/Ta)	0.978322043	
Result					C=(Pa/Pstd)*(Tstd/Ta)^0.5	0.98910634	

COMMENT

Andersen Instruments, Inc.



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(Mr. Prayun Detkla)
Technician

Approved By [redacted]
(Mr.Panupon Podang)
Environmental Scientist

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Head Office/Tax ID 0105 542 064 981

PM10 HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

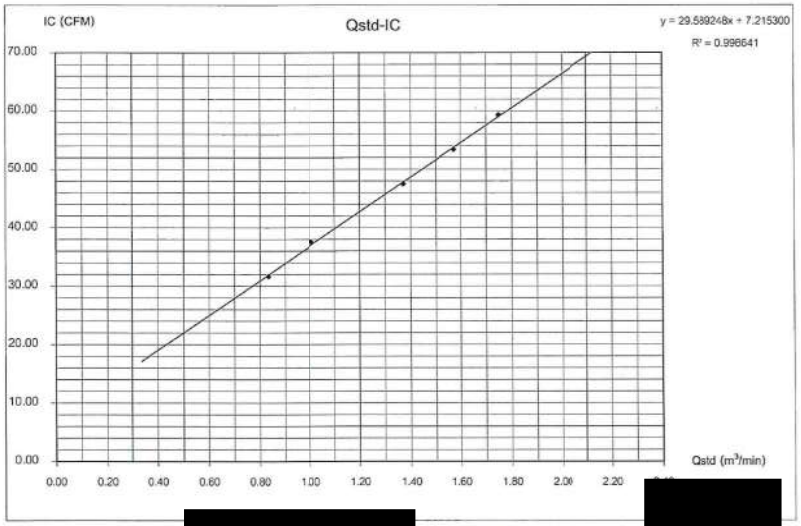
Quotation	2025-00472			*Date*	March 26, 2025
Sampler Location	บ้านแหลมใหม่ 2			*Start Time*	4:20 PM
Sampler Number	PM-10 No.23	Transfer Standard Type	Orifice	*Stop Time*	4:30 PM
Instrument Model	HIVOL-BMBBE	Calibrator Model	TE-5025A		
Motor Serial Number	2135	Calibrator Serial Number	3142	*Calibrated By*	Mr. Auttapol Areejit
Recorder Serial Number	2391				

Plate No.	(Delta H) Pressure Drop Across Orifice (inH_2O)			(A) $[\Delta H_2O(Pa/P_{std})(T_{std}/Ta)]^{1/2}$	(X) Qstd = (1/m)[(A-b)] (m^3/min)	(I) Sample Flow Rate Indicator (ft^3/min)	(Y) IC = $[(Pa/P_{std})(T_{std}/Ta)]^{1/2}$	Temparature (°K = °C+273)	Barometric Pressure (mmHg)	Start Meter	Stop Meter
	Positive	Negative	ΔH_2O								
5	1.5	1.5	3.0	1.71317	0.83425	32.0	31.65	303.0	756.0		
7	2.2	2.2	4.4	2.07476	1.00784	38.0	37.59	303.0	756.0		
10	4.1	4.1	8.2	2.83236	1.37156	46.0	47.48	303.0	756.0		
13	5.4	5.4	10.8	3.25052	1.57231	54.0	53.41	303.0	756.0		
16	6.7	6.7	13.4	3.62071	1.75004	60.0	59.35	303.0	756.0		
Linear Regression Y ON X : Y= mX + b							Average	303.0	756.0		

1	Slope (m)	2.08293	Linear Equation		r^2	0.998641	Pstd(mmHg) 760.0
2	Intercept (b)	-0.02450	Set Point Flow Rate (X) (m^3/min)	1.133	r	0.9993203	T_{STP} 298.0
3	Correlation Coefficient (r)	0.99982	Final Set Flow Rate = (I)	0	(Pa/Pstd)*(Tstd/Ta)	0.978322043	
Result					C=(Pa/Pstd)*(Tstd/Ta)^0.5	0.98910634	

COMMENT

Andersen Instruments, Inc.



Checked By [redacted]
(Mr. Prayun Detkla)
Technician

Approved By [redacted]
(Mr.Panupon Podang)
Environmental Scientist

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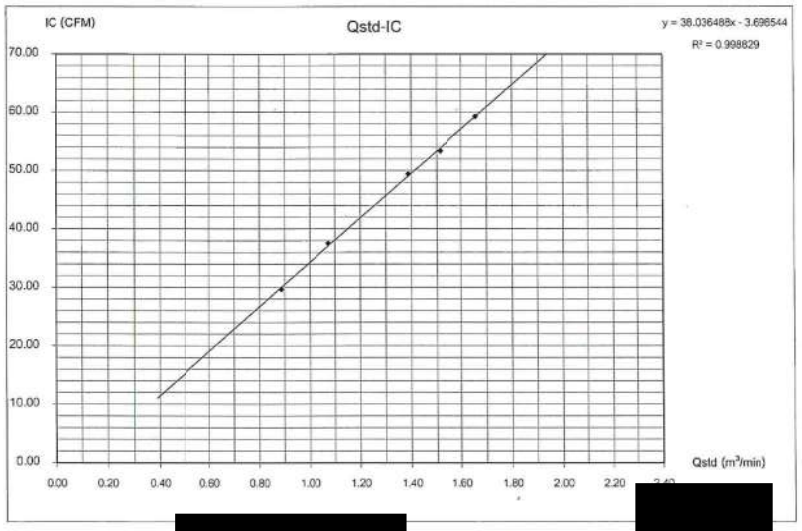
PM10 HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

Quotation	2025-00472				Date	April 2, 2025
Sampler Location	โรงเรียนบ้านนิ่มนายย์				Start Time	5:05 PM
Sampler Number	PM-10 No.10	Transfer Standard Type		Orifice	Stop Time	5:15 PM
Instrument Model	HIVOL-BMBBE	Calibrator Model		TE-5025A		
Motor Serial Number	10	Calibrator Serial Number		3142	Calibrated By	Mr. Auttapol Areejt
Recorder Serial Number	102940701					

Plate No.	(Delta H) Pressure Drop Across Orifice (inH2O) Positive	Negative	ΔH2O	(A) [ΔH2O(Pa/Pstd)(Tstd/Ta)]^1/2	(X) Qstd = (1/m)[(A-b)] (m3/min)	(I) Sample Flow Rate Indicator (ft3/min)	(Y) IC = I[(Pa/Pstd)(Tstd/Ta)]^1/2	Temperature (°K = °C+273)	Barometric Pressure (mmHg)	Start Meter	Stop Meter
5	1.7	1.7	3.4	1.82381	3.88736	30.0	29.67	303.0	756.0		
7	2.5	2.5	5.0	2.21170	1.07358	38.0	37.59	303.0	756.0		
10	4.2	4.2	8.4	2.66069	1.36804	50.0	49.45	303.0	756.0		
13	5.0	5.0	10.0	3.12781	1.51340	54.0	53.41	303.0	756.0		
18	6.0	6.0	12.0	3.42835	1.65573	60.0	59.35	303.0	756.0		
Linear Regression Y ON X : Y= mX + b							Average	303.0	756.0		
1	Slope (m)			2.08293	Linear Equation			r²	0.998829	Pstd(mmHg)	760.0
2	Intercept (b)			-0.02450	Set Point Flow Rate (X) (m3/min)		1.133	r	0.999414	Tstd	298.0
3	Correlation Coefficient (r)			0.99962	Final Set Flow Rate = (I)		0	(Pa/Pstd)*(Tstd/Ta)		0.978322043	
Result								C=(Pa/Pstd)*(Tstd/Ta)^0.5		0.989101634	

COMMENT

Andersen Instruments, Inc.



Checked By [redacted]
(Mr. Prayun Detkla)
Technician

Approved By [redacted]
(Mr.Panupon Podang)
Environmental Scientist

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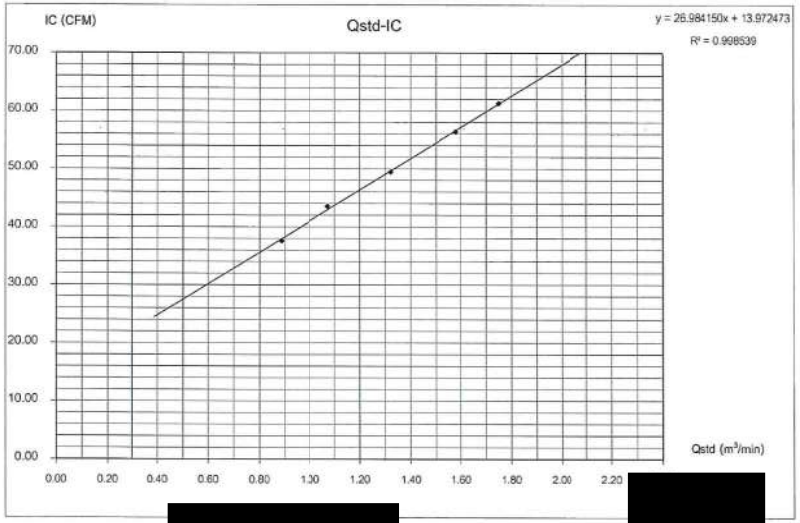
TSP HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

Quotation	2025-00472				Date	April 2, 2025
Sampler Location	โรงเรียนบ้านนิ่มนายย์				Start Time	4:55 PM
Sampler Number	TSP No.A22	Transfer Standard Type		Orifice	Stop Time	5:05 PM
Instrument Model	HIVOL-BBCBE	Calibrator Model		TE-5025A		
Motor Serial Number	2054	Calibrator Serial Number		3142	Calibrated By	Mr. Auttapol Areejt
Recorder Serial Number	2187					

Plate No.	(Delta H) Pressure Drop Across Orifice (inH2O) Positive	Negative	ΔH2O	(A) [ΔH2O(Pa/Pstd)(Tstd/Ta)]^1/2	(X) Qstd = (1/m)[(A-b)] (m3/min)	(I) Sample Flow Rate Indicator (ft3/min)	(Y) IC = I[(Pa/Pstd)(Tstd/Ta)]^1/2	Temperature (°K = °C+273)	Barometric Pressure (mmHg)	Start Meter	Stop Meter
5	1.7	1.7	3.4	1.82381	0.89736	38.0	37.59	303.0	756.0		
7	2.5	2.5	5.0	2.21170	1.07358	44.0	43.52	303.0	756.0		
10	3.8	3.8	7.6	2.72577	1.32086	50.0	49.46	303.0	756.0		
13	5.5	5.4	10.9	3.26553	1.57952	57.0	56.38	303.0	756.0		
18	6.7	6.7	13.4	3.62071	1.75004	62.0	61.32	303.0	756.0		
Linear Regression Y ON X : Y= mX + b							Average	303.0	756.0		
1	Slope (m)			2.06293	Linear Equation			r²	0.998539	Pstd(mmHg)	760.0
2	Intercept (b)			-0.02450	Set Point Flow Rate (X) (m3/min)		1.133	r	0.997459	Tstd	298.0
3	Correlation Coefficient (r)			0.99962	Final Set Flow Rate = (I)		0	(Pa/Pstd)*(Tstd/Ta)		0.978322043	
Result								C=(Pa/Pstd)*(Tstd/Ta)^0.5		0.989101634	

COMMENT

Andersen Instruments, Inc.



Checked By [redacted]
(Mr. Prayun Detkla)
Technician

Approved By [redacted]
(Mr.Panupon Podang)
Environmental Scientist

JIRANATEE ASSOCIATES CO.,LTD.

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Web site: www.jiranatee.com

Accredited calibration laboratory
ISO/IEC 17025:2017
NSC-TISI-TIS 17025
CALIBRATION 0367

Flow measurement laboratory
Calibration services department.

NSC – TISI – TIS 17025
CALIBRATION 0367

CERTIFICATE OF CALIBRATION

Certificate No. : **COF-002-68**

MEASUREMENT ITEM	: Top Load Orifice
MANUFACTURER	: TISCH
MODEL/TYPE	: TE-5025A
SERIAL NUMBER	: 3142
ID NUMBER	: -
CONDITION AS-RECEIVED	: Used item
CUSTOMER	: Environment Research & Technology Co., Ltd. 25/114 Moo 6 Soi Chinaket 1, Ngamwongwan Road, Toongsonghong, Laksi, Bangkok 10210
RECEIVED DATE	: 24 Jan 2025
MEASUREMENT DATE	: 17 Feb 2025
ISSUE DATE	: 17 Feb 2025

ENVIRONMENTAL CONDITIONS:
Ambient condition in the laboratory are as follow:

Temperature	: 23.0 ± 3.0	°C
Relative Humidity	: 55.0 ± 15.0	%RH
Atmospheric Pressure	: 1010 ± 10	hPa

CALIBRATION CONDITION:

Preconditioning	: 24 hours at ambient conditions.
Measurement Condition	: The average values during measurementare 24.1 °C and 50.0 %RH.

NOTED: *The certificate is valid only to the item calibrated on date and place of calibration.*

TABULATION OF RESULTS:
The table on next page give the measured values.

Calibration procedure:
The Orifice gas flow device was calibrated against Standard Rotary Displacement Meter (Roots Meter) Model G65/IMC/W2-dp. The WI-CL-004 was used as a calibration guideline.

Traceability:
This certificate provides a traceability of the measurement to recognized the national standards, and to realization of the international system of units (SI) through the NIMT (National Metrology Institute of Thailand) via Certificate number: MW-0016-25.

Uncertainty of Measurement:
The reported uncertainty of measurement is based on the standard uncertainty multiplied by a coverage factor k=2, Which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty has been determined in accordance with the GUM 'Evaluation of measurement data - Guide to the expression of uncertainty in measurement'

Calibrated by:
☑ Mr. Sorawit Thachalad
☐ Miss Jittraporn Lertsomphol

Approved signatory: [redacted]
Mr. Parinya Booncharoen
Calibration Department Manager

THIS CERTIFICATE OF CALIBRATION MAY NOT BE REPRODUCED EXCEPT IN FULL UNLESS PERMISSION FORREPRODUCTION HAS BEEN OBTAINED IN WRITING FROM THE LABORATORY

JIRANATEE ASSOCIATES CO.,LTD.

MEASUREMENT RESULTS:

The Orifice gas flow device was calibrated by direct comparison method with the Standard Rotary Displacement Meter (Roots Meter). The Humid air was used as a medium in the system. The standard conditions are 25°C (298.15 K) and 760 mmHg for standard temperature and standard pressure respectively.

Table 1: The results of Q Standard calibration data

Plate	Flow rate m^3/min	Pressure [Pa] mmHg	Temperature [Ta] °C	Temperature [Tm] °C	Δp_meter mmHg	Δp_Orifice inH_2O	Y	Standard Flow [Q_s] m^3/min
1	0.697	759.586	23.99	23.03	53.808	1.789	1.339	0.652
2	1.004	759.590	24.08	23.26	58.411	3.610	1.903	0.931
3	1.116	759.595	24.13	23.46	41.662	4.755	2.183	1.059
4	1.165	759.591	24.20	23.56	30.318	5.357	2.317	1.124
5	1.412	759.613	24.31	23.78	30.173	7.908	2.815	1.361

Slope (m): **2.08293**
Intercept (b): **-0.02450**
Correlation coefficient (r): **0.99962**
Uncertainty (k=2): **0.015** **m^3/min**

Table 2: The results of Q actual calibration data

Plate	Flow rate m^3/min	Pressure [Pa] mmHg	Temperature [Ta] °C	Temperature [Tm] °C	Δp_meter mmHg	Δp_Orifice inH_2O	Y	Standard Flow [Q_a] m^3/min
1	0.697	759.586	23.99	23.03	53.808	1.789	0.837	0.650
2	1.004	759.590	24.08	23.26	58.411	3.610	1.189	0.929
3	1.116	759.595	24.13	23.46	41.662	4.755	1.364	1.057
4	1.165	759.591	24.20	23.56	30.318	5.357	1.448	1.121
5	1.412	759.613	24.31	23.78	30.173	7.908	1.760	1.359

Slope (m): **1.30462**
Intercept (b): **-0.01530**
Correlation coefficient (r): **0.99962**
Uncertainty (k = 2): **0.015** **m^3/min**

End of Certificate of Calibration

Jiranatee Associates Co., Ltd.

METTLER TOLEDO

Mettler-Toledo (Thailand) Ltd.
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Bangna District, Bangkok 10260
+662 723 0382
MT-TH.ServiceSupport@mt.com

NSC-TISI-TIS 17025
CALIBRATION 0062

Accuracy Calibration Certificate

Customer

Company:	Ervironment Research & Technology Co., Ltd.		
Address:	25'114 Moo 6, Soi Chinaket 1, Ngamwongwan Rd., Toongsonghong		
City:	Laksi	**Contact:**	Ramita Taengthai
Zip / Postal:	10210		
State / Province:	Bangkok		
Order Number:			

Weighing Device

Manufacturer:	Mettler Toledo	**Instrument Type:**	Weighing Instrument
Model:	AE204-S	**Asset Number:**	ERTC-L-IN-0048
Serial No.:	1123103723	**Terminal Model:**	N/A
Building:	N/A	**Terminal Serial No.:**	N/A
Floor:	4	**Terminal Asset No.:**	N/A
Room:	406		

Range	Max. Capacity	Readability (d)
1	220 g	0.0001 g

Procedure

Calibration Guideline:	EURAMET cg-18 v. 4.0 (11/2015)
METTLER TOLEDO Work Instruction:	CP/W00220

This calibration certificate contains measurements for As Found calibration. No As Left calibration was performed because the device was not modified after As Found calibration. Therefore, results for As Left correspond to As Found.

The sensitivity/span of the weighing instrument was adjusted before calibration with a built-in weight.

In accordance with EURAMET cg-18 (11/2015), the test loads were selected to reflect the specific use of the weighing device or to accommodate specific calibration conditions.

	Temperature		Humidity	
As Found	Start: 23.1 °C	End: 23.3 °C	Start: 35.7 %	End: 35.2 %

As Found Calibration Date:	16-Jan-2025
As Left Calibration Date:	N/A
Issue Date:	18-Jan-2025

Calibrator: [redacted]
Nithit Jongkrod

Approved Signatory: [redacted]
Technica Manager / Head of Calibration Center

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METTLER TOLEDO Service

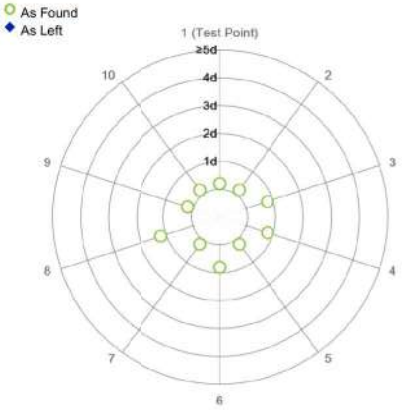
Measurement Results

Repeatability

Test Load: 100 g

	As Found	As Left
1	100.0000 g	N/A
2	100.0000 g	N/A
3	100.0001 g	N/A
4	100.0001 g	N/A
5	100.0000 g	N/A
6	100.0001 g	N/A
7	100.0000 g	N/A
8	99.9999 g	N/A
9	100.0000 g	N/A
10	100.0000 g	N/A

Standard Deviation	**0.00006 g**	**N/A**



The "d" in the graph represents the readability of the range/interval in which the test was performed.

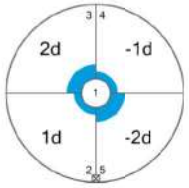
The results of this graph are based upon the absolute values of the differences from the mean value.

Eccentricity

Test Load: 100 g

Position	As Found	As Left
1	100.0000 g	N/A
2	100.0001 g	N/A
3	100.0002 g	N/A
4	99.9999 g	N/A
5	99.9998 g	N/A

Maximum Deviation	**0.0002 g**	**N/A**



As Found

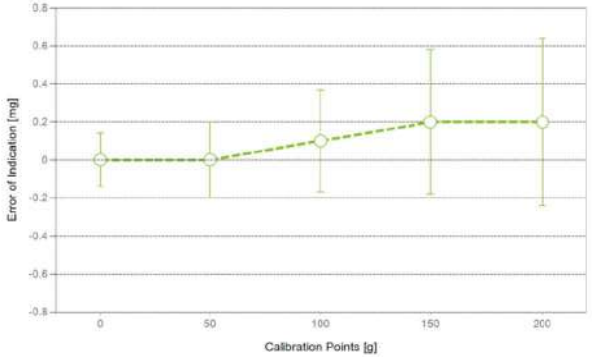
The "d" in the graph represents the readability of the range/interval in which the test was performed.

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Error of Indication

As Found

	Reference Value	Indication	Error of Indication	Expanded Uncertainty	k
1	0.0000 g	0.0000 g	0.0000 g	0.14 mg	2
2	0.0500 g	0.0500 g	0.0000 g	0.15 mg	2
3	0.1000 g	0.1000 g	0.0000 g	0.15 mg	2
4	0.5000 g	0.5000 g	0.0000 g	0.15 mg	2
5	1.0000 g	1.0000 g	0.0000 g	0.15 mg	2
6	5.0000 g	5.0000 g	0.0000 g	0.16 mg	2
7	10.0000 g	10.0000 g	0.0000 g	0.16 mg	2
8	50.0001 g	50.0001 g	0.0000 g	0.20 mg	2
9	99.9999 g	100.0000 g	0.0001 g	0.27 mg	2
10	150.0000 g	150.0002 g	0.0002 g	0.38 mg	2
11	200.0001 g	200.0003 g	0.0002 g	0.44 mg	2



As Found

As Left

For improved legibility of the graphics only increasing measurement points are shown and measurement points close to zero are not displayed.

The expanded measurement uncertainty is reported as the standard measurement uncertainty multipled by the coverage factor k such that the coverage probability corresponds to approximately 95 %.

The user is responsible for maintaining environmental conditions and the settings of the weighing instrument when it was calibrated.
The results of this calibration certificate relate only to the calibrated item.

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Test Equipment

All weights used for metrological testing are traceable to national or international standards. The weights were calibrated and certified by an accredited calibration laboratory.

Weight Set 1: OIML E2

Weight Set No.:	WS52	Date of Issue:	17-Apr-2024
Certificate Number:	191753	Calibration Due Date:	15-Oct-2025

Weight Set 2: OIML E2

Weight Set No.:	WS52-1	Date of Issue:	17-May-2024
Certificate Number:	C420107126	Calibration Due Date:	17-Oct-2025

Weight Set 3: OIML E2

Weight Set No.:	WS52-2	Date of Issue:	17-May-2024
Certificate Number:	C420107129	Calibration Due Date:	28-Oct-2025

Thermo Hygrometer

Equipment No.:	IN302	Date of Issue:	31-Oct-2024
Certificate Number:	SG-H-00908/67	Calibration Due Date:	17-Oct-2025

Remarks

Equipment conditon: Good

Next calibration according to customer's procedure

Calibration data not decide by calibration laboratory

End of Accredited Section

The information below and any attachments to this calibration certificate are not part of the accredited calibration.

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Measurement Uncertainty of the Weighing Instrument in Use

Stated is the expanded uncertainty with k=2 in use. The formula shall be used for the estimation of the uncertainty under consideration of the errors of indication. The value R represents the net load indication in the unit of measure of the device.

Temperature coefficient for the evaluation of the measurement uncertainty in use: $3.0 \cdot 10^{-6}$ / K

Temperature range on site for the evaluation of the measurement uncertainty in use: 3 K

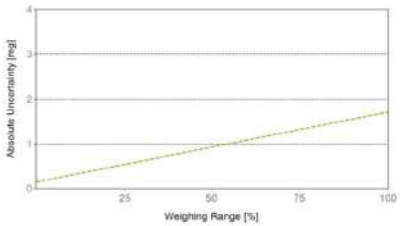
Linearization of Uncertainty Equation

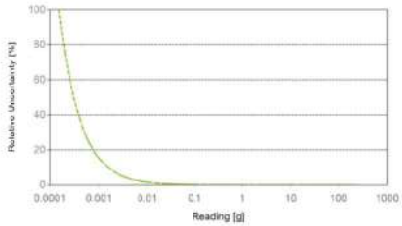
Range			As Found	As Left
	d	Max		
1	0.0001 g	220 g	U_1 = 0.15 mg + 0.00712 mg/g R	N/A

To optimize the stability of the linearization, besides of the zero load only increasing measurement points with a test load of 5% of the measurement range or larger are taken for the calculation of the linear equation.

Absolute and Relative Measurement Uncertainty in Use for Various Net Indications (Examples)

Net Indication	As Found		As Left	
0.0220 g	0.15 mg	0.68%	N/A	N/A
0.2200 g	0.15 mg	0.068%	N/A	N/A
2.2000 g	0.17 mg	0.0075%	N/A	N/A
22.0000 g	0.31 mg	0.0014%	N/A	N/A
220.0000 g	1.7 mg	0.00078%	N/A	N/A





As Found As Left

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GWP® Certificate

As Found ✓

The weighing device meets the given process requirements.

As Left ✓

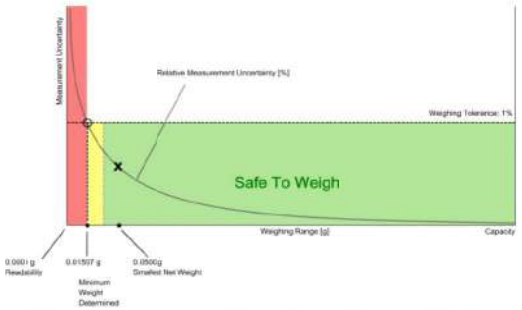
The weighing device meets the given process requirements.

Tests Performed: ☑ As Found ☐ As Left ☑ No adjustments/modifications made. As Left results correspond to As Found.

Process Requirements

Weighing Tolerance: **1%** | Smallest Net Weight: **0.0500 g** | Safety Factor: **2**

Safe Weighing Range



While the values in this graph reflect the actual calibration results, the measurement uncertainty curves are simply a visual representation. This graph reflects As Left testing, unless only As Found was performed.

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Minimum Weight

As Found Minimum Weight Table

Minimum weights for different weighing tolerances and safety factors					
	Safety Factor				
Tolerance	1	2	3	5	10
0.1%	0.15163 g	0.30546 g	0.46152 g	0.78056 g	1.62097 g
0.2%	0.07555 g	0.15163 g	0.22827 g	0.38321 g	0.78056 g
0.5%	0.03015 g	0.06039 g	0.09072 g	0.15163 g	0.30546 g
1%	0.01507 g	0.03015 g	0.04526 g	0.07555 g	0.15163 g
2%	0.00753 g	0.01507 g	0.02261 g	0.03771 g	0.07555 g
5%	0.00301 g	0.00602 g	0.00904 g	0.01507 g	0.03015 g

✓ Pass: The determined minimum weight meets the requirement for the smallest net weight.

As Left Minimum Weight Table

Minimum weights for different weighing tolerances and safety factors					
	Safety Factor				
Tolerance	1	2	3	5	10
0.1%	0.15163 g	0.30546 g	0.46152 g	0.78056 g	1.62097 g
0.2%	0.07555 g	0.15163 g	0.22827 g	0.38321 g	0.78056 g
0.5%	0.03015 g	0.06039 g	0.09072 g	0.15163 g	0.30546 g
1%	0.01507 g	0.03015 g	0.04526 g	0.07555 g	0.15163 g
2%	0.00753 g	0.01507 g	0.02261 g	0.03771 g	0.07555 g
5%	0.00301 g	0.00602 g	0.00904 g	0.01507 g	0.03015 g

✓ Pass: The determined minimum weight meets the requirement for the smallest net weight.

At these net minimum weight values, the measurement uncertainty of the weighing device is equal to or less than 1/1 (no safety factor), 1/2, 1/3, 1/5, or 1/10 of the required tolerance. The values are calculated with k = 2 and based on the linear formula of the measurement uncertainty of the weighing device in use.

The safety factor for As Found is always 1. This implies no safety factor. As Found testing looks at the behavior of the instrument from the past until test occurred. For the past, it is necessary to know that the tolerance was met, but not the safety factor. The safety factor is a proactive measure to apply for future measurements.

Notes on minimum weight values in above table:

1. If "N/A" is shown above, no appropriate value could be calculated.
2. METTLER TOLEDO is not responsible for the definition of the process requirements.

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Measurement Results

Results Summary

	Repeatability	Eccentricity	Error of Indication
As Found	✓	✓	✓
As Left	✓	✓	✓

✓ = Passed
✗ = Failed
⚠ = Safety Factor not met

Repeatability

Test Load: 100 g

		As Found		As Left	
Tolerance	Control Limit	Std. Deviation	Result	Std. Deviation	Result
0.1%	N/A	0.00006 g*	N/A	0.00006 g*	N/A
0.2%	0.00005 g		✗		✗
0.5%	0.00013 g		✓		✓
1%	0.00025 g		✓		✓
2%	0.00050 g		✓		✓
5%	0.00125 g		✓		✓

*The calculated standard deviation value is below the rounding error of the balance. The 0.41*d rule is used for the assessment of this repeatability test and the calculation of the minimum weight.

The weighing tolerance is met if the standard deviation is less than or equal to the corresponding control limit.

Eccentricity

Test Load: 100 g

		As Found		As Left	
Tolerance	Control Limit	Deviation	Result	Deviation	Result
0.1%	0.0500 g	0.0002 g	✓	0.0002 g	✓
0.2%	0.1000 g		✓		✓
0.5%	0.2500 g		✓		✓
1%	0.5000 g		✓		✓
2%	1.0000 g		✓		✓
5%	2.5000 g		✓		✓

The weighing tolerance is met if the deviation is less than or equal to the corresponding control limit.

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Error of Indication

As Found

		Control limits for various weighing tolerances					
Reference Value	Error	0.1%	0.2%	0.5%	1%	2%	5%
0.0000 g	0.0000 g	N/A	N/A	N/A	N/A	N/A	N/A
50.0001 g	0.0000 g	0.0250 g	0.0500 g	0.1250 g	0.2500 g	0.5000 g	1.2500 g
99.9999 g	0.0001 g	0.0500 g	0.1000 g	0.2500 g	0.5000 g	1.0000 g	2.5000 g
150.0000 g	0.0002 g	0.0750 g	0.1500 g	0.3750 g	0.7500 g	1.5000 g	3.7500 g
200.0001 g	0.0002 g	0.1000 g	0.2000 g	0.5000 g	1.0000 g	2.0000 g	5.0000 g
Result		✓	✓	✓	✓	✓	✓

As Left

		Control limits for various weighing tolerances					
Reference Value	Error	0.1%	0.2%	0.5%	1%	2%	5%
0.0000 g	0.0000 g	N/A	N/A	N/A	N/A	N/A	N/A
50.0001 g	0.0000 g	0.0250 g	0.0500 g	0.1250 g	0.2500 g	0.5000 g	1.2500 g
99.9999 g	0.0001 g	0.0500 g	0.1000 g	0.2500 g	0.5000 g	1.0000 g	2.5000 g
150.0000 g	0.0002 g	0.0750 g	0.1500 g	0.3750 g	0.7500 g	1.5000 g	3.7500 g
200.0001 g	0.0002 g	0.1000 g	0.2000 g	0.5000 g	1.0000 g	2.0000 g	5.0000 g
Result		✓	✓	✓	✓	✓	✓

The weighing tolerance is met if the error (of indication) for each test point is less than or equal to the corresponding control limit for that particular weighing tolerance. Results at or close to the zero point cannot be assessed.

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Calibration Data of NOx Analyzer

Analyzer Performance Test

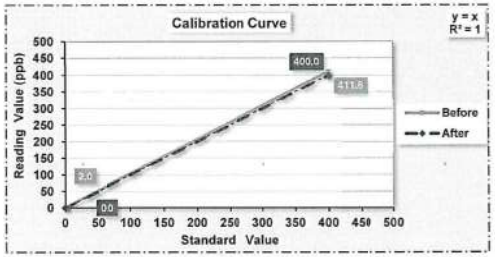
Equipment	Gas Analyzer (NOx)	**Customer Name**	วิชั่นอี คอนซัลแทนท์
Manufacture	HORIBA	**Location**	Envi Research
Model	APNA-370	**Quatation**	2025-00472
Serial No.	U9LS50WU	**Calibration Date**	March 12, 2025
Analyzer Unit	ppb		

Instruments for Calibration

Instruments	Manufacture	Model	Serial Number
Zero Air Supply	Thermo Env.	111	0700419829
Dynamic Dilution Calibrator	Tanabyte	300	0165
Standard Gas Components	CO = 4,516 ppm		
Cylinder No : EB0123013	NO = 55.3 ppm		
Expire Date : Oct 22, 2027	SO_2 = 54.9 ppm		

Single Point Calibration

Standard Gas	Standard Gas Value	Analyzer Value								% Abs Error
		NO_x (ppb)		NO (ppb)		NO_2 (ppb)		Stability		
		Before	After	Before	After	Before	After	Before	After	
Zero	0	4.3	0.0	2.0	0.0	2.3	0.0	-	-	-
Span	400	413.1	400.0	411.6	400.0	1.5	0.0	-	-	2.9



STATUS TEST AND VALIDATION OF NOx ANALYZER MODEL APNA-370

Parameter	Unit	Observed Value		Nominal Range
		Before Adjust	After Adjust	
Range	ppb	500	500	0 - 500 Standard
Signal NO	mV	0.4	0.2	Voltage of the measured NO value
Signal NOx	mV	8.1	7.3	Voltage of the measured NOx value
Detector	°C	40.7	40.7	43 °C ± 5 °C
Ambient	kPa	100.2	100.1	Current atmospheric pressure
DC 24V	V	23.8	23.8	24V ±0.5
DC 5V	V	5.0	5.0	5V ±0.5
NO Slope	-	1.34290	1.33560	0.50000 - 2.0000
NOx Slope	-	1.34240	1.32980	0.50000 - 2.0000

Calibrate By : [redacted]
(MR.PANUPON PODANG)
March 12, 2025

Checked By : [redacted]
(MS.SUTATIP IM-NOI)
March 12, 2025

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Head Office/Tax ID 0105 542 064 981

Calibration Data of NOx Analyzer

Analyzer Performance Test

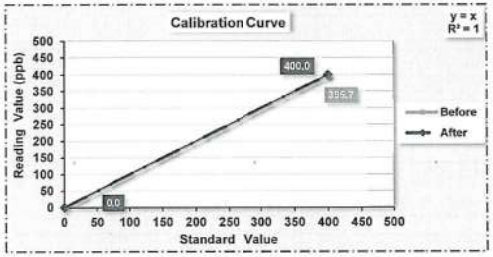
Equipment	Gas Analyzer (NOx)	Customer Name	วิชั่นอี คอนซัลแทนท์
Manufacture	HORIBA	Location	Envi Research
Model	APNA-370	Quatation	2025-00472
Serial No.	AX7HSMEO	Calibration Date	March 24, 2025
Analyzer Unit	ppb		

Instruments for Calibration

Instruments	Manufacture	Model	Serial Number
Zero Air Supply	Thermo Env.	111	0700419829
Dynamic Dilution Calibrator	Tanabyte	300	0165
Standard Gas Components	CO = 4,516 ppm		
Cylinder No : EB0123013	NO = 55.3 ppm		
Expire Date : Oct 22, 2027	SO_2 = 54.9 ppm		

Single Point Calibration

Standard Gas	Standard Gas Value	Analyzer Value								% Abs Error
		NO_x (ppb)		NO (ppb)		NO_2 (ppb)		Stability		
		Before	After	Before	After	Before	After	Before	After	
Zero	0	-0.2	0.0	-0.1	0.0	-0.1	0.0	-	-	-
Span	400	395.4	400.0	395.7	400.0	-0.3	0.0	-	-	1.1



STATUS TEST AND VALIDATION OF NOx ANALYZER MODEL APNA-370

Paramater	Unit	Observed Value		Nominal Range
		Before Adjust	After Adjust	
Range	ppb	500	500	0 - 500 Standard
Signal NO	mV	0.9	1.0	Voltage of the measured NO value
Signal NOx	mV	12.7	13.5	Voltage of the measured NOx value
Detector	°C	38.7	38.7	43 °C ± 5 °C
Ambient	kPa	100.8	100.8	Current atmospheric pressure
DC 24V	V	23.6	23.6	24V ±0.5
DC 5V	V	5.0	5.0	5V ±0.5
NO Slope	-	0.79114	0.79485	0.50000 - 2.0000
NOx Slope	-	0.78498	0.78689	0.50000 - 2.0000

Calibrate By : [redacted]
(MR.PANUPON PODANG)
March 24, 2025

Checked By : [redacted]
(MS.SUTATIP IM-NOI)
March 24, 2025

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Head Office/Tax ID 0105 542 064 981

Calibration Data of NOx Analyzer

Analyzer Performance Test

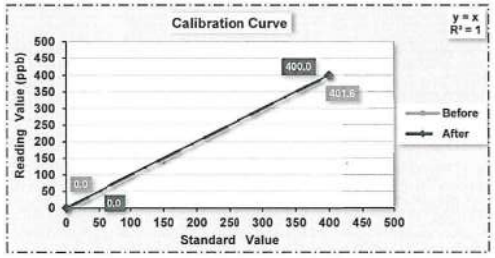
Equipment	Gas Analyzer (NOx)	Customer Name	วิชั่นอี คอนซัลแทนท์
Manufacture	HORIBA	Location	Envi Research
Model	APNA-370	Quatation	2025-00472
Serial No.	4VWFEBUK	Calibration Date	March 20, 2025
Analyzer Unit	ppb		

Instruments for Calibration

Instruments	Manufacture	Model	Serial Number
Zero Air Supply	Thermo Env.	111	0700419829
Dynamic Dilution Calibrator	Tanabyte	300	0165
Standard Gas Components	CO = 4,516 ppm		
Cylinder No : EB0123013	NO = 55.3 ppm		
Expire Date : Oct 22, 2027	SO_2 = 54.9 ppm		

Single Point Calibration

Standard Gas	Standard Gas Value	Analyzer Value								% Abs Error
		NO_x (ppb)		NO (ppb)		NO_2 (ppb)		Stability		
		Before	After	Before	After	Before	After	Before	After	
Zero	0	0.5	0.0	0.0	0.0	0.5	0.0	-	-	-
Span	400	402.5	400.0	401.6	400.0	0.9	0.0	-	-	0.4



STATUS TEST AND VALIDATION OF NOx ANALYZER MODEL APNA-370

Parameter	Unit	Observed Value		Nominal Range
		Before Adjust	After Adjust	
Range	ppb	500	500	0 - 500 Standard
Signal NO	mV	0.5	0.6	Voltage of the measured NO value
Signal NOx	mV	10.4	10.1	Voltage of the measured NOx value
Detector	°C	393.0	39.3	43 °C ± 5 °C
Ambient	kPa	101.1	101.0	Current atmospheric pressure
DC 24V	V	23.6	23.6	24V ±0.5
DC 5V	V	5.0	5.0	5V ±0.5
NO Slope	-	1.41540	1.41420	0.50000 - 2.0000
NOx Slope	-	1.37250	1.37240	0.50000 - 2.0000

Calibrate By : [redacted]
(MR.PANUPON PODANG)
March 20, 2025

Checked By : [redacted]
(MS.SUTATIP IM-NOI)
March 20, 2025

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Calibration Data of SO_2 Analyzer

Analyzer Performance Test

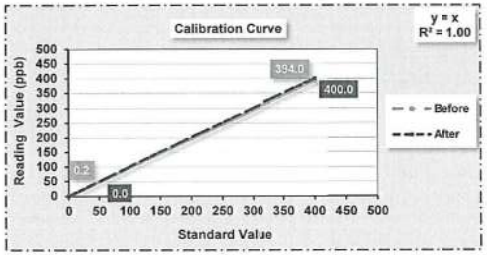
Equipment	Gas Analyzer (SO_2)	**Costomer Name**	วิชั่นอี คอนซัลแทนท์
Manufacture	Thermo	**Location**	Envi Research
Model	43C	**Quatation**	2025-00472
Serial No.	0607415768	**Calibration Date**	March 17, 2025
Analyzer Unit	ppb		

Instruments for Calibration

Instruments	Manufacture	Model	Serial Number
Zero Air Supply	Thermo Env.	111	0700419829
Dynamic Dilution Calibrator	Tanabyte	300	0165
Standard Gas Components	CO = 4,516 ppm		
Cylinder No : EB0123013	NO = 55.3 ppm		
Expire Date : Oct 22, 2027	SO_2 = 54.9 ppm		

Single Point Calibration

Standard Gas	Standard Gas Value	Analyzer Value (ppb)		Stability		% Abs Error
		Before	After	Before	After	
Zero	0	0.2	0.0	-	-	-
Span	400	394.0	400.0	-	-	1.5



STATUS TEST AND VALIDATION OF SO_2 ANALYZER MODEL 43C

Parameter	Display As	Unit	Observed Value		Nominal Range
			Before Adjust	After Adjust	
Range	RANGE	ppb	500	500	0 - 500 standard
Internal Temperature	INTERNAL	°c	31.8	32.1	8.0 °C to 47.0 °C
Chamber Temp	CHAMBER	°c	44.3	44.4	43.0 °C to 47.0 °C
Pressure	PRESSURE	mmHg	736.1	736.1	400.0 to 1,000
Sample Flow	SAMP FLOW	LPM	0.866	0.867	0.350 to 1.000
Lamp Intensity	INTENSITY	Hz	23,738	22,953	20,000 to 50,000
Lamp Voltage	LAMP VOLTAGE	V	854	854	750 to 1,200
SO2 Concentration	SO2 CONCENTRATION	ppb	1.4	0.9	0 to 10,000
Motherboard Status	MOTHERBOARD STATUS	-	OK	OK	OK
Interface Status	INTERFACE STATUS	-	OK	OK	OK

Calibrate By : [redacted]
(MR.PANUPON PODANG)
March 17, 2025

Checked By : [redacted]
(MS.SUTATIP IM-NOI)
March 17, 2025

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Head Office/Tax ID 0105 542 064 981

Calibration Data of SO_2 Analyzer

Analyzer Performance Test

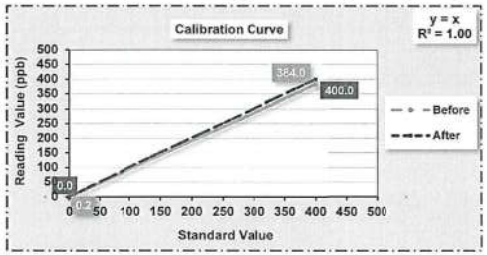
Equipment	Gas Analyzer (SO_2)	**Costomer Name**	วิชั่นอี คอนซัลแทนท์
Manufacture	Thermo	**Location**	Envi Research
Model	43C	**Quatation**	2025-00472
Serial No.	57469-317	**Calibration Date**	March 17, 2025
Analyzer Unit	ppb		

Instruments for Calibration

Instruments	Manufacture	Model	Serial Number
Zero Air Supply	Thermo Env.	111	0700419829
Dynamic Dilution Calibrator	Tanabyte	300	0165
Standard Gas Components	CO = 4,516 ppm		
Cylinder No : EB0123013	NO = 55.3 ppm		
Expire Date : Oct 22, 2027	SO_2 = 54.9 ppm		

Single Point Calibration

Standard Gas	Standard Gas Value	Analyzer Value (ppb)		Stability		% Abs Error
		Before	After	Before	After	
Zero	0	0.2	0.0	-	-	-
Span	400	384.0	400.0	-	-	4.0



STATUS TEST AND VALIDATION OF SO_2 ANALYZER MODEL 43C

Parameter	Display As	Unit	Observed Value		Nominal Range
			Before Adjust	After Adjust	
Range	RANGE	ppb	500	500	0 - 500 standard
Internal Temperature	INTERNAL	°c	31.8	32.1	8.0 °C to 47.0 °C
Chamber Temp	CHAMBER	°c	44.3	44.4	43.0 °C to 47.0 °C
Pressure	PRESSURE	mmHg	736.1	736.1	400.0 to 1,000
Sample Flow	SAMP FLOW	LPM	0.866	0.867	0.350 to 1.000
Lamp Intensity	INTENSITY	Hz	23,738	22,953	20,000 to 50,000
Lamp Voltage	LAMP VOLTAGE	V	845	854	750 to 1,200
SO2 Concentration	SO2 CONCENTRATION	ppb	1.4	0.9	0 to 10,000
Motherboard Status	MOTHERBOARD STATUS	-	OK	OK	OK
Interface Status	INTERFACE STATUS	-	OK	OK	OK

Calibrate By : [redacted]
(MR.PANUPON PODANG)
March 17, 2025

Checked By : [redacted]
(MS.SUTATIP IM-NOI)
March 17, 2025

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Calibration Data of SO_2 Analyzer

Analyzer Performance Test

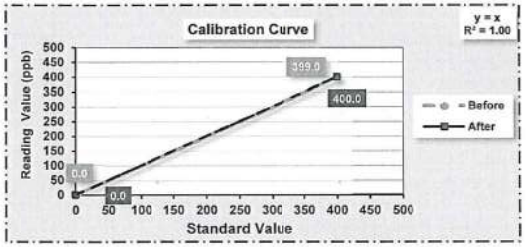
Equipment	Gas Analyzer (SO_2)	**Customer Name**	วิษัน อี คอนซัลแทนท์
Manufacture	Thermo	**Location**	Envi Research
Model	43i-BNSAA	**Quatation**	2025-00472
Serial No.	CM14430004	**Calibration Date**	March 7, 2025
Analyzer Unit	ppb		

Instruments for Calibration

Instruments	Manufacture	Model	Serial Number
Zero Air Supply	Thermo Env.	111	0700419829
Dynamic Dilution Calibrator	Tanabyte	300	0165
Standard Gas Components	CO = 4,516 ppm		
Cylinder No : EB0123013	NO = 55.3 ppm		
Expire Date : Oct 22, 2027	SO_2 = 54.9 ppm		

Single Point Calibration

Standard Gas	Standard Gas Value	Analyzer Value (ppb)		Stability		% Abs Error
		Before	After	Before	After	
Zero	0	0.0	0.0	-	-	-
Span	400	399.0	400.0	-	-	0.3



STATUS TEST AND VALIDATION OF SO_2 ANALYZER MODEL 43i-BNSAA

Parameter	Display As	Unit	Observed Value		Nominal Range
			Before Adjust	After Adjust	
Range	RANGE	ppb	500	500	0 - 500 standard
Internal Temperature	INTERNAL	°c	30.9	30.7	8.0 °C to 45.0 °C
Chamber Temp	CHAMBER	°c	45.0	44.8	43.0 °C to 47.0 °C
Pressure	PRESSURE	mmHg	739.2	740.1	400.0 to 1,000
Sample Flow	SAMP FLOW	LPM	0.35	0.351	0.350 to 0.750
Lamp Intensity	LAMP INTENSITY	%	91	91	20 to 100
Lamp Voltage	LAMP VOLTAGE	V	993	994	500 to 1200
SO2 Concentration	SO2 CONCENTRATION	ppb	0.7	1	0 to 10,000
Motherboard Status	MOTHERBOARD STATUS	-	OK	OK	OK
Interface Status	INTERFACE STATUS	-	OK	OK	OK

Calibrate By : [redacted]
(MR.PANUPON PODANG)
March 7, 2025

Checked By : [redacted]
(MS.SUTATIP IM-NOI)
March 7, 2025

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Calibration Data of SO_2 Analyzer

Analyzer Performance Test

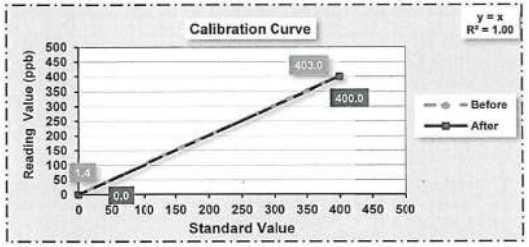
Equipment	Gas Analyzer (SO_2)	**Customer Name**	วิษัน อี คอนซัลแทนท์
Manufacture	Thermo	**Location**	Envi Research
Model	43i-BNSAA	**Quatation**	2025-00472
Serial No.	CM14430005	**Calibration Date**	March 17, 2025
Analyzer Unit	ppb		

Instruments for Calibration

Instruments	Manufacture	Model	Serial Number
Zero Air Supply	Thermo Env.	111	0700419829
Dynamic Dilution Calibrator	Tanabyte	300	0165
Standard Gas Components	CO = 4,516 ppm		
Cylinder No : EB0123013	NO = 55.3 ppm		
Expire Date : Oct 22, 2027	SO_2 = 54.9 ppm		

Single Point Calibration

Standard Gas	Standard Gas Value	Analyzer Value (ppb)		Stability		% Abs Error
		Before	After	Before	After	
Zero	0	1.4	0.0	-	-	-
Span	400	403.0	400.0	-	-	0.8



STATUS TEST AND VALIDATION OF SO_2 ANALYZER MODEL 43i-BNSAA

Parameter	Display As	Unit	Observed Value		Nominal Range
			Before Adjust	After Adjust	
Range	RANGE	ppb	500	500	0 - 500 standard
Internal Temperature	INTERNAL	°c	33.8	33.8	8.0 °C to 45.0 °C
Chamber Temp	CHAMBER	°c	44.9	45.0	43.0 °C to 47.0 °C
Pressure	PRESSURE	mmHg	755.2	755.4	400.0 to 1,000
Sample Flow	SAMP FLOW	LPM	0.354	0.353	0.350 to 0.750
Lamp Intensity	LAMP INTENSITY	%	91	91	20 to 100
Lamp Voltage	LAMP VOLTAGE	V	973	973	500 to 1200
SO2 Concentration	SO2 CONCENTRATION	ppb	2.9	1.4	0 to 10,000
Motherboard Status	MOTHEREOARD STATUS	-	OK	OK	OK
Interface Status	[redacted]	-	OK	OK	[redacted]

Calibrate By : [redacted]
(MR.PANUPON PODANG)
March 17, 2025

Checked By : [redacted]
(MS.SUTATIP IM-NOI)
March 17, 2025

envi research
ENVIRONMENT RESEARCH & TECHNOLOGY CO., LTD.

Environment Research & Technology Company Limited
25/114 Mu 6 Soi Chinnakhet 1, Ngam Wong Wan Road,
Thung Song Hong, Lak Si, Bangkok 10210
Tel 0-2954-7745-6 Fax 0-2954-7747
E-mail : envi@enviresearch.co.th
www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

Calibration Data of CO Analyzer

Analyzer Performance Test

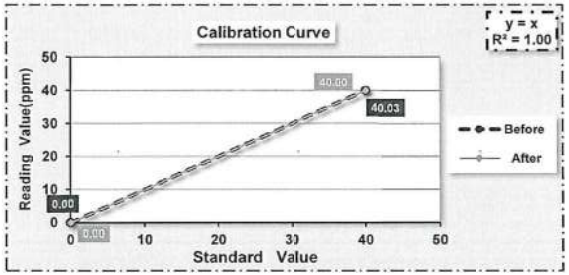
Equipment	Gas Analyzer (CO)	Customer Name	วิชันอี คอนซัลแทนท์
Manufacture	HORIBA	Location	Envi Research
Model	APMA-370	Quatation	2025-00472
Serial No.	GFB0BLNC	Calibration Date	March 20, 2025
Analyzer Unit	ppm		

Instruments for Calibration

Instruments	Manufacture	Model	Serial Number
Zero Air Supply	Thermo Env.	111	0700419829
Dynamic Dilution Calibrator	Tanabyte	300	0165
Standard Gas Components	CO = 4,487 ppm		
Cylinder No : EB0123013	NO = 46.1 ppm		
Expire Date : Oct 22, 2027	SO_2 = 46.0 ppm		

Single Point Calibration

Standard Gas	Standard Gas Value	Analyzer Value (ppm)		Stability		% Abs Error
		Before	After	Before	After	
Zero	0	0.00	0.00	-	-	-
Span	40	40.03	40.00	-	-	0.08



STATUS TEST AND VALIDATION OF CO ANALYZER MODEL APMA-370

Parameter	Unit	Observed Value		Nominal Range
		Before Adjust	After Adjust	
SIGNAL(MAIN)	mV	3.1	3.2	Voltage of the measured CO Value
SIGNAL (COMP)	mV	0.0	0.1	Voltage of the interference component Value
CELL	°C	31.3	31.4	Ambient + (5 to 10 C)
PUMP	kpa	43.5	43.4	less than 65
AMBIENT	kpa	102.1	102.0	Atmospheric pressure
DC 24V	mV	23.9	23.9	24+/- 0.5 V
DC 5V	mV	4.9	4.9	5+/- 0.5 V

Calibrate By : [redacted]
(MR.PANUPON PODANG)
March 20, 2025

Checked By : [redacted]
(MS.SUTATIP IM-NOI)
March 20, 2025

envi research
ENVIRONMENT RESEARCH & TECHNOLOGY CO., LTD.

Environment Research & Technology Company Limited
25/114 Mu 6 Soi Chinnakhet 1, Ngam Wong Wan Road,
Thung Song Hong, Lak Si, Bangkok 10210
Tel 0-2954-7745-6 Fax 0-2954-7747
E-mail : envi@enviresearch.co.th
www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

Calibration Data of CO Analyzer

Analyzer Performance Test

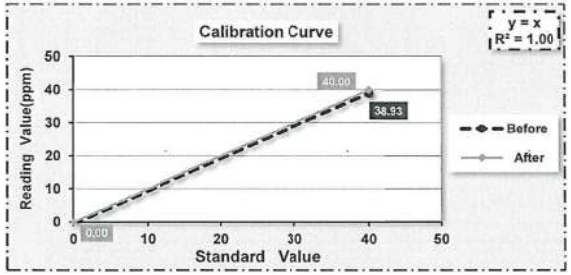
Equipment	Gas Analyzer (CO)	Customer Name	วิชันอี คอนซัลแทนท์
Manufacture	HORIBA	Location	Envi Research
Model	APMA-370	Quatation	2025-00472
Serial No.	JHG8PWA8	Calibration Date	March 20, 2025
Analyzer Unit	ppm		

Instruments for Calibration

Instruments	Manufacture	Model	Serial Number
Zero Air Supply	Thermo Env.	111	0700419829
Dynamic Dilution Calibrator	Tanabyte	300	0165
Standard Gas Components	CO = 4,487 ppm		
Cylinder No : EB0123013	NO = 46.1 ppm		
Expire Date : Oct 22, 2027	SO_2 = 46.0 ppm		

Single Point Calibration

Standard Gas	Standard Gas Value	Analyzer Value (ppm)		Stability		% Abs Error
		Before	After	Before	After	
Zero	0	-0.47	0.00	-	-	-
Span	40	38.93	40.00	-	-	2.68



STATUS TEST AND VALIDATION OF CO ANALYZER MODEL APMA-370

Parameter	Unit	Observed Value		Nominal Range
		Before Adjust	After Adjust	
SIGNAL(MAIN)	mV	3.3	3.8	Voltage of the measured CO Value
SIGNAL (COMP)	mV	0.8	0.9	Voltage of the interference component Value
CELL	°C	31.7	31.7	Ambient + (5 to 10 C)
PUMP	kpa	38.5	38.8	less than 65
AMBIENT	kpa	101.0	101.0	Atmospheric pressure
DC 24V	mV	23.9	23.9	24+/- 0.5 V
DC 5V	mV	4.9	4.9	5+/- 0.5 V

Calibrate By : [redacted]
(MR.PANUPON PODANG)
March 20, 2025

Checked By : [redacted]
(MS.SUTATIP IM-NOI)
March 20, 2025

envi research
ENVIRONMENT RESEARCH & TECHNOLOGY CO., LTD.

Environment Research & Technology Company Limited
25/114 Mu 6 Soi Chinnakhet 1, Ngam Wong Wan Road,
Thung Song Hong, Lak Si, Bangkok 10210
Tel 0-2954-7745-6 Fax 0-2954-7747
E-mail : envi@envireserach.co.th
www.envireserach.co.th
Head Office/Tax ID 0105 542 064 981

Calibration Data of CO Analyzer

Analyzer Performance Test

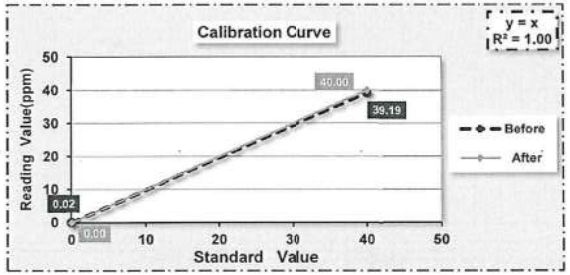
Equipment	Gas Analyzer (CO)	Customer Name	วิชันธ์ คอนซัลแทนท์
Manufacture	HORIBA	Location	Envi Research
Model	APMA-370	Quatation	2025-00472
Serial No.	Y05LRYAD	Calibration Date	March 20, 2025
Analyzer Unit	ppm		

Instruments for Calibration

Instruments	Manufacture	Model	Serial Number
Zero Air Supply	Thermo Env.	111	0700419829
Dynamic Dilution Calibrator	Tanabyte	300	0165
Standard Gas Components	CO = 4,487 ppm		
Cylinder No : EB0123013	NO = 46.1 ppm		
Expire Date : Oct 22, 2027	SO_2 = 46.0 ppm		

Single Point Calibration

Standard Gas	Standard Gas Value	Analyzer Value (ppm)		Stability		% Abs Error
		Before	After	Before	After	
Zero	0	0.02	0.00	-	-	-
Span	40	39.19	40.00	-	-	2.03



STATUS TEST AND VALIDATION OF CO ANALYZER MODEL APMA-370

Parameter	Unit	Observed Value		Nominal Range
		Before Adjust	After Adjust	
SIGNAL(MAIN)	mV	0.9	1	Voltage of the measured CO Value
SIGNAL (COMP)	mV	0.0	0.1	Voltage of the interference component Value
CELL	°C	32.8	32.9	Ambient + (5 to 10 C)
PUMP	kpa	41.8	41.7	less than 65
AMBIENT	kpa	100.5	100.5	Atmospheric pressure
DC 24V	mV	24.0	24.0	24+/- 0.5 V
DC 5V	mV	4.8	4.8	5+/- 0.5 V

Calibrate By : [redacted]
(MR.PANUPON PODANG)
March 20, 2025

Checked By : [redacted]
(MS.SUTATIP IM-NOI)
March 20, 2025

envi research
ENVIRONMENT RESEARCH & TECHNOLOGY CO., LTD.

Environment Research & Technology Company Limited
25/114 Mu 6 Soi Chinnakhet 1, Ngam Wong Wan Road,
Thung Song Hong, Lak Si, Bangkok 10210
Tel 0-2954-7745-6 Fax 0-2954-7747
E-mail : envi@envireserach.co.th
www.envireserach.co.th
Head Office/Tax ID 0105 542 064 981

Calibration Data of CO Analyzer

Analyzer Performance Test

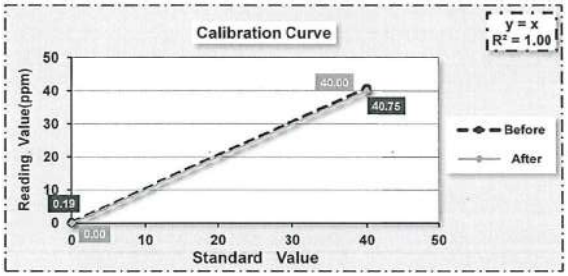
Equipment	Gas Analyzer (CO)	Customer Name	วิชันธ์ คอนซัลแทนท์
Manufacture	HORIBA	Location	Envi Research
Model	APMA-370	Quatation	2025-00472
Serial No.	RBBRW0L3	Calibration Date	March 20, 2025
Analyzer Unit	ppm		

Instruments for Calibration

Instruments	Manufacture	Model	Serial Number
Zero Air Supply	Thermo Env.	111	0700419829
Dynamic Dilution Calibrator	Tanabyte	300	0165
Standard Gas Components	CO = 4,487 ppm		
Cylinder No : EB0123013	NO = 46.1 ppm		
Expire Date : Oct 22, 2027	SO_2 = 46.0 ppm		

Single Pcint Calibration

Standard Gas	Standard Gas Value	Analyzer Value (ppm)		Stability		% Abs Error
		Before	After	Before	After	
Zero	0	0.19	0.00	-	-	-
Span	40	40.75	40.00	-	-	1.88



STATUS TEST AND VALIDATION OF CO ANALYZER MODEL APMA-370

Parameter	Unit	Observed Value		Nominal Range
		Before Adjust	After Adjust	
SIGNAL(MAIN)	mV	2.3	2.2	Voltage of the measured CO Value
SIGNAL (COMP)	mV	0.3	0.2	Voltage of the interference component Value
CELL	°C	35.2	3.1	Ambient + (5 to 10 C)
PUMP	kpa	47.6	47.5	less than 65
AMBIENT	kpa	101.4	101.3	Atmospheric pressure
DC 24V	mV	23.9	23.9	24+/- 0.5 V
DC 5V	mV	4.8	4.8	5+/- 0.5 V

Calibrate By : [redacted]
(MR.PANUPON PODANG)
March 20, 2025

Checked By : [redacted]
(MS.SUTATIP IM-NOI)
March 20, 2025

Airgas
an Air Liquide company

Airgas Specialty Gases
Airgas USA, LLC
6141 Easton Road
Bldg 1
Plumsteadville, PA 189-49
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number:	E04NI99E15A0292	Reference Number:	160-401604495-1
Cylinder Number:	EB0123013	Cylinder Volume:	144.4 Cubic Feet
Laboratory:	124 - Plumsteadville - PA	Cylinder Pressure:	2015 PSIG
PGVP Number:	A12019	Valve Outlet:	660
Gas Code:	CO,NO,NOX,SO2,BALN	Certification Date:	Oct 22, 2019

Expiration Date: Oct 22, 2027

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	55.00 PPM	55.27 PPM	G1	+/- 0.8% NIST Traceable	10/14/2019, 10/22/2019
NITRIC OXIDE	55.00 PPM	55.27 PPM	G1	+/- 0.8% NIST Traceable	10/14/2019, 10/22/2019
SULFUR DIOXIDE	55.00 PPM	54.93 PPM	G1	+/- 0.9% NIST Traceable	10/14/2019, 10/22/2019
CARBON MONOXIDE	4500 PPM	4516 PPM	G1	+/- 0.6% NIST Traceable	10/14/2019
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	13010429	KAL004123	97.6 PPM NITRIC OXIDE/NITROGEN	+/- 0.8%	Jul 23, 2025
NTRM	13010429	KAL004123	97.6 PPM NOx/NITROGEN	+/- 0.8%	Jul 23, 2025
NTRM	16010235	KAL004419	97.69 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.8%	Dec 23, 2021
NTRM	08012318	KAL004620	4857 PPM CARBON MONOXIDE/NITROGEN	+/- 0.6%	Jun 07, 2024

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
MKS FTIR - CO - 000928781	FTIR	Sep 26, 2019
MKS FTIR - NO - 000928781	FTIR	Oct 18, 2019
MKS FTIR - NOx - 000928781	FTIR	Oct 18, 2019
MKS FTIR - SO2 - 000928781	FTIR	Oct 03, 2019

Triad Data Available Upon Request

NOTES: Gross Weight: 28.0 Kg, Net Weight: 4.6 Kg.

[redacted]
Approved for Release

THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

Calibration Certificate

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

Date of Issue 15 January, 2025 Certification No. 043/25

Object : Weather Station

Manufacturer : Davis Instruments Inc.

Type : Vantage Pro 2 ID No. : No.22

Serial No. : Display AS160105011 Transmitter BD181211070

Customer : Environment Research & Technology Company Limited.
25/113-114 Moo 6 Soi Chinaket 1, Ngamworgwan Road,
Toongsonghong, Laksi, Bangkok 10210.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1014.2 hPa

NATIONAL STANDARD WIND TUNNEL :

: Micromanometer Theodor Friedrichs FC014 Serial No. 9310119

: HOOK GAGE NO 1425 Pitot Tube Theodor Friedrichs Type 0800.0000 serial 9023

N.I.S.T. Test Reference Number 731/241460 : Standard Velocity at 20 - 30 m/sec

: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)

Serial Number 110730029 (sensor 120629586)

JAPAN QUALITY ASSURANCE ORGANIZATION : Standard Velocity at 0 - 20 m/sec

STANDARD THERMOMETER : Theodor Friedrich : Dry No.8390/94 Wet No. 8389/94

: [redacted] No.918802

Calibrated by : [redacted]

Mr. Watcharapol Subwat
Mechanical Engineer

(Authorised Signatory)
for the Chief
Sub-Standard Instrument

กรมอุตุนิยมวิทยา METEOROLOGICAL DEPARTMENT

THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

The Result of Calibration

Certification No. 043/25

15 January, 2025

Standard	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
Ultrasonic Anemometer	Pressure	Vacumm	Velocity	Velocity	Correction
m/sec	inches H2O	inches H2O	m/sec	m/sec	m/sec
1.00	-	-	-	0.9	0.10
3.02	-	-	-	2.7	0.32
5.00	-	-	-	4.9	0.10
7.04	-	-	-	7.0	0.04
9.02	-	-	-	8.9	0.12
11.01	-	-	-	11.0	0.01
13.01	-	-	-	13.0	0.01
15.01	-	-	-	15.0	0.01
17.02	-	-	-	17.0	0.02
20.02	-	-	-	20.0	0.02

Wind Aloft Plotting Board. US.DEPARTMENT OF COMMERCE WEATHER BUREAU	
WIND DIRETION	TESTED WIND DIRECTION
0	0
90	90
180	180
270	270

Calibrated by : [redacted]

Mr. Watcharapol Subwat

Mechanical Engineer

Calibration & Test Section

Meteorological Instruments Bureau

THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 0-2396-0156,0-2399-0469

The Result of Calibration

Certification No. 043/25

15 January, 2025

Standard	Temperature Sensor Reading	
Temp.	Reading	Correction
°C	°C	°C
48.2	48.0	0.2
30.5	30.4	0.1
15.8	15.8	0.0

Calibrated by : [redacted]

Mr. Watcharapol Subwat

Mechanical Engineer

Calibration & Test Section

Meteorological Instruments Bureau

THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

Calibration Certificate

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

Date of Issue 15 January, 2025 Certification No. 042/25

Object : Weather Station

Manufacturer : Davis Instruments Inc.

Type : Vantage Pro 2 ID No. : No.21

Serial No. : Display AS160105017 Transmitter BE181108006

Customer : Environment Research & Technology Company Limited.
25/113-114 Moo 6 Soi Chinaket 1, Ngamwongwan Road,
Toongsonghong, Laksi, Bangkok 10210.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1014.5 hPa

NATIONAL STANDARD WIND TUNNEL :

: Micromanometer Theodor Friedrichs FC014 Serial No. 9310119

: HOOK GAGE NO 1425 Pitot Tube Theodor Friedrichs Type 0800.0300 serial 9023

N.I.S.T. Test Reference Number 731/241460 : Standard Velocity at 20 - 30 m/sec

: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)

Serial Number 110730029 (sensor 120629586)

JAPAN QUALITY ASSURANCE ORGANIZATION : Standard Velocity at 0 - 20 m/sec

STANDARD THERMOMETER : Theodor Friedrich : Dry No.8390/94 Wet No. 8389/94

r No.918802

Calibrated by : [redacted]

Mr. Watcharapol Subwat

Mechanical Engineer

(Authorised Signatory)
for the Chief
Sub-Standard Instrument

THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

The Result of Calibration

Certification No. 042/25

15 January, 2025

Standard	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
Ultrasonic Anemometer	Pressure	Vacumm	Velocity	Velocity	Correction
m/sec	inches H2O	inches H2O	m/sec	m/sec	m/sec
1.00	-	-	-	0.9	0.10
3.02	-	-	-	2.7	0.32
5.00	-	-	-	4.9	0.10
7.04	-	-	-	7.0	0.04
9.02	-	-	-	8.9	0.12
11.01	-	-	-	11.0	0.01
13.01	-	-	-	13.0	0.01
15.01	-	-	-	15.0	0.01
17.02	-	-	-	17.0	0.02
20.02	-	-	-	20.0	0.02

Wind Aloft Plotting Board. US.DEPARTMENT OF COMMERCE WEATHER BUREAU	
WIND DIRETION	TESTED WIND DIRECTION
0	0
90	90
180	180
270	270

Calibrated by : [redacted]

Mr. Watcharapol Subwat

Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 0-2396-0156,0-2399-0469

The Result of Calibration

Certification No. 042/25

15 January, 2025

Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
48.2	48.1	0.1
30.5	30.4	0.1
15.8	15.8	0.0

Calibrated by : [redacted]

Mr. Watcharapol Subwat

Mechanical Engineer

Calibration & Test Section

Meteorological Instruments Bureau

THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

Calibration Certificate

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

Date of Issue 12 December, 2024

Certification No. 441/24

Object : Wind speed and wind direction

Manufacturer : Davis Instruments Inc.

Type : Weather Wizard III Product No. 7425

Serial No. : WE91016A07 ID No. : No.9

Customer : Environment Research & Technology Company Limited.
25/113-114 Moo 6 Soi Chinaket 1, Ngamwongwan Road,
Toongsorghong, Laksi, Bangkok 10210.

Calibration Condition : Temperature 25.1 ° C Barometric Pressure 1008.9 hPa

NATIONAL STANDARD WIND TUNNEL :

: Micromanometer Theodor Friedrichs FC014 Serial No. 9310119

: HOOK GAGE NO 1425 Pitot Tube Theodor Friedrichs Type 0800.0000 serial 9023

N.I.S.T. Test Reference Number 731/241460 : Standard Velocity at 20 - 30 m/sec

: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)

Serial Number 110730029 (sensor 120629586)

JAPAN QUALITY ASSURANCE ORGANIZATION : Standard Velocity at 0 - 20 m/sec

Calibrated by : [redacted]

Mr. Watcharapol Subwat

Mechanical Engineer

Sig[redacted]

Mr.

(Authorised Signatory)

for the Chief

Sub-Standard Instrument

THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

The Result of Calibration

Certification No. 441/24

12 December, 2024 Page : 2 of 2

Standard	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
Ultrasonic Anemometer	Pressure	Vacumm	Velocity	Velocity	Correction
m/sec	inches H2O	inches H2O	m/sec	m/sec	m/sec
1.00	-	-	-	0.9	0.10
3.02	-	-	-	2.7	0.32
5.00	-	-	-	4.9	0.10
7.04	-	-	-	6.7	0.34
9.02	-	-	-	8.9	0.12
11.01	-	-	-	10.7	0.31
13.01	-	-	-	13.0	0.01
15.01	-	-	-	14.7	0.31
17.02	-	-	-	17.0	0.02
20.02	-	-	-	19.8	0.22

Wind Aloft Plotting Board. US.DEPARTMENT OF COMMERCE WEATHER BUREAU	
WIND DIRETION	TESTED WIND DIRECTION
0	0
90	90
180	180
270	270

Calibrated by : [redacted]

Mr. Watcharapol Subwat

Mechanical Engineer

Calibration & Test Section

Meteorological Instruments Bureau

THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

Calibration Certificate

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

Date of Issue 15 January, 2025 Certification No. 041/25

Page : 1 of 2

Object : Wind speed and wind direction

Manufacturer : Davis Instruments Inc.

Type : Weather Wizard III Product No. 7425

Serial No. : WC40922A02 ID No. : No.32

Customer : Environment Research & Technology Company Limited.
25/113-114 Moo 6 Soi Chinaket 1, Ngamwongwan Road,
Toongsonghong, Laksi, Bangkok 10210.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1014.7 hPa

NATIONAL STANDARD WIND TUNNEL :

: Micromanometer Theodor Friedrichs FC014 Serial No. 9310119

: HOOK GAGE NO 1425 Pitot Tube Theodor Friedrichs Type 0800.0000 serial 9023

N.I.S.T. Test Reference Number 731/241460 : Standard Velocity at 20 - 30 m/sec

: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)

Serial Number 110730029 (sensor 120629586)

JAPAN QUALITY ASSURANCE ORGAN[redacted] : Standard Velocity at 0 - 20 m/sec

Calibrated by : [redacted]

Mr. Watcharapol Subwat

Mechanical Engineer

Signed [redacted]

Mr. Pi[redacted]

(Authorised Signatory)

for the Chief

Sub-Standard Instrument

THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

The Result of Calibration

Certification No. 041/25

15 January, 2025 Page : 2 of 2

Standard	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
Ultrasonic Anemometer	Pressure	Vacumm	Velocity	Velocity	Correction
m/sec	inches H2O	inches H2O	m/sec	m/sec	m/sec
1.00	-	-	-	0.9	0.10
3.02	-	-	-	2.7	0.32
5.00	-	-	-	4.9	0.10
7.04	-	-	-	6.9	0.14
9.02	-	-	-	9.0	0.02
11.01	-	-	-	10.7	0.31
13.01	-	-	-	13.0	0.01
15.01	-	-	-	15.0	0.01
17.02	-	-	-	17.0	0.02
20.02	-	-	-	20.0	0.02

Wind Aloft Plotting Board. US.DEPARTMENT OF COMMERCE WEATHER BUREAU	
WIND DIRECTION	TESTED WIND DIRECTION
0	0
90	90
180	180
270	270

Calibrated by : [redacted]

Mr. Watcharapol Subwat

Mechanical Engineer

Calibration & Test Section

Meteorological Instruments Bureau

envi research

ENVIRONMENT RESEARCH & TECHNOLOGY CO., LTD.

Environment Research & Technology Company Limited

25/114 Mu 6 Soi Chinnakhet 1, Ngam Wong Wan Road, Thung Song Hong, Lak Si, Bangkok 10210

Tel 0-2954-7745-6 Fax 0-2954-7747

E-mail : envi@enviresearch.coth

www.enviresearch.coth

Head Office/Tax ID 0105 542 064 981

Sound Level Meter Calibration Report

Support Equipment Type	:	Sound Level Calibrator
Manufacture	:	Larson Davis
Model	:	CAL200
Serial No.	:	22707
Range of Calibrator		
- Support Equipment Type	:	94.0
- Frequency	:	1,000 Hz.
Calibrated By	:	Mr.Nitad Sirichad
Calibration Date	:	April 3, 2025
Customer Name	:	Vision E. Consultants Co., Ltd. : โครงการผลิตปิโตรเลียมพื้นที่ผลิต L1/64 บึงหญ้า แปลงสำรวจบนบกหมายเลข L1/64 พื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระ และพื้นที่ผลิตบึงหญ้าตะวันตก-หนองสระส่วนขยาย แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และจังหวัดกำแพงเพชร (ระยะผลิตปิโตรเลียม)

Item	Equipment			Actual Reading (dB(A))		Status
	Brand	Model	Serial Number	Before Adjustment	After Adjustment	
1	RION	NL-31	00803925	94.0	94.0	Pass
2	RION	NL-53	00251824	93.5	94.0	Pass
3	RION	NL-53	00251825	93.9	94.0	Pass
4	RION	NL-53	00251826	93.9	94.0	Pass

Checked By [redacted]

Mr.Prayun Detkla

Technician

Approved By [redacted]

Ms.Sutatip Im-noi

Environmental Scientist

Calibration Certificate

Certificate Number 2024009082

Customer:
Environmental Research and Technology Co Ltd Thailand
25/114 Moo 6 Soi Chinnakhet 1
Ngam Wong Wan Road
Tungsonghong,Lak si,Bangkok Thailand

Model Number	CAL200	***Procedure Number***	D0001.8386		
Serial Number	22707	***Technician***	Scott Montgomery		
Test Results	**Pass**	***Calibration Date***	20 Jun 2024		
Initial Condition	As Manufactured	***Calibration Due***			
		Temperature	20	°C	± 0.3 °C
Description	Larson Davis CAL200 Acoustic Calibrator	***Humidity***	36	%RH	± 3 %RH
		Static Pressure	101.1	kPa	± 1 kPa

Evaluation Method The data is aquired by the insert voltage calibration method using the reference microphone's open circuit sensitivity. Data reported in dB re 20 µPa.

Compliance Standards Compliant to Manufacturer Specifications per D0001.8190 and the following standards:
IEC 60942:2017 ANSI S1.40-2006

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the SI through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2017.
Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.

The quality system is registered to ISO 9001:2015.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

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Standards Used

Description	Cal Date	Cal Due	Cal Standard
Agilent 34401A DMM	06/20/2024	06/20/2025	001021
Larson Davis Model 2900 Real Time Analyzer	04/01/2024	04/01/2025	001051
Microphone Calibration System	02/22/2024	02/22/2025	005446
1/2" Preamplifier	08/16/2023	08/16/2024	006506
Larson Davis 1/2" Preamplifier 7-pin LEMO	08/04/2023	08/04/2024	006507
1/2 inch Microphone - RI - 200V	02/12/2024	02/12/2025	006510
Pressure Sensor	02/28/2024	02/28/2025	007825

Output Level

Nominal Level [dB]	Pressure [kPa]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
94	101.1	94.02	93.80	94.20	0.15	Pass
114	101.1	114.01	113.80	114.20	0.14	Pass

-- End of measurement results--

Frequency

Nominal Level [dB]	Pressure [kPa]	Test Result [Hz]	Lower limit [Hz]	Upper limit [Hz]	Expanded Uncertainty [Hz]	Result
94	101.1	1,000.08	993.00	1,007.00	0.20	Pass
114	101.1	1,000.08	993.00	1,007.00	0.20	Pass

-- End of measurement results--

Total Harmonic Distortion + Noise (THD+N)

Nominal Level [dB]	Pressure [kPa]	Test Result [%]	Lower limit [%]	Upper limit [%]	Expanded Uncertainty [%]	Result
94	101.1	0.65	0.00	2.00	0.25 ‡	Pass
114	101.1	0.64	0.00	2.00	0.25 ‡	Pass

-- End of measurement results--

Level Change Over Pressure

Tested at: 114 dB, 24 °C, 38 %RH

Nominal Pressure [kPa]	Pressure [kPa]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
108.0	108.0	-0.03	-0.25	0.25	0.04 ‡	Pass
101.3	101.2	0.00	-0.25	0.25	0.04 ‡	Pass
92.0	92.0	0.03	-0.25	0.25	0.04 ‡	Pass
83.0	83.1	0.04	-0.25	0.25	0.04 ‡	Pass
74.0	74.0	0.02	-0.25	0.25	0.04 ‡	Pass
65.0	65.1	-0.04	-0.25	0.25	0.04 ‡	Pass

-- End of measurement results--

Frequency Change Over Pressure

Tested at: 114 dB, 24 °C, 38 %RH

Nominal Pressure [kPa]	Pressure [kPa]	Test Result [Hz]	Lower limit [Hz]	Upper limit [Hz]	Expanded Uncertainty [Hz]	Result
108.0	108.0	0.00	-7.00	7.00	0.20 ‡	Pass
101.3	101.2	0.00	-7.00	7.00	0.20 ‡	Pass
92.0	92.0	0.00	-7.00	7.00	0.20 ‡	Pass
83.0	83.1	-0.01	-7.00	7.00	0.20 ‡	Pass
74.0	74.0	-0.01	-7.00	7.00	0.20 ‡	Pass
65.0	65.1	-0.01	-7.00	7.00	0.20 ‡	Pass

-- End of measurement results--

Certificate Number 2024009082

Total Harmonic Distortion + Noise (THD+N) Over Pressure

Tested at: 114 dB, 24 °C, 36 %RH

Nominal Pressure [kPa]	Pressure [kPa]	Test Result [%]	Lower limit [%]	Upper limit [%]	Expanded Uncertainty [%]	Result
108.0	108.0	0.67	0.00	2.00	0.25 ‡	Pass
101.3	101.2	0.63	0.00	2.00	0.25 ‡	Pass
92.0	92.0	0.58	0.00	2.00	0.25 ‡	Pass
83.0	83.1	0.53	0.00	2.00	0.25 ‡	Pass
74.0	74.0	0.48	0.00	2.00	0.25 ‡	Pass
65.0	65.1	0.42	0.00	2.00	0.25 ‡	Pass

-- End of measurement results--

Signatory: *Scott Montgomery*

LARSON DAVIS – A PCB DIVISION
1681 West 820 North
Provo,UT 84601 United States
716-684-0001

LARSON DAVIS
A PCB DIVISION

HORIBA

INSPECTION REPORT

1. Product Information

Product Name	Handheld pH/ORP Meter
Model	LAQUA-PH210 / PH220
MFG No.	HA4L0026
Power Requirement	2×AA batteries
Measuring range	pH :-2.00 to 16.00, mV(ORP) :±2000 mV, Temperature :-30.0 to 130.0 ℃/-22.0 to 266.0 ℉

2. Test Results

- Appearance and Construction ---------- **Good**
- Basic characteristic test ---------- **Good**

a)Linearity

pH		mV (ORP)		Temperature	
Within ±0.01 pH ±1digit		Within ±0.3 mV (within ±999.9 mV) or 0.3% of reading (beyond ±1000mV)		Within ±0.5℃ ±1digit	
Input	Indication	Input	Indication	Input	Indication
pH 0.00	pH 0.00	-1900.0 mV	-1899.0 mV	0.0 ℃	0.0 ℃
pH 7.00	pH 7.00	0.0 mV	0.0 mV	25.0 ℃	25.0 ℃
pH 14.00	pH 14.00	1900.0 mV	1901.0 mV	90.0 ℃	89.9 ℃

b)Input insulation Within ±0.05pH ±1digit

c)Repeatability Within ±0.01pH ±1digit

- Operation test ---------- **Good**

a)Operation test No failures

- Accessories ---------- **Good**

a)Accessories All accessories are set.

3. Overall Judgment ---------- **Passed**

Date	2024_11_25	
Room Temp.	25	℃
Relative Humidity	55	%

Inspected by Nageswary Panchamurutham

Approved by Sofroniojr Bangi

HORIBA

INSPECTION REPORT

1. Product Information

Product Name	Handheld DO Meter
Model	LAQUA-DO210 / DO220
MFG No.	HE4E0018
Power Requirement	2×AA batteries
Measuring range	Dissolved oxygen : 0.00 to 20.00 mg/L Saturated oxygen concentration : 0.0 to 200.0% Temperature : -30.0 to 130.0 ℃/-22 to 266.0 ℉

2. Test Results

- Appearance and Construction ---------- **Good**
- Basic characteristic test ---------- **Good**

a)Linearity

Dissolved oxygen			Temperature		
Within±0.10mg/L ±1digit			Within±0.5℃ ±1digit		
Input	Indication		Input	Indication	
0.00 mg/L	0.00	mg/L	0.0 ℃	0.2	℃
8.26 mg/L	8.26	mg/L	25.0 ℃	25.1	℃
19.62 mg/L	19.63	mg/L	90.0 ℃	90.3	℃

b)Repeatability Within ±0.10 mg/L ±1digit

- Operation test ---------- **Good**

a)Operation test No failures

- Accessories ---------- **Good**

a)Accessories All accessories are set.

3. Overall Judgment ---------- **Passed**

Date	2024_6_7	
Room Temp.	25	℃
Relative Humidity	55	%

Inspected by Kaavinasri Ramachandran

Approved by Sofroniojr Bangi

HORIBA Advanced Techno, Co., Ltd.

IR-LAQUA-DO210/DO220(E)-R1

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)

CORPORATE SERVICES 3 : EQUIPMENT CALIBRATION AND TESTING SERVICES

534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250

TEL. 0-2717-3000 FAX. 0-2719-9484

Certificate of Testing

Cert.No.: 24TW185
Page.: 1 of 2

Equipment : DO Meter

Manufacturer : YSI

Model : 5000-115V

Serial No. : 03C1280 AC

ID No. : ERTC-L-In-164

Received Date : 03 September 2024

Test Date : 04 September 2024

Reference : 2409-0126DN-1

Submitted by : Environment Research & Technology Company Limited.
25/114 Moo 6, Soi Chinaket 1, Ngamwongwan Road,
Toongsonghong, Laksi, Bangkok 10210

Laboratory Condition : Temperature (25 ± 5) °C
Humidity (50 ± 20) %

Test Procedure : In - house method : CP-CH9
by Comparison Technique with Azide Modification Method

Tested by : Walalak Sirithean

Approved by : [redacted]
Approved Signatory

( ) Unnopphol Harachai
( ) Ponpan Paipim
(✓) Saihip Meangmai

Issue Date : 6 September 2024

Condition of this result of calibration

1. Reference Standard Instruments :
   This certification is traceable to the International System of Unit through the referernce standards laboratory of Industrial Calibration Center, Technology Promotion Association (Thailand-Japan).

Instruments	Serial No.	ID No.	Certificate No.	Due Date
1. Burette	-	130BU10	23CG1172	22 Mar 2025
2. Balance	N03679	140RC001	23MM537	14 Sep 2024

2. Standard Material :-

Material	Manufacturer	Lot.No.	Assay
Sodium Thiosulfate 5-Hydrate AR	KEMAUS	2203162447	99.6%

Result : **Dissolved Oxygen Meter Adjustment With Air 100 %**
Dissolved Oxygen Probe No.: 15K100353

Titration Method (Azide Modification Method) (mg/L)	DO Meter Reading (mg/L)	Standard Deviation (mg/L)
8.18	8.18	0.0055

This report was certified only for the instrument we tested.It is allowable to use for study Intend to use for advertising and referral purpose is prohibited.This report may not be reproduced other in full, without written approval of the laboratory

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Inctech Metrological Center Co.Ltd.
39/1 Soi 82, Sukhapiban 5 Rd., O ngoen,
Saimai, Bangkok 10220, Thailand
Tel. (662) 909-8820 (Auto 10 lines) www.imcinstrument.com

ilac-MRA ACCREDITED
Calibration Cert. # 3884.01
ISO/IEC 17025

Certificate of Calibration

Certificate No. : MT24-9500
Page : 1 of 2

Customer : Environment research & Technogy Co.,Ltd.
Address : 25/114 Moo6 Soi Chinaket1, Ngamwongwan Road, Toongsonghong, Laksi, Bangkok 10210

Description : Incubator
Manufacturer : Hotpack
Model : 352601
Serial No. : 78633
Identification No. : ERTC-L-In-133
Calibration Place : Customer Laboratory

Order No. : 4090/24
Received date : Nov 29, 2024
Calibration date : Nov 29, 2024
Environment Condition :
Temperature : (25+/-10) °C
Humidity : (50+/-30) %RH

Calibration Method : Calibration were conducted using In-house calibration procedure *CP-MT-006* According to comparison with LXI Data Acquisition Switch Unit with sensor. The calibration methods based on Euramet Calibration Guide No.20 - guidelines on the Calibration of Temperature and/or Humidity Controlled Enclosures.

Reference Standard Instruments :

Instrument	Model	Serial No.	Certificate No.	Due Date
Data Acquisition System with Sensor	DAQ970A	MY58003374	MT24-1056	Jan 05, 2025

The effect that the result relate only to the items calibrated. It was found accurate as shown on date and place of calibration only.

Traceability : This measurement are traceable to the International System of Unit (SI), through National Institute of Metrology Thailand (NIMT)

The reported expanded uncertainty of measurement was based on standard uncertainty multiplied by coverage factor, k = 2, providing a level of confidence of not less than 95%

CALIBRATION LABORATORY · INCTECH METROLOGICAL CENTER CO.,LTD. · IMC

Calibrated by : Mr.Yuttakorn Jamneansri

Approved by [redacted]

Issue date : Dec 06, 2024

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Inctech Metrological Center Co.Ltd.
39/1 Soi 82, Sukhapiban 5 Rd., O ngoen,
Saimai, Bangkok 10220, Thailand
Tel. (662) 909-8820 (Auto 10 lines) www.imcinstrument.com

Calibration Cert. # 3884.01
ISO/IEC 17025

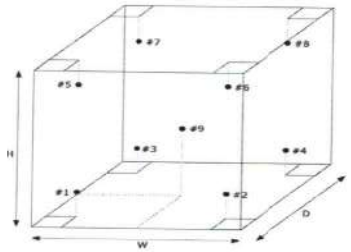
Certificate No. : MT24-9500
Page : 2 of 2

Function : Temperature measurement
Calibration point : 20 °C

Result : Without adjustment
Resolution : 0.1 °C

Calibration point (°C)	Temperature of UUC* at each position (°C)									Uncertainty of measurement (+/- °C)
	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	Ch.9	
20	20.276	20.230	20.142	20.019	19.785	20.414	20.187	20.072	20.426	0.41

Setting temperature (°C)	Indicating Temperature (°C)	Measured stability (+/- °C)	Measured uniformity (°C)	Overall variation (°C)
20.0	20.0	0.27	0.97	1.1



#1 Lower Left Front
#2 Lower Right Front
#3 Lower Left Rear
#4 Lower Right Rear
#5 Upper Left Front
#6 Upper Right Front
#7 Upper Left Rear
#8 Upper Right Rear
#9 Geometric Center

Front view

UUC* = Unit under calibration
Uniformity = Maximum and Minimum difference of measured temperature at any probes and the measured temperature at the reference and same time.
Overall Variation = Difference of temperature value between the maximum and minimum any time.
Stability = One half of the maximum difference of measured temperatures at any one probe.

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL.0-2717-3000-29 FAX.0-2719-9484

NSC-TISI-TISI17025
CALIBRATION 0008

Certificate of Calibration

Cert. No.: 25TM35
Page : 1 of 3

Equipment : Incubator
Manufacturer : Memmert
Model : IF 160
Serial No. : D522.0070
ID No. : ERTC-L-In-181
Submitted by : Environment Research & Technology Company Limited
25/114 Moo 6 Soi Chinaket 1,
Ngamwongwan Road, Toongsonghong, Laksi,
Bangkok 10210
Location : 408/2 ห้องปฏิบัติการบ่มอาหารเลี้ยงเชื้อ

Received Order : 06 January 2025
Calibration Date : 06 - 07 January 2025
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
AC Line Voltage : (220 ± 22) V

Calibrated by : [redacted]

Approved by : [redacted]
Approved Signatory

( ) Ponpan Paipim
( ) Suwit Imjai
(✓) Kunchit Promprat

Issue Date : 18 January 2025

The Uncertainties are for a confidence probability of approximately 95%

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Equipment : Incubator **Cert. No.:** 25TM35
Condition As-Received : Used Item **Page :** 2 of 3
Reference : 2501-0004ON-5

Procedure Used :-

Calibration were conducted using calibration procedure CP-OT02 based on TLAS G-20 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector (RTD).

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

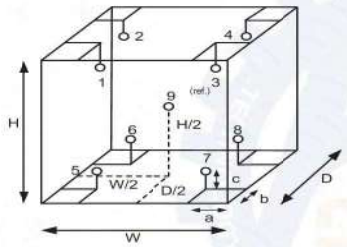
Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Data Acquisition	MY49001451	24LM44	TPA	17 Mar 2025

2. This certificate is valid only to the item calibrated on date and place of calibration.
3. This certification is traceable to the International System of Unit.

Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

Environment during calibration		
	Beginning	Finished
Temp. (°C)	25	26
REL.Humid. (%)	51	55
AC Supply (Volt)	221	222



Position :	Ref. Std. ID No.:
1	19RTD-2/1
2	19RTD-2/2
3	19RTD-2/3
4	19RTD-2/4
5	19RTD-2/5
6	24-19RTD-2/6
7	19RTD-2/7
8	19RTD-2/8
9 (ref.)	19RTD-2/9

Probe Installation Details :

a = 5.0 cm
b = 5.0 cm
c = 5.0 cm

Dimension of Chamber :

D = 0.40 m
W = 0.56 m
H = 0.73 m
Capacity = 0.16 m³

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor *k*
35.0	35.0	35.0	0.022	0.22	0.38	2

Calibration Point	Measured Temperature (°C) Position									Uncertainty
(°C)	1	2	3	4	5	6	7	8	9 (ref.)	(±°C)
35.0	34.860	34.762	34.658	34.926	34.791	34.970	34.621	34.837	34.767	0.30

Average* : The average of 30 values in each position.
Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.
Temperature uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.
Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation.
UUC* : Unit Under Calibration
Note : The reported uncertainty of measurement was included stability and excluded uniformity .

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor ***k***, providing a level of confidence of approximately 95 %.

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
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TEL.0-2717-3000-29 FAX.0-2719-9484

NSC-TISI-TIS17025
CALIBRATION 0008

Certificate of Calibration

Cert. No.: 25TM36
Page : 1 of 3

Equipment :	Incubator
Manufacturer :	Ehret
Model :	BK 4106
Serial No. :	22162
ID No. :	ERTC-L-In-022
Submitted by :	Environment Research & Technology Company Limited 25/114 Moo 6 Soi Chinaket 1, Ngamwongwan Road, Toongsonghong, Laksi, Bangkok 10210
Location :	408/2 ห้องปฏิบัติการบ่มอาหารเลี้ยงเชื้อ
Received Order :	06 January 2025
Calibration Date :	07 - 08 January 2025
Ambient Temperature :	(26 ± 10) °C
Relative Humidity :	(50 ± 30) %
AC Line Voltage :	(220 ± 22) V
Calibrated by :	Khit Ruttanaprapachai
Approved by :	[redacted] Approved Signatory

( ) Ponpan Paipim
( ) Suwit Imjai
(✓) Kunchit Promprat

Issue Date : 18 January 2025

The Uncertainties are for a confidence probability of approximately 95%

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Procedure Used :-

Calibration were conducted using calibration procedure CP-OT02 based on TLAS G-20 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector (RTD).
The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

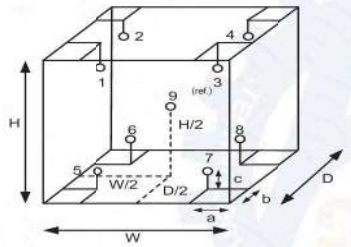
Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Data Acquisiton	MY49001451	24LM44	TPA	17 Mar 2025

2. This certificate is valid only to the item calibrated on date and place of calibration.
3. This certification is traceable to the International System of Unit.

Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Not Available

Environment during calibration		
	Beginning	Finished
Temp. (°C)	26	28
REL.Humid. (%)	53	50
AC Supply (Volt)	222	221



Position :	Ref. Std. ID No.:
1	19RTD-2/1
2	19RTD-2/2
3	19RTD-2/3
4	19RTD-2/4
5	19RTD-2/5
6	24-19RTD-2/6
7	19RTD-2/7
8	19RTD-2/8
9 (ref.)	19RTD-2/9

Probe Installation Details :

a =	5.0	cm
b =	5.0	cm
c =	5.0	cm

Dimension of Chamber :

D =	0.50	m
W =	0.60	m
H =	0.50	m
Capacity =	0.15	m^3

Equipment : Incubator
Condition As-Received : Used Item
Reference : 2501-0004ON-6
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Not Available

Cert. No.: 25TM36

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor *k*
44.5	44.5	44.5	0.16	0.64	1.4	2

Calibration Point	Measured Temperature (°C) Position									Uncertainty
(°C)	1	2	3	4	5	6	7	8	9 (ref.)	(±°C)
44.5	44.542	44.705	44.204	44.943	43.855	44.307	44.130	44.630	44.330	0.67

Average* : The average of 30 values in each position.
Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.
Temperature uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.
Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation.
UUC* : Unit Under Calibration
Note : The reported uncertainty of measurement was included stability and excluded uniformity .

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor ***k***, providing a level of confidence of approximately 95 %.

-o0o-

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EQUIPMENT QUALIFICATION REPORT (EQR)

Agilent Crosslab Compliance Services

Agilent CrossLab Compliance

Qualification Type: ES-0Q

System ID: MY15330001

EQP Name: AgilentRecommended

EQP Revision: ES.02.50

EQP Publish Date: March 2020

Date: November 25, 2024 4:27:06 PM
Report Type: Report

Org. Name: Environment Research & Technology Co.,Ltd.

Org. Location: 25/114 Moo 6 Soi Chinaket, Ngamwongwan Rd., Bangkok 10210

Table of Contents

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Test Summary

Purpose

This section includes the Overall Qualification Status and details for each test that meets at least one of the following criteria: (1) was not scheduled; (2) was scheduled but not run; (3) was processed more than once; (4) passed recommended limits only when dual limits were selected; (5) required deviation(s) or comment(s); (6) required integration event change(s). Tests that pass and do not meet any criteria above are not included.

For a complete list of scheduled tests, see the table of contents. For supporting documentation, refer to the Attachments section.

NOTE: A Pass for the Overall Qualification Status indicates that all scheduled tests were run and passed; R, I, D, and C are blank if not applicable for that specific test.

R: runs
I: integration event changes
D: number of deviations submitted
C: number of comments submitted
Status: NS (not scheduled); NR (scheduled but not run); NC (unlocked but not completed)

Details

Test	Status			
	R	I	D	C

There were no repeated or re-integrated tests. All test resulted in a pass status.

Overall Qualification Status

Pass

Service Details

Purpose

This section includes local contact and delivery details for this service.

General Details

Service Order No./Request:	6007379887
EQP Name:	AgilentRecommended
EQP Revision:	ES.02.50
Report Type:	Report

Organization Details

Name:	Environment Research & Technology Co.,Ltd.
Location:	25/114 Moo 6 Soi Chinaket, Ngamwongwan Rd., Bangkok 10210

Local Contact Details

Name:	K. Raiwin Posit
Job Title:	Supervisor Scientist
Qualification Location:	ICPOES Room

Operator Details

Name:	Burin Ngamvijit
Job Title:	Field Service Engineer

Data Acquisition Details

Acquisition Software Name:	ICP Expert
Acquisition Software Revision:	7.1.0.6821
Customer Data System (CDS):	Es: ICP Expert

Instrument Details

Purpose

This section describes the as found system configuration.

Details

Spectrometer 1	
Manufacturer	Agilent Technologies
Name	5100 VDV
Model Number	G8011A
Sample Introduction	Double pass glass cyclonic spraychamber and seaspray nebulizer
Serial Number	MY15330001
Firmware Revision	2994
Chiller 1	
Manufacturer	Agilent Technologies
Name	Chiller
Model Number	G8481A
Serial Number	1A1560387
Autosampler 1	
Manufacturer	Agilent Technologies
Name	SPS4
Model Number	G8410A
Serial Number	AU15220240
Vapor Generator 1	
Manufacturer	Agilent Technologies
Name	VGA77P
Model Number	G8475A
Serial Number	MY15330002

Protocol Details

Purpose

This section lists the revisions for all test units used in this report. For complete test-specific and high-level change details, refer to the Revision History document.

Test Revision	Test
ES.02.50	Autosampler Operation
ES.02.50	Instrument Tests
ES.02.50	Preparation

Preparation

Purpose

This test records a status for each preparation task for the Agilent ICP-OES.

Configuration Details

Model/Serial No.:	G8011A	MY15330001

Results

Criteria	Observed Result	Expected Result	Status
Does the plasma ignite successfully in the first three attempts?	Yes	Yes	Pass
Was the detector calibration performed and completed successfully?	Yes	Yes	Pass
Was the instrument calibration performed and completed successfully?	Yes	Yes	Pass

Test Evidence

Image Details: Was the detector calibration performed and completed successfully?

Date and Time: Novsmber 25, 2024 4:03:36 PM

Host Name: AG-5CG3251QJK

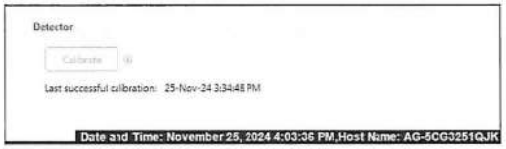
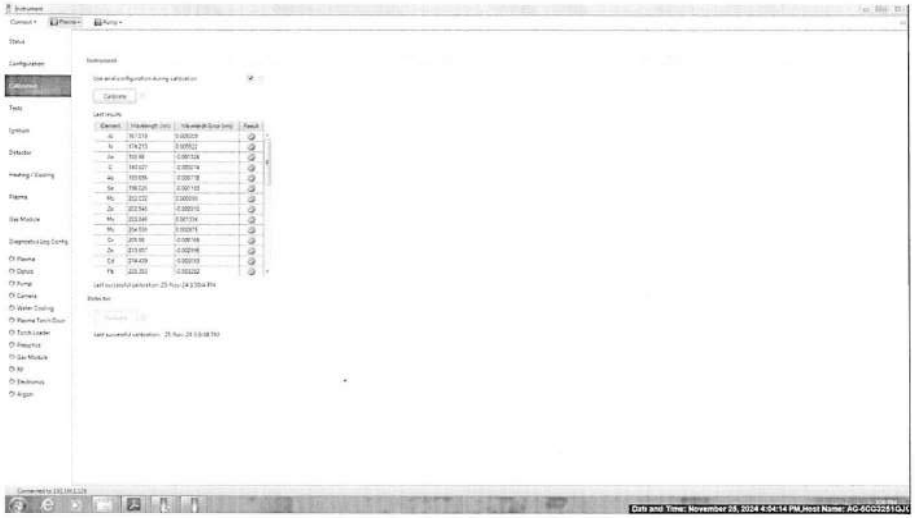


Image Details:	Was the instrument calibration performed and completed successfully?
Date and Time:	November 25, 2024 4:04:14 PM
Host Name:	AG-5CG3251QJK



Overall Test Status

Pass	Runs: 1

Instrument Tests

Purpose

This test records a status for each of the automated tests within the Agilent ICP-OES CDS. For detailed test criteria, refer to the attached report.

Configuration Details

Model/Serial No.:	G8011A	MY15330001

Results	Observed Result	Expected Result	Status
Are the Functional Tests results within acceptance criteria?			
Subsystem Communications	Yes	Yes	Pass
Air Flow	Yes	Yes	Pass
Water Flow	Yes	Yes	Pass
Gas Flows	Yes	Yes	Pass
RF Generator	Yes	Yes	Pass
Camera	Yes	Yes	Pass
Optics	Yes	Yes	Pass
Are the Instrument Performance Tests results within acceptance criteria?			
Resolution	Yes	Yes	Pass
Sensitivity	Yes	Yes	Pass
Precision	Yes	Yes	Pass

Overall Test Status

Pass	Runs: 1

Autosampler Operation

Purpose

This test verifies that the autosampler operates properly.

Configuration Details

Model/Serial No.:	G8410A	AU15220240

Results

Criteria	Observed Result	Expected Result	Status
Does the autosampler successfully move to the specified location(s)?	Yes	Yes	Pass

Overall Test Status

Pass Runs: 1

Declaration of Change Control

This document is under change control. Revision history is maintained and printed on each document. Access to the master documents is limited to process owners. Documents receive periodic review and cannot be assigned an evergreen status.

The qualification performed according to this document refers only to the hardware/sofware configuration in place at the time of the qualification. Agilent Technologies recommends that instrument configuration change management procedures be in place in order to maintain the validation process. Any changes to the analytical or computer hardware or software must be clearly specified.

A change management system provides a means for determining the degree of requalification required according to the extent of the changes made. All details of the changes must be thoroughly recorded and documented, together with details of completed tests and their results.

Note: Hardware/software configuration management is the customer's responsibility.

Attachments

Training requirements note: The delivery engineer attaches an ACE technique-specific training certificate to the Equipment Qualification Report (EQR). Obtaining ACE technique-specific certification includes pre-requisite trainings for Data Integrity, General Compliance topics (GMP, GLP, ALCOA, etc.), instrument hardware and software components, and the ACE technique itself. The one certificate encompasses all pre-requisite trainings as documented in the Agilent Learning Management System called Success Factors.

Location	Category	Document Name	Page
EQR	Material	Wavelength calibration solution	13
EQR	General	Certificate of Qualification for ACE	14
EQR	General	Operator's training certificate and qualifications	15
EQR	General	Instrument's Test Report	16
EQR	General	Instrument's Test Report	19
EQR	General	Instrument's Test Report	20
EQR	General	Instrument's Test Report	21
EQR	General	Instrument's Test Report	22
EQR	General	Instrument's Test Report	23
EQR	General	Instrument's Test Report	24

Materials

This section lists details for materials added with the ACE Attachments tool.

Name:	Wavelength calibration solution	
Specification:	Agilent Technologies	
Part/Lot No.:	6610030100	1483766
Expiration Date:	July 9, 2026	

General

Document Name: Certificate of Qualification for ACE

Agilent Technologies

Agilent Compliance Engine Self Qualification

Date: November 25, 2024 3:39:18 PM

Drive Serial #: BC1A62DC **Platform Revision:** ACE 3.13.31

Test	Result
Preparation : 5100 SVDV	Conforms
Instrument Tests : 5100 SVDV	Conforms
Autosampler Operation : Autosampler 1 - SPS3	Conforms

Overall Qualification Status

Conforms

General

Document Name: Operator's training certificate and qualifications

Agilent Technologies

Certificate of Completion

Learner Name: Barin Ngamvijit

Title Of Course: ANV-CE-ICPOES-2-007-C: ACE ICPOES Specific Training

Completion Date: March 25, 2024

Certified By Company: Learning at Agilent

All Service and Support training certificates have the following specific limitations.

A certificate for Service and Support training is only valid while employed by Agilent Technologies or while working as an Agilent-authorized service provider, through which the service employee has ongoing access to Agilent's: Safety Alerts, Service Notes, internal technical updates, update training, current documentation, technical support, current parts, and parts updates. Completion of training alone, without being employed by Agilent Technologies, does not qualify an individual to safely install, service or maintain Agilent products.

General

Document Name: Instrument's Test Report

Report Summary

Instrument Model	Agilent 5100 VDV ICP-OES
Instrument ID	G8011A
Instrument Serial Number	MY15330001
Software Version	7.1.0.6821
Firmware Version	2994
Tested By	OQ 2024_Burn Ngamvijit
Test Completed On	25-Nov-24 3:53:45 PM

Result Summary

Resolution Test	Pass
Sensitivity Test	Pass
Precision Test	Pass

Resolution Test Pass

Element Wavelength	Specification	Width
N (174.213 nm)	≤ 9.40	7.38
As (188.980 nm)	≤ 8.20	6.53
C (193.027 nm)	≤ 11.50	7.95
Mo (202.032 nm)	≤ 8.20	6.99
Cr (206.158 nm)	≤ 13.40	10.06
Zn (213.857 nm)	≤ 8.70	7.31
Pb (220.353 nm)	≤ 9.50	7.80
Co (228.615 nm)	≤ 17.20	10.63
Ba (230.424 nm)	≤ 9.40	7.92
Mn (257.610 nm)	≤ 13.30	9.30
Mn (260.568 nm)	≤ 20.30	15.89
Cr (267.716 nm)	≤ 11.00	9.11
Cu (324.754 nm)	≤ 25.00	17.68
Cu (327.395 nm)	≤ 14.20	12.61
Sr (338.071 nm)	≤ 33.50	27.14
Ba (455.403 nm)	≤ 44.00	31.65
Sr (460.733 nm)	≤ 36.00	20.40
Ba (493.408 nm)	≤ 36.00	29.54
Ba (614.171 nm)	≤ 42.00	29.50
Ar (675.283 nm)	≤ 74.00	65.70
K (766.491 nm)	≤ 80.00	61.36

Page 1 of 3

Document Name: Instrument's Test Report

Sensitivity Test Pass

Radial

Element Wavelength	Specification	Method	Ratio	Standard	Blank
As (188.980 nm)	≥ 46.0	SRBR	93.8	902.5	77.4
Se (196.026 nm)	≥ 41.0	SRBR	59.0	654.5	91.3
Zn (213.857 nm)	≥ 1421.0	SRBR	3082.0	37839.3	149.6
Pb (220.353 nm)	≥ 46.0	SRBR	154.5	2137.0	163.3
Mn (257.610 nm)	≥ 3518.0	SRBR	9444.2	205831.0	472.8
Al (396.152 nm)	≥ 3.4	SBR	6.5	29251.8	3891.4
Ba (493.408 nm)	≥ 34.0	SBR	76.6	855831.1	11021.3
K (766.491 nm)	≥ 1.8	SBR	2.4	82716.8	24314.0

Axial

Element Wavelength	Specification	Method	Ratio	Standard	Blank
As (188.980 nm)	≥ 208.0	SRBR	243.9	2566.7	102.1
Se (196.026 nm)	≥ 159.0	SRBR	172.0	2078.5	128.5
Zn (206.200 nm)	≥ 234.0	SRBR	1297.3	13097.8	100.4
Zn (213.857 nm)	≥ 1743.0	SRBR	8534.0	139946.6	267.9
Cd (214.439 nm)	≥ 4227.0	SRBR	7800.0	111549.9	204.1
Pb (220.353 nm)	≥ 320.0	SRBR	664.3	11776.3	298.6
Mn (257.610 nm)	≥ 10625.0	SRBR	38072.2	1143733.3	908.9
Cr (267.716 nm)	≥ 1048.0	SRBR	4466.9	120300.5	713.1
Cu (324.754 nm)	≥ 19.0	SBR	79.4	187702.0	2335.2
Al (396.152 nm)	≥ 6.0	SBR	27.9	184566.8	6380.2
Ba (493.408 nm)	≥ 60.0	SBR	303.2	5513982.4	18113.9
K (766.491 nm)	≥ 24.0	SBR	78.5	2564858.7	32264.7

Page 2 of 3

Document Name: Instrument's Test Report

Precision Test	Pass

Radial

Element Wavelength	Specification	Measured Value % RSD
As (188.980 nm)	≤ 2.60	1.15
Se (196.026 nm)	≤ 2.60	1.11
Zn (213.857 nm)	≤ 1.50	0.48
Pb (220.353 nm)	≤ 2.60	0.52
Mn (257.610 nm)	≤ 1.50	0.55
Al (396.152 nm)	≤ 1.50	0.46
Ba (493.408 nm)	≤ 1.50	0.72
K (766.491 nm)	≤ 1.50	0.35

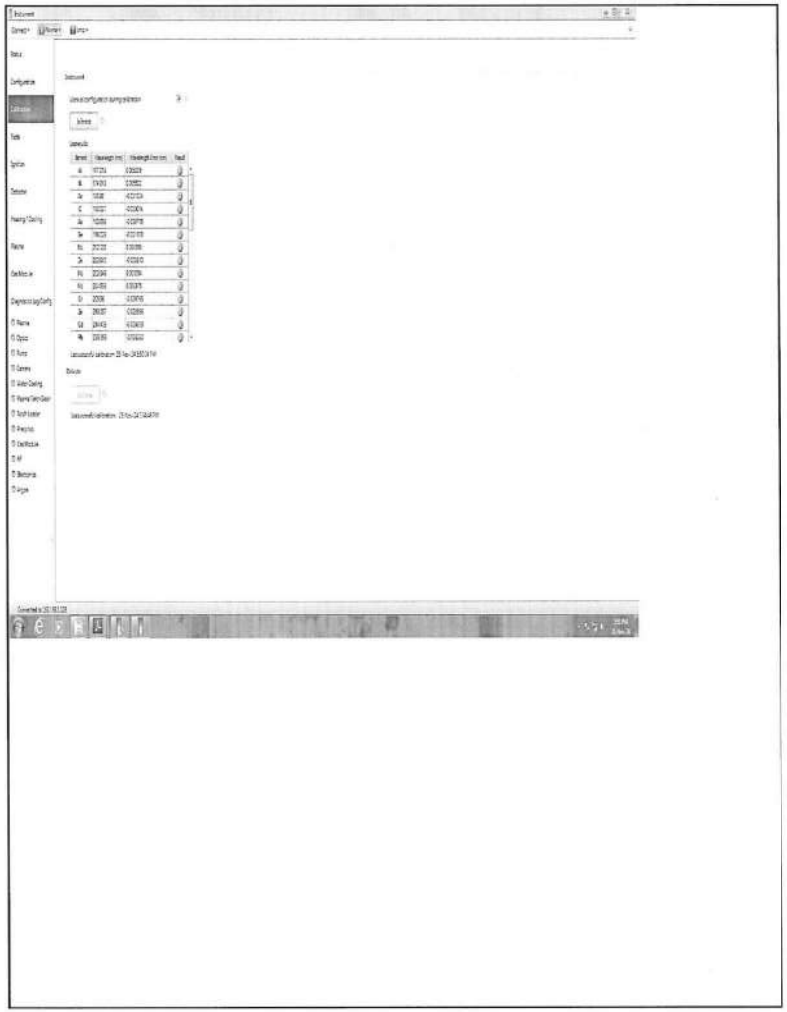
Axial

Element Wavelength	Specification	Measured Value % RSD
As (188.980 nm)	≤ 1.50	0.87
Se (196.026 nm)	≤ 1.50	0.91
Zn (206.200 nm)	≤ 1.50	0.42
Zn (213.857 nm)	≤ 1.50	0.52
Cd (214.439 nm)	≤ 1.50	0.54
Pb (220.353 nm)	≤ 1.50	0.54
Mn (257.610 nm)	≤ 1.50	0.42
Cr (267.716 nm)	≤ 1.50	0.67
Cu (324.754 nm)	≤ 1.50	0.85
Al (396.152 nm)	≤ 1.50	0.60
Ba (493.408 nm)	≤ 1.50	1.00
K (766.491 nm)	≤ 1.50	0.56

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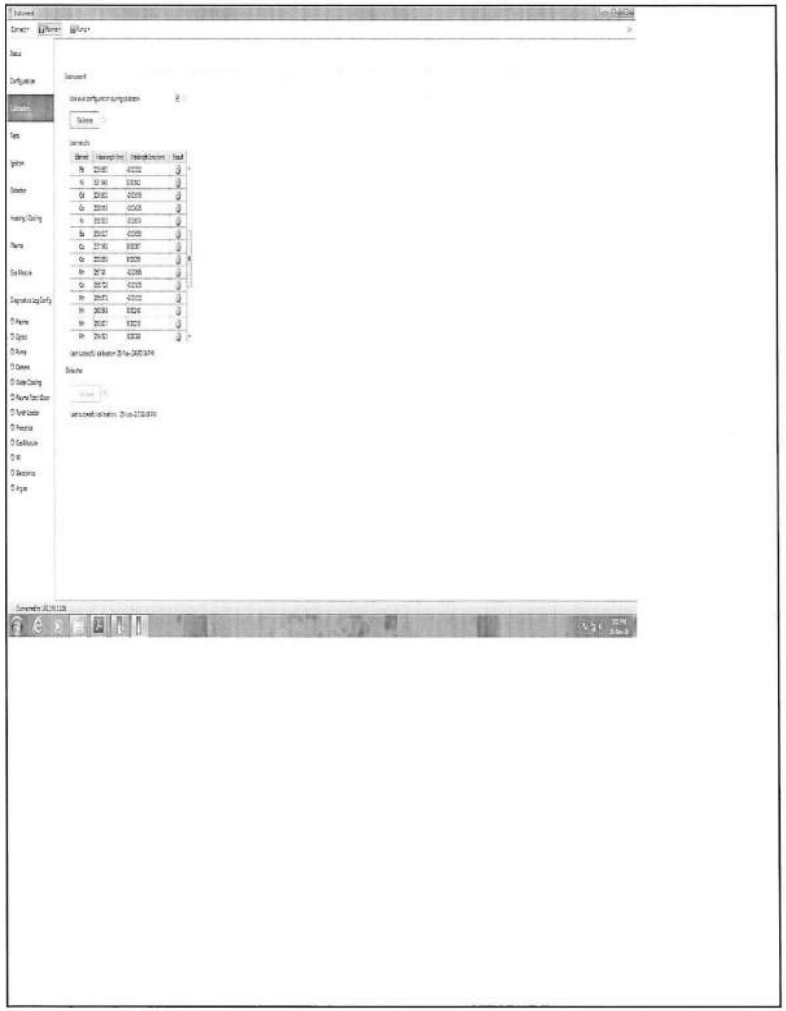
General

Document Name: Instrument's Test Report



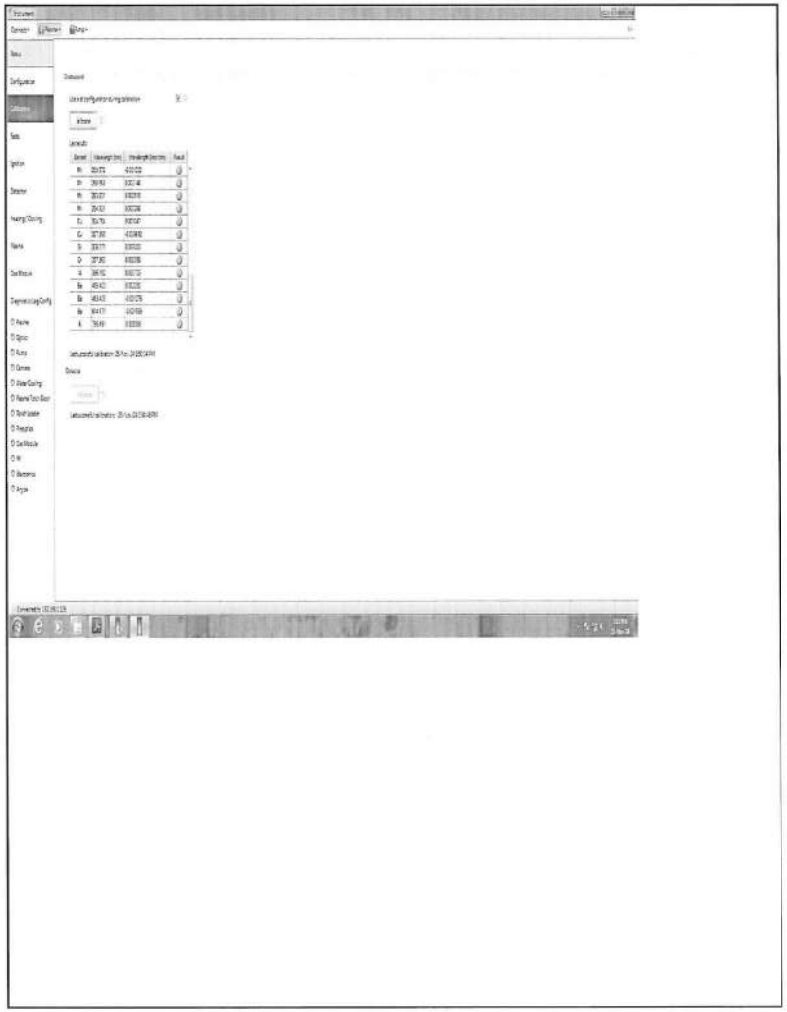
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Document Name: Instrument's Test Report



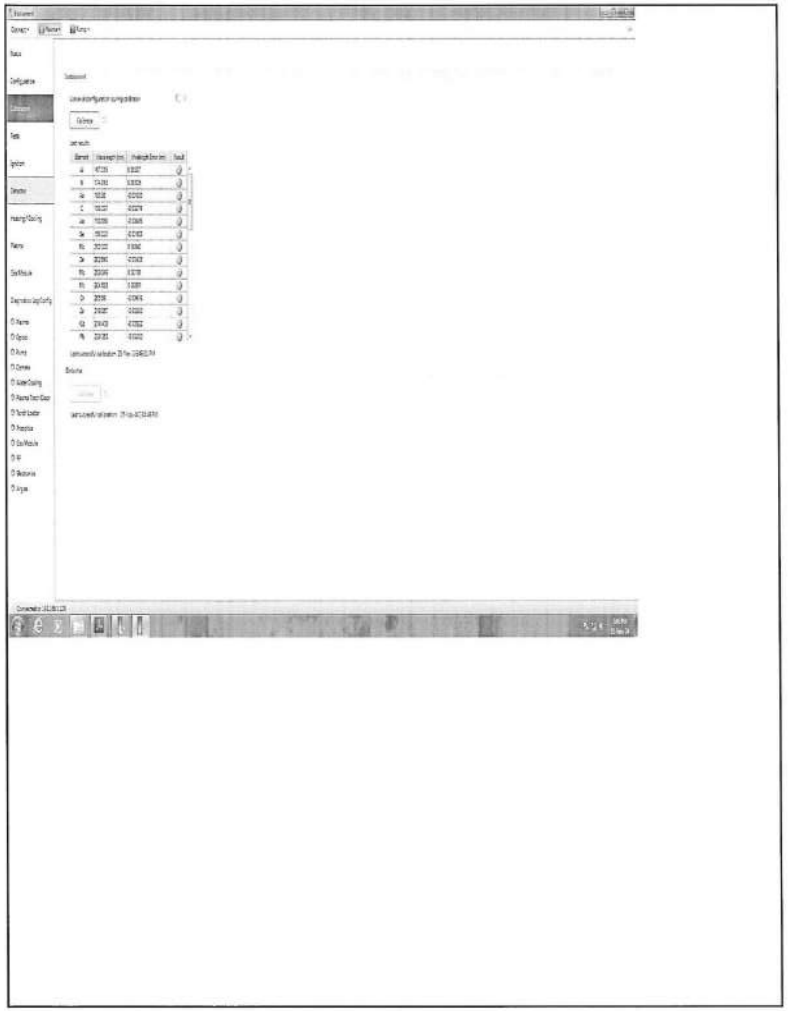
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Document Name: Instrument's Test Report



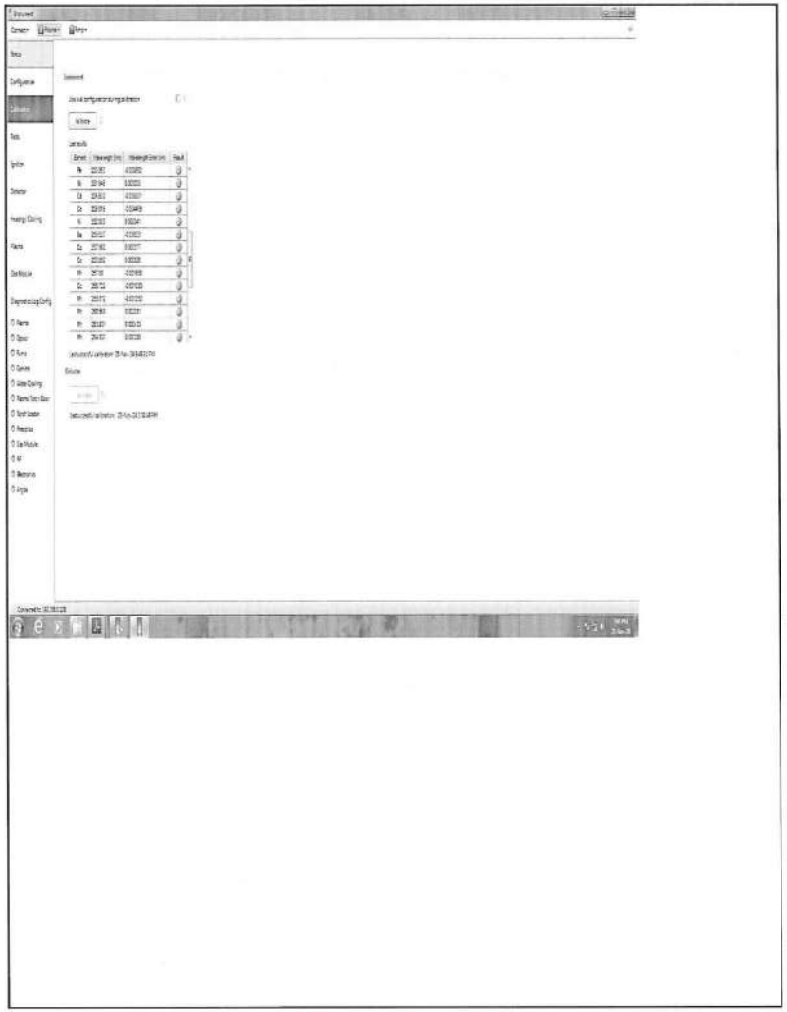
General

Document Name: Instrument's Test Report



General

Document Name: Instrument's Test Report



General

Document Name: Instrument's Test Report



Electronic Signature

Purpose

This signature page was created and published because the ACE sign-off action was executed, which is valid for the entire document, including attachments. The ACE sign-off is an electronic signature that requires two distinct identification components: unique username and personal password. The Agilent representative who has delivered this service understands the meaning and legal status of an electronic signature. As a trained official operator, the Agilent representative has a unique password and logon to access ACE and electronically sign this document. (Other e-signatures can be applied to this document using a Document Content Management or other suitable method defined in your data access and control procedures.)

Details

Full Name of Signer:	Burin Ngamvijit
Logged On User Name:	Burin_ngamvijit@agilent.com
Signature Creation Date:	November 25, 2024
Reason for Signature:	Published this original version of document

ACE Self Qualification Status

The installed version of ACE used to deliver this service passed qualification; the results conform with expected values. The self qualification summary report is available in the session folder location SDS\ClearStore\AceSelfQualification.

Regulatory Disclaimer

This document provides a protocol to verify and record instrument configuration and evidence of proper operation. It has been prepared from our interpretation of applicable regulations as well as industry best practices. The document is designed to provide an important component of a complete compliance package. Validation depends upon many factors and use of this protocol alone does not assure compliance. Agilent Technologies makes no promises or representations as to its sufficiency for any specific regulatory program.

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User Name: burin_ngamvijit System Id: MY15330001
Report Generated by Hostname: AG-5CG3251QJK Print Date: November 25, 2024 4:27:15 PM

OQ HW 5100ICPOES ERTC Nov2024 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
November 25, 2024 3:43:20 PM	Audit	SessionCreated	Session	Host Name: AG-5CG3251QJK, Drive Serial Number: 2AF11C98
November 25, 2024 3:43:20 PM	start	Configuration	Session	None
November 25, 2024 3:43:20 PM	Audit	Entitlement	Licensing	User is FieldEngineer and does not require an unlock code
November 25, 2024 3:45:57 PM	Audit	EqpLoaded	Session	EQP details for primary technique [Es] - File path: [ProtocolPacks/Es/Configurations/02.50/Es.02.50.eqp], EQP File Name: [Es.02.50.eqp], EQP Name: [AgilentRecommended],Protocol Revision :[Es.02.50]
November 25, 2024 3:46:05 PM	End	Configuration	Session	None
November 25, 2024 3:46:07 PM	start	Qualification	Session	OQ
November 25, 2024 3:46:07 PM	start	Execution	Preparation : 5100 VDV: Qualitative Test - No setpoints associated	None
November 25, 2024 4:04:19 PM	End	Execution	Preparation : 5100 VDV: Qualitative Test - No setpoints associated	Run Count : 1
November 25, 2024 4:04:21 PM	start	Execution	Instrument Tests : 5100 VDV: Qualitative Test - No setpoints associated	None
November 25, 2024 4:05:07 PM	End	Execution	Instrument Tests : 5100 VDV: Qualitative Test - No setpoints associated	Run Count : 1

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User Name: burin_ngamvijit System Id: MY15330001
Report Generated by Hostname: AG-5CG3251QJK Print Date: November 25, 2024 4:27:15 PM

OQ HW 5100ICPOES ERTC Nov2024 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
November 25, 2024 4:07:02 PM	start	Execution	Autosampler Operation : Autosampler 1 - SPS4: Qualitative Test - No setpoints associated	None
November 25, 2024 4:07:08 PM	End	Execution	Autosampler Operation : Autosampler 1 - SPS4: Qualitative Test - No setpoints associated	Run Count : 1
November 25, 2024 4:11:21 PM	Audit	AceRestarted	Session	Host Name: AG-5CG3251QJK, Drive Serial Number: 2AF11C98
November 25, 2024 4:11:22 PM	Audit	SessionReloaded	Session	None
November 25, 2024 4:11:23 PM	start	Qualification	Session	OQ
November 25, 2024 4:12:29 PM	End	Qualification	Session	OQ
November 25, 2024 4:12:29 PM	start	Reporting	Session	None
November 25, 2024 4:26:02 PM	Audit	Reporting	Session	Report Generated : Certificate
November 25, 2024 4:26:22 PM	Audit	Reporting	Session	Report Generated : Report

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User Name: burin_ngamvijit
System Id: MY15330001
Report Generated by Hostname: AG-5CG3251QJK
Print Date: November 25, 2024 4:27:15 PM

OQ HW 5100ICPOES ERTC Nov2024 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
November 25, 2024 4:27:06 PM	Audit	Reporting	Session	Report Signed : Certificate PDF Name: OQ HW 5100ICPOES ERTC Nov2024_20241125_Certificate_1.pdf User Name: Burin_ngamvijit@agilent.com Full Name of Signer: Burin Ngamvijit Reason for signature: Published this original version of document

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PerkinElmer
For the Better

PinAAcle 900Z
Preventive Maintenance Report

Company Name: ENVIRONMENT RESEARCH

Instrument Location: 25/114 M.6, THANON NGAMWONGWAN THUNGSONGHONG, LAKSI, BANGKOK, 10210

Instrument Serial No.: PZAS19031401

Date: 23-Jul-2024

PinAAcle 900Z Preventive Maintenance (PM)

Company Name:	ENVIRONMENT RESEARCH		
Address (Instrument Location):	25/114 M.6, THANON NGAMWONGWAN, THUNGSONGHONG, LAKSI, BANGI		
Serial Number:	PZAS19031401	**PM Number:**	1/2
Customer Name (if applicable):	K. RAIWIN	**Telephone Number:**	099-182-9241
Customer Support Engineer Name:	Khwanchai	**Service Order Number:**	WO-02879967
Date PM Performed: (DD-MMM-YYYY)	23-Jul-2024	**Next PM Due Date:** (DD-MMM-YYYY)	23-Jan-2025
Standard Labor Hours to Complete PM :		**5 hours**	

Part Number	Release	Publication Date	
09370144 Rev.9	A	January 2018	PerkinElmer

Scope
The purpose of this PM is to ensure the continued functionality of the PinAAcle 900Z by inspecting and replacing any worn or damaged parts. This service should only be performed by a trained representative of PerkinElmer.
The customer should save their method before the PM begins.

General Instructions:
The customer must provide the engineer operational data to demonstrate recent instrument performance prior to starting the PM.
Always check with the customer before making any changes that may affect the customer's analysis or calibration, including a current back-up of system software and/or data files.
The completed document should be signed by an authorized PerkinElmer and customer representative and left with the customer.
Update the PM sticker and instrument logbook as required.

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Component List

Component / Specific Model	Serial #	Configuration Notes

Parts Lists

Parts Included with the PM		
Part Number (if applicable)	**Description**	**Quantity**
B0501696	Fan Filters	2
B3002013	THGA Contact Cylinders	1
B3141064	Glycerol for THGA Cooling	N/A

Additional Reagents and Standards Required for PM				
Part Number (if applicable)	**Description**	**Quality**	**Batch/Lot #**	**Expired Date** (MM/YY)
N9300244	GFAAS Mixed Standard	AR	60-004CRY1	Feb-2025

Additional Reagents and Standards Required for PM (Customer Support Solution)				
Part Number (if applicable)	**Description**	**Quantity**	**Batch/Lot #**	**Expiration Date** (MM/YY)
N/A	DI Water	250 ml.	AR	AR
N/A	0.5% HNO_3	250 ml.	AR	AR

Additional Tools Required for PM			
Part Number (if applicable)	**Description**	**Quantity**	**Serial #**
B3100652 Or N9307029	Electronic Flow Meter	1	NA
B0505495	Test Jig	1	NA
03030997	System 2 EDL Driver	1	03030997
N3050605	As System 2 EDL	1	16148
N3050121	Cu Lumina HCL	1	092216-010130
N3050109	Ba Lumina HCL	1	102416-040160
N3050139	K Lumina HCL	1	110716-010060
N3050152	Ni Lumina HCL	1	100516-030190
N3050119	Cr Lumina HCL	1	091911-020150

Procedure Checklist

Use (✓) to check off those steps in the checklist that have been completed.

1. **General:**
   - ☑ Review the instrument performance with the customer and document any recent problems.
   - ☑ Inspect the customer log book and make any appropriate PM entries.
   - ☑ Perform general inspection of system for cleanliness.

2. **PC Instrument Software:**
   - ☑ Instrument Software user files/databases archived, packed, and/or deleted as needed.

3. **Mechanical:**
   - ☑ Inspect and clean all fans and filters. Replace filters if necessary
   - ☑ Inspect all gas and water lines for leaks and/or wear. Replace if needed. Thoroughly inspect all quick connects. Replace the Y connector, P/N 09921079, if needed.
   - ☑ Clean exterior of the instrument.
   - ☑ Check the drain system for signs of wear. Replace worn or damaged parts.
   - ☑ Inspect the pole pieces and clean where the pole pieces contact the furnace. Replace the pole piece p-rings as needed, P/N's B0501018 & B0501250. Grease the O-rings as needed with Apiezon L grease, P/N 09905148
   - ☑ Inspect the four insulation pads on the front contact housing of the THGA in furnace. If the pads are missing replace the THGA furnace or replace the insulator pads on the furnace.
   - ☑ Inspect the graphite tube and clean the contact cylinders. Replace if necessary.
   - ☑ Check internal and external gas flows with the Electronic Gas Flow Meter and the Gas Flow Test Probe as described in the Service Manual. Correct if necessary.
   - ☑ Check furnace open/close function.
   - ☑ Verify the operation of the GFTV Camera for proper operation and viewing alignment in the furnace camera Tube View window. Align if needed.
   - ☑ Check the operation of the Halogen Light ASSY for the GFTV Camera. Replace if needed.
   - ☑ Check the water level/quality in the recirculation (if applicable). Add distilled water if necessary.
   - ☑ Check the cooling system fluid flow rate with the FCS In-Line Flow Meter for proper levels if needed. Refer to SDB# COSY008.STN
   - ☑ Perform Cooling System maintenance if needed per SDB# COSY005.STN.
   - ☑ Check auto sampler operation.
   - ☐ Perform an auto sampler check valve test as described in the Service Manual.
   - ☑ Lubricate the spindles of the auto sampler pumps and all moving parts of the tray mechanics as described in the Service Manual.
   - ☑ Inspect the auto sampler sampling capillary as described in the Service Manual. Replace if necessary.
   - ☑ Inspect the four insulation pads on the front contact housing of the THGA in furnace. If the pads are missing replace the THGA furnace or replace the insulator pads on the furnace.
   - ☑ Inspect the graphite tube and clean the contact cylinders. Replace if necessary.
   - ☑ Check internal and external gas flows with the Electronic Gas Flow Meter and the Gas Flow Test Probe as described in the Service Manual. Correct if necessary.
   - ☑ Check furnace open/close function

4. **Electrical:**

☑ Inspect PC boards. Clean if necessary.
☑ Check instrument firmware revisions upgrade to current levels (if necessary)
☑ Run Diagnostics Test within the Advanced function of the Spectrometer page. Check the results in the service log folder in the Spectrometer BM Log Viewer.

5. **Optics:**

☑ Inspect and clean the sample compartment windows, if needed.
☑ Inspect and clean the furnace windows, if needed.
☑ Inspect and clean the GFTV camera lens, if needed.
☑ Inspect optics. Clean or replace if necessary,

6. **Gasses:**

☑ Verify that the Gasses supplied to the instrument are within the pressure and purity specifications found in the PinAAcle 900 Series Pre-installation Checklist SDB.
☑ Verify that the air filter element is dry. Replace if necessary.

7. **After PM Performance tests [THGA]:**

7.1 Furnace Gas Flows

Description: Ensures the flow rates are within specification.

Parameter	Specification	Test Results	Pass/Fail
Internal Flow Rate	250 mL/min ± 25 mL/min	208	Passed
External Flow Rate	100 mL/min ± 10 mL/min	101	Passed

7.2 Chromium Baseline Noise

Description: Signal to noise check.

Parameter	Specification	Results	Pass/Fail
Baseline Noise	≤ 0.005 Abs.	-0.0002	Passed
Standard Deviation	≤ 0.005	0.0001	Passed

7.3 Chromium Characteristic Mass and Precision

Description: Calculate the characteristic mass using the characteristic mass tool and precision from the integrated absorbance values.

Parameter	Specification	Results	Pass/Fail
Cr m_0 Results	≤ 7.0 pg/0.0044 A-s	5.6	Passed
Precision	≤ 2.0 %	1.68	Passed

7.4 Copper Characteristic Mass and Zeeman Ratio

Description: Calculate the characteristic mass using the characteristic mass tool and check the Zeeman Ratio.

Parameter	Specification	Results	Pass/Fail
Cu m_0 Result	≤ 16.5 pg/0.0044 A-s	16.3	Passed
Zeeman Ratio	0.52 ± 0.04	0.53	Passed

8. **Review:**

☑ Review with the customer PM work performed.
☑ Review with the customer routine maintenance procedures.
☑ Discuss recommended customer supplied materials to have on hand.
☑ Attach PM sticker.

Additional Comments

Additional Comments Regarding the PM
Zeeman Ratic $= \frac{Atomic\ Signal\ (Peak\ area)}{Atomic\ Signal\ (Peak\ area) + Background\ Signal\ (Peak\ area)}$ $= \frac{0.1375}{0.1375+0.1198}$ $= 0.53$

Review

The preventive maintenance checks and if applicable performance tests for PinAAcle 900Z have been completed. *This PinAAcle 900Z Passes ☑ Fails ☐ the preventive maintenance.*	
Review of Preventive Maintenance:	
Authorized PerkinElmer Representative: [redacted]	Date: 23-Jul-2024 (DD-MMM-YYYY)
Authorized Customer Representative: [redacted]	Date: 23-Jul-2024 (DD-MMM-YYYY)

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL.0-2717-3000-29 FAX.0-2719-9484

ilac-MRA

NSC-TISI-TIS17025
CALIBRATION 0008

Certificate of Calibration

Cert.No.: 25CHO3
Page.: 1 of 2

Equipment :	Conductivity Meter
Manufacturer :	WTW
Model :	inoLab Cond 730
Serial No. :	06140612
ID No. :	ERTC-L-In-050
Condition As-Received:	Used Item
Received Date :	06 January 2025
Calibration Date :	07 January 2025
Reference :	2501-0004ON-14
Submitted by :	Environment Research & Technology Company Limited. 25/114 Moo 6, Soi Chinaket 1, Ngamwongwan Road, Toongsonghong, Laksi, Bangkok 10210
Calibration Place :	ห้องปฏิบัติการวิเคราะห์ COD, TDS
Ambient Temperature :	(22.4 to 22.6) °C (On-Site)
Relative Humidity :	(44 to 44) % (On-Site)
Calibration Procedure:	In -house method : - CP-OCH3 : by direct measurement with certified reference material (CRM)
Calibrated by :	Uthen Kankawi
Approved by :	[redacted] Approved Signatory
( ) Unnopphol Harachai ( ) Ponpan Paipim (✓) Saithip Meangmai	
Issue Date :	9 January 2025

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full, except with the prior written Approval of the head of Corporate Services 3 : Equipment Calibration and Testing Services.

Condition of this result of calibration

1. Reference Standard Instrument :-

Instrument	Serial No.	ID No.	Certificate No.	Due date
1) Digital Thermometer	307901	70RC137	241973	01 Sep 2025

- This Certification is traceable to SI Throught Technology Promotion Association (Thailand - Japan)

2. Certified Reference Materials :-

- Conductivity calibration solution, CPA chem Ltd., The measurement results are traceable to SI through CPA chem Ltd., ANSI-ASQ National Accreditation Board, Accredited No. AR-1835

Conductivity Solution		Manufacturer	Lot No.	Exp. date
147.0	µS/cm	CPA Chem	970855	25 Apr 2025
1412.9	µS/cm	CPA Chem	1005307	15 June 2025
12.881	mS/cm	CPA Chem	1005308	15 June 2025

- Control Conductivity calibration solution temperature by Water bath (25 ± 0.2) °C

3. This certificate is valid only to the item calibrated on date and place of calibration.

Calibration results

Function : Conductivity Measurement

(*) After Adjustment at 1412.9 µS/cm

Conductivity Electrode Serial No.: 10110551

Standard Conductivity Solution	Before Adjustment UUC* Reading	After Adjustment UUC* Reading	Uncertainty of Measurement (±)	Coverage factor *k*
147 µS/cm	145.9 µS/cm	147.5 µS/cm	1.2 µS/cm	2.00
1412.9 µS/cm	1394 µS/cm	1414 µS/cm	11 µS/cm	2.00
12.881 mS/cm	12.79 mS/cm	12.93 mS/cm	0.099 mS/cm	2.00

Remark : **- UUC* = Unit Under Calibration**

- Cell constant = 0.480 cm^{-1}

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor *k*, providing a level of confidence of approximately 95 %.

-o0o-

Calibration Certificate ID
TH2093-012-011525-ACC-TH

Mettler-Toledo (Thailand) Ltd.
846/4 - 846/5 Lasalle Rd. Bangna Tai Sub-District
Bangna District, Bangkok 10260
+662 723 0382
MT-TH.ServiceSupport@mt.com

METTLER TOLEDO

NSC-TISI-TIS 17025
CALIBRATION 0062

Accuracy Calibration Certificate

Customer

Company:	Environment Research & Technology		
Address:	25/114 Moo 6, Soi Chiraket 1, Ngamwongwan Rd., Toongsonghong		
City:	Laksi	**Contact:**	Ramita Tsengthai
Zip / Postal:	10210		
State / Province:	Bangkok		
Order Number:			

Weighing Device

Manufacturer:	Mettler Toledo	**Instrument Type:**	Weighing Instrument
Model:	MS204S/01	**Asset Number:**	ERTC-L-IN-088
Serial No.:	B334691537	**Terminal Model:**	N/A
Building:	N/A	**Terminal Serial No.:**	N/A
Floor:	5	**Terminal Asset No.:**	N/A
Room:	504		

Range	Max. Capacity	Readability (d)
1	220 g	0.0001 g

Procedure

Calibration Guideline:	EURAMET cg-18 v. 4.0/CENAM-ema:2015
METTLER TOLEDO Work Instruction:	CP/W002/20

This calibration certificate contains measurements for As Found calibration. No As Left calibration was performed because the device was not modified after As Found calibration. Therefore, results for As Left correspond to As Found.

The sensitivity/span of the weighing instrument was adjusted before calibration with a built-in weight.

In accordance with EURAMET cg-18 (11/2015), the test loads were selected to reflect the specific use of the weighing device or to accommodate specific calibration conditions.

	Temperature		Humidity	
As Found	Start: 19.7 °C	End: 19.6 °C	Start: 40.0 %	End: 45.0 %

As Found Calibration Date:	15-Jan-2025
As Left Calibration Date:	N/A
Issue Date:	17-Jan-2025

Calibrator: [redacted]
Supapit Kruapoo

Approved Signatory: [redacted]
Technical Manager / Head of Calibration Center

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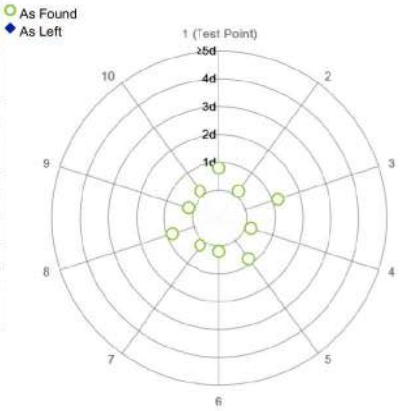
Measurement Results

Repeatability

Test Load: 100 g

	As Found	As Left
1	100.0000 g	N/A
2	100.0001 g	N/A
3	100.0002 g	N/A
4	100.0001 g	N/A
5	100.0000 g	N/A
6	100.0001 g	N/A
7	100.0001 g	N/A
8	100.0000 g	N/A
9	100.0001 g	N/A
10	100.0001 g	N/A

Standard Deviation	0.00006 g	N/A



The "d" in the graph represents the readability of the range/interval in which the test was performed.

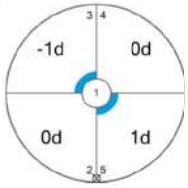
The results of this graph ars based upon the absolute values of the differences from the mean value.

Eccentricity

Test Load: 100 g

Position	As Found	As Left
1	100.0000 g	N/A
2	100.0000 g	N/A
3	99.9999 g	N/A
4	100.0000 g	N/A
5	100.0001 g	N/A

Maximum Deviation	0.0001 g	N/A



As Found

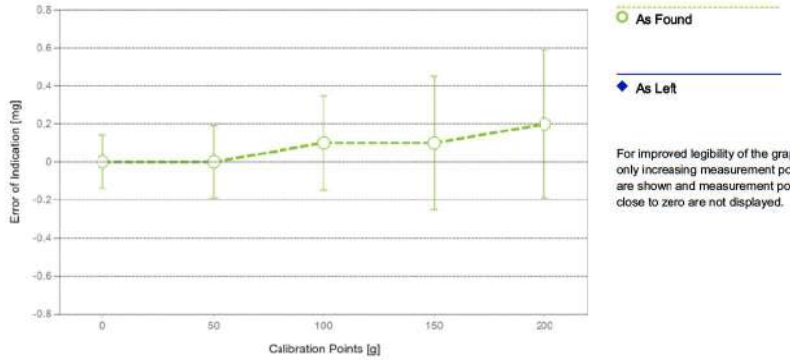
The "d" in the graph represents the readability of the range/interval in which the test was performed.

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Error of Indication

As Found

	Reference Value	Indication	Error of Indication	Expanded Uncertainty	k
1	0.0000 g	0.0000 g	0.0000 g	0.14 mg	2
2	0.0500 g	0.0500 g	0.0000 g	0.15 mg	2
3	0.1000 g	0.1000 g	0.0000 g	0.15 mg	2
4	0.5000 g	0.5000 g	0.0000 g	0.15 mg	2
5	1.0000 g	1.0000 g	0.0000 g	0.15 mg	2
6	5.0000 g	5.0000 g	0.0000 g	0.16 mg	2
7	10.0000 g	10.0001 g	0.0001 g	0.16 mg	2
8	50.0000 g	50.0000 g	0.0000 g	0.19 mg	2
9	99.9999 g	100.0000 g	0.0001 g	0.25 mg	2
10	149.9999 g	150.0000 g	0.0001 g	0.35 mg	2
11	200.0001 g	200.0003 g	0.0002 g	0.39 mg	2



For improved legibility of the graphics only increasing measurement poins are shown and measurement points close to zero are not displayed.

The expanded measurement uncertainty is reported as the standard measurement uncertainty multiplied by the coverage factor k such that the coverage probability corresponds to approximately 95 %.

The user is responsible for maintaining environmental conditions and the settings of the weighing instrument when it was calibrated. The results of this calibration certificate relate only to the calibrated item.

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Test Equipment

All weights used for metrological testing are traceable to national or international standards. The weights were calibrated and certified by an accredited calibration laboratory.

Weight Set 1: OIML E2

Weight Set No.:	WS38	Date of Issue:	15-Dec-2023
Certificate Number:	189517	Calibration Due Date:	15-Jun-2025

Weight Set 2: OIML E2

Weight Set No.:	WS38-1	Date of Issue:	22-Feb-2024
Certificate Number:	C411772496	Calibration Due Date:	22-Aug-2025

Weight Set 3: OIML E2

Weight Set No.:	WS38-3	Date of Issue:	27-Feb-2024
Certificate Number:	C411772498	Calibration Due Date:	27-Aug-2025

Thermo Hygrometer

Equipment No.:	IN256	Date of Issue:	19-Jul-2024
Certificate Number:	SG-H-00636/67	Calibration Due Date:	18-Jul-2025

Remarks

FACT adjustment functionality activated

Equipment condition: Good

Next calibration according to customer's procedure

Calibration data not decide by calibration laboratory

End of Accredited Section

The information below and any attachments to this calibration certificate are not part of the accredited calibration.

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Calibration Certificate ID
TH2093-012-011525-ACC-TH

METTLER TOLEDO Service

Measurement Uncertainty of the Weighing Instrument in Use

Stated is the expanded uncertainty with k=2 in use. The formula shall be used for the estimation of the uncertainty under consideration of the errors of indication. The value R represents the net load indication in the unit of measure of the device.

Temperature coefficient for the evaluation of the measurement uncertainty in use: $1.5 \cdot 10^{-6}$ / K

Temperature range on site for the evaluation of the measurement uncertainty in use: 3 K

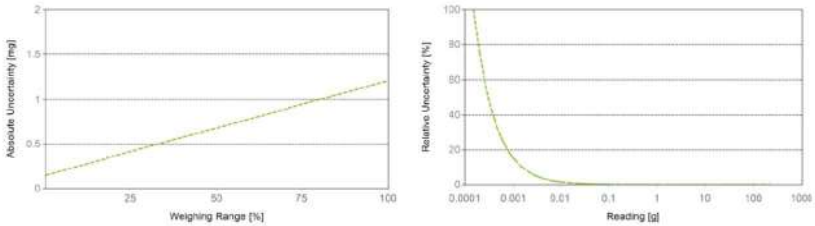
Linearization of Uncertainty Equation

Range			As Found	As Left
	d	Max		
1	0.0001 g	220 g	U_T = 0.15 mg + 0.00482 mg/g · R	N/A

To optimize the stability of the linearization, besides of the zero load only increasing measurement points with a test load of 5% of the measurement range or larger are taken for the calculation of the linear equation.

Absolute and Relative Measurement Uncertainty in Use for Various Net Indications (Examples)

Net Indication	As Found		As Left	
0.0220 g	0.15 mg	0.68%	N/A	N/A
0.2200 g	0.15 mg	0.069%	N/A	N/A
2.2000 g	0.16 mg	0.0073%	N/A	N/A
22.0000 g	0.26 mg	0.0012%	N/A	N/A
220.0000 g	1.2 mg	0.00055%	N/A	N/A



As Found

As Left

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GWP®
Certificate

As Found ✓

The weighing device meets the given process requirements.

As Left ✓

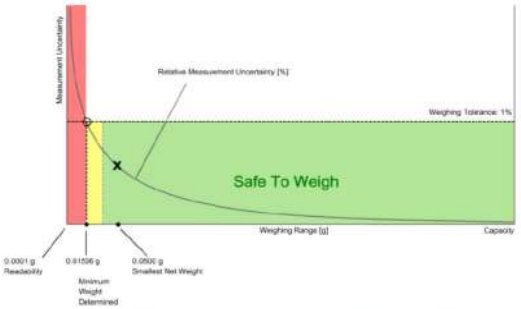
The weighing device meets the given process requirements.

Tests Performed: ☑ As Found ☐ As Left ☑ No adjustments/modifications made. As Left results correspond to As Found.

Process Requirements

Weighing Tolerance: **1%** | Smallest Net Weight: **0.0500 g** | Safety Factor: **2**

Safe Weighing Range



While the values in this graph reflect the actualcalibration results, the measurement uncertainty curves are simply a visual representation. This graph reflects As Left testing, unless only As Found was performed.

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Attachment to Calibration Certificate:
TH2093-012-011525-ACC-TH
GWP® Certificate

METTLER TOLEDO Service

Minimum Weight

As Found Minimum Weight Table

Minimum weights for different weighing tolerances and safety factors					
	Safety Factor				
Tolerance	1	2	3	5	10
0.1%	0.15128 g	0.30404 g	0.45829 g	0.77136 g	1.58179 g
0.2%	0.07546 g	0.15128 g	0.22748 g	0.38098 g	0.77136 g
0.5%	0.03014 g	0.06034 g	0.09059 g	0.15128 g	0.30404 g
1%	0.01506 g	0.03014 g	0.04523 g	0.07546 g	0.15128 g
2%	0.00753 g	0.01506 g	0.02260 g	0.03768 g	0.07546 g
5%	0.00301 g	0.00602 g	0.00904 g	0.01506 g	0.03014 g

✓ Pass: The determined minimum weight meets the requirement for the smallest net weight.

As Left Minimum Weight Table

Minimum weights for different weighing tolerances and safety factors					
	Safety Factor				
Tolerance	1	2	3	5	10
0.1%	0.15128 g	0.30404 g	0.45829 g	0.77136 g	1.58179 g
0.2%	0.07546 g	0.15128 g	0.22748 g	0.38098 g	0.77136 g
0.5%	0.03014 g	0.06034 g	0.09059 g	0.15128 g	0.30404 g
1%	0.01506 g	0.03014 g	0.04523 g	0.07546 g	0.15128 g
2%	0.00753 g	0.01506 g	0.02260 g	0.03768 g	0.07546 g
5%	0.00301 g	0.00602 g	0.00904 g	0.01506 g	0.03014 g

✓ Pass: The determined minimum weight meets the requirement for the smallest net weight.

At these net minimum weight values, the measurement uncertainty of the weighing device is ecual to or less than 1/1 (no safety factor), 1/2 1/3, 1/5, or 1/10 of the required tolerance. The values are calculated with k = 2 and based on the linear formula of the measurement uncertainty of the weighing device in use.

The safety factor for As Found is always 1. This implies no safety factor. As Found testing looks at the behavior of the instrument from the past until test occurred. For the past, it is necessary to know that the tolerance was met, but not the safety factor. The safety factor is a proactive measure to apply forfuture measurements.

Notes on minimum weight values in above table:

1. If "N/A" is shown above, no appropriate value could be calculated.
2. METTLER TOLEDO is not responsible for the definition of the process requirements.

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Measurement Results

Results Summary

	Repeatability	Eccentricity	Error of Indication
As Found	✓	✓	✓
As Left	✓	✓	✓

✓ = Passed
✗ = Failed
⚠ = Safety Factor not met

Repeatability

Test Load: 100 g

		As Found		As Left	
Tolerance	Control Limit	Std. Deviation	Result	Std. Deviation	Result
0.1%	N/A	0.00006 g*	N/A	0.00006 g*	N/A
0.2%	0.00005 g		✗		✗
0.5%	0.00013 g		✓		✓
1%	0.00025 g		✓		✓
2%	0.00050 g		✓		✓
5%	0.00125 g		✓		✓

*The calculated standard deviation value is below the rounding error of the balance. The 0.41*d rule is used for the assessment of this repeatability test and the calculation of the minimum weight.

The weighing tolerance is met if the standard deviation is less than or equal to the corresponding control limit.

Eccentricity

Test Load: 100 g

		As Found		As Left	
Tolerance	Control Limit	Deviation	Result	Deviation	Result
0.1%	0.0500 g	0.0001 g	✓	0.0001 g	✓
0.2%	0.1000 g		✓		✓
0.5%	0.2500 g		✓		✓
1%	0.5000 g		✓		✓
2%	1.0000 g		✓		✓
5%	2.5000 g		✓		✓

The weighing tolerance is met if the deviation is less than or equal to the corresponding control limit.

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Error of Indication

As Found

		Control limits for various weighing tolerances					
Reference Value	Error	0.1%	0.2%	0.5%	1%	2%	5%
0.0000 g	0.0000 g	N/A	N/A	N/A	N/A	N/A	N/A
50.0000 g	0.0000 g	0.0250 g	0.0500 g	0.1250 g	0.2500 g	0.5000 g	1.2500 g
99.9999 g	0.0001 g	0.0500 g	0.1000 g	0.2500 g	0.5000 g	1.0000 g	2.5000 g
149.9999 g	0.0001 g	0.0750 g	0.1500 g	0.3750 g	0.7500 g	1.5000 g	3.7500 g
200.0001 g	0.0002 g	0.1000 g	0.2000 g	0.5000 g	1.0000 g	2.0000 g	5.0000 g
Result		✓	✓	✓	✓	✓	✓

As Left

		Control limits for various weighing tolerances					
Reference Value	Error	0.1%	0.2%	0.5%	1%	2%	5%
0.0000 g	0.0000 g	N/A	N/A	N/A	N/A	N/A	N/A
50.0000 g	0.0000 g	0.0250 g	0.0500 g	0.1250 g	0.2500 g	0.5000 g	1.2500 g
99.9999 g	0.0001 g	0.0500 g	0.1000 g	0.2500 g	0.5000 g	1.0000 g	2.5000 g
149.9999 g	0.0001 g	0.0750 g	0.1500 g	0.3750 g	0.7500 g	1.5000 g	3.7500 g
200.0001 g	0.0002 g	0.1000 g	0.2000 g	0.5000 g	1.0000 g	2.0000 g	5.0000 g
Result		✓	✓	✓	✓	✓	✓

The weighing tolerance is met if the error (of indication) for each test point is less than or equal to the corresponding control limit for that particular weighing tolerance. Results at or close to the zero point cannot be assessed.

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METTLER TOLEDO

Mettler-Toledo (Thailand) Ltd.
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Bangna District, Bangkok 10260
+662 723 0382
MT-TH.ServiceSupport@mt.com

NSC-TISI-TIS 17025
CALIBRATION 0062

Accuracy Calibration Certificate

Customer

Company:	Ervironment Research & Technology		
Address:	25'114 Moo 6, Soi Chinaket 1, Ngamwongwan Rd., Toongsonghong		
City:	Laksi	**Contact:**	Ramita Taengthai
Zip / Postal:	10210		
State / Province:	Bangkok		
Order Number:			

Weighing Device

Manufacturer:	Mettler Toledo	**Instrument Type:**	Weighing Instrument
Model:	MS204TS/00	**Asset Number:**	ERTC-L-IN-114
Serial No.:	B547728937	**Terminal Model:**	N/A
Building:	N/A	**Terminal Serial No.:**	N/A
Floor:	5	**Terminal Asset No.:**	N/A
Room:	504		

Range	Max. Capacity	Readability (d)
1	220 g	0.0001 g

Procedure

Calibration Guideline:	EURAMET cg-18 v. 4.0/CENAM-ema:2015
METTLER TOLEDO Work Instruction:	CP/W002/20

This calibration certificate contains measurements for As Found calibration. No As Left calibration was performed because the device was not modified after As Found calibration. Therefore, results for As Left correspond to As Found.

The sensitivity/span of the weighing instrument was adjusted before calibration with a built-in weight.

In accordance with EURAMET cg-18 (11/2015), the test loads were selected to reflect the specific use of the weighing device or to accommodate specific calibration conditions.

	Temperature		Humidity	
As Found	Start: 21.1 °C	End: 20.3 °C	Start: 37.8 %	End: 42.2 %

As Found Calibration Date:	15-Jan-2025
As Left Calibration Date:	N/A
Issue Date:	17-Jan-2025

Calibrator: [redacted]
Supapit Kruapoo

Approved Signatory: [redacted]
Technical Manager / Head of Calibration Center

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METTLER TOLEDO Service

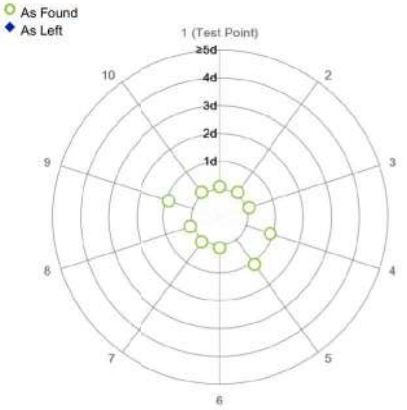
Measurement Results

Repeatability

Test Load: 100 g

	As Found	As Left
1	99.9999 g	N/A
2	99.9999 g	N/A
3	99.9999 g	N/A
4	99.9998 g	N/A
5	100.0000 g	N/A
6	99.9999 g	N/A
7	99.9999 g	N/A
8	99.9999 g	N/A
9	99.9998 g	N/A
10	99.9999 g	N/A

Standard Deviation	**0.00006 g**	**N/A**



The "d" in the graph represents the readability of the range/interval in which the test was performed.

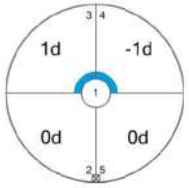
The results of this graph are based upon the absolute values of the differences from the mean value.

Eccentricity

Test Load: 100 g

Position	As Found	As Left
1	99.9999 g	N/A
2	99.9999 g	N/A
3	100.0000 g	N/A
4	99.9998 g	N/A
5	99.9999 g	N/A

Maximum Deviation	**0.0001 g**	**N/A**



As Found

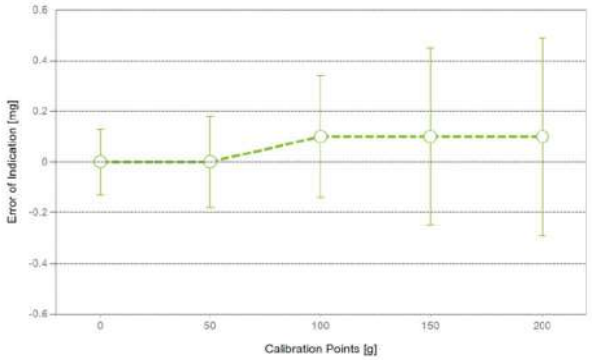
The "d" in the graph represents the readability of the range/interval in which the test was performed.

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Error of Indication

As Found

	Reference Value	Indication	Error of Indication	Expanded Uncertainty	k
1	0.0000 g	0.0000 g	0.0000 g	0.13 mg	2
2	0.0500 g	0.0500 g	0.0000 g	0.14 mg	2
3	0.1000 g	0.1000 g	0.0000 g	0.14 mg	2
4	0.5000 g	0.5000 g	0.0000 g	0.14 mg	2
5	1.0000 g	1.0000 g	0.0000 g	0.14 mg	2
6	5.0000 g	5.0000 g	0.0000 g	0.15 mg	2
7	10.0000 g	10.0000 g	0.0000 g	0.15 mg	2
8	50.0000 g	50.0000 g	0.0000 g	0.18 mg	2
9	99.9999 g	100.0000 g	0.0001 g	0.24 mg	2
10	149.9999 g	150.0000 g	0.0001 g	0.35 mg	2
11	200.0001 g	200.0002 g	0.0001 g	0.39 mg	2



As Found

As Left

For improved legibility of the graphics only increasing measurement points are shown and measurement points close to zero are not displayed.

The expanded measurement uncertainty is reported as the standard measurement uncertainty multipled by the coverage factor k such that the coverage probability corresponds to approximately 95 %.

The user is responsible for maintaining environmental conditions and the settings of the weighing instrument when it was calibrated.
The results of this calibration certificate relate only to the calibrated item.

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Test Equipment

All weights used for metrological testing are traceable to national or international standards. The weights were calibrated and certified by an accredited calibration laboratory.

Weight Set 1: OIML E2

Weight Set No.:	WS38	Date of Issue:	15-Dec-2023
Certificate Number:	189517	Calibration Due Date:	15-Jun-2025

Weight Set 2: OIML E2

Weight Set No.:	WS38-1	Date of Issue:	22-Feb-2024
Certificate Number:	C411772496	Calibration Due Date:	22-Aug-2025

Weight Set 4: OIML E2

Weight Set No.:	WS38-3	Date of Issue:	27-Feb-2024
Certificate Number:	C411772498	Calibration Due Date:	27-Aug-2025

Thermo Hygrometer

Equipment No.:	IN256	Date of Issue:	19-Jul-2024
Certificate Number:	SG-H-00636/67	Calibration Due Date:	18-Jul-2025

Remarks

FACT adjustment functionality activated

Equipment conditon: Good

Next calibration according to customer's procedure

Calibration data not decide by calibration laboratory

End of Accredited Section

The information below and any attachments to this calibration certificate are not part of the accredited calibration.

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Measurement Uncertainty of the Weighing Instrument in Use

Stated is the expanded uncertainty with k=2 in use. The formula shall be used for the estimation of the uncertainty under consideration of the errors of indication. The value R represents the net load indication in the unit of measure of the device.

Temperature coefficient for the evaluation of the measurement uncertainty in use: $3.0 \cdot 10^{-6}$ / K

Temperature range on site for the evaluation of the measurement uncertainty in use: 3 K

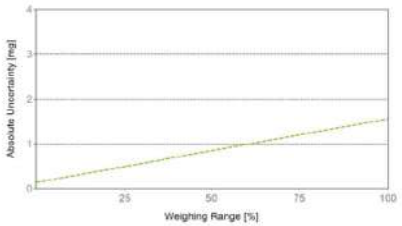
Linearization of Uncertainty Equation

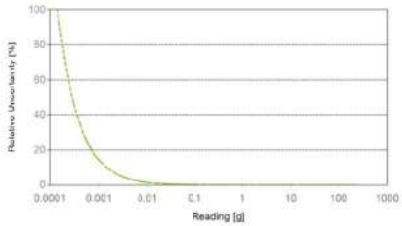
Range			As Found	As Left
	d	Max		
1	0.0001 g	220 g	U_1 = 0.14 mg + 0.00647 mg/g R	N/A

To optimize the stability of the linearization, besides of the zero load only increasing measurement points with a test load of 5% of the measurement range or larger are taken for the calculation of the linear equation.

Absolute and Relative Measurement Uncertainty in Use for Various Net Indications (Examples)

Net Indication	As Found		As Left	
0.0220 g	0.14 mg	0.64%	N/A	N/A
0.2200 g	0.14 mg	0.064%	N/A	N/A
2.2000 g	0.15 mg	0.0070%	N/A	N/A
22.0000 g	0.28 mg	0.0013%	N/A	N/A
220.0000 g	1.6 mg	0.00071%	N/A	N/A





As Found As Left

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GWP® Certificate

As Found ✓

The weighing device meets the given process requirements.

As Left ✓

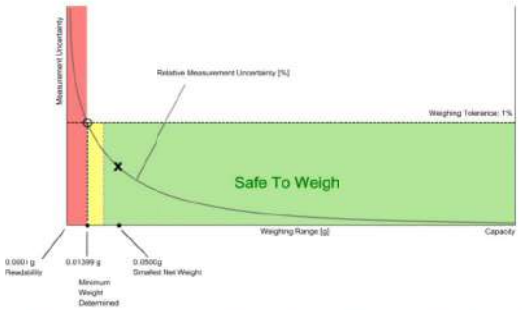
The weighing device meets the given process requirements.

Tests Performed: ☑ As Found ☐ As Left ☑ No adjustments/modifications made. As Left results correspond to As Found.

Process Requirements

Weighing Tolerance: **1%** | Smallest Net Weight: **0.0500 g** | Safety Factor: **2**

Safe Weighing Range



While the values in this graph reflect the actual calibration results, the measurement uncertainty curves are simply a visual representation. This graph reflects As Left testing, unless only As Found was performed.

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Minimum Weight

As Found Minimum Weight Table

Minimum weights for different weighing tolerances and safety factors					
	Safety Factor				
Tolerance	1	2	3	5	10
0.1%	0.14075 g	0.28335 g	0.42783 g	0.72259 g	1.49521 g
0.2%	0.07015 g	0.14075 g	0.21182 g	0.35535 g	0.72259 g
0.5%	0.02800 g	0.05608 g	0.08423 g	0.14075 g	0.28335 g
1%	0.01399 g	0.02800 g	0.04203 g	0.07015 g	0.14075 g
2%	0.00699 g	0.01399 g	0.02100 g	0.03502 g	0.07015 g
5%	0.00280 g	0.00560 g	0.00839 g	0.01399 g	0.02800 g

✓ Pass: The determined minimum weight meets the requirement for the smallest net weight.

As Left Minimum Weight Table

Minimum weights for different weighing tolerances and safety factors					
	Safety Factor				
Tolerance	1	2	3	5	10
0.1%	0.14075 g	0.28335 g	0.42783 g	0.72259 g	1.49521 g
0.2%	0.07015 g	0.14075 g	0.21182 g	0.35535 g	0.72259 g
0.5%	0.02800 g	0.05608 g	0.08423 g	0.14075 g	0.28335 g
1%	0.01399 g	0.02800 g	0.04203 g	0.07015 g	0.14075 g
2%	0.00699 g	0.01399 g	0.02100 g	0.03502 g	0.07015 g
5%	0.00280 g	0.00560 g	0.00839 g	0.01399 g	0.02800 g

✓ Pass: The determined minimum weight meets the requirement for the smallest net weight.

At these net minimum weight values, the measurement uncertainty of the weighing device is equal to or less than 1/1 (no safety factor), 1/2, 1/3, 1/5, or 1/10 of the required tolerance. The values are calculated with k= 2 and based on the linear formula of the measurement uncertainty of the weighing device in use.

The safety factor for As Found is always 1. This implies no safety factor. As Found testing looks at the behavior of the instrument from the past until test occurred. For the past, it is necessary to know that the tolerance was met, but not the safety factor. The safety factor is a proactive measure to apply for future measurements.

Notes on minimum weight values in above table:

1. If "N/A" is shown above, no appropriate value could be calculated.
2. METTLER TOLEDO is not responsible for the definition of the process requirements.

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Attachment to Calibration Certificate:
TH2093-011-011525-ACC-TH
GWP® Certificate

METTLER TOLEDO Service

Measurement Results

Results Summary

	Repeatability	Eccentricity	Error of Indication
As Found	✓	✓	✓
As Left	✓	✓	✓

✓ = Passed
✗ = Failed
⚠ = Safety Factor not met

Repeatability

Test Load: 100 g

		As Found		As Left	
Tolerance	Control Limit	Std. Deviation	Result	Std. Deviation	Result
0.1%	N/A	0.00006 g*	N/A	0.00006 g*	N/A
0.2%	0.00005 g		✗		✗
0.5%	0.00013 g		✓		✓
1%	0.00025 g		✓		✓
2%	0.00050 g		✓		✓
5%	0.00125 g		✓		✓

*The calculated standard deviation value is below the rounding error of the balance. The 0.41*d rule is used for the assessment of this repeatability test and the calculation of the minimum weight.

The weighing tolerance is met if the standard deviation is less than or equal to the corresponding control limit.

Eccentricity

Test Load: 100 g

		As Found		As Left	
Tolerance	Control Limit	Deviation	Result	Deviation	Result
0.1%	0.0500 g	0.0001 g	✓	0.0001 g	✓
0.2%	0.1000 g		✓		✓
0.5%	0.2500 g		✓		✓
1%	0.5000 g		✓		✓
2%	1.0000 g		✓		✓
5%	2.5000 g		✓		✓

The weighing tolerance is met if the deviation is less than or equal to the corresponding control limit.

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METTLER TOLEDO Service

Error of Indication

As Found

		Control limits for various weighing tolerances					
Reference Value	Error	0.1%	0.2%	0.5%	1%	2%	5%
0.0000 g	0.0000 g	N/A	N/A	N/A	N/A	N/A	N/A
50.0000 g	0.0000 g	0.0250 g	0.0500 g	0.1250 g	0.2500 g	0.5000 g	1.2500 g
99.9999 g	0.0001 g	0.0500 g	0.1000 g	0.2500 g	0.5000 g	1.0000 g	2.5000 g
149.9999 g	0.0001 g	0.0750 g	0.1500 g	0.3750 g	0.7500 g	1.5000 g	3.7500 g
200.0001 g	0.0001 g	0.1000 g	0.2000 g	0.5000 g	1.0000 g	2.0000 g	5.0000 g
Result		✓	✓	✓	✓	✓	✓

As Left

		Control limits for various weighing tolerances					
Reference Value	Error	0.1%	0.2%	0.5%	1%	2%	5%
0.0000 g	0.0000 g	N/A	N/A	N/A	N/A	N/A	N/A
50.0000 g	0.0000 g	0.0250 g	0.0500 g	0.1250 g	0.2500 g	0.5000 g	1.2500 g
99.9999 g	0.0001 g	0.0500 g	0.1000 g	0.2500 g	0.5000 g	1.0000 g	2.5000 g
149.9999 g	0.0001 g	0.0750 g	0.1500 g	0.3750 g	0.7500 g	1.5000 g	3.7500 g
200.0001 g	0.0001 g	0.1000 g	0.2000 g	0.5000 g	1.0000 g	2.0000 g	5.0000 g
Result		✓	✓	✓	✓	✓	✓

The weighing tolerance is met if the error (of indication) for each test point is less than or equal to the corresponding control limit for that particular weighing tolerance. Results at or close to the zero point cannot be assessed.

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL.0-2717-3000-29 FAX.0-2719-9484

Certificate of Calibration

Cert.No.: 25CH56

Equipment :	Salt Meter
Manufacturer :	AZ
Model :	AZ8372
Serial No. :	2103264
ID No. :	-
Condition As-Received:	Used Item
Received Date :	14 January 2025
Calibration Date :	15 January 2025
Reference :	2501-0443DN-9
Submitted by :	Environment Research & Technology Company Limited. 25/114 Moo 6, Soi Chinaket 1, Ngamwongwan Road, Toongsonghong, Laksi, Bangkok 10210
Ambient Temperature :	(25 ± 2.5) °C
Relative Humidity :	(65 ± 15) %
Calibration Procedure:	In - house method : Direct measurement by using Sodium Chloride Solution
Calibrated by :	Walalak Sirithean
Approved by :	[redacted] Approved Signatory

( ) Pornthippa Tameyakul
( ) Ponpan Paipim
(✓) Saithip Meangmai

Issue Date : 17 January 2025

The Uncertainties are for a confidence probability of approximately 95%

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Condition of this result of calibration

1. Reference Standard Instruments :

Instruments	Serial No.	ID No.	Certificate No.	Due Date
1) Thermometer	9549224	130RC003	24I426	24 Apr 2025
2) Thermo-Hygrograph	1103328	130EC010	24H1372	12 June 2025

- This Certification is traceable to SI Throught Technology Promotion Association (Thailand - Japan)

2. Reference Standard Material :
   - Sodium chloride solution, solution, Eutech Instruments Pte Ltd., The measurement results are traceable to SI through ThermoFisher Scientific Water and Lab Products.
   - Calibrated Total Dissolved Solids sclution temperature controlled by Water bath at (25 ± 0.1) °C
   - Sodium chloride solution has been prepared dilution from

Material	Manufacturer	Lot No.	Exp. Date
25 ppt	Eutech	133/01	31 Mar 2026

3. This certificate is valid only to the item calibrated on date and place of calibration.

Calibration results **(*) Adjustment at 2.84 ppt**

Probe Serial No. : 2103264

Standard NaCl Solution	Before Adjustment UUC* Reading	After Adjustment UUC* Reading	Uncertainty of Measurement (±)	Coverage factor *k*
2.50 ppt	2.43 ppt	2.51 ppt	0.028 ppt	2
2.84 ppt	2.76 ppt	2.84 ppt	0.030 ppt	2

Remark: - UUC* = Unit Under Calibration
- ppt = ppt of Sodium Chloride
- ppt = Parts per Thousand

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor *k*, providing a level of confidence of approximately 95 %.

-o0o-

Agilent CrossLab
From Insight to Outcome

Agilent CrossLab Start Up Services

Agilent 7890 Gas Chromatograph Preventive Maintenance Checklist

Agilent Preventive Maintenance provides factory recommended service for your analytical instruments to assure reliable operation and the accuracy of your results.

Delivered by highly trained and certified service engineers using genuine Agilent parts and supplies, Agilent Preventive Maintenance provides everything you need to reduce unplanned downtime and keep your systems operating at their peak. This checklist will be completed at the end of the service and provided to you as a record of the preventive maintenance activities.

Agilent

Introduction

Customer Information

- Customers should provide all necessary operating supplies upon request of the engineer.
- A customer representative should be available to the engineer while performing the preventive maintenance procedures.
- Any parts, not included in the Parts Lists section of this document, are not part of the recommended Preventive Maintenance service, nor are they included in the price of this service.
- If a system requires the use of extra or special procedures and/or parts for the maintenance service, then these must be ordered separately and charged as a repair, which may incur additional costs.

Important Customer Web Links

- For more information about ***Agilent Technologies services***, please visit our website using the following URL: http://www.agilent.com/en-us/products/crosslab-instrument-services/service-repair
- The **Agilent Community** is an excellent place to get answers, collaborate with others about applications and Agilent products, and find in-depth documents and videos relevant to Agilent technologies. Visit https://community.agilent.com/welcome.
- To access **Agilent University**, visit http://www.agilent.com/crosslab/university/ to learn about training options, which include online, classroom and onsite delivery. A training specialist can work directly with you to help determine your best options.
- A useful **Agilent Resource Center** web page is available, which includes short videos on maintenance, quick lists of consumables for new instruments, and other valuable information. Check out the Resource Page here: https://www.agilent.com/en-us/agilentresources.
- Need technical support, FAQs, supplies? – visit our **Support Home page** http://www.agilent.com/search/support.
- **Videos** about specific preparation requirements for your instrument can be found by searching the *Agilent YouTube* channel at https://www.youtube.com/user/agilent.
- **7890B Manuals** are also available on Agilent.com:
  - **Safety**
    https://www.agilent.com/cs/library/usermanuals/public/7890B_Safety.pdf
  - **Installation and First Startup**
    https://www.agilent.com/cs/library/usermanuals/Public/7890B_Installation.pdf
  - **Operation Manual**
    https://www.agilent.com/cs/library/usermanuals/Public/7890B_Operation.pdf
  - **Maintaining Your GC**
    https://www.agilent.com/cs/library/usermanuals/public/G3430-90052%207890B_Maintaining%20Guide.pdf

Revision: 2.00, Issued: December 30, 2020
Agile Document Number: D0007063
DE number: 44166.7597222222
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Agilent 7890 GC Preventive Maintenance Checklist

Service Engineer's Responsibilities

- Contact the customer and ensure that all necessary supplies are available before the preventive maintenance visit.
- Only select those pages that relate to the system or module being serviced.
- Complete empty fields with the relevant information.
- Complete the relevant checkboxes in the checklist using either a "X" or tick mark "✓".
- Check "**Section not applicable**" check boxes to indicate services/tasks not delivered, as appropriate.
- Complete the Preventive Maintenance service in the order of the tasks listed.
- Complete the Service Review section together with the customer.
- Complete the fields for page numbers at the foot of each selected page
- Complete the total number of pages field in the Service Completion section
- ***Ask the customer to sign the Service Completion section including the customer's and your signature.***

Additional Instruction Notes

- Check for any active service notes for this unit. If there are any applicable "Safety" or "Modification Recommended" Service notes, plan to implement the changes on this unit before doing any qualification service.
- Do not implement firmware updates, unless you get approval from the customer and are sure that they are compatible with the instrument control software.

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System Information

☐ Check this box if an instrument configuration report is attached instead of completing the table below.

Instrument System Name and ID	7890B / 59778
Instrument System Site and Location	Environmental Research & Technologies, Bangkok

List System Component Product Numbers	**List the Serial Numbers of each Component**
1. G3440B	CN16493176
2. G4513A	CN16500132
3. G4514A	CN18330130
4.	
5.	
6.	
7.	
8.	
9.	
10.	

Preparation

- ☑ Discuss any specific issues with the customer before starting.
- ☑ Review the instrument logbook for recorded problems and comments.
- ☑ Save instrument control settings before starting the procedure.
- ☑ Perform a general inspection of the system for cleanliness.
- ☑ Check for proper installation of parts, assemblies, sensors etc.
- ☑ Check system for required installation of components, settings as defined by current Service Notes.
- ☑ Check for required firmware updates and verify with customers if they would like them installed.
- ☑ Before starting the following procedures, record the Detector Signal Output(s) in the results table. If the GC is turned OFF or in a service mode, comparing the detector outputs before and after the service is not possible.

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Agilent 7890 GC Preventive Maintenance Checklist

Preventive Maintenance Procedure

Clean and inspect GC

- ☑ Unplug power cord from the power source.
- ☑ Open GC covers and vacuum/remove any dust/debris. Pay particular attention to cooling fans.
- ☑ Inspect internal connectors for proper contact and placement.
- ☑ Reconnect Power to the GC. Power the GC on and verify the power on self-test passed.
- ☑ Verify oven motor spins freely and turns on with the oven door closed; off when the door is opened.
- ☑ Verify operation of all other fans - the inlet and EPC cooling fans.
- ☑ Verify oven intake/outlet flap assembly is operating smoothly while heating and cooling the oven

Inlet and detector consumable replacement

- ☑ For the inlets installed, perform inlet maintenance as defined in the 7890 manual – "Maintaining Your GC" - for the inlet(s) installed.
- ☑ Replace the split vent trap cartridge filter on units with these inlets: Split/Splitless Capillary (SSL), Multi-Mode Inlet (MMI), Programmed Temperature Vaporizer (PTV), Volatiles Interface (VI).
- ☑ If the inlet system is used in Split Mode with viscous samples, inspect and clean the split vent tube on the inlet and flush or replace the tubing between the inlet and the split vent trap.
- ☑ If the GC includes a Flame Ionization Detector (FID), replace the jet. If the ignitor shows any buildup of sample or corrosion, replace the ignitor. Examine the FID collector and castle assemblies for contamination – clean as necessary.

Zero Sensors and Leak test

- ☑ Zero all pressure sensors per the procedure in the 7890 "Advanced User Guide".
- ☑ Perform inlet pressure decay test(s) as defined in the 7890 "Troubleshooting Manual".
  If the PM is done in preparation for an Operational Qualification, then the pressure decay test defined within that protocol can be used for the PM.
- ☑ Record if test passed or failed in the results table.

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ALS Maintenance

- ☐ **Section NOT applicable**
- ☑ Check all cabling and configuration settings between GC, tray, and injectors.
- ☑ Vacuum or remove any dust, especially around fans.
- ☑ Check operation of all fans.
- ☑ Check syringe for smooth plunger operation.
- ☑ Check for smooth operation of the needle support – clean if necessary

Restore Instrument

- ☑ Restore the normal operating conditions or customer method using the Browser interface or Data System.
- ☑ Purge the system with carrier flow for 15 minutes
- ☑ Bake out the system, then restore the normal operating conditions
- ☑ After equilibration, check and record the post PM detector signal output values. Results should be similar or lower than the detector outputs recorded prior to PM.
- ☑ Perform a chemical checkout. If this is a routine PM, inject the customer's sample using the ALS if applicable. This will act as a final checkout of both the ALS and the GC.

Note: If the PM Service is performed prior to a qualification service, then use the qualification procedure as a guide for final instrument set up and checkout.

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Signature Page

Service Review

- ☑ Attach available reports/printouts of all tests to this documentation
- ☑ Record the Preventive Maintenance service activity in the customer's records/logbook.
- ☑ Update/reset instrument maintenance counters as appropriate.
- ☑ Affix the PM sticker to the system or instrument logbook based on the customer's request.
- ☑ Complete the Service Engineer Comments section if there are additional comments.
- ☑ Review with the customer this service, parts replaced, and test results obtained.
- ☐ If the instrument firmware was updated, record the details of the change in the Service Engineer's Comments box or if necessary, in the customer's IQ records.
- ☐ Supply the customer with a copy of the Smart Alerts flyer.
- ☐ Describe Smart Alerts to the customer.
- ☐ Install Smart Alerts if requested.

7890 GC Test Results Table

Detector Signal Outputs	Before PM Service	After PM Service
Front detector output	N/A	19-2
Back detector output	∫	N/A
AUX detector output		N/A
Pressure decay test	**Expected test result**	**Actual test result**
Front inlet pressure decay test	Pass	Pass
Back inlet pressure decay test	Pass	Pass

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7890 Parts List Table

The following kits are recommended for capillary and purged packed inlets. If this is a general PM and the customer has a preferred set of consumables, you may use the customer's consumables.

Part description	Part number	Product or model# where used	Quantity consumed
SSL Capillary Inlet PM kit, Splitless	5188-6497	7890A/B	1
SSL Capillary Inlet PM kit, split	5188-6496	7890A/B	1
SSL Capillary Ultra Inert Inlet Gold Seal with Washer	5190-6144	7890A/B	N/A
SSL Capillary Ultra Inert Inlet Splitless Liner - Single taper with Glass Wool	5190-2293	7890A/B	
SSL Capillary Ultra Inert Inlet Low Pressure Drop Split Liner - with Glass Wool	5190-2295	7890A/B	
PP Inlet PM kit	5188-6498	7890A/B	
Split vent trap PM kit, single cartridge (for MMI, PTV & VI)	5188-6495	7890A/B	
MMI Cleaning Kit	G3510-60820	7890A/B	
PTV Septumless Head Rebuild Kit	5182-9747	7890A/B	
PTV Septumless Head Teflon Guide	5182-9748	7890A/B	
Ignitor (glow plug) assembly with O-ring	19231-60680	7890A/B	1
FID Collector Rebuild/Cleaning Kit	G1531-67000	7890A/B	1
Standard .011-inch FID Jet for capillary FID base	G1531-80560	7890A/B	N/A
High Temperature .018-inch FID Jet for capillary FID base	G1531-80620	7890A/B	
Standard .018-inch FID Jet for packed column with packed FID base	18710-20119	7890A/B	
Standard .011-inch FID Jet for capillary column with packed/adaptable FID base	19244-80560	7890A/B	
High Temperature .018-inch FID Jet for capillary column with packed/adaptable FID base	19244-80620	7890A/B	
NPD Jet, universal fit, .011-inch ID	G1534-80580	7890A/B	
NPD Jet, universal fit, .011-inch ID Extended tip	G1534-80590	7890A/B	
SSL Capillary Ultra Inert Inlet Gold Seal with Washer	5190-6144	7890A/B	
SSL Capillary Ultra Inert Inlet Splitless Liner - Single taper with Glass Wool	5190-2293	7890A/B	
**FID Collector Replacement Kit, if needed	G1531-67001	7890A/B	

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Service Engineer Comments

If there are any specific points you wish to note as part of performing the service or other items of interest for the customer, please write include them in this box.

Service Completion

Service request number 6007133139 Date service completed 8 Nov 2024

Agilent signature [redacted]

Total number of pages in this document _____

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Agilent Preventive Maintenance Services

Agilent GCMS Preventive Maintenance

Agilent Preventive Maintenance provides factory recommended service for your analytical instruments to assure reliable operation and the accuracy of your results

Delivered by highly trained and certified service engineers using genuine Agilent parts and supplies, Agilent Preventive Maintenance provides what you need to reduce unplanned downtime and keep your systems operating at their peak performance.

This checklist is used as a guide for completing the preventive maintenance tasks. A signed copy of this checklist is provided for your records.

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Introduction

This checklist covers the following model(s):

Type	Model
SQ	5973 Series MSD
SQ	5975 Series MSD
SQ	5977 Series MSD
TQ	7000 Series MS/MS
TQ	7010 Series MS/MS
QTOF	7200 Series QTOF
QTOF	7250 Series QTOF

Customer Information

- Customers should provide all necessary operating supplies upon request of the engineer.
- A customer representative should be available to the engineer while performing the preventive maintenance procedures. Customers are responsible for regular maintenance and are encouraged to observe the service representative.
- Any parts not included in the Parts Lists section of this document are not part of the recommended Preventive Maintenance service nor are they included in the price of this service.
- If a system requires the use of extra or special procedures and/or parts for the maintenance service, then these must be ordered separately and charged as a repair, which may incur additional costs.

Customer Responsibilities

Customers should ensure that all necessary operating supplies, consumables, and usage-dependent items such as gases, vials, syringes, calibrant solution and solvents required for successful preventive maintenance are available. A customer representative should be available while the preventive maintenance is being performed.

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Important notice for customers

The customer should complete the following before the Support Provider arrives on site:

- ☐ Perform an autotune and retain the printed tune report just prior to the start of the PM to verify performance of the equipment.

  Note: it is recommended to have the customer run the autotune and tune evaluation prior to the PM and then start the vent cycle so that the instrument will be ready for the service representative.

Important Customer Web Links

- To access Agilent training and education, visit http://www.agilent.com/chem/training to learn about training options, which include online, classroom and onsite delivery. A training specialist can work directly with you to help determine your best options.
- To access the **Agilent Resource Center** web page, visit https://www.agilent.com/en-us/agilentresources. The following information topics are available:
  - Sample Prep and Containment
  - Chemical Standards
  - Analysis
  - Service and Support
  - Application Workflows
- The **Agilent Community** is an excellent place to get answers, collaborate with others about applications and Agilent products, and find in-depth documents and videos relevant to Agilent technologies. Visit https://community.agilent.com/welcome
- Videos about specific preparation requirements for your instrument can be found by searching the **Agilent YouTube** channel at https://www.youtube.com/user/agilent
- **Need to place a service call?** Flexible Repair Options | Agilent

Service Engineer's Responsibilities

- Contact the customer and ensure that all necessary supplies are available before the preventive maintenance visit.
- Only select those pages that relate to the system or module being serviced.
- Complete empty fields with the relevant information.

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- Complete the relevant checkboxes in the checklist using either a "**X**" or tick mark "✓".
- Check **"Service not applicable"** check boxes to indicate services/tasks not delivered, as appropriate.
- Complete the Preventive Maintenance services in order by sections: Review, System Checks, Pump maintenance, Cleaning System and Filters, then System Post Check.
  - The tasks in each section may be completed in the most logical order relevant to the system. Complete the **Service Review** section together with the customer.
- Complete the fields for page numbers at the foot of each selected page
- Add relevant page numbers to selected pages and complete the total number of pages field in the Service Verification section
- Complete Signature Page and attach Signature Page to Service Order.

Additional Instruction Notes

- Preventive maintenance is a factory recommended procedure designed to reduce the likelihood of electromechanical failures. Failure to perform preventive maintenance may reduce the long-term reliability of certain instruments and systems. **Two preventative maintenances (PMs) per year are recommended, the Major PM Service will be performed annually with an Interim PM performed 6 months after the Major PM.**

Definition of the Task/Recommended items within the document

Task		Recommended			
Yes	No	Interim	Major	As Needed	
✓					**Yes** selected means that the task was done or the part was required
	✓				**No** selected means that the task was not done or the part was not required.
		✓			**Interim** selected means that this task is recommended to be done at 6-month intervals
			✓		**Major** selected means that this task is recommended to be done yearly; if the customer would like a service to be done at the 6-month interval then the service could be purchased
				✓	**As needed** selected means that the task was done, or the part was used as needed. For example, there could be two types of filters that could be used, and this was the one selected.

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Instrument Maintenance

Select the appropriate service to be performed.

- ☐ Interim Preventive Maintenance (when available, is typically 6 months or at the request of the customer)
- ☑ Major Preventive Maintenance (Yearly)
- ☐ Enhanced Preventive Maintenance (when available, is provided "As needed")

System Information

☐ Check this box if an instrument configuration report is attached instead of completing the table.

Instrument System Name and ID	7890B / G4777B
Instrument System Site and Location	Environmental Research & Technologies, Bemyster

	List System Component Product Numbers	List the Serial Numbers of each Component
1.	G4077B	US17031011
2.		
3.		
4.		
5.		
6.		

Preparation

- ☑ Discuss any specific issues with the customer before starting.
- ☑ Review the instrument logbook for recorded problems and comments.
- ☑ Save instrument control settings before starting the procedure.
- ☑ Perform a general inspection of the system for cleanliness.
- ☑ Check for proper installation of parts, assemblies, sensors etc.
- ☑ Check system for required installation of components and implementation of Service Notes.
- ☑ Check firmware version(s). Updating to the most current versions is strongly recommended. Verify with the customer before updating.

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Preventive Maintenance Procedures

☐ **Service Not Applicable**

Interim / Major Preventive Maintenance – GCMS

Yes/No	Interim/Major	Description
☑ ☐	☑ ☑	Perform general inspection of system for cleanliness
☑ ☐	☑ ☑	Discuss any problems the customer is having with the instrument
☑ ☐	☑ ☑	Review customer maintenance records and exclude maintenance on recently serviced items
☑ ☐	☑ ☑	Review the most recent autotune report. This will give a starting point for evaluating spectral peaks, baseline noise, peak shape, mass assignments and resolution.

Interim / Major Preventive Maintenance – System Checks

☐ **Service Not Applicable**

		System Checks
Yes/No	**Interim/Major**	**Description**
☑ ☐	☑ ☑	Verify that calibration peaks were seen prior to starting the PM
☑ ☐	☑ ☑	Vent the instrument
☑ ☐	☑ ☑	Inspect vacuum hoses, pump, exhaust tubing, and power cords for excessive wear.
☐ ☐	☑ ☑	Visually inspect calibrant levels – PFTBA PFDTD (if app.), IRM (if appl.). Refill if available.
☑ ☐	☑ ☑	Look for any obvious external damage or problems.
☑ ☐	☑ ☑	Clean air intake(s). Cosmetic cover(s) may need to be removed.
☑ ☐	☑ ☑	Verify system line voltage meets instrument specifications: **Yes** ☑ **No** ☐
☐ ☑	☑ ☑	For HydroInert systems, verify customer is running hydrogen: **Yes** ☐ **No** ☐

Interim / Major Preventive Maintenance – Wet Mechanical vacuum pumps

☐ **Service Not Applicable**

Yes/No ☐ ☐		**Wet Mechanical vacuum pumps**
Yes/No	**Interim/Major**	**Description**
☑ ☐	☑ ☑	Check for evidence of oil leakage. Check pump gasket for leakage.
☑ ☐	☐ ☑	GC/MS SQ with diffusion pump; drain and replace diffusion pump oil.
☑ ☐	☑ ☑	Drain and replace mechanical pump oil.
☐ ☑	☑ ☑	Replace Oil Mist Filter if applicable.

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Yes/No ☐ ☐		Wet Mechanical vacuum pumps	
☑ ☐	☑ ☑		Discuss with customer the need for more frequent oil changes if the oil is dirty
☐ ☑	☑ ☑		Don't use mist filters with Chemical Ionization.
☑ ☐	☑ ☑	Perform anti-suckback valve test. Power on until side plate is held closed, power off and check that side plate holds closed. Visually confirm that no oil returns up vacuum hose.	

Interim / Major Preventive Maintenance – Dry Mechanical vacuum pumps - Diaphragm

☑ Service Not Applicable

Yes/No ☐ ☐		Dry Mechanical vacuum pumps - Diaphragm
Yes/No	Interim/Major	Description
☐ ☐	☑ ☑	Check for evidence of poor vacuum – Turbo power demand, poor manifold vacuum, etc.
☐ ☐	☑ ☑	Clear air flow paths of dust.
☐ ☐	☑ ☑	If vacuum is poor, then replace the diaphragm pump.
☐ ☐	☑ ☑	Perform anti-suckback valve test. Power on until side plate is held closed, power off and check that side plate holds closed.

Interim / Major Preventive Maintenance – Dry Mechanical vacuum pumps - Scroll

☑ Service Not Applicable

Yes/No ☐ ☐		Dry Mechanical vacuum pumps - Scroll	
Yes/No	Interim/Major	Description	
☐ ☐	☑ ☑	Replace the tips seal on the IDP pump.	
☐ ☐	☑ ☑	Check for evidence of poor vacuum – Rough vac pressure, turbo power demand, poor manifold vacuum, etc.	
☐ ☐	☑ ☑	Replace the Exhaust Filter if required.	
☐ ☐	☑ ☑		Discuss with customer the need for more frequent changes, if needed.
☐ ☐	☑ ☑		Inform customer that pump gas ballast should be installed all the time.
☐ ☐	☑ ☑	Perform anti-suckback valve test. Power on until side plate is held closed, power off and check that side plate holds closed.	

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Interim / Major Preventive Maintenance – Cleaning System and Filters

☐ Service Not Applicable

		Cleaning System and Filters	
Yes/No	Interim/Major	Description	
		Fans	
☑ ☐	☑ ☑		Remove dust from fans and vent covers
☑ ☐	☑ ☑		Verify fans are functional and that there is enough space around the instrument for proper cooling.
		Source cleaning (all sources **except** HydroInert)	
☑ ☐	☐ ☑		Open analyzer and remove the source.
☑ ☐	☐ ☑		Disassemble, Clean, Re-assemble source. (7200, also, remove and clean entrance lens)
☑ ☐	☐ ☑		Re-install source and close analyzer.
		HydroInert Source	
☐ ☑	☐ ☐		Source **NOT** to be abrasively cleaned. No cleaning required at PM. If a decrease in performance is observed, recommend to the customer that filaments, insulators (repeller and extractor), extractor lens, and repeller lens may need to be replaced to restore performance. HydroInert source should not be run with helium carrier.
		Filters	
☐ ☑	☐ ☑		Replace RMSH-2 Helium gas filter (collision cell gas) – if applicable.
☐ ☑	☐ ☑		Replace RMSN-2 Nitrogen gas filter (collision cell gas) – if applicable.
☐ ☑	☐ ☑		Replace RMSHY-2 Hydrogen gas filter (HydroInert and JetClean) – if applicable.
☐ ☑	☐ ☑		CP17973 – Gas Clean GS/MS Filter (for He, N2 or H2 carrier) – if required
☐ ☑	☐ ☑		5190-9071 – Methane Gas Filter (CI systems) – if applicable

Guidance: Gas filters need to be changed only if required (ie indicating traps show color change, or if Big Universal Trap are approaching saturation based on time installed or number of gas cylinders changed for that trap)

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Interim / Major Preventive Maintenance – System Post Check

☐ **Service Not Applicable**

				System post-check	
Yes/No		Interim/Major		Description	
☑	☐	☑	☑	Pump system back down. Wait untilsystem stability has been achieved.	
☑	☐	☑	☑	Verify system vacuum reading(s) viathe gauge controller.	
☑	☐	☑	☑	Leak Check	
☑	☐	☑	☑		Verify system in manual tune
☑	☐	☑	☑		Compare against previous tune file report(s)
☑	☐	☑	☑	Change to Tune and verify that all temperatures, pressures, and gas flows reach method set points	
☑	☐	☑	☑	Check manually that you have calibration peaks.	
☐	☑	☑	☑	EI Autotune Performed	

Guidance: If the PM Service is performed prior to a qualification service, then use the qualfication procedure as a guide for final instrument setup and checkout.

Service Review

- ☑ Attach available reports/printouts of all tests to this documentation.
- ☑ Record the Preventive Maintenance service activity in the customer's records/logbook.
- ☑ Record the PM event in the Smart Alerts logbook, if applicable.
- ☑ Update/reset instrument maintenance counters as appropriate.
- ☑ Affix the PM sticker to the system or instrument logbook based on the customer's request.
- ☑ Complete the Service Engineer Comments section if there are additional comments.
- ☑ Review this service, parts replaced, and test results obtained with the customer.
- ☑ If the instrument firmware was updated, record the details of the change in the Service Engineer's Comments box. Systems in a compliant environment may need additional documentation.
- ☑ Complete Signature Page and attach Signature Page to Service Order.

Test Results

Test Description	Expected Test Result	Actual Test Result

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Signature Page

Service Engineer Comments (optional)

If there are any specific points you wish to note as part of performing the service review or other items of interest for the customer, please write in this box.

Service Verification

Service Request Number: 6007133135

Date of Service Completion: 8 Nov 2024

Service Engineer Name: [redacted]

Customer Name: [redacted]

Total number of pages in this document:

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Parts for consumption during PM

Common Oil and MS Gas Filters – 5973/5975/5977/7000/7010/7200/7250 Series

Part Description	Part Number	Interim	Major	As Needed
Agilent AVF Platinum 1 quart	5191-5851	✓	✓	✓
Helium gas filter* (collision cell gas) – if required	RMSH-2		✓	✓
Nitrogen gas filter*(collision cell gas) – if required	RMSN-2		✓	✓
Hydrogen gas filter*^ (HydroInert and JetClean) – if required	RMSHY-2		✓	✓
Chemical Ionization Gas Purifier (CI systems) (Methane) – if required	5190-9071		✓	✓
Gas Clean GS/MS Filter (for He, N2 or H2) – if required	CP17973		✓	✓
# Gas Clean Filter Kit GC/MS 1/8 in (complete replacement kit - bench mounted) – if required	CP17974			✓
# Gas Clean Carrier Gas Kit for 7890 for He, N2 or H2; Bracket, Mount and Filter – if required	CP17988			✓
# Gas Clean Carrier Gas Kit for 8890 & 8860 for He, N2 or H2; Bracket, Mount and Filter – if required	CP179880			✓

Gas filters need to be changed only if required (ie indicating traps show color change, or if Big Universal Trap are approaching saturation based on time installed or number of gas cylinders changed for that trap)

* Big Universal Trap (BUT), 1/8" fittings
^ HydroInert and JetClean Systems
# Alternate Gas Clean kit part numbers. A Gas Clean filter is included in the kits. They are only necessary if replacing carrier gas Big Universal Traps with indicating traps

MS Maintenance Supplies for 5973/5975/5977 Series

Part Description	Part Number	Interim	Major	As Needed
Diffusion pump fluid (Diffusion Pump Models)	6040-0809 Qty 2		✓	✓
Exhaust oil mist trap (threaded) Edwards/Pfeiffer	G1099-80039	✓	✓	✓
DS42 Oil Mist Eliminator 3/4G & 3/8	SR03706556	✓	✓	✓
IDP-3 Tip Seal Replacement Kit (IDP-3 Dry Scroll Pump Models – Includes tip seal, 60mm filter element, tools, mask and cleaning supplies)	G7077-67018	✓	✓	✓
IDP-3 Tip Seal Replacement Kit (no tools – CSD P/N)	5190-9561	✓	✓	✓
IDP-3 Tip Seal Replacement Kit (no tools – VPD P/N)	IDP3TS	✓	✓	✓
Filter element for IDP-3 (diameter: 60mm)	REPLSLRFILTER2	✓	✓	✓

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MS Maintenance Supplies for 7000/7010 Series

Part Description	Part Number	Interim	Major	As Needed
Oil Mist Filter RV5	G6600-80043	✓	✓	✓
IDP-10 Tip Seal Replacement Kit (IDP-10 Dry Scroll Pump Models – Includes tip seal, 102mm filter element, tools, mask and cleaning supplies)	G7004-67023	✓	✓	✓
IDP-10 Tip Seal Replacement Kit (no tools etc. – VPD P/N)	X3807-67000	✓	✓	✓
Filter element for IDP-10/IDP15 (diameter: 102mm)	REPLSLRFILTER	✓	✓	✓
Filter element for IDP-10/IDP15 (diameter: 79mm)	REPLSLRFILTER1	✓	✓	✓

MS Maintenance Supplies for 7200/7250 Series

Part Description	Part Number	Interim	Major	As Needed
RIS Probe Maintenance Kit (7200 Series only)	G7005-60170		✓	✓
DS202 Oil Mist Eliminator	SR03706800	✓	✓	✓
DS202 3/8" Magnetic Plug and Gasket	SR03701824	✓	✓	✓
IDP-15 Tip Seal Replacement Kit (IDP-15 Dry Scroll Pump Models – Includes tip seal, 102mm filter element, tools, mask and cleaning supplies)	5190-9613	✓	✓	✓
IDP-15 Tip Seal Replacement Kit (no tools etc.– VPD P/N)	X3815-67000	✓	✓	✓
Filter element for IDP-10/IDP15 (diameter: 102mm)	REPLSLRFILTER	✓	✓	✓
Filter element for IDP-10/IDP15 (diameter: 79mm)	REPLSLRFILTER1	✓	✓	✓

HydroInert Source Supplies

To determine if replacement of HydroInert parts is required, please review tune history and sample signal intensity performance. If performance is decreasing, the below parts maybe use to restore performance as part of the PM.

One way to determine if the source performance on SQ is being affected is to review the gain factor history in autotune reports or tune history csv file. If the gain factor is increasing the source performance maybe degrading.

Since TQ tunes to a fixed gain factor, review PFTBA abundance. If PFTBA abundance is decreasing over time, the source performance maybe degrading.

Real sample/standard area counts are another way to determine the performance, there could also be other factors that affect compounds abundance such as inlet and column status.

Part Description	Part Number	Interim	Major	As Needed
Repeller Insulator (qty 2)	G1099-20133			✓
Lens insulator for Extractor (ring insulator)	G3870-20445			✓
HydroInert Extractor lens (9mm)	G7078-20909			✓
HydroInert Repeller	G7078-20902			✓

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Common Parts Reference
(Purchased by customer, not included as part of PM)

Filaments and Calibrant Supplies 5973/5975/5977/7000/7010/7200/7250 Series

Part Description	Part Number	SQ	TQ	QTOF
EI High Temperature Filaments	G7005-60061 Qty 2	597X	7000x	N/A
HES EI Filaments	G7002-60001	5977B/C	7010x	N/A
LE-EI Filaments (7250 QTOF)	G3850-60021	N/A	N/A	7250
CI High Temperature Filament – SQ, TQ, 7200 QTOF	G7005-60072	N/A	N/A	7200A/B
Axial CI Filament, W/Re Straight (7250 QTOF)	G7250-60095	N/A	N/A	7250
PFTBA GCMS Tuning Standard calibrant	05971-60571	597X	70X0	72X0
PFDTD calibrant, 1 mL	8500-8510	597X	70X0	72X0
PFET, IRM calibrant for GC QTOF 0.5 mL (7200)	5190-0531	N/A	N/A	7200A/B

Transfer line seals and springs 5973/5975/5977/7000/7010/7200/7250 Series

Part Description	Part Number	SQ	TQ	QTOF
CI Interface tip seal (ceramic tip and spring combo) (**non-captured** CI tip seal interface) (5973, 5975, 7000B)	G1999-60412	5973, 5975	7000B	N/A
CI Interface tip seal (ceramic tip and spring low/non-magnetic spring combo) (**non-captured** CI tip seal interface) (7010A)	G7002-60412	N/A	7010A	N/A
CI Interface tip seal spring (spring only)	G1999-20023	597X	70X0	72X0
CI Interface tip seal (tip only) (**captured** style)	G3870-20542	5977x	70X0	72X0
Transfer-Line Tip Base, Threaded (**captured** style)	G3870-20548	5977x	70X0	72X0
Transfer-Line Tip Cap, Threaded (**captured** style)	G3870-20547	5977x	70X0	72X0
RIS Xfer Tip (7200)	G7005-20542	N/A	N/A	7200A/B
RIS Xfer Tip Spring (7200)	G7005-20024	N/A	N/A	7200A/B

MS Maintenance Supplies for Intuvo 9000 MS Series

Part Description	Part Number	SQ	TQ	QTOF
Swaged MS Tail - Packaged	G4590-60009	5977x	7000	N/A
Swaged MS Tail (HES) - Packaged	G4590-60109	5977x	7010x	N/A

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Heater/Sensor assemblies for 5973/5975/5977/7000/7010/7200/7250 Series

Part Description	Part Number	SQ	TQ	QTOF
Stainless Steel Heater/Sensor assembly (SST EI 350)	G3870-67180	597X	N/A	N/A
Inert Heater/Sensor assembly (Inert EI 350)	G3870-67179	597X	7000A/B	N/A
Extractor Heater/Sensor assembly (Xtr EI 350)	G3870-67177	5977x	7000C/D/E	N/A
H2 EI Heater/Sensor Assembly – Hydronert (H2 EI 350)	G7078-67910	5977x	7000C/D/E	N/A
CI 350 Heater/Sensor Assembly (CI 350)	G3870-67415	597X	70X0x	N/A
Ring heater/sensor assembly (HES, RIS and LEEI) (ceramic ring)	G7002-60058	5977B/C	7010x	72X0

Rough pump hoses 5973/5975/5977/7000/7010/7200/7250 Series

Part Description	Part Number	SQ	TQ	QTOF
Foreline Hose - imbedded spring	G7077-60119	597X	70X0x	72X0

Common MS Maintenance Supplies

Part Description	Part Number	SQ	TQ	QTOF
Abrasive paper, 30 µm	5061-5896	597X	70X0	72X0
Alumina powder	393706201	597X	70X0	72X0
Cloths, clean (pkg of 15)	05980-60051	597X	70X0	72X0
Cloths, cleaning (pkg of 300)	9310-4828	597X	70X0	72X0
Cotton swabs (pkg of 100)	5080-5400	597X	70X0	72X0
Gloves, clean, large	8650-0030	597X	70X0	72X0
Gloves, clean, small	8650-0029	597X	70X0	72X0

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For more information about Agilent Technologies services please visit our web site using the following URL http://www.chem.agilent.com/en-us/products/services/pages/default.aspx

Customer Information

- Customers should provide all necessary operating supplies upon request of the engineer.
- A customer representative should be available to the engineer while performing the preventive maintenance procedures.
- Any parts, not included in the Parts Lists section of this document, are not part of the recommended Preventive Maintenance service, nor are they included in the price of this service.
- If a system requires the use of additional or special procedures and/or parts for the instrument service, then these must be ordered separately and charged as a repair, which may incur additional costs.

Service Engineer's Responsibilities

- Only complete/printout pages that relate to the system or module being serviced.
- Complete empty fields with the relevant information.
- Complete the relevant checkboxes in the checklist using a "X" or tick mark "✓" in the checkbox.
- Complete Not Applicable check boxes to indicate services not delivered, as needed.
- Complete the PM service in the order of the tasks listed.
- Complete the Service Review section together with the customer.

Teledyne Tekmar ATOMX Purge and Trap
Preventive Maintenance Checklist - Standard

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System Information

Guidance

☐ Check this box if an instrument configuration report is attached instead of completing the table.

Instrument system name and ID	ATOMX
Instrument system site and location	Environmental Research & Technologies, Bangkok
List system component product numbers	**List the serial numbers of each component**
1. TMR - ATOMX	1. US17013007
2.	2.
3.	3.
4.	4.
5.	5.
6.	6.
7.	7.
8.	8.
9.	9.
10.	10.

Preparation

☑ Discuss any specific issues with the customer prior to starting.
☑ Review the instrument logbook.
☑ Save instrument control settings before starting the procedure.
☑ Perform general inspection of system for cleanliness
☑ Check for proper installation of safety-related parts, assemblies , sensors etc
☑ Check for required firmware updates and verify with customers if they would like it installed.

Check External Supplies

- ☐ **Section NOT Applicable**
- ☑ Verify the gas source is supplying an input pressure of 50 - 100 psi to the ATOMX. If the customer is using a gas cylinder, verify the cylinder is at 500+ psi.
- ☑ Verify that the waste container has sufficient volume to contain the waste generated. Empty if necessary.
- ☑ Replace the DI water supply with fresh DI water.
  - Make sure the DI water supply is sufficient for sample analysis (1 Liter minimum)
- ☑ Make sure the methanol supply is sufficient for sample analysis.

Atomx Leak and Pressure Check

- ☐ **Section NOT Applicable**
- ☑ Scan through the sample log to verify that the purge pressures are staying consistent throughout the daily runs.
- ☑ Use the Teklink software to check the standard pressure.
- ☑ Run a leak check to ensure that the unit is leak tight.

Inspect ATOMX Hardware

- ☐ **Section NOT Applicable**
- ☑ Check the tray vial holes for foreign particles. Clean if necessary.
- ☑ Inspect the needle for particles or sample build up. Clean if necessary.
- ☑ Inspect the sparger glassware for damage and/or discoloration that could restrict flow or cause contamination. Replace if necessary.
- ☑ Inspect the drain tubing for clogging. Replace the drain line if necessary.
- ☑ Lubricate the ATOMX Carousel Drive. Refer to the diagram on page 6-25 of the ATOMX User Manual for lubrication points. Teledyne Tekmar recommends using DuPont Krytox lubrication.
- ☑ Lubricate the ATOMX Elevator. Refer to the diagram on page 6-32 of the ATOMX User Manual for lubrication points. Teledyne Tekmar recommends using DuPont Krytox lubrication.

Restore Instrument

Guidance

If the PM service is performed prior to a qualification service, then use the qualification procedure as a guide for final instrument set up and checkout.

Service Review

- ☑ Attach available reports/printouts of all tests to this documentation.
- ☑ Record the PM service activity in the customer's instrument records/logbook
- ☑ Update/reset instrument maintenance counters as appropriate
- ☑ Affix the PM sticker to the system or instrument logbook based on the customer's request.
- ☑ Complete the Service Engineer Comments section below if there are additional comments
- ☑ Review the service and any test results with the customer.
- ☑ If the Instrument firmware was updated, record the details of the change in the Service Engineer's Comments box below or if necessary, in the customer's IQ records.

Product or Product Type Test Results Table

Test Description	Expected Test Result	Actual Test Result
Leak Test	Pass	Pass

Product or Product Type Parts List Table

Part Description	Part Number	Product or Model# where used	Quantity Consumed
Sparger Glassware	Ask the customer what size sparger glassware they are using; refer to the ATOMX parts list for part numbers.	TMR-ATOMX	1 N/A
Lubricant, Dupont Krytok	15-0293-000	TMR-ATOMX	1 N/A
Tubing, Drain, Self Retracting	15-0087-002	TMR-ATOMX	1 N/A

Teledyne Tekmar ATOMX Purge and Trap
Preventive Maintenance Checklist - Standard

Agilent Technologies

Service Engineer Comments (optional)

If there are any specific points you wish to note as part of performing the service or other items of interest for the customer, please write in this box.

Other Important Customer Web Links

- How to get information on your product: Literature Library - http://www.agilent.com/chem/library
- Need to know more? - www.agilent.com/chem/education
- Need technical support, FAQs? - www.agilent.com/chem/techsupp
- Need supplies? - www.agilent.com/chem/supplies

Service Completion

Service request number 6007133135 Date service completed 8 Nov 2024

Agilent signature [redacted] Customer signature [redacted]

Number of pages in this document _____

Agilent CrossLab
From Insight to Outcome

Agilent CrossLab Start Up Services

Agilent 8890 Gas Chromatograph

Preventive Maintenance Checklist

Agilent Preventive Maintenance provides factory recommended service for your analytical instruments to assure reliable operation and the accuracy of your results.

Delivered by highly trained and certified service engineers using genuine Agilent parts and supplies, Agilent Preventive Maintenance provides everything you need to reduce unplanned downtime and keep your systems operating at their peak. This checklist will be completed at the end of the service and provided to you as a record of the preventive maintenance activities.

Agilent

Introduction

Customer Information

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- A customer representative should be available to the engineer while performing the preventive maintenance procedures.
- Any parts, not included in the Parts Lists section of this document, are not part of the recommended Preventive Maintenance service, nor are they included in the price of this service.
- If a system requires the use of extra or special procedures and/or parts for the maintenance service, then these must be ordered separately and charged as a repair, which may incur additional costs.

Important Customer Web Links

- For more information about *Agilent Technologies services*, please visit our website using the following URL: http://www.agilent.com/en-us/products/crosslab-instrument-services/service-repair
- The **Agilent Community** is an excellent place to get answers, collaborate with others about applications and Agilent products, and find in-depth documents and videos relevant to Agilent technologies. Visit https://community.agilent.com/welcome.
- To access **Agilent University**, visit http://www.agilent.com/crosslab/university/ to learn about training options, which include online, classroom and onsite delivery. A training specialist can work directly with you to help determine your best options.
- A useful **Agilent Resource Center** web page is available, which includes short videos on maintenance, quick lists of consumables for new instruments, and other valuable information. Check out the Resource Page here: https://www.agilent.com/en-us/agilentresources.
- Need technical support, FAQs, supplies? – visit our **Support Home page** http://www.agilent.com/search/support.
- Videos about specific preparation requirements for your instrument can be found by searching the *Agilent YouTube* channel at https://www.youtube.com/user/agilent.

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Service Engineer's Responsibilities

- Contact the customer and ensure that all necessary supplies are available before the preventive maintenance visit.
- Only select those pages that relate to the system or module being serviced.
- Complete empty fields with the relevant information.
- Complete the relevant checkboxes in the checklist using either a "X" or tick mark "✓".
- Check **"Section not applicable"** check boxes to indicate services/tasks not delivered, as appropriate.
- Complete the Preventive Maintenance service in the order of the tasks listed.
- Complete the Service Review section together with the customer.
- Complete the fields for page numbers at the foot of each selected page
- Complete the total number of pages field in the Service Completion section
- ***Ask the customer to sign the Service Completion section including the customer's and your signature.***

Additional Instruction Notes

- Check for any active service notes for this unit. If there are any applicable "Safety" or "Modification Recommended" Service notes, plan to implement the changes on this unit before doing any qualification service.
- Do not implement firmware updates, unless you get approval from the customer and are sure that they are compatible with the instrument control software.

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System Information

☐ Check this box if an instrument configuration report is attached instead of completing the table below.

Instrument System Name and ID	ERTC - L-in-175 / US2125A011
Instrument System Site and Location	Environment Research & Technology Co., Ltd / GC ECD

List System Component Product Numbers	List the Serial Numbers of each Component
1. G3540A	US2125A011
2. G4513A	CN21195125
3. G4514A	CN21207024
4.	
5.	
6.	
7.	
8.	
9.	
10.	

Preparation

- ☑ Discuss any specific issues with the customer before starting.
- ☑ Review the instrument logbook for recorded problems and comments.
- ☑ Save instrument control settings before starting the procedure.
- ☑ Perform a general inspection of the system for cleanliness.
- ☑ Check for proper installation of parts, assemblies, sensors etc.
- ☑ Check system for required installation of components, settings as defined by current Service Notes.
- ☑ Check for required firmware updates and verify with customers if they would like them installed.
- ☑ Before starting the following procedures, record the Detector Signal Output(s) in the results table. If the GC is turned OFF or in a service mode, comparing the detector outputs before and after the service is not possible.

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Preventive Maintenance Procedure

Clean and inspect GC

- ☑ Unplug power cord from the power source.
- ☑ Open GC covers and vacuum/remove any dust/debris. Pay particular attention to cooling fans.
- ☑ Inspect internal connectors for proper contact and placement.
- ☑ Reconnect Power to the GC. Power the GC on and verify the power on self-test passed.
- ☑ Verify oven motor spins freely and turns on with the oven door closed; off when the door is opened.
- ☑ Verify operation of all other fans - the inlet and EPC cooling fans.
- ☑ Verify oven intake/outlet flap assembly is operating smoothly while heating and cooling the oven

Inlet and detector consumable replacement

- ☑ Replace the split vent trap cartridge filter using the Maintenance procedure from either the Browser User interfaces on units with these inlets: Split/Splitless Capillary (SSL), Multi-Mode Inlet (MMI), Programmed Temperature Vaporizer (PTV), Volatiles Interface (VI).
- ☑ If the inlet system is used in Split Mode with viscous samples, inspect and clean the split vent tube on the inlet and flush or replace the tubing between the inlet and the split vent trap.
- ☑ For the inlets installed, perform inlet maintenance using the Maintenance procedure from the Browser User interfaces. Record the results. (Leak and Restriction Test)
- ☑ If the GC includes a Flame Ionization Detector (FID), replace the jet. If the ignitor shows any buildup of sample or corrosion, replace the ignitor. Examine the FID collector and castle assemblies for contamination – clean as necessary.

Zero Sensors and Leak test

- ☑ Zero all pressure sensors using the Browser interface.
- ☑ Perform inlet pressure decay test(s) from the diagnostics screen on the Browser User interface. Record if test passed or failed in the results table.

Note: If the PM is done in preparation for an Operational Qualification, then the pressure decay test defined within that protocol can be used for the PM.

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ALS Maintenance

- ☐ **Section NOT applicable**
- ☑ Check all cabling and configuration settings between GC, tray, and injectors.
- ☑ Vacuum or remove any dust, especially around fans.
- ☑ Check operation of all fans.
- ☑ Check syringe for smooth plunger operation.
- ☑ Check for smooth operation of the needle support – clean if necessary

Restore Instrument

- ☑ Restore the normal operating conditions or customer method using the Browser interface or Data System.
- ☑ Purge the system with carrier flow for 15 minutes
- ☑ Bake out the system, then restore the normal operating conditions
- ☑ After equilibration, check and record the post PM detector signal output values. Results should be similar or lower than the detector outputs recorded prior to PM.
- ☑ Perform a chemical checkout. If this is a routine PM, inject the customer's sample using the ALS if applicable. This will act as a final checkout of both the ALS and the GC.

Note: If the PM Service is performed prior to a qualification service, then use the qualification procedure as a guide for final instrument set up and checkout.

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PM Parts List Table

Note: The following kits are recommended for capillary and purged packed inlets. If this is a general PM and the customer has a preferred set of consumables, you may use the customer's consumables.

Part description	Part number	Product or model# where used	Quantity consumed
SSL Capillary Inlet PM kit, Splitless	5188-6497	8890 GC	2
SSL Capillary Inlet PM kit, Split	5188-6496	8890 GC	N/A
SSL Capillary Ultra Inert Inlet Gold Seal with Washer	5190-6144	8890 GC	N/A
SSL Capillary Ultra Inert Inlet Splitless Liner - Single taper with Glass Wool	5190-2293	8890 GC	N/A
SSL Capillary Ultra Inert Inlet Low Pressure Drop Split Liner - with Glass Wool	5190-2295	8890 GC	N/A
PP Inlet PM kit	5188-6498	8890 GC	N/A
Split vent trap PM kit, single cartridge (for MMI, PTV & VI)	5188-6495	8890 GC	N/A
MMI Cleaning Kit	G3510-60820	8890 GC	N/A
PTV Septumless Head Rebuild Kit	5182-9747	8890 GC	N/A
PTV Septumless Head Teflon Guide	5182-9748	8890 GC	N/A
Ignitor (glow plug) assembly with C-ring	19231-60680	8890 GC	1
FID Collector Rebuild/Cleaning Kit	G1531-67000	8890 GC	N/A
FID Collector Replacement Kit	G1531-67001	8890 GC	N/A
Standard .011-inch FID Jet	5200-0176	8890 GC	N/A
Universal .018-inch FID Jet	5200-0177	8890 GC	N/A

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Signature Page

Service Review

- [x] Attach available reports/printouts of all tests to this documentation.
- [x] Record the Preventive Maintenance service activity in the customer's records/logbook.
- [x] Update/reset instrument maintenance counters as appropriate.
- [x] Affix the PM sticker to the system or instrument logbook based on the customer's request.
- [x] Complete the Service Engineer Comments section if there are additional comments.
- [x] Review with the customer this service, parts replaced, and test results obtained.
- [ ] If the instrument firmware was updated, record the details of the change in the Service Engineer's Comments box or if necessary, in the customer's IQ records.
- [ ] Supply the customer with a copy of the Smart Alerts flyer.
- [ ] Describe Smart Alerts to the customer.
- [ ] Install Smart Alerts if requested.

PM Test Results Table

Test description	Before PM Service	After PM Service
Front detector output	N/A	155.4
Back detector output	N/A	11.5
AUX 1 detector output	N/A	~~155.4~~ 22.0
AUX 2 detector output	N/A	
Test description	**Expected test result**	**Actual test result**
Leak and Restriction Test after front inlet maintenance	Pass	Passed
Leak and Restriction Test after back inlet maintenance	Pass	Passed
Leak and Restriction Test after front inlet Split Vent Trap replacement	Pass	Passed
Leak and Restriction Test after back inlet Split Vent Trap replacement	Pass	Passed
Front inlet pressure decay test	Pass	Passed
Back inlet pressure decay test	Pass	Passed

Service Engineer Comments

If there are any specific points you wish to note as part of performing the service or other items of interest for the customer, please write include them in this box.

completed, AM Result passed.

Service Completion

Service request number 6006787701

Date service completed 05 JUN 2024

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Customer signature [redacted]

Total number of pages in this document 9

Agilent CrossLab
From Insight to Outcome

Agilent CrossLab Start Up Services

Agilent 8890 Gas Chromatograph

Preventive Maintenance Checklist

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Agilent

Introduction

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- The **Agilent Community** is an excellent place to get answers, collaborate with others about applications and Agilent products, and find in-depth documents and videos relevant to Agilent technologies. Visit https://community.agilent.com/welcome.
- To access **Agilent University**, visit http://www.agilent.com/crosslab/university/ to learn about training options, which include online, classroom and onsite delivery. A training specialist can work directly with you to help determine your best options.
- A useful **Agilent Resource Center** web page is available, which includes short videos on maintenance, quick lists of consumables for new instruments, and other valuable information. Check out the Resource Page here: https://www.agilent.com/en-us/agilentresources.
- Need technical support, FAQs, supplies? – visit our **Support Home page** http://www.agilent.com/search/support.
- Videos about specific preparation requirements for your instrument can be found by searching the *Agilent YouTube* channel at https://www.youtube.com/user/agilent.

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Service Engineer's Responsibilities

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- ***Ask the customer to sign the Service Completion section including the customer's and your signature.***

Additional Instruction Notes

- Check for any active service notes for this unit. If there are any applicable "Safety" or "Modification Recommended" Service notes, plan to implement the changes on this unit before doing any qualification service.
- Do not implement firmware updates, unless you get approval from the customer and are sure that they are compatible with the instrument control software.

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System Information

☐ Check this box if an instrument configuration report is attached instead of completing the table below.

Instrument System Name and ID	ERTC - L-in-175 / US2125A011
Instrument System Site and Location	Environment Research & Technology Co., Ltd / GC ECD

List System Component Product Numbers	List the Serial Numbers of each Component
1. G3540A	US2125A011
2. G4513A	CN21195125
3. G4514A	CN21207024
4.	
5.	
6.	
7.	
8.	
9.	
10.	

Preparation

- ☑ Discuss any specific issues with the customer before starting.
- ☑ Review the instrument logbook for recorded problems and comments.
- ☑ Save instrument control settings before starting the procedure.
- ☑ Perform a general inspection of the system for cleanliness.
- ☑ Check for proper installation of parts, assemblies, sensors etc.
- ☑ Check system for required installation of components, settings as defined by current Service Notes.
- ☑ Check for required firmware updates and verify with customers if they would like them installed.
- ☑ Before starting the following procedures, record the Detector Signal Output(s) in the results table. If the GC is turned OFF or in a service mode, comparing the detector outputs before and after the service is not possible.

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Preventive Maintenance Procedure

Clean and inspect GC

- ☑ Unplug power cord from the power source.
- ☑ Open GC covers and vacuum/remove any dust/debris. Pay particular attention to cooling fans.
- ☑ Inspect internal connectors for proper contact and placement.
- ☑ Reconnect Power to the GC. Power the GC on and verify the power on self-test passed.
- ☑ Verify oven motor spins freely and turns on with the oven door closed; off when the door is opened.
- ☑ Verify operation of all other fans - the inlet and EPC cooling fans.
- ☑ Verify oven intake/outlet flap assembly is operating smoothly while heating and cooling the oven

Inlet and detector consumable replacement

- ☑ Replace the split vent trap cartridge filter using the Maintenance procedure from either the Browser User interfaces on units with these inlets: Split/Splitless Capillary (SSL), Multi-Mode Inlet (MMI), Programmed Temperature Vaporizer (PTV), Volatiles Interface (VI).
- ☑ If the inlet system is used in Split Mode with viscous samples, inspect and clean the split vent tube on the inlet and flush or replace the tubing between the inlet and the split vent trap.
- ☑ For the inlets installed, perform inlet maintenance using the Maintenance procedure from the Browser User interfaces. Record the results. (Leak and Restriction Test)
- ☑ If the GC includes a Flame Ionization Detector (FID), replace the jet. If the ignitor shows any buildup of sample or corrosion, replace the ignitor. Examine the FID collector and castle assemblies for contamination – clean as necessary.

Zero Sensors and Leak test

- ☑ Zero all pressure sensors using the Browser interface.
- ☑ Perform inlet pressure decay test(s) from the diagnostics screen on the Browser User interface. Record if test passed or failed in the results table.

Note: If the PM is done in preparation for an Operational Qualification, then the pressure decay test defined within that protocol can be used for the PM.

ALS Maintenance

- ☐ **Section NOT applicable**
- ☑ Check all cabling and configuration settings between GC, tray, and injectors.
- ☑ Vacuum or remove any dust, especially around fans.
- ☑ Check operation of all fans.
- ☑ Check syringe for smooth plunger operation.
- ☑ Check for smooth operation of the needle support – clean if necessary

Restore Instrument

- ☑ Restore the normal operating conditions or customer method using the Browser interface or Data System.
- ☑ Purge the system with carrier flow for 15 minutes
- ☑ Bake out the system, then restore the normal operating conditions
- ☑ After equilibration, check and record the post PM detector signal output values. Results should be similar or lower than the detector outputs recorded prior to PM.
- ☑ Perform a chemical checkout. If this is a routine PM, inject the customer's sample using the ALS if applicable. This will act as a final checkout of both the ALS and the GC.

Note: If the PM Service is performed prior to a qualification service, then use the qualification procedure as a guide for final instrument set up and checkout.

PM Parts List Table

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PP Inlet PM kit	5188-6498	8890 GC	N/A
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MMI Cleaning Kit	G3510-60820	8890 GC	N/A
PTV Septumless Head Rebuild Kit	5182-9747	8890 GC	N/A
PTV Septumless Head Teflon Guide	5182-9748	8890 GC	N/A
Ignitor (glow plug) assembly with O-ring	19231-60680	8890 GC	1
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FID Collector Replacement Kit	G1531-67001	8890 GC	N/A
Standard .011-inch FID Jet	5200-0176	8890 GC	N/A
Universal .018-inch FID Jet	5200-0177	8890 GC	N/A

Signature Page

Service Review

- ☑ Attach available reports/printouts of all tests to this documentation.
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- ☑ Complete the Service Engineer Comments section if there are additional comments.
- ☑ Review with the customer this service, parts replaced, and test results obtained.
- ☐ If the instrument firmware was updated, record the details of the change in the Service Engineer's Comments box or if necessary, in the customer's IQ records.
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- ☐ Describe Smart Alerts to the customer.
- ☐ Install Smart Alerts if requested.

PM Test Results Table

Test description	Before PM Service	After PM Service
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Back detector output	N/A	11.5
AUX 1 detector output	N/A	CA ~~155.4~~ 22.0
AUX 2 detector output	N/A	
Test description	**Expected test result**	**Actual test result**
Leak and Restriction Test after front inlet maintenance	Pass	Passed
Leak and Restriction Test after back inlet maintenance	Pass	Passed
Leak and Restriction Test after front inlet Split Vent Trap replacement	Pass	Passed
Leak and Restriction Test after back inlet Split Vent Trap replacement	Pass	Passed
Front inlet pressure decay test	Pass	Passed
Back inlet pressure decay test	Pass	Passed

Service Engineer Comments

If there are any specific points you wish to note as part of performing the service or other items of interest for the customer, please write include them in this box.

completed, All Result passed.

Service Completion

Service request number 6001787701 Date service completed 05 JUN 2024

Agilent signature [redacted] Customer signature [redacted]

Total number of pages in this document 9

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