



บริษัท ซีเอ็นพีซีเอชเค (ไทยแลนด์) จำกัด

รายงานผลการปฏิบัติตามมาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม และมาตรการติดตามตรวจสอบผลกระทบสิ่งแวดล้อม
โครงการผลิตปิโตรเลียมแหล่งผลิตบึงภูำตะวันตก - หนองสระ (BYW – NS) (ส่วนขยาย)
แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และกำแพงเพชร
ฉบับเดือนมกราคม - ธันวาคม พ.ศ.2567

ภาคผนวก ง

ผลการตรวจวัดคุณภาพสิ่งแวดล้อม



บริษัท ซีเอ็นพีซีเอชเค (ไทยแลนด์) จำกัด

รายงานผลการปฏิบัติตามมาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม และมาตรการติดตามตรวจสอบผลกระทบสิ่งแวดล้อม
โครงการผลิตปิโตรเลียมแหล่งผลิตบึงหญ้าตะวันตก - หนองสระ (BYW - NS) (ส่วนขยาย)
แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และกำแพงเพชร
ฉบับเดือนมกราคม - ธันวาคม พ.ศ.2567

ภาคผนวก ง.1

คุณภาพอากาศ

ฤดูแล้ง

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 : โครงการผลิตปุ๋ยอินทรีย์ผสมแอสแต็กจากมูลสัตว์ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนถนนหมายเลข L21/43
จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Ambient Air Quality
Sampling Point : ฐานหลุมผลิต NS2 : A9 : บ้านเลขที่ 102 หมู่ที่ 7 ตำบลจีนหินมา (บ้านจีนช้าง หมู่ที่ 7 ตำบลจีนหินมา อำเภอลานกระบือ
จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0584078 E, 1833840 N
Sampling Date : March 24-27, 2024
Sampling Time : 13:45
Sampling Method : U.S. EPA 40 CFR Part 50
Sampling By : Mr.Romsea Kateh
Analyzed By : Environment Research & Technology Co., Ltd.

Quotation No. : AR2024-00454
Analysis No. : 2024-AB392
Received Date : April 2, 2024
Analytical Date : April 2-17, 2024
Report No. : 2024-RAAG312
Report Date : April 17, 2024

Parameter	Unit	Method of Analysis	Result			Standard ¹⁾
			Mar 24-25, 24	Mar 25-26, 24	Mar 26-27, 24	
Total Suspended Particulate (TSP) 24 Hours Average	mg/m ³	High-Volume, Gravimetric	0.089	0.103	0.082	0.330
Particulate Size Less Than 10 Micron (PM10) 24 Hours Average	mg/m ³	PM10 Size Selective, High-Volume, Gravimetric	0.051	0.054	0.041	0.120

Remark : ¹⁾ Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 420 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 1040 dated September 22, B.E.2547 (2004), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).



(Ms.Natnicha Sermmatwong)
Laboratory Reviewer



(Ms.Ramita Taengthai)
Laboratory Supervisor

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 : โครงการผลิตปุ๋ยอินทรีย์ผสมแอสแต็กจากมูลสัตว์ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนถนนหมายเลข L21/43
จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Ambient Air Quality
Sampling Point : ฐานหลุมผลิต NS2 : A10 : โรงเรียนบ้านทรายทอง (หมู่ที่ 9 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0582660 E, 1833181 N
Sampling Date : March 24-27, 2024
Sampling Time : 14:20
Sampling Method : U.S. EPA 40 CFR Part 50
Sampling By : Mr.Romsea Kateh
Analyzed By : Environment Research & Technology Co., Ltd.

Quotation No. : AR2024-00454
Analysis No. : 2024-AB392
Received Date : April 2, 2024
Analytical Date : April 2-17, 2024
Report No. : 2024-RAAG313
Report Date : April 17, 2024

Parameter	Unit	Method of Analysis	Result			Standard ¹⁾
			Mar 24-25, 24	Mar 25-26, 24	Mar 26-27, 24	
Total Suspended Particulate (TSP) 24 Hours Average	mg/m ³	High-Volume, Gravimetric	0.098	0.097	0.054	0.330
Particulate Size Less Than 10 Micron (PM10) 24 Hours Average	mg/m ³	PM10 Size Selective, High-Volume, Gravimetric	0.052	0.056	0.040	0.120

Remark : ¹⁾ Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 420 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 1040 dated September 22, B.E.2547 (2004), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).



(Ms.Natnicha Sermmatwong)
Laboratory Reviewer



(Ms.Ramita Taengthai)
Laboratory Supervisor

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 : โครงการผลิตปุ๋ยอินทรีย์จากมูลสัตว์ (BYW-NS) (ส่วนขยาย) แปลงสำรวจแบบหมายเลข L21/43
จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Ambient Air Quality
Sampling Point : ฐานหลุมผลิต NS3 : A3 : ร่องจิ้งจอกน้ำาราม (บ้านจิ้งจอกน้ำ หมู่ที่ 5 ตำบลจันทน์ท่า อำเภอลานกระบือ
จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0584972 E, 1836095 N
Sampling Date : March 24-27, 2024
Sampling Time : 11:40
Sampling Method : U.S. EPA 40 CFR Part 50
Sampling By : Mr.Romsea Kateh
Analyzed By : Environment Research & Technology Co., Ltd.

Quotation No. : AR2024-00454
Analysis No. : 2024-AB392
Received Date : April 2, 2024
Analytical Date : April 2-17, 2024
Report No. : 2024-RAAG314
Report Date : April 17, 2024

Parameter	Unit	Method of Analysis	Result			Standard ^{1'}
			Mar 24-25, 24	Mar 25-26, 24	Mar 26-27, 24	
Total Suspended Particulate (TSP) 24 Hours Average	mg/m ³	High-Volume, Gravimetric	0.109	0.098	0.113	0.330
Particulate Size Less Than 10 Micron (PM10) 24 Hours Average	mg/m ³	PM10 Size Selective, High-Volume, Gravimetric	0.054	0.050	0.049	0.120

Remark : ^{1'} Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 420 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 1040 dated September 22, B.E.2547 (2004), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).

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 : โครงการผลิตปุ๋ยอินทรีย์จากมูลสัตว์ (BYW-NS) (ส่วนขยาย) แปลงสำรวจแบบหมายเลข L21/43
จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Ambient Air Quality
Sampling Point : ฐานหลุมผลิต NS3 : A4 : บ้านเลขที่ 144 หมู่ที่ 4 ตำบลจันทน์ท่า (บ้านหนองทั้งสูง หมู่ที่ 4 ตำบลจันทน์ท่า
อำเภอลานกระบือ จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0583756 E, 1835325 N
Sampling Date : March 24-27, 2024
Sampling Time : 12:40
Sampling Method : U.S. EPA 40 CFR Part 50
Sampling By : Mr.Romsea Kateh
Analyzed By : Environment Research & Technology Co., Ltd.

Quotation No. : AR2024-00454
Analysis No. : 2024-AB392
Received Date : April 2, 2024
Analytical Date : April 2-17, 2024
Report No. : 2024-RAAG316
Report Date : April 17, 2024

Parameter	Unit	Method of Analysis	Result			Standard ^{1'}
			Mar 24-25, 24	Mar 25-26, 24	Mar 26-27, 24	
Total Suspended Particulate (TSP) 24 Hours Average	mg/m ³	High-Volume, Gravimetric	0.128	0.144	0.138	0.330
Particulate Size Less Than 10 Micron (PM10) 24 Hours Average	mg/m ³	PM10 Size Selective, High-Volume, Gravimetric	0.063	0.064	0.062	0.120

Remark : ^{1'} Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 420 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 1040 dated September 22, B.E.2547 (2004), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).



(Ms.Natnicha Sermmatiwong)
Laboratory Reviewer



(Ms.Ramita Taengthai)
Laboratory Supervisor



(Ms.Natnicha Sermmatiwong)
Laboratory Reviewer



(Ms.Ramita Taengthai)
Laboratory Supervisor

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 : โครงการผลิตปิโตรเลียมแหล่งผลิตเชิงพาณิชย์วันตก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจแบบกฎหมายเลข L21/43
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : ฐานหลุมผลิต NS2 : A9 : บ้านเลขที่ 102 หมู่ที่ 7 ตำบลจันทิมา (บ้านบึงช้างหมู่ที่ 7 ตำบลจันทิมา ตำบลลานกระบือ จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0584078 E, 1833840 N
Measured Date : March 24-27, 2024
Measured By : Mr.Romsea Kateh
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : NOx Chemiluminescence Analyzer Horiba Model APNA-370 Serial Number JGUBA4N

Quotation No. : AR2024-00454
Analysis No. : 2024-AB392-001
Report No. : 2024-RAAG530
Report Date : April 20, 2024

Interval Time	Result NO ₂ (ppm)			Standard ¹⁾
	Mar 24-25, 24	Mar 25-26, 24	Mar 26-27, 24	
14:00-15:00	0.0071	0.0076	0.0082	
15:00-16:00	0.0073	0.0078	0.0081	
16:00-17:00	0.0076	0.0081	0.0106	
17:00-18:00	0.0079	0.0087	0.0084	
18:00-19:00	0.0086	0.0088	0.0092	
19:00-20:00	0.0099	0.0096	0.0103	
20:00-21:00	0.0127	0.0107	0.0097	
21:00-22:00	0.0097	0.0093	0.0075	
22:00-23:00	0.0088	0.0101	0.0078	
23:00-00:00	0.0085	0.0106	0.0079	
00:00-01:00	0.0085	0.0096	0.0079	
01:00-02:00	0.0083	0.0087	0.0085	
02:00-03:00	0.0084	0.0087	0.0086	
03:00-04:00	0.0079	0.0089	0.0077	
04:00-05:00	0.0080	0.0093	0.0088	
05:00-06:00	0.0079	0.0102	0.0086	
06:00-07:00	0.0076	0.0090	0.0087	
07:00-08:00	0.0078	0.0089	0.0079	
08:00-09:00	0.0081	0.0090	0.0086	
09:00-10:00	0.0082	0.0098	0.0079	
10:00-11:00	0.0084	0.0086	0.0077	
11:00-12:00	0.0081	0.0080	0.0074	
12:00-13:00	0.0079	0.0080	0.0074	
13:00-14:00	0.0081	0.0083	0.0071	
24 Hours Average	0.0084	0.0090	0.0084	-
1 Hour Maximum	0.0127	0.0107	0.0106	0.17

Remark : ¹⁾ Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 420 dated May 25, B.E.2538 (1995), Notification No.28, B.E.2550 (2007), published in the Royal Government Gazette No.124 Special Part 580 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 1140 dated August 14, B.E.2552 (2009), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).



(Ms.Piya-tida Pradangkhro)
Laboratory Reviewer



(Ms.Panicha Promchai)
Laboratory Supervisor

DO NOT COPY PARTIAL OF THIS ANALYSIS REPORT WITHOUT OFFICIAL APPROVAL
REPORT ANALYSIS REFERS TO SUBMITTED SAMPLE (S) ONLY

Page 1/1

F-RP-004 Rev. 02, January 18, 2021

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 : โครงการผลิตปิโตรเลียมแหล่งผลิตเชิงพาณิชย์วันตก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจแบบกฎหมายเลข L21/43
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : ฐานหลุมผลิต NS2 : A9 : บ้านเลขที่ 102 หมู่ที่ 7 ตำบลจันทิมา (บ้านบึงช้างหมู่ที่ 7 ตำบลจันทิมา ตำบลลานกระบือ จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0584078 E, 1833840 N
Measured Date : March 24-27, 2024
Measured By : Mr.Romsea Kateh
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : SO₂ UV-Fluorescence Analyzer Thermo Model 43C Serial Number 57469-317

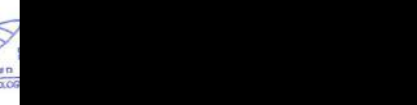
Quotation No. : AR2024-00454
Analysis No. : 2024-AB392-001
Report No. : 2024-RAAG531
Report Date : April 20, 2024

Interval Time	Result SO ₂ (ppm)			Standard
	Mar 24-25, 24	Mar 25-26, 24	Mar 26-27, 24	
14:00-15:00	0.0015	0.0015	0.0015	
15:00-16:00	0.0014	0.0014	0.0013	
16:00-17:00	0.0014	0.0014	0.0015	
17:00-18:00	0.0015	0.0014	0.0015	
18:00-19:00	0.0016	0.0015	0.0015	
19:00-20:00	0.0015	0.0016	0.0014	
20:00-21:00	0.0015	0.0015	0.0014	
21:00-22:00	0.0014	0.0015	0.0012	
22:00-23:00	0.0011	0.0015	0.0013	
23:00-00:00	0.0011	0.0015	0.0012	
00:00-01:00	0.0012	0.0015	0.0012	
01:00-02:00	0.0012	0.0014	0.0015	
02:00-03:00	0.0013	0.0014	0.0014	
03:00-04:00	0.0013	0.0015	0.0014	
04:00-05:00	0.0012	0.0014	0.0013	
05:00-06:00	0.0013	0.0013	0.0013	
06:00-07:00	0.0014	0.0014	0.0013	
07:00-08:00	0.0012	0.0014	0.0014	
08:00-09:00	0.0014	0.0016	0.0014	
09:00-10:00	0.0014	0.0015	0.0016	
10:00-11:00	0.0015	0.0014	0.0016	
11:00-12:00	0.0016	0.0016	0.0016	
12:00-13:00	0.0015	0.0015	0.0016	
13:00-14:00	0.0015	0.0016	0.0015	
24 Hours Average	0.0014	0.0015	0.0014	0.12 ¹⁾
1 Hour Maximum	0.0016	0.0016	0.0016	0.30 ¹⁾

Remark : ¹⁾ Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 420 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 1040 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 270 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 390 dated April 30, B.E.2544 (2001), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).



(Ms.Piya-tida Pradangkhro)
Laboratory Reviewer



(Ms.Panicha Promchai)
Laboratory Supervisor

DO NOT COPY PARTIAL OF THIS ANALYSIS REPORT WITHOUT OFFICIAL APPROVAL
REPORT ANALYSIS REFERS TO SUBMITTED SAMPLE (S) ONLY

Page 1/1

F-RP-004 Rev. 02, January 18, 2021

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 : โครงการผลิตปิโตรเลียมแหล่งผลิตปิโตรเลียมขนาดใหญ่ตะวันตก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจแบบกฎหมายเลข L21/43 จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : ฐานหลุมผลิต NS2 : A10 : โรงเรียนบ้านทรายทอง (หมู่ที่ 9 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0582660 E, 1833181 N
Measured Date : March 24-27, 2024
Measured By : Mr.Romsea Kateh
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : iNOx Chemiluminescence Analyzer Horiba Model APNA-370 Serial Number NKDVFYFRX

Interval Time	Result NO _x (ppm)			Standard ¹⁾
	Mar 24-25, 24	Mar 25-26, 24	Mar 26-27, 24	
14:00-15:00	0.0057	0.0084	0.0073	
15:00-16:00	0.0069	0.0070	0.0074	
16:00-17:00	0.0069	0.0077	0.0074	
17:00-18:00	0.0074	0.0081	0.0080	
18:00-19:00	0.0101	0.0106	0.0088	
19:00-20:00	0.0107	0.0122	0.0089	
20:00-21:00	0.0109	0.0115	0.0070	
21:00-22:00	0.0108	0.0113	0.0070	
22:00-23:00	0.0111	0.0143	0.0070	
23:00-00:00	0.0096	0.0130	0.0070	
00:00-01:00	0.0090	0.0108	0.0075	
01:00-02:00	0.0091	0.0106	0.0077	
02:00-03:00	0.0084	0.0107	0.0074	
03:00-04:00	0.0086	0.0107	0.0075	
04:00-05:00	0.0083	0.0108	0.0075	
05:00-06:00	0.0083	0.0109	0.0076	
06:00-07:00	0.0087	0.0108	0.0072	
07:00-08:00	0.0093	0.0108	0.0076	
08:00-09:00	0.0084	0.0101	0.0073	
09:00-10:00	0.0082	0.0085	0.0070	
10:00-11:00	0.0077	0.0078	0.0069	
11:00-12:00	0.0072	0.0075	0.0072	
12:00-13:00	0.0072	0.0073	0.0066	
13:00-14:00	0.0070	0.0075	0.0068	
24 Hours Average	0.0086	0.0100	0.0074	-
1 Hour Maximum	0.0111	0.0143	0.0089	0.17

Remark : ¹⁾ Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 420 dated May 25, B.E.2538 (1995), Notification No.28, B.E.2550 (2007), published in the Royal Government Gazette No.124 Special Part 580 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 1140 dated August 14, B.E.2552 (2009), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).



(Ms.Piyaatda Pradangkho)
Laboratory Reviewer



(Ms.Panicha Promchai)
Laboratory Supervisor

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 : โครงการผลิตปิโตรเลียมแหล่งผลิตปิโตรเลียมขนาดใหญ่ตะวันตก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจแบบกฎหมายเลข L21/43 จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : ฐานหลุมผลิต NS2 : A10 : โรงเรียนบ้านทรายทอง (หมู่ที่ 9 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0582660 E, 1833181 N
Measured Date : March 24-27, 2024
Measured By : Mr.Romsea Kateh
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : SO₂ UV-Fluorescence Analyzer Horiba Model APSA-370 Serial Number X7L602W6

Interval Time	Result SO ₂ (ppm)			Standard
	Mar 24-25, 24	Mar 25-26, 24	Mar 26-27, 24	
14:00-15:00	0.0013	0.0011	0.0008	
15:00-16:00	0.0014	0.0012	0.0009	
16:00-17:00	0.0015	0.0011	0.0009	
17:00-18:00	0.0014	0.0009	0.0008	
18:00-19:00	0.0014	0.0009	0.0008	
19:00-20:00	0.0015	0.0011	0.0008	
20:00-21:00	0.0015	0.0011	0.0008	
21:00-22:00	0.0015	0.0012	0.0010	
22:00-23:00	0.0015	0.0011	0.0011	
23:00-00:00	0.0015	0.0010	0.0012	
00:00-01:00	0.0015	0.0011	0.0009	
01:00-02:00	0.0014	0.0010	0.0011	
02:00-03:00	0.0014	0.0010	0.0012	
03:00-04:00	0.0014	0.0014	0.0010	
04:00-05:00	0.0014	0.0010	0.0013	
05:00-06:00	0.0014	0.0010	0.0013	
06:00-07:00	0.0013	0.0013	0.0010	
07:00-08:00	0.0014	0.0011	0.0010	
08:00-09:00	0.0015	0.0010	0.0009	
09:00-10:00	0.0013	0.0009	0.0008	
10:00-11:00	0.0012	0.0009	0.0007	
11:00-12:00	0.0013	0.0008	0.0006	
12:00-13:00	0.0013	0.0011	0.0007	
13:00-14:00	0.0013	0.0008	0.0011	
24 Hours Average	0.0014	0.0010	0.0009	0.12 ¹⁾
1 Hour Maximum	0.0015	0.0014	0.0013	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 420 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 1040 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 270 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 390 dated April 30, B.E.2544 (2001), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).



(Ms.Piyaatda Pradangkho)
Laboratory Reviewer



(Ms.Panicha Promchai)
Laboratory Supervisor

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 : โครงการผลิตปุ๋ยอินทรีย์จากมูลสัตว์ปีกและพืชผัก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจแบบหมายเลข L21/43
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : ฐานหลุมผลิต NS3 : A3 : วัดรุ่งโรจน์วนาราม (บ้านรุ่งโรจน์ หมู่ที่ 5 ตำบลจันทน์ผา อำเภอลานกระบือ จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0584972 E, 1836095 N
Measured Date : March 24-27, 2024
Measured By : Mr.Romsea Kateh
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : NOx Chemiluminescence Analyzer Horiba Model APNA-370 Serial Number U9LS50WU

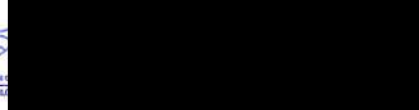
Quotation No. : AR2024-00454
Analysis No. : 2024-AB392-007
Report No. : 2024-RAAG534
Report Date : April 20, 2024

Interval Time	Result NO ₂ (ppm)			Standard ^{1*}
	Mar 24-25, 24	Mar 25-26, 24	Mar 26-27, 24	
12:00-13:00	0.0049	0.0081	0.0076	
13:00-14:00	0.0071	0.0075	0.0075	
14:00-15:00	0.0070	0.0073	0.0073	
15:00-16:00	0.0079	0.0071	0.0073	
16:00-17:00	0.0071	0.0076	0.0074	
17:00-18:00	0.0073	0.0077	0.0077	
18:00-19:00	0.0078	0.0080	0.0081	
19:00-20:00	0.0113	0.0101	0.0098	
20:00-21:00	0.0102	0.0108	0.0084	
21:00-22:00	0.0108	0.0102	0.0071	
22:00-23:00	0.0102	0.0114	0.0071	
23:00-00:00	0.0095	0.0112	0.0069	
00:00-01:00	0.0090	0.0108	0.0071	
01:00-02:00	0.0088	0.0097	0.0073	
02:00-03:00	0.0098	0.0097	0.0073	
03:00-04:00	0.0082	0.0095	0.0071	
04:00-05:00	0.0080	0.0092	0.0071	
05:00-06:00	0.0086	0.0100	0.0074	
06:00-07:00	0.0080	0.0097	0.0071	
07:00-08:00	0.0084	0.0089	0.0070	
08:00-09:00	0.0083	0.0093	0.0070	
09:00-10:00	0.0081	0.0091	0.0075	
10:00-11:00	0.0092	0.0079	0.0076	
11:00-12:00	0.0105	0.0079	0.0070	
24 Hours Average	0.0086	0.0091	0.0074	-
1 Hour Maximum	0.0113	0.0114	0.0098	0.17

Remark : ^{1*} Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 420 dated May 25, B.E.2538 (1995), Notification No.28, B.E.2550 (2007), published in the Royal Government Gazette No.124 Special Part 580 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 1140 dated August 14, B.E.2552 (2009), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).



(Ms.Piyatida Pradangkho)
Laboratory Reviewer



(Ms.Panicha Promchai)
Laboratory Supervisor

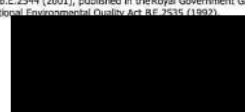
ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปุ๋ยอินทรีย์จากมูลสัตว์ปีกและพืชผัก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจแบบหมายเลข L21/43
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : ฐานหลุมผลิต NS3 : A3 : วัดรุ่งโรจน์วนาราม (บ้านรุ่งโรจน์ หมู่ที่ 5 ตำบลจันทน์ผา อำเภอลานกระบือ จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0584972 E, 1836095 N
Measured Date : March 24-27, 2024
Measured By : Mr.Romsea Kateh
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : SO₂ UV-Fluorescence Analyzer Thermo Model 43C Serial Number J335804022

Quotation No. : AR2024-00454
Analysis No. : 2024-AB392-007
Report No. : 2024-RAAG535
Report Date : April 20, 2024

Interval Time	Result SO ₂ (ppm)			Standard
	Mar 24-25, 24	Mar 25-26, 24	Mar 26-27, 24	
12:00-13:00	0.0018	0.0010	0.0013	
13:00-14:00	0.0020	0.0011	0.0013	
14:00-15:00	0.0015	0.0010	0.0015	
15:00-16:00	0.0014	0.0010	0.0017	
16:00-17:00	0.0015	0.0010	0.0019	
17:00-18:00	0.0016	0.0010	0.0022	
18:00-19:00	0.0016	0.0011	0.0023	
19:00-20:00	0.0021	0.0011	0.0021	
20:00-21:00	0.0016	0.0013	0.0018	
21:00-22:00	0.0017	0.0013	0.0009	
22:00-23:00	0.0027	0.0012	0.0007	
23:00-00:00	0.0015	0.0012	0.0008	
00:00-01:00	0.0014	0.0010	0.0007	
01:00-02:00	0.0011	0.0010	0.0007	
02:00-03:00	0.0011	0.0010	0.0008	
03:00-04:00	0.0010	0.0010	0.0006	
04:00-05:00	0.0010	0.0009	0.0007	
05:00-06:00	0.0011	0.0008	0.0007	
06:00-07:00	0.0012	0.0010	0.0008	
07:00-08:00	0.0022	0.0010	0.0009	
08:00-09:00	0.0012	0.0012	0.0009	
09:00-10:00	0.0012	0.0011	0.0013	
10:00-11:00	0.0012	0.0011	0.0012	
11:00-12:00	0.0012	0.0012	0.0011	
24 Hours Average	0.0015	0.0011	0.0012	0.12 ^{1*}
1 Hour Maximum	0.0027	0.0013	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 420 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 1040 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 270 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 390 dated April 10, B.E.2544 (2001), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).



(Ms.Piyatida Pradangkho)
Laboratory Reviewer



(Ms.Panicha Promchai)
Laboratory Supervisor

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 : โครงการผลิตปิโตรเลียมแหล่งผลิตเชิงพาณิชย์วินด-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนบกหมายเลข L21/43
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : ฐานหลุมผลิต NS3 : A4 : บานเลขที่ 144 หมู่ที่ 4 ตำบลจันทิมา (บ้านหนองหึงสน หมู่ที่ 4 ตำบลจันทิมา อำเภอลานกระบือ จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0583756 E, 1835325 N
Measured Date : March 24-27, 2024
Measured By : Mr.Romsea Kateh
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : NOx Chemiluminescence Analyzer Horiba Model APNA-370 Serial Number NSABK8F2

Quotation No. : AR2024-00454
Analysis No. : 2024-AB392-010
Report No. : 2024-RAAG536
Report Date : April 20, 2024

Interval Time	Result NO _x (ppm)			Standard ¹⁾
	Mar 24-25, 24	Mar 25-26, 24	Mar 26-27, 24	
13:00-14:00	0.0036	0.0077	0.0066	
14:00-15:00	0.0076	0.0060	0.0068	
15:00-16:00	0.0056	0.0058	0.0063	
16:00-17:00	0.0056	0.0064	0.0069	
17:00-18:00	0.0060	0.0076	0.0069	
18:00-19:00	0.0075	0.0079	0.0078	
19:00-20:00	0.0095	0.0128	0.0109	
20:00-21:00	0.0101	0.0107	0.0094	
21:00-22:00	0.0086	0.0115	0.0063	
22:00-23:00	0.0098	0.0098	0.0061	
23:00-00:00	0.0093	0.0106	0.0060	
00:00-01:00	0.0086	0.0102	0.0060	
01:00-02:00	0.0081	0.0099	0.0065	
02:00-03:00	0.0071	0.0093	0.0066	
03:00-04:00	0.0069	0.0087	0.0062	
04:00-05:00	0.0071	0.0088	0.0063	
05:00-06:00	0.0069	0.0090	0.0069	
06:00-07:00	0.0070	0.0090	0.0067	
07:00-08:00	0.0085	0.0101	0.0069	
08:00-09:00	0.0079	0.0099	0.0066	
09:00-10:00	0.0074	0.0093	0.0064	
10:00-11:00	0.0077	0.0078	0.0063	
11:00-12:00	0.0113	0.0070	0.0062	
12:00-13:00	0.0103	0.0074	0.0063	
24 Hours Average	0.0078	0.0089	0.0068	-
1 Hour Maximum	0.0113	0.0128	0.0109	0.17

Remark : ¹⁾ Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 420 dated May 25, B.E.2538 (1995), Notification No.28, B.E.2550 (2007), published in the Royal Government Gazette No.124 Special Part 580 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 1140 dated August 14, B.E.2552 (2009), under the Enhancement and Conservation of National Environmental Quality Act, B.E.2535 (1992).

(Ms.Piyatida Pradangkho)
Laboratory Reviewer

(Ms.Panicha Promchai)
Laboratory Supervisor

DO NOT COPY PARTIAL OF THIS ANALYSIS REPORT WITHOUT OFFICIAL APPROVAL
REPORT ANALYSIS REFERS TO SUBMITTED SAMPLE (S) ONLY

Page 1/1

F-RP-004 Rev. 02, January 18, 2021

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 : โครงการผลิตปิโตรเลียมแหล่งผลิตเชิงพาณิชย์วินด-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนบกหมายเลข L21/43
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : ฐานหลุมผลิต NS3 : A4 : บานเลขที่ 144 หมู่ที่ 4 ตำบลจันทิมา (บ้านหนองหึงสน หมู่ที่ 4 ตำบลจันทิมา อำเภอลานกระบือ จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0583756 E, 1835325 N
Measured Date : March 24-27, 2024
Measured By : Mr.Romsea Kateh
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : SO₂ UV-Fluorescence Analyzer Horiba Model APSA-370 Serial Number 12E8X34P

Quotation No. : AR2024-00454
Analysis No. : 2024-AB392-010
Report No. : 2024-RAAG537
Report Date : April 20, 2024

Interval Time	Result SO ₂ (ppm)			Standard
	Mar 24-25, 24	Mar 25-26, 24	Mar 26-27, 24	
13:00-14:00	0.0014	0.0019	0.0012	
14:00-15:00	0.0016	0.0018	0.0012	
15:00-16:00	0.0013	0.0018	0.0014	
16:00-17:00	0.0017	0.0019	0.0015	
17:00-18:00	0.0017	0.0020	0.0014	
18:00-19:00	0.0016	0.0011	0.0013	
19:00-20:00	0.0011	0.0014	0.0015	
20:00-21:00	0.0014	0.0017	0.0015	
21:00-22:00	0.0014	0.0017	0.0018	
22:00-23:00	0.0014	0.0017	0.0019	
23:00-00:00	0.0012	0.0018	0.0019	
00:00-01:00	0.0016	0.0019	0.0020	
01:00-02:00	0.0012	0.0019	0.0020	
02:00-03:00	0.0012	0.0020	0.0021	
03:00-04:00	0.0012	0.0019	0.0022	
04:00-05:00	0.0012	0.0019	0.0021	
05:00-06:00	0.0012	0.0017	0.0021	
06:00-07:00	0.0013	0.0019	0.0022	
07:00-08:00	0.0013	0.0019	0.0021	
08:00-09:00	0.0013	0.0019	0.0022	
09:00-10:00	0.0012	0.0019	0.0019	
10:00-11:00	0.0011	0.0018	0.0020	
11:00-12:00	0.0020	0.0016	0.0018	
12:00-13:00	0.0019	0.0014	0.0015	
24 Hours Average	0.0014	0.0018	0.0018	0.12 ¹⁾
1 Hour Maximum	0.0020	0.0020	0.0022	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 420 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 1040 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 270 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 390 dated April 30, B.E.2544 (2001), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).

(Ms.Piyatida Pradangkho)
Laboratory Reviewer

(Ms.Panicha Promchai)
Laboratory Supervisor

DO NOT COPY PARTIAL OF THIS ANALYSIS REPORT WITHOUT OFFICIAL APPROVAL
REPORT ANALYSIS REFERS TO SUBMITTED SAMPLE (S) ONLY

Page 1/1

F-RP-004 Rev. 02, January 18, 2021

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 : โครงการผลิตไฟฟ้าโดยแสงอาทิตย์จากแผงโซลาร์เซลล์ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนถนนหมายเลข L21/43
จังหวัดสุโขทัย และกำแพงเพชร
จังหวัดสุโขทัย และกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : ฐานหลุมผลิต NS2 : A9 : บ้านเลขที่ 102 หมู่ที่ 7 ตำบลจันทิมา (บ้านวังช้าง หมู่ที่ 7 ตำบลจันทิมา อำเภอฉวางบุรี
จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0584078 E, 1833840 N
Measured Date : March 24-27, 2024
Measured By : Mr.Romsea Kateh
Analyzed By : Environment Research & Technology Co., Ltd.

Quotation No. : AR2024-00454
Analysis No. : 2024-AB392-001
Report No. : 2024-RAAF984
Report Date : April 20, 2024

Date/Time	Mar 24-25, 24		Mar 25-26, 24		Mar 26-27, 24	
	WS	WD	WS	WD	WS	WD
14:00-15:00	0.4	SW	0.9	SSW	0.4	ESE
15:00-16:00	0.9	SSE	0.4	WSW	0.4	ESE
16:00-17:00	0.9	ESE	0.9	E	0.4	ESE
17:00-18:00	0.9	ESE	0.4	E	0.4	W
18:00-19:00	0.4	ESE	0.4	E	<0.4	Calm
19:00-20:00	<0.4	Calm	<0.4	Calm	<0.4	Calm
20:00-21:00	<0.4	Calm	0.4	ESE	2.2	ESE
21:00-22:00	<0.4	Calm	<0.4	Calm	3.1	E
22:00-23:00	<0.4	Calm	0.4	WSW	1.3	ESE
23:00-00:00	<0.4	Calm	<0.4	Calm	0.4	SSW
00:00-01:00	<0.4	Calm	<0.4	Calm	0.9	W
01:00-02:00	0.4	WSW	<0.4	Calm	0.4	W
02:00-03:00	0.4	WSW	<0.4	Calm	0.4	E
03:00-04:00	0.4	WSW	<0.4	Calm	0.9	E
04:00-05:00	0.9	W	0.4	WSW	0.9	E
05:00-06:00	0.4	W	0.4	E	0.9	ESE
06:00-07:00	<0.4	Calm	<0.4	Calm	0.9	ESE
07:00-08:00	0.4	S	<0.4	Calm	0.4	SSE
08:00-09:00	<0.4	Calm	<0.4	Calm	0.4	SSE
09:00-10:00	0.4	S	0.9	S	0.4	W
10:00-11:00	0.9	SSE	1.3	S	0.4	S
11:00-12:00	0.4	SE	1.3	SSE	0.9	S
12:00-13:00	0.9	SSE	0.9	S	0.9	S
13:00-14:00	0.9	ESE	0.9	ESE	0.9	S

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



(Ms.Piyatida Pradangkho)
Laboratory Reviewer



(Ms.Panida Promchai)
Laboratory Supervisor

ANALYSIS REPORT

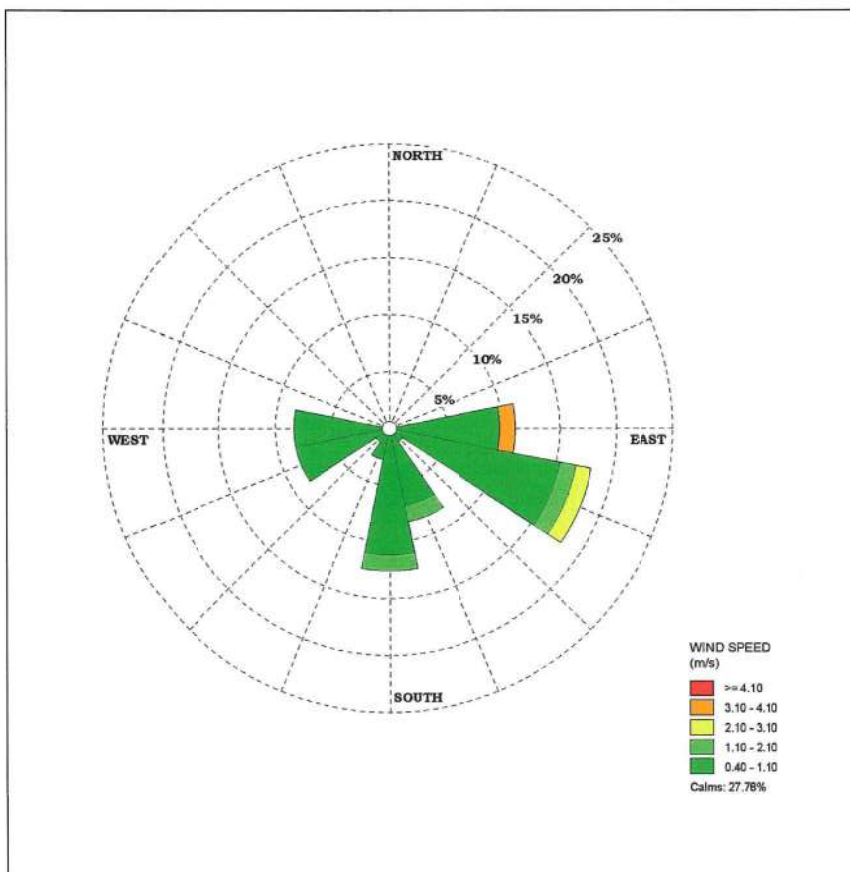
Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตไฟฟ้าโดยแสงอาทิตย์จากแผงโซลาร์เซลล์ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนถนนหมายเลข L21/43
จังหวัดสุโขทัย และกำแพงเพชร
จังหวัดสุโขทัย และกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : ฐานหลุมผลิต NS2 : A9 : บ้านเลขที่ 102 หมู่ที่ 7 ตำบลจันทิมา (บ้านวังช้าง หมู่ที่ 7 ตำบลจันทิมา อำเภอฉวางบุรี
จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0584078 E, 1833840 N
Measured Date : March 24-27, 2024
Measured By : Mr.Romsea Kateh
Analyzed By : Environment Research & Technology Co., Ltd.

Quotation No. : AR2024-00454
Analysis No. : 2024-AB392-001
Report No. : 2024-RAAF984
Report Date : April 20, 2024

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	0.00000	0.00000	0.00000	0.00000
ENE	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
E	9.72222	0.00000	0.00000	1.38889	0.00000	11.11111
ESE	15.27780	1.38889	1.38889	0.00000	0.00000	18.05558
SE	1.38889	0.00000	0.00000	0.00000	0.00000	1.38889
SSE	6.94444	1.38889	0.00000	0.00000	0.00000	8.33333
S	11.11110	1.38889	0.00000	0.00000	0.00000	12.49999
SSW	2.77778	0.00000	0.00000	0.00000	0.00000	2.77778
SW	1.38889	0.00000	0.00000	0.00000	0.00000	1.38889
WSW	8.33333	0.00000	0.00000	0.00000	0.00000	8.33333
W	8.33333	0.00000	0.00000	0.00000	0.00000	8.33333
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	27.77780					

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Project Name : โครงการผลิตปิโตรเลียมแหล่งผลิตบึงหว้าตะวันตก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และกำแพงเพชร
Measured Point : ฐานหลุมผลิต NS2 : A9 : บานเลขที่ 102 หมู่ที่ 7 ตำบลจันทนา (บ้านบึงช้าง หมู่ที่ 7 ตำบลจันทนา อำเภอลานกระบือ จังหวัดกำแพงเพชร)
Measured Date : March 24-27, 2024
Report No. : 2024-RAAF984



ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Muang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมแหล่งผลิตบึงหว้าตะวันตก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : ฐานหลุมผลิต NS2 : A10 : โรงเรียนบ้านทรายทอง (หมู่ที่ 9 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0582660 E, 1833181 N
Measured Date : March 24-27, 2024
Measured By : Mr.Romsea Kateh
Analyzed By : Environment Research & Technology Co., Ltd.
Quotation No. : AR2024-00454
Analysis No. : 2024-A3392-004
Report No. : 2024-RAAF985
Report Date : April 20, 2024

Date/Time	Mar 24-25, 24		Mar 25-26, 24		Mar 26-27, 24	
	WS	WD	WS	WD	WS	WD
14:00-15:00	0.9	SE	0.9	NW	0.4	SSE
15:00-16:00	1.3	SSE	0.9	ESE	0.9	WSW
16:00-17:00	1.3	SSE	0.9	ESE	0.9	SSE
17:00-18:00	0.9	SSE	0.4	SE	<0.4	Calm
18:00-19:00	<0.4	Calm	<0.4	Calm	<0.4	Calm
19:00-20:00	<0.4	Calm	<0.4	Calm	3.1	SE
20:00-21:00	<0.4	Calm	<0.4	Calm	3.6	SE
21:00-22:00	0.4	W	0.4	W	1.8	SE
22:00-23:00	<0.4	Calm	<0.4	Calm	0.9	W
23:00-00:00	<0.4	Calm	<0.4	Calm	1.8	W
00:00-01:00	0.4	WNW	0.4	W	0.9	W
01:00-02:00	<0.4	Calm	0.9	W	0.9	SE
02:00-03:00	0.4	WNW	0.9	WNW	0.9	ESE
03:00-04:00	0.9	WNW	0.4	ESE	1.3	SE
04:00-05:00	0.4	WNW	0.4	ESE	1.3	SE
05:00-06:00	<0.4	Calm	<0.4	Calm	1.3	SE
06:00-07:00	<0.4	Calm	<0.4	Calm	0.9	SSE
07:00-08:00	<0.4	Calm	<0.4	Calm	0.9	WSW
08:00-09:00	0.4	S	0.9	SSE	1.3	WSW
09:00-10:00	0.9	SSE	1.8	SSW	0.9	WSW
10:00-11:00	0.9	SW	1.3	SSE	0.9	S
11:00-12:00	0.9	SSE	1.3	SSE	0.9	WSW
12:00-13:00	0.9	SSE	0.9	SSE	1.3	S
13:00-14:00	0.9	SW	0.4	SSE	1.3	SSE

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

(Ms.Piyatida Pradangkho)
Laboratory Reviewer

(Ms.Panicha Promchai)
Laboratory Supervisor

ANALYSIS REPORT

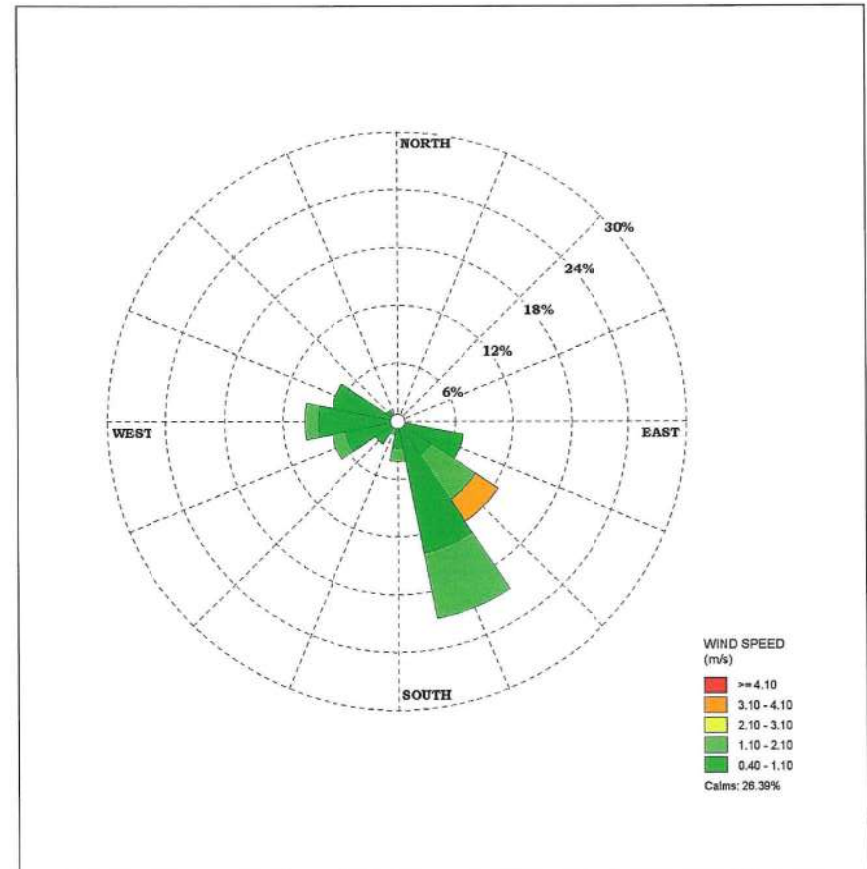
Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตบิโอโกลเลียมแหล่งผลิตบึงทุ่งนก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนบกหมายเลข L21/43
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : ฐานหลุมผลิต NS2 : A10 : โรงเรียนบ้านทรายทอง (หมู่ที่ 9 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0582660 E, 1833181 N
Measured Date : March 24-27, 2024
Measured By : Mr.Komsea Kateh
Analyzed By : Environment Research & Technology Co., Ltd.

Quotation No. : AR2024-00454
Analysis No. : 2024-AB392-004
Report No. : 2024-RAAF985
Report Date : April 20, 2024

Wind Direction	Percentage frequency of wind in each speed and direction					Total
	0.4-1.1	1.1-2.1	2.1-3.1	3.1-4.1	≥4.1	
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	0.00000	0.00000	0.00000	0.00000
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	6.94444	0.00000	0.00000	0.00000	0.00000	6.94444
SE	4.16667	5.55556	0.00000	2.77778	0.00000	12.50001
SSE	13.88890	6.94444	0.00000	0.00000	0.00000	20.83334
S	2.77778	1.38889	0.00000	0.00000	0.00000	4.16667
SSW	0.00000	1.38889	0.00000	0.00000	0.00000	1.38889
SW	2.77778	0.00000	0.00000	0.00000	0.00000	2.77778
WSW	5.55556	1.38889	0.00000	0.00000	0.00000	6.94445
W	8.33333	1.38889	0.00000	0.00000	0.00000	9.72222
WNW	6.94444	0.00000	0.00000	0.00000	0.00000	6.94444
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	26.38890					

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Project Name : โครงการผลิตบิโอโกลเลียมแหล่งผลิตบึงทุ่งนก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนบกหมายเลข L21/43
Measured Point : ฐานหลุมผลิต NS2 : A10 : โรงเรียนบ้านทรายทอง (หมู่ที่ 9 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)
Measured Date : March 24-27, 2024
Report No. : 2024-RAAF985



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 : โครงการผลิตมีโครเจนแอสแตงค์ผลิตบึงหน้าวัดบ้านดก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนถนนหมายเลข L21/43
จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : ฐานหลุมผลิต NS3 : A3 : วัดจุดโรงงานาราม (บ้านทุ่งโจรณี หมู่ที่ 5 ตำบลจีนตึก อำเภอละลานกระบือ
จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0584972 E, 1836095 N
Measured Date : March 24-27, 2024
Measured By : Mr.Romsea Kateh
Analyzed By : Environment Research & Technology Co., Ltd.

Quotation No. : AR2024-00454
Analysis No. : 2024-AB392-007
Report No. : 2024-RAAF986
Report Date : April 20, 2024

Date/Time	Mar 24-25, 24		Mar 25-26, 24		Mar 26-27, 24	
	WS	WD	WS	WD	WS	WD
12:00-13:00	0.9	SSE	1.3	S	1.3	S
13:00-14:00	0.9	NW	1.3	SSE	0.9	SE
14:00-15:00	0.9	WSW	1.3	NW	0.9	E
15:00-16:00	1.3	WSW	1.3	NE	0.9	E
16:00-17:00	1.3	SE	0.9	ESE	0.9	SSE
17:00-18:00	1.8	S	0.4	ESE	0.9	WSW
18:00-19:00	0.4	S	0.4	S	<0.4	Calm
19:00-20:00	<0.4	Calm	<0.4	Calm	<0.4	Calm
20:00-21:00	<0.4	Calm	<0.4	Calm	1.8	SE
21:00-22:00	0.4	WNW	<0.4	Calm	3.1	ESE
22:00-23:00	<0.4	Calm	<0.4	Calm	1.3	ESE
23:00-00:00	<0.4	Calm	<0.4	Calm	0.9	WSW
00:00-01:00	<0.4	Calm	<0.4	Calm	0.9	W
01:00-02:00	<0.4	Calm	0.4	W	0.9	W
02:00-03:00	0.4	SSW	0.4	W	0.4	ESE
03:00-04:00	0.4	W	<0.4	Calm	1.3	ESE
04:00-05:00	0.4	NW	0.4	W	0.9	ESE
05:00-06:00	0.4	NW	<0.4	Calm	0.4	SE
06:00-07:00	0.4	S	<0.4	Calm	0.9	SE
07:00-08:00	0.4	S	<0.4	Calm	0.4	SSE
08:00-09:00	<0.4	Calm	<0.4	Calm	0.9	WSW
09:00-10:00	0.4	SSE	0.9	S	1.3	W
10:00-11:00	0.9	S	1.8	S	1.3	WSW
11:00-12:00	0.9	WSW	1.3	SSE	1.3	SW

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

(Ms.Piyatida Pradangkho)
Laboratory Reviewer

(Ms.Panicha Promchai)
Laboratory Supervisor

ANALYSIS REPORT

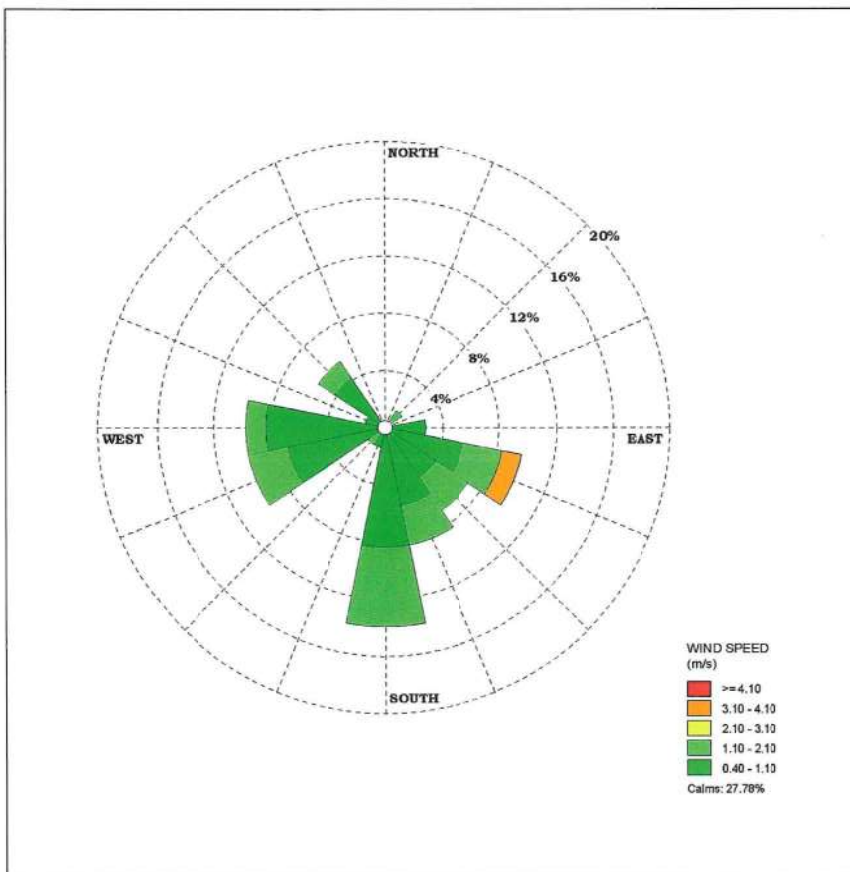
Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตมีโครเจนแอสแตงค์ผลิตบึงหน้าวัดบ้านดก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนถนนหมายเลข L21/43
จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : ฐานหลุมผลิต NS3 : A3 : วัดจุดโรงงานาราม (บ้านทุ่งโจรณี หมู่ที่ 5 ตำบลจีนตึก อำเภอละลานกระบือ
จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0584972 E, 1836095 N
Measured Date : March 24-27, 2024
Measured By : Mr.Romsea Kateh
Analyzed By : Environment Research & Technology Co., Ltd.

Quotation No. : AR2024-00454
Analysis No. : 2024-AB392-007
Report No. : 2024-RAAF986
Report Date : April 20, 2024

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	1.38889	0.00000	0.00000	0.00000	1.38889
ENE	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
E	2.77778	0.00000	0.00000	0.00000	0.00000	2.77778
ESE	5.55556	2.77778	0.00000	1.38889	0.00000	9.72223
SE	4.16667	2.77778	0.00000	0.00000	0.00000	6.94445
SSE	5.55556	2.77778	0.00000	0.00000	0.00000	8.33334
S	8.33333	5.55556	0.00000	0.00000	0.00000	13.88889
SSW	1.38889	0.00000	0.00000	0.00000	0.00000	1.38889
SW	0.00000	1.38889	0.00000	0.00000	0.00000	1.38889
WSW	6.94444	2.77778	0.00000	0.00000	0.00000	9.72222
W	8.33333	1.38889	0.00000	0.00000	0.00000	9.72222
WNW	1.38889	0.00000	0.00000	0.00000	0.00000	1.38889
NW	4.16667	1.38889	0.00000	0.00000	0.00000	5.55556
NNW	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Calm	27.77780					

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Project Name : โครงการผลิตมีโครเลียมแผลงผลิตมีโครเลียมจาก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจแบบหมายเลข L21/43 จังหวัดสุโขทัย และกำแพงเพชร
Measured Point : ฐานหลุมผลิต NS3 : A3 : วัดสูงโรงเรือน (บ้านทุ่งโรงเรือน) 5 ตำบลจันทนา อำเภอสามโก้
Measured Date : March 24-27, 2024
Report No. : 2024-RAAF986



ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Muang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตมีโครเลียมแผลงผลิตมีโครเลียมจาก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจแบบหมายเลข L21/43 จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : ฐานหลุมผลิต NS3 : A4 : บ้านเลขที่ 144 หมู่ที่ 4 ตำบลจันทนา (บ้านหนองทั้งสุข หมู่ที่ 4 ตำบลจันทนา อำเภอสามโก้ จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0581756 E, 1835325 N
Measured Date : March 24-27, 2024
Measured By : Mr. Romsea Katch
Analyzed By : Environment Research & Technology Co., Ltd.
Quotation No. : AR2024-00454
Analysis No. : 2024-A3392-010
Report No. : 2024-RAAF987
Report Date : April 20, 2024

Date/Time	Mar 24-25, 24		Mar 25-26, 24		Mar 26-27, 24	
	WS	WD	WS	WD	WS	WD
13:00-14:00	0.9	NNW	0.9	S	1.3	SE
14:00-15:00	0.9	W	1.8	W	0.9	ESE
15:00-16:00	0.9	W	0.9	WNW	0.9	ESE
16:00-17:00	2.2	S	1.3	ESE	0.9	ESE
17:00-18:00	2.2	S	1.3	SE	1.3	W
18:00-19:00	1.8	SSE	0.9	SSE	0.4	SE
19:00-20:00	0.4	SE	<0.4	Calm	0.4	SE
20:00-21:00	<0.4	Calm	<0.4	Calm	3.1	SE
21:00-22:00	0.4	SW	<0.4	Calm	4.9	ESE
22:00-23:00	0.4	SW	0.9	SW	2.7	ESE
23:00-00:00	0.4	SW	<0.4	Calm	1.3	W
00:00-01:00	0.4	SW	<0.4	Calm	2.2	W
01:00-02:00	0.9	SW	0.4	SW	1.3	W
02:00-03:00	<0.4	Calm	0.9	SW	1.3	ESE
03:00-04:00	1.8	WSW	0.9	SW	1.8	ESE
04:00-05:00	1.8	WNW	0.4	SW	1.8	ESE
05:00-06:00	1.3	WNW	0.4	SE	1.8	SSE
06:00-07:00	0.4	SSE	<0.4	Calm	1.8	SE
07:00-08:00	<0.4	Calm	<0.4	Calm	1.3	S
08:00-09:00	0.4	SSE	0.4	SE	0.4	W
09:00-10:00	0.4	SSE	0.9	S	1.8	W
10:00-11:00	1.8	SSE	1.3	S	1.3	W
11:00-12:00	1.3	S	2.2	S	0.9	S
12:00-13:00	0.9	S	1.3	S	0.9	S

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

(Ms.Piyatida Pradangkho)

Laboratory Reviewer

(Ms.Panicha Promchai)

Laboratory Supervisor

ANALYSIS REPORT

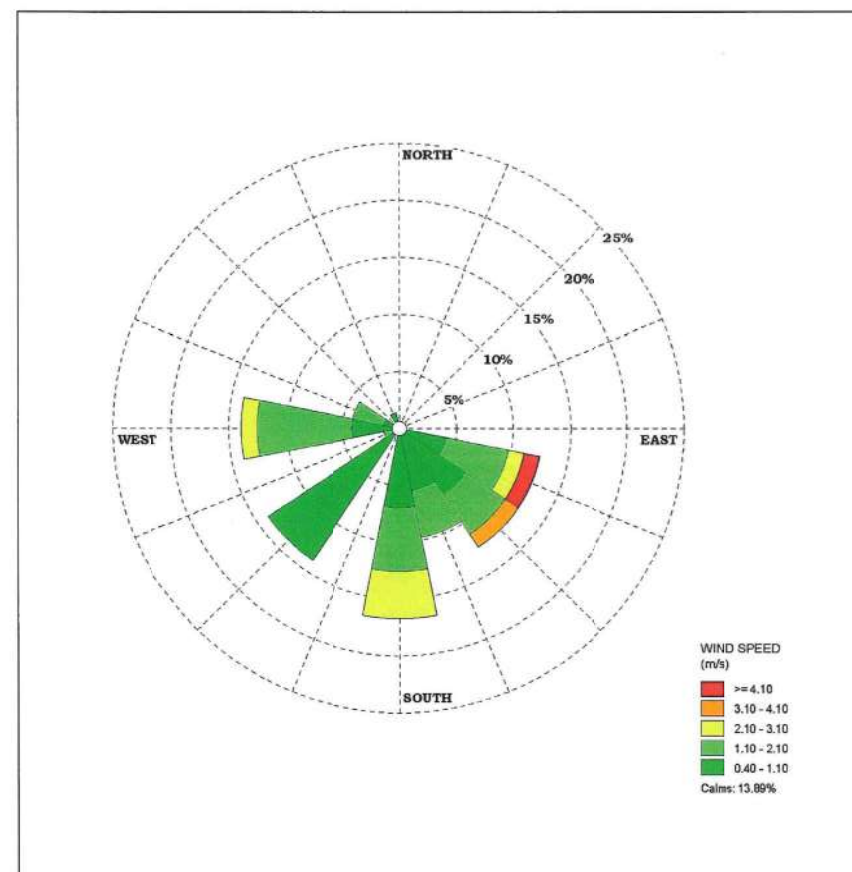
Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมแหล่งผลิตบึงหว้าตะวันตก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนบกหมายเลข L21/43
จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : ฐานหลุมผลิต NS3 : A4 : บ้านเลขที่ 144 หมู่ที่ 4 ตำบลจันทิมา (บ้านหนองหิ้งสม หมู่ที่ 4 ตำบลจันทิมา อำเภอลานกระบือ จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0583756 E, 1835325 N
Measured Date : March 24-27, 2024
Measured By : Mr.Romsea Kateh
Analyzed By : Environment Research & Technology Co., Ltd.

Quotation No. : AR2024-00454
Analysis No. : 2024-AB392-010
Report No. : 2024-RAAF987
Report Date : April 20, 2024

Wind Direction	Percentage frequency of wind in each speed and direction					Total
	0.4-1.1	1.1-2.1	2.1-3.1	3.1-4.1	≥4.1	
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	0.00000	0.00000	0.00000	0.00000
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	4.16667	5.55556	1.38889	0.00000	1.38889	12.50001
SE	6.94444	4.16667	0.00000	1.38889	0.00000	12.50000
SSE	5.55556	4.16667	0.00000	0.00000	0.00000	9.72223
S	6.94444	5.55556	4.16667	0.00000	0.00000	16.66667
SSW	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
SW	13.88890	0.00000	0.00000	0.00000	0.00000	13.88890
WSW	0.00000	1.38889	0.00000	0.00000	0.00000	1.38889
W	4.16667	8.33333	1.38889	0.00000	0.00000	13.88889
WNW	1.38889	2.77778	0.00000	0.00000	0.00000	4.16667
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	13.88890					

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Project Name : โครงการผลิตปิโตรเลียมแหล่งผลิตบึงหว้าตะวันตก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนบกหมายเลข L21/43
จังหวัดสุโขทัย และกำแพงเพชร
Measured Point : ฐานหลุมผลิต NS3 : A4 : บ้านเลขที่ 144 หมู่ที่ 4 ตำบลจันทิมา (บ้านหนองหิ้งสม หมู่ที่ 4 ตำบลจันทิมา อำเภอลานกระบือ จังหวัดกำแพงเพชร)
Measured Date : March 24-27, 2024
Report No. : 2024-RAAF987





Thai Environmental Technic Limited
บริษัท เทคนิคสิ่งแวดล้อมไทย จำกัด

ORIGINAL
ต้นฉบับ

1/6 Soi Ramkhamhaeng 145, Khwaeng / Khet Saphansung, Bangkok 10240
1/6 ซอยรามคำแหง 145 แขวงสะพานสูง เขตสะพานสูง กรุงเทพมหานคร 10240

E-mail : admin@tet1995.com

Tel : 0-2373-7799 (Auto) Fax : 0-2373-7979

Page 1 of 9

TEST REPORT

Analysis No. : R24-1869

Received Date: 03/04/24

Customer : บริษัท เอ็นไวรอนเม้นท์ รีเสิร์ช แอนด์ เทคโนโลยี จำกัด

Address : 25/114 หมู่ 6 ซอยชินเขต 1 ถนนจางวงค์วาน แขวงทุ่งสองห้อง
เขตหลักสี่ กรุงเทพฯ 10210

Contact : Tel. (02) 954 7745-6 Ext. 306 Fax. (02) 954 7747

Report Date : 29/05/24

Analysis Date : 05-08/04/24

Job No. : M/240054

Sampling Date : 24-25/03/24

Sampling By : Customer

Type of Sample : Ambient Air

Item	Parameter	Unit	Result		MDL	Standard ^(A)
			2404-AA0187	2404-AA0188		
			ฐานผลึก NS3	ฐานผลึก NS2		
VOCs						
1	Vinyl chloride	µg/m ³	< 0.13	< 0.13	0.03	20
2	1,3-Butadiene	µg/m ³	< 0.11	< 0.11	0.02	5.3
3	Acetaldehyde	µg/m ³	9.22	9.57	0.03	860
4	Bromomethane	µg/m ³	< 0.19	< 0.19	0.04	190
5	Acrolein	µg/m ³	< 0.11	< 0.11	0.02	0.55
6	Dichloromethane	µg/m ³	12.00	1.39	0.04	210
7	Acrylonitrile	µg/m ³	< 0.11	< 0.11	0.03	10
8	Chloroform	µg/m ³	0.50	0.45	0.03	57
9	Carbon tetrachloride	µg/m ³	< 0.31	< 0.31	0.04	150
10	Benzene	µg/m ³	1.49	1.30	0.02	7.6
11	1,2-Dichloroethane	µg/m ³	< 0.20	< 0.20	0.02	48
12	Trichloroethylene	µg/m ³	< 0.27	< 0.27	0.03	130
13	1,2-Dichloropropane	µg/m ³	< 0.23	< 0.23	0.04	82
14	1,4-Dioxane	µg/m ³	< 0.18	< 0.18	0.02	860
15	Tetrachloroethylene	µg/m ³	< 0.34	< 0.34	0.04	400
16	1,2-Dibromoethane	µg/m ³	< 0.38	< 0.38	0.09	370
17	1,1,2,2-Tetrachloroethane	µg/m ³	< 0.34	< 0.34	0.06	83
18	1,4-Dichlorobenzene	µg/m ³	< 0.30	< 0.30	0.11	1,100
19	Benzyl chloride	µg/m ³	< 0.26	< 0.26	0.11	12
20	Carbon disulfide	µg/m ³	0.93	0.22	0.03	100 ^(B)
21	Propene	µg/m ³	56.03	13.29	0.02	-
22	Dichlorodifluoromethane	µg/m ³	2.18	2.67	0.04	-
23	Difluorochloromethane	µg/m ³	1.32	1.21	0.04	-
24	1,2-Dichloro-1,1,2,2-tetrafluoroethane	µg/m ³	< 0.35	< 0.35	0.06	-
25	Chloromethane	µg/m ³	2.91	3.36	0.02	-
26	Isobutene	µg/m ³	< 0.11	< 0.11	0.03	-
27	Methanol	µg/m ³	15.03	10.57	0.02	-
28	Vinyl bromide	µg/m ³	< 0.22	< 0.22	0.05	-
29	Chloroethane	µg/m ³	< 0.13	< 0.13	0.02	-
30	Trichlorofluoromethane	µg/m ³	1.59	1.77	0.04	-
31	Pentane	µg/m ³	77.06	36.05	0.03	-
32	Ethanol	µg/m ³	32.07	17.98	0.02	-

continue

Refer to Analysis No. R24-1220 and follow to QF-10-02 No. 025/24 in order to add parameters ; m,p-Xylene and o-Xylene on page 3, 6 and 9

- REPORTED RESULTS REFER TO SUBMITTED SAMPLE(S) ONLY
- DO NOT COPY PARTIAL OF THIS ANALYSIS REPORT WITHOUT OFFICIAL APPROVAL



Thai Environmental Technic Limited
บริษัท เทคนิคสิ่งแวดล้อมไทย จำกัด

ORIGINAL
ต้นฉบับ

1/6 Soi Ramkhamhaeng 145, Khwaeng / Khet Saphansung, Bangkok 10240
1/6 ซอยรามคำแหง 145 แขวงสะพานสูง เขตสะพานสูง กรุงเทพมหานคร 10240

E-mail : admin@tet1995.com

Tel : 0-2373-7799 (Auto) Fax : 0-2373-7979

Page 2 of 9

TEST REPORT

Analysis No. : R24-1869

Received Date: 03/04/24

Customer : บริษัท เอ็นไวรอนเม้นท์ รีเสิร์ช แอนด์ เทคโนโลยี จำกัด

Address : 25/114 หมู่ 6 ซอยชินเขต 1 ถนนจางวงค์วาน แขวงทุ่งสองห้อง
เขตหลักสี่ กรุงเทพฯ 10210

Contact : Tel. (02) 954 7745-6 Ext. 306 Fax. (02) 954 7747

Report Date : 29/05/24

Analysis Date : 05-08/04/24

Job No. : M/240054

Sampling Date : 24-25/03/24

Sampling By : Customer

Type of Sample : Ambient Air

Item	Parameter	Unit	Result		MDL	Standard ^(A)
			2404-AA0187	2404-AA0188		
			ฐานผลึก NS3	ฐานผลึก NS2		
33	Isoprene	µg/m ³	0.89	0.76	0.02	-
34	Propanal	µg/m ³	< 0.12	< 0.12	0.02	-
35	1,1-Dichloroethene	µg/m ³	< 0.20	< 0.20	0.02	-
36	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/m ³	< 0.38	< 0.38	0.04	-
37	Acetone	µg/m ³	31.66	21.26	0.02	-
38	Iodomethane	µg/m ³	< 0.29	< 0.29	0.03	-
39	Isopropyl Alcohol	µg/m ³	1.10	0.85	0.02	-
40	Acetonitrile	µg/m ³	< 0.08	< 0.08	0.02	-
41	Allyl chloride	µg/m ³	< 0.16	< 0.16	0.02	-
42	Cyclopentane	µg/m ³	2.51	0.94	0.02	-
43	trans-1,2-dichloroethene	µg/m ³	< 0.20	< 0.20	0.03	-
44	2-Methoxy-2-methylpropane	µg/m ³	< 0.18	< 0.18	0.03	-
45	Hexane	µg/m ³	33.17	18.13	0.03	-
46	Methacrolein	µg/m ³	< 0.14	< 0.14	0.03	-
47	1,1-Dichloroethane	µg/m ³	< 0.20	< 0.20	0.03	-
48	Vinyl acetate	µg/m ³	< 0.18	< 0.18	0.05	-
49	Propanol	µg/m ³	< 0.12	< 0.12	0.02	-
50	Butanal	µg/m ³	< 0.15	< 0.15	0.04	-
51	Methyl vinyl ketone	µg/m ³	< 0.14	< 0.14	0.02	-
52	cis-1,2-Dichloroethene	µg/m ³	< 0.20	< 0.20	0.02	-
53	Methyl ethyl ketone	µg/m ³	1.14	1.04	0.02	-
54	Ethyl acetate	µg/m ³	0.74	0.63	0.03	-
55	Tetrahydrofuran	µg/m ³	< 0.15	< 0.15	0.02	-
56	1,1,1-Trichloroethane	µg/m ³	< 0.27	< 0.27	0.02	-
57	Cyclohexane	µg/m ³	9.71	4.64	0.01	-
58	2,2,4-Trimethylpentane	µg/m ³	< 0.23	< 0.23	0.03	-
59	Heptane	µg/m ³	25.46	15.18	0.03	-
60	1-Butanol	µg/m ³	12.72	1.59	0.02	-
61	2-Pentanone	µg/m ³	< 0.18	< 0.18	0.02	-
62	Pentanal	µg/m ³	< 0.18	< 0.18	0.04	-
63	3-Pentanone	µg/m ³	< 0.18	< 0.18	0.02	-
64	Bromodichloromethane	µg/m ³	< 0.34	< 0.34	0.03	-
65	cis-1,3-Dichloropropene	µg/m ³	< 0.23	< 0.23	0.04	-
66	Methyl Isobutyl Ketone	µg/m ³	0.61	0.40	0.04	-

continue

Refer to Analysis No. R24-1220 and follow to QF-10-02 No. 025/24 in order to add parameters ; m,p-Xylene and o-Xylene on page 3, 6 and 9

- REPORTED RESULTS REFER TO SUBMITTED SAMPLE(S) ONLY
- DO NOT COPY PARTIAL OF THIS ANALYSIS REPORT WITHOUT OFFICIAL APPROVAL



Thai Environmental Technic Limited
บริษัท เทคนิคสิ่งแวดล้อมไทย จำกัด

ORIGINAL
ต้นฉบับ

1/6 Soi Ramkhamhaeng 145, Khwaeng / Khet Saphansung, Bangkok 10240
1/6 ซอยรามคำแหง 145 แขวงสะพานสูง เขตสะพานสูง กรุงเทพมหานคร 10240

E-mail : admin@tet1995.com

Tel : 0-2373-7799 (Auto) Fax : 0-2373-7979

Page 3 of 9

TEST REPORT

Analysis No. : R24-1869

Received Date: 03/04/24

Customer : บริษัท เอ็นไวรอนเม้นท์ รีเสิร์ช แอนด์ เทคโนโลยี จำกัด

Address : 25/114 หมู่ 6 ซอยชินเขต 1 ถนนงามวงศ์วาน แขวงทุ่งสองห้อง
เขตหลักสี่ กรุงเทพฯ 10210

Contact : Tel. (02) 954 7745-6 Ext. 306 Fax. (02) 954 7747

Report Date : 29/05/24

Analysis Date : 05-08/04/24

Job No. : M/240054

Sampling Date : 24-25/03/24

Sampling By : Customer

Type of Sample : Ambient Air

Item	Parameter	Unit	Result		MDL	Standard ^(A)
			2404-AA0187	2404-AA0188		
			ฐานผลึก NS3	ฐานผลึก NS2		
67	Toluene	µg/m ³	2.96	1.57	0.03	-
68	trans-1,3-Dichloropropene	µg/m ³	< 0.23	< 0.23	0.04	-
69	1,1,2-Trichloroethane	µg/m ³	< 0.27	< 0.27	0.03	-
70	3-Hexanone	µg/m ³	< 0.20	< 0.20	0.02	-
71	2-Hexanone	µg/m ³	< 0.20	< 0.20	0.05	-
72	Dibromochloromethane	µg/m ³	< 0.42	< 0.42	0.07	-
73	Hexanal	µg/m ³	< 0.20	< 0.20	0.07	-
74	Chlorobenzene	µg/m ³	< 0.23	< 0.23	0.04	-
75	Ethylbenzene	µg/m ³	2.34	0.57	0.02	-
76	m,p-Xylene	µg/m ³	1.90	0.60	0.05	-
77	o-Xylene	µg/m ³	1.12	0.42	0.05	-
78	Total Xylene	µg/m ³	3.02	1.02	0.05	-
79	Styrene	µg/m ³	4.47	1.00	0.03	-
80	Bromoform	µg/m ³	< 0.52	< 0.52	0.11	-
81	4-Ethyl toluene	µg/m ³	< 0.25	< 0.25	0.06	-
82	1,3,5-Trimethylbenzene	µg/m ³	< 0.25	< 0.25	0.02	-
83	1,2,4-Trimethylbenzene	µg/m ³	0.63	0.55	0.04	-
84	1,3-Dichlorobenzene	µg/m ³	< 0.30	< 0.30	0.26	-
85	1,2,3-Trimethylbenzene	µg/m ³	< 0.25	< 0.25	0.05	-
86	1,2-Dichlorobenzene	µg/m ³	< 0.30	< 0.30	0.10	-
87	1,2,4-Trichlorobenzene	µg/m ³	< 0.37	< 0.37	0.08	-
88	Hexachloro-1,3-Butadiene	µg/m ³	< 0.53	< 0.53	0.06	-
89	Naphthalene	µg/m ³	< 0.26	< 0.26	0.06	-

Remarks : Concentration of each gas in Ambient is based on 1 atm and 25 °C

: MDL = Method Detection Limit

Method : VOCs = Canister, GC/MS (US EPA Method TO-15)

Standard (A) Notification of Pollution Control Departmental (2009) (B.E. 2552) : 24 hours

(B) Notification of the National Environment Board (2017) (B.E. 2560) : 24 hours

Reviewed by

Ms. Warunt Prachumdaeng
Chief of Laboratory

Approved by

Mr. Pongsit Petaslee
Laboratory Manager

Refer to Analysis No. R24-1220 and follow to QF-10-02 No. 025/24 in order to add parameters ; m,p-Xylene and o-Xylene on page 3, 6 and 9

- REPORTED RESULTS REFER TO SUBMITTED SAMPLE(S) ONLY
- DO NOT COPY PARTIAL OF THIS ANALYSIS REPORT WITHOUT OFFICIAL APPROVAL



Thai Environmental Technic Limited
บริษัท เทคนิคสิ่งแวดล้อมไทย จำกัด

ORIGINAL
ต้นฉบับ

1/6 Soi Ramkhamhaeng 145, Khwaeng / Khet Saphansung, Bangkok 10240
1/6 ซอยรามคำแหง 145 แขวงสะพานสูง เขตสะพานสูง กรุงเทพมหานคร 10240

E-mail : admin@tet1995.com

Tel : 0-2373-7799 (Auto) Fax : 0-2373-7979

Page 4 of 9

TEST REPORT

Analysis No. : R24-1869

Received Date: 03/04/24

Customer : บริษัท เอ็นไวรอนเม้นท์ รีเสิร์ช แอนด์ เทคโนโลยี จำกัด

Address : 25/114 หมู่ 6 ซอยชินเขต 1 ถนนงามวงศ์วาน แขวงทุ่งสองห้อง
เขตหลักสี่ กรุงเทพฯ 10210

Contact : Tel. (02) 954 7745-6 Ext. 306 Fax. (02) 954 7747

Report Date : 29/05/24

Analysis Date : 05-08/04/24

Job No. : M/240054

Sampling Date : 25-26/03/24

Sampling By : Customer

Type of Sample : Ambient Air

Item	Parameter	Unit	Result		MDL	Standard ^(A)
			2404-AA0189	2404-AA0190		
			ฐานผลึก NS3	ฐานผลึก NS2		
VOCs						
1	Vinyl chloride	µg/m ³	< 0.13	< 0.13	0.03	20
2	1,3-Butadiene	µg/m ³	< 0.11	< 0.11	0.02	5.3
3	Acetaldehyde	µg/m ³	10.51	13.40	0.03	860
4	Bromomethane	µg/m ³	< 0.19	< 0.19	0.04	190
5	Acrolein	µg/m ³	< 0.11	< 0.11	0.02	0.55
6	Dichloromethane	µg/m ³	18.06	49.32	0.04	210
7	Acrylonitrile	µg/m ³	< 0.11	< 0.11	0.03	10
8	Chloroform	µg/m ³	0.72	1.17	0.03	57
9	Carbon tetrachloride	µg/m ³	< 0.31	< 0.31	0.04	150
10	Benzene	µg/m ³	2.06	1.69	0.02	7.6
11	1,2-Dichloroethane	µg/m ³	< 0.20	< 0.20	0.02	48
12	Trichloroethylene	µg/m ³	< 0.27	< 0.27	0.03	130
13	1,2-Dichloropropane	µg/m ³	< 0.23	< 0.23	0.04	82
14	1,4-Dioxane	µg/m ³	< 0.18	< 0.18	0.02	860
15	Tetrachloroethylene	µg/m ³	< 0.34	< 0.34	0.04	400
16	1,2-Dibromoethane	µg/m ³	< 0.38	< 0.38	0.09	370
17	1,1,2,2-Tetrachloroethane	µg/m ³	< 0.34	< 0.34	0.06	83
18	1,4-Dichlorobenzene	µg/m ³	< 0.30	< 0.30	0.11	1,100
19	Benzyl chloride	µg/m ³	< 0.26	< 0.26	0.11	12
20	Carbon disulfide	µg/m ³	2.42	7.70	0.03	100 ^(B)
21	Propene	µg/m ³	43.92	17.33	0.02	-
22	Dichlorodifluoromethane	µg/m ³	2.29	2.58	0.04	-
23	Difluorochloromethane	µg/m ³	1.67	2.67	0.04	-
24	1,2-Dichloro-1,1,2,2-tetrafluoroethane	µg/m ³	< 0.35	< 0.35	0.06	-
25	Chloromethane	µg/m ³	3.10	3.54	0.02	-
26	Isobutene	µg/m ³	< 0.11	< 0.11	0.03	-
27	Methanol	µg/m ³	16.98	27.00	0.02	-
28	Vinyl bromide	µg/m ³	< 0.22	< 0.22	0.05	-
29	Chloroethane	µg/m ³	< 0.13	< 0.13	0.02	-
30	Trichlorofluoromethane	µg/m ³	1.61	1.75	0.04	-
31	Pentane	µg/m ³	69.85	47.85	0.03	-
32	Ethanol	µg/m ³	57.76	143.07	0.02	-

continue

Refer to Analysis No. R24-1220 and follow to QF-10-02 No. 025/24 in order to add parameters ; m,p-Xylene and o-Xylene on page 3, 6 and 9

- REPORTED RESULTS REFER TO SUBMITTED SAMPLE(S) ONLY
- DO NOT COPY PARTIAL OF THIS ANALYSIS REPORT WITHOUT OFFICIAL APPROVAL



Thai Environmental Technic Limited
บริษัท เทคนิคสิ่งแวดล้อมไทย จำกัด

ORIGINAL
ต้นฉบับ

1/6 Soi Ramkhamhaeng 145, Khwaeng / Khet Saphansung, Bangkok 10240
1/6 ซอยรามคำแหง 145 แขวงสะพานสูง เขตสะพานสูง กรุงเทพมหานคร 10240

E-mail : admin@tet1995.com

Tel : 0-2373-7799 (Auto) Fax : 0-2373-7979

Page 5 of 9

TEST REPORT

Analysis No. : R24-1869

Received Date: 03/04/24

Customer : บริษัท เอ็นไวรอนเม้นท์ รีเสิร์ช แอนด์ เทคโนโลยี จำกัด

Address : 25/114 หมู่ 6 ซอยชินเขต 1 ถนนนางพวงสว่าง แขวงทุ่งสองห้อง
เขตหลักสี่ กรุงเทพฯ 10210

Contact : Tel. (02) 954 7745-6 Ext. 306 Fax. (02) 954 7747

Report Date : 29/05/24

Analysis Date : 05-08/04/24

Job No. : M/240054

Sampling Date : 25-26/03/24

Sampling By : Customer

Type of Sample : Ambient Air

Item	Parameter	Unit	Result		MDL	Standard ^(A)
			2404-AA0189	2404-AA0190		
			ฐานผลึก NS3	ฐานผลึก NS2		
33	Isoprene	µg/m ³	1.95	0.98	0.02	-
34	Propanal	µg/m ³	<0.12	<0.12	0.02	-
35	1,1-Dichloroethene	µg/m ³	<0.20	<0.20	0.02	-
36	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/m ³	<0.38	<0.38	0.04	-
37	Acetone	µg/m ³	68.68	182.37	0.02	-
38	Iodomethane	µg/m ³	<0.29	<0.29	0.03	-
39	Isopropyl Alcohol	µg/m ³	1.87	12.45	0.02	-
40	Acetonitrile	µg/m ³	<0.08	<0.08	0.02	-
41	Allyl chloride	µg/m ³	<0.16	<0.16	0.02	-
42	Cyclopentane	µg/m ³	1.20	1.69	0.02	-
43	trans-1,2-dichloroethene	µg/m ³	<0.20	<0.20	0.03	-
44	2-Methoxy-2-methylpropane	µg/m ³	<0.18	<0.18	0.03	-
45	Hexane	µg/m ³	33.47	44.03	0.03	-
46	Methacrolein	µg/m ³	<0.14	<0.14	0.03	-
47	1,1-Dichloroethane	µg/m ³	<0.20	<0.20	0.03	-
48	Vinyl acetate	µg/m ³	<0.18	<0.18	0.05	-
49	Propanol	µg/m ³	<0.12	<0.12	0.02	-
50	Butanal	µg/m ³	<0.15	<0.15	0.04	-
51	Methyl vinyl ketone	µg/m ³	<0.14	<0.14	0.02	-
52	cis-1,2-Dichloroethene	µg/m ³	<0.20	<0.20	0.02	-
53	Methyl ethyl ketone	µg/m ³	1.66	2.01	0.02	-
54	Ethyl acetate	µg/m ³	1.40	1.66	0.03	-
55	Tetrahydrofuran	µg/m ³	<0.15	<0.15	0.02	-
56	1,1,1-Trichloroethane	µg/m ³	<0.27	<0.27	0.02	-
57	Cyclohexane	µg/m ³	9.38	7.05	0.01	-
58	2,2,4-Trimethylpentane	µg/m ³	<0.23	<0.23	0.03	-
59	Heptane	µg/m ³	23.29	21.43	0.03	-
60	1-Butanol	µg/m ³	227.16	7.55	0.02	-
61	2-Pentanone	µg/m ³	<0.18	<0.18	0.02	-
62	Pentanal	µg/m ³	<0.18	<0.18	0.04	-
63	3-Pentanone	µg/m ³	<0.18	<0.18	0.02	-
64	Bromodichloromethane	µg/m ³	<0.34	<0.34	0.03	-
65	cis-1,3-Dichloropropene	µg/m ³	<0.23	<0.23	0.04	-
66	Methyl Isobutyl Ketone	µg/m ³	0.93	0.78	0.04	-

continue

*Refer to Analysis No. R24-1220 and follow to QF-10-02 No. 025/24 in order to add parameters ; m,p-Xylene and o-Xylene on page 3, 6 and 9"

- REPORTED RESULTS REFER TO SUBMITTED SAMPLE(S) ONLY
- DO NOT COPY PARTIAL OF THIS ANALYSIS REPORT WITHOUT OFFICIAL APPROVAL



Thai Environmental Technic Limited
บริษัท เทคนิคสิ่งแวดล้อมไทย จำกัด

ORIGINAL
ต้นฉบับ

1/6 Soi Ramkhamhaeng 145, Khwaeng / Khet Saphansung, Bangkok 10240
1/6 ซอยรามคำแหง 145 แขวงสะพานสูง เขตสะพานสูง กรุงเทพมหานคร 10240

E-mail : admin@tet1995.com

Tel : 0-2373-7799 (Auto) Fax : 0-2373-7979

Page 6 of 9

TEST REPORT

Analysis No. : R24-1869

Received Date: 03/04/24

Customer : บริษัท เอ็นไวรอนเม้นท์ รีเสิร์ช แอนด์ เทคโนโลยี จำกัด

Address : 25/114 หมู่ 6 ซอยชินเขต 1 ถนนนางพวงสว่าง แขวงทุ่งสองห้อง
เขตหลักสี่ กรุงเทพฯ 10210

Contact : Tel. (02) 954 7745-6 Ext. 306 Fax. (02) 954 7747

Report Date : 29/05/24

Analysis Date : 05-08/04/24

Job No. : M/240054

Sampling Date : 25-26/03/24

Sampling By : Customer

Type of Sample : Ambient Air

Item	Parameter	Unit	Result		MDL	Standard ^(A)
			2404-AA0189	2404-AA0190		
			ฐานผลึก NS3	ฐานผลึก NS2		
67	Toluene	µg/m ³	4.33	5.56	0.03	-
68	trans-1,3-Dichloropropene	µg/m ³	<0.23	<0.23	0.04	-
69	1,1,2-Trichloroethane	µg/m ³	<0.27	<0.27	0.03	-
70	3-Hexanone	µg/m ³	<0.20	<0.20	0.02	-
71	2-Hexanone	µg/m ³	<0.20	<0.20	0.05	-
72	Dibromochloromethane	µg/m ³	<0.42	<0.42	0.07	-
73	Hexanal	µg/m ³	<0.20	<0.20	0.07	-
74	Chlorobenzene	µg/m ³	<0.23	<0.23	0.04	-
75	Ethylbenzene	µg/m ³	2.45	5.29	0.02	-
76	m,p-Xylene	µg/m ³	2.21	4.75	0.05	-
77	o-Xylene	µg/m ³	1.35	2.60	0.05	-
78	Total Xylene	µg/m ³	3.56	7.35	0.05	-
79	Styrene	µg/m ³	4.70	12.82	0.03	-
80	Bromoform	µg/m ³	<0.52	<0.52	0.11	-
81	4-Ethyl toluene	µg/m ³	<0.25	<0.25	0.06	-
82	1,3,5-Trimethylbenzene	µg/m ³	<0.25	<0.25	0.02	-
83	1,2,4-Trimethylbenzene	µg/m ³	0.62	0.69	0.04	-
84	1,3-Dichlorobenzene	µg/m ³	<0.30	<0.30	0.26	-
85	1,2,3-Trimethylbenzene	µg/m ³	<0.25	<0.25	0.05	-
86	1,2-Dichlorobenzene	µg/m ³	<0.30	<0.30	0.10	-
87	1,2,4-Trichlorobenzene	µg/m ³	<0.37	<0.37	0.08	-
88	Hexachloro-1,3-Butadiene	µg/m ³	<0.53	<0.53	0.06	-
89	Naphthalene	µg/m ³	<0.26	<0.26	0.06	-

Remarks : Concentration of each gas in Ambient is based on 1 atm and 25 °C

MDL = Method Detection Limit

Method : VOCs = Canister, GC/MS (US EPA Method TO-15)

Standard (A) Notification of Pollution Control Departmental (2009)(B.E. 2552) : 24 hours

(B) Notification of the National Environment Board (2017) (B.E. 2560) : 24 hours

Reviewed by

Ms. Warunt Prachumkang
Chief of Laboratory

Approved by

Mrs. Pongp Pichalee
Laboratory Manager

*Refer to Analysis No. R24-1220 and follow to QF-10-02 No. 025/24 in order to add parameters ; m,p-Xylene and o-Xylene on page 3, 6 and 9"

- REPORTED RESULTS REFER TO SUBMITTED SAMPLE(S) ONLY
- DO NOT COPY PARTIAL OF THIS ANALYSIS REPORT WITHOUT OFFICIAL APPROVAL



Thai Environmental Technic Limited
บริษัท เทคนิคสิ่งแวดล้อมไทย จำกัด

ORIGINAL
ต้นฉบับ

1/6 Soi Ramkhamhaeng 145, Khwaeng / Khet Saphansung, Bangkok 10240
1/6 ซอยรามคำแหง 145 แขวงสะพานสูง เขตสะพานสูง กรุงเทพมหานคร 10240

E-mail : admin@tet1995.com

Tel : 0-2373-7799 (Auto) Fax : 0-2373-7979

Page 7 of 9

TEST REPORT

Analysis No. : R24-1869

Received Date: 03/04/24

Customer : บริษัท เอ็นไวรอนเม้นท์ รีเสิร์ช แอนด์ เทคโนโลยี จำกัด

Address : 25/114 หมู่ 6 ซอยชินเขต 1 ถนนจันทบุรี แขวงทุ่งสองห้อง
เขตหลักสี่ กรุงเทพฯ 10210

Contact : Tel. (02) 954 7745-6 Ext. 306 Fax. (02) 954 7747

Report Date : 29/05/24

Analysis Date : 05-08/04/24

Job No. : M/240054

Sampling Date : 26-27/03/24

Sampling By : Customer

Type of Sample : Ambient Air

Item	Parameter	Unit	Result		MDL	Standard ^(A)
			2404-AA0191	2404-AA0192		
			ฐานผลึก NS3	ฐานผลึก NS2		
VOCs						
1	Vinyl chloride	µg/m ³	< 0.13	< 0.13	0.03	20
2	1,3-Butadiene	µg/m ³	< 0.11	< 0.11	0.02	5.3
3	Acetaldehyde	µg/m ³	11.83	6.27	0.03	860
4	Bromomethane	µg/m ³	< 0.19	< 0.19	0.04	190
5	Acrolein	µg/m ³	< 0.11	< 0.11	0.02	0.55
6	Dichloromethane	µg/m ³	16.30	0.95	0.04	210
7	Acrylonitrile	µg/m ³	< 0.11	< 0.11	0.03	10
8	Chloroform	µg/m ³	0.48	< 0.24	0.03	57
9	Carbon tetrachloride	µg/m ³	< 0.31	< 0.31	0.04	150
10	Beazene	µg/m ³	1.13	0.71	0.02	7.6
11	1,2-Dichloroethane	µg/m ³	< 0.20	< 0.20	0.02	48
12	Trichloroethylene	µg/m ³	< 0.27	< 0.27	0.03	130
13	1,2-Dichloropropane	µg/m ³	< 0.23	< 0.23	0.04	82
14	1,4-Dioxane	µg/m ³	< 0.18	< 0.18	0.02	860
15	Tetrachloroethylene	µg/m ³	< 0.34	< 0.34	0.04	400
16	1,2-Dibromoethane	µg/m ³	< 0.38	< 0.38	0.09	370
17	1,1,2,2-Tetrachloroethane	µg/m ³	< 0.34	< 0.34	0.06	83
18	1,4-Dichlorobenzene	µg/m ³	< 0.30	< 0.30	0.11	1,100
19	Benzyl chloride	µg/m ³	< 0.26	< 0.26	0.11	12
20	Carbon disulfide	µg/m ³	3.69	0.24	0.03	100 ^(B)
21	Propene	µg/m ³	45.50	6.41	0.02	-
22	Dichlorodifluoromethane	µg/m ³	2.44	2.17	0.04	-
23	Difluorochloromethane	µg/m ³	1.88	1.05	0.04	-
24	1,2-Dichloro-1,1,2,2-tetrafluoroethane	µg/m ³	< 0.35	< 0.35	0.06	-
25	Chloromethane	µg/m ³	2.44	2.06	0.02	-
26	Isobutene	µg/m ³	< 0.11	< 0.11	0.03	-
27	Methanol	µg/m ³	12.37	7.13	0.02	-
28	Visyl bromide	µg/m ³	< 0.22	< 0.22	0.05	-
29	Chloroethane	µg/m ³	< 0.13	< 0.13	0.02	-
30	Trichlorofluoromethane	µg/m ³	1.69	1.47	0.04	-
31	Pentane	µg/m ³	86.54	14.32	0.03	-
32	Ethanol	µg/m ³	60.54	7.37	0.02	-

continue

*Refer to Analysis No. R24-1220 and follow to QF-10-02 No. 025/24 in order to add parameters ; m,p-Xylene and o-Xylene on page 3, 6 and 9"

- REPORTED RESULTS REFER TO SUBMITTED SAMPLE(S) ONLY
- DO NOT COPY PARTIAL OF THIS ANALYSIS REPORT WITHOUT OFFICIAL APPROVAL



Thai Environmental Technic Limited
บริษัท เทคนิคสิ่งแวดล้อมไทย จำกัด

ORIGINAL
ต้นฉบับ

1/6 Soi Ramkhamhaeng 145, Khwaeng / Khet Saphansung, Bangkok 10240
1/6 ซอยรามคำแหง 145 แขวงสะพานสูง เขตสะพานสูง กรุงเทพมหานคร 10240

E-mail : admin@tet1995.com

Tel : 0-2373-7799 (Auto) Fax : 0-2373-7979

Page 8 of 9

TEST REPORT

Analysis No. : R24-1869

Received Date: 03/04/24

Customer : บริษัท เอ็นไวรอนเม้นท์ รีเสิร์ช แอนด์ เทคโนโลยี จำกัด

Address : 25/114 หมู่ 6 ซอยชินเขต 1 ถนนจันทบุรี แขวงทุ่งสองห้อง
เขตหลักสี่ กรุงเทพฯ 10210

Contact : Tel. (02) 954 7745-6 Ext. 306 Fax. (02) 954 7747

Report Date : 29/05/24

Analysis Date : 05-08/04/24

Job No. : M/240054

Sampling Date : 26-27/03/24

Sampling By : Customer

Type of Sample : Ambient Air

Item	Parameter	Unit	Result		MDL	Standard ^(A)
			2404-AA0191	2404-AA0192		
			ฐานผลึก NS3	ฐานผลึก NS2		
33	Isoprene	µg/m ³	0.51	0.26	0.02	-
34	Propanal	µg/m ³	< 0.12	< 0.12	0.02	-
35	1,1-Dichloroethene	µg/m ³	< 0.20	< 0.20	0.02	-
36	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/m ³	< 0.38	< 0.38	0.04	-
37	Acetone	µg/m ³	109.77	16.27	0.02	-
38	Iodomethane	µg/m ³	< 0.29	< 0.29	0.03	-
39	Isopropyl Alcohol	µg/m ³	5.84	0.51	0.02	-
40	Acetonitrile	µg/m ³	< 0.08	< 0.08	0.02	-
41	Allyl chloride	µg/m ³	< 0.16	< 0.16	0.02	-
42	Cyclopentane	µg/m ³	2.48	0.37	0.02	-
43	trans-1,2-dichloroethene	µg/m ³	< 0.20	< 0.20	0.03	-
44	2-Methoxy-2-methylpropane	µg/m ³	< 0.18	< 0.18	0.03	-
45	Hexane	µg/m ³	45.82	6.76	0.03	-
46	Methacrolein	µg/m ³	< 0.14	< 0.14	0.03	-
47	1,1-Dichloroethane	µg/m ³	< 0.20	< 0.20	0.03	-
48	Vinyl acetate	µg/m ³	< 0.18	< 0.18	0.05	-
49	Propanol	µg/m ³	< 0.12	< 0.12	0.02	-
50	Butanal	µg/m ³	< 0.15	< 0.15	0.04	-
51	Methyl vinyl ketone	µg/m ³	< 0.14	< 0.14	0.02	-
52	cis-1,2-Dichloroethene	µg/m ³	< 0.20	< 0.20	0.02	-
53	Methyl ethyl ketone	µg/m ³	1.61	0.75	0.02	-
54	Ethyl acetate	µg/m ³	0.94	0.43	0.03	-
55	Tetrahydrofuran	µg/m ³	< 0.15	< 0.15	0.02	-
56	1,1,1-Trichloroethane	µg/m ³	< 0.27	< 0.27	0.02	-
57	Cyclohexane	µg/m ³	11.16	1.79	0.01	-
58	2,2,4-Trimethylpentane	µg/m ³	< 0.23	< 0.23	0.03	-
59	Heptane	µg/m ³	30.72	5.22	0.03	-
60	1-Butanol	µg/m ³	1.94	1.07	0.02	-
61	2-Pentanone	µg/m ³	< 0.18	< 0.18	0.02	-
62	Pentanal	µg/m ³	< 0.18	< 0.18	0.04	-
63	3-Pentanone	µg/m ³	< 0.18	< 0.18	0.02	-
64	Bromodichloromethane	µg/m ³	< 0.34	< 0.34	0.03	-
65	cis-1,3-Dichloropropene	µg/m ³	< 0.23	< 0.23	0.04	-
66	Methyl Isobutyl Ketone	µg/m ³	0.74	< 0.20	0.04	-

continue

*Refer to Analysis No. R24-1220 and follow to QF-10-02 No. 025/24 in order to add parameters ; m,p-Xylene and o-Xylene on page 3, 6 and 9"

- REPORTED RESULTS REFER TO SUBMITTED SAMPLE(S) ONLY
- DO NOT COPY PARTIAL OF THIS ANALYSIS REPORT WITHOUT OFFICIAL APPROVAL



Thai Environmental Technic Limited
บริษัท เทคนิคสิ่งแวดล้อมไทย จำกัด

ORIGINAL

ต้นฉบับ

1/6 Soi Ramkhamhaeng 145, Khwaeng / Khet Saphansung, Bangkok 10240

E-mail : admin@tet1995.com

1/6 ซอยรามคำแหง 145 แขวงสะพานสูง เขตสะพานสูง กรุงเทพมหานคร 10240

Tel : 0-2373-7799 (Auto) Fax : 0-2373-7979

Page 9 of 9

TEST REPORT

Analysis No. : R24-1869

Received Date: 03/04/24

Customer : บริษัท เอ็นไวรอนเม้นท์ รีเสิร์ช แอนด์ เทคโนโลยี จำกัด

Address : 25/114 หมู่ 6 ซอยชินเขต 1 ถนนวงเวียนควน แขวงทุ่งตອງห้อง
เขตหลักสี่ กรุงเทพฯ 10210

Contact : Tel. (02) 954 7745-6 Ext. 306 Fax. (02) 954 7747

Report Date : 29/05/24

Analysis Date : 05-08/04/24

Job No. : M/240054

Sampling Date : 26-27/03/24

Sampling By : Customer

Type of Sample : Ambient Air

Item	Parameter	Unit	Result		MDL	Standard ^(A)
			2404-AA0191	2404-AA0192		
			ฐานผลิตร NS3	ฐานผลิตร NS2		
67	Toluene	µg/m ³	2.86	0.78	0.03	-
68	trans-1,3-Dichloropropene	µg/m ³	< 0.23	< 0.23	0.04	-
69	1,1,2-Trichloroethane	µg/m ³	< 0.27	< 0.27	0.03	-
70	3-Hexanone	µg/m ³	< 0.20	< 0.20	0.02	-
71	2-Hexanone	µg/m ³	< 0.20	< 0.20	0.05	-
72	Dibromochloromethane	µg/m ³	< 0.42	< 0.42	0.07	-
73	Hexanal	µg/m ³	< 0.20	< 0.20	0.07	-
74	Chlorobenzene	µg/m ³	< 0.23	< 0.23	0.04	-
75	Ethylbenzene	µg/m ³	1.25	0.36	0.02	-
76	m,p-Xylene	µg/m ³	1.05	0.30	0.05	-
77	o-Xylene	µg/m ³	0.63	0.23	0.05	-
78	Total Xylene	µg/m ³	1.68	0.53	0.05	-
79	Styrene	µg/m ³	1.95	0.57	0.03	-
80	Bromoform	µg/m ³	< 0.52	< 0.52	0.11	-
81	4-Ethyl toluene	µg/m ³	< 0.25	< 0.25	0.06	-
82	1,3,5-Trimethylbenzene	µg/m ³	< 0.25	< 0.25	0.02	-
83	1,2,4-Trimethylbenzene	µg/m ³	0.37	< 0.25	0.04	-
84	1,3-Dichlorobenzene	µg/m ³	< 0.30	< 0.30	0.26	-
85	1,2,3-Trimethylbenzene	µg/m ³	< 0.25	< 0.25	0.05	-
86	1,2-Dichlorobenzene	µg/m ³	< 0.30	< 0.30	0.10	-
87	1,2,4-Trichlorobenzene	µg/m ³	< 0.37	< 0.37	0.08	-
88	Hexachloro-1,3-Butadiene	µg/m ³	< 0.52	< 0.53	0.06	-
89	Naphthalene	µg/m ³	< 0.26	< 0.26	0.06	-

Remarks : Concentration of each gas is Ambient is based on 1 atm and 25 °C

: MDL = Method Detection Limit

Method : VOCs = Canister, GC/MS (US EPA Method TO-15)

Standard (A) Notification of Pollution Control Department (2009) (B.E. 2552) : 24 hours

(B) Notification of the National Environmental Quality Management Act (2002) : 24 hours

Reviewed by

Ms. Waseerul Prachundang
Chief of Laboratory

Approved by

Mrs. Pornpip Pethsuee
Laboratory Manager

"Refer to Analysis No. R24-1220 and follow to QF-10-02 No. 025/24 in order to add parameters ; m,p-Xylene and o-Xylene on page 3, 6 and 9"

END OF REPORT

- REPORTED RESULTS REFER TO SUBMITTED SAMPLE(S) ONLY
- DO NOT COPY PARTIAL OF THIS ANALYSIS REPORT WITHOUT OFFICIAL APPROVAL

ฤดูฝน

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 : โครงการผลิตยี่โถรเคื่องผสมคิลคั้งหูกัดะวันดก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจจนทกณนเลข L21/43
จังหวัดสุโขทัย และก้นพ่งเพชร
จังหวัดสุโขทัย และก้นพ่งเพชร
Project Location : จังหวัดสุโขทัย และก้นพ่งเพชร
Sampling Source : Ambient Air Quality
Sampling Point : ฐานหลุมผลิต NS2 : A9 : บ้านเลขที่ 102 หมู่ที่ 7 ตำบลจันทิมา (บ้านบึงช้าง หมู่ที่ 7 ตำบลจันทิมา
อำเภอลานกระบือ จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0584078 E, 1833840 N
Sampling Date : August 29-September 1, 2024
Sampling Time : 10:03
Sampling Method : U.S. EPA 40 CFR Part 50
Sampling By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.

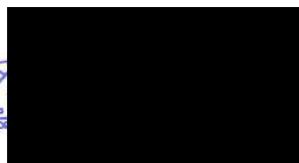
Quotation No. : AR2024-00454
Analysis No. : 2024-AE317
Received Date : September 3, 2024
Analytical Date : September 3-10, 2024
Report No. : 2024-RAAS212
Report Date : September 10, 2024

Parameter	Unit	Method of Analysis	Result			Standard ¹⁾
			Aug 29-30, 24	Aug 30-31, 24	Aug 31-Sep 1, 24	
Total Suspended Particulate (TSP) 24 Hours Average	mg/m ³	High-Volume, Gravimetric	0.025	0.029	0.028	0.330
Particulate Size Less Than 10 Micron (PM10) 24 Hours Average	mg/m ³	PM10 Size Selective, High-Volume, Gravimetric	0.014	0.015	0.015	0.120

Remark : ¹⁾ Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 420 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 1040 dated September 22, B.E.2547 (2004), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).



(Ms.Natricha Sermmatiwong)
Laboratory Reviewer



(Ms.Ramita Taengthal)
Laboratory Supervisor

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 : โครงการผลิตยี่โถรเคื่องผสมคิลคั้งหูกัดะวันดก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจจนทกณนเลข L21/43
จังหวัดสุโขทัย และก้นพ่งเพชร
จังหวัดสุโขทัย และก้นพ่งเพชร
Project Location : จังหวัดสุโขทัย และก้นพ่งเพชร
Sampling Source : Ambient Air Quality
Sampling Point : ฐานหลุมผลิต NS2 : A10 : โรงเจียนบ้านทรายทอง (หมู่ที่ 9 ตำบลหนองหลวง อำเภอลานกระบือ
จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0582660 E, 1833181 N
Sampling Date : August 29-September 1, 2024
Sampling Time : 11:12
Sampling Method : U.S. EPA 40 CFR Part 50
Sampling By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.

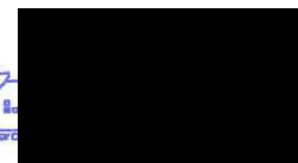
Quotation No. : AR2024-00454
Analysis No. : 2024-AE317
Received Date : September 3, 2024
Analytical Date : September 3-10, 2024
Report No. : 2024-RAAS213
Report Date : September 10, 2024

Parameter	Unit	Method of Analysis	Result			Standard ¹⁾
			Aug 29-30, 24	Aug 30-31, 24	Aug 31-Sep 1, 24	
Total Suspended Particulate (TSP) 24 Hours Average	mg/m ³	High-Volume, Gravimetric	0.024	0.027	0.032	0.330
Particulate Size Less Than 10 Micron (PM10) 24 Hours Average	mg/m ³	PM10 Size Selective, High-Volume, Gravimetric	0.012	0.013	0.015	0.120

Remark : ¹⁾ Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 420 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 1040 dated September 22, B.E.2547 (2004), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).



(Ms.Natricha Sermmatiwong)
Laboratory Reviewer



(Ms.Ramita Taengthal)
Laboratory Supervisor

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 : โครงการผลิตปิโตรเลียมแห่งผลิตปิโตรเลียมจังหวัดระยอง-หนองสรวง (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Ambient Air Quality
Sampling Point : ฐานหลุมผลิต NS3 : A3 : ใต้ถังโรงแยกน้ำมัน (บ้านโรงโรงแยก หมู่ที่ 5 ตำบลจันทิมา อำเภอฉวางนครนิมิต จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0584972 E, 1836095 N
Sampling Date : August 29-September 1, 2024
Sampling Time : 10:09
Sampling Method : U.S. EPA 40 CFR Part 50
Sampling By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.
Quotation No. : AR2024-00454
Analysis No. : 2024-AE317
Received Date : September 3, 2024
Analytical Date : September 3-10, 2024
Report No. : 2024-RAAS214
Report Date : September 10, 2024

Parameter	Unit	Method of Analysis	Result			Standard ¹⁾
			Aug 29-30, 24	Aug 30-31, 24	Aug 31-Sep 1, 24	
Total Suspended Particulate (TSP) 24 Hours Average	mg/m ³	High-Volume, Gravimetric	0.023	0.022	0.028	0.330
Particulate Size Less Than 10 Micron (PM10) 24 Hours Average	mg/m ³	PM10 Size Selective, High-Volume, Gravimetric	0.012	0.012	0.015	0.120

Remark : ¹⁾ Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 420 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).

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 : โครงการผลิตปิโตรเลียมแห่งผลิตปิโตรเลียมจังหวัดระยอง-หนองสรวง (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Ambient Air Quality
Sampling Point : ฐานหลุมผลิต NS3 : A4 : บ้านเลขที่ 144 หมู่ที่ 4 ตำบลจันทิมา (บ้านหนองท้องสุม หมู่ที่ 4 ตำบลจันทิมา อำเภอฉวางนครนิมิต จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0583756 E, 1835325 N
Sampling Date : August 29-September 1, 2024
Sampling Time : 10:43
Sampling Method : U.S. EPA 40 CFR Part 50
Sampling By : Mr.Nitad Sirichad
Analyzed By : Environment Research & Technology Co., Ltd.
Quotation No. : AR2024-00454
Analysis No. : 2024-AE317
Received Date : September 3, 2024
Analytical Date : September 3-10, 2024
Report No. : 2024-RAAS215
Report Date : September 10, 2024

Parameter	Unit	Method of Analysis	Result			Standard ¹⁾
			Aug 29-30, 24	Aug 30-31, 24	Aug 31-Sep 1, 24	
Total Suspended Particulate (TSP) 24 Hours Average	mg/m ³	High-Volume, Gravimetric	0.025	0.028	0.029	0.330
Particulate Size Less Than 10 Micron (PM10) 24 Hours Average	mg/m ³	PM10 Size Selective, High-Volume, Gravimetric	0.012	0.013	0.016	0.120

Remark : ¹⁾ Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 420 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).

(Ms.Natnicha Sermmatiwong)

Laboratory Reviewer

(Ms.Ramita Taengthai)

Laboratory Supervisor

(Ms.Natnicha Sermmatiwong)

Laboratory Reviewer

(Ms.Ramita Taengthai)

Laboratory Supervisor

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Muang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมแหล่งผลิตปิโตรเลียมวันตก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจฉบับกฎหมายเลข L21/43
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : ฐานหลุมผลิต NS2 : A9 : บ่อนเลขที่ 102 หมู่ที่ 7 ตำบลจันทิมา (บ้านวังช้าง หมู่ที่ 7 ตำบลจันทิมา อำเภอลานกระบือ จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0584078 E, 1833840 N
Measured Date : August 29-September 1, 2024
Measured By : Mr.Kunakorn Ratanawongsa
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : NOx Chemiluminescence Analyzer Horiba Model APNA-370 Serial Number 4VWFEBUK

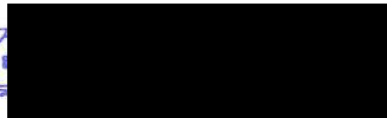
Quotation No. : AR2024-00454
Analysis No. : 2024-AE317-001
Report No. : 2024-RAAS446
Report Date : September 16, 2024

Interval Time	Result NO _x (ppm)			Standard ^{1/}
	Aug 29-30, 24	Aug 30-31, 24	Aug 31-Sep 1, 24	
10:00-11:00	0.0069	0.0071	0.0072	
11:00-12:00	0.0070	0.0075	0.0075	
12:00-13:00	0.0069	0.0076	0.0073	
13:00-14:00	0.0067	0.0073	0.0077	
14:00-15:00	0.0073	0.0076	0.0071	
15:00-16:00	0.0074	0.0071	0.0075	
16:00-17:00	0.0068	0.0074	0.0072	
17:00-18:00	0.0069	0.0073	0.0070	
18:00-19:00	0.0068	0.0073	0.0073	
19:00-20:00	0.0069	0.0067	0.0072	
20:00-21:00	0.0062	0.0067	0.0077	
21:00-22:00	0.0066	0.0065	0.0075	
22:00-23:00	0.0064	0.0065	0.0070	
23:00-00:00	0.0070	0.0066	0.0080	
00:00-01:00	0.0066	0.0064	0.0072	
01:00-02:00	0.0064	0.0064	0.0069	
02:00-03:00	0.0066	0.0066	0.0073	
03:00-04:00	0.0066	0.0065	0.0070	
04:00-05:00	0.0060	0.0068	0.0075	
05:00-06:00	0.0064	0.0069	0.0070	
06:00-07:00	0.0068	0.0069	0.0067	
07:00-08:00	0.0065	0.0067	0.0064	
08:00-09:00	0.0066	0.0065	0.0071	
09:00-10:00	0.0071	0.0070	0.0065	
24 Hours Average	0.0067	0.0069	0.0072	-
1 Hour Maximum	0.0074	0.0076	0.0080	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) and 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).



(Ms. Piyatida Pradangcho)
Laboratory Reviewer



(Ms. Panicha Promchai)
Laboratory Supervisor

DO NOT COPY PARTIAL OF THIS ANALYSIS REPORT WITHOUT OFFICIAL APPROVAL
REPORT ANALYSIS REFERS TO SUBMITTED SAMPLE (S) ONLY

Page 1/1

F-RP-004 Rev. 02, January 18, 2021

ANALYSIS REPORT

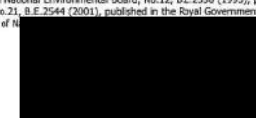
Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Muang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมแหล่งผลิตปิโตรเลียมวันตก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจฉบับกฎหมายเลข L21/43
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : ฐานหลุมผลิต NS2 : A9 : บ่อนเลขที่ 102 หมู่ที่ 7 ตำบลจันทิมา (บ้านวังช้าง หมู่ที่ 7 ตำบลจันทิมา อำเภอลานกระบือ จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0584078 E, 1833840 N
Measured Date : August 29-September 1, 2024
Measured By : Mr.Kunakorn Ratanawongsa
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : SO₂ UV-Fluorescence Analyzer Thermo Model 43i Serial Number CH14430002

Quotation No. : AR2024-00454
Analysis No. : 2024-AE317-001
Report No. : 2024-RAAS447
Report Date : September 16, 2024

Interval Time	Result SO ₂ (ppm)			Standard
	Aug 29-30, 24	Aug 30-31, 24	Aug 31-Sep 1, 24	
10:00-11:00	0.0015	0.0015	0.0013	
11:00-12:00	0.0015	0.0014	0.0014	
12:00-13:00	0.0016	0.0013	0.0013	
13:00-14:00	0.0016	0.0012	0.0015	
14:00-15:00	0.0015	0.0013	0.0014	
15:00-16:00	0.0014	0.0013	0.0014	
16:00-17:00	0.0015	0.0014	0.0013	
17:00-18:00	0.0016	0.0014	0.0015	
18:00-19:00	0.0017	0.0013	0.0013	
19:00-20:00	0.0017	0.0013	0.0014	
20:00-21:00	0.0016	0.0014	0.0013	
21:00-22:00	0.0017	0.0014	0.0013	
22:00-23:00	0.0015	0.0014	0.0016	
23:00-00:00	0.0017	0.0014	0.0014	
00:00-01:00	0.0016	0.0013	0.0015	
01:00-02:00	0.0015	0.0014	0.0012	
02:00-03:00	0.0015	0.0014	0.0016	
03:00-04:00	0.0016	0.0012	0.0014	
04:00-05:00	0.0016	0.0013	0.0017	
05:00-06:00	0.0014	0.0013	0.0016	
06:00-07:00	0.0013	0.0013	0.0014	
07:00-08:00	0.0016	0.0013	0.0013	
08:00-09:00	0.0015	0.0014	0.0014	
09:00-10:00	0.0015	0.0015	0.0014	
24 Hours Average	0.0016	0.0014	0.0014	0.12 ^{1/}
1 Hour Maximum	0.0017	0.0015	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 12, 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 32D dated July 13, B.E.2544 (2001), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).



(Ms. Piyatida Pradangcho)
Laboratory Reviewer



(Ms. Panicha Promchai)
Laboratory Supervisor

DO NOT COPY PARTIAL OF THIS ANALYSIS REPORT WITHOUT OFFICIAL APPROVAL
REPORT ANALYSIS REFERS TO SUBMITTED SAMPLE (S) ONLY

Page 1/1

F-RP-004 Rev. 02, January 18, 2021

ANALYSIS REPORT

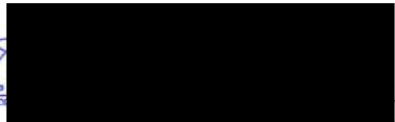
Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Manesya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปุ๋ยอินทรีย์และแกลบปิ้งจากเศษอาหารของสระ (BYW-NS) (สวนขยาย) แปลงสำรวจแบบกฎหมายเลข L21/43
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : ฐานหม้อผลิต NS2 : A10 : โรงเรือนปั้นหยาของ (หมู่ที่ 9 ตำบลหนองหลวง อำเภอละหานทราย จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0582660 E, 1833181 N
Measured Date : August 29-September 1, 2024
Measured By : Mr.Kunakorn Ratanawongsa
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : NOx Chemiluminescence Analyzer Horiba Model APNA-370 Serial Number J6GUBA4N

Interval Time	Result: NO _x (ppm)			Standard ¹⁾
	Aug 29-30, 24	Aug 30-31, 24	Aug 31-Sep 1, 24	
11:00-12:00	0.0049	0.0045	0.0050	
12:00-13:00	0.0049	0.0050	0.0050	
13:00-14:00	0.0050	0.0050	0.0052	
14:00-15:00	0.0051	0.0051	0.0051	
15:00-16:00	0.0050	0.0048	0.0051	
16:00-17:00	0.0049	0.0053	0.0051	
17:00-18:00	0.0050	0.0056	0.0056	
18:00-19:00	0.0051	0.0056	0.0057	
19:00-20:00	0.0049	0.0055	0.0060	
20:00-21:00	0.0051	0.0049	0.0069	
21:00-22:00	0.0055	0.0049	0.0075	
22:00-23:00	0.0052	0.0050	0.0069	
23:00-00:00	0.0051	0.0048	0.0072	
00:00-01:00	0.0050	0.0050	0.0062	
01:00-02:00	0.0049	0.0050	0.0057	
02:00-03:00	0.0047	0.0051	0.0056	
03:00-04:00	0.0048	0.0052	0.0057	
04:00-05:00	0.0048	0.0051	0.0054	
05:00-06:00	0.0048	0.0051	0.0055	
06:00-07:00	0.0048	0.0051	0.0051	
07:00-08:00	0.0051	0.0052	0.0049	
08:00-09:00	0.0050	0.0050	0.0052	
09:00-10:00	0.0049	0.0050	0.0052	
10:00-11:00	0.0049	0.0048	0.0050	
24 Hours Average	0.0050	0.0051	0.0057	-
1 Hour Maximum	0.0055	0.0056	0.0075	0.17

Remark : ¹⁾ Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 420 dated May 25, B.E.2538 (1995), Notification No.26, B.E.2550 (2007), published in the Royal Government Gazette No.124 Special Part 580 dated May 14, B.E.2550 (2007) and Notification No.33, B.E.2562 (2009), published in the Royal Government Gazette No.126 Special Part 1140 dated August 14, B.E.2562 (2009), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).



(Ms.Piyatida Pradangkho)
Laboratory Reviewer



(Ms.Panicha Promchai)
Laboratory Supervisor

ANALYSIS REPORT

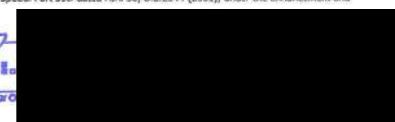
Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Manesya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปุ๋ยอินทรีย์และแกลบปิ้งจากเศษอาหารของสระ (BYW-NS) (สวนขยาย) แปลงสำรวจแบบกฎหมายเลข L21/43
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : ฐานหม้อผลิต NS2 : A10 : โรงเรือนปั้นหยาของ (หมู่ที่ 9 ตำบลหนองหลวง อำเภอละหานทราย จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0582660 E, 1833181 N
Measured Date : August 29-September 1, 2024
Measured By : Mr.Kunakorn Ratanawongsa
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : SO₂ UV-Fluorescence Analyzer Thermo Model 431 Serial Number CM14430005

Interval Time	Result SO ₂ (ppm)			Standard
	Aug 29-30, 24	Aug 30-31, 24	Aug 31-Sep 1, 24	
11:00-12:00	0.0011	0.0010	0.0015	
12:00-13:00	0.0013	0.0014	0.0017	
13:00-14:00	0.0013	0.0012	0.0018	
14:00-15:00	0.0013	0.0016	0.0015	
15:00-16:00	0.0013	0.0018	0.0015	
16:00-17:00	0.0016	0.0019	0.0016	
17:00-18:00	0.0015	0.0015	0.0015	
18:00-19:00	0.0015	0.0015	0.0017	
19:00-20:00	0.0016	0.0015	0.0017	
20:00-21:00	0.0016	0.0015	0.0017	
21:00-22:00	0.0015	0.0018	0.0017	
22:00-23:00	0.0018	0.0017	0.0018	
23:00-00:00	0.0015	0.0015	0.0018	
00:00-01:00	0.0018	0.0016	0.0019	
01:00-02:00	0.0015	0.0019	0.0017	
02:00-03:00	0.0016	0.0017	0.0019	
03:00-04:00	0.0018	0.0017	0.0017	
04:00-05:00	0.0018	0.0018	0.0019	
05:00-06:00	0.0017	0.0017	0.0020	
06:00-07:00	0.0017	0.0018	0.0019	
07:00-08:00	0.0018	0.0019	0.0018	
08:00-09:00	0.0016	0.0018	0.0019	
09:00-10:00	0.0017	0.0018	0.0018	
10:00-11:00	0.0014	0.0016	0.0018	
24 Hours Average	0.0016	0.0016	0.0017	0.12 ¹⁾
1 Hour Maximum	0.0018	0.0019	0.0020	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 420 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 1040 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 270 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 390 dated April 30, B.E.2544 (2001), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).



(Ms.Piyatida Pradangkho)
Laboratory Reviewer



(Ms.Panicha Promchai)
Laboratory Supervisor

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Musang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมแหล่งผลิตปิโตรเลียมวันตก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนบกหมายเลข L21/43
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : ฐานหลุมผลิต NS3 : A3 : วัดจุดโรงน้ำมันาราม (บ้านทุ่งโรงน้ำมัน หมู่ที่ 5 ตำบลจันทิมา อำเภอลานกระบือ
จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0584972 E, 1836095 N
Measured Date : August 29-September 1, 2024
Measured By : Mr.Kunakorn Ratanawongsa
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : NOx Chemiluminescence Analyzer Horiba Model APNA-370 Serial Number KPACV8NA

Quotation No. : AR2024-00454
Analysis No. : 2024-AE317-007
Report No. : 2024-RAA5450
Report Date : September 16, 2024

Interval Time	Result NO _x (ppm)			Standard ^{1*}
	Aug 29-30, 24	Aug 30-31, 24	Aug 31-Sep 1, 24	
10:00-11:00	0.0042	0.0045	0.0046	-
11:00-12:00	0.0044	0.0041	0.0043	
12:00-13:00	0.0042	0.0049	0.0043	
13:00-14:00	0.0044	0.0045	0.0044	
14:00-15:00	0.0042	0.0043	0.0043	
15:00-16:00	0.0043	0.0042	0.0043	
16:00-17:00	0.0043	0.0046	0.0045	
17:00-18:00	0.0043	0.0046	0.0049	
18:00-19:00	0.0043	0.0048	0.0054	
19:00-20:00	0.0044	0.0050	0.0052	
20:00-21:00	0.0046	0.0043	0.0060	
21:00-22:00	0.0047	0.0040	0.0053	
22:00-23:00	0.0046	0.0043	0.0054	
23:00-00:00	0.0045	0.0042	0.0061	
00:00-01:00	0.0044	0.0042	0.0059	
01:00-02:00	0.0044	0.0043	0.0054	
02:00-03:00	0.0043	0.0043	0.0046	
03:00-04:00	0.0044	0.0048	0.0047	
04:00-05:00	0.0044	0.0048	0.0047	
05:00-06:00	0.0044	0.0047	0.0042	
06:00-07:00	0.0045	0.0048	0.0042	
07:00-08:00	0.0044	0.0047	0.0041	
08:00-09:00	0.0043	0.0046	0.0046	
09:00-10:00	0.0045	0.0044	0.0045	
24 Hours Average	0.0044	0.0045	0.0048	-
1 Hour Maximum	0.0047	0.0050	0.0061	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.31, 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).

(Ms.Piyatida Pradangkho)
Laboratory Reviewer

(Ms.Panicha Promchai)
Laboratory Supervisor

DO NOT COPY PARTIAL OF THIS ANALYSIS REPORT WITHOUT OFFICIAL APPROVAL
REPORT ANALYSIS REFERS TO SUBMITTED SAMPLE (S) ONLY

Page 1/1

F-RP-004 Rev. 02, January 18, 2021

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 : โครงการผลิตปิโตรเลียมแหล่งผลิตปิโตรเลียมวันตก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนบกหมายเลข L21/43
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : ฐานหลุมผลิต NS3 : A3 : วัดจุดโรงน้ำมันาราม (บ้านทุ่งโรงน้ำมัน หมู่ที่ 5 ตำบลจันทิมา อำเภอลานกระบือ
จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0584972 E, 1836095 N
Measured Date : August 29-September 1, 2024
Measured By : Mr.Kunakorn Ratanawongsa
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : SO₂ UV-Fluorescence Analyzer Thermo Model 43C Serial Number 0611116460

Quotation No. : AR2024-00454
Analysis No. : 2024-AE317-007
Report No. : 2024-RAA5451
Report Date : September 16, 2024

Interval Time	Result SO ₂ (ppm)			Standard
	Aug 29-30, 24	Aug 30-31, 24	Aug 31-Sep 1, 24	
10:00-11:00	0.0014	0.0016	0.0016	-
11:00-12:00	0.0013	0.0015	0.0016	
12:00-13:00	0.0013	0.0016	0.0016	
13:00-14:00	0.0015	0.0016	0.0017	
14:00-15:00	0.0014	0.0017	0.0018	
15:00-16:00	0.0015	0.0017	0.0017	
16:00-17:00	0.0015	0.0017	0.0017	
17:00-18:00	0.0015	0.0017	0.0017	
18:00-19:00	0.0015	0.0016	0.0017	
19:00-20:00	0.0015	0.0017	0.0017	
20:00-21:00	0.0014	0.0015	0.0016	
21:00-22:00	0.0015	0.0015	0.0016	
22:00-23:00	0.0015	0.0014	0.0016	
23:00-00:00	0.0014	0.0015	0.0016	
00:00-01:00	0.0014	0.0016	0.0015	
01:00-02:00	0.0014	0.0014	0.0016	
02:00-03:00	0.0014	0.0015	0.0015	
03:00-04:00	0.0015	0.0015	0.0014	
04:00-05:00	0.0015	0.0015	0.0015	
05:00-06:00	0.0014	0.0016	0.0015	
06:00-07:00	0.0014	0.0015	0.0015	
07:00-08:00	0.0014	0.0016	0.0014	
08:00-09:00	0.0015	0.0014	0.0016	
09:00-10:00	0.0015	0.0016	0.0016	
24 Hours Average	0.0014	0.0016	0.0016	0.12 ^{1*}
1 Hour Maximum	0.0015	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 12, 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).

(Ms.Piyatida Pradangkho)
Laboratory Reviewer

(Ms.Panicha Promchai)
Laboratory Supervisor

DO NOT COPY PARTIAL OF THIS ANALYSIS REPORT WITHOUT OFFICIAL APPROVAL
REPORT ANALYSIS REFERS TO SUBMITTED SAMPLE (S) ONLY

Page 1/1

F-RP-004 Rev. 02, January 18, 2021

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 : โครงการผลิตปุ๋ยโรตารีแอสฟัลต์บดจากกากกาแฟ (BYW-NS) (ส่วนขยาย) แปลงสำรวจแบบกฎหมายเลข L21/43
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : ฐานหลุมผลิต NS3 : A4 : บ้านเลขที่ 144 หมู่ที่ 4 ตำบลจันทิมา (บ้านหนองหุ้ม หมู่ที่ 4 ตำบลจันทิมา อำเภอสามโก้ จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WG584) 47Q 0583756 E, 1835325 N
Measured Date : August 29-September 1, 2024
Measured By : Mr.Kunakorn Ratanawongsa
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : NOx Chemiluminescence Analyzer Horiba Model APNA-370 Serial Number KCDVY226

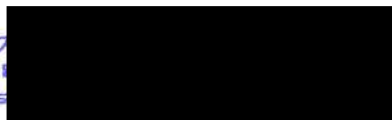
Quotation No. : AR2024-00454
Analysis No. : 2024-AE317-010
Report No. : 2024-RAAS452
Report Date : September 16, 2024

Interval Time	Result: NO _x (ppm)			Standard ^{1/}
	Aug 29-30, 24	Aug 30-31, 24	Aug 31-Sep 1, 24	
11:00-12:00	0.0042	0.0055	0.0055	
12:00-13:00	0.0056	0.0054	0.0057	
13:00-14:00	0.0046	0.0057	0.0057	
14:00-15:00	0.0053	0.0057	0.0056	
15:00-16:00	0.0057	0.0056	0.0056	
16:00-17:00	0.0057	0.0057	0.0056	
17:00-18:00	0.0054	0.0057	0.0057	
18:00-19:00	0.0056	0.0056	0.0058	
19:00-20:00	0.0056	0.0056	0.0060	
20:00-21:00	0.0056	0.0055	0.0060	
21:00-22:00	0.0057	0.0056	0.0060	
22:00-23:00	0.0056	0.0056	0.0058	
23:00-00:00	0.0055	0.0055	0.0057	
00:00-01:00	0.0056	0.0056	0.0059	
01:00-02:00	0.0057	0.0056	0.0057	
02:00-03:00	0.0054	0.0056	0.0056	
03:00-04:00	0.0055	0.0057	0.0056	
04:00-05:00	0.0056	0.0056	0.0057	
05:00-06:00	0.0054	0.0055	0.0057	
06:00-07:00	0.0055	0.0056	0.0058	
07:00-08:00	0.0055	0.0054	0.0056	
08:00-09:00	0.0055	0.0055	0.0057	
09:00-10:00	0.0056	0.0056	0.0057	
10:00-11:00	0.0056	0.0056	0.0057	
24 Hours Average	0.0055	0.0056	0.0057	-
1 Hour Maximum	0.0057	0.0057	0.0060	0.17

Remark : ^{1/} Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 420 dated May 25, B.E.2538 (1995), Notification No.28, B.E.2550 (2007), published in the Royal Government Gazette No.124 Special Part 580 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 1140 dated August 14, B.E.2552 (2009), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).



(Ms. Piya Tida Pradangkho)
Laboratory Reviewer



(Ms. Panicha Promchai)
Laboratory Supervisor

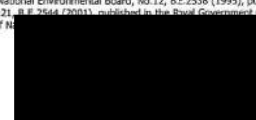
ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปุ๋ยโรตารีแอสฟัลต์บดจากกากกาแฟ (BYW-NS) (ส่วนขยาย) แปลงสำรวจแบบกฎหมายเลข L21/43
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : ฐานหลุมผลิต NS3 : A4 : บ้านเลขที่ 144 หมู่ที่ 4 ตำบลจันทิมา (บ้านหนองหุ้ม หมู่ที่ 4 ตำบลจันทิมา อำเภอสามโก้ จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WG584) 47Q 0583756 E, 1835325 N
Measured Date : August 29-September 1, 2024
Measured By : Mr.Kunakorn Ratanawongsa
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : SO₂ UV-Fluorescence Analyzer Thermo Model 43C Serial Number 57469-317

Quotation No. : AR2024-00454
Analysis No. : 2024-AE317-010
Report No. : 2024-RAAS453
Report Date : September 16, 2024

Interval Time	Result: SO ₂ (ppm)			Standard
	Aug 29-30, 24	Aug 30-31, 24	Aug 31-Sep 1, 24	
11:00-12:00	0.0014	0.0015	0.0015	
12:00-13:00	0.0014	0.0015	0.0016	
13:00-14:00	0.0013	0.0014	0.0016	
14:00-15:00	0.0013	0.0015	0.0018	
15:00-16:00	0.0014	0.0018	0.0018	
16:00-17:00	0.0014	0.0018	0.0018	
17:00-18:00	0.0015	0.0020	0.0019	
18:00-19:00	0.0017	0.0021	0.0018	
19:00-20:00	0.0018	0.0018	0.0018	
20:00-21:00	0.0016	0.0017	0.0018	
21:00-22:00	0.0014	0.0017	0.0018	
22:00-23:00	0.0012	0.0015	0.0016	
23:00-00:00	0.0013	0.0014	0.0018	
00:00-01:00	0.0013	0.0014	0.0016	
01:00-02:00	0.0014	0.0015	0.0014	
02:00-03:00	0.0013	0.0013	0.0014	
03:00-04:00	0.0014	0.0013	0.0014	
04:00-05:00	0.0015	0.0014	0.0013	
05:00-06:00	0.0014	0.0014	0.0014	
06:00-07:00	0.0013	0.0014	0.0013	
07:00-08:00	0.0014	0.0012	0.0013	
08:00-09:00	0.0015	0.0014	0.0014	
09:00-10:00	0.0014	0.0013	0.0014	
10:00-11:00	0.0015	0.0014	0.0014	
24 Hours Average	0.0014	0.0015	0.0016	0.12 ^{1/}
1 Hour Maximum	0.0018	0.0021	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 420 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 1040 dated September 12, 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 270 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 1040 dated September 12, B.E.2544 (2001), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).



(Ms. Piya Tida Pradangkho)
Laboratory Reviewer



(Ms. Panicha Promchai)
Laboratory Supervisor

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 : โครงการผลิตปิโตรเลียมแหล่งผลิตบึงหว้าตะวันตก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจแบบกฎหมายเลข L21/43 จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : ฐานหลุมผลิต NS2 : A9 : บ่อน้ำเลขที่ 102 หมู่ที่ 7 ตำบลจันทิมา (บ้านมีช้าง หมู่ที่ 7 ตำบลจันทิมา อำเภอลานกระบือ จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0584078 E, 1833840 N
Measured Date : August 29-September 1, 2024
Measured By : Mr.Kunakorn Ratanawongsa
Analyzed By : Environment Research & Technology Co., Ltd.

Quotation No. : AR2024-00454
Analysis No. : 2024-AE317-001 - 003
Report No. : 2024-RAAS454
Report Date : September 16, 2024

Date/Time	Aug 29-30, 24		Aug 30-31, 24		Aug 31-Sep 1, 24	
	WS	WD	WS	WD	WS	WD
10:00-11:00	1.3	S	<0.4	Calm	0.4	WNW
11:00-12:00	0.9	S	0.4	N	0.9	WNW
12:00-13:00	0.9	S	0.4	SSE	0.9	WNW
13:00-14:00	1.3	SE	0.4	ESE	0.9	WNW
14:00-15:00	0.9	SE	0.9	E	0.9	SW
15:00-16:00	1.8	SE	0.4	S	0.4	SW
16:00-17:00	2.2	S	0.4	S	0.9	SSE
17:00-18:00	1.8	NW	0.4	SSW	0.9	S
18:00-19:00	0.9	NNW	1.3	W	1.3	SSW
19:00-20:00	0.4	NNE	0.9	NNW	0.4	SSW
20:00-21:00	0.4	NW	1.3	W	<0.4	Calm
21:00-22:00	<0.4	Calm	0.4	W	<0.4	Calm
22:00-23:00	0.4	W	<0.4	Calm	<0.4	Calm
23:00-00:00	<0.4	Calm	0.4	SSW	<0.4	Calm
00:00-01:00	<0.4	Calm	<0.4	Calm	<0.4	Calm
01:00-02:00	<0.4	Calm	<0.4	Calm	<0.4	Calm
02:00-03:00	<0.4	Calm	0.4	SSW	<0.4	Calm
03:00-04:00	<0.4	Calm	0.4	SSW	<0.4	Calm
04:00-05:00	<0.4	Calm	<0.4	Calm	<0.4	Calm
05:00-06:00	<0.4	Calm	<0.4	Calm	<0.4	Calm
06:00-07:00	<0.4	Calm	<0.4	Calm	<0.4	Calm
07:00-08:00	0.9	S	<0.4	Calm	<0.4	Calm
08:00-09:00	0.9	S	0.4	S	<0.4	Calm
09:00-10:00	0.4	SSE	0.9	SSW	0.9	WNW

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

(Ms.Piyatida Pradangkho)
Laboratory Reviewer

(Ms.Panicha Promchai)
Laboratory Supervisor

ANALYSIS REPORT

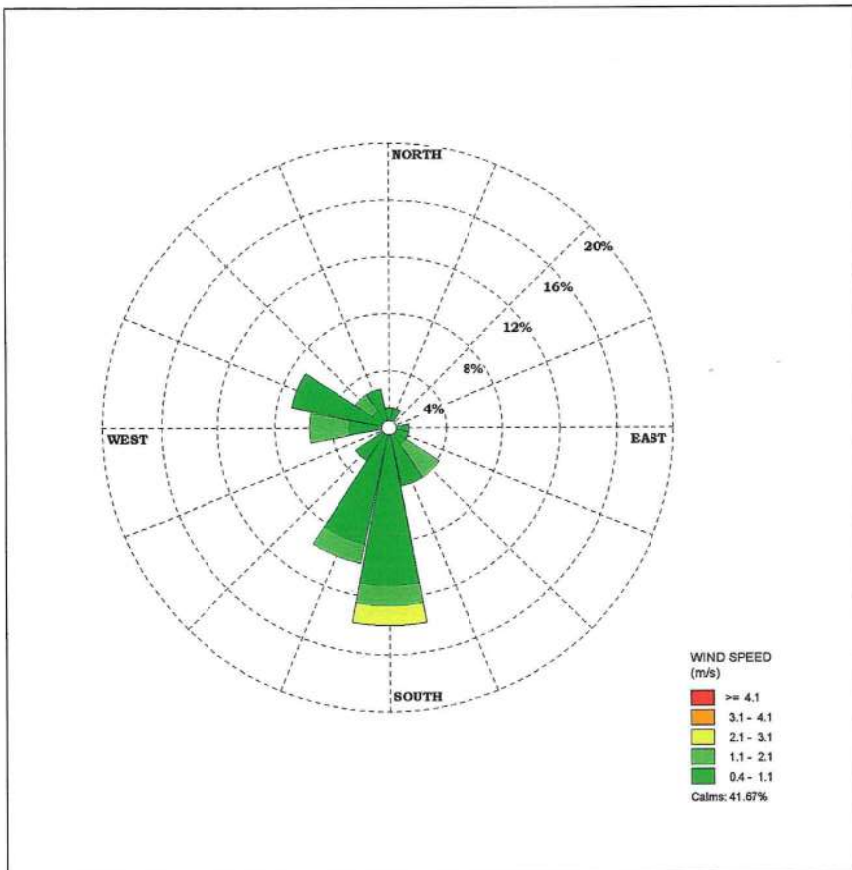
Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมแหล่งผลิตบึงหว้าตะวันตก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจแบบกฎหมายเลข L21/43 จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : ฐานหลุมผลิต NS2 : A9 : บ่อน้ำเลขที่ 102 หมู่ที่ 7 ตำบลจันทิมา (บ้านมีช้าง หมู่ที่ 7 ตำบลจันทิมา อำเภอลานกระบือ จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0584078 E, 1833840 N
Measured Date : August 29-September 1, 2024
Measured By : Mr.Kunakorn Ratanawongsa
Analyzed By : Environment Research & Technology Co., Ltd.

Quotation No. : AR2024-00454
Analysis No. : 2024-AE317-001 - 003
Report No. : 2024-RAAS454
Report Date : September 16, 2024

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	1.38889	0.00000	0.00000	0.00000	0.00000	1.38889
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	1.38889	0.00000	0.00000	0.00000	0.00000	1.38889
SE	1.38889	2.77778	0.00000	0.00000	0.00000	4.16667
SSE	4.16667	0.00000	0.00000	0.00000	0.00000	4.16667
S	11.11110	1.38889	1.38889	0.00000	0.00000	13.88888
SSW	8.33333	1.38889	0.00000	0.00000	0.00000	9.72222
SW	2.77778	0.00000	0.00000	0.00000	0.00000	2.77778
WSW	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
W	2.77778	2.77778	0.00000	0.00000	0.00000	5.55556
WNW	6.94444	0.00000	0.00000	0.00000	0.00000	6.94444
NW	1.38889	1.38889	0.00000	0.00000	0.00000	2.77778
NNW	2.77778	0.00000	0.00000	0.00000	0.00000	2.77778
Calm	41.66670					

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Project Name : โครงการผลิตปิโตรเลียมแหล่งผลิตปิโตรเลียมตะวันตก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และกำแพงเพชร
Measured Point : ฐานหลุมผลิต NS2 : A9 : บ่อน้ำที่ 102 หมู่ที่ 7 ตำบลจันทนา (บ้านวังช้าง หมู่ที่ 7 ตำบลจันทนา อำเภอลานกระบือ จังหวัดกำแพงเพชร)
Measured Date : August 29-September 1, 2024
Report No. : 2024-RAAS454



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 : โครงการผลิตปิโตรเลียมแหล่งผลิตปิโตรเลียมตะวันตก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : ฐานหลุมผลิต NS2 : A10 : โรงเรือนบ้านทรายทอง (หมู่ที่ 9 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0582660 E, 1833181 N
Measured Date : August 29-September 1, 2024
Measured By : Mr.Kunakorn Ratanawongia
Analyzed By : Environment Research & Technology Co., Ltd.
Quotation No. : AR2024-00454
Analysis No. : 2024-AE317-004 - 006
Report No. : 2024-RAAS455
Report Date : September 16, 2024

Date/Time	Aug 29-30, 24		Aug 30-31, 24		Aug 31-Sep 1, 24	
	WS	WD	WS	WD	WS	WD
11:00-12:00	0.9	S	<0.4	Calm	0.9	S
12:00-13:00	0.9	S	0.4	SSE	1.3	NNW
13:00-14:00	1.3	SE	0.9	ENE	1.8	NW
14:00-15:00	0.9	SE	1.3	SE	1.3	NNW
15:00-16:00	1.8	SE	1.3	ESE	0.9	WSW
16:00-17:00	2.2	S	1.3	SE	0.9	S
17:00-18:00	1.8	NW	1.8	SE	1.3	S
18:00-19:00	0.9	NNW	1.3	SSE	1.3	SSW
19:00-20:00	0.4	NNE	0.9	WNW	0.4	SW
20:00-21:00	0.4	NW	0.4	SSE	<0.4	Calm
21:00-22:00	<0.4	Calm	<0.4	Calm	<0.4	Calm
22:00-23:00	0.4	W	<0.4	Calm	<0.4	Calm
23:00-00:00	<0.4	Calm	1.8	WNW	<0.4	Calm
00:00-01:00	<0.4	Calm	0.4	NNW	0.4	W
01:00-02:00	<0.4	Calm	<0.4	Calm	<0.4	Calm
02:00-03:00	<0.4	Calm	<0.4	Calm	0.4	NNW
03:00-04:00	<0.4	Calm	<0.4	Calm	<0.4	Calm
04:00-05:00	<0.4	Calm	0.9	SE	0.4	NNW
05:00-06:00	<0.4	Calm	0.9	SSE	0.4	NNW
06:00-07:00	<0.4	Calm	0.4	SE	0.9	NNW
07:00-08:00	0.9	S	0.9	SE	0.4	N
08:00-09:00	0.9	S	0.9	SSE	0.4	NNW
09:00-10:00	0.4	SSE	1.3	S	1.8	NNW
10:00-11:00	<0.4	Calm	0.9	S	2.7	NW

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

(Ms.Piyatida Pradangkh)
Laboratory Reviewer

(Ms.Panicha Promchae)
Laboratory Supervisor

ANALYSIS REPORT

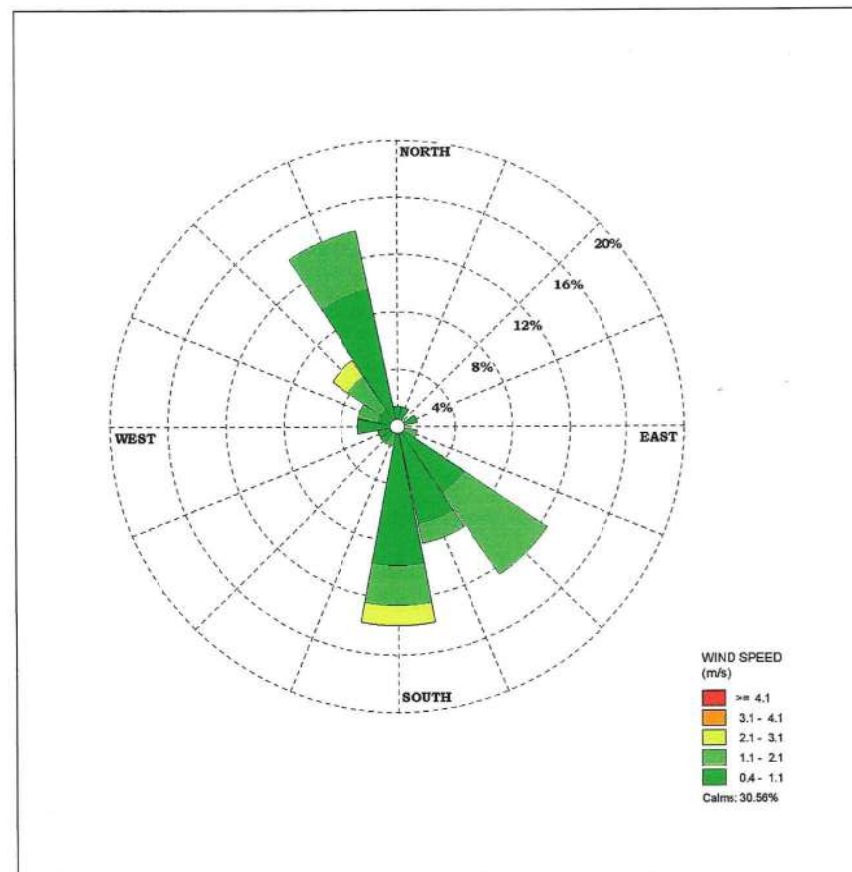
Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตมีโตรเลียมแห่งผลิตบึงภูาคะวันก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจแบบหมายเลข L21/43
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : ฐานหลุมผลิต NS2 : A10 : โรงเรียนบ้านทรายทอง (หมู่ที่ 9 ตำบลหนองหลวง อำเภอสามกระบือ จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0582660 E, 1833181 N
Measured Date : August 29-September 1, 2024
Measured By : Mr.Kinakorn Ratanawongsa
Analyzed By : Environment Research & Technology Co., Ltd.

Quotation No. : AR2024-00454
Analysis No. : 2024-AE317-004 - 006
Report No. : 2024-RAAS455
Report Date : September 16, 2024

Wind Direction	Percentage frequency of wind in each speed and direction					Total
	0.4-1.1	1.1-2.1	2.1-3.1	3.1-4.1	≥4.1	
N	1.38889	0.00000	0.00000	0.00000	0.00000	1.38889
NNE	1.38889	0.00000	0.00000	0.00000	0.00000	1.38889
NE	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
ENE	1.38889	0.00000	0.00000	0.00000	0.00000	1.38889
E	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
ESE	0.00000	1.38889	0.00000	0.00000	0.00000	1.38889
SE	5.55556	6.94444	0.00000	0.00000	0.00000	12.50000
SSE	6.94444	1.38889	0.00000	0.00000	0.00000	8.33333
S	9.72222	2.77778	1.38889	0.00000	0.00000	13.88889
SSW	0.00000	1.38889	0.00000	0.00000	0.00000	1.38889
SW	1.38889	0.00000	0.00000	0.00000	0.00000	1.38889
WSW	1.38889	0.00000	0.00000	0.00000	0.00000	1.38889
W	2.77778	0.00000	0.00000	0.00000	0.00000	2.77778
WNW	1.38889	1.38889	0.00000	0.00000	0.00000	2.77778
NW	1.38889	2.77778	1.38889	0.00000	0.00000	5.55556
NNW	9.72222	4.16667	0.00000	0.00000	0.00000	13.88889
Calm	30.55560					

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Project Name : โครงการผลิตมีโตรเลียมแห่งผลิตบึงภูาคะวันก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจแบบหมายเลข L21/43
Measured Point : ฐานหลุมผลิต NS2 : A10 : โรงเรียนบ้านทรายทอง (หมู่ที่ 9 ตำบลหนองหลวง อำเภอสามกระบือ จังหวัดกำแพงเพชร)
Measured Date : August 29-September 1, 2024
Report No. : 2024-RAAS455



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 : โครงการผลิตปิโตรเลียมแหล่งผลิตปิโตรเลียมวันตก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนบกหมายเลข L21/43
จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : ฐานหลุมผลิต NS3 : A3 : วัดจุดโรงน้ำมัน (น้ำมันดิบ) หมู่ที่ 5 ตำบลจันทิมา อำเภอฉะลอมกระบือ
จังหวัดกำแพงเพชร
GPS. Coordinate : UTM (WGS84) 47Q 0584972 E, 1836095 N
Measured Date : August 29-September 1, 2024
Measured By : Mr.Kunakorn Ratanawongsa
Analyzed By : Environment Research & Technology Co., Ltd.

Quotation No. : AR2024-00454
Analysis No. : 2024-AE317-007 - 009
Report No. : 2024-RAAS456
Report Date : September 16, 2024

Date/Time	Aug 29-30, 24		Aug 30-31, 24		Aug 31-Sep 1, 24	
	WS	WD	WS	WD	WS	WD
10:00-11:00	0.9	S	<0.4	Calm	1.8	NW
11:00-12:00	0.9	S	0.4	S	1.8	NW
12:00-13:00	0.4	S	0.4	NE	1.3	WSW
13:00-14:00	0.4	ESE	0.4	E	1.3	NNW
14:00-15:00	0.9	E	0.9	E	0.9	W
15:00-16:00	0.9	E	0.9	ESE	0.9	WSW
16:00-17:00	1.3	WSW	0.4	SSE	0.9	SSW
17:00-18:00	0.9	WNW	0.4	ESE	1.8	S
18:00-19:00	1.3	NNW	0.4	S	1.3	SSW
19:00-20:00	0.4	SSW	0.9	NNW	0.4	SSW
20:00-21:00	0.4	NNW	0.4	WNW	<0.4	Calm
21:00-22:00	<0.4	Calm	<0.4	Calm	<0.4	Calm
22:00-23:00	<0.4	Calm	0.4	E	<0.4	Calm
23:00-00:00	<0.4	Calm	<0.4	Calm	<0.4	Calm
00:00-01:00	<0.4	Calm	0.9	W	<0.4	Calm
01:00-02:00	<0.4	Calm	<0.4	Calm	<0.4	Calm
02:00-03:00	<0.4	Calm	<0.4	Calm	0.9	NNW
03:00-04:00	<0.4	Calm	<0.4	Calm	<0.4	Calm
04:00-05:00	<0.4	Calm	<0.4	Calm	0.9	NNW
05:00-06:00	<0.4	Calm	<0.4	Calm	1.3	NNW
06:00-07:00	<0.4	Calm	<0.4	Calm	1.8	NNW
07:00-08:00	0.4	S	<0.4	Calm	1.8	NNW
08:00-09:00	0.9	S	<0.4	Calm	0.9	NNW
09:00-10:00	0.4	SSE	0.4	S	1.3	NNW

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

(Ms.Piyatida Pradangkho)
Laboratory Reviewer

(Ms.Panicha Promchai)
Laboratory Supervisor

ANALYSIS REPORT

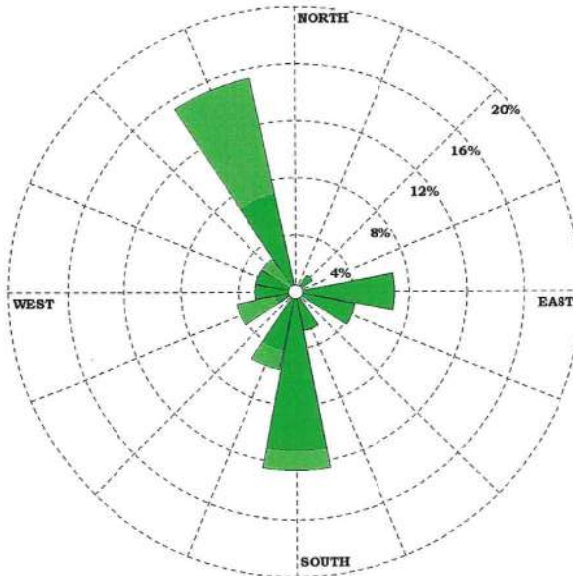
Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมแหล่งผลิตปิโตรเลียมวันตก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนบกหมายเลข L21/43
จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : ฐานหลุมผลิต NS3 : A3 : วัดจุดโรงน้ำมัน (น้ำมันดิบ) หมู่ที่ 5 ตำบลจันทิมา อำเภอฉะลอมกระบือ
จังหวัดกำแพงเพชร
GPS. Coordinate : UTM (WGS84) 47Q 0584972 E, 1836095 N
Measured Date : August 29-September 1, 2024
Measured By : Mr.Kunakorn Ratanawongsa
Analyzed By : Environment Research & Technology Co., Ltd.

Quotation No. : AR2024-00454
Analysis No. : 2024-AE317-007 - 009
Report No. : 2024-RAAS456
Report Date : September 16, 2024

Wind Direction	Percentage frequency of wind in each speed and direction					Total
	0.4-1.1	1.1-2.1	2.1-3.1	3.1-4.1	≥4.1	
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	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	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
SSE	2.77778	0.00000	0.00000	0.00000	0.00000	2.77778
S	11.11110	1.38889	0.00000	0.00000	0.00000	12.49999
SSW	4.16667	1.38889	0.00000	0.00000	0.00000	5.55556
SW	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
WSW	1.38889	2.77778	0.00000	0.00000	0.00000	4.16667
W	2.77778	0.00000	0.00000	0.00000	0.00000	2.77778
WNW	2.77778	0.00000	0.00000	0.00000	0.00000	2.77778
NW	0.00000	2.77778	0.00000	0.00000	0.00000	2.77778
NNW	6.94444	8.33333	0.00000	0.00000	0.00000	15.27777
Calm	38.88890					

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Project Name : โครงการผลิตปิโตรเลียมแหล่งผลิตอ่าวต๋องวันตก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และกำแพงเพชร
Measured Point : ฐานหลุมผลิต NS3 : A3 : วัดสูงโรงน้ำมัน (บ้านทุ่งโรงน้ำมัน หมู่ที่ 5 ตำบลจันทน์ทิพย์ อำเภอละานกระบือ จังหวัดกำแพงเพชร)
Measured Date : August 29-September 1, 2024
Report No. : 2024-RAAS456



WIND SPEED
(m/s)
■ >= 4.1
■ 3.1 - 4.1
■ 2.1 - 3.1
■ 1.1 - 2.1
■ 0.4 - 1.1
Calms: 38.89%

ANALYSIS REPORT

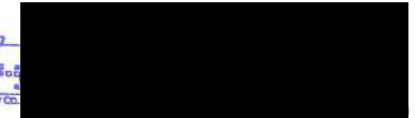
Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeaya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมแหล่งผลิตอ่าวต๋องวันตก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : ฐานหลุมผลิต NS3 : A4 : บ้านเลขที่ 144 หมู่ที่ 4 ตำบลจันทน์ทิพย์ (บ้านหนองทั้งส้ม หมู่ที่ 4 ตำบลจันทน์ทิพย์ อำเภอละานกระบือ จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0583756 E, 1835325 N
Measured Date : August 29-September 1, 2024
Measured By : Mr.Kunakorn Ratanawongsa
Analyzed By : Environment Research & Technology Co., Ltd.
Quotation No. : AR2024-00454
Analysis No. : 2024-AE317-010 - 012
Report No. : 2024-RAAS457
Report Date : September 16, 2024

Date/Time	Aug 29-30, 24		Aug 30-31, 24		Aug 31-Sep 1, 24	
	WS	WD	WS	WD	WS	WD
11:00-12:00	1.3	S	0.9	S	1.3	W
12:00-13:00	1.3	SSE	0.9	S	1.8	WSW
13:00-14:00	1.3	E	1.3	SE	1.8	W
14:00-15:00	1.3	E	1.3	ENE	1.8	WSW
15:00-16:00	1.8	ENE	1.3	E	1.3	SW
16:00-17:00	2.2	SW	1.3	E	1.3	S
17:00-18:00	1.8	WNW	1.3	S	2.2	SSE
18:00-19:00	1.3	NW	1.8	W	1.8	SSE
19:00-20:00	0.4	SSW	1.8	W	0.9	S
20:00-21:00	0.9	N	2.7	W	0.4	S
21:00-22:00	<0.4	Calm	1.8	WSW	<0.4	Calm
22:00-23:00	0.4	NNW	0.4	WSW	<0.4	Calm
23:00-00:00	<0.4	Calm	0.4	S	0.4	SSW
00:00-01:00	<0.4	Calm	<0.4	Calm	0.9	W
01:00-02:00	<0.4	Calm	<0.4	Calm	0.4	W
02:00-03:00	<0.4	Calm	0.9	S	0.9	WNW
03:00-04:00	<0.4	Calm	0.4	S	0.9	WNW
04:00-05:00	<0.4	Calm	<0.4	Calm	0.9	WNW
05:00-06:00	<0.4	Calm	<0.4	Calm	1.3	WNW
06:00-07:00	<0.4	Calm	<0.4	Calm	1.8	NW
07:00-08:00	0.4	S	<0.4	Calm	1.3	NW
08:00-09:00	1.3	SSE	0.9	S	0.9	NW
09:00-10:00	0.9	SSE	0.9	SSE	2.7	WNW
10:00-11:00	0.4	S	1.3	WSW	3.6	WNW

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



(Ms.Piyatida Pradangkho)
Laboratory Reviewer



(Ms.Panicha Promchai)
Laboratory Supervisor

ANALYSIS REPORT

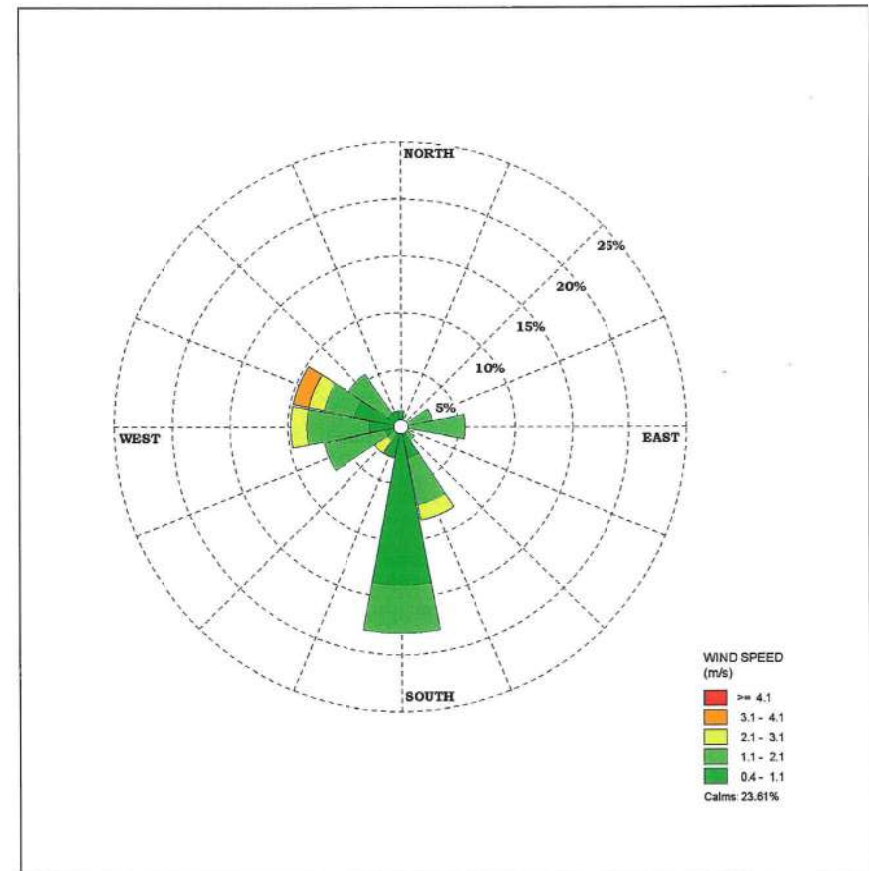
Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11010
Project Name : โครงการผลิตปิโตรเลียมแหล่งผลิตบึงหว้าตะวันตก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนบกหมายเลข L21/43
จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Measured Source : Ambient Air Quality
Measured Point : ฐานหลุมผลิต NS3 : A4 : บานเลขที่ 144 หมู่ที่ 4 ตำบลจันทิมา (บ้านหนองหิ้งสุ่ม หมู่ที่ 4 ตำบลจันทิมา
อำเภอลานกระบือ จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WG84) 47Q 0583756 E, 1835325 N
Measured Date : August 29-September 1, 2024
Measured By : Mr.Kunakorn Ratanawongsa
Analyzed By : Environment Research & Technology Co., Ltd.

Quotation No. : AR2024-00454
Analysis No. : 2024-AE317-010 - 012
Report No. : 2024-RAAS457
Report Date : September 16, 2024

Wind Direction	Percentage frequency of wind in each speed and direction					Total
	0.4-1.1	1.1-2.1	2.1-3.1	3.1-4.1	≥4.1	
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	2.77778	0.00000	0.00000	0.00000	2.77778
E	0.00000	5.55556	0.00000	0.00000	0.00000	5.55556
ESE	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
SE	0.00000	1.38889	0.00000	0.00000	0.00000	1.38889
SSE	2.77778	4.16667	1.38889	0.00000	0.00000	8.33334
S	13.88890	4.16667	0.00000	0.00000	0.00000	18.05557
SSW	2.77778	0.00000	0.00000	0.00000	0.00000	2.77778
SW	0.00000	1.38889	1.38889	0.00000	0.00000	2.77778
WSW	1.38889	5.55556	0.00000	0.00000	0.00000	6.94445
W	2.77778	5.55556	1.38889	0.00000	0.00000	9.72223
WNW	4.16667	2.77778	1.38889	1.38889	0.00000	9.72223
NW	1.38889	4.16667	0.00000	0.00000	0.00000	5.55556
NNW	1.38889	0.00000	0.00000	0.00000	0.00000	1.38889
Calm	23.61110					

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Project Name : โครงการผลิตปิโตรเลียมแหล่งผลิตบึงหว้าตะวันตก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนบกหมายเลข L21/43
จังหวัดสุโขทัย และกำแพงเพชร
Measured Point : ฐานหลุมผลิต NS3 : A4 : บานเลขที่ 144 หมู่ที่ 4 ตำบลจันทิมา (บ้านหนองหิ้งสุ่ม หมู่ที่ 4 ตำบลจันทิมา
อำเภอลานกระบือ จังหวัดกำแพงเพชร)
Measured Date : August 29-September 1, 2024
Report No. : 2024-RAAS457





บริษัท ซีเอ็นพีซีเอชเค (ไทยแลนด์) จำกัด

รายงานผลการปฏิบัติตามมาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม และมาตรการติดตามตรวจสอบผลกระทบสิ่งแวดล้อม
โครงการผลิตปิโตรเลียมแหล่งผลิตบึงหญ้าตะวันตก - หนองสระ (BYW - NS) (ส่วนขยาย)
แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และกำแพงเพชร
ฉบับเดือนมกราคม - ธันวาคม พ.ศ.2567

ภาคผนวก ง.2

ระดับเสียง

ฤดูแล้ง

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Mareeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมแหล่งผลิตอ่าวต๋ายวันตก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Measured Source : Ambient Noise
Measured Point : ฐานหลุมผลิต NS2 : N9 : บานเลขที่ 2 หมู่ที่ 4 ตำบลจันทิมา (บ้านหนองหึงสม หมู่ที่ 4 ตำบลจันทิมา อำเภออุ้มผาง จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0583951 E, 1834298 N
Measured Date : March 24-25, 2024
Measured By : Mr.Romsea Kateh
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820938

Quotation No. : AR2024-00454
Analysis No. : 2024-AB392-013
Report No. : 2024-RAAF990
Report Date : April 20, 2024

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
13:00-14:00	47.6	73.1	52.8	50.0	42.7	38.6
14:00-15:00	46.4	71.8	51.7	47.9	40.9	37.2
15:00-16:00	47.9	78.8	53.1	50.7	43.5	39.8
16:00-17:00	50.0	74.6	54.7	53.0	47.4	42.9
17:00-18:00	50.6	75.8	55.6	53.4	47.7	44.2
18:00-19:00	52.8	81.7	59.8	56.7	47.3	43.4
19:00-20:00	56.5	71.6	59.4	57.8	55.8	55.0
20:00-21:00	52.3	67.7	55.2	54.3	51.4	49.9
21:00-22:00	50.2	69.6	53.6	52.5	49.1	47.6
22:00-23:00	51.6	64.1	54.9	53.5	50.7	49.1
23:00-00:00	56.2	67.9	58.8	58.3	56.0	50.9
00:00-01:00	57.8	63.4	61.1	60.6	57.6	50.2
01:00-02:00	56.3	63.9	60.0	59.3	55.7	47.9
02:00-03:00	54.7	72.7	60.3	58.8	51.9	48.2
03:00-04:00	59.6	70.3	65.6	64.2	53.4	51.0
04:00-05:00	55.3	70.2	59.9	59.1	53.4	52.2
05:00-06:00	51.6	78.6	55.7	53.7	49.7	47.8
06:00-07:00	53.1	83.2	58.0	55.2	49.5	45.8
07:00-08:00	54.0	84.3	59.5	56.7	50.2	45.9
08:00-09:00	53.5	86.5	58.3	55.6	48.1	43.3
09:00-10:00	52.1	80.6	56.4	54.7	46.1	41.5
10:00-11:00	48.5	75.5	53.2	51.1	44.9	40.9
11:00-12:00	48.6	73.2	54.5	52.4	43.6	39.5
12:00-13:00	47.3	68.4	52.1	50.1	44.0	39.3
24 Hours Measurement	53.7	86.5	58.3	56.8	51.4	47.9
Standard ¹⁾	70	115	-	-	-	-
Ldn	61.9	-	-	-	-	-

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).



(Ms. Supawan Suwannapa)
Laboratory Reviewer



(Ms. Thanida Bunrungrueang)
Laboratory Supervisor

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Mareeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมแหล่งผลิตอ่าวต๋ายวันตก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Measured Source : Ambient Noise
Measured Point : ฐานหลุมผลิต NS2 : N9 : บานเลขที่ 2 หมู่ที่ 4 ตำบลจันทิมา (บ้านหนองหึงสม หมู่ที่ 4 ตำบลจันทิมา อำเภออุ้มผาง จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0583951 E, 1834298 N
Measured Date : March 25-26, 2024
Measured By : Mr.Romsea Kateh
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820938

Quotation No. : AR2024-00454
Analysis No. : 2024-AB392-013
Report No. : 2024-RAAF990
Report Date : April 20, 2024

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
13:00-14:00	45.5	68.2	51.6	48.6	41.1	37.2
14:00-15:00	47.4	72.3	52.2	49.3	42.4	38.1
15:00-16:00	48.2	69.1	53.4	51.5	45.4	42.0
16:00-17:00	55.2	79.8	62.2	58.2	47.7	44.3
17:00-18:00	51.0	76.1	56.2	53.9	47.7	43.9
18:00-19:00	55.6	74.9	61.4	59.3	51.9	46.6
19:00-20:00	58.3	75.6	63.9	61.7	55.7	53.2
20:00-21:00	59.4	78.0	64.1	62.3	57.0	55.3
21:00-22:00	56.8	81.0	62.4	60.5	53.6	50.5
22:00-23:00	55.1	67.2	60.8	58.4	52.6	50.4
23:00-00:00	56.1	67.3	61.9	59.6	53.2	50.9
00:00-01:00	60.8	68.7	64.0	63.5	60.5	54.8
01:00-02:00	64.5	77.2	67.8	65.9	64.2	58.9
02:00-03:00	58.3	74.8	61.9	60.7	57.5	53.0
03:00-04:00	55.9	77.0	60.9	57.9	54.9	52.4
04:00-05:00	52.8	71.2	56.0	55.3	52.0	50.5
05:00-06:00	52.2	79.3	58.8	53.4	46.2	43.9
06:00-07:00	54.2	81.8	58.3	55.6	51.0	45.9
07:00-08:00	52.6	79.0	56.8	54.6	50.2	45.8
08:00-09:00	55.5	82.1	61.1	57.1	51.0	46.4
09:00-10:00	54.8	76.3	60.0	55.2	49.8	46.4
10:00-11:00	51.3	68.2	55.9	51.5	49.5	45.7
11:00-12:00	52.7	73.3	56.7	55.6	51.4	46.6
12:00-13:00	49.9	69.3	54.7	53.3	47.8	42.2
24 Hours Measurement	56.5	82.1	61.1	59.2	54.9	50.8
Standard ¹⁾	70	115	-	-	-	-
Ldn	64.6	-	-	-	-	-

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).



(Ms. Supawan Suwannapa)
Laboratory Reviewer



(Ms. Thanida Bunrungrueang)
Laboratory Supervisor

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 : โครงการผลิตปิโตรเลียมแหล่งผลิตบึงหว้าตะวันตก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจฉบับหมายเลข L21/43
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Measured Source : Ambient Noise
Measured Point : ฐานหลุมผลิต NS2 : N9 : บานเลขที่ 2 หมู่ที่ 4 ตำบลจันทิมา (บ้านหนองท้องน หมู่ที่ 4 ตำบลจันทิมา อำเภอสามกระดี่ จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0583951 E, 1834298 N
Measured Date : March 26-27, 2024
Measured By : Mr.Romsea Kateh
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820938

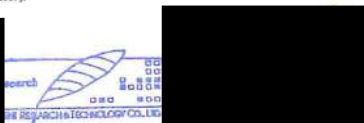
Quotation No. : AR2024-00454
Analysis No. : 2024-AB392-013
Report No. : 2024-RAAF990
Report Date : April 20, 2024

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
13:00-14:00	49.2	73.9	53.3	52.0	47.8	42.9
14:00-15:00	48.5	73.8	53.0	51.5	46.6	41.7
15:00-16:00	48.0	79.7	51.9	50.5	45.0	40.1
16:00-17:00	48.9	71.8	54.0	52.0	45.6	41.2
17:00-18:00	53.3	80.1	57.7	55.7	49.8	45.3
18:00-19:00	55.5	82.3	60.1	58.5	53.5	48.8
19:00-20:00	60.6	84.3	62.9	61.9	59.3	57.2
20:00-21:00	59.9	80.3	62.1	61.5	59.4	58.0
21:00-22:00	59.3	66.7	62.1	61.3	58.6	56.6
22:00-23:00	56.7	65.3	61.2	60.2	55.1	50.9
23:00-00:00	60.8	68.8	65.2	64.5	59.0	52.5
00:00-01:00	63.4	69.8	66.9	66.3	62.9	56.4
01:00-02:00	58.8	74.1	63.9	62.6	56.2	53.4
02:00-03:00	54.5	68.7	56.8	56.2	54.0	52.7
03:00-04:00	52.7	64.3	54.5	54.1	52.4	51.3
04:00-05:00	48.7	73.0	50.7	49.0	47.5	46.5
05:00-06:00	50.3	74.1	58.0	53.1	43.8	42.0
06:00-07:00	51.7	81.5	56.7	53.6	47.7	44.1
07:00-08:00	53.2	86.5	58.2	54.7	48.5	44.2
08:00-09:00	52.6	82.0	58.6	54.1	46.8	43.1
09:00-10:00	51.5	78.9	56.6	54.3	48.3	44.4
10:00-11:00	50.7	74.9	56.3	54.0	47.0	42.8
11:00-12:00	49.7	77.1	54.6	51.9	45.1	40.6
12:00-13:00	51.0	80.2	55.1	53.6	48.4	44.1
24 Hours Measurement	56.3	86.5	60.1	58.9	54.8	51.3
Standard ¹⁾	70	115	-	-	-	-
Ldn	63.9	-	-	-	-	-

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 270 dated April 3, B.E.2540 (1997).



(Ms. Supawan Suwannapa)
Laboratory Reviewer



(Ms. Thanida Bunngrueang)
Laboratory Supervisor

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 : โครงการผลิตปิโตรเลียมแหล่งผลิตบึงหว้าตะวันตก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจฉบับหมายเลข L21/43
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Measured Source : Ambient Noise
Measured Point : ฐานหลุมผลิต NS3 : N12 : บานเลขที่ 119 หมู่ที่ 4 ตำบลจันทิมา (บ้านหนองท้องน หมู่ที่ 4 ตำบลจันทิมา อำเภอสามกระดี่ จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0584054 E, 1835467 N
Measured Date : March 24-25, 2024
Measured By : Mr.Romsea Kateh
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820859

Quotation No. : AR2024-00454
Analysis No. : 2024-AB392-014
Report No. : 2024-RAAF991
Report Date : April 20, 2024

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
12:00-13:00	46.8	72.1	52.0	49.5	42.3	39.2
13:00-14:00	46.9	68.0	53.0	50.6	42.8	38.2
14:00-15:00	47.7	71.1	53.7	50.6	43.7	39.6
15:00-16:00	49.1	72.6	53.1	50.9	45.0	41.5
16:00-17:00	50.8	73.3	57.4	53.3	44.8	40.0
17:00-18:00	51.4	75.7	55.8	52.9	46.4	41.8
18:00-19:00	48.0	73.1	53.4	50.8	43.3	38.6
19:00-20:00	48.0	66.4	49.6	48.7	47.7	46.4
20:00-21:00	52.4	58.0	53.3	53.1	52.1	51.4
21:00-22:00	53.0	58.5	53.6	53.5	52.4	52.0
22:00-23:00	51.9	55.7	52.9	52.6	51.8	51.0
23:00-00:00	58.2	66.3	59.2	58.9	57.9	57.1
00:00-01:00	61.8	67.6	62.5	62.3	61.4	60.9
01:00-02:00	57.3	67.0	58.8	58.5	57.0	55.8
02:00-03:00	51.0	61.2	53.4	52.9	50.7	48.2
03:00-04:00	47.0	69.2	48.5	47.8	45.3	44.4
04:00-05:00	51.0	73.0	52.5	51.9	50.8	49.4
05:00-06:00	52.4	74.4	56.7	53.4	49.4	48.0
06:00-07:00	57.9	86.0	62.7	59.7	50.9	45.3
07:00-08:00	54.9	85.7	64.9	55.8	49.1	43.4
08:00-09:00	53.8	80.7	59.0	56.2	48.3	42.6
09:00-10:00	53.7	82.0	60.5	55.9	46.5	40.5
10:00-11:00	50.7	73.0	56.6	54.2	46.3	40.6
11:00-12:00	49.7	75.4	56.4	52.7	45.3	39.8
24 Hours Measurement	53.9	86.0	57.9	55.3	52.2	51.0
Standard ¹⁾	70	115	-	-	-	-
Ldn	62.4	-	-	-	-	-

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 270 dated April 3, B.E.2540 (1997).



(Ms. Supawan Suwannapa)
Laboratory Reviewer



(Ms. Thanida Bunngrueang)
Laboratory Supervisor

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 : โครงการผลิตปิโตรเลียมแหล่งผลิตเชิงพาณิชย์วันตก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Measured Source : Ambient Noise
Measured Point : ฐานหลุมผลิต NS3 : N12 : บานเลขที่ 119 หมู่ที่ 4 ตำบลจันทิมา (บ้านหนองหึงส้ม หมู่ที่ 4 ตำบลจันทิมา อำเภอสามกระดี่ จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0584054 E, 1835467 N
Measured Date : March 25-26, 2024
Measured By : Mr.Romsea Kateh
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820859

Quotation No. : AR2024-00454
Analysis No. : 2024-AB392-014
Report No. : 2024-RAAF991
Report Date : April 20, 2024

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
12:00-13:00	50.1	73.9	56.0	52.9	44.5	39.7
13:00-14:00	48.0	76.9	53.9	50.6	42.1	38.1
14:00-15:00	47.3	71.1	52.7	50.1	41.6	36.2
15:00-16:00	47.7	76.6	52.4	49.9	42.7	38.2
16:00-17:00	50.3	71.6	55.8	53.2	46.8	41.5
17:00-18:00	51.4	80.5	55.6	53.0	46.2	40.7
18:00-19:00	56.7	83.5	64.6	58.6	41.8	38.8
19:00-20:00	50.8	67.0	52.5	51.6	49.8	48.9
20:00-21:00	53.4	64.0	54.2	54.0	52.5	51.6
21:00-22:00	51.3	60.3	52.6	52.4	50.7	49.8
22:00-23:00	54.9	63.8	56.1	55.9	54.5	53.7
23:00-00:00	61.3	69.1	62.1	61.9	60.3	59.6
00:00-01:00	60.4	68.8	61.2	61.0	59.3	58.5
01:00-02:00	53.2	73.3	55.0	54.6	53.0	51.2
02:00-03:00	48.3	79.7	53.0	50.9	45.8	44.7
03:00-04:00	48.5	75.9	54.0	51.3	47.1	46.0
04:00-05:00	48.9	71.3	50.5	49.6	48.4	47.4
05:00-06:00	58.4	78.1	66.4	60.8	44.6	42.8
06:00-07:00	61.3	88.3	68.0	64.6	57.6	49.9
07:00-08:00	54.7	86.8	61.0	58.4	50.2	44.4
08:00-09:00	56.8	79.3	62.6	60.3	50.6	43.5
09:00-10:00	55.9	85.8	62.5	58.2	47.2	41.7
10:00-11:00	54.7	73.7	61.1	58.6	50.0	43.0
11:00-12:00	54.6	78.6	61.8	59.5	47.1	40.6
24 Hours Measurement	55.5	88.3	60.6	57.7	52.4	50.5
Standard ¹⁾	70	115	-	-	-	-
Ldn	63.6	-	-	-	-	-

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).



(Ms. Supawan Suwannapa)
Laboratory Reviewer



(Ms. Thanida Bunrungrueang)
Laboratory Supervisor

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 : โครงการผลิตปิโตรเลียมแหล่งผลิตเชิงพาณิชย์วันตก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Measured Source : Ambient Noise
Measured Point : ฐานหลุมผลิต NS3 : N12 : บานเลขที่ 119 หมู่ที่ 4 ตำบลจันทิมา (บ้านหนองหึงส้ม หมู่ที่ 4 ตำบลจันทิมา อำเภอสามกระดี่ จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0584054 E, 1835467 N
Measured Date : March 26-27, 2024
Measured By : Mr.Romsea Kateh
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820859

Quotation No. : AR2024-00454
Analysis No. : 2024-AB392-014
Report No. : 2024-RAAF991
Report Date : April 20, 2024

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
12:00-13:00	53.2	77.8	60.1	55.8	47.3	40.7
13:00-14:00	51.6	73.3	57.8	51.4	45.5	39.4
14:00-15:00	49.2	71.7	54.3	51.1	45.6	39.7
15:00-16:00	55.1	81.6	59.7	58.5	51.9	42.0
16:00-17:00	54.2	79.7	58.1	55.5	50.7	42.9
17:00-18:00	51.5	80.5	58.9	53.1	41.6	36.6
18:00-19:00	49.8	73.2	56.3	51.6	42.0	37.5
19:00-20:00	57.7	75.7	62.1	61.0	56.3	50.8
20:00-21:00	57.0	67.9	60.5	59.4	56.1	53.8
21:00-22:00	51.6	62.7	53.0	52.6	51.4	50.3
22:00-23:00	52.4	59.5	53.9	53.6	52.3	51.1
23:00-00:00	58.5	64.2	59.4	59.2	57.9	57.3
00:00-01:00	56.4	63.6	57.6	57.4	56.0	55.1
01:00-02:00	50.1	59.3	52.1	51.6	49.8	48.0
02:00-03:00	45.1	56.7	47.1	46.6	44.8	43.2
03:00-04:00	45.5	68.7	47.8	46.5	45.1	44.1
04:00-05:00	46.1	70.8	53.2	47.0	45.7	44.8
05:00-06:00	49.3	71.3	55.8	52.1	42.5	40.5
06:00-07:00	57.1	88.8	65.4	59.8	48.3	42.1
07:00-08:00	56.0	89.3	61.5	57.1	48.4	42.2
08:00-09:00	54.0	85.8	58.9	55.5	46.9	42.1
09:00-10:00	53.2	75.8	59.2	55.6	46.3	41.0
10:00-11:00	53.3	81.6	59.0	55.4	45.1	40.2
11:00-12:00	51.6	77.2	58.3	54.2	43.6	38.7
24 Hours Measurement	53.9	89.3	58.8	56.0	51.1	48.7
Standard ¹⁾	70	115	-	-	-	-
Ldn	60.2	-	-	-	-	-

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 Government Gazette No.114 Part 27D dated April 3, B.E.2540 (1997).



(Ms. Supawan Suwannapa)
Laboratory Reviewer



(Ms. Thanida Bunrungrueang)
Laboratory Supervisor

รายงานผลการตรวจวัดเสียงรบกวน

ชื่อลูกค้า	: บริษัท วิษัณ คอนซัลแตนท์ จำกัด	หมายเลขใบเสนอราคา	: AR2024-00454
ที่อยู่ลูกค้า	: เลขที่ 101/22 หมู่ที่ 2 ซอยอมฤตยา ซอย 3 ตำบลโพธิ์ท่า อำเภอเมืองนนทบุรี จังหวัดนนทบุรี 11000	หมายเลขปฏิบัติการ	: 2024-AB392-013
ชื่อโครงการ	: โครงการผลิตปิโตรเลียมแหล่งผลิตบึงหว้าตะวันตก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจแบบหมายเลข L21/43 จังหวัดสุโขทัย และกำแพงเพชร	หมายเลขรายงานผล	: 2024-RAAF988
ที่ตั้งโครงการ	: จังหวัดสุโขทัย และกำแพงเพชร	วันที่รายงานผล	: 20 เมษายน 2567
ประเภทของแหล่งกำเนิด	: เสียงรบกวนกรณี 4 เกิดจากการผลิตปิโตรเลียม		
บริเวณที่ตรวจวัดเสียงขณะมีการรบกวน	: ฐานหลุมผลิต NS2 : N9 : บ้านเลขที่ 2 หมู่ที่ 4 ตำบลจันทน์ท่า UTM (WGS84) 47Q 0583951 E, 1834298 N		
บริเวณที่ตรวจวัดเสียงขณะไม่มีการรบกวน	: จุดอ้างอิง UTM (WGS84) 47Q 0583180 E, 1834515 N		
ตรวจวัดโดย	: นายอมรชัย กาเด๊ะ		
วิเคราะห์โดย	: บริษัท เอ็นไวรอนเม้นท์ รีเสิร์ช แอนด์ เทคโนโลยี จำกัด		
เครื่องมือที่ใช้ตรวจวัด	: เครื่องวัดระดับเสียง Scarlet Tech Model ST-11D Serial Number 820938, เครื่องวัดระดับเสียง Scarlet Tech Model ST-11D Serial Number 820802		

ระดับเสียงขณะเกิดเสียงของแหล่งกำเนิด			ระดับเสียงขณะไม่มีการรบกวน			การคำนวณระดับการรบกวน ¹⁾						มาตรฐาน ²⁾	สรุปผล
วันที่	ช่วงเวลา	ระดับเสียงเฉลี่ย (L _{Aeq,T5} ; dB(A))	วันที่	ช่วงเวลา	ระดับเสียงเฉลี่ย 5 นาที (L _{Aeq,5} ; dB(A))	ระดับเสียงพื้นฐาน (L _{A90} ; dB(A))	ระยะเวลา ของช่วงเวลาที่มีเสียงค่าเกิดเสียง (T _{eq} ; นาที)	ระดับเสียงขณะมีการรบกวน (L _{Aeq,T5} ; dB(A))	กรณี 4 มากเพิ่ม 3 dB(A)	กรณี 5 มากเพิ่ม 5 dB(A)	ระดับการรบกวน		
24 มี.ค. 67	23:20-23:25	55.0	24 มี.ค. 67	23:15-23:20	48.3	47.4	5	54.0	57.0	-	9.6	≤10	ไม่เป็นเสียงรบกวน
26 มี.ค. 67	02:55-03:00	56.0	26 มี.ค. 67	02:30-02:35	49.3	48.3	5	55.0	58.0	-	9.7	≤10	ไม่เป็นเสียงรบกวน
27 มี.ค. 67	02:05-02:10	55.9	27 มี.ค. 67	02:15-02:20	49.0	48.1	5	54.9	57.9	-	9.8	≤10	ไม่เป็นเสียงรบกวน

หมายเหตุ : ¹⁾ ปริมณฑลของการคำนวณคือเสียงรบกวนที่เกิดจากกิจกรรมการดำเนินงานของโรงงานอุตสาหกรรม การตรวจวัดและคำนวณระดับเสียงขณะมีการรบกวน การคำนวณค่าระดับการรบกวน และแบบบันทึกการตรวจวัดเสียงรบกวน พ.ศ. 2565
²⁾ ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 29 (พ.ศ. 2550) เรื่อง ค่าระดับเสียงรบกวน



ห้ามคัดลอกหรือเผยแพร่รายงานผลการตรวจวัดเสียงรบกวน โดยไม่ได้รับอนุญาตจากบริษัท เอ็นไวรอนเม้นท์ รีเสิร์ช แอนด์ เทคโนโลยี จำกัด เป็นลายลักษณ์อักษร
รายงานนี้เป็นเอกสารทรัพย์สินทางปัญญาของบริษัท วิษัณ คอนซัลแตนท์

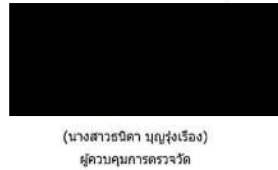
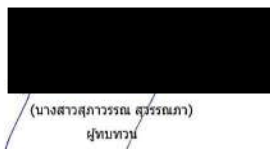
F-RP-006 Rev. 05, January 18, 2021

รายงานผลการตรวจวัดเสียงรบกวน

ชื่อลูกค้า	: บริษัท วิษัณ คอนซัลแตนท์ จำกัด	หมายเลขใบเสนอราคา	: AR2024-00454
ที่อยู่ลูกค้า	: เลขที่ 101/22 หมู่ที่ 2 ซอยอมฤตยา ซอย 3 ตำบลโพธิ์ท่า อำเภอเมืองนนทบุรี จังหวัดนนทบุรี 11000	หมายเลขปฏิบัติการ	: 2024-AB392-014
ชื่อโครงการ	: โครงการผลิตปิโตรเลียมแหล่งผลิตบึงหว้าตะวันตก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจแบบหมายเลข L21/43 จังหวัดสุโขทัย และกำแพงเพชร	หมายเลขรายงานผล	: 2024-RAAF989
ที่ตั้งโครงการ	: จังหวัดสุโขทัย และกำแพงเพชร	วันที่รายงานผล	: 20 เมษายน 2567
ประเภทของแหล่งกำเนิด	: เสียงรบกวนกรณี 4 เกิดจากการผลิตปิโตรเลียม		
บริเวณที่ตรวจวัดเสียงขณะมีการรบกวน	: ฐานหลุมผลิต NS3 : N12 : บ้านเลขที่ 119 หมู่ที่ 4 ตำบลจันทน์ท่า UTM (WGS84) 47Q 0584054 E, 1835467 N		
บริเวณที่ตรวจวัดเสียงขณะไม่มีการรบกวน	: จุดอ้างอิง UTM (WGS84) 47Q 0584068 E, 1835552 N		
ตรวจวัดโดย	: นายอมรชัย กาเด๊ะ		
วิเคราะห์โดย	: บริษัท เอ็นไวรอนเม้นท์ รีเสิร์ช แอนด์ เทคโนโลยี จำกัด		
เครื่องมือที่ใช้ตรวจวัด	: เครื่องวัดระดับเสียง Scarlet Tech Model ST-11D Serial Number 820859, เครื่องวัดระดับเสียง Scarlet Tech Model ST-11D Serial Number 820867		

ระดับเสียงขณะเกิดเสียงของแหล่งกำเนิด			ระดับเสียงขณะไม่มีการรบกวน			การคำนวณระดับการรบกวน ¹⁾						มาตรฐาน ²⁾	สรุปผล
วันที่	ช่วงเวลา	ระดับเสียงเฉลี่ย (L _{Aeq,T5} ; dB(A))	วันที่	ช่วงเวลา	ระดับเสียงเฉลี่ย 5 นาที (L _{Aeq,5} ; dB(A))	ระดับเสียงพื้นฐาน (L _{A90} ; dB(A))	ระยะเวลา ของช่วงเวลาที่มีเสียงค่าเกิดเสียง (T _{eq} ; นาที)	ระดับเสียงขณะมีการรบกวน (L _{Aeq,T5} ; dB(A))	กรณี 4 มากเพิ่ม 3 dB(A)	กรณี 5 มากเพิ่ม 5 dB(A)	ระดับการรบกวน		
24 มี.ค. 67	22:45-22:50	52.6	24 มี.ค. 67	22:55-23:00	48.2	47.7	5	50.6	53.6	-	5.9	≤10	ไม่เป็นเสียงรบกวน
25 มี.ค. 67	22:10-22:15	53.7	25 มี.ค. 67	22:20-22:25	48.7	47.1	5	52.0	55.0	-	7.9	≤10	ไม่เป็นเสียงรบกวน
27 มี.ค. 67	03:55-04:00	47.1	27 มี.ค. 67	03:50-03:55	43.6	42.6	5	44.5	47.5	-	4.9	≤10	ไม่เป็นเสียงรบกวน

หมายเหตุ : ¹⁾ ปริมณฑลของการคำนวณคือเสียงรบกวนที่เกิดจากกิจกรรมการดำเนินงานของโรงงานอุตสาหกรรม การตรวจวัดและคำนวณระดับเสียงขณะมีการรบกวน การคำนวณค่าระดับการรบกวน และแบบบันทึกการตรวจวัดเสียงรบกวน พ.ศ. 2565
²⁾ ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 29 (พ.ศ. 2550) เรื่อง ค่าระดับเสียงรบกวน



ห้ามคัดลอกหรือเผยแพร่รายงานผลการตรวจวัดเสียงรบกวน โดยไม่ได้รับอนุญาตจากบริษัท เอ็นไวรอนเม้นท์ รีเสิร์ช แอนด์ เทคโนโลยี จำกัด เป็นลายลักษณ์อักษร
รายงานนี้เป็นเอกสารทรัพย์สินทางปัญญาของบริษัท วิษัณ คอนซัลแตนท์

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

ฤดูฝน

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Manesya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมแหล่งผลิตปิโตรเลียมวันตาก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจแบบกฎหมายเลข L21/43
จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Measured Source : Ambient Noise
Measured Point : ฐานหลุมผลิต NS2 : N9 : บานเลขที่ 2 หมู่ที่ 4 ตำบลจันทิมา (บ้านหนองทั้งส้ม หมู่ที่ 4 ตำบลจันทิมา
อำเภอสามโก้ จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0583951 E, 1834298 N
Measured Date : August 29-30, 2024
Measured By : Mr.Kunakorn Ratanawongsa
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820966

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
08:00-09:00	47.7	72.6	53.2	50.3	43.7	39.3
09:00-10:00	47.9	75.4	53.6	51.0	44.3	38.8
10:00-11:00	43.0	70.7	48.0	45.1	39.0	35.6
11:00-12:00	47.8	78.9	56.6	49.0	44.0	40.6
12:00-13:00	45.7	75.9	48.2	47.0	44.2	41.9
13:00-14:00	47.4	73.9	52.2	50.1	44.2	40.6
14:00-15:00	50.3	70.7	55.2	53.4	48.4	45.3
15:00-16:00	59.3	74.6	62.0	61.6	58.0	55.8
16:00-17:00	53.9	73.6	58.4	57.2	52.0	44.8
17:00-18:00	50.7	77.3	53.3	52.2	44.5	41.8
18:00-19:00	51.1	75.0	55.6	54.3	49.0	45.5
19:00-20:00	59.5	58.2	60.9	60.4	59.4	58.6
20:00-21:00	62.9	72.8	63.7	63.5	62.8	62.2
21:00-22:00	63.4	56.5	64.2	64.0	63.3	62.7
22:00-23:00	63.7	57.2	64.5	64.3	63.6	63.1
23:00-00:00	59.4	54.4	60.4	60.1	59.3	58.7
00:00-01:00	56.7	56.6	58.0	57.4	56.5	55.7
01:00-02:00	59.1	57.1	60.7	59.9	58.9	58.2
02:00-03:00	61.3	58.4	63.4	62.5	61.0	60.2
03:00-04:00	59.9	56.1	61.4	61.0	59.8	58.7
04:00-05:00	53.7	66.4	56.2	54.8	53.3	51.9
05:00-06:00	50.5	75.0	54.8	52.1	45.3	43.8
06:00-07:00	55.9	74.5	61.6	59.6	52.9	41.6
07:00-08:00	52.0	77.5	56.8	53.0	45.9	40.7
24 Hours Measurement	57.8	78.9	59.7	58.9	57.4	56.5
Standard ¹⁾	70	115	-	-	-	-
Ldn	65.4	-	-	-	-	-

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 270 dated April 3, B.E.2540 (1997).



(Ms. Supawan Suwannapa)
Laboratory Reviewer



(Ms. Thanida Bunrungrueang)
Laboratory Supervisor

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Mareeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมแหล่งผลิตปิโตรเลียมวันตาก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจแบบกฎหมายเลข L21/43
จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Measured Source : Ambient Noise
Measured Point : ฐานหลุมผลิต NS2 : N9 : บานเลขที่ 2 หมู่ที่ 4 ตำบลจันทิมา (บ้านหนองทั้งส้ม หมู่ที่ 4 ตำบลจันทิมา
อำเภอสามโก้ จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0583951 E, 1834298 N
Measured Date : August 30-31, 2024
Measured By : Mr.Kunakorn Ratanawongsa
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820966

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
08:00-09:00	51.1	79.0	55.1	52.2	43.9	38.8
09:00-10:00	48.3	71.3	54.0	51.6	43.4	36.7
10:00-11:00	43.6	66.4	48.3	46.2	38.9	33.7
11:00-12:00	48.0	69.0	51.9	50.6	46.6	44.5
12:00-13:00	46.2	72.3	49.9	48.8	44.4	42.0
13:00-14:00	46.3	66.9	49.8	48.6	44.6	41.9
14:00-15:00	45.0	65.9	49.5	47.9	42.4	39.6
15:00-16:00	47.4	71.6	52.7	51.0	40.3	36.2
16:00-17:00	42.0	69.5	47.1	45.2	38.9	34.8
17:00-18:00	45.8	73.3	49.9	48.5	43.7	40.1
18:00-19:00	46.8	72.1	52.5	49.5	41.8	39.0
19:00-20:00	57.6	69.7	60.1	59.4	57.0	55.8
20:00-21:00	61.6	65.6	62.6	62.4	61.5	60.6
21:00-22:00	62.1	65.7	62.8	62.6	62.0	61.4
22:00-23:00	61.4	68.1	62.2	62.0	61.3	60.7
23:00-00:00	58.6	66.0	59.5	59.2	58.5	57.9
00:00-01:00	55.3	65.6	57.1	56.5	55.1	54.1
01:00-02:00	60.4	70.9	64.2	62.1	59.3	58.0
02:00-03:00	63.7	71.1	65.1	64.6	63.6	62.6
03:00-04:00	63.4	67.3	65.0	64.6	63.2	61.9
04:00-05:00	59.1	67.7	60.9	60.2	58.9	57.9
05:00-06:00	53.1	76.3	56.8	54.3	50.2	49.3
06:00-07:00	50.7	78.2	55.5	52.4	45.9	42.6
07:00-08:00	50.3	75.4	54.3	51.9	46.7	43.3
24 Hours Measurement	57.5	79.0	59.4	58.6	57.1	56.1
Standard ¹⁾	70	115	-	-	-	-
Ldn	66.0	-	-	-	-	-

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 270 dated April 3, B.E.2540 (1997).



(Ms. Supawan Suwannapa)
Laboratory Reviewer



(Ms. Thanida Bunrungrueang)
Laboratory Supervisor

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 : โครงการผลิตปิโตรเลียมแหล่งผลิตบึงหว้าตะวันออก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนบกหมายเลข L21/43
จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Measured Source : Ambient Noise
Measured Point : ฐานหลุมผลิต NS2 : N9 : บานเลขที่ 2 หมู่ที่ 4 ตำบลจันทิมา (บ้านหนองทั้งสุข หมู่ที่ 4 ตำบลจันทิมา
อำเภอลานกระบือ จังหวัดกำแพงเพชร)
: UTM (WGS84) 47Q 0583951 E, 1834298 N
GPS. Coordinate :
Measured Date : August 31-September 1, 2024
Measured By : Mr.Kunakorn Ratanawongsa
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 82C966

Quotation No. : AR2024-00454
Analysis No. : 2024-AE317-013
Report No. : 2024-RAAS433
Report Date : September 16, 2024

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
08:00-09:00	53.5	79.7	57.5	54.4	47.9	45.0
09:00-10:00	51.0	80.6	53.2	51.8	46.2	44.4
10:00-11:00	47.2	71.6	50.5	48.9	45.3	43.2
11:00-12:00	45.4	66.3	50.8	47.9	42.2	39.1
12:00-13:00	45.1	70.4	45.9	47.4	41.9	37.9
13:00-14:00	45.7	71.0	51.0	47.5	41.4	38.4
14:00-15:00	45.7	70.2	45.4	47.6	43.4	40.3
15:00-16:00	44.6	64.4	46.5	47.0	42.9	40.3
16:00-17:00	50.7	76.6	53.5	51.1	45.4	42.3
17:00-18:00	47.2	74.3	50.8	48.5	43.4	40.8
18:00-19:00	48.4	75.7	51.4	49.8	44.9	42.4
19:00-20:00	56.2	81.7	57.6	57.3	56.0	55.0
20:00-21:00	61.2	85.3	62.3	61.9	61.1	60.5
21:00-22:00	62.2	87.6	63.2	62.9	62.1	61.5
22:00-23:00	60.1	85.4	61.8	61.2	59.8	58.9
23:00-00:00	58.8	84.9	60.9	60.1	58.4	57.3
00:00-01:00	58.0	84.5	58.8	59.1	57.7	56.9
01:00-02:00	56.1	83.9	57.8	57.3	55.9	54.8
02:00-03:00	62.4	88.2	63.9	63.5	62.2	61.1
03:00-04:00	65.0	88.9	66.5	66.2	64.8	63.5
04:00-05:00	60.0	86.5	62.3	61.7	59.7	58.1
05:00-06:00	51.6	73.0	56.9	53.2	47.8	46.4
06:00-07:00	49.8	77.4	54.1	51.8	46.6	43.6
07:00-08:00	48.9	70.8	52.8	51.1	46.4	42.3
24 Hours Measurement	57.4	80.6	59.2	58.5	57.0	55.9
Standard ¹⁾	70	115	-	-	-	-
Ldn	65.9	-	-	-	-	-

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 270 dated April 3, B.E.2540 (1997).

(Ms.Supawan Suwannapa)
Laboratory Reviewer

(Ms.Thanida Bunrungrueang)
Laboratory Supervisor

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 : โครงการผลิตปิโตรเลียมแหล่งผลิตบึงหว้าตะวันออก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนบกหมายเลข L21/43
จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Measured Source : Ambient Noise
Measured Point : ฐานหลุมผลิต NS3 : N12 : บานเลขที่ 119 หมู่ที่ 4 ตำบลจันทิมา (บ้านหนองทั้งสุข หมู่ที่ 4 ตำบลจันทิมา
อำเภอลานกระบือ จังหวัดกำแพงเพชร)
: UTM (WGS84) 47Q 0584054 E, 1835467 N
GPS. Coordinate :
Measured Date : August 29-30, 2024
Measured By : Mr.Kunakorn Ratanawongsa
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820934

Quotation No. : AR2024-00454
Analysis No. : 2024-AE317-014
Report No. : 2024-RAAS435
Report Date : September 16, 2024

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
08:00-09:00	54.2	85.2	59.8	56.7	46.0	37.9
09:00-10:00	54.0	83.5	59.4	56.1	45.3	39.6
10:00-11:00	54.5	79.4	62.4	55.6	46.3	42.2
11:00-12:00	51.0	77.4	58.0	53.3	41.3	35.4
12:00-13:00	50.1	78.0	54.0	50.6	40.3	35.9
13:00-14:00	51.8	77.7	58.5	53.3	42.0	36.9
14:00-15:00	48.8	71.7	53.8	51.2	45.9	42.8
15:00-16:00	54.6	70.7	58.0	57.2	53.5	50.8
16:00-17:00	50.7	72.2	56.8	53.8	45.3	42.4
17:00-18:00	45.6	63.6	50.1	48.7	43.5	39.9
18:00-19:00	48.8	66.0	52.8	51.6	47.3	43.8
19:00-20:00	56.8	64.1	57.9	57.7	56.6	55.7
20:00-21:00	61.5	66.4	62.2	62.0	61.4	60.9
21:00-22:00	61.7	64.0	62.4	62.2	61.6	61.1
22:00-23:00	61.3	65.5	61.9	61.8	61.2	60.9
23:00-00:00	60.8	62.5	61.4	61.2	60.7	60.3
00:00-01:00	59.7	61.8	60.4	60.2	59.6	59.1
01:00-02:00	62.1	65.8	62.9	62.7	61.9	61.3
02:00-03:00	65.4	70.9	66.1	65.9	65.2	64.7
03:00-04:00	64.6	75.4	65.4	65.2	64.5	63.9
04:00-05:00	60.5	70.4	61.8	61.3	60.4	59.5
05:00-06:00	52.6	70.0	57.6	53.9	50.6	49.6
06:00-07:00	56.6	79.0	62.7	60.0	46.9	42.2
07:00-08:00	53.5	73.7	58.5	55.0	44.4	39.5
24 Hours Measurement	58.9	85.2	60.8	59.7	58.3	57.7
Standard ¹⁾	70	115	-	-	-	-
Ldn	67.6	-	-	-	-	-

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 270 dated April 3, B.E.2540 (1997).

(Ms.Supawan Suwannapa)
Laboratory Reviewer

(Ms.Thanida Bunrungrueang)
Laboratory Supervisor

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 : โครงการผลิตบิโตรเลียมแหล่งผลิตบึงหน้าดงวันตก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจขออนุญาตหมายเลข L21/43
จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Measured Source : Ambient Noise
Measured Point : ฐานหลุมผลิต NS3 : N12 : บ้านเลขที่ 119 หมู่ที่ 4 ตำบลจันทนิมา (บ้านหนองทั้งสาม หมู่ที่ 4 ตำบลจันทนิมา
อำเภอลานกระบือ จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0584054 E, 1835467 N
Measured Date : August 30-31, 2024
Measured By : Mr.Kunakorn Ratanawongsa
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820934

Quotation No. : AR2024-00454
Analysis No. : 2024-AE317-014
Report No. : 2024-RAAS435
Report Date : September 16, 2024

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
08:00-09:00	51.2	74.6	58.8	54.2	43.0	36.6
09:00-10:00	53.7	78.3	61.1	56.6	44.3	38.6
10:00-11:00	51.0	77.4	58.8	51.1	41.5	31.6
11:00-12:00	45.3	74.1	45.0	46.8	42.4	40.1
12:00-13:00	44.5	59.3	50.6	45.1	35.4	32.4
13:00-14:00	44.7	59.2	51.9	45.0	35.0	32.6
14:00-15:00	45.9	73.9	51.7	48.0	37.4	34.4
15:00-16:00	47.3	77.8	52.5	49.1	37.4	33.0
16:00-17:00	48.2	59.7	55.0	51.8	38.5	32.2
17:00-18:00	48.9	71.3	54.1	51.6	41.2	36.8
18:00-19:00	44.2	55.4	45.3	47.5	41.2	38.2
19:00-20:00	52.2	58.7	53.7	53.4	52.0	50.8
20:00-21:00	58.4	53.0	55.2	59.0	58.3	57.7
21:00-22:00	58.6	51.1	55.3	59.2	58.5	57.9
22:00-23:00	59.7	70.9	61.1	60.4	59.6	59.0
23:00-00:00	58.4	53.0	55.1	59.0	58.2	57.7
00:00-01:00	56.5	54.4	57.5	57.3	56.4	55.7
01:00-02:00	59.5	56.9	60.6	60.3	59.4	58.5
02:00-03:00	64.5	56.9	65.3	65.1	64.4	63.8
03:00-04:00	64.7	58.6	65.5	65.3	64.5	63.9
04:00-05:00	60.9	77.7	62.1	61.6	60.7	59.9
05:00-06:00	55.1	82.5	62.1	57.2	47.7	45.9
06:00-07:00	53.5	85.9	55.2	56.8	47.8	42.5
07:00-08:00	52.8	86.4	55.0	55.3	46.4	39.1
24 Hours Measurement	57.4	86.4	55.6	58.3	56.8	56.1
Standard ¹⁾	70	115	-	-	-	-
Ldn	66.5	-	-	-	-	-

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 270 dated April 3, B.E.2540 (1997).

(Ms.Supawan Suwannapa)
Laboratory Reviewer

(Ms.Thanida Bunrungueang)
Laboratory Supervisor

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 : โครงการผลิตบิโตรเลียมแหล่งผลิตบึงหน้าดงวันตก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจขออนุญาตหมายเลข L21/43
จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Measured Source : Ambient Noise
Measured Point : ฐานหลุมผลิต NS3 : N12 : บ้านเลขที่ 119 หมู่ที่ 4 ตำบลจันทนิมา (บ้านหนองทั้งสาม หมู่ที่ 4 ตำบลจันทนิมา
อำเภอลานกระบือ จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0584054 E, 1835467 N
Measured Date : August 31-September 1, 2024
Measured By : Mr.Kunakorn Ratanawongsa
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820934

Quotation No. : AR2024-00454
Analysis No. : 2024-AE317-014
Report No. : 2024-RAAS435
Report Date : September 16, 2024

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
08:00-09:00	51.9	83.4	58.1	55.7	43.4	36.9
09:00-10:00	50.0	83.3	56.2	53.3	43.6	38.7
10:00-11:00	46.1	67.5	53.0	50.2	38.6	34.5
11:00-12:00	44.3	63.1	49.2	47.2	41.3	37.3
12:00-13:00	48.6	67.7	54.3	51.3	43.8	40.5
13:00-14:00	48.1	76.5	52.0	49.4	40.8	33.6
14:00-15:00	49.3	77.9	52.6	49.9	39.9	35.1
15:00-16:00	49.2	73.5	57.5	50.0	38.8	34.8
16:00-17:00	46.0	74.3	49.8	46.6	38.2	35.7
17:00-18:00	46.9	76.7	51.3	47.2	38.9	36.1
18:00-19:00	43.5	69.5	47.7	44.5	39.4	36.5
19:00-20:00	53.3	68.9	54.4	54.0	53.1	52.1
20:00-21:00	57.4	78.0	58.1	57.9	57.3	56.7
21:00-22:00	56.6	75.2	57.7	57.1	56.3	55.7
22:00-23:00	56.3	59.3	57.4	57.1	56.2	55.5
23:00-00:00	55.9	64.2	56.7	56.5	55.8	55.2
00:00-01:00	54.8	58.6	55.6	55.4	54.7	54.1
01:00-02:00	53.9	62.0	55.0	54.7	53.8	53.2
02:00-03:00	60.7	74.2	61.8	61.6	60.6	59.6
03:00-04:00	63.5	70.8	64.4	64.2	63.4	62.8
04:00-05:00	60.9	73.3	62.1	61.7	60.8	59.7
05:00-06:00	52.0	69.7	56.5	53.4	49.8	48.4
06:00-07:00	50.0	70.4	56.2	52.7	45.3	43.2
07:00-08:00	48.8	71.7	55.2	51.6	43.8	40.1
24 Hours Measurement	55.4	83.4	57.4	56.4	54.9	54.0
Standard ¹⁾	70	115	-	-	-	-
Ldn	64.3	-	-	-	-	-

Remark : ²⁾ 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 270 dated April 3, B.E.2540 (1997).

(Ms.Supawan Suwannapa)
Laboratory Reviewer

(Ms.Thanida Bunrungueang)
Laboratory Supervisor

รายงานผลการตรวจวัดเสียงรบกวน

ชื่อลูกค้า : บริษัท วิชั่นดี คอนสตรัคชั่น จำกัด
ที่ปรึกษา : เลขที่ 101/22 หมู่ที่ 2 ซอยมณีเษมา ซอย 3 ตำบลโพธิ์มา อำเภอบึงนาราง จังหวัดพิจิตร 31000
ชื่อโครงการ : โครงการผลิตบิโตรเลียมน้ำดื่มผลิตหนึ่งหน่วยบริโภค-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจถนนหมายเลข L21/43 จังหวัดสุโขทัย และกำแพงเพชร
ที่ตั้งโครงการ : จังหวัดสุโขทัย และกำแพงเพชร
ประเภทของแหล่งกำเนิด : เสียงรบกวนกรณี 4 เกิดจากการผลิตบิโตรเลียมน้ำดื่ม
บริเวณที่ตรวจวัดเสียงขณะมีการรบกวน : ฐานหลุมผลิต NS2 : N9 : ป้ายเลขที่ 2 หมู่ที่ 4 ตำบลจันทิมา UTM (WGS84) 47Q 0583951 E, 1834258 N หมายเลขใบเสนอราคา : AR2024-00454
บริเวณที่ตรวจวัดเสียงขณะไม่มีการรบกวน : จุดอ้างอิง UTM (WGS84) 47Q 0583172 E, 1834508 N หมายเลขปฏิบัติการ : 2024-AE317-013
ตรวจวัดโดย : นายคุณากร รัตนวงษา หมายเลขรายงานผล : 2024-RAAS434
วิเคราะห์โดย : บริษัท เอ็นไวรอนเม้นท์ รีเสิร์ช แอนด์ เทคโนโลยี จำกัด วันที่รายงานผล : 16 กันยายน 2567
เครื่องมือที่ใช้ตรวจวัด : เครื่องวัดระดับเสียง Scarlet Tech Model ST-11D Serial Number 820966, เครื่องวัดระดับเสียง Scarlet Tech Model ST-11D Serial Number 820801

ระดับเสียงขณะเกิดเสียงของแหล่งกำเนิด			ระดับเสียงขณะไม่มีการรบกวน				การคำนวณระดับการรบกวน ¹⁾					มาตรฐาน ²⁾	สรุปผล
วันที่	ช่วงเวลา	ระดับเสียงเฉลี่ย (L _{Aeq,Ts} ; dB(A))	วันที่	ช่วงเวลา	ระดับเสียงเฉลี่ย 5 นาที (L _{Aeq,5} ; dB(A))	ระดับเสียงพื้นฐาน (L ₉₀ ; dB(A))	ระยะเวลาของช่วงเวลาที่แหล่งกำเนิดเกิดเสียง (Ts; นาที)	ระดับเสียงขณะมีการรบกวน (L _{Aeq,Ts} ; dB(A))	กรณี 4 บวกเพิ่ม 3 dB(A)	กรณี 5 บวกเพิ่ม 5 dB(A)	ระดับการรบกวน		
29 ส.ค. 67	23:15-23:20	58.6	29 ส.ค. 67	23:25-23:30	52.6	51.0	5	57.3	60.3	-	9.3	≤10	ไม่เป็นเสียงรบกวน
30 ส.ค. 67	23:15-23:20	60.0	30 ส.ค. 67	23:30-23:35	53.8	52.3	5	58.8	61.8	-	9.5	≤10	ไม่เป็นเสียงรบกวน
1 ก.ย. 67	00:05-00:10	58.8	1 ก.ย. 67	00:30-00:35	52.8	50.9	5	57.5	60.5	-	9.6	≤10	ไม่เป็นเสียงรบกวน

หมายเหตุ : ¹⁾ ประกาศคณะกรรมการควบคุมมลพิษ เรื่อง วิธีการตรวจวัดระดับเสียงพื้นฐาน ระดับเสียงขณะไม่มีการรบกวน การตรวจวัดและคำนวณระดับเสียงขณะมีการรบกวน การคำนวณระดับการรบกวน และแบบฉบับวิธีการตรวจวัดเสียงรบกวน พ.ศ. 2555
²⁾ ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 29 (พ.ศ. 2550) เรื่อง ค่าระดับเสียงรบกวน



(นางสาวสุภาวรรณ สุวรรณภา)
ผู้ทำหน้า



(นางสาวธิดา บุญรุ่งเรือง)
ผู้ควบคุมการตรวจวัด

คำนี้จัดทำขึ้นโดยหน่วยงานเพื่อเป็นเอกสารอ้างอิง โดยไม่ได้เป็นเอกสารจากบริษัท เอ็นไวรอนเม้นท์ รีเสิร์ช แอนด์ เทคโนโลยี จำกัด เป็นเอกสารเชิงเทคนิค
รายงานนี้เป็นเอกสารที่จัดทำขึ้นเพื่อใช้ในการวิเคราะห์ และคำนวณเท่านั้น
หน้า 1/1

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

รายงานผลการตรวจวัดเสียงรบกวน

ชื่อลูกค้า : บริษัท วิชั่นดี คอนสตรัคชั่น จำกัด
ที่ปรึกษา : เลขที่ 101/22 หมู่ที่ 2 ซอยมณีเษมา ซอย 3 ตำบลโพธิ์มา อำเภอบึงนาราง จังหวัดพิจิตร 31000
ชื่อโครงการ : โครงการผลิตบิโตรเลียมน้ำดื่มผลิตหนึ่งหน่วยบริโภค-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจถนนหมายเลข L21/43 จังหวัดสุโขทัย และกำแพงเพชร
ที่ตั้งโครงการ : จังหวัดสุโขทัย และกำแพงเพชร
ประเภทของแหล่งกำเนิด : เสียงรบกวนกรณี 4 เกิดจากการผลิตบิโตรเลียมน้ำดื่ม
บริเวณที่ตรวจวัดเสียงขณะมีการรบกวน : ฐานหลุมผลิต NS3 : N12 : ป้ายเลขที่ 119 หมู่ที่ 4 ตำบลจันทิมา UTM (WGS84) 47Q 0584054 E, 1835467 N หมายเลขใบเสนอราคา : AR2024-00454
บริเวณที่ตรวจวัดเสียงขณะไม่มีการรบกวน : จุดอ้างอิง UTM (WGS84) 47Q 0584069 E, 1835552 N หมายเลขปฏิบัติการ : 2024-AE317-014
ตรวจวัดโดย : นายคุณากร รัตนวงษา หมายเลขรายงานผล : 2024-RAAS436
วิเคราะห์โดย : บริษัท เอ็นไวรอนเม้นท์ รีเสิร์ช แอนด์ เทคโนโลยี จำกัด วันที่รายงานผล : 16 กันยายน 2567
เครื่องมือที่ใช้ตรวจวัด : เครื่องวัดระดับเสียง Scarlet Tech Model ST-11D Serial Number 820934, เครื่องวัดระดับเสียง Scarlet Tech Model ST-11D Serial Number 820870

ระดับเสียงขณะเกิดเสียงของแหล่งกำเนิด			ระดับเสียงขณะไม่มีการรบกวน			การคำนวณระดับการรบกวน ¹⁾					มาตรฐาน ²⁾	สรุปผล	
วันที่	ช่วงเวลา	ระดับเสียงเฉลี่ย (L _{Aeq,Ts} ; dB(A))	วันที่	ช่วงเวลา	ระดับเสียงเฉลี่ย 5 นาที (L _{Aeq,5} ; dB(A))	ระดับเสียงพื้นฐาน (L ₉₀ ; dB(A))	ระยะเวลาของช่วงเวลาที่แหล่งกำเนิดเกิดเสียง (Ts; นาที)	ระดับเสียงขณะมีการรบกวน (L _{Aeq,Ts} ; dB(A))	กรณี 4 บวกเพิ่ม 3 dB(A)	กรณี 5 บวกเพิ่ม 5 dB(A)			ระดับการรบกวน
29 ส.ค. 67	22:35-22:40	61.2	29 ส.ค. 67	22:00-22:05	54.9	53.5	5	60.0	63.0	-	9.5	≤10	ไม่เป็นเสียงรบกวน
30 ส.ค. 67	22:30-22:35	59.5	30 ส.ค. 67	22:20-22:25	53.3	52.0	5	58.3	61.3	-	9.3	≤10	ไม่เป็นเสียงรบกวน
31 ส.ค. 67	23:20-23:25	56.1	31 ส.ค. 67	23:55-00:00	50.6	50.0	5	54.7	57.7	-	7.7	≤10	ไม่เป็นเสียงรบกวน

หมายเหตุ : ¹⁾ ประกาศคณะกรรมการควบคุมมลพิษ เรื่อง วิธีการตรวจวัดระดับเสียงพื้นฐาน ระดับเสียงขณะไม่มีการรบกวน การตรวจวัดและคำนวณระดับเสียงขณะมีการรบกวน การคำนวณระดับการรบกวน และแบบฉบับวิธีการตรวจวัดเสียงรบกวน พ.ศ. 2555
²⁾ ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 29 (พ.ศ. 2550) เรื่อง ค่าระดับเสียงรบกวน



(นางสาวสุภาวรรณ สุวรรณภา)
ผู้ทำหน้า



(นางสาวธิดา บุญรุ่งเรือง)
ผู้ควบคุมการตรวจวัด

คำนี้จัดทำขึ้นโดยหน่วยงานเพื่อเป็นเอกสารอ้างอิง โดยไม่ได้เป็นเอกสารจากบริษัท เอ็นไวรอนเม้นท์ รีเสิร์ช แอนด์ เทคโนโลยี จำกัด เป็นเอกสารเชิงเทคนิค
รายงานนี้เป็นเอกสารที่จัดทำขึ้นเพื่อใช้ในการวิเคราะห์ และคำนวณเท่านั้น
หน้า 1/1

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



บริษัท ซีเอ็นพีซีเอชเค (ไทยแลนด์) จำกัด

รายงานผลการปฏิบัติตามมาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม และมาตรการติดตามตรวจสอบผลกระทบสิ่งแวดล้อม
โครงการผลิตปิโตรเลียมแหล่งผลิตบึงน้ำตวันตก - หนองสระ (BYW – NS) (ส่วนขยาย)
แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และกำแพงเพชร
ฉบับเดือนมกราคม - ธันวาคม พ.ศ.2567

v

ภาคผนวก ง.3

คุณภาพน้ำผิวดิน

ฤดูแล้ง

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeaya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปุ๋ยอินทรีย์จากเศษอาหารและขยะ (BYW-NS) (ส่วนขยาย) แปลงสำรวจแบบหมายเลข L21/43
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : ฐานหลุมผลิต NS2 : SW3 : คลองชลประทาน (บ้านบึงช้าง) (แผนที่ 7 ตำบลจันทิมา อำเภอลาดหญ้า จังหวัดสุโขทัย)
GPS. Coordinate : UTM (WGS84) 47Q 0585073 E, 1834262 N
Sampling Date : March 26, 2024
Sampling Time : 10:03
Sampling Method : Grab
Sampling By : Mr.Romsea Kateh
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Light Yellow, Sediment, Odorless

Quotation No. : AR2024-00454
Analysis No. : 2024-AB318-001
Received Date : March 28, 2024
Analytical Date : March 28-April 26, 2024
Report No. : 2024-RAAF648
Report Date : April 29, 2024

Parameter	Unit	Method of Analysis ¹	MRL	Result	Standard ²	
					Class 3	Class 4
Temperature	°C	Certified Thermometer	-	30.3	n'	n'
pH	-	Electrometric	-	8.6	5.0-9.0	5.0-9.0
Dissolved Oxygen	mg/L	Azide Modification	1.0	5.6	≥4.0	≥2.0
Biochemical Oxygen Demand	mg/L	5-Day BOD Test, Membrane Electrode	1.0	5.1	2.0	4.0
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	0.021	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	0.340	1.0	1.0
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.05	1.0	1.0
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.005 ³	0.005 ³
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	0.0002	0.01	0.01
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.07	-	-
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	2.1	-	-
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	187	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	<0.1	-	-
Total Dissolved Solids	mg/L	Dried at 180°C	50	128	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	20	-	-

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeaya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปุ๋ยอินทรีย์จากเศษอาหารและขยะ (BYW-NS) (ส่วนขยาย) แปลงสำรวจแบบหมายเลข L21/43
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : ฐานหลุมผลิต NS2 : SW3 : คลองชลประทาน (บ้านบึงช้าง) (แผนที่ 7 ตำบลจันทิมา อำเภอลาดหญ้า จังหวัดสุโขทัย)
GPS. Coordinate : UTM (WGS84) 47Q 0585073 E, 1834262 N
Sampling Date : March 26, 2024
Sampling Time : 10:03
Sampling Method : Grab
Sampling By : Mr.Romsea Kateh
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Light Yellow, Sediment, Odorless

Quotation No. : AR2024-00454
Analysis No. : 2024-AB318-001
Received Date : March 28, 2024
Analytical Date : March 28-April 26, 2024
Report No. : 2024-RAAF648
Report Date : April 29, 2024

Parameter	Unit	Method of Analysis ¹	MRL	Result	Standard ²	
					Class 3	Class 4
TPH (Gasoline Range Hydrocarbons; C4-C6)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-
TPH (Kerosene Range Hydrocarbons; C10-C14)	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Diesel Range Hydrocarbons; C15-C30)	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Heavy Oil Range Hydrocarbons; C30-C36)	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-

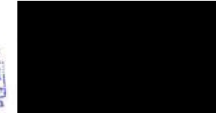
Remark : ¹ Standard Method for Examination of Water and Wastewater, 24th Edition, 2023.

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 CaCO₃ (Hardness as CaCO₃ is 73 mg/L)

n' = naturally but changing not more than 3°C


(Ms. Yuwadee Na Ranong)
Laboratory Reviewer


(Mr. Virat Hemvannanukul)
Laboratory Supervisor

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 : โครงการผลิตยี่โถโรตารีแห้งผลัดวันตาก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนถนนหมายเลข L21/43
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : ฐานหลุมผลิต NS3 : SW4 : คลองชลประทาน (บ้านทรายทอง) (หมู่ที่ 9 ตำบลหนองหลวง ตำบลฉนวนกระปี่ จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0582690 E, 1836116 N
Sampling Date : March 25, 2024
Sampling Time : 11:25
Sampling Method : Grab
Sampling By : Mr.Romsea Kateh
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Light Yellow, Sediment, Odorless

Quotation No. : AR2024-00454
Analysis No. : 2024-AB233-001
Received Date : March 26, 2024
Analytical Date : March 26-April 26, 2024
Report No. : 2024-RAAF496
Report Date : April 29, 2024

Parameter	Unit	Method of Analysis ^{1'}	MRL	Result	Standard ^{2'}	
					Class 3	Class 4
Temperature	°C	Certified Thermometer	-	30.0	n'	n'
pH	-	Electrometric	-	7.8	5.0-9.0	5.0-9.0
Dissolved Oxygen	mg/L	Azide Modification	1.0	1.0	≥4.0	≥2.0
Biochemical Oxygen Demand	mg/L	5-Day BOD Test, Membrane Electrode	1.0	2.0	2.0	4.0
Fecal Coliform Bacteria	MPN/100 mL	Most Probable Number	1.8	1,400	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	0.672	1.0	1.0
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.05	1.0	1.0
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.005 ^{3'}	0.005 ^{3'}
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	0.003	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	0.07	-	-
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	1.9	-	-
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	<0.005	-	-
Conductivity	µS/cm	Electrical Conductivity Meter	0.1	200	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	<0.1	-	-
Total Dissolved Solids	mg/L	Dried at 180°C	50	148	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	15	-	-

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 : โครงการผลิตยี่โถโรตารีแห้งผลัดวันตาก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนถนนหมายเลข L21/43
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : ฐานหลุมผลิต NS3 : SW4 : คลองชลประทาน (บ้านทรายทอง) (หมู่ที่ 9 ตำบลหนองหลวง ตำบลฉนวนกระปี่ จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0582690 E, 1836116 N
Sampling Date : March 25, 2024
Sampling Time : 11:25
Sampling Method : Grab
Sampling By : Mr.Romsea Kateh
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Light Yellow, Sediment, Odorless

Quotation No. : AR2024-00454
Analysis No. : 2024-AB233-001
Received Date : March 26, 2024
Analytical Date : March 26-April 26, 2024
Report No. : 2024-RAAF496
Report Date : April 29, 2024

Parameter	Unit	Method of Analysis ^{1'}	MRL	Result	Standard ^{2'}	
					Class 3	Class 4
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 ₂₄)	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Heavy Oil Range Hydrocarbons; C ₂₅ -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, 23rd Edition, 2017.
^{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 CaCO₃ (Hardness as CaCO₃ is 58 mg/l)
n' = naturally but changing not more than 3°C

(Ms.Yuwadee Na Ranong)
Laboratory Reviewer

(Mr.Virat Hemvannanukul)
Laboratory Supervisor

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Sol 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตน้ำประปาเพื่อเลี้ยงคอกหมูและเลี้ยงไก่ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนถนนหมายเลข L21/43
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : ฐานหลุมผลิต NS3 : SW5 : คลองชลประทาน (บ้านหนองหุ้ง) (หมู่ที่ 4 ตำบลจันทน์ อำเภอลานกระบือ จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0583505 E, 1835418 N
Sampling Date : March 26, 2024
Sampling Time : 09:19
Sampling Method : Grab
Sampling By : Mr.Romsea Kateh
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Light Yellow, Sediment, Odorless

Quotation No. : AR2024-00454
Analysis No. : 2024-AB318-002
Received Date : March 28, 2024
Analytical Date : March 28-April 26, 2024
Report No. : 2024-RAAF649
Report Date : April 5, 2024

Parameter	Unit	Method of Analysis ¹	MRL	Result	Standard ²	
					Class 3	Class 4
Temperature	°C	Certified Thermometer	-	30.0	n ³	n ³
pH	-	Electrometric	-	7.7	5.0-9.0	5.0-9.0
Dissolved Oxygen	mg/L	Azide Modification	1.0	1.0	≥4.0	≥2.0
Biochemical Oxygen Demand	mg/L	5-Day BOD Test, Membrane Electrode	1.0	2.2	2.0	4.0
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	0.009	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	0.769	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
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	0.06	-	-
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	2.3	-	-
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	207	-	-
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	15	-	-

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Sol 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตน้ำประปาเพื่อเลี้ยงคอกหมูและเลี้ยงไก่ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนถนนหมายเลข L21/43
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : ฐานหลุมผลิต NS3 : SW5 : คลองชลประทาน (บ้านหนองหุ้ง) (หมู่ที่ 4 ตำบลจันทน์ อำเภอลานกระบือ จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0583505 E, 1835418 N
Sampling Date : March 26, 2024
Sampling Time : 09:19
Sampling Method : Grab
Sampling By : Mr.Romsea Kateh
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Light Yellow, Sediment, Odorless

Quotation No. : AR2024-00454
Analysis No. : 2024-AB318-002
Received Date : March 28, 2024
Analytical Date : March 28-April 26, 2024
Report No. : 2024-RAAF649
Report Date : April 5, 2024

Parameter	Unit	Method of Analysis ¹	MRL	Result	Standard ²	
					Class 3	Class 4
TPH (Gasoline Range Hydrocarbons; C ₆ -C ₈)	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, 23rd Edition, 2017.
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 CaCO₃ (hardness as CaCO₃ is 61 mg/l)
n³ = naturally but changing not more than 3°C

(Ms.Yuwadee Na Ranong)
Laboratory Reviewer

(Mr.Virat Hemvannanukul)
Laboratory Supervisor

ฤดูฝน

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11010
Project Name : โครงการผลิตปุ๋ยอินทรีย์แอมโมเนียมจากกาก-ของเสีย (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนบกหมายเลข L21/43
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : ฐานหลุมผลิต NS2 : SW3 : คลองชลประทาน (บ้านวังช้าง) (แผนที่ 7 ตำบลจันทิมา อำเภอลานกระบี่
จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0585073 E, 1834262 N
Sampling Date : August 29, 2024
Sampling Time : 09:53
Sampling Method : Grab
Sampling By : Mr.Suchapong Rungreang
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Light Yellow, Sediment, Odorless

Quotation No. : AR2024-00454
Analysis No. : 2024-AE276-001
Received Date : August 30, 2024
Analytical Date : August 30-September 16, 2024
Report No. : 2024-RAAR950
Report Date : September 16, 2024

Parameter	Unit	Method of Analysis ¹	MRL	Result	Standard ²	
					Class 3	Class 4
Temperature	°C	Certified Thermometer	-	31.0	n ³	n ³
pH	-	Electrometric	-	8.7	5.0-9.0	5.0-9.0
Dissolved Oxygen	mg/L	Azide Modification	1.0	2.8	≥4.0	≥2.0
Biochemical Oxygen Demand	mg/L	5-Day BOD Test, Membrane Electrode	1.0	2.8	2.0	4.0
Fecal Coliform Bacteria	MPN/100 mL	Most Probable Number	1.8	16,000	4,000	-
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.028	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	0.657	1.0	1.0
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.07	1.0	1.0
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.005 ³	0.005 ³
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	0.007	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	0.0007	0.01	0.01
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.12	-	-
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	3.0	-	-
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	0.006	-	-
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	210	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	0.1	-	-
Total Dissolved Solids	mg/L	Dried at 180°C	50	177	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	50	116	-	-

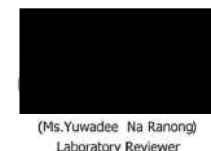
ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปุ๋ยอินทรีย์แอมโมเนียมจากกาก-ของเสีย (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนบกหมายเลข L21/43
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : ฐานหลุมผลิต NS2 : SW3 : คลองชลประทาน (บ้านวังช้าง) (แผนที่ 7 ตำบลจันทิมา อำเภอลานกระบี่
จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0585073 E, 1834262 N
Sampling Date : August 29, 2024
Sampling Time : 09:53
Sampling Method : Grab
Sampling By : Mr.Suchapong Rungreang
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Light Yellow, Sediment, Odorless

Quotation No. : AR2024-00454
Analysis No. : 2024-AE276-001
Received Date : August 30, 2024
Analytical Date : August 30-September 16, 2024
Report No. : 2024-RAAR950
Report Date : September 16, 2024

Parameter	Unit	Method of Analysis ¹	MRL	Result	Standard ²	
					Class 3	Class 4
TPH (Gasoline Range Hydrocarbons; C6-C9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-
TPH (Kerosene Range Hydrocarbons; C10-C14)	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Diesel Range Hydrocarbons; C15-C28)	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Heavy Oil Range Hydrocarbons; C29-C36)	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, E.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 CaCO₃ (Hardness as CaCO₃ is 63 mg/L)
⁴ n³ = naturally but changing not more than 3°C



(Ms.Yuwadee Na Ranong)
Laboratory Reviewer



(Mr.Virat Hemvannanukul)
Laboratory Supervisor

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 : โครงการพัฒนาระบบบำบัดน้ำเสียชุมชนตำบลบ้านดง-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจแบบกฎหมายเลข L21/43
จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : ฐานหลุมผลิต NS3 : SW4 : คลองชลประทาน (บ้านทรายทอง) (หมู่ที่ 9 ตำบลหนองหลวง อำเภอลานกระบี่
จังหวัดกำแพงเพชร)
: UTM (WGS84) 47Q 0582690 E, 1836116 N
GPS. Coordinate
Sampling Date : August 29, 2024
Sampling Time : 11:31
Sampling Method : Grab
Sampling By : Mr.Suchapong Rungrueang
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Light Yellow, Sediment, Odorless

Quotation No. : AR2024-00454
Analysis No. : 2024-AE276-002
Received Date : August 30, 2024
Analytical Date : August 30-September 16, 2024
Report No. : 2024-RAAR951
Report Date : September 16, 2024

Parameter	Unit	Method of Analysis ¹	MRL	Result	Standard ²	
					Class 3	Class 4
Temperature	°C	Certified Thermometer	-	31.1	n ³	n ³
pH	-	Electrometric	-	8.2	5.0-9.0	5.0-9.0
Dissolved Oxygen	mg/L	Azide Modification	1.0	2.3	≥4.0	≥2.0
Biochemical Oxygen Demand	mg/L	5-Day BOD Test, Membrane Electrode	1.0	1.1	2.0	4.0
Fecal Coliform Bacteria	MPN/100 mL	Most Probable Number	1.8	9,200	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	0.257	1.0	1.0
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.04	1.0	1.0
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.005 ³	0.005 ³
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	0.004	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	0.0012	0.01	0.01
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.07	-	-
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	2.1	-	-
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	269	-	-
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	29	-	-

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 : โครงการพัฒนาระบบบำบัดน้ำเสียชุมชนตำบลบ้านดง-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจแบบกฎหมายเลข L21/43
จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : ฐานหลุมผลิต NS3 : SW4 : คลองชลประทาน (บ้านทรายทอง) (หมู่ที่ 9 ตำบลหนองหลวง อำเภอลานกระบี่
จังหวัดกำแพงเพชร)
: UTM (WGS84) 47Q 0582690 E, 1836116 N
GPS. Coordinate
Sampling Date : August 29, 2024
Sampling Time : 11:31
Sampling Method : Grab
Sampling By : Mr.Suchapong Rungrueang
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Light Yellow, Sediment, Odorless

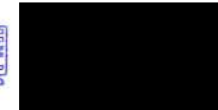
Quotation No. : AR2024-00454
Analysis No. : 2024-AE276-002
Received Date : August 30, 2024
Analytical Date : August 30-September 16, 2024
Report No. : 2024-RAAR951
Report Date : September 16, 2024

Parameter	Unit	Method of Analysis ¹	MRL	Result	Standard ²	
					Class 3	Class 4
TPH (Gasoline Range Hydrocarbons; C6-C9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-
TPH (Kerosene Range Hydrocarbons; C10-C14)	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Diesel Range Hydrocarbons; C15-C28)	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Heavy Oil Range Hydrocarbons; C29-C36)	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 CaCO₃ (Hardness as CaCO₃ is 85 mg/l)
n³ = naturally but changing not more than 3°C



(Ms.Yuwadee Na Ranong)
Laboratory Reviewer



(Mr.Virat Hemvannanukul)
Laboratory Supervisor

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 : โครงการผลิตปุ๋ยอินทรีย์ผสมแห้งผลัดใบจากกาก-ของเสีย (BYW-NS) (ส่วนขยาย) แปลงสำรวจแบบกฎหมายเลข L21/43
จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : ฐานหลุมผลิต NS3 : SW5 : คลองชลประทาน (บ้านหนองหึงส้ม) (หมู่ที่ 4 ตำบลจันทิมา อำเภอลานกระบือ
จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0583505 E, 1835418 N
Sampling Date : August 29, 2024
Sampling Time : 10:45
Sampling Method : Grab
Sampling By : Mr.Suchapong Rungrueng
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Light Yellow, Sediment, Odorless

Quotation No. : AR2024-00454
Analysis No. : 2024-AE276-003
Received Date : August 30, 2024
Analytical Date : August 30-September 16, 2024
Report No. : 2024-RAAR952
Report Date : September 16, 2024

Parameter	Unit	Method of Analysis ^{1*}	MRL	Result	Standard ^{2*}	
					Class 3	Class 4
Temperature	°C	Certified Thermometer	-	31.9	n ³	n ³
pH	-	Electrometric	-	8.2	5.0-9.0	5.0-9.0
Dissolved Oxygen	mg/L	Azide Modification	1.0	1.5	≥4.0	≥2.0
Biochemical Oxygen Demand	mg/L	5-Day BOD Test, Membrane Electrode	1.0	1.3	2.0	4.0
Fecal Coliform Bacteria	MPN/100 mL	Most Probable Number	1.8	16,000	4,000	-
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.011	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	0.609	1.0	1.0
Zinc	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.05	1.0	1.0
Cadmium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.003	<0.003	0.005 ^{3*}	0.005 ^{3*}
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	0.0007	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	2.3	-	-
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	242	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	0.1	-	-
Total Dissolved Solids	mg/L	Dried at 180°C	50	138	-	-
Total Suspended Solids	mg/L	Dried at 103-105°C	5.0	18	-	-

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 : โครงการผลิตปุ๋ยอินทรีย์ผสมแห้งผลัดใบจากกาก-ของเสีย (BYW-NS) (ส่วนขยาย) แปลงสำรวจแบบกฎหมายเลข L21/43
จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Surface Water Sampling
Sampling Point : ฐานหลุมผลิต NS3 : SW5 : คลองชลประทาน (บ้านหนองหึงส้ม) (หมู่ที่ 4 ตำบลจันทิมา อำเภอลานกระบือ
จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0583505 E, 1835418 N
Sampling Date : August 29, 2024
Sampling Time : 10:45
Sampling Method : Grab
Sampling By : Mr.Suchapong Rungrueng
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Light Yellow, Sediment, Odorless

Quotation No. : AR2024-00454
Analysis No. : 2024-AE276-003
Received Date : August 30, 2024
Analytical Date : August 30-September 16, 2024
Report No. : 2024-RAAR952
Report Date : September 16, 2024

Parameter	Unit	Method of Analysis ^{1*}	MRL	Result	Standard ^{2*}	
					Class 3	Class 4
TPH (Gasoline Range Hydrocarbons; C6-C8)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-
TPH (Kerosene Range Hydrocarbons; C10-C14)	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Diesel Range Hydrocarbons; C15-C28)	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-
TPH (Heavy Oil Range Hydrocarbons; C29-C36)	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 Rational 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 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 CaCO₃ (Hardness as CaCO₃ is 83 mg/l)
^{n³} = naturally but changing not more than 3°C



(Ms.Yuwadee Na Ranongi)
Laboratory Reviewer



(Mr.Virat Hemvannanukul)
Laboratory Supervisor



บริษัท ซีเอ็นพีซีเอชเค (ไทยแลนด์) จำกัด

รายงานผลการปฏิบัติตามมาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม และมาตรการติดตามตรวจสอบผลกระทบสิ่งแวดล้อม
โครงการผลิตปิโตรเลียมแหล่งผลิตบึงหญ้าตะวันตก - หนองสระ (BYW - NS) (ส่วนขยาย)
แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และกำแพงเพชร
ฉบับเดือนมกราคม - ธันวาคม พ.ศ.2567

ภาคผนวก ง.4

คุณภาพดินตะกอนท้องน้ำ

ฤดูแล้ง

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 : โครงการผลิตปิโตรเลียมแหล่งผลิตขีปนาวุธวันทอง-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : ฐานหลุมผลิต NS2 : OW1 : บ่อส่งผลการผลิตตั้งในฐานหลุมผลิตหนองสระ 2 (NS2) ในทิศทางห้วยน้ำ
GPS. Coordinate : UTM (WGS84) 47Q 0583883 E, 1834013 N
Sampling Date : March 26, 2024
Sampling Time : 08:47
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Light Yellow, Sediment, Odor

Quotation No. : AR2024-00454
Analysis No. : 2024-AB313-001
Received Date : March 28, 2024
Analytical Date : March 28-April 26, 2024
Report No. : 2024-RAAF635
Report Date : April 29, 2024

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
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	0.009	0.01	None	0.05
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.382	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	0.0002	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	2.4	-	≤0.5	1.0
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.05	-	-	-
Total Chromium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	-	-	-
Temperature	°C	Certified Thermometer	-	30.0	-	-	-
pH	-	Electrometric	-	7.4	-	7.0-8.5	6.5-9.2
Total Dissolved Solids	mg/L	Dried at 180°C	50	69	-	≤600	1,200
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	144	-	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	0.1	-	-	-

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 : โครงการผลิตปิโตรเลียมแหล่งผลิตขีปนาวุธวันทอง-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : ฐานหลุมผลิต NS2 : OW1 : บ่อส่งผลการผลิตตั้งในฐานหลุมผลิตหนองสระ 2 (NS2) ในทิศทางห้วยน้ำ
GPS. Coordinate : UTM (WGS84) 47Q 0583883 E, 1834013 N
Sampling Date : March 26, 2024
Sampling Time : 08:47
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Light Yellow, Sediment, Odor

Quotation No. : AR2024-00454
Analysis No. : 2024-AB313-001
Received Date : March 28, 2024
Analytical Date : March 28-April 26, 2024
Report No. : 2024-RAAF635
Report Date : April 29, 2024

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	-	-	-

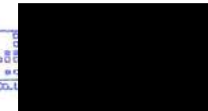
Remark : ^{1'} Standard Method for Examination of Water and Wastewater, 23rd Edition, 2017.

^{2'} Notification of the National Environment Board, No.26, 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 940, 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).



(Ms. Yuvadee Na Ranong)
Laboratory Reviewer



(Mr. Virat Hemvannanukul)
Laboratory Supervisor

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Sol 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการพัฒนาระบบบำบัดน้ำเสียจากโรงงานอุตสาหกรรม (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนถนนหมายเลข L21/43
จังหวัดสุโขทัย และกำแพงเพชร
จังหวัดสุโขทัย และกำแพงเพชร
Project Location :
Sampling Source : Ground Water Sampling
Sampling Point : ฐานหลุมผลิต NS3 : OW2 : ปะสงเคการกให้ดัดตั้งในฐานหลุมผลิตของสระ 3 (NS3) ในทิศทางท้ายน้ำ
GPS. Coordinate : UTM (WGS84) 47Q 0584132 E, 1835190 N
Sampling Date : March 26, 2024
Sampling Time : 08:24
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Light Yellow, Sediment, Odor

Quotation No. : AR2024-00454
Analysis No. : 2024-AB313-004
Received Date : March 28, 2024
Analytical Date : March 28-April 24, 2024
Report No. : 2024-RAAF638
Report Date : April 29, 2024

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
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.036	1.0	≤1.0	1.5
Lead	mg/L	Digestion, Electrothermal Atomic Absorption Spectrometry	0.001	0.004	0.01	None	0.05
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.928	0.5	≤0.3	0.5
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.028	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	0.0006	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	0.0008	0.001	None	0.001
Iron	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.1	20	-	≤0.5	1.0
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.16	-	-	-
Total Chromium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	-	-	-
Temperature	°C	Certified Thermometer	-	30.0	-	-	-
pH	-	Electrometric	-	7.4	-	7.0-8.5	6.5-9.2
Total Dissolved Solids	mg/L	Dried at 180°C	50	127	-	≤600	1,200
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	182	-	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	0.1	-	-	-

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Sol 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการพัฒนาระบบบำบัดน้ำเสียจากโรงงานอุตสาหกรรม (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนถนนหมายเลข L21/43
จังหวัดสุโขทัย และกำแพงเพชร
จังหวัดสุโขทัย และกำแพงเพชร
Project Location :
Sampling Source : Ground Water Sampling
Sampling Point : ฐานหลุมผลิต NS3 : OW2 : ปะสงเคการกให้ดัดตั้งในฐานหลุมผลิตของสระ 3 (NS3) ในทิศทางท้ายน้ำ
GPS. Coordinate : UTM (WGS84) 47Q 0584132 E, 1835190 N
Sampling Date : March 26, 2024
Sampling Time : 08:24
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Light Yellow, Sediment, Odor

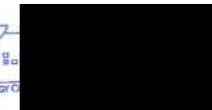
Quotation No. : AR2024-00454
Analysis No. : 2024-AB313-004
Received Date : March 28, 2024
Analytical Date : March 28-April 24, 2024
Report No. : 2024-RAAF638
Report Date : April 29, 2024

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, 23rd Edition, 2017.
^{2*} Notification of the National Environment Board, No.28, 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 940, 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 850, dated May 21, B.E.2551 (2008).



(Ms.Yuwadee Na Ranong)
Laboratory Reviewer



(Mr.Virat Hemvannanukul)
Laboratory Supervisor

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 : โครงการผลิตปุ๋ยอินทรีย์แบบอัดเม็ดจากมูลสัตว์ปีก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนถนนหมายเลข L21/43
จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : ฐานหลุมผลิต NS2 : GW5 : บ่อน้ำจาก หมู่ที่ 4 บ้านหนองทั้งสาม ตำบลจันทิมา (ต้นน้ำ) (ระบบประปาหมู่บ้าน)
อำเภอเมืองสุโขทัย จังหวัดกำแพงเพชร
GPS. Coordinate : UTM (WGS84) 47Q 0583797 E, 1835466 N
Sampling Date : March 25, 2024
Sampling Time : 17:35
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odorless

Quotation No. : AR2024-00454
Analysis No. : 2024-AB313-002
Received Date : March 28, 2024
Analytical Date : March 28-April 26, 2024
Report No. : 2024-RAAF636
Report Date : April 29, 2024

Parameter	Unit	Method of Analysis ²¹	MRL	Result	Standard ²²	Standard ²³	
						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
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	1.0	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	0.05	5.0	≤5.0	15
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0014	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	1.0	-	≤0.5	1.0
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.30	-	-	-
Total Chromium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	-	-	-
Temperature	°C	Certified Thermometer	-	29.0	-	-	-
pH	-	Electrometric	-	7.3	-	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	148	-	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	0.1	-	-	-

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 : โครงการผลิตปุ๋ยอินทรีย์แบบอัดเม็ดจากมูลสัตว์ปีก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนถนนหมายเลข L21/43
จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : ฐานหลุมผลิต NS2 : GW5 : บ่อน้ำจาก หมู่ที่ 4 บ้านหนองทั้งสาม ตำบลจันทิมา (ต้นน้ำ) (ระบบประปาหมู่บ้าน)
อำเภอเมืองสุโขทัย จังหวัดกำแพงเพชร
GPS. Coordinate : UTM (WGS84) 47Q 0583797 E, 1835466 N
Sampling Date : March 25, 2024
Sampling Time : 17:35
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odorless

Quotation No. : AR2024-00454
Analysis No. : 2024-AB313-002
Received Date : March 28, 2024
Analytical Date : March 28-April 26, 2024
Report No. : 2024-RAAF636
Report Date : April 29, 2024

Parameter	Unit	Method of Analysis ²¹	MRL	Result	Standard ²²	Standard ²³	
						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	-	-	-

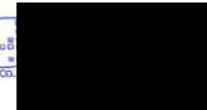
Remark : ²¹ Standard Method for Examination of Water and Wastewater, 23rd Edition, 2017.

²² Notification of the National Environment Board, No.28, 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 940, dated September 15, B.E.2543 (2000).

²³ Notification of the Ministry of Natural Resources and Environment B.E.2551 (2008), published in the Royal Government Gazette, Vol.125, Part 850, dated May 21, B.E.2551 (2008).



(Ms.Yuwadee Na Ranong)
Laboratory Reviewer



(Mr.Virat Hemvannanukul)
Laboratory Supervisor

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 : โครงการผลิตปิโตรเลียมแหล่งผลิตอู่ทองตะวันตก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนบกหมายเลข L21/43
จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : ฐานหลุมผลิต NS2 : GW6 : บ่อน้ำจาก หมู่ที่ 1 บ้านหนองจิก ตำบลจันทิมา (ท้ายน้ำ) (ระบบประปาหมู่บ้าน)
ตำบลลานกระบือ จังหวัดกำแพงเพชร
GPS. Coordinate : UTM (WGS84) 47Q 0587342 E, 1835090 N
Sampling Date : March 25, 2024
Sampling Time : 17:05
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odorless

Quotation No. : AR2024-00454
Analysis No. : 2024-AB313-003
Received Date : March 28, 2024
Analytical Date : March 28-April 26, 2024
Report No. : 2024-RAAF637
Report Date : April 29, 2024

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
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	<0.001	0.01	None	0.05
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.855	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	0.0036	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	1.0	-	≤0.5	1.0
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.32	-	-	-
Total Chromium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	-	-	-
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	162	-	≤600	1,200
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	211	-	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	0.1	-	-	-

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 : โครงการผลิตปิโตรเลียมแหล่งผลิตอู่ทองตะวันตก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนบกหมายเลข L21/43
จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : ฐานหลุมผลิต NS2 : GW6 : บ่อน้ำจาก หมู่ที่ 1 บ้านหนองจิก ตำบลจันทิมา (ท้ายน้ำ) (ระบบประปาหมู่บ้าน)
ตำบลลานกระบือ จังหวัดกำแพงเพชร
GPS. Coordinate : UTM (WGS84) 47Q 0587342 E, 1835090 N
Sampling Date : March 25, 2024
Sampling Time : 17:05
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odorless

Quotation No. : AR2024-00454
Analysis No. : 2024-AB313-003
Received Date : March 28, 2024
Analytical Date : March 28-April 26, 2024
Report No. : 2024-RAAF637
Report Date : April 29, 2024

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	-	-	-

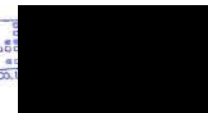
Remark : ^{1*} Standard Method for Examination of Water and Wastewater, 23rd Edition, 2017.

^{2*} Notification of the National Environment Board, No.24, 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 940, 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).



(Ms.Yuwadee Na Ranong)
Laboratory Reviewer



(Mr.Virat Hemvannanukul)
Laboratory Supervisor

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 : โครงการผลิตไบโอดีเซลจากเมล็ดพืชและกากมันสำปะหลัง (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนถนนหมายเลข L21/43
จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : ฐานหลุมผลิต NS3 : GWS : ป่านาตา หมู่ที่ 4 บ้านหนองทั้งสาม ตำบลจันทิมา (ต้นน้ำ) (ระบบประปาหมู่บ้าน)
อำเภอละลานกระโดง จังหวัดกำแพงเพชร
GPS. Coordinate : UTM (WGS84) 47Q 0583797 E, 1835466 N
Sampling Date : March 25, 2024
Sampling Time : 17:35
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odorless

Quotation No. : AR2024-00454
Analysis No. : 2024-AB313-006
Received Date : March 28, 2024
Analytical Date : March 28-April 26, 2024
Report No. : 2024-RAAF640
Report Date : April 29, 2024

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
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	1.0	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	0.05	5.0	≤5.0	15
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0014	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	1.0	-	≤0.5	1.0
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.30	-	-	-
Total Chromium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	-	-	-
Temperature	°C	Certified Thermometer	-	29.0	-	-	-
pH	-	Electrometric	-	7.3	-	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	148	-	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	0.1	-	-	-

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 : โครงการผลิตไบโอดีเซลจากเมล็ดพืชและกากมันสำปะหลัง (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนถนนหมายเลข L21/43
จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : ฐานหลุมผลิต NS3 : GWS : ป่านาตา หมู่ที่ 4 บ้านหนองทั้งสาม ตำบลจันทิมา (ต้นน้ำ) (ระบบประปาหมู่บ้าน)
อำเภอละลานกระโดง จังหวัดกำแพงเพชร
GPS. Coordinate : UTM (WGS84) 47Q 0583797 E, 1835466 N
Sampling Date : March 25, 2024
Sampling Time : 17:35
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odorless

Quotation No. : AR2024-00454
Analysis No. : 2024-AB313-006
Received Date : March 28, 2024
Analytical Date : March 28-April 26, 2024
Report No. : 2024-RAAF640
Report Date : April 29, 2024

Parameter	Unit	Method of Analysis ^{1*}	MRL	Result	Standard ^{2*}	Standard ^{3*}	
						Suitable Allowance	Maximum Allowable
TPH (Gasoline Range Hydrocarbons; C4-C9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-	-
TPH (Kerosene Range Hydrocarbons; C10-C14)	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Diesel Range Hydrocarbons; C15-C28)	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Heavy Oil Range Hydrocarbons; C29-C38)	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-

Remark : ^{1*} Standard Method for Examination of Water and Wastewater, 23rd Edition, 2017.

^{2*} Notification of the National Environment Board, No.28, 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 940, 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 850, dated May 21, B.E.2551 (2008).

(Ms.Yuwadee Na Ranong)
Laboratory Reviewer

(Mr.Virat Nethvannaratkul)
Laboratory Supervisor

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 : โครงการผลิตไบโอดีเซลจากเมล็ดพืชและกากมันสำปะหลัง (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนถนนหมายเลข L21/43
จังหวัดสุโขทัย และกำแพงเพชร
จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : ฐานหลุมผลิต NS3 : GW6 : บ่อน้ำบาดาล หมู่ที่ 1 บ้านหนองจิก ตำบลจันทิมา (ท้ายน้ำ) (ระบบประปาหมู่บ้าน)
อำเภอลานกระบือ จังหวัดกำแพงเพชร
GPS. Coordinate : UTM (WGS84) 47Q 0587342 E, 1835090 N
Sampling Date : March 25, 2024
Sampling Time : 17:05
Sampling Method : Mr.Vitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odorless

Quotation No. : AR2024-00454
Analysis No. : 2024-AB313-007
Received Date : March 28, 2024
Analytical Date : March 28-April 26, 2024
Report No. : 2024-RAAF641
Report Date : April 29, 2024

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 Spectrometry (GC-MS)	1.0	<1.0	5	-	-
Ethylbenzene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometry (GC-MS)	1.0	<1.0	700	-	-
Toluene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometry (GC-MS)	1.0	<1.0	1,000	-	-
Total Xylene	µg/L	Purge and Trap, Gas Chromatographic Mass Spectrometry (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
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	<0.001	0.01	None	0.05
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.855	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	0.0036	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	1.0	-	≤0.5	1.0
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.32	-	-	-
Total Chromium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	-	-	-
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	162	-	≤600	1,200
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	211	-	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	0.1	-	-	-

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 : โครงการผลิตไบโอดีเซลจากเมล็ดพืชและกากมันสำปะหลัง (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนถนนหมายเลข L21/43
จังหวัดสุโขทัย และกำแพงเพชร
จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : ฐานหลุมผลิต NS3 : GW6 : บ่อน้ำบาดาล หมู่ที่ 1 บ้านหนองจิก ตำบลจันทิมา (ท้ายน้ำ) (ระบบประปาหมู่บ้าน)
อำเภอลานกระบือ จังหวัดกำแพงเพชร
GPS. Coordinate : UTM (WGS84) 47Q 0587342 E, 1835090 N
Sampling Date : March 25, 2024
Sampling Time : 17:05
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odorless

Quotation No. : AR2024-00454
Analysis No. : 2024-AB313-007
Received Date : March 28, 2024
Analytical Date : March 28-April 26, 2024
Report No. : 2024-RAAF641
Report Date : April 29, 2024

Parameter	Unit	Method of Analysis ^{1*}	MRL	Result	Standard ^{2*}	Standard ^{3*}	
						Suitable Allowance	Maximum Allowable
TPH (Gasoline Range Hydrocarbons: C ₄ -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 ₂₅)	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Heavy Oil Range Hydrocarbons: C ₂₆ -C ₃₅)	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-

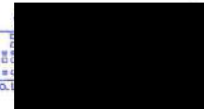
Remark : ^{1*} Standard Method for Examination of Water and Wastewater, 23rd Edition, 2017.

^{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 940, 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 850, dated May 21, B.E.2551 (2008).



(Ms. Yuwadee Na Ranong)
Laboratory Reviewer



(Mr. Virat Hemvannanukul)
Laboratory Supervisor

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 : โครงการผลิตปิโตรเลียมแหล่งผลิตปิโตรเลียมภาคตะวันออกสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนบกหมายเลข L21/43
จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : ฐานหลุมผลิต BMS2 : หลุมอัดน้ำกลับ (Injection Well) ในฐานหลุมผลิต BMS2-7
GPS. Coordinate : UTM (WGS84) 47Q 0583875 E, 1840440 N
Sampling Date : March 26, 2024
Sampling Time : 09:24
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Brickred, Sediment, Odor

Quotation No. : AR2024-00454
Analysis No. : 2024-AB313-005
Received Date : March 28, 2024
Analytical Date : March 28-April 26, 2024
Report No. : 2024-RAAF639
Report Date : April 29, 2024

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
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.012	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	1.2	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	6.7	-	≤0.5	1.0
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.14	-	-	-
Total Chromium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.008	-	-	-
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	150	-	≤600	1,200
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	193	-	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	0.1	-	-	-

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 : โครงการผลิตปิโตรเลียมแหล่งผลิตปิโตรเลียมภาคตะวันออกสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนบกหมายเลข L21/43
จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : ฐานหลุมผลิต BMS2 : หลุมอัดน้ำกลับ (Injection Well) ในฐานหลุมผลิต BMS2-7
GPS. Coordinate : UTM (WGS84) 47Q 0583875 E, 1840440 N
Sampling Date : March 26, 2024
Sampling Time : 09:24
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Brickred, Sediment, Odor

Quotation No. : AR2024-00454
Analysis No. : 2024-AB313-005
Received Date : March 28, 2024
Analytical Date : March 28-April 26, 2024
Report No. : 2024-RAAF639
Report Date : April 29, 2024

Parameter	Unit	Method of Analysis ^{1*}	MRL	Result	Standard ^{2*}	Standard ^{3*}	
						Suitable Allowance	Maximum Allowable
TPH (Gasoline Range Hydrocarbons; C ₆ -C ₈)	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 ₁₉ -C ₂₆)	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-

Remark : ^{1*} Standard Method for Examination of Water and Wastewater, 23rd Edition, 2017.

^{2*} Notification of the National Environment Board, No.28, 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 940, 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 850, dated May 21, B.E.2551 (2008).



(Ms. Yuwadee Na Ranong)
Laboratory Reviewer



(Mr. Virat Hemvannanukul)
Laboratory Supervisor

ฤดูฝน

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 : โครงการพัฒนาระบบบำบัดน้ำเสียชุมชนตำบลบ้านดง-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจแบบทนายเลข L21/43
จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : ฐานหลุมผลิต NS2 : OW1 : ปอส่งผลการผลิตน้ำดื่มในฐานหลุมผลิตหนองสระ 2 (NS2) ในทิศทางซ้าย
GPS. Coordinate : UTM (WGS84) 47Q 0583883 E, 1834013 N
Sampling Date : August 29, 2024
Sampling Time : 12:16
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Light Yellow, Sediment, Odor

Quotation No. : AR2024-00454
Analysis No. : 2024-AE291-001
Received Date : September 2, 2024
Analytical Date : September 2-23, 2024
Report No. : 2024-RAAS057
Report Date : September 23, 2024

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
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	0.007	0.01	None	0.05
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.030	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	<0.0002	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	0.2	-	≤0.5	1.0
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.02	-	-	-
Total Chromium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	-	-	-
Temperature	°C	Certified Thermometer	-	32.9	-	-	-
pH	-	Electrometric	-	6.8	-	7.0-8.5	6.5-9.2
Total Dissolved Solids	mg/L	Dried at 180°C	50	52	-	≤600	1,200
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	68	-	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	<0.1	-	-	-

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 : โครงการพัฒนาระบบบำบัดน้ำเสียชุมชนตำบลบ้านดง-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจแบบทนายเลข L21/43
จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : ฐานหลุมผลิต NS2 : OW1 : ปอส่งผลการผลิตน้ำดื่มในฐานหลุมผลิตหนองสระ 2 (NS2) ในทิศทางซ้าย
GPS. Coordinate : UTM (WGS84) 47Q 0583883 E, 1834013 N
Sampling Date : August 29, 2024
Sampling Time : 12:16
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Light Yellow, Sediment, Odor

Quotation No. : AR2024-00454
Analysis No. : 2024-AE291-001
Received Date : September 2, 2024
Analytical Date : September 2-23, 2024
Report No. : 2024-RAAS057
Report Date : September 23, 2024

Parameter	Unit	Method of Analysis ^{1'}	MRL	Result	Standard ^{2'}	Standard ^{3'}	
						Suitable Allowance	Maximum Allowable
TPH (Gasoline Range Hydrocarbons; C ₆ -C ₇)	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 ₃₆)	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Heavy Oil Range Hydrocarbons; C ₃₇ -C ₅₆)	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 940, 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 650, dated May 21, B.E.2551 (2008).


(Ms.Yuwadee Na Ranong)
Laboratory Reviewer


(Mr.Virat Hermvannanukul)
Laboratory Supervisor

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 : โครงการผลิตปุ๋ยอินทรีย์แอมมอนด์อินทรีย์จากกาก-ของเสีย (BYW-NS) (ส่วนขยาย) แปลงสำรวจแบบกฎหมายเลข L21/43
จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : ฐานหลุมผลิต NS3 : OW2 : ปอสังเกตการณ์ที่ติดตั้งในฐานหลุมผลิตของสระ 3 (NS3) ในทิศทางท้ายน้ำ
GPS. Coordinate : UTM (WGS84) 47Q 0584132 E, 1835190 N
Sampling Date : August 29, 2024
Sampling Time : 11:44
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Light Yellow, Sediment, Odor

Quotation No. : AR2024-00454
Analysis No. : 2024-AE275-001
Received Date : August 30, 2024
Analytical Date : August 30-September 18, 2024
Report No. : 2024-RAAR948
Report Date : September 18, 2024

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
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.246	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	0.746	0.5	≤0.3	0.5
Nickel	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.006	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	0.0003	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	9.6	-	≤0.5	1.0
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.15	-	-	-
Total Chromium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	-	-	-
Temperature	°C	Certified Thermometer	-	31.9	-	-	-
pH	-	Electrometric	-	7.6	-	7.0-8.5	6.5-9.2
Total Dissolved Solids	mg/L	Dried at 180°C	50	101	-	≤600	1,200
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	159	-	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	0.1	-	-	-

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 : โครงการผลิตปุ๋ยอินทรีย์แอมมอนด์อินทรีย์จากกาก-ของเสีย (BYW-NS) (ส่วนขยาย) แปลงสำรวจแบบกฎหมายเลข L21/43
จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : ฐานหลุมผลิต NS3 : OW2 : ปอสังเกตการณ์ที่ติดตั้งในฐานหลุมผลิตของสระ 3 (NS3) ในทิศทางท้ายน้ำ
GPS. Coordinate : UTM (WGS84) 47Q 0584132 E, 1835190 N
Sampling Date : August 29, 2024
Sampling Time : 11:44
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Light Yellow, Sediment, Odor

Quotation No. : AR2024-00454
Analysis No. : 2024-AE275-001
Received Date : August 30, 2024
Analytical Date : August 30-September 18, 2024
Report No. : 2024-RAAR948
Report Date : September 18, 2024

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 ₂₆)	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Heavy Oil Range Hydrocarbons; C ₂₇ -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).



(Ms.Yuwadee Na Ranong)
Laboratory Reviewer



(Mr.Virat Hemvannanukul)
Laboratory Supervisor

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11030
Project Name : โครงการผลิตปิโตรเลียมแหล่งผลิตมิ่งหวัดตะวันตก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจฉบับกฎหมายเลข L21/43 จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : ฐานหลุมผลิต NS2 : GW5 : บ่อน้ำตาล หมู่ที่ 4 บ้านหนองหึงส้ม ตำบลจันทิมา (ต้นน้ำ) (ระบบประปาหมู่บ้าน) อำเภอลานกระบือ จังหวัดกำแพงเพชร
GPS. Coordinate : UTM (WGS84) 47Q 0583797 E, 1835466 N
Sampling Date : August 30, 2024
Sampling Time : 11:06
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odorless

Quotation No. : AR2024-00454
Analysis No. : 2024-AE291-002
Received Date : September 2, 2024
Analytical Date : September 2-23, 2024
Report No. : 2024-RAAS058
Report Date : September 23, 2024

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
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	0.008	0.01	None	0.05
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.033	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	0.22	5.0	≤5.0	15
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0010	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	0.19	-	-	-
Total Chromium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	-	-	-
Temperature	°C	Certified Thermometer	-	30.0	-	-	-
pH	-	Electrometric	-	7.8	-	7.0-8.5	6.5-9.2
Total Dissolved Solids	mg/L	Dried at 180°C	50	136	-	≤600	1,200
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	142	-	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	0.1	-	-	-

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 : โครงการผลิตปิโตรเลียมแหล่งผลิตมิ่งหวัดตะวันตก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจฉบับกฎหมายเลข L21/43 จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : ฐานหลุมผลิต NS2 : GW5 : บ่อน้ำตาล หมู่ที่ 4 บ้านหนองหึงส้ม ตำบลจันทิมา (ต้นน้ำ) (ระบบประปาหมู่บ้าน) อำเภอลานกระบือ จังหวัดกำแพงเพชร
GPS. Coordinate : UTM (WGS84) 47Q 0583797 E, 1835466 N
Sampling Date : August 30, 2024
Sampling Time : 11:06
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odorless

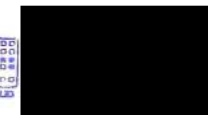
Quotation No. : AR2024-00454
Analysis No. : 2024-AE291-002
Received Date : September 2, 2024
Analytical Date : September 2-23, 2024
Report No. : 2024-RAAS058
Report Date : September 23, 2024

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 940, 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 850, dated May 21, B.E.2551 (2008).



(Ms.Yuwadee Na Nanong)
Laboratory Reviewer



(Mr.Virat Hemvannakul)
Laboratory Supervisor

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/12 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตปิโตรเลียมแหล่งผลิตปิโตรเลียมตะวันตก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจขออนุญาตหมายเลข L21/43 จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : ฐานหลุมผลิต NS2 : GW6 : ปะมาดาล หมู่ที่ 1 บ้านหนองจิก ตำบลจันทิมา (บ้านเก่า) (ระบบประปาหมู่บ้าน) อำเภอละลานกระบือ จังหวัดกำแพงเพชร
GPS. Coordinate : UTM (WGS84) 47Q 0587342 E, 1835090 N
Sampling Date : August 30, 2024
Sampling Time : 12:18
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Light Yellow, Sediment, Odorless

Quotation No. : AR2024-00454
Analysis No. : 2024-AE291-003
Received Date : September 2, 2024
Analytical Date : September 2-20, 2024
Report No. : 2024-RAAS059
Report Date : September 9, 2024

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
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	0.004	0.01	None	0.05
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.853	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	0.0033	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	0.32	-	-	-
Total Chromium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	-	-	-
Temperature	°C	Certified Thermometer	-	30.9	-	-	-
pH	-	Electrometric	-	7.5	-	7.0-8.5	6.5-9.2
Total Dissolved Solids	mg/L	Dried at 180°C	50	124	-	≤600	1,200
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	224	-	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	0.1	-	-	-

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 : โครงการผลิตปิโตรเลียมแหล่งผลิตปิโตรเลียมตะวันตก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจขออนุญาตหมายเลข L21/43 จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : ฐานหลุมผลิต NS2 : GW6 : ปะมาดาล หมู่ที่ 1 บ้านหนองจิก ตำบลจันทิมา (บ้านเก่า) (ระบบประปาหมู่บ้าน) อำเภอละลานกระบือ จังหวัดกำแพงเพชร
GPS. Coordinate : UTM (WGS84) 47Q 0587342 E, 1835090 N
Sampling Date : August 30, 2024
Sampling Time : 12:18
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Light Yellow, Sediment, Odorless

Quotation No. : AR2024-00454
Analysis No. : 2024-AE291-003
Received Date : September 2, 2024
Analytical Date : September 2-20, 2024
Report No. : 2024-RAAS059
Report Date : September 9, 2024

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, 3.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 Par: 940, 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 850, dated May 21, B.E.2551 (2008).



(Ms.)Yuwadee Na Ranong
Laboratory Reviewer



(Mr.)Virat Hemvannanukul
Laboratory Supervisor

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 : โครงการผลิตปุ๋ยอินทรีย์ผสมแหล่งผลิตปุ๋ยมูลสัตว์วันตก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนโฉนดเลขที่ L21/43
จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : ฐานหลุมผลิต NS3 : GW5 : ป้อมตาล หมู่ที่ 4 บ้านหนองหิ้งส้ม ตำบลจันทิมา (ต้นน้ำ) (ระบบประปาหมู่บ้าน)
อำเภอลานกระบือ จังหวัดกำแพงเพชร
: UTM (WGS84) 47Q 0583797 E, 1835466 N
GPS. Coordinate
Sampling Date : August 30, 2024
Sampling Time : 11:06
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odorless

Quotation No. : AR2024-00454
Analysis No. : 2024-AE291-004
Received Date : September 2, 2024
Analytical Date : September 2-23, 2024
Report No. : 2024-RAAS061
Report Date : September 23, 2024

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
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	0.008	0.01	None	0.05
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.033	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	0.22	5.0	≤5.0	15
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0010	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	0.19	-	-	-
Total Chromium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	-	-	-
Temperature	°C	Certified Thermometer	-	30.0	-	-	-
pH	-	Electrometric	-	7.8	-	7.0-8.5	6.5-9.2
Total Dissolved Solids	mg/L	Dried at 180°C	50	136	-	≤600	1,200
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	142	-	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	0.1	-	-	-

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 : โครงการผลิตปุ๋ยอินทรีย์ผสมแหล่งผลิตปุ๋ยมูลสัตว์วันตก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนโฉนดเลขที่ L21/43
จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : ฐานหลุมผลิต NS3 : GW5 : ป้อมตาล หมู่ที่ 4 บ้านหนองหิ้งส้ม ตำบลจันทิมา (ต้นน้ำ) (ระบบประปาหมู่บ้าน)
อำเภอลานกระบือ จังหวัดกำแพงเพชร
: UTM (WGS84) 47Q 0583797 E, 1835466 N
GPS. Coordinate
Sampling Date : August 30, 2024
Sampling Time : 11:06
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Clear, Light Yellow, Sediment, Odorless

Quotation No. : AR2024-00454
Analysis No. : 2024-AE291-004
Received Date : September 2, 2024
Analytical Date : September 2-23, 2024
Report No. : 2024-RAAS061
Report Date : September 23, 2024

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 940, 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).



(Ms.Yuwadee Na Ranong)
Laboratory Reviewer



(Mr.Virat Hemvannanukul)
Laboratory Supervisor

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 : โครงการผลิตปิโตรเลียมแหล่งผลิตปิโตรเลียมวันตก-หนองสระ (BYW-NS) (สาขาชาย) แปลงสำรวจบนบกหมายเลข L21/43
จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : ฐานหลุมผลิต NS3 : GW6 : ป่อนาคาล หมู่ที่ 1 บ้านหนองจิก ตำบลจันทิมา (ท่าแม่ป่า) (ระบบประปาหมู่บ้าน)
สำนักงานกระบี่ จังหวัดกำแพงเพชร
GPS. Coordinate : UTM (WGS84) 47Q 0587342 E, 1835090 N
Sampling Date : August 30, 2024
Sampling Time : 12:18
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Light Yellow, Sediment, Odorless

Quotation No. : AR2024-00454
Analysis No. : 2024-AE291-005
Received Date : September 2, 2024
Analytical Date : September 2-20, 2024
Report No. : 2024-RAAS062
Report Date : September 23, 2024

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
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	0.004	0.01	None	0.05
Manganese	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.853	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	0.0033	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	0.32	-	-	-
Total Chromium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	<0.005	-	-	-
Temperature	°C	Certified Thermometer	-	30.9	-	-	-
pH	-	Electrometric	-	7.5	-	7.0-8.5	6.5-9.2
Total Dissolved Solids	mg/L	Dried at 180°C	50	124	-	≤600	1,200
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	224	-	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	0.1	-	-	-

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 : โครงการผลิตปิโตรเลียมแหล่งผลิตปิโตรเลียมวันตก-หนองสระ (BYW-NS) (สาขาชาย) แปลงสำรวจบนบกหมายเลข L21/43
จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : ฐานหลุมผลิต NS3 : GW6 : ป่อนาคาล หมู่ที่ 1 บ้านหนองจิก ตำบลจันทิมา (ท่าแม่ป่า) (ระบบประปาหมู่บ้าน)
สำนักงานกระบี่ จังหวัดกำแพงเพชร
GPS. Coordinate : UTM (WGS84) 47Q 0587342 E, 1835090 N
Sampling Date : August 30, 2024
Sampling Time : 12:18
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Light Yellow, Sediment, Odorless

Quotation No. : AR2024-00454
Analysis No. : 2024-AE291-005
Received Date : September 2, 2024
Analytical Date : September 2-20, 2024
Report No. : 2024-RAAS062
Report Date : September 23, 2024

Parameter	Unit	Method of Analysis ^{1*}	MRL	Result	Standard ^{2*}	Standard ^{3*}	
						Suitable Allowance	Maximum Allowable
TPH (Gasoline Range Hydrocarbons; C ₅ -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 940, 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 850, dated May 21, B.E.2551 (2008).



(Ms.Yuwadee Na Ranong)
Laboratory Reviewer



(Mr.Virat Hemvannanukit)
Laboratory Supervisor

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeaya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตไบโอดีเซลแห่งผลิตมีงหุ้กัฒะวันตก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนบกหมายเลข L21/43
จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : ฐานหลุมผลิต BMS2 : หลุมอัดน้ำกลับ (Injection Well) ในฐานหลุมผลิต BMS2-7
GPS. Coordinate : UTM (WGS84) 47Q 0583875 E, 1840440 N
Sampling Date : August 29, 2024
Sampling Time : 15:35
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Yellow, Sediment, Odor

Quotation No. : AR2024-00454
Analysis No. : 2024-AE275-002
Received Date : August 30, 2024
Analytical Date : August 30-September 18, 2024
Report No. : 2024-RAAR949
Report Date : September 18, 2024

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
Copper	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.027	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	0.336	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	0.05	5.0	≤5.0	15
Arsenic	mg/L	Digestion, Hydride Generation Atomic Absorption Spectrometry	0.0002	0.0010	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	8.5	-	≤0.5	1.0
Barium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.01	0.09	-	-	-
Total Chromium	mg/L	Digestion, Inductively Coupled Plasma (ICP-OES)	0.005	0.009	-	-	-
Temperature	°C	Certified Thermometer	-	29.0	-	-	-
pH	-	Electrometric	-	8.2	-	7.0-8.5	6.5-9.2
Total Dissolved Solids	mg/L	Dried at 180°C	50	364	-	≤600	1,200
Conductivity	µs/cm	Electrical Conductivity Meter	0.1	517	-	-	-
Salinity	ppt	Electrical Conductivity Meter	0.1	0.2	-	-	-

ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeaya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตไบโอดีเซลแห่งผลิตมีงหุ้กัฒะวันตก-หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนบกหมายเลข L21/43
จังหวัดสุโขทัย และกำแพงเพชร
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Ground Water Sampling
Sampling Point : ฐานหลุมผลิต BMS2 : หลุมอัดน้ำกลับ (Injection Well) ในฐานหลุมผลิต BMS2-7
GPS. Coordinate : UTM (WGS84) 47Q 0583875 E, 1840440 N
Sampling Date : August 29, 2024
Sampling Time : 15:35
Sampling Method : Mr.Nitad Sirichad
Sampling By : Grab
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Yellow, Sediment, Odor

Quotation No. : AR2024-00454
Analysis No. : 2024-AE275-002
Received Date : August 30, 2024
Analytical Date : August 30-September 18, 2024
Report No. : 2024-RAAR949
Report Date : September 18, 2024

Parameter	Unit	Method of Analysis ^{1'}	MRL	Result	Standard ^{2'}	Standard ^{3'}	
						Suitable Allowance	Maximum Allowable
TPH (Gasoline Range Hydrocarbons; C6-C9)	mg/L	Purge and Trap, Gas Chromatographic (GC-FID)	0.040	<0.040	-	-	-
TPH (Kerosene Range Hydrocarbons; C10-C14)	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Diesel Range Hydrocarbons; C15-C28)	mg/L	Liquid-Liquid Extraction, Gas Chromatographic (GC-FID)	0.020	<0.020	-	-	-
TPH (Heavy Oil Range Hydrocarbons; C29-C36)	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 940, 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).



(Ms.Yuwadee Na Ranong)
Laboratory Reviewer



(Mr.Virat Hemvannanukul)
Laboratory Supervisor



บริษัท ซีเอ็นพีซีเอชเค (ไทยแลนด์) จำกัด

รายงานผลการปฏิบัติตามมาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม และมาตรการติดตามตรวจสอบผลกระทบสิ่งแวดล้อม
โครงการผลิตปิโตรเลียมแหล่งผลิตบึงน้ำตตะวันตก - หนองสระ (BYW - NS) (ส่วนขยาย)
แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และกำแพงเพชร
ฉบับเดือนมกราคม - ธันวาคม พ.ศ.2567

ภาคผนวก ง.5
คุณภาพน้ำใต้ดิน

ฤดูแล้ง

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 : โครงการผลิตยิปโซร์เคมิกัลจากน้ำทิ้งจากโรงงานกระดาษ (BYW-NS) (ส่วนขยาย) แปลงสำรวจแบบหมายเลข L21/43
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Sediments Sampling (Composite)
Sampling Point : ฐานหลุมผลิต NS3 : SW4 : คลองชลประทาน (บ้านทรายทอง) (หมู่ที่ 9 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0582690 E, 1836116 N
Sampling Date : March 25, 2024
Sampling Time : 11:40
Sampling Method : Ekman Grab Sampler
Sampling By : Mr.Romsea Kateh
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : -

Quotation No. : AR2024-00454
Analysis No. : 2024-AB233-002
Received Date : March 26, 2024
Analytical Date : March 26-April 18, 2024
Report No. : 2024-RAAF497
Report Date : April 29, 2024

Parameter	Unit	Method of Analysis	MRL	Result	Standard ^{1/}	
					Protection	Safety level
Arsenic	mg/kg	Digestion, Inductively Coupled Plasma (ICP-OES)	1.0	5.8	10	<33
Iron	mg/kg	Digestion, Inductively Coupled Plasma (ICP-OES)	1.0	18,126	-	-
Manganese	mg/kg	Digestion, Inductively Coupled Plasma (ICP-OES)	0.3	291	-	-

Remark : ^{1/} Notification of the National Environment Board, B.E.2545 (2002), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.140 Part 30, dated January 5, B.E.2566 (2023).



(Ms.Raiwin Posit)
Laboratory Reviewer



(Ms.Ramita Taengthai)
Laboratory Supervisor

DO NOT COPY PARTIAL OF THIS ANALYSIS REPORT WITHOUT OFFICIAL APPROVAL
REPORT ANALYSIS REFERS TO SUBMITTED SAMPLE (S) ONLY

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 : โครงการผลิตยิปโซร์เคมิกัลจากน้ำทิ้งจากโรงงานกระดาษ (BYW-NS) (ส่วนขยาย) แปลงสำรวจแบบหมายเลข L21/43
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Sediments Sampling (Composite)
Sampling Point : ฐานหลุมผลิต NS3 : SW5 : คลองชลประทาน (บ้านหนองหุ้งส้ม) (หมู่ที่ 4 ตำบลจันทิมา อำเภอลานกระบือ จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0583505 E, 1835418 N
Sampling Date : March 26, 2024
Sampling Time : 09:35
Sampling Method : Ekman Grab Sampler
Sampling By : Mr.Romsea Kateh
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : -

Quotation No. : AR2024-00454
Analysis No. : 2024-AB318-003
Received Date : March 28, 2024
Analytical Date : March 28-April 18, 2024
Report No. : 2024-RAAF650
Report Date : April 29, 2024

Parameter	Unit	Method of Analysis	MRL	Result	Standard ^{1/}	
					Protection	Safety level
Arsenic	mg/kg	Digestion, Inductively Coupled Plasma (ICP-OES)	1.0	13	10	<33
Iron	mg/kg	Digestion, Inductively Coupled Plasma (ICP-OES)	1.0	34,692	-	-
Manganese	mg/kg	Digestion, Inductively Coupled Plasma (ICP-OES)	0.3	886	-	-

Remark : ^{1/} Notification of the National Environment Board, B.E.2545 (2002), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.140 Part 30, dated January 5, B.E.2566 (2023).



(Ms.Raiwin Posit)
Laboratory Reviewer



(Ms.Ramita Taengthai)
Laboratory Supervisor

DO NOT COPY PARTIAL OF THIS ANALYSIS REPORT WITHOUT OFFICIAL APPROVAL
REPORT ANALYSIS REFERS TO SUBMITTED SAMPLE (S) ONLY

ฤดูฝน

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 : โครงการผลิตยี่โหรเสริมแหล่งผลิตยี่โหรวัดบ้านหนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจฉบับกฎหมายเลข L21/43
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Sediments Sampling (Composite)
Sampling Point : ฐานหลุมผลิต NS3 : SW4 : คลองชลประทาน (บ้านทรายทอง) (หมู่ที่ 9 ตำบลหนองหลวง อำเภอลานกระบือ จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0582690 E, 1836116 N
Sampling Date : August 29, 2024
Sampling Time : 11:37
Sampling Method : Ekman Grab Sampler
Sampling By : Mr.Suchapong Rungruang
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : -

Quotation No. : AR2024-00454
Analysis No. : 2024-AE292-001
Received Date : September 2, 2024
Analytical Date : September 2-19, 2024
Report No. : 2024-RAAS063
Report Date : September 23, 2024

Parameter	Unit	Method of Analysis	Result	Standard ¹⁾	
				Protection	Safety Level
Arsenic	mg/kg	Digestion, Inductively Coupled Plasma (ICP-OES)	3.6	10	<33
Iron	mg/kg	Digestion, Inductively Coupled Plasma (ICP-OES)	6,443	-	-
Manganese	mg/kg	Digestion, Inductively Coupled Plasma (ICP-OES)	106	-	-

Remark : ¹⁾ Notification of the National Environment Board, B.E.2565 (2022), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.140 Part 3D, dated January 5, B.E.2566 (2023).

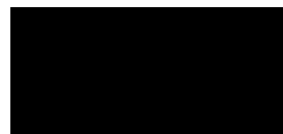
ANALYSIS REPORT

Customer Name : Vision E. Consultants Co., Ltd.
Address : 101/22 Moo 2, Soi Maneeya Soi 3, Sai Ma, Mueang Nonthaburi, Nonthaburi 11000
Project Name : โครงการผลิตยี่โหรเสริมแหล่งผลิตยี่โหรวัดบ้านหนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจฉบับกฎหมายเลข L21/43
Project Location : จังหวัดสุโขทัย และกำแพงเพชร
Sampling Source : Sediments Sampling (Composite)
Sampling Point : ฐานหลุมผลิต NS3 : SW5 : คลองชลประทาน (บ้านหนองหึงส้ม) (หมู่ที่ 4 ตำบลจันทิมา อำเภอลานกระบือ จังหวัดกำแพงเพชร)
GPS. Coordinate : UTM (WGS84) 47Q 0583505 E, 1835418 N
Sampling Date : August 29, 2024
Sampling Time : 10:51
Sampling Method : Ekman Grab Sampler
Sampling By : Mr.Suchapong Rungruang
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : -

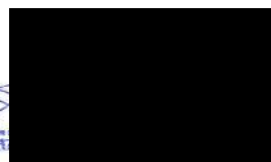
Quotation No. : AR2024-00454
Analysis No. : 2024-AE292-002
Received Date : September 2, 2024
Analytical Date : September 2-19, 2024
Report No. : 2024-RAAS064
Report Date : September 23, 2024

Parameter	Unit	Method of Analysis	Result	Standard ¹⁾	
				Protection	Safety Level
Arsenic	mg/kg	Digestion, Inductively Coupled Plasma (ICP-OES)	3.4	10	<33
Iron	mg/kg	Digestion, Inductively Coupled Plasma (ICP-OES)	23,876	-	-
Manganese	mg/kg	Digestion, Inductively Coupled Plasma (ICP-OES)	606	-	-

Remark : ¹⁾ Notification of the National Environment Board, B.E.2565 (2022), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.140 Part 3D, dated January 5, B.E.2566 (2023).

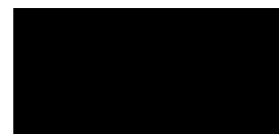


(Ms. Raiwin Posit)
Laboratory Reviewer

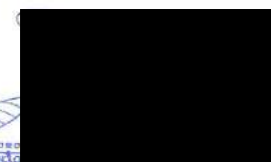


(Ms. Ramita Taengthai)
Laboratory Supervisor

DO NOT COPY PARTIAL OF THIS ANALYSIS REPORT WITHOUT OFFICIAL APPROVAL
REPORT ANALYSIS REFERS TO SUBMITTED SAMPLE (S) ONLY



(Ms. Raiwin Posit)
Laboratory Reviewer



(Ms. Ramita Taengthai)
Laboratory Supervisor

DO NOT COPY PARTIAL OF THIS ANALYSIS REPORT WITHOUT OFFICIAL APPROVAL
REPORT ANALYSIS REFERS TO SUBMITTED SAMPLE (S) ONLY



บริษัท ซีเอ็นพีซีเอชเค (ไทยแลนด์) จำกัด

รายงานผลการปฏิบัติตามมาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม และมาตรการติดตามตรวจสอบผลกระทบสิ่งแวดล้อม
โครงการผลิตปิโตรเลียมแหล่งผลิตบึงน้ำตตะวันตก - หนองสระ (BYW - NS) (ส่วนขยาย)
แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และกำแพงเพชร
ฉบับเดือนมกราคม - ธันวาคม พ.ศ.2567

ภาคผนวก ง.6

เอกสารขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์

ที่ อก ๐๓๑๐(๑)/ ๖๔๗ ๖



กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๐๓ กรกฎาคม ๒๕๖๗

เรื่อง ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท เอ็นไวรอนเม้นท์ รีเสิร์ช 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 เอ็นไวรอนเม้นท์ รีเสิร์ช แอนด์ เทคโนโลยี จำกัด ขอต่ออายุหนังสือ
รับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๐๙๙ สถานีที่ตั้งเลขที่ ๒๕/๑๑๔ หมู่ที่ ๖
ซอยชินเขต ๑ ถนนงามวงศ์วาน แขวงทุ่งสองห้อง เขตหลักสี่ กรุงเทพมหานคร ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอ็นไวรอนเม้นท์ รีเสิร์ช 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 หากประสงค์จะต่ออายุหนังสือรับขึ้น
ทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงานอุตสาหกรรม
ภายใน ๖๐ วัน ก่อนวันสิ้นอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายพรยศ กลิ่นกรอง)

รองอธิบดี ปฏิบัติราชการแทน
อธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕

โทรสาร ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๕๙

ไปรษณีย์อิเล็กทรอนิกส์ saraban@diw.mail.go.th



“อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว”



เอกสารแนบท้ายหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอ็นไวรอนเม้นท์ รีเสิร์ช แอนด์ เทคโนโลยี จำกัด

เลขทะเบียน ๖-๐๙๙

ที่ อก ๐๓๑๐(๑)/ ๖๔๗ ๖

ลงวันที่ ๐๓ กรกฎาคม ๒๕๖๗

ก. ผู้ควบคุมห้องปฏิบัติการวิเคราะห์เอกชน จำนวน ๒๐ ราย

- ๑) นางสาวสุภารัตน์ เขจรักษ์
- ๒) นางสาวพิชิตา เขียวนรภัย
- ๓) นางสาวลลิตา โพธิ์เจริญ
- ๔) ว่าที่ร้อยตรีวันชนะ สีหามาตร
- ๕) นางสาวรัชชวีวรรณ ภูประเสริฐ
- ๖) นางสาวปณิชา พรหมชัย
- ๗) นางณัฐรดา เลี้ยงรักษา
- ๘) นายมงคล บุรภักดิ์
- ๙) นางสาวธนิศา บุญรุ่งเรือง
- ๑๐) นางสาวนิศา แดงไทย
- ๑๑) นางสาวไรวินทร์ โพธิ์สิทธิ์
- ๑๒) นางสาวณัฐธิดา เสริมมั่งคั่ง
- ๑๓) นายพนัสสิทธิ์ ทวีพรประดิษฐ์
- ๑๔) นางสาวธิดารัตน์ ปุกตะ
- ๑๕) นายอภิชาติ พูลพล
- ๑๖) นายนิทัศน์ ศิริชาติ
- ๑๗) นายสุทธิชาญ สังข์ทอง
- ๑๘) นางสาวยุวดี ณ ระนอง
- ๑๙) นางสาวอุภาวรรณ สุวรรณภา
- ๒๐) นางสาวภาจรัส หมินวงษ์

- ทะเบียนเลขที่ ๖-๐๙๙-ค-๐๐๐๑
ทะเบียนเลขที่ ๖-๐๙๙-ค-๐๐๐๒
ทะเบียนเลขที่ ๖-๐๙๙-ค-๐๐๐๓
ทะเบียนเลขที่ ๖-๐๙๙-ค-๐๐๐๔
ทะเบียนเลขที่ ๖-๐๙๙-ค-๐๐๐๕
ทะเบียนเลขที่ ๖-๐๙๙-ค-๐๐๐๖
ทะเบียนเลขที่ ๖-๐๙๙-ค-๐๐๐๗
ทะเบียนเลขที่ ๖-๐๙๙-ค-๐๐๐๘
ทะเบียนเลขที่ ๖-๐๙๙-ค-๐๐๐๙
ทะเบียนเลขที่ ๖-๐๙๙-ค-๐๐๑๐
ทะเบียนเลขที่ ๖-๐๙๙-ค-๐๐๑๑
ทะเบียนเลขที่ ๖-๐๙๙-ค-๐๐๑๒
ทะเบียนเลขที่ ๖-๐๙๙-ค-๐๐๑๓
ทะเบียนเลขที่ ๖-๐๙๙-ค-๐๐๑๔
ทะเบียนเลขที่ ๖-๐๙๙-ค-๐๐๑๕
ทะเบียนเลขที่ ๖-๐๙๙-ค-๐๐๑๖
ทะเบียนเลขที่ ๖-๐๙๙-ค-๐๐๑๗
ทะเบียนเลขที่ ๖-๐๙๙-ค-๐๐๑๘
ทะเบียนเลขที่ ๖-๐๙๙-ค-๐๐๑๙
ทะเบียนเลขที่ ๖-๐๙๙-ค-๐๐๒๐

เอกสารแนบท้ายหนังสือต่ออายุรั้งขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอ็นไวรอนเม้นท์ รีเสิร์ช แอนด์ เทคโนโลยี จำกัด

เลขทะเบียน ๖-๐๙๙

ที่ อก ๐๓๑๐(๑)/ ๖๔๙ ๖

ลงวันที่ ๐๓ กรกฎาคม ๒๕๖๓

ข. เจ้าหน้าที่ห้องปฏิบัติการวิเคราะห์เอกชน จำนวน ๖๑ ราย

- ๑) นางสาวณัฏฐณิชา ชาวสุทธิ
- ๒) นางสาวสุธิดา ทองประภา
- ๓) นายจิรยุทธ สามารถ
- ๔) นายอัมภา ไชยวงศ์
- ๕) นางสาวณัฐริสา บุญหนัก
- ๖) นายนฤตม์ โชติกาญจน์
- ๗) นางสาวพรทิพย์ อัมภรัตน์
- ๘) นายอัศวิน คชบก
- ๙) นางสาวธัญทิศา สุดเขียน
- ๑๐) นางสาวพชวิญญ์ นนพละ
- ๑๑) นางสาววิมลรัตน์ แปรงทอง
- ๑๒) นางสาวจรรยาดี ข้าแบ่ง
- ๑๓) นางสาวธารารมย์ สมัยใหม่
- ๑๔) นางสาวรัตนชนก ชนเค้า
- ๑๕) นางสาวกมลทิพย์ พุ่มตาก้อง
- ๑๖) นางสาวสุพัตรา มาสุขพักตร์
- ๑๗) นางสาวฉัตรยาลักษณ์ บรรดิษฐ์
- ๑๘) นางสาวอาภากร หล้าสูงเนิน
- ๑๙) นางสาวพิมพ์ิศา ทับพันธ์
- ๒๐) นางสาวอัจฉริ แก้วเพชรวงศ์
- ๒๑) นางสาวชลธิชา กันยานุช
- ๒๒) นางสาวพิชามญช์ ย่างผ่อง
- ๒๓) นางสาวณิชาธิ์ ปริญญานุวัตร
- ๒๔) นายวัชรพล บุตรดิษฐ์
- ๒๕) นางสาวณัฐติมา ปัดชา
- ๒๖) นายวัชรพงษ์ พูลเขตกิจ
- ๒๗) นายศิวกร วงศ์ศาล
- ๒๘) นางสาววิภา จารณะ
- ๒๙) นางสาวธัญญาภรณ์ คณะศรี
- ๓๐) นางสาวพัชรพร อนุสร
- ๓๑) นายธนากร อริยพงษ์โสภณ
- ๓๒) นางสาวบุษกร สมรักษ์
- ๓๓) นางสาววิลาวัลย์ แก้วยม
- ๓๔) นางสาวธัญญาลักษณ์ แสงโยธา
- ๓๕) นายสุชาพงศ์ รุ่งเรือง

- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๐๒
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๐๕
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๐๗
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๐๘
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๐๙
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๑๒
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๑๓
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๑๕
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๑๖
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๑๗
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๑๘
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๑๙
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๒๐
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๒๑
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๒๒
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๒๓
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๒๔
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๒๕
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๒๖
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๒๗
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๒๘
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๒๙
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๓๐
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๓๑
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๓๒
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๓๓
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๓๔
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๓๕
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๓๖
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๓๗
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๓๘
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๓๙
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๔๐
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๔๑
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๔๒

๓๖) นายสิทธิพร...

- ๓๖) นายสิทธิพร วงศ์คำ
- ๓๗) นางเดชนิ สืบเสระ
- ๓๘) นางสาวณัฏพร คนแรง
- ๓๙) นายภาณุพล โพธิ์แดง
- ๔๐) นายวัชรกร กองแสง
- ๔๑) นางสาวสุราทิพย์ อิมน้อย
- ๔๒) นางสาวชมพูนุท กลีชีวิน
- ๔๓) นางสาววิวรรณ สุขารมย์
- ๔๔) นางสาวกัญญาลักษณ์ กระทาง
- ๔๕) นางสาวปิยิดา ประแดงโค
- ๔๖) นางสาวปิยิดา นาทเล็ก
- ๔๗) นางสาวทิชพร ไกรสิงห์
- ๔๘) นางสาวเบญจวรรณ คำหงษา
- ๔๙) นางสาวพัชรา แก้วน้อย
- ๕๐) นางสาวณัฐชา สัมฤทธิ์ดี
- ๕๑) นายรอมย์ กาเหาะ
- ๕๒) นางสาวอังคณา อุณา
- ๕๓) นายสุริยง พูลทอง
- ๕๔) นายฉัตรชัย เหลืองกุล
- ๕๕) นายศิวกร ธรรมนิทา
- ๕๖) นายอนุวัฒน์ เรืองอ่อน
- ๕๗) นายฉัตรชัย โยวะผุย
- ๕๘) นายกุลยุทธ์ อินทร์คำ
- ๕๙) นางสาวนันทา เนื่อนวล
- ๖๐) นางสาวจิตวรรณ ลิ้มสมบุญ
- ๖๑) ว่าที่ร้อยตรีรัฐพล สุทธิมิล

- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๔๓
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๔๔
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๔๕
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๔๖
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๔๗
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๔๘
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๔๙
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๕๐
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๕๑
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๕๒
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๕๓
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๕๔
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๕๕
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๕๖
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๕๗
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๕๘
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๕๙
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๖๐
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๖๑
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๖๒
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๖๓
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๖๔
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๖๕
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๖๖
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๖๗
- ทะเบียนเลขที่ ๖-๐๙๙-จ-๐๐๖๘

เอกสารแนบท้ายหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอ็นไวรอนเม้นท์ รีเสิร์ช แอนด์ เทคโนโลยี จำกัด

เลขทะเบียน ว-๐๙๙

ที่ ออก ๐๓๑๐(๑)/ ๖๔๗๖

ลงวันที่ ๐๓ กรกฎาคม ๒๕๖๗

ขอขยายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม 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]

21 Sulfide...

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]

13 Chlorodibromomethane...

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]

31 Hexachloro-1,3-butadiene...

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, Inductively 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][9]}
48	TPH (C ₉ -C ₁₆)	Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[9,13]

49 TPH (C₁₆-C₃₃)...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
49	TPH (C ₁₀ -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]

อากาศเสีย (ปล่องระบาย) จำนวน 26 รายการ

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	วิธีวิเคราะห์
21	Sulfur Dioxide	1) Isokinetic Sampling, Barium-Thorin Titrimetric Method ^[5] 2) Absorption Sampling, Barium-Thorin Titrimetric Method ^[5] 3) Instrumental 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	Isokinetic Sampling, Gravimetric Method ^[5]
25	Vanadium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
26	Xylene	Absorption Sampling, Gas Chromatographic Method ^[5]

สิ่งปลูกสรหรือวัสดุที่ไม่ใช้แล้ว จำนวน 20 รายการ

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]

6 Chromium...

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; Calculation ^[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 ^[1,5,13] 2) Digestion, Inductively Coupled Plasma Method ^[7,13]
10	Copper	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,5,13] 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]

3) Digestion...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
17	Silver	3) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[7,14] 4) 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]

ดิน จำนวน 59 รายการ

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]

47 TPH (C₁₆-C₃₅)...

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, Inductively Coupled Plasma Method ^[7,13]

เอกสารอ้างอิง

- กระทรวงอุตสาหกรรม. ประกาศกระทรวงอุตสาหกรรม, พ.ศ. 2566. เรื่อง การจัดการสิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว. **ราชกิจจานุเบกษา**. 31 พฤษภาคม 2566. เล่มที่ 140 ตอนพิเศษ 126 ง.
- กระทรวงอุตสาหกรรม. ประกาศกระทรวงอุตสาหกรรม, พ.ศ. 2549. เรื่อง กำหนดค่าปริมาณเขม่าควันที่เจือปนในอากาศที่ระบายออกจากปล่องของหม้อน้ำโรงสีข้าวที่แปลงเป็นเชื้อเพลิง. **ราชกิจจานุเบกษา**. 4 ธันวาคม 2549. เล่มที่ 123 ตอนพิเศษ 125 ง.
- สมาคมวิศวกรรมสิ่งแวดล้อมแห่งประเทศไทย. คู่มือวิเคราะห์น้ำเสีย. พิมพ์ครั้งที่ 4. กรุงเทพฯ: เรือนแก้วการพิมพ์, 2547.
- APHA, AWWA, WEF. *Standard Methods for the Examination of Water and Wastewater*. 24th ed. Washington, DC: APHA, 2023.

5. United States...

5. United States Environmental Protection Agency. **Standards of Performance for New Stationary Sources**. 40 CFR 60. Appendix A, 2023.
6. United States Environmental Protection Agency. **Test Methods for Evaluation Solid Waste Physical/Chemical Methods. SW-846**, 1997.
7. United States Environmental Protection Agency. **Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Acid Digestion of Sludges and Sediments and Soils. SW-846 Method 3050B**, 1996.
8. United States Environmental Protection Agency. **Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Alkaline Digestion for Hexavalent Chromium. SW-846 Method 3060A**, 1996.
9. United States Environmental Protection Agency. **Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Separatory Funnel Liquid-Liquid Extraction. SW-846 Method 3510C**, 1996.
10. United States Environmental Protection Agency. **Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Ultrasonic Extraction. SW-846 Method 3550C**, 2007.
11. United States Environmental Protection Agency. **Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Purge-and-Trap for Aqueous Samples. SW-846 Method 5030C**, 2003.
12. United States Environmental Protection Agency. **Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Closed-System Purge-and-Trap and Extraction for Volatile Organics in Soil and Waste Samples. SW-846 Method 5035A**, 2002.
13. United States Environmental Protection Agency. **Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Inductively Coupled Plasma - Atomic Emission Spectrometry. SW-846 Method 6010D**, 2018.
14. United States Environmental Protection Agency. **Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Antimony and Arsenic (Atomic Absorption, Borohydride Reduction). SW-846 Method 7062**, 1994.
15. United States Environmental Protection Agency. **Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Chromium, Hexavalent (Colorimetric). SW-846 Method 7196A**, 1992.
16. United States Environmental Protection Agency. **Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Mercury in Liquid Waste (Manual Cold-Vapor Technique). SW-846 Method 7470A**, 1994.
17. United States Environmental Protection Agency. **Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Mercury in Solid or Semisolid Waste (Manual Cold-Vapor Technique). SW-846 Method 7471B**, 2007.
18. United States Environmental Protection Agency. **Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Selenium (Atomic Absorption, Borohydride Reduction). SW-846 Method 7742**, 1994. [REDACTED]

19. United States

19. United States Environmental Protection Agency. **Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Nonhalogenated Organics Using GC/FID. SW-846 Method 8015D**, 2003.
20. United States Environmental Protection Agency. **Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS). SW-846 Method 8260C**, 1996.
21. United States Environmental Protection Agency. **Test Methods for Evaluation Solid Waste Physical/Chemical Methods. pH Electrometric Measurement. SW-846 Method 9040C**, 2004.
22. United States Environmental Protection Agency. **Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Soil and Waste pH. SW-846 Method 9045D**, 2004. [REDACTED]

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เทคนิกลิ่งแวดล้อมไทย จำกัด เลขทะเบียน ๖-๒๓๖
ที่ ออก ๐๓๑๐(๑)/ ๙ ๘ ๗ ๖ ลงวันที่ ๒๒ มิถุนายน ๒๕๖๖

ขอขยายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๓๗ รายการ

น้ำเสีย จำนวน 40 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldrin	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
2	Arsenic	Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ⁽⁴⁾
3	Barium	1) Digestion, Direct Nitrous Oxide-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
4	α-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
5	γ-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
6	Biochemical Oxygen Demand	5-Day BOD Test, Azide Modification Method ⁽⁴⁾
7	Cadmium	1) Digestion, Direct Air-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
8	Chemical Oxygen Demand	Closed Reflux, Titrimetric Method ⁽⁴⁾
9	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
10	Chromium	1) Digestion, Direct Air-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
11	Color	ADMI Weighted-Ordinate Spectrophotometric Method ⁽⁴⁾
12	Copper	1) Digestion, Direct Air-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
13	Cyanide	Distillation, Colorimetric Method ⁽⁴⁾
14	4,4'-DDE	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
15	4,4'-DDT	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
16	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾

17 Endosulfan I...

- ๒ -

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
17	Endosulfan I	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
18	Endosulfan II	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
19	Endosulfan Sulfate	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
20	Endrin	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
21	Formaldehyde	Distillation, Colorimetric Method ⁽³⁾
22	Free Chlorine	DPD Ferrous Titrimetric Method ⁽⁴⁾
23	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
24	Heptachlor Epoxide	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
25	Hexavalent Chromium	Colorimetric Method ⁽⁴⁾
26	Lead	1) Digestion, Direct Air-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
27	Manganese	1) Digestion, Direct Air-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
28	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽⁴⁾
29	Nickel	1) Digestion, Direct Air-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
30	Oil & Grease	1) Liquid-Liquid, Partition-Gravimetric Method ⁽⁴⁾ 2) Soxhlet Extraction Method ⁽⁴⁾
31	pH	Electrometric Method ⁽⁴⁾
32	Phenols	Distillation, Direct Photometric Method ⁽⁴⁾
33	Selenium	Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ⁽⁴⁾
34	Sulfide	1) Iodometric Method ⁽⁴⁾ 2) Methylene Blue Method ⁽⁴⁾
35	Temperature	Laboratory and Field Methods ⁽⁴⁾
36	Total Dissolved Solids	Dried at 180 °C ⁽⁴⁾
37	Total Kjeldahl Nitrogen	Macro-Kjeldahl Method ⁽⁴⁾
38	Total Suspended Solids	Dried at 103-105 °C ⁽⁴⁾

39 Trivalent Chromium...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
39	Trivalent Chromium	Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation ⁽⁴⁾
40	Zinc	1) Digestion, Direct Air-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾

น้ำใต้ดิน จำนวน 122 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
2	Acetone	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
3	Aldrin	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
4	Anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
5	Antimony	1) Digestion, Direct Air-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
6	Arsenic	Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ⁽⁴⁾
7	Atrazine	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
8	Barium	1) Digestion, Direct Nitrous Oxide-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
9	Benz(a)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
10	Benzene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
11	Benzo(b)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
12	Benzo(k)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾

13 Benzoic acid...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
13	Benzoic acid	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
14	Benzo(a)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
15	Benzo(g,h,i)perylene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
16	Beryllium	1) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
17	Bis(2-chloropethyl)ether	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
18	Bis(2-ethylhexyl)phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
19	Bromodichloromethane	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
20	Bromoform	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
21	Butanol	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
22	Butyl benzyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
23	Cadmium	1) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
24	Carbazole	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
25	Carbon disulfide	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
26	Carbon tetrachloride	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
27	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
28	p-Chloroaniline	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
29	Chlorobenzene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
30	Chlorodibromomethane	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
31	Chloroform	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾

32 Chromium...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
32	Chromium	1) Digestion, Direct Air-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
33	Chromium (III)	1) Digestion, Direct Air-Acetylene Flame Method; Colorimetric Method; Calculation ⁽⁴⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method; Colorimetric Method; Calculation ⁽⁴⁾ 3) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation ⁽⁴⁾
34	Chromium (VI)	Colorimetric Method ⁽⁴⁾
35	Chrysene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
36	Cyanide	Distillation, Colorimetric Method ⁽⁴⁾
37	2,4-D	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
38	DDD	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
39	DDE	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
40	DDT	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
41	Dibenz(a,h)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
42	Di-n-butyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
43	1,2-Dichlorobenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
44	1,3-Dichlorobenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
45	1,4-Dichlorobenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
46	1,1-Dichloroethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
47	1,2-Dichloroethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
48	1,1-Dichloroethylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
49	cis-1,2-Dichloroethylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾

50 trans-1,2-Dichloroethylene...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
50	trans-1,2-Dichloroethylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
51	1,2-Dichloropropane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
52	1,3-Dichloropropane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
53	1,3-Dichloropropane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
54	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
55	Diethyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
56	2,4-Dimethylphenol	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
57	2,4-Dinitrophenol	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
58	2,4-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
59	2,6-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
60	Di-n-Octyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
61	Endosulfan	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
62	Endrin	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
63	Ethylbenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
64	Fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
65	Fluorene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
66	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
67	Heptachlor epoxide	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
68	Hexachloro-1,3-butadiene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
69	n-Hexane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
70	α-HCH	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
71	β-HCH	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
72	γ-HCH	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
73	Hexachlorocyclopentadiene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾

74 Hexachloroethane...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
74	Hexachloroethane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
75	Indeno(1,2,3-cd)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
76	Isophorone	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
77	Lead	1) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
78	Manganese	1) Digestion, Direct Air-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
79	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽⁴⁾
80	Methanol	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
81	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
82	Methyl bromide	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
83	Methylene chloride	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
84	2-Methylphenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
85	2-Methylnaphthalene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
86	Methyl tert-butyl ether	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
87	Naphthalene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
88	Nickel	1) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
89	Nitrobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
90	N-Nitrosodiphenylamine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾

91 N-Nitrosodi-n-propylamine...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
91	N-Nitrosodi-n-propylamine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
92	Polychlorinated Biphenyls PCB-1016 PCB-1221 PCB-1232 PCB-1242 PCB-1248 PCB-1254 PCB-1260	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
93	Pentachlorophenol	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
94	pH	Electrometric Method ⁽⁴⁾
95	Phenanthrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
96	Phenol	1) Distillation, Direct Photometric Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
97	Pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
98	Selenium	Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ⁽⁴⁾
99	Silver	1) Digestion, Direct Air-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
100	Styrene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
101	1,1,2,2-Tetrachloroethane	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
102	Tetrachloroethylene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
103	Toluene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
104	Toxaphene	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
105	TPH (C ₅ -C ₈)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(12,22)

106 TPH (C₈-C₁₆)...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
106	TPH (C ₈ -C ₁₆)	Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(9,22)
107	TPH (C ₁₆ -C ₃₅)	Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(9,22)
108	1,2,4-Trichlorobenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
109	1,1,1-Trichloroethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
110	1,1,2-Trichloroethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
111	Trichloroethylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
112	2,4,5-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
113	2,4,6-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
114	1,3,5-Trimethylbenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
115	Vanadium	1) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
116	Vinyl acetate	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
117	Vinyl chloride	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
118	m-Xylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
119	o-Xylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
120	p-Xylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
121	Xylene (Total)	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
122	Zinc	1) Digestion, Direct Air-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾

อากาศเสีย...

อากาศเสีย (ปล่องระบาย) จำนวน 18 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Antimony	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽⁵⁾ 2) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ⁽⁵⁾ 3) Isokinetic Sampling, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ⁽⁵⁾
2	Arsenic	Isokinetic Sampling, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ⁽⁵⁾
3	Carbon monoxide	Instrumental Analyzer Method ⁽⁵⁾
4	Chlorine	Absorption Sampling, Ion Chromatographic Method ⁽⁵⁾
5	Copper	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽⁵⁾ 2) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ⁽⁵⁾
6	Cresol	Adsorption Sampling, Gas Chromatographic Method ⁽⁵⁾
7	Dioxins/Furans	Isokinetic Sampling, Analysis by ISO/IEC 17025 Accredited Laboratory or Analysis by Department of Industrial Works Registered Laboratory (Dioxins/Furans Analysis Approved) ⁽⁵⁾
8	Hydrogen Chloride	Absorption Sampling, Ion Chromatographic Method ⁽⁵⁾
9	Hydrogen Fluoride	Absorption Sampling, Ion Chromatographic Method ⁽⁵⁾
10	Hydrogen Sulfide	Absorption Sampling, Iodometric Method ⁽⁵⁾
11	Lead	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽⁵⁾ 2) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ⁽⁵⁾ 3) Isokinetic Sampling, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ⁽⁵⁾
12	Mercury	Isokinetic Sampling, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽⁵⁾
13	Opacity	Ringelmann's Method ⁽²⁾
14	Oxides of Nitrogen	1) Absorption Sampling, Phenoldisulfonic acid Method ⁽⁵⁾ 2) Instrumental Analyzer Method ⁽⁵⁾

15 Sulfur dioxide...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
15	Sulfur dioxide	1) Absorption Sampling, Barium-Thorin Titrimetric Method ^[5] 2) Instrumental Analyzer Method ^[5]
16	Sulfuric acid	Isokinetic Sampling, Barium-Thorin Titrimetric Method ^[5]
17	Total Suspended Particulate	Isokinetic Sampling, Gravimetric Method ^[5]
18	Xylene	Adsorption Sampling, Gas Chromatographic Method ^[5]

สิ่งบ่งชี้หรือวัสดุที่ไม่ใช่แล้ว จำนวน 36 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldrin	1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ^[1,10,24] 2) Solid-Phase Extraction, Gas Chromatographic Method ^[10,24] 3) Soxhlet Extraction, Gas Chromatographic Method ^[11,24]
2	Antimony	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15] 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[1,6,16] 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 4) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[7,16] 6) Digestion, Inductively Coupled Plasma Method ^[7,14]
3	Arsenic	1) Waste Extraction, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[1,6,17] 2) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[7,17]
4	Barium	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15] 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[1,6,16] 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14]

4) Digestion...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
5	Beryllium	4) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[7,16] 6) Digestion, Inductively Coupled Plasma Method ^[7,14] 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15] 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[1,6,16] 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 4) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[7,16] 6) Digestion, Inductively Coupled Plasma Method ^[7,14]
6	Cadmium	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15] 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[1,6,16] 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 4) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[7,16] 6) Digestion, Inductively Coupled Plasma Method ^[7,14]
7	Chlordane	1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ^[1,10,24] 2) Solid-Phase Extraction, Gas Chromatographic Method ^[10,24] 3) Soxhlet Extraction, Gas Chromatographic Method ^[11,24]
8	Chromium	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15] 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[1,6,16]

3) Waste Extraction...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
9	Chromium (III)	3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,14) 4) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,16) 6) Digestion, Inductively Coupled Plasma Method ^(7,14) 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method; Waste Extraction, Colorimetric Method; Calculation ^(1,6,15,18) 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method; Waste Extraction, Colorimetric Method; Calculation ^(1,6,16,18) 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method; Waste Extraction, Colorimetric Method; Calculation ^(1,6,14,8) 4) Digestion, Flame Atomic Absorption Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation ^(7,8,15,18) 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation ^(7,8,16,18) 6) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation ^(7,8,14,18)
10	Chromium (VI)	1) Waste Extraction, Colorimetric Method ^(1,18) 2) Alkaline Digestion, Colorimetric Method ^(8,18)
11	Cobalt	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^(1,6,15) 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(1,6,14) 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,14) 4) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,16) 6) Digestion, Inductively Coupled Plasma Method ^(7,14)

12 Copper...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
12	Copper	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^(1,6,15) 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(1,6,16) 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,14) 4) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,16) 6) Digestion, Inductively Coupled Plasma Method ^(7,14)
13	2,4-D	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(1,9,24) 2) Soxhlet Extraction, Gas Chromatographic Method ^(11,24)
14	DDD	1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ^(1,10,24) 2) Solid-Phase Extraction, Gas Chromatographic Method ^(10,24) 3) Soxhlet Extraction, Gas Chromatographic Method ^(11,24)
15	DDE	1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ^(1,10,24) 2) Solid-Phase Extraction, Gas Chromatographic Method ^(10,24) 3) Soxhlet Extraction, Gas Chromatographic Method ^(11,24)
16	DDT	1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ^(1,10,24) 2) Solid-Phase Extraction, Gas Chromatographic Method ^(10,24) 3) Soxhlet Extraction, Gas Chromatographic Method ^(11,24)
17	Dieldrin	1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ^(1,10,24) 2) Solid-Phase Extraction, Gas Chromatographic Method ^(10,24) 3) Soxhlet Extraction, Gas Chromatographic Method ^(11,24)

18 Endrin...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
18	Endrin	1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ^(1,10,24) 2) Solid-Phase Extraction, Gas Chromatographic Method ^(10,24) 3) Soxhlet Extraction, Gas Chromatographic Method ^(11,24)
19	Heptachlor	1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ^(1,10,24) 2) Solid-Phase Extraction, Gas Chromatographic Method ^(10,24) 3) Soxhlet Extraction, Gas Chromatographic Method ^(11,24)
20	Lead	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^(1,6,15) 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(1,6,16) 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,14) 4) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,16) 6) Digestion, Inductively Coupled Plasma Method ^(7,14)
21	Lindane	1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ^(1,10,24) 2) Solid-Phase Extraction, Gas Chromatographic Method ^(10,24) 3) Soxhlet Extraction, Gas Chromatographic Method ^(11,24)
22	Mercury	1) Waste Extraction, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^(1,6,19) 2) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽²⁰⁾
23	Methoxychlor	1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ^(1,10,24) 2) Solid-Phase Extraction, Gas Chromatographic Method ^(10,24)

3) Soxhlet...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
24	Mirex	3) Soxhlet Extraction, Gas Chromatographic Method ^(11,24) 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(1,9,24) 2) Soxhlet Extraction, Gas Chromatographic Method ^(11,24)
25	Molybdenum	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^(1,6,15) 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(1,6,16) 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,14) 4) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,16) 6) Digestion, Inductively Coupled Plasma Method ^(7,14)
26	Nickel	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^(1,6,15) 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(1,6,16) 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,14) 4) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,16) 6) Digestion, Inductively Coupled Plasma Method ^(7,14)
27	Polychlorinated Bphenyls Aroclor 1016 Aroclor 1221 Aroclor 1232 Aroclor 1242 Aroclor 1248 Aroclor 1254 Aroclor 1260 2,4,4'-Trichlorobiphenyl 2,2',5,5'-Tetrachlorobiphenyl	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(1,9,25) 2) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ^(1,10,25) 3) Soxhlet Extraction, Gas Chromatographic Method ^(11,25)

2,2',4,5,5'...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
28	2,2',4,5,5'-Pentachlorobiphenyl 2,2',3,4,4',5'- Hexachlorobiphenyl 2,2',4,4',5,5'- Hexachlorobiphenyl 2,2',3,4,4',5,5'- Heptachlorobiphenyl Pentachlorophenol	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(1,9,24) 2) Soxhlet Extraction, Gas Chromatographic Method ^(11,24)
29	Selenium	1) Waste Extraction, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^(1,6,21) 2) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^(7,21)
30	Silver	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^(1,6,15) 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(1,6,16) 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,14) 4) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,15) 6) Digestion, Inductively Coupled Plasma Method ^(7,14)
31	Thallium	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^(1,6,15) 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(1,6,16) 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,14) 4) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,15) 6) Digestion, Inductively Coupled Plasma Method ^(7,14)

32 Toxaphene...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
32	Toxaphene	1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ^(1,10,24) 2) Solid-Phase Extraction, Gas Chromatographic Method ^(10,24) 3) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,27)
33	Trichloroethylene	1) Waste Extraction, Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(1,12,26) 2) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,26)
34	Vanadium	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^(1,6,15) 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(1,6,16) 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,4) 4) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,16) 6) Digestion, Inductively Coupled Plasma Method ^(7,14)
35	Vinyl chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,26)
36	Zinc	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^(1,6,15) 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(1,6,16) 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,14) 4) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,16) 6) Digestion, Inductively Coupled Plasma Method ^(7,14)

ดิน...

ดิน จำนวน 121 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,27)
2	Acetone	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26)
3	Aldrin	Soxhlet Extraction, Gas Chromatographic Method ^(11,24)
4	Anthracene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,27)
5	Antimony	1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,16) 3) Digestion, Inductively Coupled Plasma Method ^(7,14)
6	Arsenic	Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^(7,17)
7	Atrazine	Soxhlet Extraction, Gas Chromatographic Method ^(11,24)
8	Barium	1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,16) 3) Digestion, Inductively Coupled Plasma Method ^(7,14)
9	Benz(a)anthracene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,27)
10	Benzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26)
11	Benzo(b)fluoranthene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,27)
12	Benzo(k)fluoranthene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,27)
13	Benzoic acid	Soxhlet Extraction, Gas Chromatographic Method ^(11,23)
14	Benzo(a)pyrene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,27)
15	Benzo(g,h,i)perylene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,27)
16	Beryllium	1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15)

2) Digestion...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
		2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,16) 3) Digestion, Inductively Coupled Plasma Method ^(7,14)
17	Bis(2-chloroethyl)ether	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,27)
18	Bis(2-ethylhexyl)phthalate	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,27)
19	Bromodichloromethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26)
20	Bromoform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26)
21	Butanol	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26)
22	Butyl benzyl phthalate	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,27)
23	Cadmium	1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,16) 3) Digestion, Inductively Coupled Plasma Method ^(7,14)
24	Carbazole	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,27)
25	Carbon disulfide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26)
26	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26)
27	Chlordane	Soxhlet Extraction, Gas Chromatographic Method ^(11,24)
28	p-Chloroaniline	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,27)
29	Chlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26)
30	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26)
31	Chloroform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26)
32	Chromium	1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15)

2) Digestion...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
33	Chromium (III)	2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,16) 3) Digestion, Inductively Coupled Plasma Method ^(7,10) 1) Digestion, Flame Atomic Absorption Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation ^(7,8,15,18) 2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation ^(7,8,16,18) 3) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation ^(7,8,14,18)
34	Chromium (VI)	Alkaline Digestion, Colorimetric Method ^(8,18)
35	Chrysene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,27)
36	Cyanide	1) Extraction, Distillation, Titrimetric Method ^(28,29,30) 2) Extraction, Distillation, Colorimetric Method ^(28,29,30)
37	2,4-D	Soxhlet Extraction, Gas Chromatographic Method ^(11,24)
38	DDD	Soxhlet Extraction, Gas Chromatographic Method ^(11,24)
39	DDE	Soxhlet Extraction, Gas Chromatographic Method ^(11,24)
40	DDT	Soxhlet Extraction, Gas Chromatographic Method ^(11,24)
41	Dibenz(a,h)anthracene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,27)
42	Di-n-butyl phthalate	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,27)
43	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,26)
44	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,26)
45	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,26)
46	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,26)
47	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,26)
48	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,26)

49 cis-1,2-Dichloroethylene...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
49	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,26)
50	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,26)
51	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,26)
52	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,26)
53	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,26)
54	Dieldrin	Soxhlet Extraction, Gas Chromatographic Method ^(11,24)
55	Diethyl phthalate	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,27)
56	2,4-Dimethylphenol	Soxhlet Extraction, Gas Chromatographic Method ^(11,23)
57	2,4-Dinitrophenol	Soxhlet Extraction, Gas Chromatographic Method ^(11,23)
58	2,4-Dinitrotoluene	Soxhlet Extraction, Gas Chromatographic Method ^(11,23)
59	2,6-Dinitrotoluene	Soxhlet Extraction, Gas Chromatographic Method ^(11,23)
60	Di-n-Octyl phthalate	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,27)
61	Endosulfan	Soxhlet Extraction, Gas Chromatographic Method ^(11,24)
62	Endrin	Soxhlet Extraction, Gas Chromatographic Method ^(11,24)
63	Ethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,26)
64	Fluoranthene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,27)
65	Fluorene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,27)
66	Heptachlor	Soxhlet Extraction, Gas Chromatographic Method ^(11,24)
67	Heptachlor epoxide	Soxhlet Extraction, Gas Chromatographic Method ^(11,24)
68	Hexachloro-1,3-butadiene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,26)
69	n-Hexane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,26)
70	α-HCH	Soxhlet Extraction, Gas Chromatographic Method ^(11,24)
71	β-HCH	Soxhlet Extraction, Gas Chromatographic Method ^(11,24)
72	γ-HCH	Soxhlet Extraction, Gas Chromatographic Method ^(11,24)

73 Hexachlorocyclopentadiene...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
73	Hexachlorocyclopentadiene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,27)
74	Hexachloroethane	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,27)
75	Indeno(1,2,3-cd)pyrene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,27)
76	Isophorone	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,27)
77	Lead	1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,14) 3) Digestion, Inductively Coupled Plasma Method ^(7,14)
78	Manganese	1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,14) 3) Digestion, Inductively Coupled Plasma Method ^(7,14)
79	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽²⁰⁾
80	Methanol	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26)
81	Methoxychlor	Soxhlet Extraction, Gas Chromatographic Method ^(11,24)
82	Methyl bromide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26)
83	Methylene chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26)
84	2-Methylphenol	Soxhlet Extraction, Gas Chromatographic Method ^(11,23)
85	2-Methylnaphthalene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,27)
86	Methyl tert-butyl ether	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26)
87	Naphthalene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26)
88	Nickel	1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,14) 3) Digestion, Inductively Coupled Plasma Method ^(7,14)

89 Nitrobenzene...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
89	Nitrobenzene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,27)
90	N-Nitrosodiphenylamine	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,27)
91	N-Nitrosodi-n-propylamine	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,27)
92	Polychlorinated Biphenyls Aroclor 1016 Aroclor 1221 Aroclor 1232 Aroclor 1242 Aroclor 1248 Aroclor 1254 Aroclor 1260 2,2',5,5'-Tetrachlorobiphenyl 2,2',4,5,5'-Pentachlorobiphenyl 2,2',3,4,4',5'- Hexachlorobiphenyl 2,2',4,4',5,5'- Hexachlorobiphenyl 2,2',3,4,4',5,5'- Heptachlorobiphenyl	Soxhlet Extraction, Gas Chromatographic Method ^(11,25)
93	Pentachlorophenol	Soxhlet Extraction, Gas Chromatographic Method ^(11,24)
94	Phenanthrene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,27)
95	Phenol	Soxhlet Extraction, Gas Chromatographic Method ^(11,23)
96	Pyrene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,27)
97	Selenium	Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^(7,21)
98	Silver	1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,14) 3) Digestion, Inductively Coupled Plasma Method ^(7,14)
99	Styrene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26)

100 1,1,2,2-Tetrachloroethane...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
100	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26)
101	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26)
102	Toluene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26)
103	Toxaphene	Soxhlet Extraction, Gas Chromatographic Method ^(11,24)
104	TPH (C ₅ -C ₈)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26)
105	TPH (C ₈ -C ₁₆)	Soxhlet Extraction, Gas Chromatographic Method ^(11,22)
106	TPH (C ₁₆ -C ₃₅)	Soxhlet Extraction, Gas Chromatographic Method ^(11,22)
107	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26)
108	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26)
109	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26)
110	Trichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26)
111	2,4,5-Trichlorophenol	Soxhlet Extraction, Gas Chromatographic Method ^(11,23)
112	2,4,6-Trichlorophenol	Soxhlet Extraction, Gas Chromatographic Method ^(11,23)
113	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26)
114	Vanadium	1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,14) 3) Digestion, Inductively Coupled Plasma Method ^(7,14)
115	Vinyl acetate	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26)
116	Vinyl chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26)
117	m-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26)
118	o-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26)
119	p-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26)

120 Xylene (Total)

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
120	Xylene (Total)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,26)
121	Zinc	1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^(7,16) 3) Digestion, Inductively Coupled Plasma Method ^(7,14)

เอกสารอ้างอิง

- กระทรวงอุตสาหกรรม. ประกาศกระทรวงอุตสาหกรรม, พ.ศ. 2548. เรื่อง การกำจัดสิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว.ราชกิจจานุเบกษา. 25 มกราคม 2549. เล่มที่ 123 ตอนพิเศษ 11ง.
- กระทรวงอุตสาหกรรม. ประกาศกระทรวงอุตสาหกรรม, พ.ศ. 2549. เรื่อง กำหนดค่าปริมาณเขม่าควันที่เจือปนในอากาศที่ระบายออกจากปล่องของหม้อน้ำโรงสีข้าวที่ใช้ถ่านเป็นเชื้อเพลิง.ราชกิจจานุเบกษา. 4 ธันวาคม 2549. เล่มที่ 123 ตอนพิเศษ 125ง.
- สมาคมวิศวกรรมสิ่งแวดล้อมแห่งประเทศไทย. คู่มือวิเคราะห์น้ำเสีย. พิมพ์ครั้งที่ 4. กรุงเทพฯ: เรือนแก้วการพิมพ์, 2547.
- APHA, AWWA, WEF. Standard Methods for the Examination of Water and Wastewater. 23rd ed. Washington, DC: APHA, 2017.
- United States Environmental Protection Agency. Standards of Performance for New Stationary Sources. 40 CFR 60. Appendix A, 2022.
- United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. SW-846, 1997.
- United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Acid Digestion of Sludges and Sediments and Soils. SW-846 Method 3050B, 1996.
- United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Alkaline Digestion for Hexavalent Chromium. SW-846 Method 3060A, 1996.
- United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Separatory Funnel Liquid-Liquid Extraction. SW-846 Method 3510C, 1996.
- United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Solid Phase Extraction. SW-846 Method 3535A, 2007.
- United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Soxhlet Extraction. SW-846 Method 3540C, 1996.

12. United States...

12. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Purge-and-Trap for Aqueous Samples. SW-846 Method 5030C, 2003.
13. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Closed-System Purge-and-Trap and Extraction for Volatile Organics in Soil and Waste Samples. SW-846 Method 5035A, 2007.
14. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Inductively Coupled Plasma-Optical Emission Spectrometry. SW-846 Method 6010D, 2018.
15. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Flame Atomic Absorption Spectrophotometry. SW-846 Method 7000B, 2007.
16. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Graphite Furnace Atomic Absorption Spectrophotometry. SW-846 Method 7010, 2007.
17. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Arsenic (Atomic Absorption, Gaseous Hydride). SW-846 Method 7061A, 1992.
18. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Chromium, Hexavalent (Colorimetric). SW-846 Method 7196A, 1992.
19. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Mercury in Liquid Waste (Manual Cold-Vapor Technique). SW-846 Method 7470A, 1994.
20. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Mercury in Solid or Semisolid Waste (Manual Cold-Vapor Technique). SW-846 Method 7471A, 1994.
21. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Selenium (Atomic Absorption, Borohydride Reduction). SW-846 Method 7742, 1994.
22. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Nonhalogenated Organics Using GC/FID. SW-846 Method 8015D, 2003.
23. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Phenols by Gas Chromatography. SW-846 Method 8041, 1996.

24. United States...

24. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Organochlorine Pesticides by Gas Chromatography. SW-846 Method 8081B, 2007.
25. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Polychlorinated Biphenyls (PCBs) by Gas Chromatography. SW-846 Method 8082A, 2007.
26. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS). SW-846 Method 8260C, 2006.
27. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry. SW-846 Method 8270D, 2014.
28. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Total and Amenable Cyanide: Distillation. SW-846 Method 9010C, 2004.
29. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Cyanide Extraction Procedure for Solids and Oil. SW-846 Method 9013A, 1996.
30. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Cyanide in Waters and Extracts Using Titrimetric and Manual Spectrophotometric Procedures. SW-846 Method 9014, 2014.



บริษัท ซีเอ็นพีซีเอชเค (ไทยแลนด์) จำกัด

รายงานผลการปฏิบัติตามมาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม และมาตรการติดตามตรวจสอบผลกระทบสิ่งแวดล้อม
โครงการผลิตปิโตรเลียมแหล่งผลิตบึงน้ำตวันตก - หนองสระ (BYW - NS) (ส่วนขยาย)
แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และกำแพงเพชร
ฉบับเดือนมกราคม - ธันวาคม พ.ศ.2567

ภาคผนวก ง.7

เอกสารการสอบเทียบเครื่องมือตรวจวัด

ฤดูแล้ง

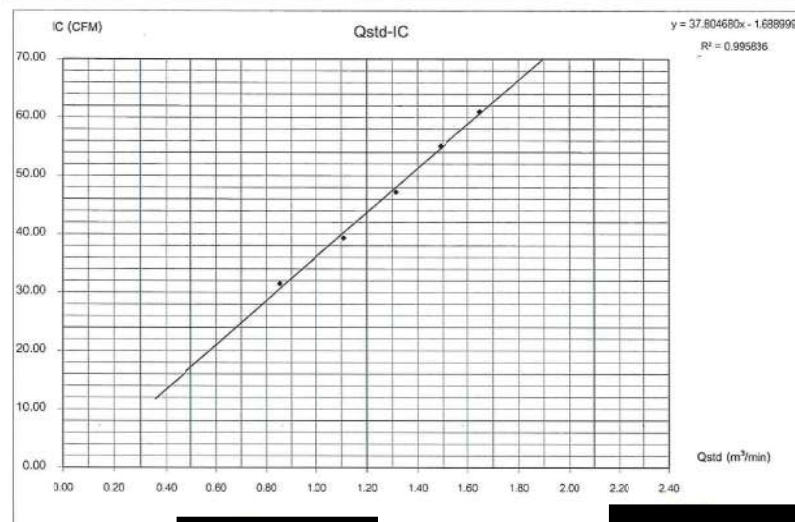
TSP HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

Quotation	2024-00454	Date	March 24, 2024
Sampler Location	จังหวัดนนทบุรี	Start Time	11:30 AM
Sampler Number	TSP No A24	Stop Time	11:40 AM
Instrument Model	HIVOL-BSCBE	Transfer Standard Type	Orifice
Motor Serial Number	2151	Calibrator Model	TE-5025A
Recorder Serial Number	2412	Calibrator Serial Number	2914
		Calibrated By	Mr.Anan Kongquemok

Rate No.	(Delta H)	(A)	(X)	(I)	(Y)	Temperature	Barometric Pressure	Start Motor	Stop Motor
	Pressure Drop Across Orifice (mmH ₂ O)	$[\Delta H \cdot D(Pa \cdot P_{atm}) / (T_{atm} \cdot T_{ref})]^{1/2}$	$Q_{std} = (1/m) \cdot [(A \cdot b)]$	Sample Flow Rate Indicator	$IC = [(P/P_{atm}) \cdot (T_{ref}/T_{atm})]^{1/2}$	(°K = °C + 273)	(mmHg)		
	Positive Negative ΔH_{H_2O}		(m ³ /min)	(l/min)					
5	1.6 1.6 3.2	1.75050	0.85539	32.0	31.47	306.0	755.0		
7	2.7 2.7 5.4	2.28595	1.10851	40.0	39.34	306.0	755.0		
10	3.8 3.8 7.6	2.71157	1.31340	48.0	47.21	306.0	755.0		
13	4.9 4.9 9.8	3.07912	1.49022	50.0	55.08	306.0	755.0		
18	6.0 6.0 12.0	3.40726	1.84807	62.0	60.98	306.0	755.0		
Linear Regression Y ON X : Y = mx + b						Average	306.0	755.0	
1	Slope (m)	2.07671	Linear Equation			r ²	0.995836	Pstdev/mmHg	700.0
2	Intercept (b)	-0.01861	Set Point Flow Rate (X) (m ³ /min)	1.133	r	0.997098	T _{ref}		298.0
3	Correlation Coefficient (r)	0.99984	Final Set Flow Rate = (I)	0	(Pa/Patm) * (Tstd/Tat)		0.96744926		
Result						C = (Pa/Patm) * (Tstd/Tat) * 0.5		0.983399980	

COMMENT

Andersen Instruments, Inc.



Checked By

(Mr. Prayun Detkla)
Technician

Approved By

(Mr. Panupon Podang)
Environmental Scientist

F-AB-024, Rev. 02, June 3, 2019

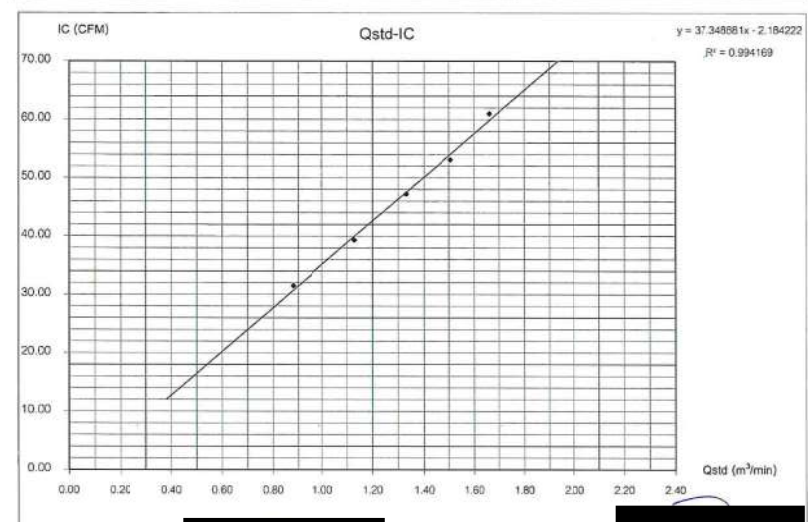
PM10 HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

Quotation	2024-00454	Date	March 24, 2024
Sampler Location	จังหวัดนนทบุรี	Start Time	11:20 AM
Sampler Number	PM-10 No.26	Stop Time	11:30 AM
Instrument Model	HIVOL-SMBBE	Transfer Standard Type	Orifice
Motor Serial Number	2206	Calibrator Model	TE-5025A
Recorder Serial Number	7261	Calibrator Serial Number	2914
		Calibrated By	Mr.Anan Kongquemok

Rate No.	(Delta H)	(A)	(X)	(I)	(Y)	Temperature	Barometric Pressure	Start Motor	Stop Motor
	Pressure Drop Across Orifice (mmH ₂ O)	$[\Delta H \cdot D(Pa \cdot P_{atm}) / (T_{atm} \cdot T_{ref})]^{1/2}$	$Q_{std} = (1/m) \cdot [(A \cdot b)]$	Sample Flow Rate Indicator	$IC = [(P/P_{atm}) \cdot (T_{ref}/T_{atm})]^{1/2}$	(°K = °C + 273)	(mmHg)		
	Positive Negative ΔH_{H_2O}		(m ³ /min)	(l/min)					
5	1.7 1.7 3.4	1.81365	0.88144	32.0	31.47	306.0	755.0		
7	2.8 2.8 5.6	2.32760	1.12868	40.0	39.34	306.0	755.0		
10	3.9 3.9 7.8	2.74702	1.33045	48.0	47.21	306.0	755.0		
13	5.0 5.0 10.0	3.11036	1.50526	54.0	53.11	306.0	755.0		
18	6.1 6.1 12.2	3.43553	1.66168	62.0	60.98	306.0	755.0		
Linear Regression Y ON X : Y = mx + b						Average	306.0	755.0	
1	Slope (m)	2.07671	Linear Equation			r ²	0.994190	Pstdev/mmHg	700.0
2	Intercept (b)	-0.01861	Set Point Flow Rate (X) (m ³ /min)	1.133	r	0.997098	T _{ref}		298.0
3	Correlation Coefficient (r)	0.99984	Final Set Flow Rate = (I)	0	(Pa/Patm) * (Tstd/Tat)		0.96744926		
Result						C = (Pa/Patm) * (Tstd/Tat) * 0.5		0.983399980	

COMMENT

Andersen Instruments, Inc.



Checked By

(Mr. Prayun Detkla)
Technician

Approved By

(Mr. Panupon Podang)
Environmental Scientist

F-AB-024, Rev. 02, June 3, 2019

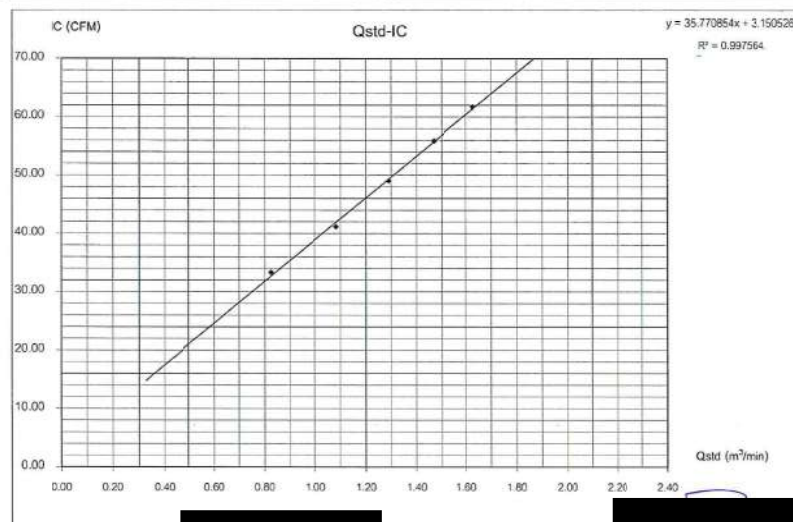
TSP HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

Quotation	2024-00454	Date	March 24, 2024
Sampler Location	บ้านเลขที่ 144 หมู่ที่ 4 ตำบลจันทน์	Start Time	12:30 AM
Sampler Number	TSP No. A27	Transfer Standard Type	Office
Instrument Model	HIVOL-BB08E	Calibrator Model	TE-5025A
Motor Serial Number	2215	Calibrator Serial Number	2914
Recorder Serial Number	2133	Calibrated By	Mr. Anan Kongguernnok

No.	(Delta H)	(A)	(K)	(I)	(Y)	Temperature	Barometric	Start	Stop
No.	Pressure Drop Across Orifice (mmHg)	$[\Delta H \cdot O/P_{atm} \cdot (T_{std}/T_{atm})^{1.2}]$	$Q_{std} = (1/min)[(A \cdot b)]$	Sample Flow Rate Indicator	$IC = (P/P_{std}) \cdot (T_{std}/T_{atm})^{1.2}$	(°K = °C + 273)	(mmHg)	Motor	Motor
	Positive Negative ΔH_{H_2O}		(m³/min)	(l/min)		(°K = °C + 273)	(mmHg)		
5	1.5 1.5 3.0	1.00090	0.82531	34.0	33.31	308.0	754.0		
7	2.0 2.0 5.2	2.23416	1.06373	43.0	41.15	308.0	754.0		
10	3.7 3.7 7.4	2.66519	1.29109	50.0	48.99	308.0	754.0		
13	4.8 4.8 9.6	3.03562	1.49029	57.0	55.65	308.0	754.0		
18	5.9 5.9 11.8	3.36552	1.62800	63.0	61.72	308.0	754.0		
Linear Regression Y ON X: Y = mX + b						Average	308.0	754.0	
1	Slope (m)	2.07871	Linear Equation			r^2	0.997564	Paid/mmHg	700.0
2	Intercept (b)	-0.01861	Set Point Flow Rate (X) (m³/min)			r	0.9987813	T _{std}	298.0
3	Correlation Coefficient (r)	0.99984	Final Set Flow Rate = (I)			0	(Pa/Pstd)(Tstd/Tat)	0.999894053	
Result						C = (Pa/Pstd)(Tstd/Tat)⁰.5			
						0.97074183			

COMMENT

Andersen Instruments, Inc.



Checked By

(Mr. Prayun Detkla)
Technician

Approved By

(Mr. Panupon Podang)
Environmental Scientist

F-A3-02A, Rev. 02, June 3, 2019

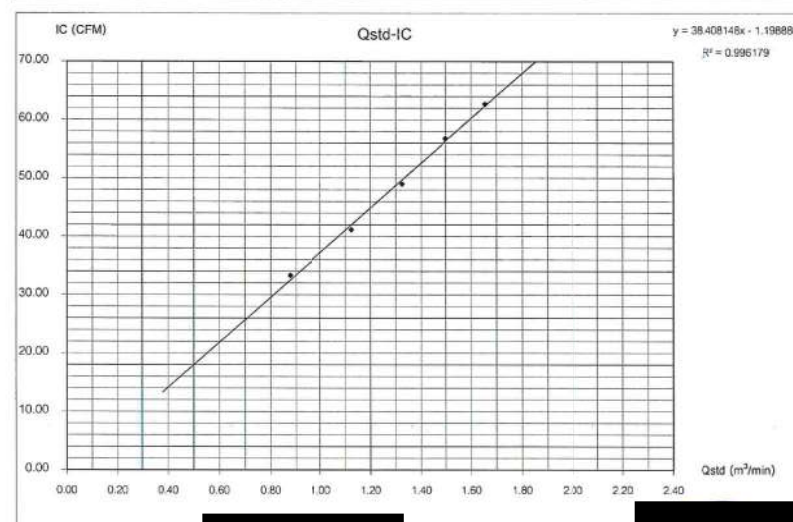
PM10 HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

Quotation	2024-00454	Date	March 24, 2024
Sampler Location	บ้านเลขที่ 144 หมู่ที่ 4 ตำบลจันทน์	Start Time	12:20 AM
Sampler Number	PM-10 No.30	Transfer Standard Type	Office
Instrument Model	HIVOL-BB08E	Calibrator Model	TE-5025A
Motor Serial Number	2208	Calibrator Serial Number	2914
Recorder Serial Number	2610	Calibrated By	Mr. Anan Kongguernnok

Plate No.	(Delta H)			(A)	(X)	(I)	(Y)	Temperature	Barometric	Start	Stop
	Pressure Drop Across Orifice (mmHg)			$[\Delta H \cdot O/P_{atm} \cdot (T_{std}/T_{atm})^{1.2}]$	$Q_{std} = (1/min)[(A \cdot b)]$	sample Flow Rate Indicator	$IC = (P/P_{std}) \cdot (T_{std}/T_{atm})^{1.2}$				
	Positive	Negative	ΔH_{H_2O}		(m³/min)	(l/min)		(°K = °C + 273)	Pressure	Meter	Meter
5	1.7	1.7	3.4	1.80655	0.87803	34.0	33.31	308.0	754.0		
7	2.8	2.8	5.6	2.31049	1.12430	42.0	41.15	308.0	754.0		
10	3.9	3.9	7.8	2.73627	1.32528	50.0	48.99	308.0	754.0		
13	5.0	5.0	10.0	3.09822	1.49040	58.0	55.63	308.0	754.0		
18	6.1	6.1	12.2	3.42209	1.65521	64.0	62.70	308.0	754.0		
Linear Regression Y ON X: Y = mx + b							Average		308.0	754.0	
1	Slope (m)			2.07871	Linear Equation			r^2	0.996179	Total/mmHg	700.0
2	Intercept (b)			-0.01861	Set Point Flow Rate (X) (m³/min)			r	0.9980677	T _{std}	298.0
3	Correlation Coefficient (r)			0.99984	Final Set Flow Rate = (I)			0	(Pa/Pstd)(Tstd/Tat)	0.999894053	
Result					C=(Pa/Pstd)(Tstd/Tat)⁰.5						
					0.97874183						

COMMENT

Andersen Instruments, Inc.



Checked By

(Mr. Prayun Detkla)
Technician

Approved By

(Mr. Panupon Podang)
Environmental Scientist

F-A3-02A, Rev. 02, June 3, 2019

TSP HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

Quotation	2024-00454	Date	March 24, 2024
Sampler Location	บ้านเลขที่ 102 หมู่ที่ 7 ตำบลคูบัว	Start Time	1:35 PM
Sampler Number	TSP No A25	Transfer Standard Type	Orifice
Instrument Model	HIVOL-BBCBE	Calibrator Model	TE-5025A
Meter Seal Number	2152	Calibrator Serial Number	2914
Recorder Serial Number	2411	Calibrated By	Mr.Aran Kongguenrakk

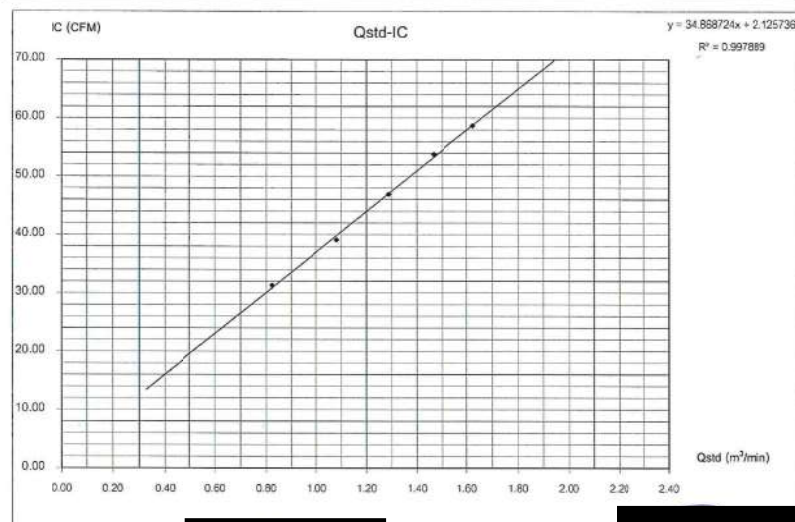
No.	(Delta H)	(A)	(X)	(I)	(Y)	Temperature	Barometric	Start	Stop
	Pressure Drop Across Orifice (mmH ₂ O)	$[\Delta H \cdot O(Pa/P_{atm}) \cdot (T_{atm}/T_{ref})]^{1/2}$	$Q_{std} = (1/m) \cdot [(A \cdot b)]$	Sample Flow Rate Indicator	$IC = (P/P_{atm}) \cdot (T_{atm}/T_{ref})^{1/2}$	(°K = °C + 273)	Pressure	Meter	Meter
	Positive	Negative	ΔH_2O	(m ³ /min)	(m ³ /min)	(mmHg)			
5	1.5	1.5	3.0	1.69309	0.82344	32.0	309.0	753.0	
7	2.6	2.6	5.2	2.22906	1.09128	40.0	309.0	753.0	
10	3.7	3.7	7.4	2.65910	1.29916	48.0	309.0	753.0	
13	4.8	4.8	9.6	3.02899	1.49596	56.0	309.0	753.0	
18	5.9	5.9	11.8	3.35794	1.62430	60.0	309.0	753.0	

Linear Regression Y ON X: Y = mx + b

1	Slope (m)	2.07871	Linear Equation		Average	309.0	753.0
2	Intercept (b)	-0.01851	Set Point Flow Rate (X) (m ³ /min)	1.133	r ²	0.997889	760.0
3	Correlation Coefficient (r)	0.99984	Final Set Flow Rate = (I)	0	r	0.999439	298.0
Result					(Pa/P _{atm})(T _{atm} /T _{ref})	0.95518651	
					C = (Pa/P _{atm})(T _{atm} /T _{ref}) ^{0.5}	0.97700343	

COMMENT

Andersen Instruments, Inc.



Checked By

(Mr. Prayun Detkla)
Technician

Approved By

(Mr. Panupon Podang)
Environmental Scientist

F-AB-02A, Rev. 02, June 3, 2019

PM10 HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

Quotation	2024-00454	Date	March 24, 2024
Sampler Location	บ้านเลขที่ 102 หมู่ที่ 7 ตำบลคูบัว	Start Time	1:25 PM
Sampler Number	PM-10 No. 17	Transfer Standard Type	Orifice
Instrument Model	HIVOL-BMBBE	Calibrator Model	TE-5025A
Meter Serial Number	2085	Calibrator Serial Number	2914
Recorder Serial Number	2217	Calibrated By	Mr.Aran Kongguenrakk

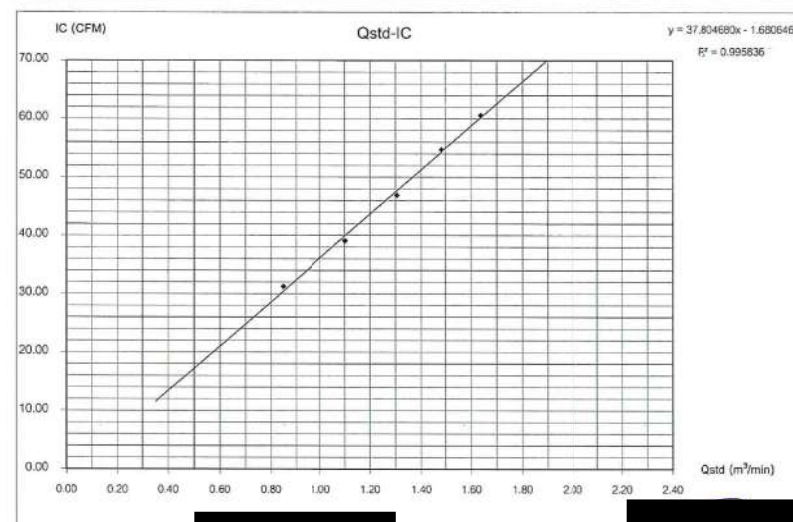
No.	(Delta H)	(A)	(X)	(I)	(Y)	Temperature	Barometric	Start	Stop
	Pressure Drop Across Orifice (mmH ₂ O)	$[\Delta H \cdot O(Pa/P_{atm}) \cdot (T_{atm}/T_{ref})]^{1/2}$	$Q_{std} = (1/m) \cdot [(A \cdot b)]$	Sample Flow Rate Indicator	$IC = (P/P_{atm}) \cdot (T_{atm}/T_{ref})^{1/2}$	(°K = °C + 273)	Pressure	Meter	Meter
	Positive	Negative	ΔH_2O	(m ³ /min)	(m ³ /min)	(mmHg)			
5	1.6	1.6	3.2	1.74862	0.85016	32.0	309.0	753.0	
7	2.7	2.7	5.4	2.27152	1.10171	40.0	309.0	753.0	
10	3.8	3.8	7.6	2.69480	1.30533	48.0	309.0	753.0	
13	4.9	4.9	9.8	3.00098	1.48106	56.0	309.0	753.0	
18	6.0	6.0	12.0	3.38618	1.63793	62.0	309.0	753.0	

Linear Regression Y ON X: Y = mx + b

1	Slope (m)	2.07871	Linear Equation		Average	309.0	753.0
2	Intercept (b)	-0.01851	Set Point Flow Rate (X) (m ³ /min)	1.133	r ²	0.995836	760.0
3	Correlation Coefficient (r)	0.99984	Final Set Flow Rate = (I)	0	r	0.9979158	298.0
Result					(Pa/P _{atm})(T _{atm} /T _{ref})	0.95518651	
					C = (Pa/P _{atm})(T _{atm} /T _{ref}) ^{0.5}	0.97700343	

COMMENT

Andersen Instruments, Inc.



Checked By

(Mr. Prayun Detkla)
Technician

Approved By

(Mr. Panupon Podang)
Environmental Scientist

F-AB-02A, Rev. 02, June 3, 2019

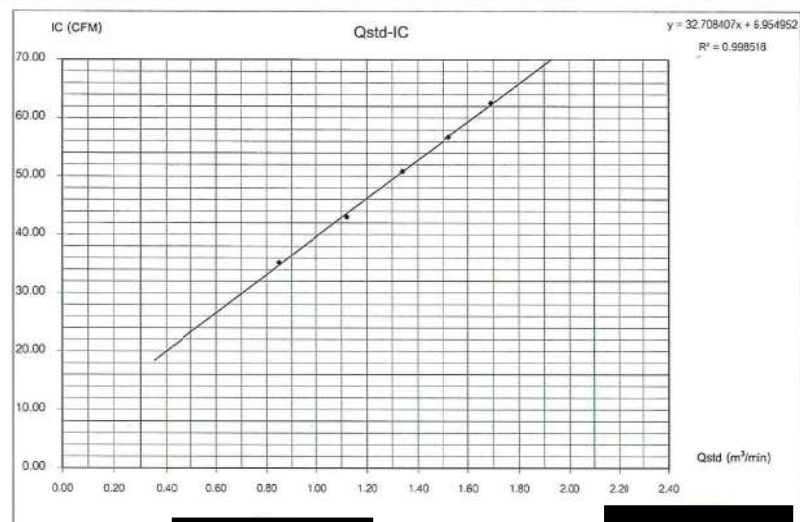
TSP HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

Quotation	2024-00454	Date	March 24, 2024
Sampler Location	Trinity Road/Huamrasak	Start Time	2:10 PM
Sampler Number	TSP No A22	Transfer Standard Type	Orifice
Instrument Model	HVOL-BBCBE	Calibrator Model	TE-5025A
Motor Serial Number	2054	Calibrator Serial Number	2914
Recorder Serial Number	2187	Calibrated By	Mr. Anan Kongguannok

No.	(Delta H)	(A)	(X)	(I)	(Y)	Temperature	Barometric Pressure	Start Meter	Stop Meter
	Pressure Drop Across Orifice (mmH ₂ O)	$[\Delta H \cdot O / (Pa \cdot P_{std} \cdot (T_{std}/T_a))]^{1/2}$	$Q_{std} = (1 \text{ m}) \cdot [(A \cdot b)]$	Sample Flow Rate Indicator	$IC = (Q / (Pa \cdot P_{std} \cdot (T_{std}/T_a)))^{1/2}$	(°K = °C + 273)	(mmHg)		
	Positive Negative ΔH_{H_2O}		(m ³ /min)	(l ³ /min)					
5	1.6 1.6 3.2	1.74802	0.85016	36.0	35.19	306.0	753.0		
7	2.8 2.8 5.6	2.31320	1.12176	44.0	43.01	306.0	753.0		
10	4.0 4.0 8.0	2.76481	1.33001	52.0	50.63	306.0	753.0		
13	5.2 5.2 10.4	3.15236	1.52545	58.0	56.70	306.0	753.0		
18	6.4 6.4 12.8	3.49723	1.69136	64.0	62.56	306.0	753.0		
Linear Regression Y ON X: Y = mX + b						Average	306.0	753.0	
1	Slope (m)	2.07871	Linear Equation			r ²	0.998518	Pstd:mmHg	750.0
2	Intercept (b)	-0.01861	Set Point Flow Rate (X) (m ³ /min)	1.133	r	0.9992587	T _{std}		298.0
3	Correlation Coefficient (r)	0.99984	Final Set Flow Rate = (I)	0	(Pa/Pstd)*(Tstd/Ta)	0.955518051			
Result:						C = (Pa/Pstd)*(Tstd/Ta)*0.5			
						0.977506343			

COMMENT

Andersen Instruments, Inc.



Checked By

(Mr. Prayun Detkla)
Technician

Approved By

(Mr. Panupon Podang)
Environmental Scientist

F-AB-02A, Rev. 02, June 3, 2019

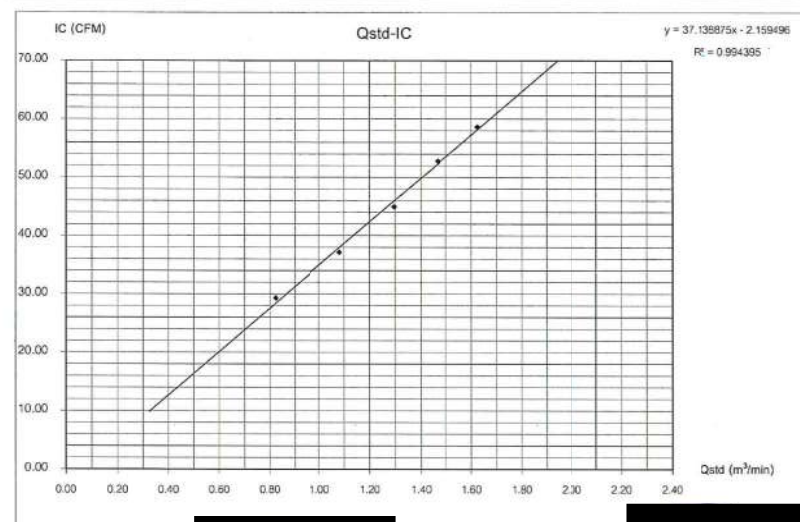
PM10 HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

Quotation	2024-00454	Date	March 24, 2024
Sampler Location	Trinity Road/Huamrasak	Start Time	2:00 PM
Sampler Number	PM-10 No.21	Transfer Standard Type	Orifice
Instrument Model	HVOL-GMBBE	Calibrator Model	TE-5025A
Motor Serial Number	2132	Calibrator Serial Number	2914
Recorder Serial Number	2362	Calibrated By	Mr. Anan Kongguannok

No.	(Delta H)	(A)	(X)	(I)	(Y)	Temperature	Barometric Pressure	Start Meter	Stop Meter
	Pressure Drop Across Orifice (mmH ₂ O)	$[\Delta H \cdot O / (Pa \cdot P_{std} \cdot (T_{std}/T_a))]^{1/2}$	$Q_{std} = (1 \text{ m}) \cdot [(A \cdot b)]$	Sample Flow Rate Indicator	$IC = (Q / (Pa \cdot P_{std} \cdot (T_{std}/T_a)))^{1/2}$	(°K = °C + 273)	(mmHg)		
	Positive Negative ΔH_{H_2O}		(m ³ /min)	(l ³ /min)					
5	1.5 1.5 3.0	1.69309	0.82344	30.0	29.33	309.0	753.0		
7	2.8 2.8 5.6	2.22905	1.08128	38.0	37.15	309.0	753.0		
10	3.7 3.8 7.5	2.57701	1.29578	46.0	44.97	309.0	753.0		
13	4.8 4.8 9.6	3.02860	1.46596	54.0	52.79	309.0	753.0		
18	5.9 5.9 11.8	3.35784	1.62430	60.0	58.65	309.0	753.0		
Linear Regression Y ON X: Y = mX + b						Average	309.0	753.0	
1	Slope (m)	2.07871	Linear Equation			r ²	0.994395	Pstd:mmHg	750.0
2	Intercept (b)	-0.01861	Set Point Flow Rate (X) (m ³ /min)	1.133	r	0.9971930	T _{std}		298.0
3	Correlation Coefficient (r)	0.99994	Final Set Flow Rate = (I)	0	(Pa/Pstd)*(Tstd/Ta)	0.955518051			
Result:						C = (Pa/Pstd)*(Tstd/Ta)*0.5			
						0.977506343			

COMMENT

Andersen Instruments, Inc.



Checked By

(Mr. Prayun Detkla)
Technician

Approved By

(Mr. Panupon Podang)
Environmental Scientist

F-AB-02A, Rev. 02, June 3, 2019

CERTIFICATE OF CALIBRATION

Certificate No. : COF-006-66

Page 1 of 2 Pages

MEASUREMENT ITEM
MANUFACTURER
MODEL/TYPE
SERIAL NUMBER
ID NUMBER
CONDITION AS-RECEIVED
CUSTOMER

: Top Load Orifice
: TISCH
: TE-S025A
: 2914
: -
: Used item
: Environment Research & Technology Co., Ltd.
25/114 Moo 6 Soi Chinaket 1, Ngamwongwan Road,
Toongsonghong, Laksi, Bangkok 10210

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 VSL (National
Metrology Institute of Netherlands) via Certificate
number: G2211901

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'

RECEIVED DATE : 27 Jul 2023
MEASUREMENT DATE : 31 Jul 2023
ISSUE DATE : 31 Jul 2023

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 24.3 °C and 50.5 %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 Jitraporn Lertsomphol



Approved signatory:

Mr. Parinya Booncharoen
Calibration Department Manager

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	$\Delta p_{Orifice}$ inH ₂ O	γ	Standard Flow [Q_s] m^3/min
1	0.699	755.476	24.24	23.40	53.510	1.786	1.334	0.649
2	1.000	755.470	24.17	23.68	58.170	3.598	1.894	0.921
3	1.111	755.481	24.19	23.60	40.793	4.682	2.160	1.050
4	1.167	755.465	23.87	23.48	31.004	5.323	2.305	1.118
5	1.411	755.522	24.29	23.78	30.145	7.846	2.796	1.352

Slope (m): 2.07871

Intercept (b): -0.01861

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	$\Delta p_{Orifice}$ inH ₂ O	γ	Standard Flow [Q_s] m^3/min
1	0.699	755.476	24.24	23.40	53.510	1.786	0.839	0.651
2	1.000	755.470	24.17	23.68	58.170	3.598	1.190	0.924
3	1.111	755.481	24.19	23.60	40.793	4.682	1.357	1.053
4	1.167	755.465	23.87	23.48	31.004	5.323	1.447	1.121
5	1.411	755.522	24.29	23.78	30.145	7.846	1.758	1.357

Slope (m): 1.30200

Intercept (b): -0.01171

Correlation coefficient (r): 0.99984

Uncertainty (k=2): 0.015 m^3/min

End of Certificate of Calibration



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



Accuracy Calibration Certificate

Customer

Company: Environment Research & Technology Co., Ltd.
Address: 25114 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: CPW00220

This calibration certificate contains measurements for As Found and As Left calibrations.
The sensitivity/span of the weighing instrument was adjusted before As Found and As Left calibrations 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: 25.4 °C	End: 25.3 °C	Start: 36.4 %	End: 34.9 %
As Left	Start: 25.3 °C	End: 25.2 °C	Start: 34.9 %	End: 34.1 %

As Found Calibration Date: 15-Jan-2024 Calibrator:
As Left Calibration Date: 15-Jan-2024
Issue Date: 15-Jan-2024
Approved Signatory:
Technical Manager / Head of Calibration Center

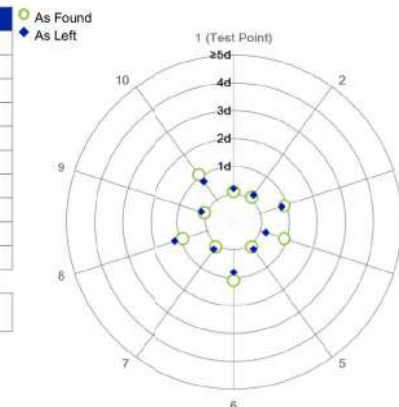
Measurement Results

Repeatability

Test Load: 100 g

	As Found	As Left
1	99.9993 g	100.0002 g
2	99.9993 g	100.0002 g
3	99.9992 g	100.0003 g
4	99.9992 g	100.0002 g
5	99.9993 g	100.0002 g
6	99.9994 g	100.0003 g
7	99.9993 g	100.0002 g
8	99.9992 g	100.0001 g
9	99.9993 g	100.0002 g
10	99.9994 g	100.0003 g

Standard Deviation	0.00007 g	0.00006 g
--------------------	-----------	-----------



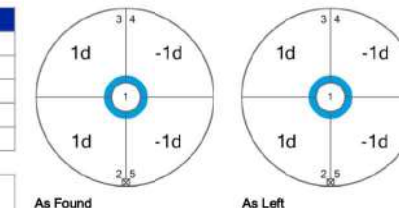
The "d" in the graph represents the readability of the range/interval in which the test was performed.
The results of this graph are based upon the absolute values of the differences from the mean value.

Eccentricity

Test Load: 100 g

Position	As Found	As Left
1	99.9993 g	100.0002 g
2	99.9994 g	100.0003 g
3	99.9994 g	100.0003 g
4	99.9992 g	100.0001 g
5	99.9992 g	100.0001 g

Maximum Deviation	0.0001 g	0.0001 g
-------------------	----------	----------

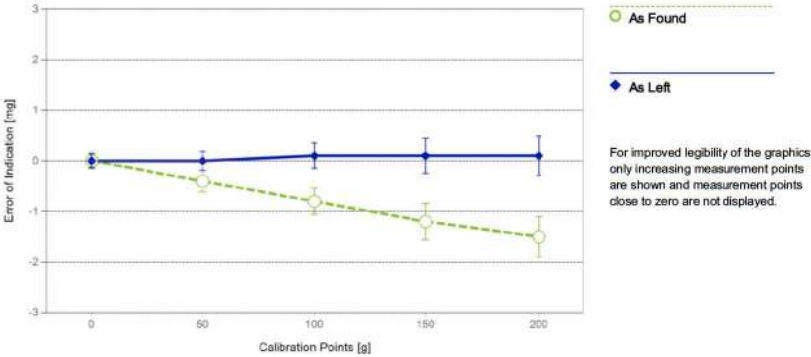


The "d" in the graph represents the readability of the range/interval in which the test was performed.

Error of Indication

As Found					
	Reference Value	Indication	Error of Indication	Expanded Uncertainty	k
1	0.0000 g	0.0000 g	0.0000 g	0.16 mg	2
2	0.0500 g	0.0501 g	0.0001 g	0.17 mg	2
3	0.1000 g	0.1000 g	0.0000 g	0.17 mg	2
4	0.5000 g	0.5001 g	0.0001 g	0.17 mg	2
5	1.0000 g	1.0000 g	0.0000 g	0.17 mg	2
6	5.0000 g	4.9999 g	-0.0001 g	0.17 mg	2
7	10.0000 g	9.9998 g	-0.0002 g	0.18 mg	2
8	50.0000 g	49.9996 g	-0.0004 g	0.21 mg	2
9	100.0001 g	99.9993 g	-0.0008 g	0.26 mg	2
10	150.0001 g	149.9989 g	-0.0012 g	0.36 mg	2
11	200.0000 g	199.9985 g	-0.0015 g	0.40 mg	2

As Left					
	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	50.0000 g	50.0000 g	0.0000 g	0.19 mg	2
9	100.0001 g	100.0002 g	0.0001 g	0.25 mg	2
10	150.0001 g	150.0002 g	0.0001 g	0.35 mg	2
11	200.0000 g	200.0001 g	0.0001 g	0.39 mg	2



The uncertainty stated is the expanded uncertainty at calibration obtained by multiplying the standard combined uncertainty by the coverage factor k – which can be larger than 2 according to EURAMET cg-18. The value of the measurand lies within the assigned range of values with a probability of 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.

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:	22-Nov-2022
Certificate Number:	182272	Calibration Due Date:	21-May-2024

Thermo Hygromeier

Equipment No.:	IN302	Date of Issue:	11-Oct-2023
Certificate Number:	SG-H-00656/66	Calibration Due Date:	08-Oct-2024

Remarks

Value of the built-in weight adjusted
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.

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: $3 K$

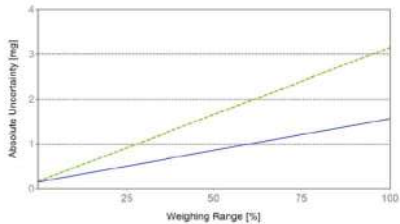
Linearization of Uncertainty Equation

	Range		As Found	As Left
	d	Max		
1	0.0001 g	220 g	$U_1 = 0.17 \text{ mg} + 0.0136 \text{ mg/g} \cdot R$	$U_1 = 0.15 \text{ mg} + 0.00644 \text{ mg/g} \cdot R$

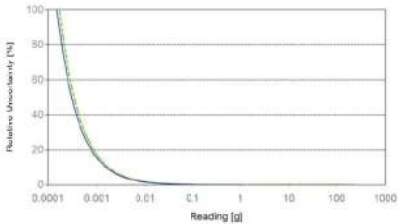
To optimize the stability of the linearization, besides of the zero load only increasing measurement points with a test load of 5% of the measurement range or larger are taken for the calculation of the linear equation.

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

Net Indication	As Found		As Left	
0.0220 g	0.17 mg	0.77%	0.15 mg	0.68%
0.2200 g	0.17 mg	0.075%	0.15 mg	0.069%
2.2000 g	0.20 mg	0.0091%	0.15 mg	0.0075%
22.0000 g	0.47 mg	0.0021%	0.29 mg	0.0013%
220.0000 g	3.2 mg	0.0014%	1.6 mg	0.00071%



As Found



As Left

GWP®
Certificate



As Found



As Left



The weighing device meets the given process requirements.

The weighing device meets the given process requirements.

Tests Performed: ☒ As Found ☒ As Left

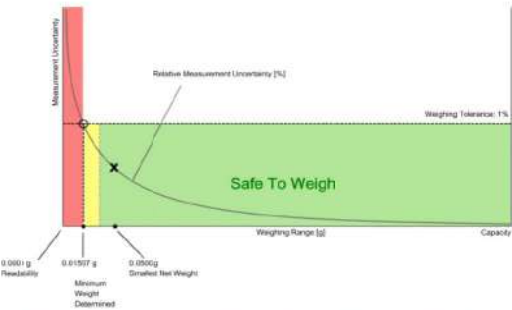
Process Requirements

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.

Minimum Weight

As Found Minimum Weight Table

Minimum weights for different weighing tolerances and safety factors					
Tolerance	Safety Factor				
	1	2	3	5	10
0.1%	0.17097 g	0.34671 g	0.52742 g	0.90460 g	1.95110 g
0.2%	0.08490 g	0.17097 g	0.25823 g	0.43643 g	0.90460 g
0.5%	0.03382 g	0.05783 g	0.10202 g	0.17097 g	0.34671 g
1%	0.01689 g	0.03382 g	0.05080 g	0.08490 g	0.17097 g
2%	0.00844 g	0.01689 g	0.02535 g	0.04231 g	0.08490 g
5%	0.00337 g	0.00675 g	0.01013 g	0.01689 g	0.03382 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					
Tolerance	Safety Factor				
	1	2	3	5	10
0.1%	0.15153 g	0.30304 g	0.46056 g	0.77780 g	1.60910 g
0.2%	0.07552 g	0.15153 g	0.22803 g	0.38254 g	0.77780 g
0.5%	0.03015 g	0.06030 g	0.09068 g	0.15153 g	0.30304 g
1%	0.01507 g	0.03015 g	0.04525 g	0.07552 g	0.15153 g
2%	0.00753 g	0.01507 g	0.02261 g	0.03770 g	0.07552 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:

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

Measurement Results

Results Summary

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

✓ = Passed

✗ = Failed

⚠ = Safety Factor not met

Repeatability

Test Load: 100 g

Tolerance	Control Limit	As Found		As Left	
		Std. Deviation	Result	Std. Deviation	Result
0.1%	N/A	0.00007 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

Tolerance	Control Limit	As Found		As Left	
		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.

Attachment to Calibration Certificate:

TH3067-067-011524-ACC-TH

GWP® Certificate

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	-0.0004 g	0.0250 g	0.0500 g	0.1250 g	0.2500 g	0.5000 g	1.2500 g
100.0001 g	-0.0008 g	0.0500 g	0.1000 g	0.2500 g	0.5000 g	1.0000 g	2.5000 g
150.0001 g	-0.0012 g	0.0750 g	0.1500 g	0.3750 g	0.7500 g	1.5000 g	3.7500 g
200.0000 g	-0.0015 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
100.0001 g	0.0001 g	0.0500 g	0.1000 g	0.2500 g	0.5000 g	1.0000 g	2.5000 g
150.0001 g	0.0001 g	0.0750 g	0.1500 g	0.3750 g	0.7500 g	1.5000 g	3.7500 g
200.0000 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.

METTLER TOLEDO Service



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 64 981

Calibration Data of NOx Analyzer

Analyzer Performance Test

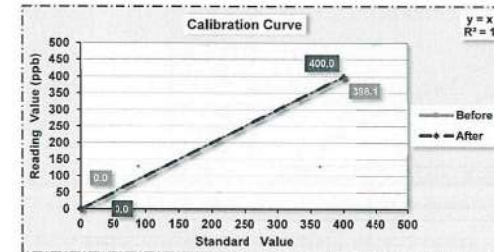
Equipment	Gas Analyzer (NOx)	Customer Name	Vision E.
Manufacture	HORIBA	Location	Envi Research
Model	APNA-370	Quotation	2024-00454
Serial No.	J6GUBA4N	Calibration Date	February 9, 2024
Analyzer Unit	ppb	Time	10:02 AM

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	397.5	400.0	398.1	400.0	-0.6	0.0	-	-	0.5



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	1.2	0.8	Voltage of the measured NO value
Signal NOx	mV	12.8	9.7	Voltage of the measured NOx value
Detector	°C	41.6	41.6	43 °C ± 5 °C
Ambient	kPa	102.2	101.9	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	-	0.78200	0.79230	0.50000 - 2.0000
NOx Slope	-	0.76210	0.78450	0.50000 - 2.0000

Calibrate By :



(MR.PANUPON PODANG)
February 9, 2024

Checked By :



(MS.SUTATIP IM-NOI)
February 9, 2024

Calibration Data of NOx Analyzer

Analyzer Performance Test

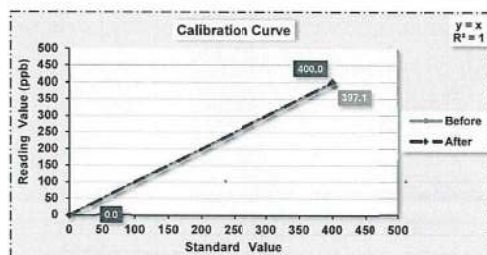
Equipment	Gas Analyzer (NOx)	Customer Name	Vision E.
Manufacture	HORIBA	Location	Envi Research
Model	APNA-370	Quotation	2024-00454
Serial No.	NKDVFYFRX	Calibration Date	February 1, 2024
Analyzer Unit	ppb	Time	10:27 AM

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 : E80123013	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	396.7	400.0	397.1	400.0	-0.4	0.0	-	-	0.7



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	3.3	3.4	Voltage of the measured NO value
Signal NOx	mV	27.8	26.6	Voltage of the measured NOx value
Detector	°C	41.3	41.3	43 °C ± 5 °C
Ambient	kPa	102.0	102.3	Current atmospheric pressure
DC 24V	V	23.5	23.7	24V ±0.5
DC 5V	V	5.0	5.0	5V ±0.5
NO Slope	-	0.95323	0.95401	0.50000 - 2.0000
NOx Slope	-	0.39569	0.94012	0.50000 - 2.0000

Calibrate By :

(MR.PANUPON PODANG)
February 1, 2024

Checked By :

(MS.SUTATIP IM-NOI)
February 1, 2024

Calibration Data of NOx Analyzer

Analyzer Performance Test

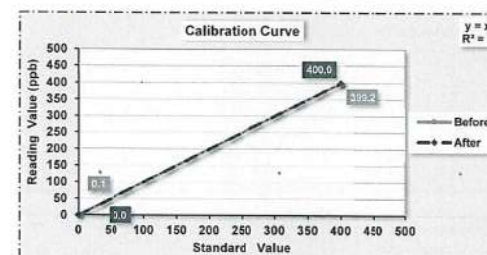
Equipment	Gas Analyzer (NOx)	Customer Name	Vision E.
Manufacture	HORIBA	Location	Envi Research
Model	APNA-370	Quotation	2024-00454
Serial No.	U9LS50WU	Calibration Date	February 12, 2024
Analyzer Unit	ppb	Time	10:02 AM

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 : E80123013	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	399.1	400.0	399.2	400.0	-0.1	0.0	-	-	0.2



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	0.1	2.1	Voltage of the measured NO value
Signal NOx	mV	11.6	8.0	Voltage of the measured NOx value
Detector	°C	41.5	41.4	43 °C ± 5 °C
Ambient	kPa	102.0	101.6	Current atmospheric pressure
DC 24V	V	23.5	23.6	24V ±0.5
DC 5V	V	5.0	5.0	5V ±0.5
NO Slope	-	0.83010	0.83250	0.50000 - 2.0000
NOx Slope	-	0.82480	0.82680	0.50000 - 2.0000

Calibrate By :

(MR.PANUPON PODANG)
February 12, 2024

Checked By :

(MS.SUTATIP IM-NOI)
February 12, 2024

Calibration Data of NOx Analyzer

Analyzer Performance Test

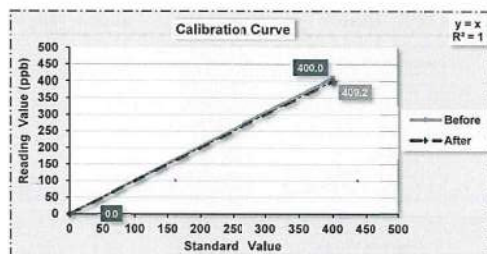
Equipment	Gas Analyzer (NOx)	Customer Name	Vision E.
Manufacture	HORIBA	Location	Envi Research
Model	APNA-370	Quotation	2024-00454
Serial No.	NGABK8F2	Calibration Date	February 29, 2024
Analyzer Unit	ppb	Time	1:32 PM

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	-1.0	0.0	-0.1	0.0	-0.9	0.0	-	-	-
Span	400	409.5	400.0	409.2	400.0	0.3	0.0	-	-	2.3



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	0.8	0.7	Voltage of the measured NO value
Signal NOx	mV	6.2	5.3	Voltage of the measured NOx value
Detector	°C	39.9	39.9	43 °C ± 5 °C
Ambient	kPa	100.8	100.7	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	-	1.42258	1.41550	0.50000 - 2.0000
NOx Slope	-	1.37328	1.37250	0.50000 - 2.0000

Calibrate By :

(MR.PANUPON PODANG)
February 29, 2024

Checked By :

(MS.SUTATIP IM-NOI)
February 29, 2024

Calibration Data of SO₂ Analyzer

Analyzer Performance Test

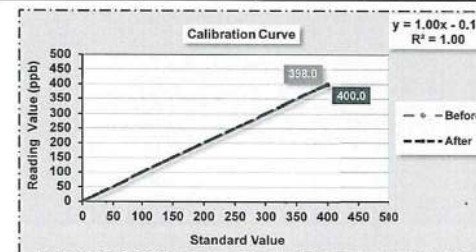
Equipment	Gas Analyzer (SO ₂)	Customer Name	Vision E.
Manufacture	Thermo	Location	Envi Research
Model	43C	Quotation	2024-00454
Serial No.	57469-317	Calibration Date	March 13, 2024
Analyzer Unit	ppb	Time	1:50 PM

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	-0.1	-0.1	-	-	-
Span	400	398.0	400.0	-	-	0.5



STATUS TEST AND VALIDATION OF SO₂ 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	32.7	33.2	8.0 °C to 47.0 °C
Chamber Temp	CHAMBER	°C	45	44.5	43.0 °C to 47.0 °C
Pressure	PRESSURE	mmHg	719.1	761.9	400.0 to 1,000
Sample Flow	SAMP FLOW	LPM	0.430	0.371	0.350 to 1,000
Lamp Intensity	INTENSITY	Hz	24781	24364	20,000 to 50,000
Lamp Voltage	LAMP VOLTAGE	V	919	830	750 to 1,200
SO2 Concentration	SO2 CONCENTRATION	ppb	0.8	1.8	0 to 10,000
Motherboard Status	MOTHERBOARD STATUS	-	OK	OK	OK
Interface Status	INTERFACE STATUS	-	OK	OK	OK

Calibrate By :

(MR.PANUPON PODANG)
March 13, 2024

Checked By :

(MS.SUTATIP IM-NOI)
March 13, 2024

Calibration Data of SO₂ Analyzer

Analyzer Performance Test

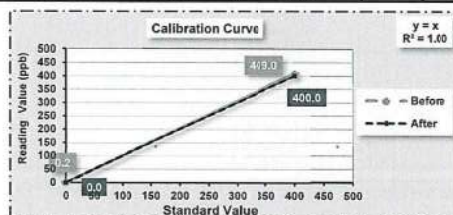
Equipment	Gas Analyzer (SO ₂)	Customer Name	Vision E.
Manufacture	Horiba	Location	Envi Research
Model	AFSA-370	Quotation	2024-00454
Serial No.	X7L602W6	Calibration Date	March 5, 2024
Analyzer Unit	ppb	Time	11:13 AM

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	409.0	400.0	-	-	2.3



STATUS TEST AND VALIDATION OF SO₂ ANALYZER MODEL AFSA-370

Parameter	Unit	Observed Value		Nominal Range
		Before Adjust	After Adjust	
Range	ppb	500	500	0 - 500 Standard
Signal (SO ₂)	mV	6.2	6.3	Voltage of the measured SO ₂ value
LAMP	mV	240.3	243.9	200 mV - 1200 mV
CELL	°C	30.0	29.2	Ambient temperature + 5 °C - 15 °C
PUMP	Kpa	44.0	42.9	65 kPa or less
AMBIENT	kPa	102.0	101.8	Current atmospheric pressure
DC 24V	V	24.0	24.0	24 V ±0.5 V
DC 5V	V	5.0	5.0	5 V ±0.5 V

Calibrate By :

(MR.PANUPON PODANG)
March 5, 2024

Checked By :

(MS.SUTATIP IM-NOI)
March 5, 2024

Calibration Data of SO₂ Analyzer

Analyzer Performance Test

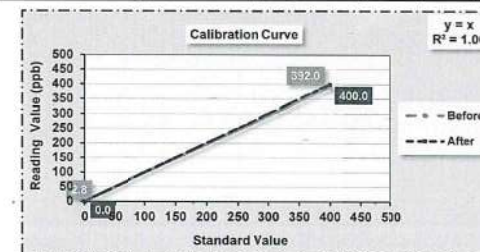
Equipment	Gas Analyzer (SO ₂)	Customer Name	Vision E.
Manufacture	Thermo	Location	Envi Research
Model	43C	Quotation	2024-00454
Serial No.	0335804022	Calibration Date	March 11, 2024
Analyzer Unit	ppb	Time	7:39 PM

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	2.8	0.0	-	-	-
Span	400	392.0	400.0	-	-	2.0



STATUS TEST AND VALIDATION OF SO₂ 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	32.9	33.0	8.0 °C to 47.0 °C
Chamber Temp	CHAMBER	°C	45.5	45.6	43.0 °C to 47.0 °C
Pressure	PRESSURE	mmHg	730.9	731.0	400.0 to 1,000
Sample Flow	SAMP FLOW	LPM	0.442	0.443	0.350 to 1,000
Lamp Intensity	INTENSITY	Hz	29311	30139	20,000 to 50,000
Lamp Voltage	LAMP VOLTAGE	V	786	786	750 to 1,200
SO ₂ Concentration	SO ₂ CONCENTRATION	ppb	2.4	1.4	0 to 10,000
Motherboard Status	MOTHERBOARD STATUS	-	OK	OK	OK
Interface Status	-	-	OK	OK	OK

Calibrate By :

(MR.PANUPON PODANG)
March 11, 2024

Checked By :

(MS.SUTATIP IM-NOI)
March 11, 2024

Calibration Data of SO₂ Analyzer

Analyzer Performance Test

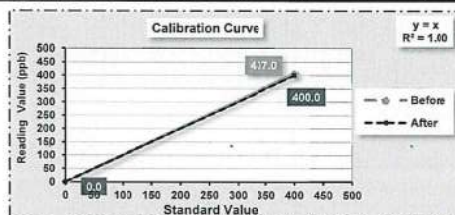
Equipment	Gas Analyzer (SO ₂)	Customer Name	Vision E.
Manufacture	Horiba	Location	Envi Research
Model	AFSA-370	Quotation	2024-00454
Serial No.	12E8X34P	Calibration Date	March 5, 2024
Analyzer Unit	ppb	Time	10:12 AM

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	-0.9	0.0	-	-	-
Span	400	407.0	400.0	-	-	1.8



STATUS TEST AND VALIDATION OF SO₂ ANALYZER MODEL AFSA-370

Parameter	Unit	Observed Value		Nominal Range
		Before Adjust	After Adjust	
Range	ppb	500	500	0 - 500 Standard
Signal (SO ₂)	mV	7.8	7.9	Voltage of the measured SO ₂ value
LAMP	mV	371.0	351.0	200 mV - 1200 mV
CELL	°C	35.4	35.4	Ambient temperature + 5 °C - 15 °C
PUMP	Kpa	43.4	43.4	65 kPa or less
AMBIENT	kPa	101.2	101.2	Current atmospheric pressure
DC 24V	V	23.9	23.9	24 V ±0.5 V
DC 5V	V	5.0	5.0	5 V ±0.5 V

Calibrate By :

(MR.PANUPON PODANG)
March 5, 2024

Checked By :

(MS.SUTATIP IM-NOI)
March 5, 2024

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.

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	55.00 PPM	55.27 PPM	G1	+/- 0.6% NIST Traceable	10/14/2019, 10/22/2019
NITRIC OXIDE	55.00 PPM	55.27 PPM	G1	+/- 0.6% NIST Traceable	10/14/2019, 10/22/2019
SULFUR DIOXIDE	55.00 PPM	54.93 PPM	G1	+/- 0.6% NIST Traceable	10/14/2019, 10/22/2019
CARBON MONOXIDE	4500 PPM	4516 PPM	G1	+/- 0.6% NIST Traceable	10/14/2019, 10/22/2019
NITROGEN	Balance				10/14/2019

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	13010429	KAL004123	57.6 PPM NITRIC OXIDE/NITROGEN	+/- 0.8%	Jul 23, 2025
NTRM	13010429	KAL004123	57.6 PPM NOx/NITROGEN	+/- 0.8%	Jul 23, 2025
NTRM	16010235	KAL004419	57.69 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.8%	Dec 23, 2021
NTRM	08012318	KAL004620	4857 PPM CARBON MONOXIDE/NITROGEN	+/- 0.6%	Jun 07, 2024

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 - 006928781	FTIR	Oct 18, 2019
MKS FTIR - SO ₂ - 006928781	FTIR	Oct 03, 2019

Triad Data Available Upon Request

NOTES: Gross Weight: 28.0 Kg, Net Weight: 4.6 Kg.



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 11 August, 2023

Certification No. 282/23

Page : 1 of 2

Object : Wind speed and wind direction

Manufacturer : Davis Instruments Inc.

Type : Weather Wizard III Product No 7425

Serial No. : WE60321A26A ID No. : No.5

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 1007.9 hPa

NATIONAL STANDARD WIND TUNNEL :

: Thermal Anemometer 642 S/N 91563

: HOOK GAGE NO 1425 Pilot 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 CA-650-3TV (sensor TR-90AH)

Serial Number 110730029 (sensor 120629586)

JAPAN QUALITY ASSURANCE ORGANIZATION : Standard Velocity at 0 - 20 m/sec

Calibrated by :

Mr. Watcharapol Subwat

Mechanical Engineer

Signature

Mr. Pisood Prombut



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804, 0-2399-0469

The Result of Calibration

Certification No. 282/23

11 August, 2023

Page : 2 of 2

Standard Ultrasonic Anemometer m/sec	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
	Pressure inches H2O	Vacuum inches H2O	Velocity m/sec	Velocity m/sec	Correction m/sec
1.00	-	-	-	0.4	0.60
3.02	-	-	-	2.2	0.82
5.00	-	-	-	4.5	0.50
7.04	-	-	-	6.3	0.74
9.02	-	-	-	8.5	0.52
11.01	-	-	-	10.3	0.71
13.01	-	-	-	12.5	0.51
15.01	-	-	-	14.3	0.71
17.02	-	-	-	16.5	0.52
20.02	-	-	-	19.3	0.72

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 :

Mr. Watcharapol Subwat

Mechanical Engineer





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 11 August, 2023

Certification No. 283/23

Page : 1 of 2

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.
Toongsonghong, Laksi, Bangkok 10210.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1008.3 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)

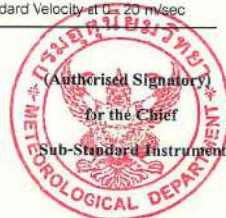
Serial Number 110730029 (sensor 120629586)

JAPAN QUALITY ASSURANCE ORGANIZATION : Standard Velocity at 20 - 30 m/sec

Calibrated by :
Mr. Watchapol Subwat
Mechanical Engineer

Signature

Mr. P.



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

The Result of Calibration

Certification No. 283/23

11 August, 2023

Page : 2 of 2

Standard Ultrasonic Anemometer m/sec	HCOK GAGE NO. 1425			TESTED ANEMOMETER	
	Pressure	Vacuum	Velocity	Velocity	Correction
	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	-	-	-	14.8	0.21
17.02	-	-	-	17.0	0.02
20.02	-	-	-	19.8	0.22

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 :

Mr. Watchapol Subwat
Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau





THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804, 0-2359-0469

Calibration Certificate

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

Date of Issue 12 September, 2023

Certification No. 351/23

Page : 1 of 4

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 Chinakel 1, Ngamwongwan Road,
Toongsonghong, Laksi, Bangkok 10210.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1011.1 hPa

NATIONAL STANDARD WIND TUNNEL :

: Micromanometer Theodor Friedrichs FC014 Serial No. 9310119

: HOOK GAGE NO 1425 Pitot Tube Theodor Friedrichs Type 0300.0000 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 Friedrichs Dry No.8390/94 Wet No. 8389/94

Calibrated by : [Redacted] : Theodor Friedrichs No.918802

Mr. Watcharapol Subwat

Mechanical Engineer

Sign

Mr. Pisood Promsut

(Authorized 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. 351/23

12 September, 2023

Page : 2 of 4

Standard	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
	Pressure	Vacuum	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.	
U.S. DEPARTMENT OF COMMERCE WEATHER BUREAU	
WIND DIRECTION	TESTED WIND DIRECTION
0	0
90	90
180	180
270	270

Calibrated by :

Mr. Watcharapol Subwat

Mechanical Engineer





THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 0-2396-0156,0-2399-0469

The Result of Calibration

12 September, 2023

Certification No. 351/23

Page : 3 of 4

Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
50.2	50.2	0.0
30.4	30.5	-0.1
15.6	15.8	-0.2

Checked by :

Mr. Watchapol Subwat
Mechanical Engineer



Date of Issue 12 September, 2023

Certification No. 351/23

Page: 4 of 4

ใบรับรอง

หนังสือฉบับนี้รับรองว่า เครื่องวัดฝน ยี่ห้อ Davis Instruments แบบ TIPPING
BUCKET Product No.7342.026 Mfg. Code. BE.181108006 ทำการสอบเทียบกับแก้ววัดฝน
แบบแก้วดาว GAUGE DIAMETER 8.0 INCHES, NEGRETTI & ZAMBRA LONDON No.
71082 และสามารถนำไปใช้ได้ มีค่าถูกต้องตามรายละเอียดของเครื่องมือ (0.01 in./TIP)



ลงชื่อ...

(นายวัชรพล ทรัพย์วัฒน์)

วิศวกรชำนาญการ



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 September, 2023

Certification No. 352/23

Page : 1 of 4

Object : Weather Station

Manufacturer : Davis Instruments Inc.

Type : Vantage Pro 2 ID No. : No.22

Serial No. : Display AS160105011 Transmitter AS160105019

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 1011.5 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 120629566)

JAPAN QUALITY ASSURANCE ORGANIZATION : Standard Velocity at 0 - 20 m/sec

STANDARD THERMOMETER : Theodor Friedrich : Dry No.8390/94 Wet No. 8389/94

Calibrated by : [Redacted] : Theodor Friedrich No.918802

Signed [Redacted]

Mr. Watcharapol Subwat

Mechanical Engineer

Mr. Pisod Promset



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804, 0-2399-0469

The Result of Calibration

Certification No. 352/23

12 September, 2023

Page : 2 of 4

Standard	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
	Pressure	Vacuum	Velocity	Velocity	Correction
m/sec	inches H2O	inches H2O	m/sec	m/sec	m/sec
1.00	-	-	-	0.9	0.10
3.02	-	-	-	3.0	0.02
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	-	-	-	12.9	0.11
15.01	-	-	-	15.0	0.01
17.02	-	-	-	16.9	0.12
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 :

Mr. Watcharapol Subwat

Mechanical Engineer





THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 0-2396-0156,0-2399-0469

The Result of Calibration

Certification No. 352/23

12 September, 2023

Page : 3 of 4

Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
50.2	50.2	0.0
30.4	30.3	0.1
15.6	15.5	0.1

Checked by :

Mr. Watchapol Subwat
Mechanical Engineer



Date of Issue 12 September, 2023

Certification No. 352/23

Page: 4 of 4

ใบรับรอง

หนังสือฉบับนี้ขอรับรองว่า เครื่องวัดฝน ยี่ห้อ Davis Instruments แบบ TIPPING
BUCKET Product No.7342.026 Mfg. Code. AS.160105019 ทำการสอบเทียบกับแก้ววัดฝน
แบบแก้วดวง GAUGE DIAMETER 8.0 INCHES, NEGRETTI & ZAMBRA LONDON No.
71082 และสามารถนำไปใช้ได้ มีค่าถูกต้องตามรายละเอียดของเครื่องมือ (0.01 in./TIP)



ลงชื่อ..

(นายวัชรพล ทรัพย์วัฒน์)

วิศวกรชำนาญการ

Sound Level Meter Calibration Report

Support Equipment Type	:	Sound Level Calibrator
Manufacture	:	Larson Davis
Model	:	CAL200
Serial No.	:	3606
Range of Calibrator		
- Support Equipment Type	:	93.4
- Frequency	:	1,000 Hz.
Calibrated By	:	Mr.Romsea Kateh
Calibration Date	:	March 24, 2024
Customer Name	:	Vision E. Consultants Co., Ltd. : โครงการผลิตปิโตรเลียมแหล่งผลิตบึงผู้ทะวันคก- หนองสระ (BYW-NS) (ส่วนขยาย) แปลงสำรวจบนบกหมายเลข L21/43 จังหวัดสุโขทัย และกำแพงเพชร

[illegible]

Checked By

Mr. Prayun Detkla
Technician

Approved By

Ms.Sutatip Im-noi
Environmental Scientist

THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-67/0064

MTC No. EEL. BP. 121/1066

CALIBRATION CERTIFICATE

Submitted by : Environment Research & Technology Co.,Ltd.
Address : 25/114 Moo 6, Soi Chinaket 1, Ngamwongwan Road, Toongscnghong, Laksi, Bangkok, 10210.
Calibrated at : Electrical and Electronic Standards Laboratory, Industrial Metrology and Testing Service Centre.
 Soi 1C, Bangpoo Industrial Estate, Sukhumvit Rd., Muang, Samutprakan 10280.

Instrument Calibrated :		Ambient Environment	
Description	: Precision Acoustic Calibrator	Temperature	: $(23 \pm 3) ^\circ\text{C}$
Manufacturer	: Larson Davis	Relative Humidity	: $(50 \pm 15) \%$
Model	: CAL200	Ambient Pressure	: $(101.325 \pm 1.500) \text{ kPa}$
Serial No.	: 3606		

Standards used :

1. Digital Function Synthesizer NF Electronic DF-193A S/N 122037.
2. Measuring Amplifier Bruel&Kjaer 2636 S/N 1537484.
3. Programmable Attenuator Tamagawa TPA-303A S/N OF 2214.
4. Digital Multimeter Agilent 34401A S/N MY44005560.
5. Pressure Transmitter Vaisala PTB202AD S/N T0650001.
6. Audio Analyzer Panasonic VP-7722A S/N 041477D122.
7. Condenser Microphone B&K 4180 S/N 2633526.

Calibration Procedure: CP-102-04 based on IEC 60942-2003. The sound pressure level of instrument was measured by standard microphone using an insert voltage technique.

This instrument has been calibrated against standards maintained at Electrical and Electronic Standards Laboratory (EEL), which are traceable to the International System of Units through the National Institute of Metrology (Thailand).

The information on actual reading is attached herewith and the uncertainty limits quoted refer to the measured values only.

Date of Receipt : 30 Oct. 2023

Date of Calibration : 31 Oct. 2023

The results relate only to the items tested/calibrated or value assigned.
Advertising the Report/Certificate and publicity of the results except in full are prohibited unless written permission is obtained from the governor of TISTR.

FM.BL.MTC002 Rev.4

Head Office
35 Mu 3 Tambon Khlong Ha, Amphoe Khlong Luang,
Changwat Pathumthani 12120, Thailand
Tel. (66) 0 2577 9000
Fax. (66) 0 2577 9009
E-mail : numpaj@tistr.or.th Website: www.tistr.or.th

Office/Laboratory
Soi 1C, Bangpoo Industrial Estate, Sukhumvit Road,
Amphoe Muang, Changwat Samutprakan 10280, Thailand
Tel. (66) 0 2323 1672-80 ext. 115, 116
Fax. (66) 0 2323 9165
E-mail : mtc@tistr.or.th

Office
196 Phahonyothin Road, Chatuchak, Bangkok 10900,
Thailand
Tel. (66) 0 2579 1121-30 ext. 5219, 5225, 5217
Fax. (66) 0 2579 8592
E-mail : sumalee@tistr.or.th



THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-67/0064 MTC No. EEL. BP. 121/1066

The reported expanded uncertainty is based upon a standard uncertainty multiplied by a coverage factor $k = 2$, providing a level of confidence of approximately 95%.

Nominal Output of Unit Under Test = 94 dB re 20 μ Pa at 1000 Hz

Acoustic Output in dB re 20 μ Pa, Corrected to Reference Conditions : 101.325 kPa, 23.0 °C and 50 %RH

1. Sound Pressure Level

Standard Microphone Type	Measured Sound Pressure Level (dB)	Deviated value (dB)	Uncertainty (dB)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer4180	93.42	-0.58	± 0.10	± 0.40 dB

2. Frequency

Standard Microphone Type	Measured Frequency (Hz)	Deviated value (Hz)	Uncertainty (Hz)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer4180	1000.4	0.4	± 1.5	$\pm 1.0\%$

3. Total distortion

Standard Microphone Type	Measured Total distortion (%)	Uncertainty (%)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer4180	1.80	± 0.50	$\pm 3.0\%$

Note : 1. No adjustment.

2. The calibrator pressure correction was not included.

3. The microphone volume correction was included at level of 0.26 dB from manual.

Date of Calibration : 31 Oct. 2023

2/3

The results relate only to the items tested/calibrated or value assigned.
Advertising the Report/Certificate and publicity of the results except in full are prohibited unless written permission is obtained from the governor of TISTR.

Head Office
35 Mu 3 Tambon Khlong Ha, Amphoe Khlong Luang,
Changwat Pathumthani 12120, Thailand
Tel. (66) 0 2577 9000
Fax. (66) 0 2577 9009
E-mail : rumpaigtistr.or.th Website:www.tistr.or.th

Office/Laboratory
Soi 1C, Bangpoo Industrial Estate, Sukhumvit Road,
Amphoe Muang, Changwat Samutprakan 10280, Thailand
Tel. (66) 0 2323 1672-80 ext. 115, 116
Fax. (66) 0 2323 9165
E-mail : mtc@tistr.or.th

Office
196 Phahonyothin Road, Chatuchak, Bangkok 10900,
Thailand
Tel. (66) 0 2579 1121-30 ext. 5219, 5225, 5217
Fax. (66) 0 2579 8592
E-mail : sumalee@tistr.or.th

FM.BLMTC.002 Rev.4



THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-67/0064 MTC No. EEL. BP. 121/1066

Nominal Output of Unit Under Test = 114 dB re 20 μ Pa at 1000 Hz

Acoustic Output in dB re 20 μ Pa, Corrected to Reference Conditions : 101.325 kPa, 23.0 °C and 50 %RH

1. Sound Pressure Level

Standard Microphone Type	Measured Sound Pressure Level (dB)	Deviated value (dB)	Uncertainty (dB)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer 4180	113.45	-0.55	± 0.10	± 0.40 dB

2. Frequency

Standard Microphone Type	Measured Frequency (Hz)	Deviated value (Hz)	Uncertainty (Hz)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer 4180	1000.2	0.2	± 1.5	$\pm 1.0\%$

3. Total Distortion

Standard Microphone Type	Measured Total Distortion (%)	Uncertainty (%)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer 4180	0.60	± 0.50	$\pm 3.0\%$

Note : 1. No adjustment.

2. The calibrator pressure correction was not included.

3. The microphone volume correction was included at level of 0.26 dB from manual.

Calibrated by :

(Mr.Weerachai Deechaiyae)

Approved by :

(Mr.Prawate Kluaypa)

Director

Electrical and Electronic Standards Laboratory

Industrial Metrology and Testing Service Centre

Date of Calibration : 31 Oct. 2023

Date of Issue : 1 Nov. 2023

Ref : 2011266103004305003

End of Certificate

3 / 3

The results relate only to the items tested/calibrated or value assigned.
Advertising the Report/Certificate and publicity of the results except in full are prohibited unless written permission is obtained from the governor of TISTR.

Head Office
35 Mu 3 Tambon Khlong Ha, Amphoe Khlong Luang,
Changwat Pathumthani 12120, Thailand
Tel. (66) 0 2577 9000
Fax. (66) 0 2577 9009
E-mail : rumpaigtistr.or.th Website:www.tistr.or.th

Office/Laboratory
Soi 1C, Bangpoo Industrial Estate, Sukhumvit Road,
Amphoe Muang, Changwat Samutprakan 10280, Thailand
Tel. (66) 0 2323 1672-80 ext. 115, 116
Fax. (66) 0 2323 9165
E-mail : mtc@tistr.or.th

Office
196 Phahonyothin Road, Chatuchak, Bangkok 10900,
Thailand
Tel. (66) 0 2579 1121-30 ext. 5219, 5225, 5217
Fax. (66) 0 2579 8592
E-mail : sumalee@tistr.or.th

FM.BLMTC.002 Rev.4



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



Cert.No.: 24CH15
Page.: 1 of 2

Certificate of Calibration

Equipment : pH Meter
Manufacturer : Waterproof
Model : pHTestr30
Serial No. : 3066362
ID No. : -
Condition As-Received: Used Item
Received Date : 05 January 2024
Calibration Date : 09 January 2024
Reference : 2401-0077DN-1
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-CH5 by direct measurement with standard
voltage calibrator and direct measurement
with certified reference material (CRM)

Calibrated by : Walalak Sirithean

Approved by : [Signature]
Approved Signatory

(✓) Saithip Meangmai
() Warakorn Lernagatrakul
() Ponpan Paipim

Issue Date : 10 January 2024

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.



Cert.No.: 24CH15
Page.: 2 of 2

Condition of this calibration result

1. Certified Reference Materials : The measurement results are traceable to SI through CPA chem Ltd.,
ANSI-ASQ National Accreditation Board, Accredited No. AR-1835

Buffer Solution	Manufacturer	Lot No.	Exp. date
pH 4.008	CPA chem	940102	27 Nov 2025
pH 6.986	CPA chem	931959	01 Oct 2024
pH 9.997	CPA chem	940106	02 Nov 2024

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	4.008	4.01	N/A	0.0079	2.00
S/N.: 3066362	6.986	6.99	N/A	0.011	2.00
	9.997	10.00	N/A	0.0092	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-

A 0062383

a 1196387



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3 : EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLLANG, SUANLUANG BANGKOK 10250
TEL. 0-2717-3000 FAX. 0-2719-9484

Cert.No.: 24TW1
Page.: 1 of 2

Certificate of Testing

Equipment : DO Meter
Manufacturer : YSI
Model : Pro20
Serial No. : 14L101229
ID No. : -
Received Date : 05 January 2024
Test Date : 08 January 2024
Reference : 2401-0077DN-5
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 : 
Saithip Meangmai
() Warakorn Lernagatrakul
() Fonpan Paipim
Issue Date : 10 January 2024

B 0331698



Cert.No.: 24TW1
Page.: 2 of 2

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	1124013382	140RC006	23MM18	20 Feb 2024

2. Standard Material :-

Material	Manufacturer	Lot.No.	Assay
Sodium Thiosulfate pentahydrate	Merck	AM1763316	100.2%

Result : Dissolved Oxygen Meter Adjustment With Air 100 %
Dissolved Oxygen Probe No.: 15K100212

Titration Method (Azide Modification Method) (mg/L)	DO Meter Reading (mg/L)	Standard Deviation (mg/L)
8.18	8.17	0.0055

This report was certified only for the instrument we tested. It is allowable to use for study the system efficiency. The environmental impact control and present to organization it may concerned 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-

a 1196378



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



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



Certificate of Calibration

Certificate No. : MT23-7846
Page : 1 of 2

Customer : Environment Research & Technogy Co., Ltd.
Address : 25/114 Moo 6 Soi Chinaket1, Ngamwongwan Road, Toongsonghong, Laksi, Bangkok 10210

Description : Incubator
Manufacturer : Accuplus
Model : Smart I250
Serial No. : 2059-0218-0002
Identification No. : ERTC-L-IN-143
Calibration Place : Customer Laboratory

Order No. : 3936/23
Received date : Dec 12, 2023
Calibration date : Dec 12, 2023
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
LXI Data Acquisition Switch Unit with Sensor	34972A	MY57003222	MT23-5938	Oct 05, 2024

This result of calibration 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 uncertainty of measurement was based on standard uncertainty multiplied by coverage factor $k = 2$, providing a level of confidence of not less than 95%



Calibrated by : Mr.Yutakorn Jamneansri
Issue date : Jan 09, 2024

Approved by : (Mr.Panuwat Phuklan)

This calibration certificate shall not be reproduced other than in full except with the prior written approval of Inctech Metrological Center Co.,Ltd

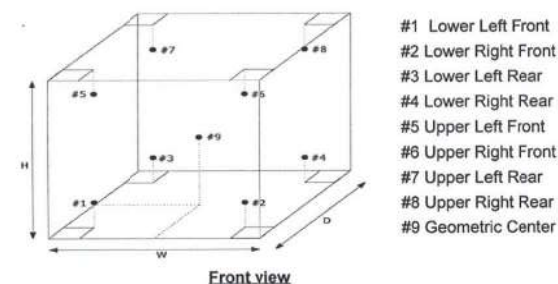
Certificate No. : MT23-7846
Page : 2 of 2

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	20.542	20.166	20.504	20.211	20.551	20.501	20.477	20.728	19.867	0.46

Setting temperature (°C)	Indicating Temperature (°C)	Measured stability (+/- °C)	Measured uniformity (°C)	Overall variation (°C)
20.0	20 to 20.3	0.25	1.0	1.3



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.



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3 : EQUIPMENT CALIBRATION AND TESTING SERVICES

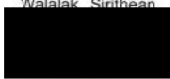
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250

TEL. 0-2717-3000 FAX. 0-2719-9484

Cert.No.: 23TW254

Page.: 1 of 2

Certificate of Testing

Equipment : DO Meter
Manufacturer : YSI
Model : 5000-115
Serial No. : 17H104220
ID No. : ERTC-L-In.137
Received Date : 29 November 2023
Test Date : 30 November 2023
Reference : 2311-0939DN-1
Submitted by : Environment Research & Technology Company Limited.
25/14 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-CH3
by Comparison Technique with Azide Modification Method
Tested by : Walalak Sirithuan
Approved by : 
Approved Signatory
(✓) Saithip Meangmai
() Warakorn Lerngagtrakul
() Ponpan Paipim
Issue Date : 4 December 2023

B 0328870



Cert.No.: 23TW254

Page.: 2 of 2

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	1124013382	140RC006	23MM18	20 Feb 2024

2. Standard Material :-

Material	Manufacturer	Lot.No.	Assay
Sodium Thiosulfate pentahydrate	Merck	AM1763316	100.2%

Result : Dissolved Oxygen Meter Adjustment With Air 100 %
Dissolved Oxygen Probe No.: 17J100003

Titration Method (Azide Modification Method) (mg/L)	DO Meter Reading (mg/L)	Standard Deviation (mg/L)
8.18	8.17	0.0055

This report was certified only for the instrument we tested. It is allowable to use for study the system efficiency. The environmental impact control and present to organization it may concerned. 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-

a 1192571



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



Cert. No.: 24TM96
Page : 1 of 3

Certificate of Calibration

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 ห้องปฏิบัติการป้อนอาหารเลี้ยงเชื้อ
Received Order : 03 January 2024
Calibration Date : 04 January 2024
Ambient Temperature : $(26 \pm 10) ^\circ\text{C}$
Relative Humidity : $(50 \pm 30) \%$
Calibrated by : Suwit Imjai
Approved by : [Signature]
() Pornthippa Tameyakul
(✓) Ponpan Paipim
() Kunchit Promprat

Issue Date : 16 January 2024

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 : Incubator
Condition As-Received : Used Item
Reference : 2401-0001ON-6
Procedure Used :-

Cert. No.: 24TM96
Page : 2 of 3

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	MY57013711	23LM115	TPA	11 Jul 2024

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.

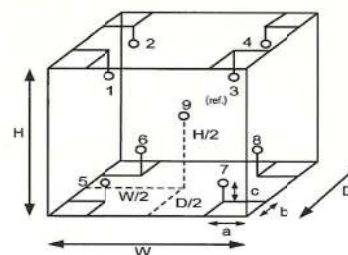
Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Not Available

Environment during calibration		
	Beginning	Finished
Temp. (°C)	26	29
REL.Humid. (%)	45	50
AC Supply (Volt)	225	226



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 m³

Position :	Ref. Std. ID No.:
1	18-18RTD-01
2	18-18RTD-02
3	18-18RTD-03
4	18-18RTD-04
5	18-18RTD-05
6	23-18RTD-06
7	18-18RTD-07
8	22-18RTD-08
9 (ref.)	18-18RTD-09

A 0062475

a 1197873



Equipment : Incubator
Condition As-Received : Used Item
Reference : 2401-0001ON-6
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Not Available

Cert. No.: 24TM96
Page : 3 of 3

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor <i>k</i>
44.5	44.5	45.0	0.20	0.77	1.6	2

Calibration Point (°C)	Measured Temperature (°C)									Uncertainty
	Position									
	1	2	3	4	5	6	7	8	9 (ref.)	(± °C)
44.5	45.038	45.142	45.077	45.127	43.812	44.180	44.402	44.990	44.497	0.85

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 %.

-000-

EQUIPMENT QUALIFICATION REPORT (EQR)

Agilent CrossLab Compliance Services



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 28, 2023 1:10:31 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

Section	Page
Cover page	1
Table of Contents	2
Test Summary	3
Service Details	4
Instrument Details	5
Protocol Details	6
Tests	7
Preparation : 5100 VDV	7
Instrument Tests : 5100 VDV	9
Autosampler Operation : Autosampler 1 - SPS4	10
Declaration of Change Control	11
Attachments	12
Signature	25
Transaction Logs	26

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: 6006377416
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: Worawit Timakul
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 28, 2023 12:56:03 PM
Host Name:	5CGC202NQ4

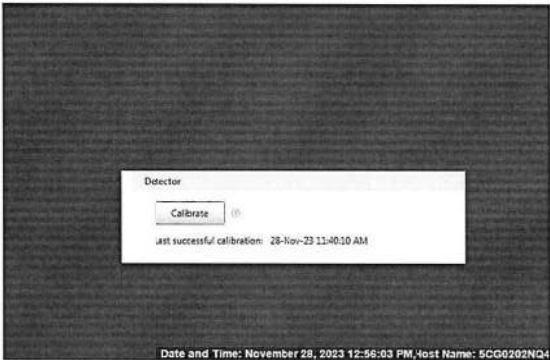
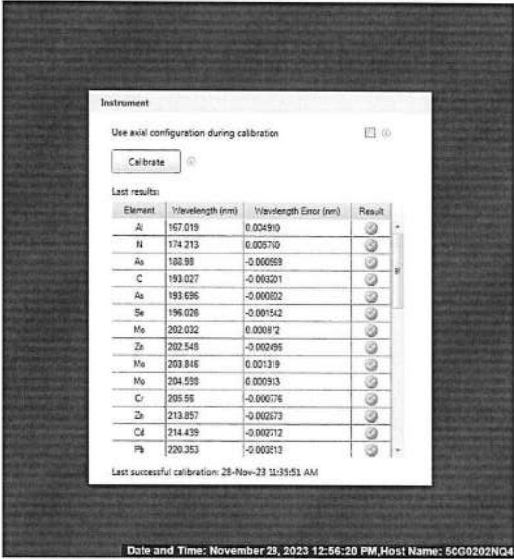


Image Details: Was the instrument calibration performed and completed successfully?
Date and Time: November 28, 2023 12:56:20 PM
Host Name: 5CG0202NQ4



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	General	Certificate of Qualification for ACE	13
EQR	General	Operator's training certificate and qualifications	14
EQR	General	Operator's training certificate and qualifications	15
EQR	General	Certificate of System Qualification	16
EQR	General	Instrument's Test Report	17
EQR	General	Software Verification	20
EQR	Material	Certificate of Analysis Wavelength calibration solution	21

General

Document Name:

Certificate of Qualification for ACE

Agilent Technologies

Agilent Compliance Engine Self Qualification

Date:October 18, 2023 10:19:46 AM

Drive Serial #:90593EBAPlatform Revision:ACE 1.12.112

Individual self-qualification reports for each specific technique installed are also available upon request. They provide additional details on the general report from the concise summary and are structured by the actual algorithms challenged during the process. There is not a one-to-one relationship between algorithms and OQ program tests because some algorithms are used by several tests and across multiple similar hardware components of the qualified systems.

Technique Type	Tests Completed	Result
Atomic Absorption	7	Conforms
Capillary Electrophoresis	10	Conforms
Dissolution	6	Conforms
Emission Spectroscopy	3	Conforms
Gas Chromatography - GCMS	17	Conforms
Gas Chromatography	29	Conforms
Gel Permeation Chromatography	9	Conforms
ICPMS	6	Conforms
Infrared Spectroscopy	7	Conforms
Liquid Chromatography	17	Conforms
Liquid Chromatography - LCMS	8	Conforms
Microfluidics	18	Conforms
Sample Preparation - Gas Chromatography	9	Conforms
Sample Preparation - Liquid Chromatography	8	Conforms
Supercritical Fluid Chromatography	15	Conforms
Software	6	Conforms
UV-Vis Spectrophotometer	13	Conforms

Overall Qualification Status

Conforms

General

Document Name: Operator's training certificate and qualifications



Certificate of Completion

Learner Name: Worawit Timakul

Title Of Course: ANV-CE-ICPOES-2-008-A: Agilent 5100 ICP-OES Support Neophyte Training

Completion Date: August 25, 2016

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: Operator's training certificate and qualifications



Certificate of Completion

Learner Name: Worawit Timakul

Title Of Course: ANV-CE-ICPOES-2-007-C: CrossLab Compliance Hardware Specific Delivery for Agilent ICP-OES Systems

Completion Date: October 30, 2020

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: Certificate of System Qualification



Certificate of Completion

Learner Name: Worswit Timakul

Title Of Course: AN-CE-SS-II-030-A: ACE 3 X User Update Training

Completion Date: July 1, 2020

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.

Date: November 28, 2023 1:10:31 PM
System ID: MY15330001

Page 16 / 28

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: Worawit T.
Test Completed On: 27-Nov-23 2:23:13 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	7.28
As (188.960 nm)	≤ 8.20	6.66
C (193.027 nm)	≤ 11.50	8.01
Mo (202.032 nm)	≤ 8.20	6.71
Cr (206.158 nm)	≤ 13.40	10.27
Zn (213.857 nm)	≤ 8.70	7.56
Pb (220.353 nm)	≤ 9.50	7.70
Co (228.615 nm)	≤ 17.20	10.70
Ba (230.424 nm)	≤ 9.40	8.14
Mn (257.610 nm)	≤ 13.30	9.43
Mn (260.568 nm)	≤ 20.30	15.91
Cr (267.716 nm)	≤ 11.00	9.30
Cu (324.754 nm)	≤ 25.00	17.80
Cu (327.395 nm)	≤ 14.20	12.73
Sr (338.071 nm)	≤ 33.50	27.28
Ba (455.403 nm)	≤ 44.00	31.08
Sr (460.733 nm)	≤ 36.00	21.11
Ba (493.408 nm)	≤ 36.00	29.33
Ba (614.171 nm)	≤ 42.00	32.02
Ar (675.283 nm)	≤ 74.00	64.85
K (766.491 nm)	≤ 80.00	62.51

Page 1 of 3

Date: November 28, 2023 1:10:31 PM
System ID: MY15330001

Page 17 / 28

Document Name:

Instrument's Test Report

Sensitivity Test					
Pass					
Radial					
Element Wavelength	Specification	Method	Ratio	Standard	Blank
As (188.980 nm)	≥ 46.0	SRBR	111.1	1111.0	85.2
Se (196.026 nm)	≥ 41.0	SRBR	68.5	856.2	116.6
Zn (213.857 nm)	≥ 1421.0	SRBR	3583.1	52766.1	215.1
Pb (220.353 nm)	≥ 46.0	SRBR	183.7	2811.8	201.3
Mn (257.610 nm)	≥ 3518.0	SRBR	10296.2	279763.9	735.3
Al (396.152 nm)	≥ 3.4	SBR	8.2	37571.9	4071.0
Ba (493.408 nm)	≥ 34.0	SBR	100.5	1198903.7	11867.1
K (766.491 nm)	≥ 1.8	SBR	3.8	100874.8	20871.5
Axial					
Element Wavelength	Specification	Method	Ratio	Standard	Blank
As (188.980 nm)	≥ 208.0	SRBR	248.6	3738.6	202.3
Se (196.026 nm)	≥ 159.0	SRBR	163.8	3040.9	283.3
Zn (206.200 nm)	≥ 234.0	SRBR	1402.0	19648.6	192.3
Zn (213.857 nm)	≥ 1743.0	SRBR	8340.9	200514.1	574.3
Cd (214.439 nm)	≥ 4227.0	SRBR	7606.2	156421.5	420.7
Pb (220.353 nm)	≥ 320.0	SRBR	631.4	16069.9	600.3
Mn (257.610 nm)	≥ 10625.0	SRBR	32328.3	1472044.4	2067.5
Cr (267.716 nm)	≥ 1048.0	SRBR	4308.3	155802.6	1286.3
Cu (324.754 nm)	≥ 19.0	SBR	57.8	242584.8	4123.5
Al (396.152 nm)	≥ 6.0	SBR	21.9	239924.8	10474.6
Ba (493.408 nm)	≥ 60.0	SBR	236.0	7235267.3	30527.2
K (766.491 nm)	≥ 24.0	SBR	68.8	3110677.8	44585.8

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	0.74
Se (196.026 nm)	≤ 2.60	0.65
Zn (213.857 nm)	≤ 1.50	0.21
Pb (220.353 nm)	≤ 2.60	0.51
Mn (257.610 nm)	≤ 1.50	0.25
Al (396.152 nm)	≤ 1.50	0.30
Ba (493.408 nm)	≤ 1.50	0.60
K (766.491 nm)	≤ 1.50	0.20
Axial		
Element Wavelength	Specification	Measured Value % RSD
As (188.980 nm)	≤ 1.50	0.51
Se (196.026 nm)	≤ 1.50	0.37
Zn (206.200 nm)	≤ 1.50	0.30
Zn (213.857 nm)	≤ 1.50	0.26
Cd (214.439 nm)	≤ 1.50	0.21
Pb (220.353 nm)	≤ 1.50	0.30
Mn (257.610 nm)	≤ 1.50	0.63
Cr (267.716 nm)	≤ 1.50	0.17
Cu (324.754 nm)	≤ 1.50	0.32
Al (396.152 nm)	≤ 1.50	0.30
Ba (493.408 nm)	≤ 1.50	0.48
K (766.491 nm)	≤ 1.50	0.53

Page 3 of 3

General

Document Name: Software Verification

Software Verification Report			
Date:	Monday, November 27, 2023	Time:	1:58:23 PM [UTC -07:00:00]
Windows User Name:	Admin	Base Revision Number:	1.0.1
Install Type:	N/A	Additional Packages:	RA
Host Name: 500NDV-HP			
Product Name: ICP Expert			
Base Reference File Name: ICPReferenceFile.xml			
Summary :			
Overall Evaluation of Installation Check : PASS			
File Report Summary			
No missing files or invalid files found			
No system file difference found			
Files Registration Report Summary			
Files Registration check not required for this product			
Registry Report Summary			
Registry entries check not required for this product			

Date: November 28, 2023 1:10:31 PM
System ID: MY15330001

Materials

Document Name: Certificate of Analysis Wavelength calibration solution

Agilent							
CERTIFICATE OF ANALYSIS							
Agilent Product Name: Wavelength Calibration Solution for ICP-OES & MP-AES, 5 mg/L, 500mL							
Agilent Part No: 661030100							
Lot No: 0012990411							
Product Specifications							
Analyte	Starting Material	CAS #	Certified Conc.	Analyte	Starting Material	CAS #	Certified Conc.
Al	Al(NO ₃) ₃	7704-27-2	5.000 ± 0.025 mg/L	Mo	Mo	7439-98-5	5.000 ± 0.025 mg/L
As	As	7440-38-2	5.000 ± 0.025 mg/L	Mo	(NH ₄) ₂ MoO ₄	13166-76-8	5.000 ± 0.025 mg/L
Ba	Ba(NO ₃) ₂	10022-31-9	5.000 ± 0.025 mg/L	Ni	Ni	7440-02-0	5.000 ± 0.025 mg/L
Cd	Cd	7440-43-8	5.000 ± 0.025 mg/L	Pb	Pb	7439-92-1	5.000 ± 0.025 mg/L
Co	Co	7440-48-4	5.000 ± 0.025 mg/L	Se	Se	7782-49-2	5.000 ± 0.025 mg/L
Cr	Cr(NO ₃) ₃	13448-38-4	5.000 ± 0.025 mg/L	Sr	Sr(NO ₃) ₂	10043-71-9	5.000 ± 0.025 mg/L
Cu	Cu	7440-50-8	5.000 ± 0.025 mg/L	Zn	Zn	7440-66-8	5.000 ± 0.025 mg/L
K	KNO ₃	7757-79-1	50.00 ± 0.25 mg/L				
Matrix: 5% HNO ₃							
Intended Use: This solution is intended for use as a certified reference material or calibration standard for inductively coupled plasma optical emission spectroscopy (ICP-OES), inductively coupled plasma mass spectrometry (ICP-MS), atomic absorption spectroscopy (flame AAS or GFAAS), microwave plasma atomic emission spectroscopy (MP-AES), x-ray fluorescence spectroscopy (XRF), and other techniques for elemental analysis.							
Certification & Traceability: This CRM was manufactured under a quality management system that is registered to ISO 9001, ISO 17034 and ISO/IEC 17025. This CRM was prepared to the certified concentrations shown above by gravimetric methods using single-element concentrates that were certified using the "High Performance ICP-OES" protocol developed by NIST and are directly traceable to the NIST SRMs listed below. This solution was stabilized using high purity nitric acid (HNO ₃) and diluted with filtered (0.22µm), 18 M-ohm deionized water. The balances used in the preparation of this CRM are calibrated regularly with traceability to NIST. All volumetric dilutions are performed in Class A calibrated glassware. The certified concentrations were determined based upon gravimetric procedures. Secondary verification of the certified concentrations was performed using ICP-OES that was calibrated and/or referenced against NIST SRMs: 3101a, 3103a, 3104a, 3108, 3112, 3112a, 1114, 3141a, 3132, 3134, 3136, 3128, 3148, 3153a, and 3168a. The uncertainty associated with each certified concentration represents the expanded uncertainty at the 95% confidence level using a coverage factor of k=2.							
Instructions for Use: Agilent recommends that the solution be thoroughly mixed by repeated shaking or swirling of the bottle immediately prior to use. To achieve the highest accuracy the analyst should: (1) use only pre-cleaned containers and transferware, (2) avoid pipetting directly from the CRM's original container, (3) use a minimum sub-sample size of 500µL, (4) make dilutions using calibrated balances or certified volumetric class A flasks and pipettes, (5) dilute to volume using the same matrix as the original CRM, and (6) never pour used product back into the original container. The solution should be kept tightly capped and stored under normal laboratory conditions. Do not freeze, heat, or expose to direct sunlight. Minimize exposure to moisture or high humidity.							
Page 1 of 2							

Date: November 28, 2023 1:10:31 PM
System ID: MY15330001

Document Name: Certificate of Analysis Wavelength calibration solution



Period of Validity: Agilent ensures the accuracy of this solution until the expiration date shown below, provided the instructions for use are followed. During the period of validity, the purchaser will be notified if this product is recalled due to any significant changes in the stability of the solution.

Sample lot approval:

Check Goodness, Certifying Officer

Date of release: 18 October 2022
Date of expiration: 30 April 2024

Page 2 of 3

Date: November 28, 2023 1:10:31 PM
System ID: MY15330001

Page 22 / 28

Document Name: Certificate of Analysis Wavelength calibration solution



Hazard Information: Refer to the Safety Data Sheet (SDS), which can be obtained at www.agilent.com/chem/sds.

Homogeneity: This solution was determined to be homogeneous by procedures consistent with the requirements of ISO 17034 and ISO Guide 35. Replicate samples of the finished solution were analyzed to confirm its homogeneity, in accordance with OSP 6-13 Assessment of Homogeneity and Stability. To ensure homogeneity, users should not take a smaller sub-sample than specified in the Instructions for Use, or doing so will invalidate the certified values and uncertainties.

Further Information: Please contact Agilent for further information about this CRM.

Quality Certifications: This CRM was prepared under a quality management system that is:

- Registered to ISO 9001 – Quality Management Systems – Requirements (TUV NORD Cert. No. 44 100 18580231)
- Accredited to ISO 17034 – General Requirements for the Competence of Reference Material Producers (AZLA Cert. No. 284832)
 - ISO 17034 references additional requirements specified in ISO Guide 31 and ISO Guide 35.
- Accredited to ISO/IEC 17025 – General Requirements for the Competence of Testing and Calibration Laboratories (AZLA Cert. No. 2548.01)
- LGC Standards, 201 Midway Road, Manchester, NY 12042

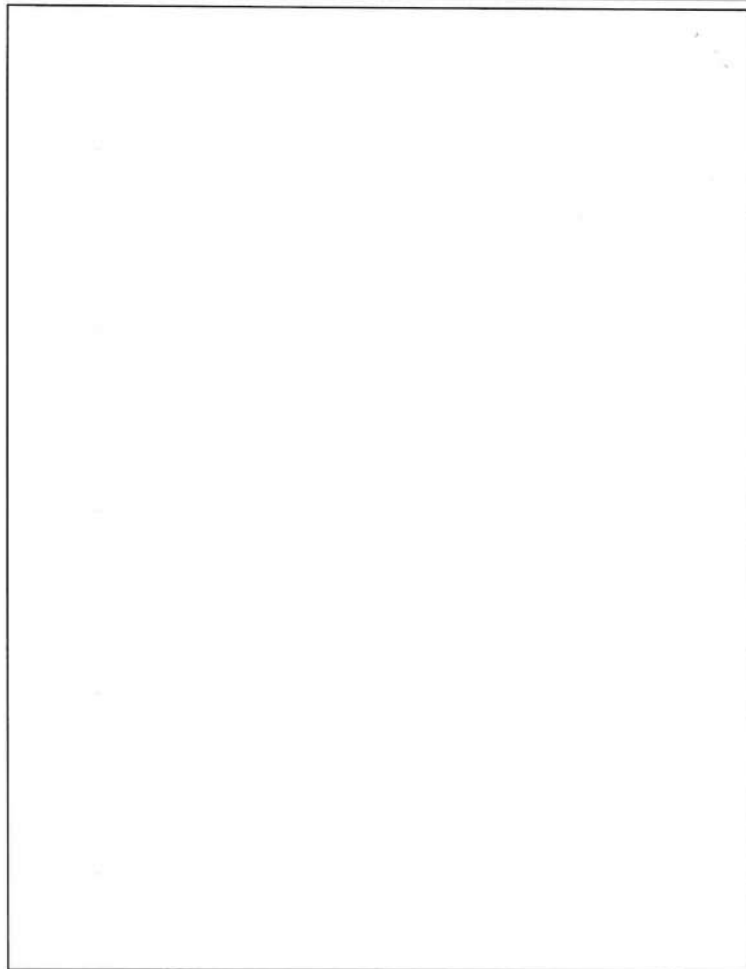
Page 3 of 3

Date: November 28, 2023 1:10:31 PM
System ID: MY15330001

Page 23 / 28

Document Name:

Certificate of Analysis Wavelength calibration solution



Date: November 28, 2023 1:10:31 PM
System ID: MY15330001

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 login 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	Worawit Timakul
Logged On User Name:	worawit.timakul@agilent.com
Signature Creation Date:	November 28, 2023
Reason for Signature:	Executed protocol and published this original version of document

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.

Warranty

Agilent Technologies makes no warranty of any kind to this material, including but not limited to, the implied warranties or merchantability and fitness for a particular purpose. Agilent Technologies shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this material.

Date: November 28, 2023 1:10:31 PM
System ID: MY15330001

User Name worawit.timakul

Report Generated by Hostname: SCG0202NQ4

System Id: MY15330001

Print Date: November 28, 2023 1:10:41 PM

OQHW ICP 5100 ENVI Research Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
November 28, 2023 12:54:06 PM	Audit	SessionCreated	Session	None
November 28, 2023 12:54:06 PM	Start	Configuration	Session	None
November 28, 2023 12:54:06 PM	Audit	Entitlement	Licensing	User is FieldEngineer and does not require an unlock code
November 28, 2023 12:54:32 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 28, 2023 12:54:38 PM	End	Configuration	Session	None
November 28, 2023 12:54:41 PM	Start	Qualification	Session	OQ
November 28, 2023 12:54:41 PM	Start	Execution	Preparation : 5100 VDV: Qualitative Test - No setpoints associated	None
November 28, 2023 12:56:26 PM	End	Execution	Preparation : 5100 VDV: Qualitative Test - No setpoints associated	Run Count : 1
November 28, 2023 12:56:27 PM	Start	Execution	Instrument Tests : 5100 VDV: Qualitative Test - No setpoints associated	None
November 28, 2023 12:56:57 PM	End	Execution	Instrument Tests : 5100 VDV: Qualitative Test - No setpoints associated	Run Count : 1

Page 1 / 3

Page 1 / 3

User Name: worawit.timakul			System Id: MY15330001	
Report Generated by Hostname: SCG0202NQ4			Print Date: November 28, 2023 1:10:41 PM	
OQHW ICP 5100 ENVI Research Transaction log :				
Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
November 28, 2023 12:57:03 PM	Start	Execution	Autosampler Operation : Autosampler 1 - SPS4; Qualitative Test - No setpoints associated	None
November 28, 2023 12:57:08 PM	End	Execution	Autosampler Operation : Autosampler 1 - SPS4; Qualitative Test - No setpoints associated	Run Count : 1
November 28, 2023 12:57:09 PM	End	Qualification	Session	OQ
November 28, 2023 12:57:09 PM	Start	Reporting	Session	None
November 28, 2023 1:04:49 PM	Audit	AceRestarted	Session	None
November 28, 2023 1:04:50 PM	Audit	SessionReloaded	Session	None
November 28, 2023 1:04:58 PM	Start	Qualification	Session	OQ
November 28, 2023 1:08:10 PM	Audit	Reporting	Session	Report Generated : Certificate
November 28, 2023 1:09:28 PM	Audit	Reporting	Session	Report Generated : Report

Page 2 / 3

Page 2 / 3

User Name: worawit.timakul
Report Generated by Hostname: SCG0202NQ4

System Id: MY15330001
Print Date: November 28, 2023 1:10:41 PM

QQHW ICP 5100 ENVI Research Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
November 28, 2023 1:10:31 PM	Audit	Reporting	Session	Report Signed: Certificate PDF Name: QQHW ICP 5100 ENVI Research_20231128_Certificate_1.pdf User Name: worawit.timakul@agilent.com Full Name of Signer: Worawit Timakul Reason for signature: Executed protocol and published this original version of document

Page 3 / 3



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: 30-Jun-2023

Date: November 28, 2023 1:10:31 PM
System ID: MY15330001

Page 28 / 28

PinAAcle 900Z Preventive Maintenance (PM)

Company Name:	ENVIRONMENT RESEARCH		
Address (Instrument Location):	25/114 M.6, THANON NGAMWONGWAN, THUNGSONGHONG, LAKSI, BANGKOK		
Serial Number:	PZAS19031401	PM Number:	1/2
Customer Name (if applicable):	K. RAIWIN	Telephone Number:	099-182-9241
Customer Support Engineer Name:	K. DUANG	Service Order Number:	WO-02273780
Date PM Performed: (DD-MMM-YYYY)	30-Jun-2023	Next PM Due Date: (DD-MMM-YYYY)	30-Dec-2023
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.

Copyright Information

This document contains proprietary information that is protected by copyright. All rights are reserved.

No part of this publication may be reproduced in any form whatsoever or translated into any language without the prior, written permission of PerkinElmer, Inc. Copyright © 2013 PerkinElmer, Inc.

Trademarks

Registered names, trademarks, etc. used in this document, even when not specifically marked as such, are protected by law. PerkinElmer is a registered trademark of PerkinElmer, Inc. All other trademarks and registered trademarks not owned by PerkinElmer, Inc. or its subsidiaries that are depicted herein are the property of their respective owners. Except as specifically set forth in its terms and conditions of sale, PerkinElmer makes no Warranty of any kind with regard to this document, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose.

PerkinElmer shall not be liable for incidental or consequential damages in connection with the furnishing or use of this document.

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	56-021CRY1	30-Jun-2023

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 TH-GA 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 TH-GA 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 \pm 25 mL/min	255	Passed
External flow Rate	100 mL/min \pm 10 mL/min	105	Passed

7.2 Chromium Baseline Noise

Description: Signal to noise check.

Parameter	Specification	Results	Pass/Fail
Baseline Noise	\leq 0.005 Abs.	0.0011	Passed
Standard Deviation	\leq 0.005	0.0003	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	\leq 7.0 pg/0.0044 A-s	6.6	Passed
Precision	\leq 2.0 %	1.47	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	\leq 16.5 pg/0.0044 A-s	15.4	Passed
Zeeman Ratio	0.52 \pm 0.04	0.52	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	$= \frac{\text{Atomic Signal (Peak area)}}{\text{Atomic Signal (Peak area)} + \text{Background Signal (Peak area)}}$
	$= \frac{0.1456}{0.1456+0.1293}$
	$= 0.52$

Review

The preventive maintenance checks and if applicable performance tests for PinAAcle 900Z have been completed.	
This PinAAcle 900Z Passes <input checked="" type="checkbox"/> Fails <input type="checkbox"/> the preventive maintenance.	
Review of Preventive Maintenance:	
Authorized PerkinElmer Representative:	Date: 30-Jun-2023 (DD-MMM-YYYY)
Authorized Customer Representative:	Date: 30-Jun-2023 (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



Cert.No.: 24CH11
Page.: 1 of 2

Certificate of Calibration

Equipment : Conductivity Meter
Manufacturer : HM DIGITAL
Model : COM-100
Serial No. : PONPE5851661
ID No. : NO.5
Condition As-Received: Used Item
Received Date : 05 January 2024
Calibration Date : 08 January 2024
Reference : 2401-0077DN-7
Submitted by : Environment Research & Technology Company Limited.
25/114 Moo 6, Soi Chinaket 1, Ngamwongwan Road,
Toongsonghong, Laksi, Bangkok 10210

Ambient Temperature : $(25 \pm 2.5) ^\circ\text{C}$
Relative Humidity : $(50 \pm 15) \%$
Calibration Procedure: In -house method :
- CP-CH6 : based on direct measurement by
using certified reference material (CRM)

Calibrated by : Walalak Sirithean

Approved by :

(✓) Saitip Meangmai
() Warakorn Lerngegrakul
() Ponpan Paipim

Approved Signatory

Issue Date : 10 January 2024

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.



Cert.No.: 24CH11

Page.: 2 of 2

Condition of this result of calibration**1. Reference Standard Instrument :-**

Instrument	Serial No.	ID No.	Certificate No.	Due date
1) Thermometer	9549224	130RC003	231435	10 Apr 2024

- This Certification is traceable to SI Through 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 $\mu\text{S/cm}$	Thermo Scientific	193/01	11 May 2024
1413.0 $\mu\text{S/cm}$	CPA Chem	931955	30 Sep 2024

- Control Conductivity calibration solution temperature by Water bath (25 ± 0.1) $^{\circ}\text{C}$

3. This certificate is valid only to the item calibrated on date and place of calibration.

Calibration results**Function : Conductivity Measurement****(*) After Adjustment at 1413.0 $\mu\text{S/cm}$**

Conductivity Electrode Serial No.: PONPE5851661

Standard Conductivity Solution	Before Adjustment UUC* Reading	After Adjustment UUC* Reading	Uncertainty of Measurement (\pm)	Coverage factor k
*100 $\mu\text{S/cm}$	97.0 $\mu\text{S/cm}$	98.8 $\mu\text{S/cm}$	5.1 $\mu\text{S/cm}$	2.00
1413.0 $\mu\text{S/cm}$	1170 $\mu\text{S/cm}$	1410 $\mu\text{S/cm}$	11 $\mu\text{S/cm}$	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 %.

-000-

a 1196382



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL. 0-1717-3000-29 FAX. 0-2719-9484



Cert. No.: 24TM93

Page : 1 of 3

Certificate of Calibration

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 : Laboratory (ERTC)

Received Order : 03 January 2024
Calibration Date : 03 January 2024
Ambient Temperature : (26 ± 10) $^{\circ}\text{C}$
Relative Humidity : (50 ± 30) %

Calibrated by : Tawatchai Pama

Approved by : [Signature]
Approved Signatory

() Pornthippa Tameyakul
(✓) Ponpan Paipim
() Suwit Imjai

Issue Date : 16 January 2024**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.

A 0062472



Equipment : Hot Air Oven
 Condition As-Received : Used Item
 Reference : 2401-00010N-3

Cert. No.: 24TM93
 Page : 2 of 3

Procedure Used :-

Calibration were conducted using calibration procedure CP-OT02 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	MY57013823	23LM66	TPA	25 Mar 2024

2. This certificate is valid only to the item calibrated on date and place of calibration.

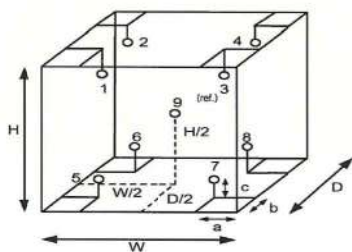
3. This certification is traceable to the International System of Unit.

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)	30	30
REL.Humid. (%)	53	53
AC Supply (Volt)	226	225

Ref. Std. ID No.: @ Calibration Point		
Position :	(104) °C	(180) °C
1	21-17RTD-01	22-17TC-01
2	21-17RTD-02	23-17TC-02
3	17RTD-03	19-17TC-03
4	23-17RTD-10	19-17TC-04
5	17RTD-05	19-17TC-05
6	17RTD-06	19-17TC-06
7	17RTD-07	19-17TC-07
8	23-17RTD-08	19-17TC-08
9 (ref.)	23-17RTD-09	19-17TC-09

Probe Installation Details : Dimension of Chamber :

a = 5.0 cm	D = 0.40 m
b = 5.0 cm	W = 0.56 m
c = 5.0 cm	H = 0.48 m
	Capacity = 0.11 m³



Equipment : Hot Air Oven
 Condition As-Received : Used Item
 Reference : 2401-00010N-3
 Result of Calibration :- (*) Without Adjustment
 Function of UUC* : Temperature Source
 Fresh air setting : Close

Cert. No.: 24TM93
 Page : 3 of 3

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	0.075	1.2	2.4	2
180.0	180.0	180.0	0.41	3.4	3.9	2

Calibration Point (°C)	Measured Temperature (°C)									Uncertainty (± °C)
	Position									
	1	2	3	4	5	6	7	8	9 (ref.)	
104.0	105.068	102.783	103.239	103.695	104.855	103.867	102.799	103.295	103.959	0.42
180.0	179.954	177.587	177.414	178.118	181.087	179.869	179.584	178.045	180.704	1.3

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-

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



Accuracy Calibration Certificate

Customer

Company: Environment Research & Technology Co., Ltd.
Address: 25114 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: 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 (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.

As Found	Temperature		Humidity	
	Stat: 27.5 °C	End: 26.9 °C	Start: 44.1 %	End: 44.8 %

As Found Calibration Date: 15-Jan-2024 Calibrator: Nithit Jongkrod
As Left Calibration Date: N/A
Issue Date: 15-Jan-2024
Approved Signatory: Technical Manager / Head of Calibration Center

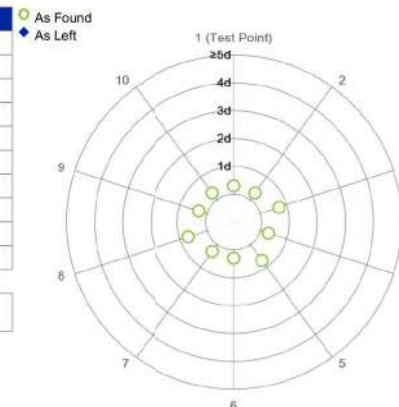
Measurement Results

Repeatability

Test Load: 100 g

	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	99.9999 g	N/A
6	100.0000 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	0.00005 g	N/A
--------------------	-----------	-----



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

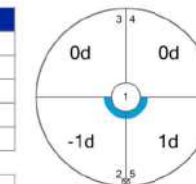
The results of this graph are based upon the absolute values of the differences from the mean value.

Eccentricity

Test Load: 100 g

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

Maximum Deviation	0.0001 g	N/A
-------------------	----------	-----

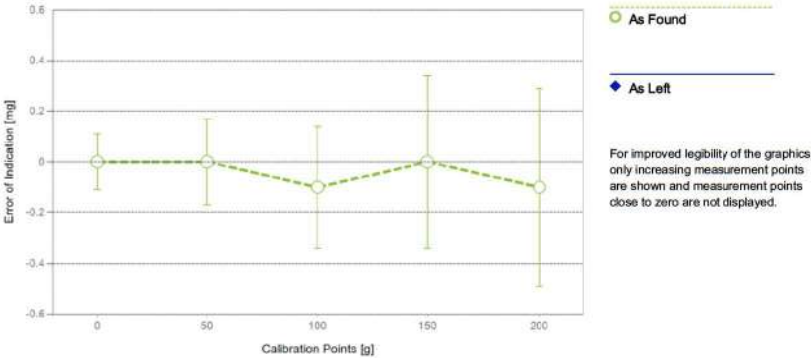


As Found

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

Error of Indication

As Found					
	Reference Value	Indication	Error of Indication	Expanded Uncertainty	k
1	0.0000 g	0.0000 g	0.0000 g	0.11 mg	2
2	0.0500 g	0.0500 g	0.0000 g	0.13 mg	2
3	0.1000 g	0.1000 g	0.0000 g	0.13 mg	2
4	0.5000 g	0.5000 g	0.0000 g	0.13 mg	2
5	1.0000 g	1.0000 g	0.0000 g	0.13 mg	2
6	5.0000 g	5.0000 g	0.0000 g	0.13 mg	2
7	10.0000 g	10.0000 g	0.0000 g	0.14 mg	2
8	50.0000 g	50.0000 g	0.0000 g	0.17 mg	2
9	100.0001 g	100.0000 g	-0.0001 g	0.24 mg	2
10	150.0001 g	150.0001 g	0.0000 g	0.34 mg	2
11	200.0000 g	199.9999 g	-0.0001 g	0.39 mg	2



The uncertainty stated is the expanded uncertainty at calibration obtained by multiplying the standard combined uncertainty by the coverage factor k – which can be larger than 2 according to EURAMET cg-18. The value of the measurand lies within the assigned range of values with a probability of 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.

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:	22-Nov-2022
Certificate Number:	182272	Calibration Due Date:	21-May-2024

Thermo Hygrometer

Equipment No.:	IN302	Date of Issue:	11-Oct-2023
Certificate Number:	SG-H-00656/66	Calibration Due Date:	08-Oct-2024

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.

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: $3 K$

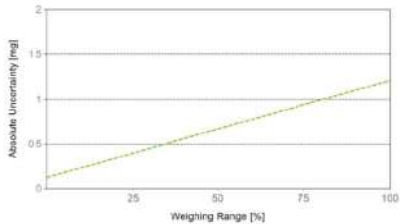
Linearization of Uncertainty Equation

	Range		As Found	As Left
	d	Max		
1	0.0001 g	220 g	$U_1 = 0.13 \text{ mg} + 0.00494 \text{ mg/g} \cdot R$	N/A

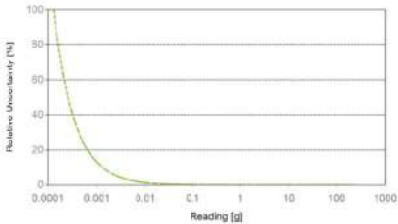
To optimize the stability of the linearization, besides of the zero load only increasing measurement points with a test load of 5% of the measurement range or larger are taken for the calculation of the linear equation.

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

Net Indication	As Found		As Left	
0.0220 g	0.13 mg	0.59%	N/A	N/A
0.2200 g	0.13 mg	0.060%	N/A	N/A
2.2000 g	0.14 mg	0.0064%	N/A	N/A
22.0000 g	0.24 mg	0.0011%	N/A	N/A
220.0000 g	1.2 mg	0.00055%	N/A	N/A



As Found



As Left

GWP®
Certificate



As Found



As Left



The weighing device meets the given process requirements.

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.

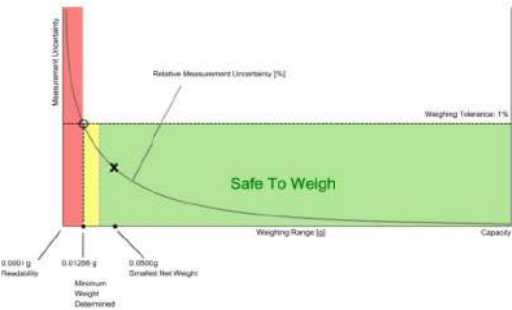
Process Requirements

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.

Minimum Weight

As Found Minimum Weight Table

Minimum weights for different weighing tolerances and safety factors					
Tolerance	Safety Factor				
	1	2	3	5	10
0.1%	0.12712 g	0.25551 g	0.38518 g	0.64847 g	1.33062 g
0.2%	0.06340 g	0.12712 g	0.19115 g	0.32018 g	0.64847 g
0.5%	0.02532 g	0.05070 g	0.07612 g	0.12712 g	0.25551 g
1%	0.01266 g	0.02532 g	0.03800 g	0.06340 g	0.12712 g
2%	0.00633 g	0.01266 g	0.01899 g	0.03166 g	0.06340 g
5%	0.00253 g	0.00506 g	0.00759 g	0.01266 g	0.02532 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					
Tolerance	Safety Factor				
	1	2	3	5	10
0.1%	0.12712 g	0.25551 g	0.38518 g	0.64847 g	1.33062 g
0.2%	0.06340 g	0.12712 g	0.19115 g	0.32018 g	0.64847 g
0.5%	0.02532 g	0.05070 g	0.07612 g	0.12712 g	0.25551 g
1%	0.01266 g	0.02532 g	0.03800 g	0.06340 g	0.12712 g
2%	0.00633 g	0.01266 g	0.01899 g	0.03166 g	0.06340 g
5%	0.00253 g	0.00506 g	0.00759 g	0.01266 g	0.02532 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:

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

Measurement Results

Results Summary

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

✓ = Passed

✗ = Failed

⚠ = Safety Factor not met

Repeatability

Test Load: 100 g

Tolerance	Control Limit	As Found		As Left	
		Std. Deviation	Result	Std. Deviation	Result
0.1%	N/A	0.00005 g*	N/A	0.00005 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

Tolerance	Control Limit	As Found		As Left	
		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.

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
100.0001 g	-0.0001 g	0.0500 g	0.1000 g	0.2500 g	0.5000 g	1.0000 g	2.5000 g
150.0001 g	0.0000 g	0.0750 g	0.1500 g	0.3750 g	0.7500 g	1.5000 g	3.7500 g
200.0000 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
100.0001 g	-0.0001 g	0.0500 g	0.1000 g	0.2500 g	0.5000 g	1.0000 g	2.5000 g
150.0001 g	0.0000 g	0.0750 g	0.1500 g	0.3750 g	0.7500 g	1.5000 g	3.7500 g
200.0000 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.



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



Cert. No.: 24TM92

Page : 1 of 3

Certificate of Calibration

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 : Laboratory (ERTC)


Received Order : 03 January 2024

Calibration Date : 03 January 2024

Ambient Temperature : (26 ± 10) °C

Relative Humidity : (50 ± 30) %

Calibrated by : Tawatchai Pama

Approved by : 
Approved Signatory

() Porntipha Tameyakul
(✓) Ponpan Paipim
() Suwit Imjai

Issue Date : 16 January 2024

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
Condition As-Received : Used Item
Reference : 2401-0001ON-2

Cert. No.: 24TM92
Page : 2 of 3

Procedure Used :-

Calibration were conducted using calibration procedure CP-OT02 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	MY57013823	23LM66	TPA	25 Mar 2024

2. This certificate is valid only to the item calibrated on date and place of calibration.

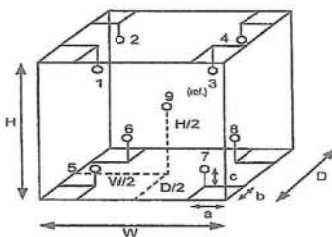
3. This certification is traceable to the International System of Unit.

Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Close



Probe Installation Details : Dimension of Chamber :

a = 5.0 cm	D = 0.40 m
b = 5.0 cm	W = 0.60 m
c = 5.0 cm	H = 0.48 m
	Capacity = 0.12 m ³

Environment during calibration		
	Beginning	Finished
Temp. (°C)	30	33
REL.Humid. (%)	53	41
AC Supply (Volt)	226	225

Ref. Std. ID No.: @ Calibration Point		
Position :	(104) °C	(180) °C
1	21-17RTD-01	22-17TC-01
2	21-17RTD-02	23-17TC-02
3	17RTD-03	19-17TC-03
4	23-17RTD-10	19-17TC-04
5	17RTD-05	19-17TC-05
6	17RTD-06	19-17TC-06
7	17RTD-07	19-17TC-07
8	23-17RTD-08	19-17TC-08
9 (ref.)	23-17RTD-09	19-17TC-09

a 1197881



Equipment : Hot Air Oven
Condition As-Received : Used Item
Reference : 2401-0001ON-2
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

Cert. No.: 24TM92
Page : 3 of 3

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor k
104	104	104	0.10	1.8	2.1	2
180	180	180	0.27	4.4	5.0	2

Calibration Point (°C)	Measured Temperature (°C)									Uncertainty (± °C)
	Position									
	1	2	3	4	5	6	7	8	9 (ref.)	
104	104.379	103.463	103.443	103.893	104.213	103.223	105.222	104.297	103.494	0.77
180	179.045	177.562	181.296	179.300	180.773	177.931	182.136	178.131	178.019	1.6

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-

a 1197880

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 8890 GC Preventive Maintenance Checklist

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](http://www.agilent.com/en-us/products/crosslab-instrument-services/service-repair), 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](https://www.youtube.com/user/agilent) channel at <https://www.youtube.com/user/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.
- 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.

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	US2125A-011
Instrument System Site and Location	Environment Research	Laboratory

List System Component Product Numbers	List the Serial Numbers of each Component
1. 64513 A	US2125A CN21195025
2. 64514 A	CN12107024
3. 64515 9540 A	US2125A-011
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.

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.

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	282.6
Back detector output	N/A	243.2
AUX 1 detector output	N/A	282.4
AUX 2 detector output CFPD	N/A	12.6
Test description	Expected test result	Actual test result
Leak and Restriction Test after front inlet maintenance	Pass	pass
Leak and Restriction Test after back inlet maintenance	Pass	pass
Leak and Restriction Test after front Inlet Split Vent Trap replacement	Pass	pass
Leak and Restriction Test after back inlet Split Vent Trap replacement	Pass	pass
Front inlet pressure decay test	Pass	pass
Back inlet pressure decay test	Pass	pass

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 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	1
Universal .018-inch FID Jet	5200-0177	8890 GC	N/A

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 600590679 Date service completed 12-13 June 2023

Agilent signature [Redacted] Customer signature _____

Total number of pages in this document 1 pages

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.

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

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.

System Information

- ☐ Check this box if an instrument configuration report is attached instead of completing the table below.

Instrument System Name and ID	GCMS
Instrument System Site and Location	Environmental Research & Technology Co., Ltd.

List System Component Product Numbers	List the Serial Numbers of each Component
1. G3440B	CN16993176
2. G4513A	CN16600132
3. G4514A	CN170 CN1830130
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.

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.

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.

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	0.1
Back detector output	9	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

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	1
SSL Capillary Ultra Inert Inlet Low Pressure Drop Split Liner - with Glass Wool	5190-2295	7890A/B	1
PP Inlet PM kit	5188-6498	7890A/B	1
Split vent trap PM kit, single cartridge (for MMI, PTV & VI)	5188-6495	7890A/B	1
MMI Cleaning Kit	63510-60820	7890A/B	1
PTV Septumless Head Rebuild Kit	5182-9747	7890A/B	1
PTV Septumless Head Teflon Guide	5182-9748	7890A/B	1
Ignitor (glow plug) assembly with O-ring	19231-60680	7890A/B	1
FID Collector Rebuild/Cleaning Kit	G1531-67000	7890A/B	N/A
Standard .011-inch FID Jet for capillary FID base	G1531-80560	7890A/B	1
High Temperature .018-inch FID Jet for capillary FID base	G1531-80620	7890A/B	N/A
Standard .018-inch FID Jet for packed column with packed FID base	18710-20119	7890A/B	1
Standard .011-inch FID Jet for capillary column with packed/adaptable FID base	19244-80560	7890A/B	1
High Temperature .018-inch FID Jet for capillary column with packed/adaptable FID base	19244-80620	7890A/B	1
NPD Jet, universal fit, .011-inch ID	G1534-80580	7890A/B	1
NPD Jet, universal fit, .011-inch ID Extended tip	G1534-80590	7890A/B	1
SSL Capillary Ultra Inert Inlet Gold Seal with Washer	5190-6144	7890A/B	1
SSL Capillary Ultra Inert Inlet Splitless Liner - Single taper with Glass Wool	5190-2293	7890A/B	1
**FID Collector Replacement Kit, if needed	G1531-67001	7890A/B	1

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 6006365875 Date service completed 24 Nov 2023
 Agilent signature  Customer signature _____
 Total number of pages in this document _____

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.

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.

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.

- 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.

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
Instrument System Site and Location

GCMS
Environment Research & Technology Co., Ltd.

List System Component Product Numbers	List the Serial Numbers of each Component
1. G1707713	U17031011
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.

Preventive Maintenance Procedures

- ☐ Service Not Applicable

Interim / Major Preventive Maintenance – GCMS

Yes/No	Interim/Major	Description
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Perform general inspection of system for cleanliness
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Discuss any problems the customer is having with the instrument
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Review customer maintenance records and exclude maintenance on recently serviced items
<input checked="" type="checkbox"/>	<input type="checkbox"/>	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

Yes/No	Interim/Major	System Checks
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Verify that calibration peaks were seen prior to starting the PM
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Vent the instrument
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Inspect vacuum hoses, pump, exhaust tubing, and power cords for excessive wear.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Visually inspect calibrant levels – PFTBA PFDTD (if appl.), IRM (if appl.). Refill if available.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Look for any obvious external damage or problems.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Clean air intake(s). Cosmetic cover(s) may need to be removed.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Verify system line voltage meets instrument specifications: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	For HydroInert systems, verify customer is running hydrogen: Yes <input type="checkbox"/> No <input type="checkbox"/>

Interim / Major Preventive Maintenance – Wet Mechanical vacuum pumps

- ☐ Service Not Applicable

Yes/No	Interim/Major	Wet Mechanical vacuum pumps
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Check for evidence of oil leakage. Check pump gasket for leakage.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	GC/MS SQ with diffusion pump; drain and replace diffusion pump oil.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Drain and replace mechanical pump oil.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Replace Oil Mist Filter if applicable.

Yes/No	<input type="checkbox"/>	<input type="checkbox"/>	Wet Mechanical vacuum pumps
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Discuss with customer the need for more frequent oil changes if the oil is dirty
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Don't use mist filter's with Chemical Ionization.
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	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	<input type="checkbox"/>	<input type="checkbox"/>	Dry Mechanical vacuum pumps - Diaphragm
Yes/No	Interim/Major	Description	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Check for evidence of poor vacuum – Turbo power demand, poor manifold vacuum, etc.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Clear air flow paths of dust.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	If vacuum is poor, then replace the diaphragm pump.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	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	<input type="checkbox"/>	<input type="checkbox"/>	Dry Mechanical vacuum pumps - Scroll
Yes/No	Interim/Major	Description	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Replace the tips seal on the IDP pump.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Check for evidence of poor vacuum: – Rough vac pressure, turbopower demand, poor manifold vacuum, etc.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Replace the Exhaust Filter if required.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Discuss with customer the need for more frequent changes, if needed.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Inform customer that pump gas ballast should be installed all the time.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	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 – Cleaning System and Filters

☐ Service Not Applicable

		Cleaning System and Filters			
Yes/No	Interim/Major	Description			
		Fans			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		Remove dust from fans and vent covers.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		Verify fans are functional and that there is enough space around the instrument for proper cooling.
		Source cleaning (all sources except Hydrolnert)			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Open analyzer and remove the source.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Disassemble, Clean, Re-assemble source. (7200, also, remove and clean entrance lens)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Re-install source and close analyzer.
		Hydrolnert Source			
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		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. Hydrolnert source should not be run with helium carrier.
		Filters			
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Replace RMSH-2 Helium gas filter (collision cell gas) – if applicable.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Replace RMSN-2 Nitrogen gas filter (collision cell gas) – if applicable.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Replace RMSHY-2 Hydrogen gas filter (Hydrolnert and JetClean) – if applicable.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		CP17973 – Gas Clean GS/MS Filter (forHe, N2 or H2 carrier) – if required
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		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)

Interim / Major Preventive Maintenance – System Post Check

☐ Service Not Applicable

System post-check				Description	
Yes/No	Interim	Major			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Pump system back down. Wait until system stability has been achieved.	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Verify system vacuum reading(s) via the gauge controller.	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Leak Check	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Verify system in manual tune	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Compare against previous tune file report(s)	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Change to Tune and verify that all temperatures, pressures, and gas flows reach method set points	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Check manually that you have calibration peaks.	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	EI Autotune Performed	

Guidance: If the FM 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
------------------	----------------------	--------------------

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:

6006765875

Date of Service Completion:

24 Nov 2023

Service Engineer Name:

Customer Name

Service Technician Name:

Total number of pages in this document:

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	5191-5651	✓	✓	✓
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, N ₂ or H ₂) – 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, N ₂ or H ₂ ; Bracket, Mount and Filter – if required	CP17988			✓
# Gas Clean Carrier Gas Kit for 8890 & 8860 for He, N ₂ or H ₂ ; Bracket, Mount and Filter – if required	CF179880			✓

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 DP-3 (diameter: 60mm)	REPLSLRFILTER2	✓	✓	✓

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			✓

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
El High Temperature Filaments	G7005-60061 Qty 2	597X	7000x	N/A
HES El Filaments	G7002-60001	5977B/C	7010x	N/A
LE-El Filaments (7250 QTOF)	G3850-60021	N/A	N/A	7250
CI High Temperature Filament – SQ, TQ, 7200 QTOF	G7035-60072	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

Ion source insulators for 5973/5975/5977/7000/7010/7200/7250 Series

Part Description	Part Number	SQ	TQ	QTOF
Repeller insulator (SQ, TQ)	G1099-20133 Qty 2	597X	7000x	N/A
Lens insulator for extractor lens (ceramic ring insulator) (Extractor source)	G3870-20445	5977x	7000C/D/E	N/A
Lens insulator for Extractor lens (Vespel ring insulator) (7000B extractor ion source)	G7000-20445	N/A	7000B only	N/A
Lens stack insulator for SS, Inert, Extractor sources (captures ion focus and entrance lens) (Vespel)	G3170-20530	597X	7000x	N/A
Lens insulator for Extractor lens for HES/LEEI (ceramic ring insulator)	G7002-20064	5977B/C	7010x	7250
Lens stack insulator/holder for HES/LEEI (Vespel)	G7002-20074	5977B/C	7010x	7250
CI Repeller Lens Insulator (SQ, TQ)	G1999-20433	597X	70X0x	N/A
CI Lens stack insulator (SQ, TQ) (Vespel)	G3170-20540	597X	70X0x	N/A
Repeller insulator (7200 RIS) (Ceramic)	G7005-20447	N/A	N/A	7200A/B
Extractor Lens Insulator (7200 RIS) (Vespel)	G7005-20133	N/A	N/A	7200A/B
Ion Focus Insulator (7200 RIS) (Vespel)	G7005-20442	N/A	N/A	7200A/B
CI Repeller Insulator/bushing (7200 RIS) (Ceramic)	G7005-20030	N/A	N/A	7200A/B

HydroInert coated lenses for 5977/7000 Series

Part Description	Part Number	SQ	TQ	QTOF
HydroInert Repeller	G7078-20902	5977x	7000C/D/E	N/A
Ext Source Body – HydroInert	G7078-20903	5977x	7000C/D/E	N/A
HydroInert Extractor lens (9mm)	G7078-20909	5977x	7000C/D/E	N/A
Ion Focus Lens – HydroInert	G7078-20905	5977x	7000C/D/E	N/A
Entrance Lens – HydroInert	G7078-20904	5977x	7000C/D/E	N/A

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 – Hydroinert (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)	G70C2-60058	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	8650-3030	597X	70X0	72X0
Gloves, clean, small	8650-0029	597X	70X0	72X0



Teledyne Tekmar ATOMX Purge and Trap
Preventive Maintenance Checklist - Standard

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.
 - o 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 InstrumentGuidance

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.

Teledyne Tekmar ATOMX Purge and Trap
Preventive Maintenance Checklist - Standard



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
Lubricant, Dupont Krytox	15-0293-000	TMR-ATOMX	1
Tubing, Drain, Self Retracting	15-0087-002	TMR-ATOMX	1

Teledyne Tekmar ATOMX Purge and Trap
Preventive Maintenance Checklist - Standard



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.

System Information

Guidance

- ☐ Check this box if an instrument configuration report is attached instead of completing the table.

Instrument system name and ID	ATOMX Purge & Trap
Instrument system site and location	Environment Research & Technology Co., Ltd.
List system component product numbers	List the serial numbers of each component
1. TME-ATOMX	1. VS17013007
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.

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 6006365875 Date service completed 24 Nov 2023

Agilent signature  Customer signature _____

Number of pages in this document _____



SHIPPED TO: Science Plus
16/26 Moo 12
Talingchan, Bangkok 10170

PAGE: 1 of 2

ANALYSIS REPORT

Sales#: 117404289 Cylinder Size: 185 (3.2" X 9.4")
Production#: 1602683 Cylinder #: AB-116946
Report Date: Jan-18-2024 Cylinder Pressure: 1700 psig
P.O.#: 0573518-ENTECH Cylinder Valve: CGA 180 / Aluminum
Blend Type: QUALIFIED Cylinder Volume: 0.8 Liter
Material#: 24086377 Cylinder Material: Aluminum
Traceability: NIST by weight Gas Volume: 98 Liters
Expiration Date: Jan-18-2025 Blend Tolerance: 10% Relative
Do NOT use under: 150 psig Analytical Accuracy: 5% Relative

COMPONENT	CAS NUMBER	REQUESTED CONC	QUALIFIED CONC
Dichlorodifluoromethane	75-71-8	1.00 ppm	0.98 ppm
Chloromethane	74-87-3	1.00 ppm	0.99 ppm
Freon-114	76-14-2	1.00 ppm	0.95 ppm
Vinyl Chloride	75-01-4	1.00 ppm	0.98 ppm
Bromomethane	74-83-9	1.00 ppm	0.97 ppm
Chloroethane	75-06-3	1.00 ppm	0.96 ppm
Freon-11	75-66-4	1.00 ppm	0.94 ppm
1,1-Dichloroethene	75-35-4	1.00 ppm	1.02 ppm
Methylene Chloride	75-06-2	1.00 ppm	0.98 ppm
Freon-113	76-13-1	1.00 ppm	1.02 ppm
1,1-Dichloroethane	75-34-3	1.00 ppm	0.97 ppm
Cis-1,2-Dichloroethylene	156-59-2	1.00 ppm	0.98 ppm
Chloroform	67-66-3	1.00 ppm	1.01 ppm
1,2-Dichloroethane	107-06-2	1.00 ppm	0.97 ppm
1,1,1-Trichloroethane	71-55-6	1.00 ppm	0.99 ppm
Benzene	71-43-2	1.00 ppm	0.99 ppm
Carbon Tetrachloride	56-23-5	1.00 ppm	0.98 ppm
1,2-Dichloropropane	78-87-5	1.00 ppm	0.98 ppm
Trichloroethylene	79-01-6	1.00 ppm	0.98 ppm
Cis-1,3-Dichloropropene	10061-01-5	1.00 ppm	0.98 ppm
Trans-1,3-Dichloropropene	10061-02-6	1.00 ppm	0.92 ppm
1,1,2-Trichloroethane	79-00-5	1.00 ppm	0.98 ppm
Toluene	108-88-3	1.00 ppm	1.01 ppm
1,2-Dibromoethane	106-93-4	1.00 ppm	0.99 ppm
Tetrachloroethylene	127-18-4	1.00 ppm	0.98 ppm
Chlorobenzene	108-90-7	1.00 ppm	0.99 ppm
Ethylbenzene	100-41-4	1.00 ppm	0.99 ppm
P-Xylene	106-42-3	1.00 ppm	0.97 ppm



SHIPPED TO: Science Plus
16/26 Moo 12
Talingchan, Bangkok 10170

PAGE: 2 of 2

ANALYSIS REPORT

Sales#: 117404289 Cylinder Size: 185 (3.2" X 9.4")
Production#: 1602683 Cylinder #: AB-116946
Report Date: Jan-18-2024 Cylinder Pressure: 1700 psig
P.O.#: 0573518-ENTECH Cylinder Valve: CGA 180 / Aluminum
Blend Type: QUALIFIED Cylinder Volume: 0.8 Liter
Material#: 24086377 Cylinder Material: Aluminum
Traceability: NIST by weight Gas Volume: 98 Liters
Expiration Date: Jan-18-2025 Blend Tolerance: 10% Relative
Do NOT use under: 150 psig Analytical Accuracy: 5% Relative

COMPONENT	CAS NUMBER	REQUESTED CONC	QUALIFIED CONC
M-Xylene	108-38-3	1.00 ppm	0.97 ppm
Styrene	100-42-5	1.00 ppm	0.97 ppm
O-Xylene	95-47-6	1.00 ppm	0.97 ppm
1,1,2,2-Tetrachloroethane	79-34-5	1.00 ppm	0.97 ppm
1,3,5-Trimethylbenzene	108-67-8	1.00 ppm	0.95 ppm
1,2,4-Trimethylbenzene	95-63-6	1.00 ppm	0.93 ppm
1,3-Dichlorobenzene	541-73-1	1.00 ppm	0.92 ppm
1,4-Dichlorobenzene	106-46-7	1.00 ppm	0.91 ppm
1,2-Dichlorobenzene	95-50-1	1.00 ppm	0.93 ppm
1,2,4-Trichlorobenzene	120-82-1	1.00 ppm	0.93 ppm
Hexachloro-1,3-Butadiene	87-68-3	1.00 ppm	0.92 ppm
Nitrogen	7727-37-9	Balance	Balance

ANALYST:

Brian Bramkamp

DATE: Jan-18-2024

THE LINDE GROUP



SHIPPED TO: Science Plus
16/26 Moo 12
Talingchan, Bangkok 10170

PAGE: 1 of 2

ANALYSIS REPORT

Sales#: 117494289
Production#: 1602690
Report Date: Jan-24-2024
P.O.#: 0573518-Entech
Blend Type: QUALIFIED
Material#: 24110866
Traceability: NIST by weight
Expiration Date: Jan-24-2025
Do NOT use under: 150 psig

Cylinder Size: 185 (3.2" X 9.4")
Cylinder #: AB-118316
Cylinder Pressure: 1700 psig
Cylinder Valve: CGA 180 / Aluminum
Cylinder Volume: 0.8 Liter
Cylinder Material: Aluminum
Gas Volume: 98 Liters
Blend Tolerance: 10% Relative
Analytical Accuracy: 5% Relative

COMPONENT	CAS NUMBER	REQUESTED CONC	QUALIFIED CONC
Chlorodifluoromethane	75-45-6	1.00 ppm	1.05 ppm
Acetaldehyde	75-07-0	1.00 ppm	1.08 ppm
Isobutene	115-11-7	1.00 ppm	1.07 ppm
Methanol (Analytical Accuracy \pm 10%)	67-56-1	1.00 ppm	1.20 ppm
Ethanol (Analytical Accuracy \pm 10%)	64-17-5	1.00 ppm	1.19 ppm
Acetonitrile (Analytical Accuracy \pm 10%)	75-05-8	1.00 ppm	1.12 ppm
Acrolein (Analytical Accuracy \pm 10%)	107-02-8	1.00 ppm	1.18 ppm
Propanal	123-38-6	1.00 ppm	1.07 ppm
Acrylonitrile	107-13-1	1.00 ppm	1.10 ppm
n-Pentane	109-66-0	1.00 ppm	1.07 ppm
Methyl Iodide	74-88-4	1.00 ppm	1.06 ppm
Isoprene	78-79-5	1.00 ppm	1.10 ppm
Dichloromethane	75-09-2	1.00 ppm	1.06 ppm
Methacrolein	78-85-3	1.00 ppm	1.06 ppm
1-Propanol	71-23-8	1.00 ppm	1.00 ppm
Cyclopentane	287-92-3	1.00 ppm	1.05 ppm
Methyl Vinyl Ketone	78-94-4	1.00 ppm	1.10 ppm
n-Butanal	123-72-8	1.00 ppm	1.07 ppm
1-Butanol	71-36-3	1.00 ppm	1.10 ppm
Carbon Tetrachloride	56-23-5	1.00 ppm	1.07 ppm
2-Pentanone	107-87-9	1.00 ppm	1.07 ppm
3-Pentanone	96-22-0	1.00 ppm	1.07 ppm
Pentanal (Analytical Accuracy \pm 10%)	110-62-3	1.00 ppm	1.16 ppm
3-Hexanone	589-38-8	1.00 ppm	1.06 ppm
Hexanal (Analytical Accuracy \pm 10%)	66-25-1	1.00 ppm	0.86 ppm

THE LINDE GROUP



SHIPPED TO: Science Plus
16/26 Moo 12
Talingchan, Bangkok 10170

PAGE: 2 of 2

ANALYSIS REPORT

Sales#: 117494289
Production#: 1602690
Report Date: Jan-24-2024
P.O.#: 0573518-Entech
Blend Type: QUALIFIED
Material#: 24110866
Traceability: NIST by weight
Expiration Date: Jan-24-2025
Do NOT use under: 150 psig

Cylinder Size: 185 (3.2" X 9.4")
Cylinder #: AB-118316
Cylinder Pressure: 1700 psig
Cylinder Valve: CGA 180 / Aluminum
Cylinder Volume: 0.8 Liter
Cylinder Material: Aluminum
Gas Volume: 98 Liters
Blend Tolerance: 10% Relative
Analytical Accuracy: 5% Relative

COMPONENT	CAS NUMBER	REQUESTED CONC	QUALIFIED CONC
1,2,3-Trimethylbenzene	526-73-8	1.00 ppm	1.06 ppm
Naphthalene (Analytical Accuracy \pm 10%)	91-20-3	1.00 ppm	1.18 ppm
Nitrogen	7727-37-9	Balance	Balance

ANALYST

Lou Lorenzetti

DATE: Jan-24-2024



SHIPPED TO: Science Plus
16/26 Moo 12
Talingchan, Bangkok 10170

PAGE: 1 of 2

ANALYSIS REPORT

Sales#: 117494289
Production#: 1602685
Report Date: Jan-23-2024
P.O.#: 0573518-ENTECH
Blend Type: QUALIFIED
Material#: 24086380
Traceability: NIST by weight
Expiration Date: Jan-23-2025
Do NOT use under: 150 psig

Cylinder Size: 185 (3.2" X 9.4")
Cylinder #: AB-117844
Cylinder Pressure: 1700 psig
Cylinder Valve: CGA 180 / Aluminum
Cylinder Volume: 0.8 Liter
Cylinder Material: Aluminum
Gas Volume: 98 Liters
Blend Tolerance: 10% Relative
Analytical Accuracy: 5% Relative

COMPONENT	CAS NUMBER	REQUESTED CONC	QUALIFIED CONC
Propylene	115-07-1	1.00 ppm	1.00 ppm
1,3-Butadiene	106-99-0	1.00 ppm	0.99 ppm
Vinyl Bromide	593-60-2	1.00 ppm	1.00 ppm
Acetone	67-64-1	1.00 ppm	0.99 ppm
Isopropyl Alcohol	67-63-0	1.00 ppm	0.96 ppm
Carbon Disulfide (Analytical Accuracy \pm 10%)	75-15-0	1.00 ppm	1.07 ppm
Allyl Chloride	107-05-1	1.00 ppm	0.94 ppm
Trans-1,2-Dichloroethene	156-60-5	1.00 ppm	1.04 ppm
Methyl Teri-Butyl Ether	1634-04-4	1.00 ppm	0.99 ppm
Vinyl Acetate	108-05-4	1.00 ppm	1.10 ppm
Methyl Ethyl Ketone	78-93-3	1.00 ppm	1.01 ppm
n-Hexane	110-54-3	1.00 ppm	1.01 ppm
Ethyl Acetate	141-78-6	1.00 ppm	0.95 ppm
Tetrahydrofuran	109-99-9	1.00 ppm	0.92 ppm
Cyclohexane	110-82-7	1.00 ppm	1.00 ppm
Bromodichloromethane	75-27-4	1.00 ppm	0.95 ppm
1,4-Dioxane	123-91-1	1.00 ppm	0.95 ppm
2,2,4-Trimethylpentane	540-84-1	1.00 ppm	0.97 ppm
n-Heptane	142-82-5	1.00 ppm	0.97 ppm
Methyl Isobutyl Ketone	108-10-1	1.00 ppm	0.96 ppm
Methyl Butyl Ketone	591-78-6	1.00 ppm	0.92 ppm
Dibromochloromethane	124-48-1	1.00 ppm	0.97 ppm
Bromoform	75-25-2	1.00 ppm	1.03 ppm



SHIPPED TO: Science Plus
16/26 Moo 12
Talingchan, Bangkok 10170

PAGE: 2 of 2

ANALYSIS REPORT

Sales#: 117494289
Production#: 1602685
Report Date: Jan-23-2024
P.O.#: 0573518-ENTECH
Blend Type: QUALIFIED
Material#: 24086380
Traceability: NIST by weight
Expiration Date: Jan-23-2025
Do NOT use under: 150 psig

Cylinder Size: 185 (3.2" X 9.4")
Cylinder #: AB-117844
Cylinder Pressure: 1700 psig
Cylinder Valve: CGA 180 / Aluminum
Cylinder Volume: 0.8 Liter
Cylinder Material: Aluminum
Gas Volume: 98 Liters
Blend Tolerance: 10% Relative
Analytical Accuracy: 5% Relative

COMPONENT	CAS NUMBER	REQUESTED CONC	QUALIFIED CONC
4-Ethyltoluene	622-56-8	1.00 ppm	0.93 ppm
Benzyl Chloride (Analytical Accuracy \pm 10%)	100-44-7	1.00 ppm	1.09 ppm
Nitrogen	7727-37-9	Balance	Balance

ANALYST:

Brian Bramkamp

DATE: Jan-23-2024

ฤดูฝน

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	GA 2
SSL Capillary Inlet PM kit, Split	5188-6496	8890 GC	GA 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	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 6006981701 Date service completed 05 JUN 2024

Agilent signature [Redacted] Customer signature [Signature]

Total number of pages in this document 9

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.

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

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.

System Information

- ☐ Check this box if an instrument configuration report is attached instead of completing the table below.

Instrument System Name and ID	GCMS
Instrument System Site and Location	Environmental Research & Technology Co., Ltd.

List System Component Product Numbers	List the Serial Numbers of each Component
1. G3440B	CN16993176
2. G4513A	CN16600132
3. G4514A	CN170 CN1830130
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.

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.

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.

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	0.1
Back detector output	9	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

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	1
SSL Capillary Ultra Inert Inlet Low Pressure Drop Split Liner - with Glass Wool	5190-2295	7890A/B	1
PP Inlet PM kit	5188-6498	7890A/B	1
Split vent trap PM kit, single cartridge (for MMI, PTV & VI)	5188-6495	7890A/B	1
MMI Cleaning Kit	63510-60820	7890A/B	1
PTV Septumless Head Rebuild Kit	5182-9747	7890A/B	1
PTV Septumless Head Teflon Guide	5182-9748	7890A/B	1
Ignitor (glow plug) assembly with O-ring	19231-60680	7890A/B	1
FID Collector Rebuild/Cleaning Kit	61531-67000	7890A/B	N/A
Standard .011-inch FID Jet for capillary FID base	61531-80560	7890A/B	1
High Temperature .018-inch FID Jet for capillary FID base	61531-80620	7890A/B	N/A
Standard .018-inch FID Jet for packed column with packed FID base	18710-20119	7890A/B	1
Standard .011-inch FID Jet for capillary column with packed/adaptable FID base	19244-80560	7890A/B	1
High Temperature .018-inch FID Jet for capillary column with packed/adaptable FID base	19244-80620	7890A/B	1
NPD Jet, universal fit, .011-inch ID	61534-80580	7890A/B	1
NPD Jet, universal fit, .011-inch ID Extended tip	61534-80590	7890A/B	1
SSL Capillary Ultra Inert Inlet Gold Seal with Washer	5190-6144	7890A/B	1
SSL Capillary Ultra Inert Inlet Splitless Liner - Single taper with Glass Wool	5190-2293	7890A/B	1
**FID Collector Replacement Kit, if needed	61531-67001	7890A/B	1

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 6001365875 Date service completed 24 Nov 2023
 Agilent signature _____ Customer signature _____
 Total number of pages in this document _____

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.

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.

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.

- 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.

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
Instrument System Site and Location

GCMS
Environment Research & Technology Co., Ltd.

List System Component Product Numbers	List the Serial Numbers of each Component
1. G1707713	U17031011
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.

Preventive Maintenance Procedures

- ☐ Service Not Applicable

Interim / Major Preventive Maintenance – GCMS

Yes/No	Interim/Major	Description
<input checked="" type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	Perform general inspection of system for cleanliness
<input checked="" type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	Discuss any problems the customer is having with the instrument
<input checked="" type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	Review customer maintenance records and exclude maintenance on recently serviced items
<input checked="" type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	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

Yes/No	Interim/Major	System Checks
Yes/No	Interim/Major	Description
<input checked="" type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	Verify that calibration peaks were seen prior to starting the PM
<input checked="" type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	Vent the instrument
<input checked="" type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	Inspect vacuum hoses, pump, exhaust tubing, and power cords for excessive wear.
<input checked="" type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	Visually inspect calibrant levels – PFTBA PFDTD (if appl.), IRM (if appl.). Refill if available.
<input checked="" type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	Look for any obvious external damage or problems.
<input checked="" type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	Clean air intake(s). Cosmetic cover(s) may need to be removed.
<input checked="" type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	Verify system line voltage meets instrument specifications: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
<input type="checkbox"/> <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	For HydroInert systems, verify customer is running hydrogen: Yes <input type="checkbox"/> No <input type="checkbox"/>

Interim / Major Preventive Maintenance – Wet Mechanical vacuum pumps

- ☐ Service Not Applicable

Yes/No	Interim/Major	Wet Mechanical vacuum pumps
Yes/No	Interim/Major	Description
<input type="checkbox"/> <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	Check for evidence of oil leakage. Check pump gasket for leakage.
<input type="checkbox"/> <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	GC/MS SQ with diffusion pump; drain and replace diffusion pump oil.
<input type="checkbox"/> <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	Drain and replace mechanical pump oil.
<input type="checkbox"/> <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	Replace Oil Mist Filter if applicable.

Yes/No	<input type="checkbox"/>	<input type="checkbox"/>	Wet Mechanical vacuum pumps
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Discuss with customer the need for more frequent oil changes if the oil is dirty
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Don't use mist filter's with Chemical Ionization.
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	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	<input type="checkbox"/>	<input type="checkbox"/>	Dry Mechanical vacuum pumps - Diaphragm
Yes/No	Interim/Major	Description	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Check for evidence of poor vacuum – Turbo power demand, poor manifold vacuum, etc.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Clear air flow paths of dust.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	If vacuum is poor, then replace the diaphragm pump.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	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	<input type="checkbox"/>	<input type="checkbox"/>	Dry Mechanical vacuum pumps - Scroll
Yes/No	Interim/Major	Description	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Replace the tips seal on the IDP pump.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Check for evidence of poor vacuum: – Rough vac pressure, turbopower demand, poor manifold vacuum, etc.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Replace the Exhaust Filter if required.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Discuss with customer the need for more frequent changes, if needed.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Inform customer that pump gas ballast should be installed all the time.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	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 – Cleaning System and Filters

☐ Service Not Applicable

		Cleaning System and Filters			
Yes/No	Interim/Major	Description			
		Fans			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		Remove dust from fans and vent covers.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		Verify fans are functional and that there is enough space around the instrument for proper cooling.
		Source cleaning (all sources except HydroInert)			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Open analyzer and remove the source.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Disassemble, Clean, Re-assemble source. (7200, also, remove and clean entrance lens)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Re-install source and close analyzer.
		HydroInert Source			
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		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			
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Replace RMSH-2 Helium gas filter (collision cell gas) – if applicable.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Replace RMSN-2 Nitrogen gas filter (collision cell gas) – if applicable.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Replace RMSHY-2 Hydrogen gas filter (HydroInert and JetClean) – if applicable.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		CP17973 – Gas Clean GS/MS Filter (for He, N2 or H2 carrier) – if required
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		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)

Interim / Major Preventive Maintenance – System Post Check

☐ Service Not Applicable

System post-check				
Yes/No	Interim	Major	Description	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Pump system back down. Wait until system stability has been achieved.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Verify system vacuum reading(s) via the gauge controller.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Leak Check
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Verify system in manual tune
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Compare against previous tune file report(s)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Change to Tune and verify that all temperatures, pressures, and gas flows reach method set points
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Check manually that you have calibration peaks.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	EI Autotune Performed

Guidance: If the FM 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
------------------	----------------------	--------------------

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:

6006765875

Date of Service Completion:

24 Nov 2023

Service Engineer Name:

Customer Name

Service Engineer Signature:

Total number of pages in this document:

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	5191-5651	✓	✓	✓
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, N ₂ or H ₂) – 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, N ₂ or H ₂ ; Bracket, Mount and Filter – if required	CP17988			✓
# Gas Clean Carrier Gas Kit for 8890 & 8860 for He, N ₂ or H ₂ ; 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 DP-3 (diameter: 60mm)	REPLSLRFILTER2	✓	✓	✓

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			✓

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
El High Temperature Filaments	G7005-60061 Qty 2	597X	7000x	N/A
HES El Filaments	G7002-60001	5977B/C	7010x	N/A
LE-El Filaments (7250 QTOF)	G3850-60021	N/A	N/A	7250
CI High Temperature Filament – SQ, TQ, 7200 QTOF	G7035-60072	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

Ion source insulators for 5973/5975/5977/7000/7010/7200/7250 Series

Part Description	Part Number	SQ	TQ	QTOF
Repeller insulator (SQ, TQ)	G1099-20133 Qty 2	597X	7000x	N/A
Lens insulator for extractor lens (ceramic ring insulator) (Extractor source)	G3870-20445	5977x	7000C/D/E	N/A
Lens insulator for Extractor lens (Vespel ring insulator) (7000B extractor ion source)	G7000-20445	N/A	7000B only	N/A
Lens stack insulator for SS, Inert, Extractor sources (captures ion focus and entrance lens) (Vespel)	G3170-20530	597X	7000x	N/A
Lens insulator for Extractor lens for HES/LEEI (ceramic ring insulator)	G7002-20064	5977B/C	7010x	7250
Lens stack insulator/holder for HES/LEEI (Vespel)	G7002-20074	5977B/C	7010x	7250
CI Repeller Lens Insulator (SQ, TQ)	G1999-20433	597X	70X0x	N/A
CI Lens stack insulator (SQ, TQ) (Vespel)	G3170-20540	597X	70X0x	N/A
Repeller insulator (7200 RIS) (Ceramic)	G7005-20447	N/A	N/A	7200A/B
Extractor Lens Insulator (7200 RIS) (Vespel)	G7005-20133	N/A	N/A	7200A/B
Ion Focus Insulator (7200 RIS) (Vespel)	G7005-20442	N/A	N/A	7200A/B
CI Repeller Insulator/bushing (7200 RIS) (Ceramic)	G7005-20030	N/A	N/A	7200A/B

HydroInert coated lenses for 5977/7000 Series

Part Description	Part Number	SQ	TQ	QTOF
HydroInert Repeller	G7078-20902	5977x	7000C/D/E	N/A
Ext Source Body – HydroInert	G7078-20903	5977x	7000C/D/E	N/A
HydroInert Extractor lens (9mm)	G7078-20909	5977x	7000C/D/E	N/A
Ion Focus Lens – HydroInert	G7078-20905	5977x	7000C/D/E	N/A
Entrance Lens – HydroInert	G7078-20904	5977x	7000C/D/E	N/A

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 – Hydroinert (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)	G70C2-60058	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	8650-3030	597X	70X0	72X0
Gloves, clean, small	8650-0029	597X	70X0	72X0



Teledyne Tekmar ATOMX Purge and Trap
Preventive Maintenance Checklist - Standard

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.
 - o 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 InstrumentGuidance

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.

Teledyne Tekmar ATOMX Purge and Trap
Preventive Maintenance Checklist - Standard



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
Lubricant, Dupont Krytox	15-0293-000	TMR-ATOMX	1
Tubing, Drain, Self Retracting	15-0087-002	TMR-ATOMX	1

Teledyne Tekmar ATOMX Purge and Trap
Preventive Maintenance Checklist - Standard



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.

System Information

Guidance

- ☐ Check this box if an instrument configuration report is attached instead of completing the table.

Instrument system name and ID	ATOMX Purge & Trap
Instrument system site and location	Environment Research & Technology Co., Ltd.
List system component product numbers	List the serial numbers of each component
1. TME-ATOMX	1. VS17013007
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.

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 6006365875 Date service completed 24 Nov 2023

Agilent signature  Customer signature _____

Number of pages in this document _____