

ภาคผนวก ค

หนังสือรับรองผลการตรวจวัดและวิเคราะห์



บริษัท ซีคอต จำกัด
SECOT CO., LTD.

239 ถนนริมคลองประปา แขวงบางซื่อ เขตบางซื่อ กรุงเทพมหานคร 10800

239 RIMKLONGPRAPA ROAD, BANGSUE, BANGKOK 10800, THAILAND

TEL. (662) 959-3600 FAX (662) 959-3535 Website : secot.co.th E-mail : envserv@secot.co.th

GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Kuwait Petroleum Aviation (Thailand) Ltd.	REQUEST SERVICE No.	: 2063/64
	(Feeder Line Project)	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING TIME	: 11:09-11:20
SAMPLING DATE	: 22/09/2021	ANALYTICAL DATE	: 22, 24-30/09/2021
RECEIVED DATE	: 24/09/2021	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 06/10/2021	FILE CODE	: 221100_GW_September
SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS	ND	STATION
		METHODS	(non-detectable)	MW-2
Depth	m	-	-	4.0
Temperature	°C	2550 B	< 0.5	29.3
pH	-	4500-H ⁺ B	< 0.10	4.14
Color	Unit	2120 B	< 5.0	5
Conductivity	µS/cm	2510 B	< 1.0	2,754
Total Dissolved Solids	mg/l	2540 C	< 50	1,870
Total Suspended Solids	mg/l	2540 D	< 5	33

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd ED. 2017 (AWWA, APHA, WEF)

(Miss Khemchuda Insorn)

Analyst

(Mrs. Araya Tipparuk)

Technical Management Team

Remark : 1. Reported analysis refers to submitted sample only.

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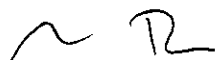
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REPORT DATE	: 06/10/2021	FILE CODE	: 221100_GW_September
SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS	ND	STATION	STANDARD ^{1/}
		METHODS	(non-detectable)	MW-2	
Benzene	mg/l	6200 B	< 0.0002	ND	≤ 0.2
Carbon tetrachloride	mg/l	6200 B	< 0.0002	ND	≤ 0.4
1,2-Dichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.5
Dichloromethane	mg/l	6200 B	< 0.0002	0.0009	≤ 6.0
1,1-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.1
cis-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
trans-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
Ethylbenzene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
Styrene	mg/l	6200 B	< 0.0002	ND	≤ 24
Tetrachloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.9
Toluene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
1,1,1-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.2
1,1,2-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.8
Trichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 4.4
m-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
o-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
p-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
Total Xylenes	mg/l	6200 B	< 0.0006	ND	≤ 24
Vinyl Chloride	mg/l	6200 B	< 0.0005	ND	≤ 0.03

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd ED., 2017 (AWWA, APHA, WEF)

Natsiri L.
(Miss Natsiri Lerterpipat)
Analyst
REG. NO. ๖-239-๖-6423


(Mrs. Araya Tipparuk)
Technical Management Team
REG. NO. ๖-239-๖-5863

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SAMPLE CONDITION	: Normal	FILE CODE	: 221100_GW_September

PARAMETER	UNIT	ANALYSIS	ND	STATION	STANDARD ^{1/}
		METHODS	(non-detectable)	MW-2	
<u>Total Petroleum Hydrocarbons</u>					
- C ₅ -C ₈	mg/l	5030 C/8260 D	< 0.003	ND	≤ 1.4
- Pentane					
- Benzene					
- Toluene					
- m,p-Xylene					
- o-Xylene					
- C ₈ -C ₁₆	mg/l	3510 C/8015 D	< 0.025	ND	≤ 1.7
- n-Nonane					
- n-Decane					
- n-Dodecane					
- n-Tetradecane					
- n-Hexadecane					
- C ₁₆ -C ₃₅	mg/l	3510 C/8015 D	< 0.050	ND	≤ 0.1
- n-Octadecane					
- n-Eicosane					
- n-Docosane					
- n-Tetracosane					
- n-Hexacosane					
- n-Octacosane					
- n-Triacontane					
- n-Dotriacontane					
- n-Tetratriacontane					
- Pentatriacontane					

REFERENCE : US EPA SW 846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE, 3rd ED., 2020

Natsiri L.

(Miss Natsiri Lerterapipat)

Analyst

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SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING DATE	: 22/09/2021	SAMPLING TIME	: 10:38-10:51
RECEIVED DATE	: 24/09/2021	ANALYTICAL DATE	: 22, 24-30/09/2021
REPORT DATE	: 06/10/2021	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 221100_GW_September

PARAMETER	UNIT	ANALYSIS	ND	STATION
		METHODS	(non-detectable)	MW-4
Depth	m	-	-	3.6
Temperature	°C	2550 B	< 0.5	30.3
pH	-	4500-H ⁺ B	< 0.10	6.77
Color	Unit	2120 B	< 5.0	10
Conductivity	µS/cm	2510 B	< 1.0	862
Total Dissolved Solids	mg/l	2540 C	< 50	514
Total Suspended Solids	mg/l	2540 D	< 5	179

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd ED. 2017 (AWWA, APHA, WEF)

(Miss Khemchuda Insorn)

Analyst

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SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS	ND	STATION	STANDARD ^{1/}
		METHODS	(non-detectable)	MW-4	
Benzene	mg/l	6200 B	< 0.0002	ND	≤ 0.2
Carbon tetrachloride	mg/l	6200 B	< 0.0002	ND	≤ 0.4
1,2-Dichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.5
Dichloromethane	mg/l	6200 B	< 0.0002	0.0007	≤ 6.0
1,1-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.1
cis-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
trans-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
Ethylbenzene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
Styrene	mg/l	6200 B	< 0.0002	ND	≤ 24
Tetrachloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.9
Toluene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
1,1,1-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.2
1,1,2-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.8
Trichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 4.4
m-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
o-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
p-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
Total Xylenes	mg/l	6200 B	< 0.0006	ND	≤ 24
Vinyl Chloride	mg/l	6200 B	< 0.0005	ND	≤ 0.03

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd ED. 2017 (AWWA, APHA, WEF)

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(Miss Natsiri Lertterapipat)

Analyst

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(Mrs. Araya Tipparuk)

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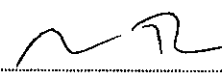
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PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION MW-4	STANDARD ^{1/}
<u>Total Petroleum Hydrocarbons</u>					
- C ₅ -C ₈	mg/l	5030 C/8260 D	< 0.003	ND	≤ 1.4
- Pentane					
- Benzene					
- Toluene					
- m,p-Xylene					
- o-Xylene					
- C ₈ -C ₁₆	mg/l	3510 C/8015 D	< 0.025	ND	≤ 1.7
- n-Nonane					
- n-Decane					
- n-Dodecane					
- n-Tetradecane					
- n-Hexadecane					
- C ₁₆ -C ₃₅	mg/l	3510 C/8015 D	< 0.050	ND	≤ 0.1
- n-Octadecane					
- n-Eicosane					
- n-Docosane					
- n-Tetracosane					
- n-Hexacosane					
- n-Octacosane					
- n-Triacontane					
- n-Dotriacontane					
- n-Tetratriacontane					
- Pentatriacontane					

REFERENCE : US EPA SW 846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE, 3rd ED., 2020

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	(Feeder Line Project)	SAMPLING METHOD	: Pneumatic Bladder Pump
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RECEIVED DATE	: 24/09/2021	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 06/10/2021	FILE CODE	: 221100_GW_September
SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS	ND	STATION
		METHODS	(non-detectable)	MW-6
Depth	m	-	-	3.5
Temperature	°C	2550 B	< 0.5	29.5
pH	-	4500-H ⁺ B	< 0.10	6.67
Color	Unit	2120 B	< 5.0	80
Conductivity	µS/cm	2510 B	< 1.0	1,107
Total Dissolved Solids	mg/l	2540 C	< 50	620
Total Suspended Solids	mg/l	2540 D	< 5	45

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd ED., 2017 (AWWA, APHA, WEF)

(Miss Khemchuda Insorn)

Analyst

(Mrs. Araya Tipparuk)

Technical Management Team

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SAMPLE CONDITION	: Normal	FILE CODE	: 221100_GW_September

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD ^{1/}
				MW-6	
Benzene	mg/l	6200 B	< 0.0002	ND	≤ 0.2
Carbon tetrachloride	mg/l	6200 B	< 0.0002	ND	≤ 0.4
1,2-Dichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.5
Dichloromethane	mg/l	6200 B	< 0.0002	0.0006	≤ 6.0
1,1-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.1
cis-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
trans-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
Ethylbenzene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
Styrene	mg/l	6200 B	< 0.0002	ND	≤ 24
Tetrachloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.9
Toluene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
1,1,1-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.2
1,1,2-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.8
Trichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 4.4
m-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
o-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
p-Xylene	mg/l	6200 B	< 0.0002	0.0003	≤ 24
Total Xylenes	mg/l	6200 B	< 0.0006	ND	≤ 24
Vinyl Chloride	mg/l	6200 B	< 0.0005	ND	≤ 0.03

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd ED., 2017 (AWWA, APHA, WEF)

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Analyst

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PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION MW-6	STANDARD ^{1/}
<u>Total Petroleum Hydrocarbons</u>					
- C ₅ -C ₈	mg/l	5030 C/8260 D	< 0.003	0.023	≤ 1.4
- Pentane					
- Benzene					
- Toluene					
- m,p-Xylene					
- o-Xylene					
- C ₈ -C ₁₆	mg/l	3510 C/8015 D	< 0.025	0.347	≤ 1.7
- n-Nonane					
- n-Decane					
- n-Dodecane					
- n-Tetradecane					
- n-Hexadecane					
- C ₁₆ -C ₃₅	mg/l	3510 C/8015 D	< 0.050	0.082	≤ 0.1
- n-Octadecane					
- n-Eicosane					
- n-Docosane					
- n-Tetracosane					
- n-Hexacosane					
- n-Octacosane					
- n-Triacontane					
- n-Dotriacontane					
- n-Tetratriacontane					
- Pentatriacontane					

REFERENCE: US EPA SW 846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE, 3rd ED., 2020

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TEL. (662) 959-3600 FAX (662) 959-3535 Website : secot.co.th E-mail : envserv@secot.co.th

GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Kuwait Petroleum Aviation (Thailand) Ltd. (Feeder Line Project)	REQUEST SERVICE No.	: 2063/64
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING DATE	: 21/09/2021	SAMPLING TIME	: 11:07-11:20
RECEIVED DATE	: 24/09/2021	ANALYTICAL DATE	: 21, 24-30/09/2021
REPORT DATE	: 06/10/2021	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 221100_GW_September

PARAMETER	UNIT	ANALYSIS	ND	STATION
		METHODS	(non-detectable)	MW-7
Depth	m	-	-	3.0
Temperature	°C	2550 B	< 0.5	31.3
pH	-	4500-H ⁺ B	< 0.10	7.11
Color	Unit	2120 B	< 5.0	35
Conductivity	µS/cm	2510 B	< 1.0	425
Total Dissolved Solids	mg/l	2540 C	< 50	252
Total Suspended Solids	mg/l	2540 D	< 5	14

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd ED., 2017 (AWWA, APHA, WEF)

(Miss Khemchuda Insorn)

Analyst

(Mrs. Araya Tipparuk)

Technical Management Team

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GROUND WATER ANALYSIS REPORT

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	(Feeder Line Project)	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING TIME	: 11:07-11:20
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RECEIVED DATE	: 24/09/2021	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 06/10/2021	FILE CODE	: 221100_GW_September
SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD ^{1/}
				MW-7	
Benzene	mg/l	6200 B	< 0.0002	ND	≤ 0.2
Carbon tetrachloride	mg/l	6200 B	< 0.0002	ND	≤ 0.4
1,2-Dichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.5
Dichloromethane	mg/l	6200 B	< 0.0002	0.0007	≤ 6.0
1,1-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.1
cis-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
trans-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
Ethylbenzene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
Styrene	mg/l	6200 B	< 0.0002	ND	≤ 24
Tetrachloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.9
Toluene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
1,1,1-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.2
1,1,2-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.8
Trichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 4.4
m-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
o-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
p-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
Total Xylenes	mg/l	6200 B	< 0.0006	ND	≤ 24
Vinyl Chloride	mg/l	6200 B	< 0.0005	ND	≤ 0.03

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd ED. 2017 (AWWA, APHA, WEF)

Natsiri L.

(Miss Natsiri Lertterapipat)

Analyst

REG. NO. ๖-239-๖-6423

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ๖-239-๖-5863

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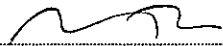
GROUND WATER ANALYSIS REPORT

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REPORT DATE	: 06/10/2021	FILE CODE	: 221100_GW_September
SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION MW-7	STANDARD ^{1/}
<u>Total Petroleum Hydrocarbons</u>					
- C ₅ -C ₈	mg/l	5030 C/8260 D	< 0.003	ND	≤ 1.4
- Pentane					
- Benzene					
- Toluene					
- m,p-Xylene					
- o-Xylene					
- C ₉ -C ₁₆	mg/l	3510 C/8015 D	< 0.025	ND	≤ 1.7
- n-Nonane					
- n-Decane					
- n-Dodecane					
- n-Tetradecane					
- n-Hexadecane					
- C ₁₇ -C ₃₅	mg/l	3510 C/8015 D	< 0.050	ND	≤ 0.1
- n-Octadecane					
- n-Eicosane					
- n-Docosane					
- n-Tetracosane					
- n-Hexacosane					
- n-Octacosane					
- n-Triacontane					
- n-Dotriacontane					
- n-Tetratriacontane					
- Pentatriacontane					

REFERENCE : US EPA SW 846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE. 3rd ED., 2020

Natsiri L.
(Miss Natsiri Lertterapipat)
Analyst
REG. NO. ๖-239-๖-6423


(Mrs. Araya Tipparuk)
Technical Management Team
REG. NO. ๖-239-๖-5863

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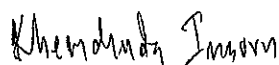
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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Kuwait Petroleum Aviation (Thailand) Ltd. (Feeder Line Project)	REQUEST SERVICE No.	: 2063/64
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING DATE	: 20/09/2021	SAMPLING TIME	: 11:58-12:07
RECEIVED DATE	: 24/09/2021	ANALYTICAL DATE	: 20, 24-30/09/2021
REPORT DATE	: 06/10/2021	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 221100_GW_September

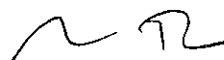
PARAMETER	UNIT	ANALYSIS	ND	STATION
		METHODS	(non-detectable)	MW-8
Depth	m	-	-	4.5
Temperature	°C	2550 B	< 0.5	31.5
pH	-	4500-H ⁺ B	< 0.10	5.89
Color	Unit	2120 B	< 5.0	35
Conductivity	µS/cm	2510 B	< 1.0	4,680
Total Dissolved Solids	mg/l	2540 C	< 50	3,600
Total Suspended Solids	mg/l	2540 D	< 5	94

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd ED. 2017 (AWWA, APHA, WEF)



(Miss Khemchuda Insorn)

Analyst



(Mrs. Araya Tipparuk)

Technical Management Team

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SAMPLE CONDITION	: Normal	FILE CODE	: 221100_GW_September

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD ^{1/}
				MW-8	
Benzene	mg/l	6200 B	< 0.0002	ND	≤ 0.2
Carbon tetrachloride	mg/l	6200 B	< 0.0002	ND	≤ 0.4
1,2-Dichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.5
Dichloromethane	mg/l	6200 B	< 0.0002	0.0008	≤ 6.0
1,1-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.1
cis-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
trans-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
Ethylbenzene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
Styrene	mg/l	6200 B	< 0.0002	ND	≤ 24
Tetrachloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.9
Toluene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
1,1,1-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.2
1,1,2-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.8
Trichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 4.4
m-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
o-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
p-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
Total Xylenes	mg/l	6200 B	< 0.0006	ND	≤ 24
Vinyl Chloride	mg/l	6200 B	< 0.0005	ND	≤ 0.03

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd ED., 2017 (AWWA, APHA, WEF)

Natsiri L.

(Miss Natsiri Lertterapipat)

Analyst

REG. NO. ๓-239-๓-6423

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ๓-239-๓-5863

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REPORT DATE	: 06/10/2021	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 221100_GW_September

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION MW-8	STANDARD ^{1/}
Total Petroleum Hydrocarbons					
- C ₅ -C ₈	mg/l	5030 C/8260 D	< 0.003	ND	≤ 1.4
- Pentane					
- Benzene					
- Toluene					
- m,p-Xylene					
- o-Xylene					
- C ₈ -C ₁₆	mg/l	3510 C/8015 D	< 0.025	ND	≤ 1.7
- n-Nonane					
- n-Decane					
- n-Dodecane					
- n-Tetradecane					
- n-Hexadecane					
- C ₁₆ -C ₃₅	mg/l	3510 C/8015 D	< 0.050	ND	≤ 0.1
- n-Octadecane					
- n-Eicosane					
- n-Docosane					
- n-Tetracosane					
- n-Hexacosane					
- n-Octacosane					
- n-Triacontane					
- n-Dotriacontane					
- n-Tetratriacontane					
- Pentatriacontane					

REFERENCE: US EPA SW 846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE, 3rd ED., 2020

Natsiri L.

(Miss Natsiri Lertterapipat)

Analyst

REG. NO. ๓-239-๓-6423

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SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING DATE	: 21/09/2021	SAMPLING TIME	: 09:56-10:05
RECEIVED DATE	: 24/09/2021	ANALYTICAL DATE	: 21, 24-30/09/2021
REPORT DATE	: 06/10/2021	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 221100_GW_September

PARAMETER	UNIT	ANALYSIS	ND	STATION
		METHODS	(non-detectable)	MW-10
Depth	m	-	-	3.4
Temperature	°C	2550 B	< 0.5	30.8
pH	-	4500-H ⁺ B	< 0.10	6.57
Color	Unit	2120 B	< 5.0	30
Conductivity	µS/cm	2510 B	< 1.0	1,025
Total Dissolved Solids	mg/l	2540 C	< 50	656
Total Suspended Solids	mg/l	2540 D	< 5	93

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd ED., 2017 (AWWA, APHA, WEF)

(Miss Khemchuda Insorn)

Analyst

(Mrs. Araya Tipparuk)

Technical Management Team

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SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD ^{1/}
				MW-10	
Benzene	mg/l	6200 B	< 0.0002	ND	≤ 0.2
Carbon tetrachloride	mg/l	6200 B	< 0.0002	ND	≤ 0.4
1,2-Dichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.5
Dichloromethane	mg/l	6200 B	< 0.0002	0.0006	≤ 6.0
1,1-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.1
cis-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
trans-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
Ethylbenzene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
Styrene	mg/l	6200 B	< 0.0002	ND	≤ 24
Tetrachloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.9
Toluene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
1,1,1-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.2
1,1,2-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.8
Trichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 4.4
m-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
o-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
p-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
Total Xylenes	mg/l	6200 B	< 0.0006	ND	≤ 24
Vinyl Chloride	mg/l	6200 B	< 0.0005	ND	≤ 0.03

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd ED. 2017 (AWWA, APHA, WEF)

Natsiri L.

(Miss Natsiri Lertterapipat)

Analyst

REG. NO. ๓-239-๓-6423

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ๓-239-๓-5863

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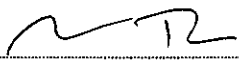
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	(Feeder Line Project)	SAMPLING METHOD	: Pneumatic Bladder Pump
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SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION MW-10	STANDARD ^{1/}
<u>Total Petroleum Hydrocarbons</u>					
- C ₅ -C ₈	mg/l	5030 C/8260 D	< 0.003	ND	≤ 1.4
- Pentane					
- Benzene					
- Toluene					
- m,p-Xylene					
- o-Xylene					
- C ₈ -C ₁₆	mg/l	3510 C/8015 D	< 0.025	ND	≤ 1.7
- n-Nonane					
- n-Decane					
- n-Dodecane					
- n-Tetradecane					
- n-Hexadecane					
- C ₁₆ -C ₃₅	mg/l	3510 C/8015 D	< 0.050	ND	≤ 0.1
- n-Octadecane					
- n-Eicosane					
- n-Docosane					
- n-Tetracosane					
- n-Hexacosane					
- n-Octacosane					
- n-Triacontane					
- n-Dotriacontane					
- n-Tetratriacontane					
- Pentatriacontane					

REFERENCE : US EPA SW 846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE, 3rd ED., 2020

Natsiri L.
(Miss Natsiri Lerterapipat)
Analyst
REG. NO. 2-239-1-6423


(Mrs. Araya Tipparuk)
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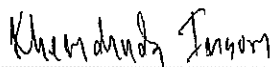
TEL. (662) 959-3600 FAX (662) 959-3535 Website: secot.co.th E-mail: envserv@secot.co.th

GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Kuwait Petroleum Aviation (Thailand) Ltd.	REQUEST SERVICE No.	: 2063/64
	(Feeder Line Project)	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING TIME	: 10:22-10:38
SAMPLING DATE	: 21/09/2021	ANALYTICAL DATE	: 21, 24-30/09/2021
RECEIVED DATE	: 24/09/2021	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 06/10/2021	FILE CODE	: 221100_GW_September
SAMPLE CONDITION	: Normal		


PARAMETER	UNIT	ANALYSIS	ND	STATION
		METHODS	(non-detectable)	MW-16
Depth	m	-	-	4.0
Temperature	°C	2550 B	< 0.5	30.7
pH	-	4500-H ⁺ B	< 0.10	6.71
Color	Unit	2120 B	< 5.0	70
Conductivity	µS/cm	2510 B	< 1.0	401
Total Dissolved Solids	mg/l	2540 C	< 50	243
Total Suspended Solids	mg/l	2540 D	< 5	26

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd ED., 2017 (AWWA, APHA, WEF)



(Miss Khemchuda Insorn)

Analyst



(Mrs. Araya Tipparuk)

Technical Management Team

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REPORT DATE	: 06/10/2021	FILE CODE	: 221100_GW_September
SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD ^{1/}
				MW-16	
Benzene	mg/l	6200 B	< 0.0002	ND	≤ 0.2
Carbon tetrachloride	mg/l	6200 B	< 0.0002	ND	≤ 0.4
1,2-Dichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.5
Dichloromethane	mg/l	6200 B	< 0.0002	0.0019	≤ 6.0
1,1-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.1
cis-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
trans-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
Ethylbenzene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
Styrene	mg/l	6200 B	< 0.0002	ND	≤ 24
Tetrachloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.9
Toluene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
1,1,1-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.2
1,1,2-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.8
Trichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 4.4
m-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
o-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
p-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
Total Xylenes	mg/l	6200 B	< 0.0006	ND	≤ 24
Vinyl Chloride	mg/l	6200 B	< 0.0005	ND	≤ 0.03

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd ED. 2017 (AWWA, APHA, WEF)

Natsiri L.

(Miss Natsiri Lerterapipat)

Analyst

REG. NO. ๓-239-๓-6423

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ๓-239-๓-5863

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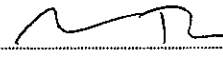
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REPORT DATE	: 06/10/2021	FILE CODE	: 221100_GW_September
SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION MW-16	STANDARD ^{1/}
<u>Total Petroleum Hydrocarbons</u>					
- C ₅ -C ₈	mg/l	5030 C/8260 D	< 0.003	ND	≤ 1.4
- Pentane					
- Benzene					
- Toluene					
- m,p-Xylene					
- o-Xylene					
- C ₈ -C ₁₆	mg/l	3510 C/8015 D	< 0.025	ND	≤ 1.7
- n-Nonane					
- n-Decane					
- n-Dodecane					
- n-Tetradecane					
- n-Hexadecane					
- C ₁₆ -C ₃₅	mg/l	3510 C/8015 D	< 0.050	ND	≤ 0.1
- n-Octadecane					
- n-Eicosane					
- n-Docosane					
- n-Tetracosane					
- n-Hexacosane					
- n-Octacosane					
- n-Triacontane					
- n-Dotriacontane					
- n-Tetratriacontane					
- Pentatriacontane					

REFERENCE : US EPA SW 846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE, 3rd ED., 2020

Natsiri L.
(Miss Natsiri Lerterapipat)
Analyst
REG. NO. ๓-239-๓-6423


(Mrs. Araya Tipparuk)
Technical Management Team
REG. NO. ๓-239-๓-5863

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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Kuwait Petroleum Aviation (Thailand) Ltd. (Feeder Line Project)	REQUEST SERVICE No.	: 2063/64
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING DATE	: 22/09/2021	SAMPLING TIME	: 14:00-14:08
RECEIVED DATE	: 24/09/2021	ANALYTICAL DATE	: 22, 24-30/09/2021
REPORT DATE	: 06/10/2021	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 221100_GW_September

PARAMETER	UNIT	ANALYSIS	ND	STATION
		METHODS	(non-detectable)	GW-1
Depth	m	-	-	3.8
Temperature	°C	2550 B	< 0.5	31.8
pH	-	4500-H ⁺ B	< 0.10	3.56
Color	Unit	2120 B	< 5.0	15
Conductivity	µS/cm	2510 B	< 1.0	6,370
Total Dissolved Solids	mg/l	2540 C	< 50	4,368
Total Suspended Solids	mg/l	2540 D	< 5	27

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd ED., 2017 (AWWA, APHA, WEF)

(Miss Khemchuda Insorn)

Analyst

(Mrs. Araya Tipparuk)

Technical Management Team

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REPORT DATE	: 06/10/2021	FILE CODE	: 221100_GW_September
SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD ^{1/}
				GW-1	
Benzene	mg/l	6200 B	< 0.0002	ND	≤ 0.2
Carbon tetrachloride	mg/l	6200 B	< 0.0002	ND	≤ 0.4
1,2-Dichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.5
Dichloromethane	mg/l	6200 B	< 0.0002	0.0004	≤ 6.0
1,1-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.1
cis-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
trans-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
Ethylbenzene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
Styrene	mg/l	6200 B	< 0.0002	ND	≤ 24
Tetrachloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.9
Toluene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
1,1,1-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.2
1,1,2-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.8
Trichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 4.4
m-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
o-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
p-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
Total Xylenes	mg/l	6200 B	< 0.0006	ND	≤ 24
Vinyl Chloride	mg/l	6200 B	< 0.0005	ND	≤ 0.03

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd ED. 2017 (AWWA, APHA, WEF)

Natsiri L.

(Miss Natsiri Lertterapipat)

Analyst

REG. NO. ๖-239-๖-6423

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ๖-239-๖-5863

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REPORT DATE	: 06/10/2021	FILE CODE	: 221100_GW_September
SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION GW-1	STANDARD ^{1/}
<u>Total Petroleum Hydrocarbons</u>					
- C ₅ -C ₈	mg/l	5030 C/8260 D	< 0.003	ND	≤ 1.4
- Pentane					
- Benzene					
- Toluene					
- m,p-Xylene					
- o-Xylene					
- C ₈ -C ₁₆	mg/l	3510 C/8015 D	< 0.025	ND	≤ 1.7
- n-Nonane					
- n-Decane					
- n-Dodecane					
- n-Tetradecane					
- n-Hexadecane					
- C ₁₆ -C ₃₅	mg/l	3510 C/8015 D	< 0.050	ND	≤ 0.1
- n-Octadecane					
- n-Eicosane					
- n-Docosane					
- n-Tetracosane					
- n-Hexacosane					
- n-Octacosane					
- n-Triacontane					
- n-Dotriacontane					
- n-Tetratriacontane					
- Pentatriacontane					

REFERENCE : US EPA SW 846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE, 3rd ED., 2020

Natsiri L.

(Miss Natsiri Lertterapipat)

Analyst

REG. NO. 7-239-1-6423

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 7-239-1-5863

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GROUND WATER ANALYSIS REPORT

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SAMPLING BY	: SECOT Co., Ltd.	SAMPLING TIME	: 11:28-11:37
SAMPLING DATE	: 20/09/2021	ANALYTICAL DATE	: 20, 24-30/09/2021
RECEIVED DATE	: 24/09/2021	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 06/10/2021	FILE CODE	: 221100_GW_September
SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS	ND	STATION
		METHODS	(non-detectable)	GW-4
Depth	m	-	-	3.5
Temperature	°C	2550 B	< 0.5	30.5
pH	-	4500-H ⁺ B	< 0.10	6.68
Color	Unit	2120 B	< 5.0	270
Conductivity	µS/cm	2510 B	< 1.0	751
Total Dissolved Solids	mg/l	2540 C	< 50	541
Total Suspended Solids	mg/l	2540 D	< 5	22

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd ED., 2017 (AWWA, APHA, WEF)

(Miss Khemchuda Insorn)

Analyst

(Mrs. Araya Tipparuk)

Technical Management Team

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SAMPLE CONDITION	: Normal	FILE CODE	: 221100_GW_September

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD ^{1/}
				GW-4	
Benzene	mg/l	6200 B	< 0.0002	ND	≤ 0.2
Carbon tetrachloride	mg/l	6200 B	< 0.0002	ND	≤ 0.4
1,2-Dichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.5
Dichloromethane	mg/l	6200 B	< 0.0002	0.0004	≤ 6.0
1,1-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.1
cis-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
trans-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
Ethylbenzene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
Styrene	mg/l	6200 B	< 0.0002	ND	≤ 24
Tetrachloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.9
Toluene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
1,1,1-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.2
1,1,2-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.8
Trichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 4.4
m-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
o-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
p-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
Total Xylenes	mg/l	6200 B	< 0.0006	ND	≤ 24
Vinyl Chloride	mg/l	6200 B	< 0.0005	ND	≤ 0.03

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd ED. 2017 (AWWA, APHA, WEF)

Natsiri L.
(Miss Natsiri Lertterapipat)

Analyst

REG. NO. ๖-239-๖-6423

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REPORT DATE	: 06/10/2021	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 221100_GW_September

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION GW-4	STANDARD ^{1/}
Total Petroleum Hydrocarbons					
- C ₅ -C ₈	mg/l	5030 C/8260 D	< 0.003	ND	≤ 1.4
- Pentane					
- Benzene					
- Toluene					
- m,p-Xylene					
- o-Xylene					
- C ₈ -C ₁₆	mg/l	3510 C/8015 D	< 0.025	ND	≤ 1.7
- n-Nonane					
- n-Decane					
- n-Dodecane					
- n-Tetradecane					
- n-Hexadecane					
- C ₁₆ -C ₃₅	mg/l	3510 C/8015 D	< 0.050	ND	≤ 0.1
- n-Octadecane					
- n-Eicosane					
- n-Docosane					
- n-Tetracosane					
- n-Hexacosane					
- n-Octacosane					
- n-Triacontane					
- n-Dotriacontane					
- n-Tetracontane					
- n-Pentatriacontane					

REFERENCE : US EPA SW 846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE, 3rd ED., 2020

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(Miss Natsiri Lertterapipat)

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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Kuwait Petroleum Aviation (Thailand) Ltd. (Feeder Line Project)	REQUEST SERVICE No.	: 2063/64
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING DATE	: 20/09/2021	SAMPLING TIME	: 10:45-11:02
RECEIVED DATE	: 24/09/2021	ANALYTICAL DATE	: 20, 24-30/09/2021
REPORT DATE	: 06/10/2021	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 221100_GW_September

PARAMETER	UNIT	ANALYSIS	ND	STATION
		METHODS	(non-detectable)	GW-5
Depth	m	-	-	2.8
Temperature	°C	2550 B	< 0.5	29.9
pH	-	4500-H ⁺ B	< 0.10	6.52
Color	Unit	2120 B	< 5.0	180
Conductivity	µS/cm	2510 B	< 1.0	250
Total Dissolved Solids	mg/l	2540 C	< 50	192
Total Suspended Solids	mg/l	2540 D	< 5	8

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd ED. 2017 (AWWA, APHA, WEF)

(Miss Khemchuda Insorn)

Analyst

(Mrs. Araya Tipparuk)

Technical Management Team

- Remark :** 1. Reported analysis refers to submitted sample only.
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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Kuwait Petroleum Aviation (Thailand) Ltd.	REQUEST SERVICE No.	: 2063/64
	(Feeder Line Project)	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING TIME	: 10:45-11:02
SAMPLING DATE	: 20/09/2021	ANALYTICAL DATE	: 30/09/2021 - 01/10/2021
RECEIVED DATE	: 24/09/2021	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 06/10/2021	FILE CODE	: 221100_GW_September
SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD ^{1/}
				GW-5	
Benzene	mg/l	6200 B	< 0.0002	ND	≤ 0.2
Carbon tetrachloride	mg/l	6200 B	< 0.0002	ND	≤ 0.4
1,2-Dichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.5
Dichloromethane	mg/l	6200 B	< 0.0002	0.0007	≤ 6.0
1,1-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.1
cis-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
trans-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
Ethylbenzene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
Styrene	mg/l	6200 B	< 0.0002	ND	≤ 24
Tetrachloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.9
Toluene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
1,1,1-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.2
1,1,2-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.8
Trichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 4.4
m-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
o-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
p-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
Total Xylenes	mg/l	6200 B	< 0.0006	ND	≤ 24
Vinyl Chloride	mg/l	6200 B	< 0.0005	ND	≤ 0.03

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd ED., 2017 (AWWA, APHA, WEF)

Natsiri L.

(Miss Natsiri Lertterapipat)

Analyst

REG. NO. 3-239-ก-6423

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 3-239-ก-5863

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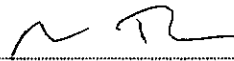
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REPORT DATE	: 06/10/2021	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 221100_GW_September

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD ^{1/}
				GW-5	
<u>Total Petroleum Hydrocarbons</u>					
- C ₅ -C ₈	mg/l	5030 C/8260 D	< 0.003	ND	≤ 1.4
- Pentane					
- Benzene					
- Toluene					
- m,p-Xylene					
- o-Xylene					
-C ₈ -C ₁₆	mg/l	3510 C/8015 D	< 0.025	ND	≤ 1.7
- n-Nonane					
- n-Decane					
- n-Dodecane					
- n-Tetradecane					
- n-Hexadecane					
-C ₁₆ -C ₃₅	mg/l	3510 C/8015 D	< 0.050	ND	≤ 0.1
- n-Octadecane					
- n-Eicosane					
- n-Docosane					
- n-Tetracosane					
- n-Hexacosane					
- n-Octacosane					
- n-Triacontane					
- n-Dotriacontane					
- n-Tetratriacontane					
- Pentatriacontane					

REFERENCE : US EPA SW 846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE. 3rd ED., 2020

Natsiri L.
(Miss Natsiri Lerterapipat)
Analyst
REG. NO. ๖-239-๖-6423


(Mrs. Araya Tipparuk)
Technical Management Team
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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Kuwait Petroleum Aviation (Thailand) Ltd.	REQUEST SERVICE No.	: 2063/64
	(Feeder Line Project)	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING TIME	: 10:00-10:11
SAMPLING DATE	: 20/09/2021	ANALYTICAL DATE	: 20, 24-30/09/2021
RECEIVED DATE	: 24/09/2021	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 06/10/2021	FILE CODE	: 221100_GW_September
SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS	ND	STATION
		METHODS	(non-detectable)	GW-8
Depth	m	-	-	3.1
Temperature	°C	2550 B	< 0.5	30.7
pH	-	4500-H ⁺ B	< 0.10	6.71
Color	Unit	2120 B	< 5.0	35
Conductivity	µS/cm	2510 B	< 1.0	220
Total Dissolved Solids	mg/l	2540 C	< 50	159
Total Suspended Solids	mg/l	2540 D	< 5	13

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd ED. 2017 (AWWA APHA WEF)

(Miss Khemchuda Insorn)

Analyst

(Mrs. Araya Tipparak)

Technical Management Team

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REPORT DATE	: 06/10/2021	FILE CODE	: 221100_GW_September
SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD ^{1/}
				GW-8	
Benzene	mg/l	6200 B	< 0.0002	ND	≤ 0.2
Carbon tetrachloride	mg/l	6200 B	< 0.0002	ND	≤ 0.4
1,2-Dichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.5
Dichloromethane	mg/l	6200 B	< 0.0002	0.0004	≤ 6.0
1,1-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.1
cis-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
trans-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
Ethylbenzene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
Styrene	mg/l	6200 B	< 0.0002	ND	≤ 24
Tetrachloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.9
Toluene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
1,1,1-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.2
1,1,2-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.8
Trichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 4.4
m-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
o-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
p-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
Total Xylenes	mg/l	6200 B	< 0.0006	ND	≤ 24
Vinyl Chloride	mg/l	6200 B	< 0.0005	ND	≤ 0.03

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd ED., 2017 (AWWA, APHA, WEF)

Natsiri L.

(Miss Natsiri Lertterapipat)

Analyst

REG. NO. ๓-239-๖-6423

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ๓-239-๖-5863

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SAMPLING DATE	: 20/09/2021	SAMPLING TIME	: 10:00-10:11
RECEIVED DATE	: 24/09/2021	ANALYTICAL DATE	: 28/09/2021-02/10/2021
REPORT DATE	: 06/10/2021	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 221100_GW_September

PARAMETER	UNIT	ANALYSIS METHODS	ND	STATION	STANDARD ^{1/}
			(non-detectable)	GW-8	
<u>Total Petroleum Hydrocarbons</u>					
- C ₅ -C ₈	mg/l	5030 C/8260 D	< 0.003	ND	≤ 1.4
- Pentane					
- Benzene					
- Toluene					
- m,p-Xylene					
- o-Xylene					
-C _{>8} -C ₁₆	mg/l	3510 C/8015 D	< 0.025	ND	≤ 1.7
- n-Nonane					
- n-Decane					
- n-Dodecane					
- n-Tetradecane					
- n-Hexadecane					
-C _{>16} -C ₃₅	mg/l	3510 C/8015 D	< 0.050	ND	≤ 0.1
- n-Octadecane					
- n-Eicosane					
- n-Docosane					
- n-Tetracosane					
- n-Hexacosane					
- n-Octacosane					
- n-Triacontane					
- n-Dotriacontane					
- n-Tetratriacontane					
- Pentatriacontane					

REFERENCE: US EPA SW 846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE 3rd ED., 2020

Natsiri L.

(Miss Natsiri Lertterapipat)

Analyst

REG. NO. ๖-239-๖-6423

(Mrs. Araya Tipparuk)

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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Kuwait Petroleum Aviation (Thailand) Ltd. (Feeder Line Project)	REQUEST SERVICE No.	: 2063/64
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING DATE	: 22/09/2021	SAMPLING TIME	: 14:41-14:55
RECEIVED DATE	: 24/09/2021	ANALYTICAL DATE	: 22, 24-30/09/2021
REPORT DATE	: 06/10/2021	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 221100_GW_September

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION
				GW-11
Depth	m	-	-	2.8
Temperature	°C	2550 B	< 0.5	30.6
pH	-	4500-H ⁺ B	< 0.10	6.61
Color	Unit	2120 B	< 5.0	25
Conductivity	µS/cm	2510 B	< 1.0	847
Total Dissolved Solids	mg/l	2540 C	< 50	474
Total Suspended Solids	mg/l	2540 D	< 5	102

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd ED. 2017 (AWWA, APHA, WEF)

(Miss Khemchuda Insorn)

Analyst

(Mrs. Araya Tipparuk)

Technical Management Team

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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Kuwait Petroleum Aviation (Thailand) Ltd.	REQUEST SERVICE No.	: 2063/64
	(Feeder Line Project)	SAMPLING METHOD	: Pneumatic Bladder Pump
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RECEIVED DATE	: 24/09/2021	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 06/10/2021	FILE CODE	: 221100_GW_September
SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD ^{1/}
				GW-11	
Benzene	mg/l	6200 B	< 0.0002	ND	≤ 0.2
Carbon tetrachloride	mg/l	6200 B	< 0.0002	ND	≤ 0.4
1,2-Dichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.5
Dichloromethane	mg/l	6200 B	< 0.0002	0.0008	≤ 6.0
1,1-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.1
cis-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
trans-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
Ethylbenzene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
Styrene	mg/l	6200 B	< 0.0002	ND	≤ 24
Tetrachloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.9
Toluene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
1,1,1-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.2
1,1,2-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.8
Trichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 4.4
m-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
o-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
p-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
Total Xylenes	mg/l	6200 B	< 0.0006	ND	≤ 24
Vinyl Chloride	mg/l	6200 B	< 0.0005	ND	≤ 0.03

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd ED. 2017 (AWWA, APHA, WEF)

Natsiri L.

(Miss Natsiri Lertterapipat)

Analyst

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(Mrs. Araya Tipparuk)

Technical Management Team

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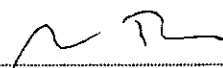
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SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION GW-11	STANDARD ^{1/}
<u>Total Petroleum Hydrocarbons</u>					
- C ₅ -C ₈	mg/l	5030 C/8260 D	< 0.003	ND	≤ 1.4
- Pentane					
- Benzene					
- Toluene					
- m,p-Xylene					
- o-Xylene					
- C ₈ -C ₁₆	mg/l	3510 C/8015 D	< 0.025	ND	≤ 1.7
- n-Nonane					
- n-Decane					
- n-Dodecane					
- n-Tetradecane					
- n-Hexadecane					
- C ₁₆ -C ₃₅	mg/l	3510 C/8015 D	< 0.050	ND	≤ 0.1
- n-Octadecane					
- n-Eicosane					
- n-Docosane					
- n-Tetracosane					
- n-Hexacosane					
- n-Octacosane					
- n-Triacontane					
- n-Dotriacontane					
- n-Tetratriacontane					
- Pentatriacontane					

REFERENCE : US EPA SW 846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE, 3rd ED., 2020

Natsiri L.
(Miss Natsiri Lerterapipat)
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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Kuwait Petroleum Aviation (Thailand) Ltd. (Feeder Line Project)	REQUEST SERVICE No.	: 2063/64
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING DATE	: 22/09/2021	SAMPLING TIME	: 11:39-11:52
RECEIVED DATE	: 24/09/2021	ANALYTICAL DATE	: 22, 24-30/09/2021
REPORT DATE	: 06/10/2021	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 221100_GW_September

PARAMETER	UNIT	ANALYSIS	ND	STATION
		METHODS	(non-detectable)	GW-17
Depth	m	-	-	3.0
Temperature	°C	2550 B	< 0.5	32.4
pH	-	4500-H ⁺ B	< 0.10	4.43
Color	Unit	2120 B	< 5.0	< 5
Conductivity	µS/cm	2510 B	< 1.0	4,734
Total Dissolved Solids	mg/l	2540 C	< 50	3,196
Total Suspended Solids	mg/l	2540 D	< 5	42

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd ED., 2017 (AWWA, APHA, WEF)

(Miss Khemchuda Insorn)

Analyst

(Mrs. Araya Tipparuk)

Technical Management Team

Remark : 1. Reported analysis refers to submitted sample only.

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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Kuwait Petroleum Aviation (Thailand) Ltd. (Feeder Line Project)	REQUEST SERVICE No.	: 2063/64
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING DATE	: 22/09/2021	SAMPLING TIME	: 11:39-11:52
RECEIVED DATE	: 24/09/2021	ANALYTICAL DATE	: 30/09/2021 - 01/10/2021
REPORT DATE	: 06/10/2021	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 221100_GW_September

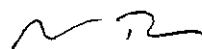
PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD ^{1/}
				GW-17	
Benzene	mg/l	6200 B	< 0.0002	ND	≤ 0.2
Carbon tetrachloride	mg/l	6200 B	< 0.0002	ND	≤ 0.4
1,2-Dichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.5
Dichloromethane	mg/l	6200 B	< 0.0002	0.0004	≤ 6.0
1,1-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.1
cis-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
trans-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
Ethylbenzene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
Styrene	mg/l	6200 B	< 0.0002	ND	≤ 24
Tetrachloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.9
Toluene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
1,1,1-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.2
1,1,2-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.8
Trichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 4.4
m-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
o-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
p-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
Total Xylenes	mg/l	6200 B	< 0.0006	ND	≤ 24
Vinyl Chloride	mg/l	6200 B	< 0.0005	ND	≤ 0.03

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd ED., 2017 (AWWA, APHA, WEF)

Natsiri L.
(Miss Natsiri Lertterapipat)

Analyst

REG. NO. 2-239-ก-6423


(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 2-239-ก-5863

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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Kuwait Petroleum Aviation (Thailand) Ltd.	REQUEST SERVICE No.	: 2063/64
	(Feeder Line Project)	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING TIME	: 11:39-11:52
SAMPLING DATE	: 22/09/2021	ANALYTICAL DATE	: 28/09/2021-02/10/2021
RECEIVED DATE	: 24/09/2021	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 06/10/2021	FILE CODE	: 221100_GW_September
SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION GW-17	STANDARD ^{1/}
Total Petroleum Hydrocarbons					
- C ₅ -C ₈	mg/l	5030 C/8260 D	< 0.003	ND	≤ 1.4
- Pentane					
- Benzene					
- Toluene					
- m,p-Xylene					
- o-Xylene					
- C ₈ -C ₁₆	mg/l	3510 C/8015 D	< 0.025	ND	≤ 1.7
- n-Nonane					
- n-Decane					
- n-Dodecane					
- n-Tetradecane					
- n-Hexadecane					
- C ₁₆ -C ₃₅	mg/l	3510 C/8015 D	< 0.050	ND	≤ 0.1
- n-Octadecane					
- n-Eicosane					
- n-Docosane					
- n-Tetracosane					
- n-Hexacosane					
- n-Octacosane					
- n-Triacontane					
- n-Dotriacontane					
- n-Tetratriacontane					
- Pentatriacontane					

REFERENCE : US EPA SW 846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE, 3rd ED., 2020

Natsiri L.

(Miss Natsiri Lerterapipat)

Analyst

REG. NO. ๖-239-๖-6423

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ๖-239-๖-5863

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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Kuwait Petroleum Aviation (Thailand) Ltd. (Feeder Line Project)	REQUEST SERVICE No.	: 2063/64
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING DATE	: 24/09/2021	SAMPLING TIME	: 09.30
RECEIVED DATE	: 24/09/2021	ANALYTICAL DATE	: 24-30/10/2021
REPORT DATE	: 06/10/2021	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 221100_GW_September

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION
				บ่อน้ำบาดาลบริเวณชุมชนบ้านทุ่ง
Temperature	°C	2550 B	< 0.5	29.0
pH	-	4500-H ⁺ B	< 0.10	6.63
Color	Unit	2120 B	< 5.0	< 5
Conductivity	µS/cm	2510 B	< 1.0	1,058
Total Dissolved Solids	mg/l	2540 C	< 50	667
Total Suspended Solids	mg/l	2540 D	< 5	< 5

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd ED., 2017 (AWWA, APHA, WEF)

(Miss Khemchuda Insorn)

Analyst

(Mrs. Araya Tipparuk)

Technical Management Team

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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Kuwait Petroleum Aviation (Thailand) Ltd.	REQUEST SERVICE No.	: 2063/64
	(Feeder Line Project)	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING TIME	: 09.30
SAMPLING DATE	: 24/09/2021	ANALYTICAL DATE	: 30/09/2021 - 01/10/2021
RECEIVED DATE	: 24/09/2021	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 06/10/2021	FILE CODE	: 221100_GW_September
SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD ^{1/}
				บ่อน้ำบาดาลบริเวณชุมชนบ้านทุ่ง	
Benzene	mg/l	6200 B	< 0.0002	ND	≤ 0.2
Carbon tetrachloride	mg/l	6200 B	< 0.0002	ND	≤ 0.4
1,2-Dichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.5
Dichloromethane	mg/l	6200 B	< 0.0002	0.0010	≤ 6.0
1,1-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.1
cis-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
trans-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
Ethylbenzene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
Styrene	mg/l	6200 B	< 0.0002	ND	≤ 24
Tetrachloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.9
Toluene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
1,1,1-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.2
1,1,2-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.8
Trichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 4.4
m-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
o-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
p-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
Total Xylenes	mg/l	6200 B	< 0.0006	ND	≤ 24
Vinyl Chloride	mg/l	6200 B	< 0.0005	ND	≤ 0.03

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd ED. 2017 (AWWA, APHA, WEF)

Natsiri L.

(Miss Natsiri Lertterapipat)

Analyst

REG. NO. ๖-239-๖-6423

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ๖-239-๖-5863

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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Kuwait Petroleum Aviation (Thailand) Ltd.	REQUEST SERVICE No.	: 2063/64
	(Feeder Line Project)	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING TIME	: 09.30
SAMPLING DATE	: 24/09/2021	ANALYTICAL DATE	: 28/09/2021-02/10/2021
RECEIVED DATE	: 24/09/2021	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 06/10/2021	FILE CODE	: 221100_GW_September
SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION บ่อน้ำบาดาลบริเวณชุมชนบ้านทุ่ง	STANDARD ^{1/}
Total Petroleum Hydrocarbons					
- C ₅ -C ₈	mg/l	5030 C/8260 D	< 0.003	ND	≤ 1.4
- Pentane					
- Benzene					
- Toluene					
- m,p-Xylene					
- o-Xylene					
- C ₈ -C ₁₆	mg/l	3510 C/8015 D	< 0.025	ND	≤ 1.7
- n-Nonane					
- n-Decane					
- n-Dodecane					
- n-Tetradecane					
- n-Hexadecane					
- C ₁₆ -C ₃₅	mg/l	3510 C/8015 D	< 0.050	ND	≤ 0.1
- n-Octadecane					
- n-Eicosane					
- n-Docosane					
- n-Tetracosane					
- n-Hexacosane					
- n-Octacosane					
- n-Triacontane					
- n-Dotriacontane					
- n-Tetratriacontane					
- Pentatriacontane					

REFERENCE : US EPA SW 846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE. 3rd ED., 2020

Natsiri L.
(Miss Natsiri Lertterapipat)
Analyst
REG. NO. ๖-239-๖-6423


(Mrs. Araya Tipparuk)
Technical Management Team
REG. NO. ๖-239-ก-5863

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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Kuwait Petroleum Aviation (Thailand) Ltd. (Feeder Line Project)	REQUEST SERVICE No.	: 2063/64
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING DATE	: 24/09/2021	SAMPLING TIME	: 09.50
RECEIVED DATE	: 24/09/2021	ANALYTICAL DATE	: 24-30/10/2021
REPORT DATE	: 06/10/2021	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 221100_GW_September

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION
				บ่อน้ำบาดาลบริเวณวัดใหม่เนินพยอม
Temperature	°C	2550 B	< 0.5	29.6
pH	-	4500-H ⁺ B	< 0.10	6.88
Color	Unit	2120 B	< 5.0	< 5
Conductivity	μS/cm	2510 B	< 1.0	976
Total Dissolved Solids	mg/l	2540 C	< 50	699
Total Suspended Solids	mg/l	2540 D	< 5	< 5

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd ED. 2017 (AWWA, APHA, WEF)

(Miss Khemchuda Insorn)

Analyst

(Mrs. Araya Tipparuk)

Technical Management Team

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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Kuwait Petroleum Aviation (Thailand) Ltd. (Feeder Line Project)	REQUEST SERVICE No	: 2063/64
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Pneumatic Bladder Pump
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REPORT DATE	: 06/10/2021	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 221100_GW_September

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD ^{1/}
				บ่อน้ำบาดาลบริเวณวัดใหม่เนินพยอม	
Benzene	mg/l	6200 B	< 0.0002	ND	≤ 0.2
Carbon tetrachloride	mg/l	6200 B	< 0.0002	ND	≤ 0.4
1,2-Dichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.5
Dichloromethane	mg/l	6200 B	< 0.0002	0.0021	≤ 6.0
1,1-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.1
cis-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
trans-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
Ethylbenzene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
Styrene	mg/l	6200 B	< 0.0002	ND	≤ 24
Tetrachloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.9
Toluene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
1,1,1-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.2
1,1,2-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.8
Trichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 4.4
m-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
o-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
p-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
Total Xylenes	mg/l	6200 B	< 0.0006	ND	≤ 24
Vinyl Chloride	mg/l	6200 B	< 0.0005	ND	≤ 0.03

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd ED., 2017 (AWWA, APHA, WEF)

Natsiri L.

(Miss Natsiri Lertterapipat)

Analyst

REG. NO. ว-239-ท-6423

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ว-239-ท-5863

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REPORT DATE	: 06/10/2021	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 221100_GW_September

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION บ่อน้ำบาดาลบริเวณวัดใหม่เนินพยอม	STANDARD ¹⁾
<u>Total Petroleum Hydrocarbons</u>					
- C ₅ -C ₈	mg/l	5030 C/8260 D	< 0.003	ND	≤ 1.4
- Pentane					
- Benzene					
- Toluene					
- m,p-Xylene					
- o-Xylene					
- C ₈ -C ₁₆	mg/l	3510 C/8015 D	< 0.025	ND	≤ 1.7
- n-Nonane					
- n-Decane					
- n-Dodecane					
- n-Tetradecane					
- n-Hexadecane					
- C ₁₆ -C ₃₅	mg/l	3510 C/8015 D	< 0.050	ND	≤ 0.1
- n-Octadecane					
- n-Eicosane					
- n-Docosane					
- n-Tetracosane					
- n-Hexacosane					
- n-Octacosane					
- n-Triacontane					
- n-Dotriacontane					
- n-Tetratriacontane					
- Pentatriacontane					

REFERENCE : US EPA SW 846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE 3rd ED., 2020

Natsiri L.

(Miss Natsiri Lerterapipat)

Analyst

REG. NO. 2-239-จ-6423

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 2-239-ค-5863

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ใบแสดงการตรวจเทียบเครื่องมือตรวจวัดและวิเคราะห์

CAL

Calibratech Co.,Ltd.

7/106-7 Moo 2, Sukhaphachan 3 Rd., Bangpoo, Pakkred, Nonthaburi 11120

Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech.cal@yahoo.com, calibratech.cal@hotmail.com



NSG-TIS-TIS17025
CALIBRATION 0030

Certificate of Calibration

Certificate No. : 64-420032-1

Page : 1 of 2

Submitted by : Secot Co.,Ltd.

239 RimKlongprapa Road, Bangsue, Bangkok 10800 Thailand

Equipment : pH Meter with electrode

pH meter

Manufacturer : Mettler Toledo Model : Seven2Go S2

Range : N/A pH Resolution : 0.01 pH

Serial No. : B924795409 ID No. : N/A

Electrode

Model : InLab Expert Go-ISM Serial No. : 0436432

Environment : Ambient Temperature : (25 ± 2) °C

Relative Humidity : (50 ± 15) %

Date of Received : 15 February 2021

Date of Calibration : 17 February 2021

Date of Issue : 17 February 2021

Calibrated by : Bunjerd Masri

Calibration Method : In-house method CAL-M4201 direct measurement by using standard voltage calibrator and using certified reference material (CRM)


Reference Standard Instruments : This certification is traceable to the International System of Units

1. Multiproduct Calibrator

ID No.	Cert. No.	Due Date	Traceability
400005	E1U190739	31 Aug 2021	National Institute of Metrology Thailand (NIMT)

2. Standard Buffer Solution

pH	Cert. No.	Lot No.	Exp. Date	Traceability
4.004	61208711	684575	10 Apr 2021	CPA chem
6.985	61191143	684576	10 Apr 2021	CPA chem
9.963	61208865	684577	10 Apr 2021	CPA chem

Approved by : 
(Bunjerd Masri)
Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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CAL-F0031-03

CAL

Calibratech Co.,Ltd.

7/106-7 Moo 2, Sukhaphachan 3 Rd., Bangpoo, Pakkred, Nonthaburi 11120

Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech.cal@yahoo.com, calibratech.cal@hotmail.com

Certificate of Calibration

Certificate No. : 64-420032-1

Page : 2 of 2

Result of Calibration :

UUC Condition As-Received : Good

Function : Electrical measurement

pH meter

Performing standard curve by Multiproduct Calibrator at pH (4,7,10)

Adjustment Curve at nominal pH	Applied Voltage (mV)	Nominal Value (pH)	UUC Reading		Correction (mV)	Uncertainty (± mV)
			(pH)	(mV)		
4, 7, 10	177.4800	4	4.00	177	0	0.58
	0.0000	7	7.00	0	0	0.58
	-177.4800	10	10.00	-178	1	0.58

Function : pH meter with electrode

Performing a three - buffer standard curve using buffer nominal pH (4,7,10)

Adjustment Curve at nominal pH	Standard Buffer (pH)	UUC Reading (pH)	Correction (pH)	Uncertainty (± pH)
4, 7, 10	4.004	4.00	0.00	0.011
	6.985	7.00	-0.01	0.020
	9.963	10.00	-0.04	0.053

Remark

UUC : Unit Under Calibration

This result of calibration was found accurate as shown on date and place of calibration only.

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%

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CAL-F0031-03



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)

CALIBRATION AND TESTING EQUIPMENT SERVICES

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

TEL. 0-2717-3000-24 FAX. 0-2719-9484

Cert.No.: 20CH1949

Page.: 1 of 2

Certificate of Calibration

Equipment : Conductivity Meter
Manufacturer : Hanna
Model : HI98192
Serial No. : 04510019101
ID No. : 220112
Condition As-Received: Used Item
Received Date : 22 December 2020
Calibration Date : 23 December 2020
Reference : 2012-0683DN-2
Submitted by : Secot Co.,Ltd.
239 Rimklongprapa Road,
Bangsue, Bangkok 10800
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 reference material (RM)
Calibrated by : Walaiak Sirithan
Approved by :
(/) Malee Butkruea
() Sathip Meangmai
() Warakorn Lemgagtrakul
Issue Date : 28 December 2020

The Uncertainties are for a confidence probability of approximately 95%.

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Cert.No.: 20CH1949

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	1963878	130RC095	2011119	15 Sep 2021

This certification is traceable to the International System of Unit maintained at:-

- Traceable to National Institute of Metrology (Thailand), NIMT

2. Certified Reference Materials :-

- Conductivity calibration solution, Thermo Scientific (traceable to NIST)

Conductivity Solution	Manufacturer	Lot No.	Exp. date
100 $\mu\text{S/cm}$	Thermo Scientific	110/01	10 Mar 2021
1.413 mS/cm	Thermo Scientific	060/01	07 Feb 2023
12.88 mS/cm	Thermo Scientific	100/01	05 Mar 2023

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

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

Calibration results

Function : Conductivity Measurement

(*) After Adjustment at 1.413, 12.88 mS/cm

Conductivity Electrode Serial No.: TH 123161

Standard Conductivity Solution	Before Adjustment UUC* Reading	After Adjustment UUC* Reading	Uncertainty of Measurement (\pm)	Coverage factor k
100 $\mu\text{S/cm}$	105.3 $\mu\text{S/cm}$	106.0 $\mu\text{S/cm}$	5.1 $\mu\text{S/cm}$	2.00
1.413 mS/cm	1.400 mS/cm	1.412 mS/cm	0.015 mS/cm	2.00
12.88 mS/cm	13.57 mS/cm	12.87 mS/cm	0.14 mS/cm	2.00

Remark - UUC* = Unit Under Calibration

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k , providing a level of confidence of approximately 95 %.

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a 1035260

A 0006104

7890 GC
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 GC Support please visit our web site using the following URL:

<http://www.agilent.com/en-us/products/gas-chromatography/gc-systems/7890b-gc#support>

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 sections 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.

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.

7890 GC
Preventive Maintenance Checklist – Standard



System Information

Guidance

- Check this box if an instrument configuration report is attached instead of completing the table.

Instrument system name and ID	CN13201053
Instrument system site and location	SECOT, Bangkok
List system component product numbers	List the serial numbers of each component
1. G9440A	1. CN13201053
2. G4519A	2. CN13201096
3. G4514A	3. CN13230031
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.
- 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.

7890 GC

Preventive Maintenance Checklist – Standard



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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 removed 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
- ☒ Check for correct operation of syringe volume settings.



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7890 GC

Preventive Maintenance Checklist – Standard

Restore Instrument

- ☒ Restore the normal operating conditions or customer method using the Keyboard 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.

Guidance

If the PM Service is performed prior to a qualification service, then use the qualification procedure as a guide for final instrument set up and checkout.

7890 GC
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 Review 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.
- ☐ Please ask the customer if they would like to have Smart Alerts installed on their computer.

7890 GC Test Results Table

Detector Signal Outputs	Before PM service	After PM service
Front detector output	N/A	N/A
Back detector output	S	S
AUX detector output		
Pressure decay test:	Expected result	Actual result or N/A
Front inlet pressure decay test	Pass	Pass
Back inlet pressure decay test	Pass	N/A

7890 GC
Preventive Maintenance Checklist – Standard



7890 GC 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	Models 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	N/A
SSL Capillary Ultra Inert Inlet Gold Seal with Washer	5190-6144	7890A/B	
SSL Capillary Ultra Inert Inlet Splitless Liner - Single taper with Glass Wool	5190-2293	7890A/B	
SSL Capillary Ultra Inert Inlet Low Pressure Drop Split Liner - with Glass Wool	5190-2295	7890A/B	
PP Inlet PM kit	5188-6498	7890A/B	
Split vent trap PM kit, single cartridge (for MMI, PTV & VI)	5188-6495	7890A/B	
MMI Cleaning Kit	G3510-60820	7890A/B	
PTV Septumless Head Rebuild Kit	5182-9747	7890A/B	
PTV Septumless Head Teflon Guide	5182-9748	7890A/B	
Ignitor (glow plug) assembly with O-ring	19231-60850	7890A/B	
FID Collector Rebuild/Cleaning Kit	G1531-67000	7890A/B	
FID Collector Replacement Kit	G1531-67001	7890A/B	
FID Jet, universal fit, 0.011 inch ID*	5200-0176	7890A/B	
FID Jet, universal fit, 0.018 inch ID*	5200-0177	7890A/B	
Jet, Adapt, wide bore packed, 0.76mm ID*	18789-80070	7890A/B	

*Note: the legacy versions of FID and NPD jets have become obsolete on February 1, 2020 and replaced by the new FID and NPD universal jets. Please refer to service note 7890 Series GC-057 for the detailed information.

7890 GC
Preventive Maintenance Checklist - Standard



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

- ☐ 7890 GC manual "Maintaining Your GC" - http://www.agilent.com/cs/library/usermanuals/public/G3430-90052%207890B_Maintaining%20Guide.pdf
- ☐ Need to know more? - <http://www.agilent.com/crosslab/university/>
- ☐ Need supplies? - www.agilent.com/chem/supplies

Service Completion

Service request number 6004419083 Date service completed 12 Mar 2021

Agilent signature Sgt N. Customer signature Nalsiri L.

Document part number: G3430-90004

Agilent GC/MS Preventive Maintenance Checklist



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Select the appropriate PM to be done and then perform the checklist under that section.

- ☐ Interim Preventive Maintenance 6 months
- ☒ Major Preventive Maintenance Yearly

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

Definition of the Task/Recommended Items within the document.

Task	Recommended	
Yes	No	Interim/Major/As needed
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Yes selected means that the task was done or the part was required.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> No selected means that the task was not done or the part was required.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Means that this task is recommended to be done at 6-month intervals.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> 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.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> As needed means that the task was done or the part was used as needed. Could be two type of filters could be used and this was the one which was selected.

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>

Agilent GC/MS Preventive Maintenance Checklist

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 listed in the Parts Lists section of this document, are not 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 Responsibilities

- Print out all pages of the document and complete sections that relate to the system being installed.
- Complete empty fields with the relevant information.
- Complete the relevant checkboxes in the checklist using X or tick mark ✓ in the checkbox.
- Check the Not Applicable check boxes or specify N/A (where appropriate) to indicate optional services not delivered.
- Complete the Service Review and Service Completion sections together with the customer.

Additional Instruction Notes

Preventive maintenance is a factory recommended procedure designed to reduce the likelihood of electro-mechanical 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.

Agilent GC/MS Preventive Maintenance Checklist

System Information

System Name and ID	System Site and Location
U513343B01	SECOT / Bangkok

System Components

- ☐ Check this box if an instrument configuration report is attached instead of completing the table.

List system component product numbers	List the serial numbers of each component
1. G3172A	1. U513343B01
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.



Agilent GC/MS Preventive Maintenance Checklist

Preventive Maintenance for MSs

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 the successful preventive maintenance are available.

A customer representative should be available while the preventive maintenance procedure 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 the night prior to the PM and then start the vent cycle so that the instrument will be ready for the service representative.



Agilent GC/MS Preventive Maintenance Checklist

Parts – Included and as needed as part of the preventive maintenance

Common MS Maintenance Supplies

Parts Required					Supplies	
Yes/No	Interim/Major/As needed	Description	Part number			
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Abrasive paper, 30 µm	5061-5695			
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Alumina powder	393706201			
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Cloths, clean (package of 15)	05980-60051			
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Cloths, cleaning (package of 300)	9310-4828			
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Cotton swabs (package of 100)	5080-5400			
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Gloves, clean, large	8650-0030			
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Gloves, clean, small	8650-0029			
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Grease, Aplezon L, high vacuum	6040-0289			

Common MS Filters and Seals – 5973/5975/5977/7000/7010/7200/7250 Series

Supplies					Supplies	
Yes/No	Interim/Major/As needed	Description	Part number			
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Helium gas filter – if required	RMSH-2			
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Nitrogen gas filter – if required	RMSN-2			
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Big Universal Trap, 1/8i fittings, Hydrogen – if required	RMSHY-2			
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Gas Clean Carrier Gas Kit for 7890 for Nitrogen or Helium; Bracket, Mount, and Filter – if required	CP17988			
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Gas Clean Filter kit GC/MS 1/8 in (complete replacement kit) – if required	CP17974			
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Gas Clean GS/MS Filter – if required	CP17873			
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Chemical Ionization Gas Purifier (CI systems) – if required	5190-9071			
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Foreline Pump Oil, Inland 45	6040-0834			

MS Maintenance Supplies for 5973/5975/5977

Supplies					Supplies	
Yes/No	Interim/Major/As needed	Description	Part number			
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Diffusion pump fluid (Diffusion Pump Models)	6040-0809	Qty 2		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	IDP-3 Tip Seal Replacement Kit (IDP-3 Dry Pump Models)	G7077-57018			
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	DS42 Oil Mist Eliminator 3/4G & 3/8	SR03796555			
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Exhaust oil mist trap (thread) Edwards/Pfeiffer	G1099-80039			

MS Maintenance Supplies for 7000/7010

Supplies					Supplies	
Yes/No	Interim/Major/As needed	Description	Part number			
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Nitrogen gas filter	RMSN-2			
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Oil Mist Filter RV5	66600-80043			



Agilent GC/MS Preventive Maintenance Checklist

MS Maintenance Supplies for 7200/7250

Yes/No	Interim/Major/As needed	Description	Part number
<input type="checkbox"/>	<input type="checkbox"/>	Nitrogen gas filter	RMSN-2
<input type="checkbox"/>	<input type="checkbox"/>	RIS Probe Maintenance Kit (7200 Series only)	G7005-60170
<input type="checkbox"/>	<input type="checkbox"/>	DS202 Oil Mist Eliminator	SR03708800
<input type="checkbox"/>	<input type="checkbox"/>	IDP-15 Tip Seal Replacement Kit (IDP-15 Dry Pump Models)	X3815-67000
<input type="checkbox"/>	<input type="checkbox"/>	Filter element, for SH-110/SH-112/IDP-15 exhaust silencer	REPLSLRFILTER1
<input type="checkbox"/>	<input type="checkbox"/>	DS 3/8 MAG. PLUG AND GASKET	SR03701824

MS Maintenance Supplies for JetClean

Yes/No	Interim/Major/As needed	Description	Part number
<input type="checkbox"/>	<input type="checkbox"/>	Big Universal Trap, 1/8in fittings, Hydrogen -- if required	RMSHY-2

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Agilent GC/MS Preventive Maintenance Checklist

Parts – Needs be purchased if found defective or worn out

Common MSD Maintenance Supplies 5973/5975/5977/7000/7010/7200/7250

Yes/No	Interim/Major/As needed	Description	Part number	Qty 2
<input type="checkbox"/>	<input type="checkbox"/>	El High Temperature Filaments	G7005-60061	
<input type="checkbox"/>	<input type="checkbox"/>	HES El Filaments	G7002-60001	
<input type="checkbox"/>	<input type="checkbox"/>	LE-El Filaments	G3850-60021	
<input type="checkbox"/>	<input type="checkbox"/>	CI High Temperature Filament – all MSDs	G7005-60072	
<input type="checkbox"/>	<input type="checkbox"/>	PFTBA GCMS Tuning Standard calibrant	05971-60571	
<input type="checkbox"/>	<input type="checkbox"/>	PFTD calibrant, 1 ml	8500-8510	
<input type="checkbox"/>	<input type="checkbox"/>	PFET, IRM calibrant for GC OTOF 0.5 ml	5190-0531	

MS Maintenance Supplies for 5973/5975/5977

Yes/No	Interim/Major/As needed	Description	Part number	Qty 2
<input type="checkbox"/>	<input type="checkbox"/>	CI Interface tip seal (tip and spring combo)	G1999-60412	
<input type="checkbox"/>	<input type="checkbox"/>	CI Interface tip seal (tip only)	G3870-20542	
<input type="checkbox"/>	<input type="checkbox"/>	CI Interface tip seal spring (spring only)	G1999-20023	
<input type="checkbox"/>	<input type="checkbox"/>	Repeller insulator	G1099-20133	
<input type="checkbox"/>	<input type="checkbox"/>	Lens insulator/holder (HES)	G7002-20074	
<input type="checkbox"/>	<input type="checkbox"/>	Ring heater/sensor assembly (HES)	G7002-60043	
<input type="checkbox"/>	<input type="checkbox"/>	Ceramic insulator for Extractor (HES)	G7002-20064	
<input type="checkbox"/>	<input type="checkbox"/>	Transfer-Line Tip Cap, Threaded	G3870-20547	
<input type="checkbox"/>	<input type="checkbox"/>	Transfer-Line Tip Base, Threaded	G3870-20548	

MS Maintenance Supplies for 7000/7010

Yes/No	Interim/Major/As needed	Description	Part number	Qty 2
<input type="checkbox"/>	<input type="checkbox"/>	CI Interface tip seal - 7000	G1999-60412	
<input type="checkbox"/>	<input type="checkbox"/>	CI Interface tip seal - 7010	G7002-60412	
<input type="checkbox"/>	<input type="checkbox"/>	CI Interface tip seal (tip only)	G3870-20542	
<input type="checkbox"/>	<input type="checkbox"/>	CI Interface tip seal spring (spring only)	G1999-20023	
<input type="checkbox"/>	<input type="checkbox"/>	Repeller insulator - 7000	G1099-20133	
<input type="checkbox"/>	<input type="checkbox"/>	Lens insulator/holder (HES)	G7002-20074	
<input type="checkbox"/>	<input type="checkbox"/>	Ring heater/sensor assembly (HES)	G7002-60043	
<input type="checkbox"/>	<input type="checkbox"/>	Ceramic insulator for Extractor (HES)	G7002-20064	
<input type="checkbox"/>	<input type="checkbox"/>	Transfer-Line Tip Cap, Threaded	G3870-20547	
<input type="checkbox"/>	<input type="checkbox"/>	Transfer-Line Tip Base, Threaded	G3870-20548	

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Agilent GC/MS Preventive Maintenance Checklist

MS Maintenance Supplies for 7200

Yes/No	Interim/Major/As needed	Description	Part number
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Extractor Lens Insulator	G7005-20133
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Ion Focus Insulator	G7005-20442
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Ring Heater/Sensor Assembly	G7005-60110
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	RIS Xfer Tip	G7005-20542
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	RIS Xfer Tip Spring	G7005-20024

MS Maintenance Supplies for 7250

Yes/No	Interim/Major/As needed	Description	Part number
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Lens insulator/holder (HES)	G7002-20074
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Ring heater/sensor assembly (HES)	G7002-60043
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Ceramic insulator for Extractor (HES)	G7002-20064
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Transfer-Line Tip Cap, Threaded	G3870-20547
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Transfer-Line Tip Base, Threaded	G3870-20548
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	EI Extractor Transfer Tip	G3870-20542
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	CI Tip Compression Spring	G1899-20023

MS Maintenance Supplies for Intuvo 9000 MS Systems

Yes/No	Interim/Major/As needed	Description	Part number
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Swaged MS Tail - Packaged	G4590-60009
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Swaged MS Tail (HES) - Packaged	G4590-60109

Agilent GC/MS Preventive Maintenance Checklist

Preventive Maintenance Checklist:

Yes/No	Interim/Major	Description
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Perform general inspection of system for cleanliness.
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Discuss any problems the customer is having with the instrument.
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Review customer maintenance records and exclude maintenance on recently serviced items.
<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.

Yes/No	Interim/Major	Description
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Record instrument model no. <i>G3142</i>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Record instrument serial no. <i>US12343801</i>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Record Rough Vacuum. <i>~1A</i>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Record Manifold Vacuum. <i>1.3 x 10⁻³</i>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Type of Column installed. <i>HP-5 MS</i>

Yes/No	Interim/Major	Description
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Check manually that you have calibration peaks.
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Vent the instrument.
<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 checked="" type="checkbox"/>	Visually inspect the calibrant levels – PFTBA, PFDTD (if appl), IRM (if appl). Refill if necessary.
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Look for any obvious external damage or problems.
<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 checked="" type="checkbox"/>	Verify system line voltage meets instrument specifications: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>

Yes/No	Interim/Major	Description
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Check for evidence of oil leakage. Check pump gasket for leakage.
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Drain and replace mechanical pump oil.
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Replace Oil Mist Filter if applicable.
<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"/>	Demonstrate ballast, if requested.
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Anti-suckback test.

Yes/No	Interim/Major	Description
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Check for evidence of poor vacuum - Turbo Power Demand, poor manifold vacuum, etc.
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	If vacuum is poor, then replace the diaphragm pump.
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Anti-suckback test.



Yes/No	Interim/Major	Description
<input type="checkbox"/>	<input type="checkbox"/>	Replace the tip seal on the IDP pump.
<input type="checkbox"/>	<input type="checkbox"/>	Check for evidence of poor vacuum - Turbo Power Demand, poor manifold vacuum.
<input type="checkbox"/>	<input type="checkbox"/>	Replace the Exhaust Filter if required.
<input type="checkbox"/>	<input type="checkbox"/>	Discuss with customer the need for more frequent changes if needed.
<input type="checkbox"/>	<input type="checkbox"/>	Inform customer that pump gas ballast should be installed all the time.
<input type="checkbox"/>	<input type="checkbox"/>	Anti-suckback test.

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 type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Fans are functional, area is cleared around fans.
Source Cleaning				
<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.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Re-install source and close analyzer.
Filters				
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Replace RMSH-2 Helium gas filter - if applicable.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Replace RMSN-2 Nitrogen gas filter - if applicable.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Replace RMSHY-2 Hydrogen gas filter - if applicable.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	CP17988 – Gas Clean Carrier Gas Kit for 8890 for Nitrogen or Helium; Bracket, Mount, and Filter - if applicable.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	CP17974 – Gas Clean Filter Kit GC/MS 1/8 in; Mount and Filter - if applicable
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	CP17973 – Gas Clean Filter; Replacement Filter - if applicable.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	5190-9071 – Methane Gas Filter - if applicable.

Yes/No		Interim/Major		System post-check	
				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	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Rough Vacuum	N/A
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Vacuum Manifold	N/A
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	High Vacuum	158 x 10 ⁻³

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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 Review 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.

Agilent Test Results Table:

[illegible]

Agilent Parts List Table:

☐ Section NOT Applicable[illegible]

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Important Customer Web Links

How to get information on your product:

Literature Library

Need to know more?

Need technical support?

Need supplies?

www.agilent.com/chem/library

www.agilent.com/chem/education

www.agilent.com/chem/techsupp

www.agilent.com/chem/supplies

Service Engineer Comments (optional)

If there are specific points you wish to note as part of the installation or items of interest for the customer, please write in this box.

Service Completion

Service request number

6004469083

Date service completed

12 Mar 2021

Agilent signature

Sgt N.

Customer signature

Natiri L.

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