Annex G

Laboratory Results for NMVOCs and VOCs (including methane) for CHP 1 & CHP 2

ALS Technichem (HK) Pty Ltd
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CERTIFICATE OF ANALYSIS

CLIENT:	Oscar Bioenergy Joint Venture	WORK ORDER:	HK1916679
CONTACT:	Mr Edwin wong		
ADDRESS:	No. 5, Sham Fung Road, Siu Ho Wan, Lantau Island, NT, Hong Kong	LABORATORY:	Hong Kong
		SUB-BATCH:	0
		DATE RECEIVED:	18 April, 2019
		DATE OF ISSUE:	29 April, 2019
PROJECT:	Stack Gas Sampling	SAMPLE TYPE:	Air
SITE:	ORRC1, Siu Ho Wan, Lantau Island	NO OF SAMPLES:	1
PO: ---			

COMMENTS

One (1) stack gas sample was collected by ALS Technichem (HK) staff on 18th April, 2019 at the Organic Resources Recovery Centre (Phase 1) in Lantau Island.

The sample(s) were analysed and reported on an as received basis.

NOTES

This is the Final Report and supersedes any preliminary report with this batch number.

Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

PP

Richard Fung
General Manager - Hong Kong

1. Summary of Work

The document is the final report for the stack gas sampling and testing event for Oscar Bioenergy Joint Venture at Siu Ho Wan, North Lantau Island.

Sampling Period: 18th April, 2019
Location of Stack: ORRC1, Siu Ho Wan
No. of Stack: 1
Name of Stack: CHP-1

Methods for Stack Sampling and Analysis:

Parameter	Method Reference	Sampling Time (minutes)
Volatile Organic Compounds (VOCs) [1]	US EPA Method 18	60
Non-Methane Volatile Organic Compounds (NMCOCs)) [1]	US EPA Method 18	60

Note:
[1]: Results expressed as carbon
[2]: Results reported as at 273K, 101.325kPa, 6% Oxygen content and dry gas basis.

2. Sampling Summary

Volatile Organic Compounds (VOCs)
Sample gas was collected by using a stainless steel sampling probe, from the centroid of the stack, into the Tedlar bag by passive sampling technique.
The measurement of total volatile organic compounds (VOCs) content in the sample was conducted in references to BS EN 12619. VOCs content was determined by measuring the methane and non-methane volatile organic compounds of the sample by Gas Chromatograph-Flame Ionisation Detector (GC-FID).
VOCs was reported as the sum of methane and non-methane organics content in the sample.

3. Sampling Period

Test Parameters	Sampling Period
Volatile Organic Compounds (VOCs)	18 April 2019 15:00 – 16:00

4. Result

Parameter	Unit	Reporting Limit	Result [1]
Gaseous & vaporous organic substances (VOCs) [2]	mg/m^3	0.7	919
Methane (CH_4) [2]	mg/m^3	0.5	911
Non-Methane Organic Carbon (NMOC) [2]	mg/m^3	0.2	8.0

Note:
[1]: Results expressed as dry, at 0 degree Celsius temperature, 101.325 kilopascal pressure and 6% O_2 content conditions.
[2]: Results expressed as carbon.
[3]: The average Oxygen content in the flue gas was 9.8% during the sampling period.

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CERTIFICATE OF ANALYSIS

CLIENT:	Oscar Bioenergy Joint Venture	WORK ORDER:	HK1915304
CONTACT:	Mr Edwin wong		
ADDRESS:	No. 5, Sham Fung Road, Siu Ho Wan, Lantau Island, NT, Hong Kong	LABORATORY:	Hong Kong
		SUB-BATCH:	0
		DATE RECEIVED:	10 April, 2019
		DATE OF ISSUE:	29 April, 2019
PROJECT:	Stack Gas Sampling	SAMPLE TYPE:	Air
SITE:	ORRC1, Siu Ho Wan, Lantau Island	NO OF SAMPLES:	1
PO: ---			

COMMENTS

One (1) stack gas sample was collected by ALS Technichem (HK) staff on 10th April, 2019 at the Organic Resources Recovery Centre (Phase 1) in Lantau Island.

The sample(s) were analysed and reported on an as received basis.

NOTES

This is the Final Report and supersedes any preliminary report with this batch number.

Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

PP
Richard Fung
General Manager - Hong Kong

1. Summary of Work

The document is the final report for the stack gas sampling and testing event for Oscar Bioenergy Joint Venture at Siu Ho Wan, North Lantau Island.

Sampling Period: 10th April, 2019
Location of Stack: ORRC1, Siu Ho Wan
No. of Stack: 1
Name of Stack: CHP-2

Methods for Stack Sampling and Analysis:

Parameter	Method Reference	Sampling Time (minutes)
Volatile Organic Compounds (VOCs) [1]	US EPA Method 18	60
Non-Methane Volatile Organic Compounds (NMCOCs)) [1]	US EPA Method 18	60

Note:
[1]: Results expressed as carbon
[2]: Results reported as at 273K, 101.325kPa, 6% Oxygen content and dry gas basis.

2. Sampling Summary

Volatile Organic Compounds (VOCs)
Sample gas was collected by using a stainless steel sampling probe, from the centroid of the stack, into the Tedlar bag by passive sampling technique.
The measurement of total volatile organic compounds (VOCs) content in the sample was conducted in references to BS EN 12619. VOCs content was determined by measuring the methane and non-methane volatile organic compounds of the sample by Gas Chromatograph-Flame Ionisation Detector (GC-FID).
VOCs was reported as the sum of methane and non-methane organics content in the sample.

3. Sampling Period

Test Parameters	Sampling Period
Volatile Organic Compounds (VOCs)	10 April 2019 11:25 – 12:25

4. Result

Parameter	Unit	Reporting Limit	Result [1]
Gaseous & vaporous organic substances (VOCs) [2]	mg/m^3	0.7	871
Methane (CH_4) [2]	mg/m^3	0.5	858
Non-Methane Organic Carbon (NMOC) [2]	mg/m^3	0.2	13.0

Note:
[1]: Results expressed as dry, at 0 degree Celsius temperature, 101.325 kilopascal pressure and 6% O_2 content conditions.
[2]: Results expressed as carbon.
[3]: The average Oxygen content in the flue gas was 10.0% during the sampling period.

Annex G 12

Laboratory Results for NMVOCs

ALS Technichem (HK) Pty Ltd
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STACK GAS SAMPLING AND LABORATORY TESTING REPORT

Location: Organic Resources Recovery Centre Phase 1 (ORRC1)

Sampling Period: 3rd May, 2019

Stack ID: CHP-1

ALS Work Order No: HK1918585B

Report Issue Date: 10th May, 2019

CLIENT:
Oscar Bioenergy Joint Venture
No. 5, Sham Fung Road,
Siu Ho Wan, Lantau Island, NT
Hong Kong

PREPARED BY:

Mr Poon Kwong Lun, Allen
Manager

Mr. Fung Lim Chee, Richard
General Manager - Hong Kong

This is the Final Report and supersedes any preliminary report with this batch number.

Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

1. Summary of Work

The document is the final report for the stack gas sampling and testing event for Oscar Bioenergy Joint Venture in Siu Ho Wan, North Lantau Island.

Sampling Period: 3rd May, 2019
Location of Stack: ORRC1, Siu Ho Wan
No. of Stack: 1
Name of Stack: CHP-1

Methods for Stack Sampling and Analysis:

Parameter	Method Reference	Sampling Time (minutes)
Volatile Organic Compounds (VOCs) [1]	US EPA Method 18	60

Note:
[1]: Results expressed as carbon.

2. Sampling Summary

Volatile Organic Compounds (VOCs)

Sample gas was collected by using a stainless steel sampling probe, from the centroid of the stack, into the Tedlar bag by passive sampling technique.
The measurement of total volatile organic compounds (VOCs) content in the sample was conducted in references to BS EN 12619. VOCs content was determined by measuring the methane and non-methane volatile organic compounds of the sample by Gas Chromatograph-Flame Ionisation Detector (GC-FID).
VOCs was reported as the sum of methane and non-methane organics content in the sample.

3. Sampling Period

Test Parameters	Sampling Period
Volatile Organic Compounds (VOCs)	3 May 2019 13:02 – 14:02

4. Stack Parameter

Test Parameter	Sampling Volume (m^3) [1]	Carbon Dioxide Content (%) [1]	Oxygen Content (%) [1]	Moisture Content (%)
VOCs	-	11.7	8.3	13.4

Note:
[1]: Expressed as at dry, 0 deg. C, 101.325 kilopascal pressure conditions.

5. Result

Parameter	Unit	Reporting Limit	Result
Gaseous & vaporous organic substances (VOCs) [2]	mg/m^3 [1]	0.7	658
	kg/hr	0.003	2.25
Methane (CH_4) [2]	mg/m^3 [1]	0.5	652
	kg/hr	0.002	2.23
Non-Methane Organic Carbon (NMOC) [2]	mg/m^3 [1]	0.2	5.7
	kg/hr	0.001	0.02

Note:
[1]: Results expressed as dry, at 0 degree Celsius temperature, 101.325 kilopascal pressure and 6% O_2 content conditions.
[2]: Results expressed as carbon.

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STACK GAS SAMPLING AND LABORATORY TESTING REPORT

Location: Organic Resources Recovery Centre Phase 1 (ORRC1)

Sampling Period: 14th May, 2019

Stack ID: CHP-3

ALS Work Order No: HK1919461B

Report Issue Date: 24th May, 2019

CLIENT:
Oscar Bioenergy Joint Venture
No. 5, Sham Fung Road,
Siu Ho Wan, Lantau Island, NT,
Hong Kong

PREPARED BY:

Mr Poon Kwong Lun, Allen
Manager

Mr Fung Lim Chee, Richard
Managing Director - Hong Kong

This is the Final Report and supersedes any preliminary report with this batch number.

Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

1. Summary of Work

The document is the final report for the stack gas sampling and testing event for Oscar Bioenergy Joint Venture at Siu Ho Wan, North Lantau Island.

Sampling Period: 14th May, 2019
Location of Stack: ORRC1, Siu Ho Wan
No. of Stack: 1
Name of Stack: CHP-3

Methods for Stack Sampling and Analysis:

Parameter	Method Reference	Sampling Time (minutes)
Volatile Organic Compounds (VOCs) [1]	US EPA Method 18	60

Note:
[1]: Results expressed as carbon.

2. Sampling Summary

Volatile Organic Compounds (VOCs)
Sample gas was collected by using a stainless steel sampling probe, from the centroid of the stack, into the Tedlar bag by passive sampling technique.
The measurement of total volatile organic compounds (VOCs) content in the sample was conducted in references to BS EN 12619. VOCs content was determined by measuring the methane and non-methane volatile organic compounds of the sample by Gas Chromatograph-Flame Ionisation Detector (GC-FID).
VOCs was reported as the sum of methane and non-methane organics content in the sample.

3. Sampling Period

Test Parameters	Sampling Period
Volatile Organic Compounds (VOCs)	14 May 2019 10:56 – 11.56

4. Stack Parameter

Test Parameter	Sampling Volume (m^3) [1]	Carbon Dioxide Content (%) [1]	Oxygen Content (%) [1]	Moisture Content (%)
VOCs	-	11.6	8.2	14.3

Note:
[1] Expressed as at dry, 0 deg. C, 101.325 kilopascal pressure conditions.

5. Result

Parameter	Unit	Reporting Limit	Result
Gaseous & vaporous organic substances (VOCs) [3]	mg/m^3 [1]	0.7	781
	kg/hr	0.003	2.796
Methane (CH_4) [3]	mg/m^3 [1]	0.5	776
	kg/hr	0.002	2.778
Non-Methane Organic Carbon (NMOC) [3]	mg/m^3 [1]	0.2	5.2
	kg/hr	0.001	0.019

Note:
[1] Results expressed as dry, at 0 degree Celsius temperature, 101.325 kilopascal pressure and 6% O_2 content conditions.
[2] Results expressed as carbon.

CERTIFICATE OF ANALYSIS

CLIENT:	Oscar Bioenergy Joint Venture	WORK ORDER:	HK1922259
CONTACT:	Mr Edwin wong		
ADDRESS:	No. 5, Sham Fung Road, Siu Ho Wan, Lantau Island, NT, Hong Kong	LABORATORY:	Hong Kong
		SUB-BATCH:	0
		DATE RECEIVED:	24 May, 2019
		DATE OF ISSUE:	3 Jun, 2019
PROJECT:	Stack Gas Sampling	SAMPLE TYPE:	Air
SITE:	ORRC1, Siu Ho Wan, Lantau Island	NO OF SAMPLES:	1
PO: ---			

COMMENTS

One (1) stack gas sample was collected by ALS Technichem (HK) staff on 24th May, 2019 at the Organic Resources Recovery Centre (Phase 1) in Lantau Island.

The sample(s) were analysed and reported on an as received basis.

NOTES

This is the Final Report and supersedes any preliminary report with this batch number.

Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

Richard Fung
Managing Director - Hong Kong

1. Summary of Work

The document is the final report for the stack gas sampling and testing event for Oscar Bioenergy Joint Venture at Siu Ho Wan, North Lantau Island.

Sampling Period: 24th May, 2019
Location of Stack: ORRC1, Siu Ho Wan
No. of Stack: 1
Name of Stack: CHP-1

Methods for Stack Sampling and Analysis:

Parameter	Method Reference	Sampling Time (minutes)
Volatile Organic Compounds (VOCs) [1]	US EPA Method 18	60
Non-Methane Volatile Organic Compounds (NMCOCs)) [1]	US EPA Method 18	60

Note:
[1]: Results expressed as carbon

2. Sampling Summary

Volatile Organic Compounds (VOCs)
Sample gas was collected by using a stainless steel sampling probe, from the centroid of the stack, into the Tedlar bag by passive sampling technique.
The measurement of total volatile organic compounds (VOCs) content in the sample was conducted in references to BS EN 12619. VOCs content was determined by measuring the methane and non-methane volatile organic compounds of the sample by Gas Chromatograph-Flame Ionisation Detector (GC-FID).

VOCs was reported as the sum of methane and non-methane organics content in the sample.

3. Sampling Period

Test Parameters	Sampling Period
Volatile Organic Compounds (VOCs)	24 May 2019 10:40 – 11:40

4. Result

Parameter	Unit	Reporting Limit	Result [1]
Gaseous & vaporous organic substances (VOCs) [2]	mg/m^3	0.7	876
Methane (CH_4) [2]	mg/m^3	0.5	871
Non-Methane Organic Carbon (NMOC) [2]	mg/m^3	0.2	5.0

Note:
[1]: Results expressed as dry, at 0 degree Celsius temperature, 101.325 kilopascal pressure and 6% O_2 content conditions.
[2]: Results expressed as carbon.
[3]: The average Oxygen content in the flue gas was 9.1% during the sampling period.