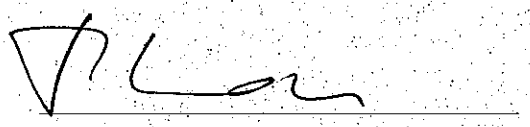
**ASB Biodiesel (Hong Kong) Limited**

# Development of a Biodiesel Plant at Tseung Kwan O Industrial Estate

Quarterly EM&A Report

July – September 2017

(Version 1.0)

Certified By 

(Environmental Team Leader)

REMARKS:

The information supplied and contained within this report is, to the best of our knowledge, correct at the time of printing.

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| *Job No.* | D1067 | *Total Pages:* | 1 |

**Subject:** **Development of a Biodiesel Plant at Tseung Kwan O Industrial Estate Quarterly EM&A Report (Jul - Sep 2017) v2.0**

Dear Sir,

We refer to your submission of the Quarterly EM&A Report (Jul - Sep 2017) v2.0 via email dated 9 April 2018.

We write to advise that we have no comment on the captioned report.

Regards,

Mark Cheung
Independent Environmental Checker

KTC/gk

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# EXECUTIVE SUMMARY

## Introduction

1. This is the 6th quarterly Environmental Monitoring and Audit (EM&A) Report prepared by Cinotech Consultants Limited for Development of a Biodiesel Plant at Tseung Kwan O Industrial Estate in operational phase. This report documents the findings of EM&A works carried out in July – September 2017.

## Environmental Licenses and Permits

2. Licenses/Permits granted to the Project include the followings:
   - Environmental Permit, EP-319/2009/D, granted on 28 January 2014;
   - Specified Process Licence, L-25-019(1), granted on 10 October 2013 &
   - Water Pollution Control Ordinance Licence, WT00022972-2015, granted on 16 December 2015.

## Environmental Monitoring and Audit Works

3. Environmental monitoring and audit works for the Project were carried out in accordance with the criteria and requirements listed in the EM&A Manual, Environmental Permit, Specified Process Licence and Water Pollution Control Ordinance (WPCO) Licence granted. Monitoring results were checked and reviewed.

4. As the wastewater treatment plant is under maintenance (no biogas was generated) in July 2017, emission from stack of biogas flare cannot be sampled. Therefore, monitoring on emission form the stack was suspended in July 2017, and was resumed in August 2017.

5. As maintenance work is required after Typhoon Hato, emission from stacks of boiler cannot be sampled in August 2017. Therefore, monitoring on emission form the stack was suspended in August 2017, and was resumed in September 2017.

## Key Information in the Reporting Month

6. Summary of key information in this reporting quarter (July – September 2017) is listed in **Table I**.

**Table I Summary of Key Information in July – September 2017**

| Event | Event Details | | Action Taken | Status | Remark |
|---|---|---|---|---|---|
| | Number | Nature | | | |
| Exceedance of Action & Limit Levels | 6 | (1) & (2): NMOC in emission from Stack of Biogas Flare<br>(3), (4) & (5): Methanol in emission from Stack of Process Building<br>(6): Odour due to complaint received | Exceedance events were investigated and measures have been proposed. | N/A | --- |
| Complaint received | 2 | (1): Noise nuisance and unpleasant malodour<br>(2): Dark smoke emission | Events were investigated and measures have been proposed. | N/A | --- |
| Changes to the assumptions and key construction / operation activities recorded | 0 | --- | N/A | N/A | --- |
| Status of submissions under EP | 7 | (1): Monthly EM&A Report for May 2017 v2.0<br>(2): Monthly EM&A Report June 2017 v1.0<br>(3): Monthly EM&A Report June 2017 v2.0<br>(4): Monthly EM&A Report July 2017 v1.0<br>(5): Quarterly EM&A Report (April – June 2017)<br>(6): Monthly EM&A Report July 2017 v2.0<br>(7): Monthly EM&A Report August 2017 v1.0 | Submitted to EPD on<br>(1) & (2): 14 July 2017<br>(3). (4) & (5): 14 August 2017<br>(6) & (7): 13 September 2017 | Verified by IEC | --- |
| Notifications of any summons & prosecutions | 0 | --- | N/A | N/A | --- |

# 1 INTRODUCTION

## Background

1.1 Development of a Biodiesel Plant at Tseung Kwan O Industrial Estate (hereafter referred to as "the Project") is to construct and operate a 100,000 tonnes per annum biodiesel plant at Tseung Kwan O Industrial Estate (see **Figure 1.1** for the location plan of Project Site). The plant will use a multi-feedstock which consists of used cooking oil (UCO), oil and grease recovered from grease trap waste (GTW), palm fatty acid distillate (PFAD) and animal fats. The proposed biodiesel plant offers a convenient recycling outlet for GTW and UCO, and converts oil and grease recovered from these wastes into useful products. The Project also offers a more environmental-friendly alternative to the diesel fuel market in Hong Kong.

1.2 This Project is a Designated Project under the Environmental Impact Assessment Ordinance (Cap. 499). An environmental impact assessment (EIA) was undertaken to identify and evaluate the impact on environment (e.g. air quality, noise, water quality and ecology), and propose possible measures to mitigate the impact. The EIA Report was approved by the Environmental Protection Department (EPD) on 26 February 2009.

1.3 Environmental Permit (EP) No. EP-319/2009 was issued on 11 March 2009 to ASB Biodiesel (Hong Kong) Limited as the Permit Holder. After several rounds of amendments, the latest version is EP No. EP-319/2009/D, which was issued on 28 January 2014.

1.4 Construction of the Biodiesel Plant has been completed since October 2013. After more than 2 years of commissioning trial, the Plant started to operate in April 2016. Cinotech Consultants Limited was commissioned by ASB Biodiesel (Hong Kong) Limited to undertake the Environmental Monitoring and Audit (EM&A) works for the Project. This is the 6$^{th}$ Quarterly EM&A report summarizing the EM&A works in operational phase for the Project in July – September 2017.

## Project Organizations

1.5 Different parties with different levels of involvement in the project organization include:

- Project Proponent & Operator – ASB Biodiesel (Hong Kong) Limited
- Independent Environmental Checker (IEC) – Mannings (Asia) Consultants Ltd
- Environmental Team (ET) – Cinotech Consultants Limited

1.6 The responsibilities of respective parties are detailed in Section 2 of the Final EM&A Manual of the Project.

1.7 The key contacts of the Project are shown in **Table 1-1**.

**Table 1-1 Key Project Contacts**

| Party | Role | Name | Position | Phone No. |
|---|---|---|---|---|
| ASB | Permit Holder & Operator | Mr. Albert Kwan | Facilities and Operations Manager | 3183 4209 |
| | | Ms. Fion Wong | Engineer | 3183 4204 |
| Mannings | Independent Environmental Checker | Mr. Mark Cheung | Independent Environmental Checker | 3168 2028 |
| | | Mr. Gavin Kwok | Assistant to Independent Environmental Checker | 3970 8628 |
| Cinotech | Environmental Team | Dr. HF Chan | ET Leader | 2151 2088 |
| | | Ms. Betty Choi | Project Coordinator | 2151 2072 |

### Summary of EM&A Requirements

1.8 EM&A requirements for the Project include:

- Monitoring requirements as listed in the Project EM&A Manual;
- Conditions listed in the Environmental Permit; &
- Conditions listed in the SP License.

### Status of Environmental Licensing and Permitting

1.9 All permits/licenses obtained for the Project are summarized in **Appendix A**.

# 2 ENVIRONMENTAL MONITORING REQUIREMENTS

## Air Quality

2.1 According to Section 4.3 of the Final EM&A Manual of the Project, the emission from stacks of boiler, biogas flare and process building, and odour concentrations at the final air scrubber shall be monitored. Odour patrol along the Project Site boundary is also required. Detailed monitoring criteria (i.e. frequency, parameter, and action & limit levels) are listed in **Appendix B**. If limit levels are exceeded, the event and action plan as shown in **Appendix C** should be implemented.

## Water Quality

2.2 According to Section 6.3 of the Final EM&A Manual of the Project, the water quality of treated effluent discharged from Project Site and stormwater discharge shall be monitored. Detailed monitoring criteria (i.e. frequency, parameter, and limit levels) are listed in **Appendix B**. If limit levels are exceeded, the event and action plan as shown in **Appendix C** should be implemented.

## Sulphur Content in Bio Heating Oil

2.3 According to Section 3.11 of the EP-319/2009/D, if Bio Heating Oil (BHO) is used on site, the sulphur content in BHO shall be monitored. Monitoring criteria (i.e. frequency, parameter, and limit level) for the sulphur content in BHO are listed in **Appendix B**. If limit level is exceeded, the following actions should be taken by the ET:

- Inform Project Proponent and IEC within 24 hours;
- Inform Project Proponent to increase the use of low sulphur diesel in the fuel tank(s) to achieve a fuel mixture with sulphur content of less than 346 ppm; and
- Revert the monitoring programme to the original frequency of a test for every tank load of BHO, or at such a monitoring frequency to be advised and agreed by the EPD's Director.

# 3 MONITORING RESULTS

## Air Quality

*Emission from Stack of Boiler*

3.1 Emission from stack of boiler was sampled and analyzed monthly. As maintenance work was required after Typhoon Hato, emission from stack of boiler cannot be sampled in August 2017. Therefore, monitoring on emission form the stack was suspended in August 2017, and resumed in September 2017. Monitoring results of boiler emission in July and September 2017 are summarized in **Table 3-1** below and graphical presentation of results is shown in **Appendix D**.

**Table 3-1 Monitoring Result of the Emission from the Stack of Boiler**

| Parameter | Limit Level | Monitoring Result * | | |
|---|---|---|---|---|
| | | Jul-17 | Aug-17 *** | Sep-17 |
| Nitrogen oxides ($NO_X$) | 2.213 kg/h | 0.734 kg/h | - | 0.62 kg/h |
| Carbon monoxide (CO) | 0.553 kg/h | <0.2 kg/h | - | < 0.2 kg/h |
| Sulphur dioxide ($SO_2$) | 0.797 kg/h | 0.0415 kg/h | - | <0.04 kg/h |
| Non-methane Organic Compounds (NMOC) | 0.041 kg/h | 0.010 kg/h | - | 0.0035 kg/h |
| Exhaust gas velocity | 7 m/s ** | 15.16 m/s | - | 14.59 m/s |

* Average result of all trials is presented. If one of the data was smaller than the limit of reporting, the smallest recordable value was used for calculation of average.
** Minimum level should be achieved.
*** Monitoring was suspended as maintenance work was required after Typhoon Hato.

3.2 No exceedance of Limit Level was reported in July – September 2017.

*Emission from Stack of Biogas Flare*

3.3 Emission from stack of biogas flare was sampled and analyzed monthly. As the wastewater treatment plant is under maintenance (no biogas was generated) in July 2017, emission from stack of biogas flare cannot be sampled. Therefore, monitoring on emission form the stack was suspended in July 2017, and resumed in August 2017. Summary of monitoring result of the emission from the stack of biogas flare in August and September 2017 is presented in **Table 3-2** below and graphical presentation of results is shown in **Appendix D**.

**Table 3-2 Monitoring Result of the Emission from the Stack of Biogas Flare**

| Parameter | Limit Level | Monitoring Result * | | |
|---|---|---|---|---|
| | | Jul-17 *** | Aug-17 | Sep-17 |
| Nitrogen oxides ($NO_X$) | 0.053 kg/h | - | <0.004 kg/h | <0.004 kg/h |
| Carbon monoxide (CO) | 0.018 kg/h | - | <0.0175 kg/h | <0.015 kg/h |
| Sulphur dioxide ($SO_2$) | 0.039 kg/h | - | <0.003 kg/h | <0.003 kg/h |

| Parameter | Limit Level | Monitoring Result * | | |
|---|---|---|---|---|
| | | Jul-17 *** | Aug-17 | Sep-17 |
| Non-methane Organic Compounds (NMOC) | 0.0018 kg/h | - | 0.00545 kg/h **** | 0.0062 kg/h **** |
| Exhaust gas velocity | 0.54 m/s ** | - | 0.81 m/s | 0.675 m/s |

* Average result of all trials is presented. If one of the data was smaller than the limit of reporting, the smallest recordable value was used for calculation of average.
** Minimum level should be achieved.
*** Monitoring was suspended as the wastewater treatment plant is under maintenance (no biogas was generated).
**** Exceedance of Limit Level.

3.4 One exceedance of Limit Level was reported in August 2017 and one exceedance of Limit Level was reported in September 2017. Investigation of the exceedance events was finished and measures were proposed for countering the exceedances.

*Emission from Stack of Process Building*

3.5 Emission from stack of process building was sampled and analyzed monthly. Summary of monitoring result of the emission from the stack of process building in July – September 2017 is presented in **Table 3-3** below and graphical presentation of results is shown in **Appendix D**.

**Table 3-3 Monitoring Result of the Emission from the Stack of Process Building**

| Parameter | Limit Level | Monitoring Result * | | |
|---|---|---|---|---|
| | | Jul-17 | Aug-17 | Sep-17 |
| Acetyldehyde | 0.0975 kg/h | <0.001 kg/h | <0.001 kg/h | <0.001 kg/h |
| Methanol | 0.0975 kg/h | 10.4 kg/h *** | 1.095 kg/h *** | 0.95 kg/h *** |
| Exhaust gas velocity | 0.79 m/s ** | 4.3 m/s | 3.8 m/s | 4.1 m/s |

* Average result of all trials is presented. If one of the data was smaller than the limit of reporting, the smallest recordable value was used for calculation of average.
** Minimum level should be achieved.
*** Exceedance of Limit Level.

3.6 Exceedances of Limit Level were reported in July – September 2017. Investigation of the exceedance events was finished and measure for countering the exceedance was carried out.

*Odour Concentration at the Final Air Scrubber*

3.7 Odour Concentration at the final air scrubber was sampled and analyzed monthly. Summary of monitoring result of odour concentrations at the final air scrubber in July – September 2017 is presented in **Table 3-4** below and graphical presentation of results is shown in **Appendix D**.

**Table 3-4 Monitoring Result of the Odour Concentrations at the Final Air Scrubber**

| Parameter | Limit Level | Monitoring Result * | | |
|---|---|---|---|---|
| | | Jul-17 | Aug-17 | Sep-17 |
| Odour | 200.3 OU/s | 11.05 OU/s | 19.0 OU/s | 15.35 OU/s |
| Exhaust gas velocity | 0.7 m/s ** | 1.05 m/s | 0.79 m/s | 0.75 m/s |

* Average result of all trials is presented. If one of the data was smaller than the limit of reporting, the smallest recordable value was used for calculation of average.
** Minimum level should be achieved.

3.8 No exceedance of Limit Level was reported in July – September 2017.

*Odour Patrols along Site Boundary*

3.9 Odour intensity were monthly monitored by the odour patrols. Odour patrols were carried out by a qualified odour panelist in both morning and afternoon on 28 July, 8 August and 13 September 2017. Summary of monitoring result of odour patrols in July – September 2017 is presented in **Table 3-5** below and graphical presentation of results is shown in **Appendix D**.

**Table 3-5 Monitoring Result of Odour Patrols along Site Boundary**

| Date | Odour Intensity | | |
|---|---|---|---|
| | Action Level | Limit Level | Range of Measured Level |
| July 2017 | Odour intensity ≥Class 2 recorded; or One documented complaint received | Odour intensity ≥Class 3 recorded on 2 consecutive patrols | 0 – 1~2 |
| August 2017 | | | 0 – 1~2 |
| September 2017 | | | 0 – 1~2 |

3.10 1 exceedance of Action Level was reported in July 2017 as 1 complaint regarding odour was received (see **Section 4**).

**Water Quality**

*Water Quality of Treated Effluent Discharged from Project Site*

3.11 Water quality of treated effluent discharged from Project Site was sampled and analyzed monthly. Summary of water quality monitoring result of treated effluent discharge from Project Site in July – September 2017 is presented in **Table 3-6** below and graphical presentation of results is shown in **Appendix E**.

**Table 3-6 Water Quality Monitoring Result of Treated Effluent Discharged from Project Site**

| Parameter | Limit Level | Monitoring Result | | |
|---|---|---|---|---|
| | | Jul-17 | Aug-17 | Sep-17 |
| pH | Within the range of 6-10 | 7.14 | 7.62 | 6.87 |
| Suspended Solids | 800 mg/L | 370 mg/L | 510 mg/L | 140 mg/L |
| Biochemical Oxygen Demand (BOD) (5 days, 20°C | 800 mg/L | 280 mg/L | 620 mg/L | 620 mg/L |
| Chemical Oxygen Demand (COD) | 2000 mg/L | 384 mg/L | 780 mg/L | 1023 mg/L |
| Oil & Grease | 50 mg/L | <10 mg/L | 40 mg/L | 45 mg/L |
| Sulphate | 1000 mg/L | 160 mg/L | <10 mg/L | <20 mg/L |
| Total Nitrogen | 200 mg/L | 40 mg/L | 16 mg/L | 100 mg/L |
| Total Phosphorus | 50 mg/L | 40 mg/L | 31 mg/L | 17.5 mg/L |

3.12 No exceedance of Limit Level was reported in July – September 2017.

*Water Quality of Stormwater Discharge*

3.13 Water quality of stormwater discharge was sampled and analyzed quarterly. Summary of water quality monitoring result of stormwater discharge in July – September 2017 is presented in **Table 3-7** below and graphical presentation of results is shown in **Appendix E**.

**Table 3-7 Water Quality Monitoring Result of Stormwater Discharge**

| Parameter | Limit Level | Monitoring Result | | |
|---|---|---|---|---|
| | | Jul-17 | Aug-17 | Sep-17 |
| pH | Within the range of 6-9 | -- | -- | 7.08 |
| Suspended Solids | 50 mg/L | -- | -- | 30 mg/L |
| Biochemical Oxygen Demand (BOD) (5 days, 20°C | 50 mg/L | -- | -- | <10 mg/L |
| Chemical Oxygen Demand (COD) | 100 mg/L | -- | -- | 30 mg/L |
| Oil & Grease | 30 mg/L | -- | -- | <10 mg/L |
| * Water quality of stormwater discharge from Project Site was sampled and analyzed quarterly | | | | |

3.14 No exceedance of Limit Level was reported in July – September 2017.

**Sulphur Content in Bio Heating Oil**

3.15 Sulphur content in bio heating oil was sampled and analyzed. Summary of monitoring result of Sulphur content in bio heating oil in July – September 2017 is presented in **Table 3-8** below and graphical presentation of results is shown in **Appendix F**.

**Table 3-8 Monitoring Result of Sulphur Content in Bio Heating Oil**

| Parameter | Limit Level | Monitoring Result | | |
|---|---|---|---|---|
| | | Jul-17 | Aug-17 | Sep-17 |
| Sulphur Content | 346 ppm | 297 ppm | 305 ppm | 320 ppm |

3.16 No exceedance of Limit Level was reported in July – September 2017.

**Summary of Exceedance Events in the Reporting Quarter**

3.17 A summary of all exceedance events is presented in **Table 3-9** below. Investigation report for the exceedance events in July – September 2017 are attached in the Monthly EM&A Reports (July – September 2017) respectively.

**Table 3-9 Summary of Exceedance Events in the Reporting Quarter**

| Parameter | | Unit | Action Level | Limit Level | Monitoring Result |
|---|---|---|---|---|---|
| **July 2017** | | | | | |
| Stack of Process Building (EP3) | Methanol | kg/hr | - * | 0.0975 | 10.4 |
| Odour Patrol | Odour Intensity | - | Odour intensity ≥Class 2 recorded; or One documented complaint received | Odour intensity ≥Class 3 recorded on 2 consecutive patrols | One documented complaint received |
| **August 2017** | | | | | |
| Stack of Biogas Flare (EP1) | Non-methane Organic Compounds (NMOC) | kg/hr | - * | 0.0018 | 0.00545 |
| Stack of Process Building (EP3) | Methanol | kg/hr | - * | 0.0975 | 1.095 |
| **September 2017** | | | | | |
| Stack of Biogas Flare (EP1) | Non-methane Organic Compounds (NMOC) | kg/hr | - * | 0.0018 | 0.0062 |
| Stack of Process Building (EP3) | Methanol | kg/hr | - * | 0.0975 | 0.95 |

* No action level was set in the Final EM&A Manual of the Project, Environmental Permit, and in the Specified Process Licence

# 4 SUMMARY OF COMPLAINT AND PROSECUTION

4.1 2 environmental related complaint was received in July 2017 (see **Appendix H**).

4.2 No prosecution or notification of summon was received in July – September 2017.

4.3 There were 6 environmental complaint, 1 notification of summons, and 1 successful prosecutions received since the commencement of Project (operational phase). The Complaint Log is attached in **Appendix H**.

# 5 CONCLUSIONS

5.1 In July – September 2017, environmental monitoring and audit works were carried out in accordance with criteria and requirements listed in the Project EM&A Manual, Environmental Permit EP-319/2009D, Specified Process Licence L-25-019(1) and Water Pollution Control Ordinance Licence WT00022972-2015.

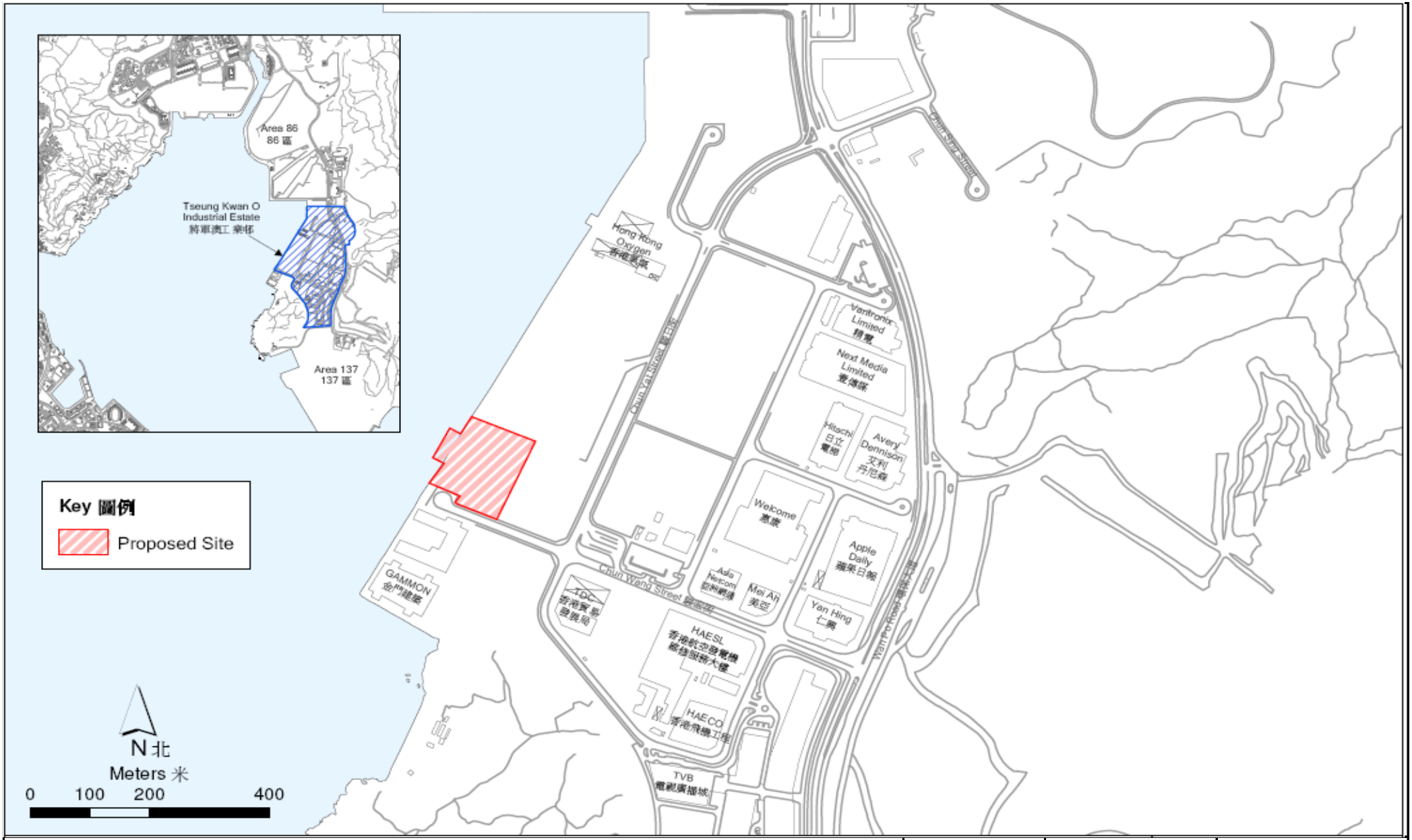
5.2 Monitoring of air quality, water quality and sulphur content in Bio Heating Oil were carried out at designated locations. In the reporting quarter, 2 exceedances of Limit Levels were recorded at the Stack of Biogas Flare, and 3 exceedances of Limit Levels were recorded at Stack of Process Building. In addition, 1 Action Level exceedance was recorded due to the complaint received on 4$^{th}$ July 2017. Investigation reports / complaint log for the events are attached in the Monthly EM&A Reports (July – September 2017) respectively.

5.3 As the wastewater treatment plant is under maintenance (no biogas was generated) in July 2017, emission from stack of biogas flare cannot be sampled. Therefore, monitoring on emission form the stack was suspended in July 2017, and was resumed in August 2017.

5.4 As maintenance work is required after Typhoon Hato, emission from stacks of boiler cannot be sampled in August 2017. Therefore, monitoring on emission form the stack was suspended in August 2017, and was resumed in September 2017.

5.5 In the reporting quarter, 2 environmental related complaint, with no notification of summons and no successful prosecution were received.

## FIGURES




| | | | | |
|---|---|---|---|---|
| Title | Development of a Biodiesel Plant at Tseung Kwan O Industrial Estate | Scale N.T.S | Project No. MA15052 | CINOTECH |
| | Location Plan | Date MAY 2016 | Figure 1.1 | |

**APPENDIX A**
**Summary of Environmental Licensing and Permit Status**

Appendix A Summary of Environmental Licensing and Permit Status

| Permit / License No. | Valid Period | | Summary | Status |
|---|---|---|---|---|
| | From | To | | |
| **Environmental Permit (EP)** | | | | |
| EP-319/2009/D | 28/01/2014 | N/A | Operation of<br>• a biochemical plant with a storage capacity of more than 500 tonnes and in which substances are processed and produced;<br>• a storage, transfer and transhipment of oil facility with a storage capacity of not less than 1,000 tonnes; and<br>• a dangerous goods godown with a storage capacity exceeding 500 tonnes | Valid |
| **Specified Process (SP) Licence** | | | | |
| L-25-019(1) | 10/10/2013 | 10/10/2015 | • Emission of non-fugitive fixed point emissions | Under renewal |
| **Water Pollution Control Ordinance (WPCO) Licence** | | | | |
| WT00022972-2015 | 16/12/2015 | 31/12/2017 | Discharge of<br>• effluent from wastewater treatment facilities to communal foul sewer; and<br>• effluent from floor washing of operation areas to communal storm drain | Valid |

**APPENDIX B**
**Summary of Monitoring Criteria**

Appendix B Summary of Monitoring Criteria

| **Air Quality** | | | | |
|---|---|---|---|---|
| | **Frequency** | **Parameter** | **Action Levels** | **Limit Levels** |
| Emission from Stack of Boiler (EP2) | Monthly for the first 12 months of operation. If the monitoring results of the first year monitoring meet the limit level, the monitoring will be reduced to half-yearly intervals for the whole operational stage. * | Nitrogen oxides ($NO_X$) | – ** | 2.213 kg/h |
| | | Carbon monoxide (CO) | | 0.553 kg/h |
| | | Sulphur dioxide ($SO_2$) | | 0.797 kg/h |
| | | Non-methane Organic Compounds (NMOC) | | 0.041 kg/h |
| | | Exhaust gas velocity | | 7 m/s (minimum) |
| Emission from Stack of Biogas Flare (EP1) | | $NO_X$ | – ** | 0.053 kg/h |
| | | CO | | 0.018 kg/h |
| | | $SO_2$ | | 0.039 kg/h |
| | | NMOC | | 0.0018 kg/h |
| | | Exhaust gas velocity | | 0.54 m/s (minimum) |
| Emission from Stack of Process Building (EP3) | | Acetyldehyde | – ** | 0.0975 kg/h |
| | | Methanol | | 0.0975 kg/h |
| | | Exhaust gas velocity | | 0.79 m/s (minimum) |
| Odour Concentrations at the Final Air Scrubber (EP5) | Monthly for the first 2 years of operation * | Odour | – ** | 200.3 OU/s |
| | | Exhaust gas velocity | | 0.7 m/s (minimum) |
| Odour Patrols along the Project Site Boundary | Two times a day, one in the morning and one in the afternoon<br>• Monthly for the first 12 months of operation. If the monitoring results of the first year monitoring meet the limit level, the monitoring frequency will be reduced to quarterly intervals in the second year;<br>• If the action level is triggered during the second year of operation, the frequency will be resumed to monthly intervals until compliance with the action level for three consecutive months is obtained;<br>• If the action level is not triggered for four consecutive quarterly monitoring, the monitoring can be terminated. | Odour Intensity | • Odour intensity ≥ Class 2 recorded; or<br>• One documented complaint received | • Odour intensity ≥Class 3 recorded on 2 consecutive patrols |

* Monitoring will not be carried out during raining days

** No action level is set in the Final EM&A Manual of the Project and in the Specified Process Licence

Appendix B Summary of Monitoring Criteria

| **Water Quality** | | | |
|---|---|---|---|
| **Discharge** | **Frequency** | **Parameter** | **Limit Levels** |
| Treated Effluent Discharged from Project Site | Monthly | pH | Within the range of 6 - 10 |
| | | Suspended Solids | 800 mg/L |
| | | Biochemical Oxygen Demand (BOD) (5 days, 20 $^{o}$C) | 800 mg/L |
| | | Chemical Oxygen Demand (COD) | 2000 mg/L |
| | | Oil & Grease | 50 mg/L |
| | | Sulphate | 1000 mg/L |
| | | Total Nitrogen | 200 mg/L |
| | | Total Phosphorus | 50 mg/L |
| Stormwater Discharge | Quarterly | pH | Within the range of 6 – 9 |
| | | Suspended Solids | 50 mg/L |
| | | Biochemical Oxygen Demand (BOD) (5 days, 20 $^{o}$C) | 50 mg/L |
| | | Chemical Oxygen Demand (COD) | 100 mg/L |
| | | Oil & Grease | 30 mg/L |
| * No action level was set in the WPCO Licence | | | |

| **Sulphur Content in Bio Heating Oil** | | |
|---|---|---|
| **Frequency** | **Parameter** | **Limit Levels** |
| Every tank load of the BHO for the BHO's sulphur content when the fuel tank(s) is being filled/refilled<br>• This original frequency shall be adopted in the first three months of using BHO on site. After the first three months of the original monitoring regime, if all monitoring result in the first three months meet the limit level, the frequency may be reduced to one test for every two refills for the next three months; and after the first six months, the monitoring may be conducted once a month.<br>• If exceedance occur, the monitoring shall be reverted to the original frequency of a test for every tank load of BHO, or at such a monitoring frequency to be advised and agreed by the EPD's Director. | Sulphur Content | 346 ppm |
| * No action level was set in the EP of the Project | | |

**APPENDIX C**
**Event and Action Plan**

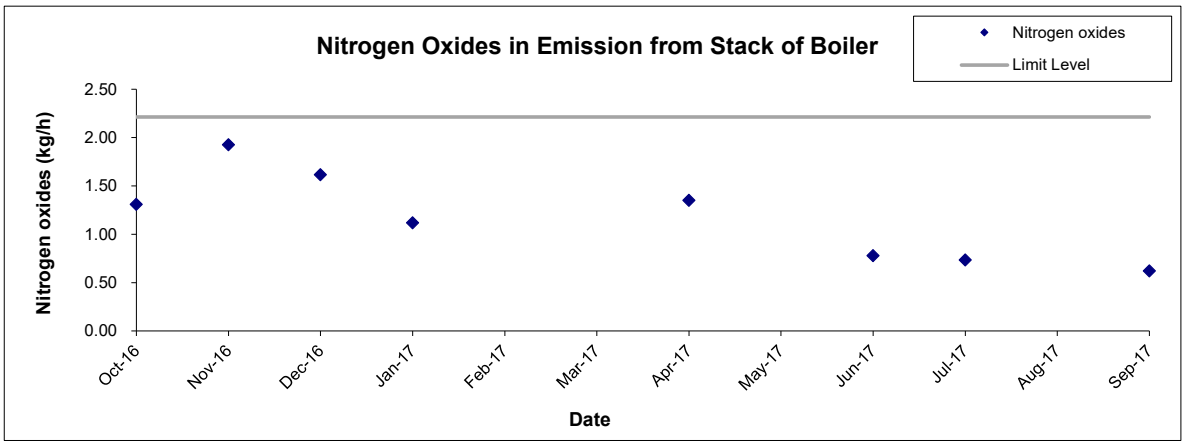
Appendix C Event and Action Plan

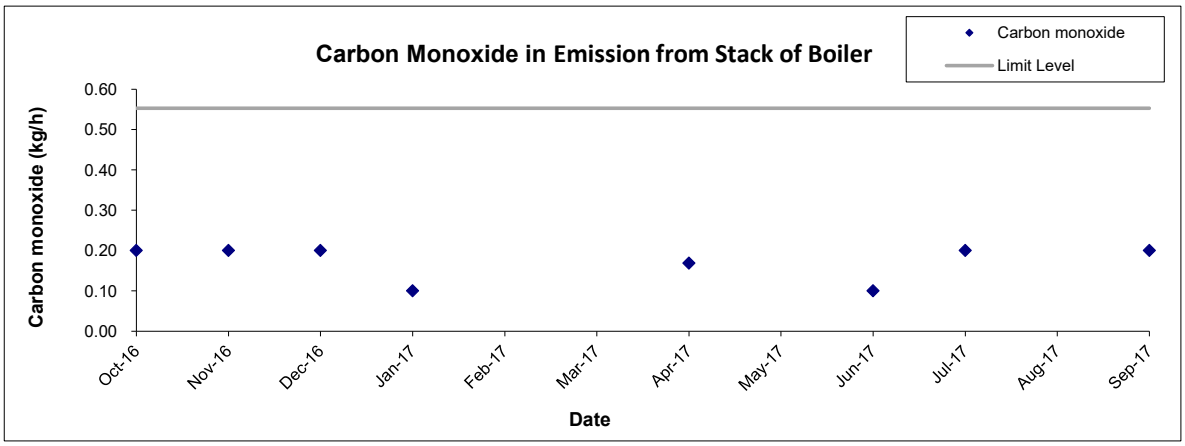
| **Air Quality** | | | |
|---|---|---|---|
| **Event** | **Actions** | | |
| | **ET Leader** | **IEC** | **Project Proponent** |
| Exceedance of Limit Level for stack emission from boiler, biogas flare, process building and final air scrubber | • Inform Project Proponent and IEC, and investigate and record the cause of exceedance within 24 hours<br>• Repeat measurement to confirm finding<br>• Identify source(s) and investigate the cause(s) of exceedance<br>• Inform Project Proponent whether the cause of exceedance is due to the Project<br>• Prepare the Notification of Exceedance within 24 hours<br>• Discuss remedial actions with the Project Proponent<br>• Assess the effectiveness of Project Proponent's remedial actions<br>• For the monitoring of emissions from the stacks of the boiler, biogas flare and process building, increase the monitoring frequency from half-yearly (for the second year onward) to monthly intervals. If results of three consecutive monthly monitoring show no exceedance of the limit level, the monitoring frequency will be reverted back to half-yearly intervals. | • Verify the Notification of Exceedance submitted by the ET Leader<br>• Check with the Project Proponent on the operating activities and implementation of control measures<br>• Discuss with ET Leader and Project Proponent on the possible remedial actions<br>• Advise the Project Proponent on the effectiveness of the proposed remedial measures<br>• Supervise implementation of remedial measures | • Rectify any unacceptable practice<br>• Amend working methods as required<br>• Implement amended working methods, if necessary |
| Exceedance of Action Level for odour | • Inform Project Proponent and IEC, and investigate and record the cause of exceedance within 24 hours<br>• Repeat measurement to confirm finding<br>• Identify source(s) / reason of exceedance or complain<br>• Prepare the odour complain form or the Notification of Exceedance within 24 hours<br>• Inform Project Proponent whether the cause of exceedance is due to the Project<br>• Discuss remedial actions with the Project Proponent<br>• During the second year of operation, if the action level is triggered, the frequency will be resumed to monthly until compliance with the action level for three consecutive months is obtained and the frequency will be reduced to quarterly intervals thereafter. | • Verify the Notification of Exceedance submitted by the ET Leader | • Rectify any unacceptable practice<br>• Amend working methods as required<br>• Implement amended working methods, if necessary |

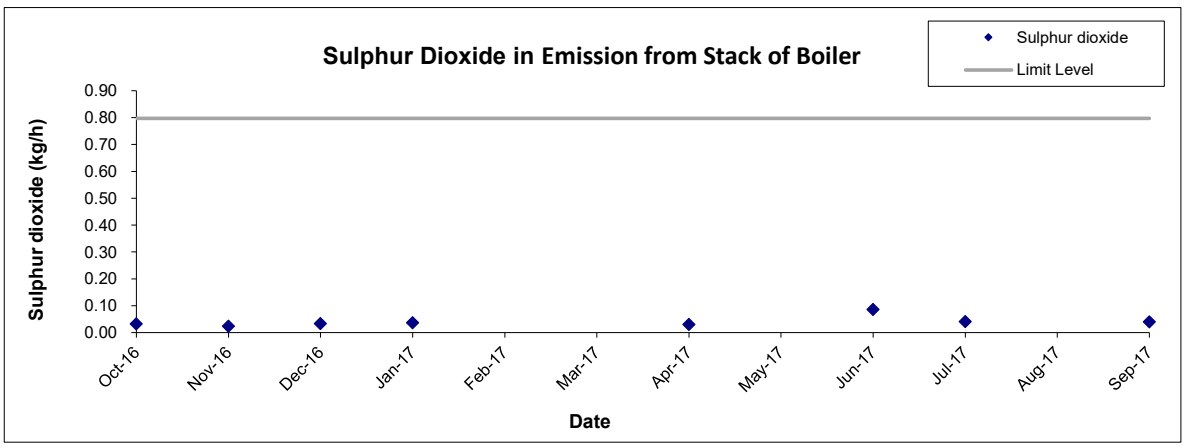
| | | | |
|---|---|---|---|
| Exceedance of Limit Level for odour | • Inform Project Proponent and IEC, and investigate and record the cause of exceedance within 24 hours<br>• Repeat measurement to confirm finding<br>• Identify source(s) / reason of exceedance or complain<br>• Prepare the odour complain form or the Notification of Exceedance within 24 hours<br>• Inform Project Proponent whether the cause of exceedance is due to the Project<br>• Assess the effectiveness of Project Proponent's remedial actions or amended design | • Verify the Notification of Exceedance submitted by the ET Leader<br>• Check with the Project Proponent on the operating activities and implementation of control measures<br>• Discuss with ET Leader and Project Proponent on the possible remedial actions<br>• Advise the Project Proponent on the effectiveness of the proposed remedial measures<br>• Supervise implementation of remedial measures | • Rectify any unacceptable practice<br>• Propose and implement remedial measures or amend design as required within 3 working days of notification<br>• Resubmit proposals if problem still not under control |

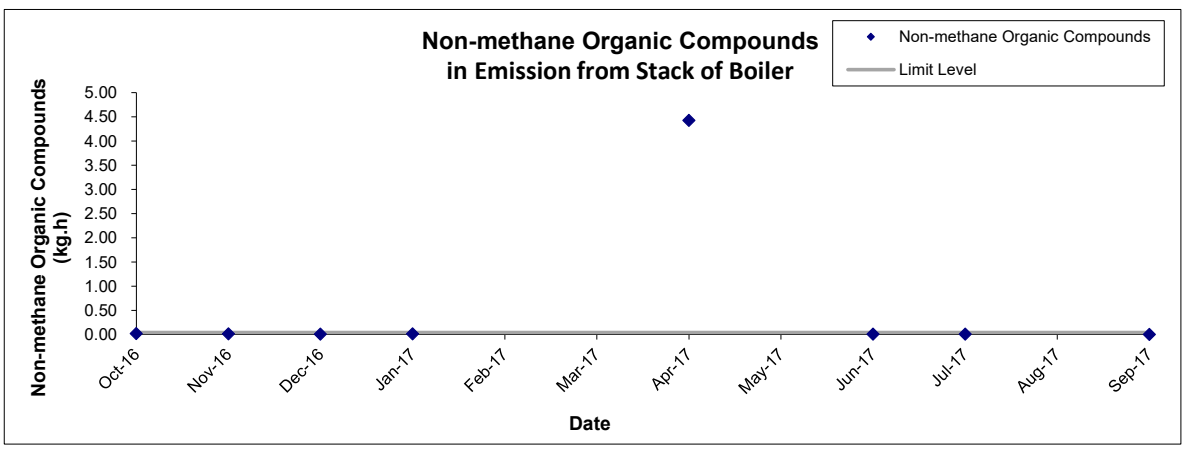
| **Water Quality** | | | |
|---|---|---|---|
| **Event** | **Actions** | | |
| | **ET Leader** | **IEC** | **Project Proponent** |
| Exceedance of Limit Level for Treated Effluent Discharged from Project Site | • Inform Project Proponent and IEC, and investigate and record the cause of exceedance within 24 hours<br>• Repeat measurement to confirm finding<br>• Identify source(s) and investigate the cause(s) of exceedance<br>• Prepare the Notification of Exceedance within 24 hours<br>• Discuss remedial actions with the Project Proponent<br>• Assess the effectiveness of Project Proponent's remedial actions | • Verify the Notification of Exceedance submitted by the ET Leader<br>• Check with Contractor on the operating activities and implementation of landfill gas control measures<br>• Discuss with ET Leader and Contractor on the possible remedial actions<br>• Advise the IC on the effectiveness of the proposed remedial measures<br>• Supervise implementation of remedial measures | • Check the performance of the on-site WWTP<br>• Rectify any unacceptable performance<br>• Carry out remedial measures or amend design as required<br>• Implement amended design, if necessary |
| Exceedance of Limit Level for Stormwater Discharged from the Project Site | • Inform Project Proponent and IEC, and investigate and record the cause of exceedance within 24 hours<br>• Repeat measurement to confirm finding<br>• Identify source(s) and investigate the cause(s) of exceedance<br>• Prepare the Notification of Exceedance within 24 hours<br>• Discuss remedial actions with the Project Proponent<br>• Assess the effectiveness of Project Proponent's remedial actions | • Verify the Notification of Exceedance submitted by the ET Leader<br>• Check with Project Proponent on the operating activities<br>• Discuss with ET Leader and Project Proponent on the possible remedial actions<br>• Advise the Project Proponent on the effectiveness of the proposed remedial measures<br>• Supervise implementation of remedial measures | • Propose and implement remedial measures or amend design as required<br>• Rectify any unacceptable practice<br>• Amend working methods as required<br>• Implement amended working methods, if necessary |

**APPENDIX D**
**Graphical Presentation of Monitoring Results – Air Quality**

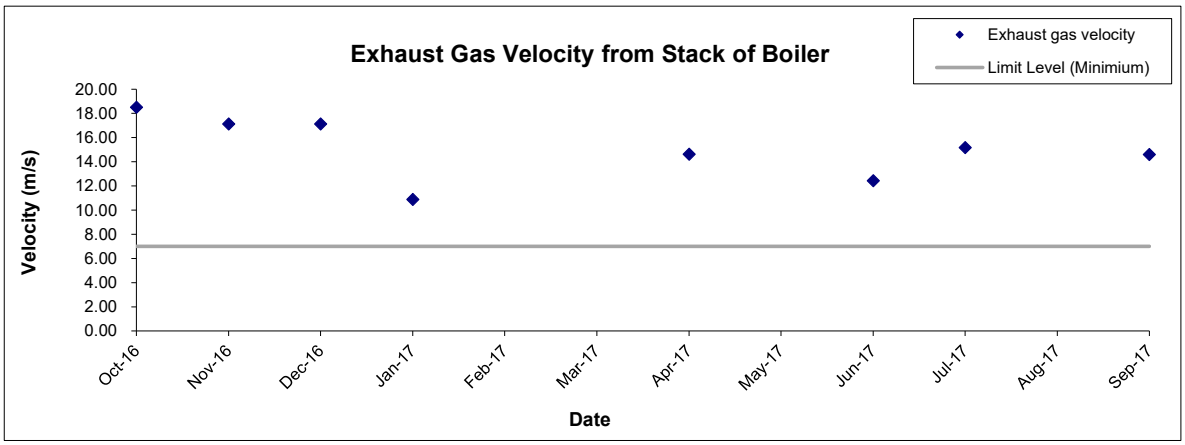


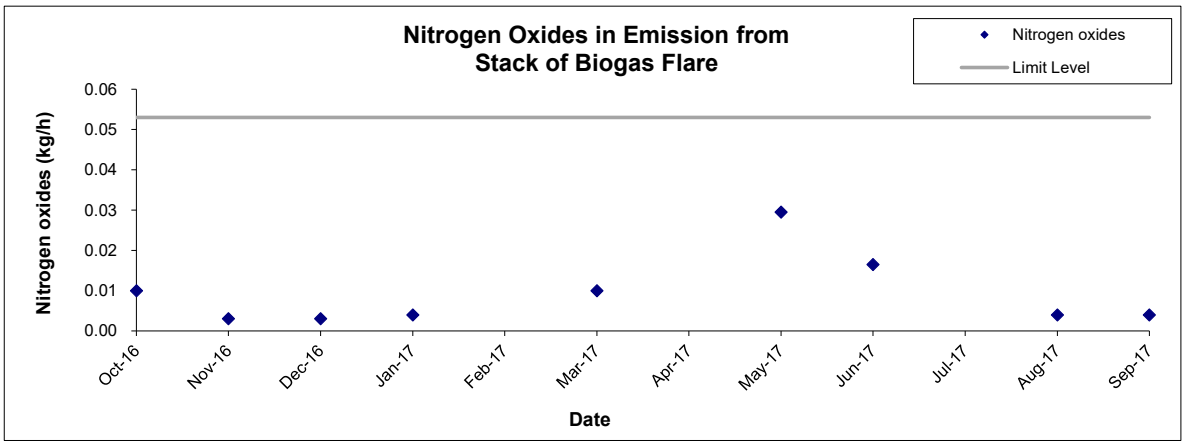



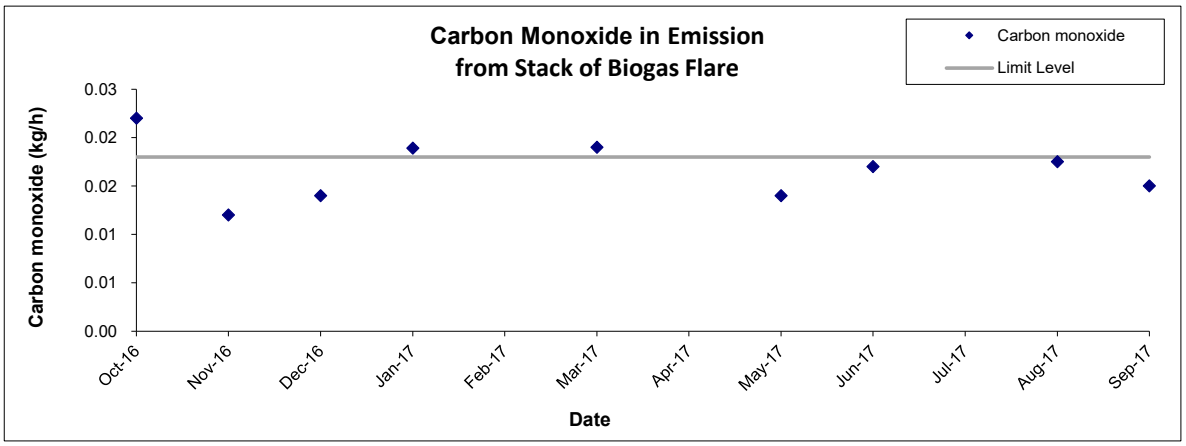

| | | | |
|---|---|---|---|
| Title: Development of a Biodiesel Plant at Tseung Kwan O Industrial Estate<br>Graphical Presentation of Monitoring Results – Air Quality (Emission from Stack of Boiler) | Scale: N.T.S<br>Date: Sep 17 | Project No.: MA15052<br>Appendix: D-1 | CINOTECH |

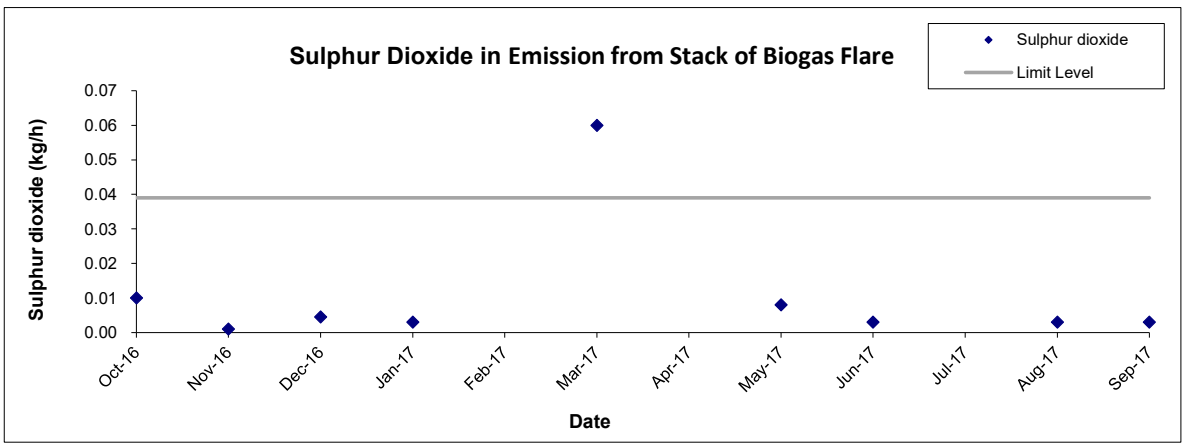


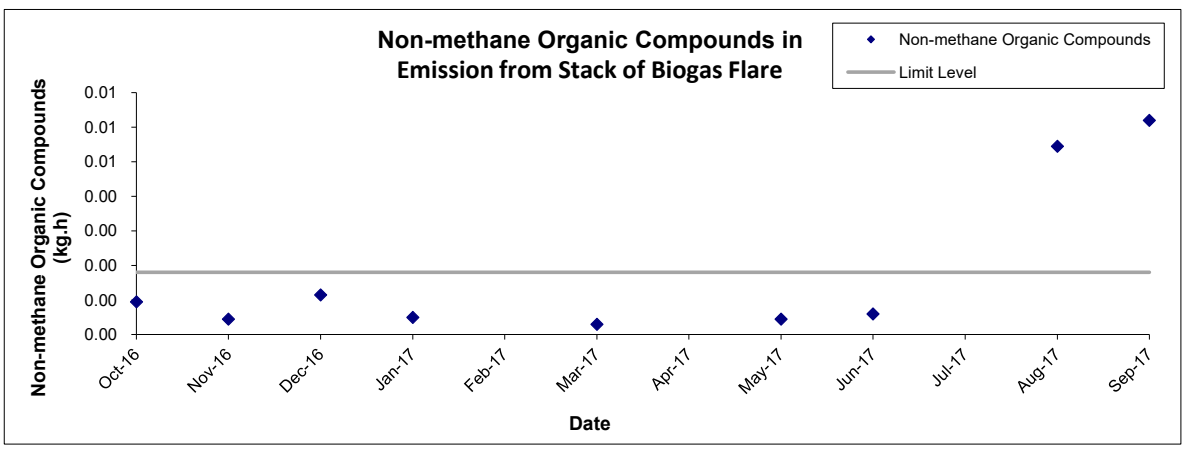

Remark: As there was no production in February 2017 due to lacking of feedstock, emission from stacks of boiler, biogas flare and process building cannot be sampled.
As there was limited production in March 2017 due to the lack of feedstock, emission from stacks of boiler and process building cannot be sampled.
As the boiler was under maintenance in May 2017, emission from stack of boiler cannot be sampled.
As maintenance work is required after Typhoon Hato, emission from stack of boiler in August 2017 cannot be sampled.

| Title | | Scale | Project No. | |
|---|---|---|---|---|
| Development of a Biodiesel Plant at Tseung Kwan O Industrial Estate | | N.T.S | MA15052 | CINOTECH |
| Graphical Presentation of Monitoring Results – Air Quality (Emission from Stack of Boiler) | | Date: Sep 17 | Appendix: D-2 | |



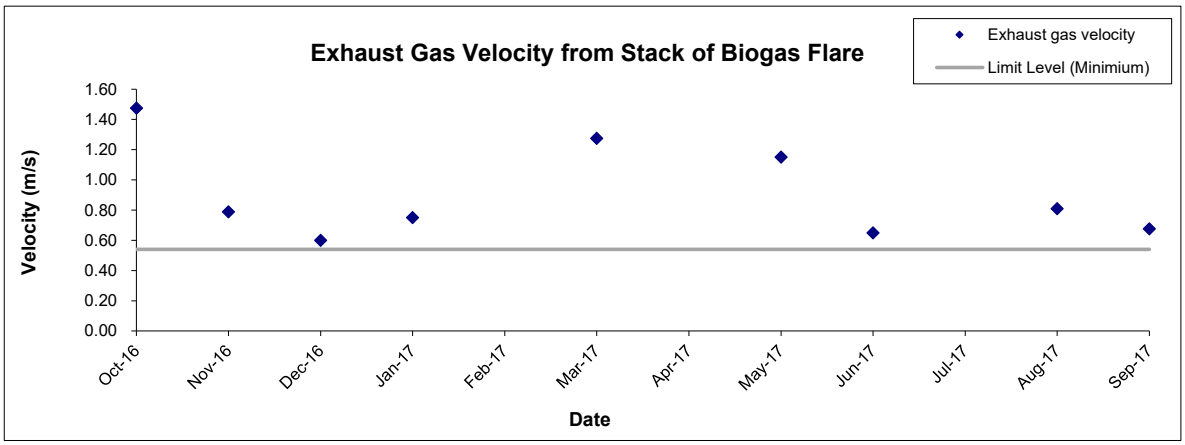



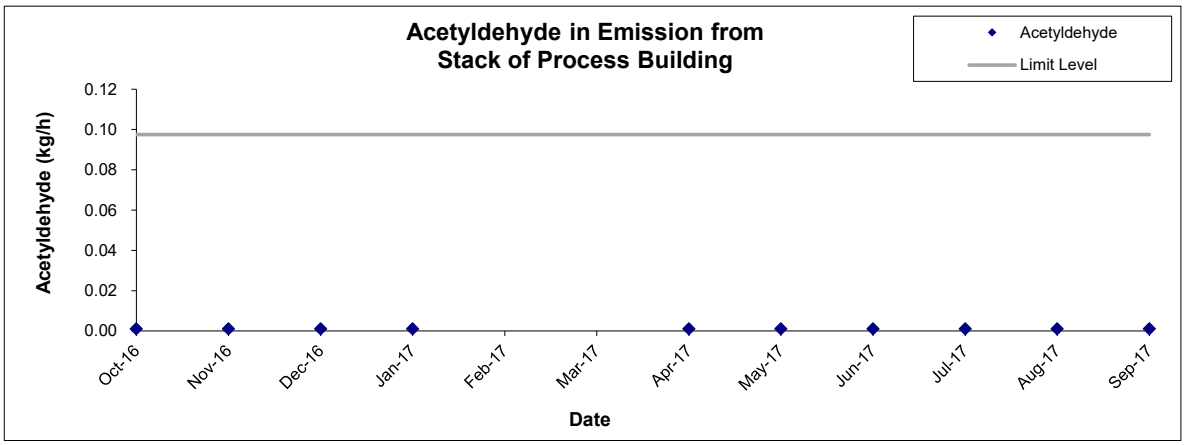

| Title | Scale | Project No. |
|---|---|---|
| Development of a Biodiesel Plant at Tseung Kwan O Industrial Estate | N.T.S | MA15052 |
| Graphical Presentation of Monitoring Results – Air Quality (Emission from Stack of Biogas Flare) | Date: Sep 17 | Appendix: D-3 |

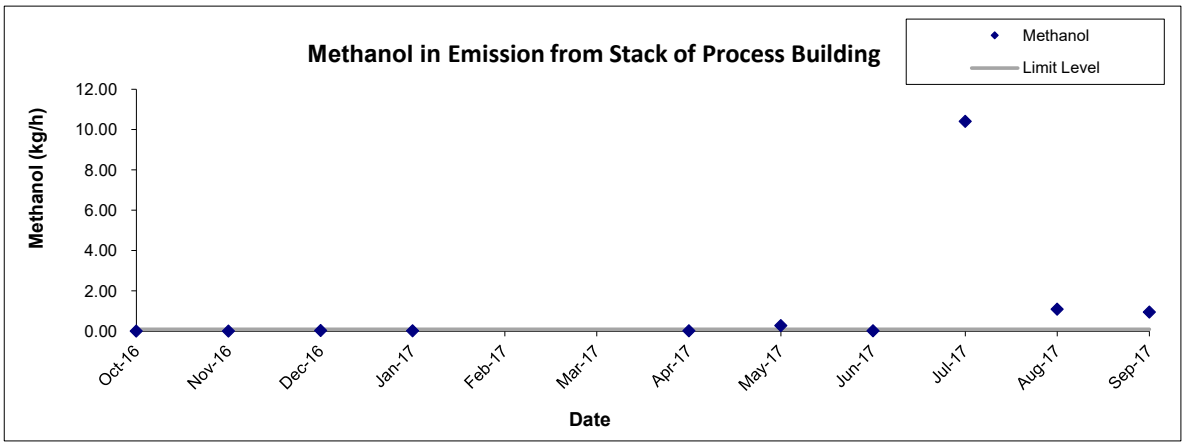
CINOTECH

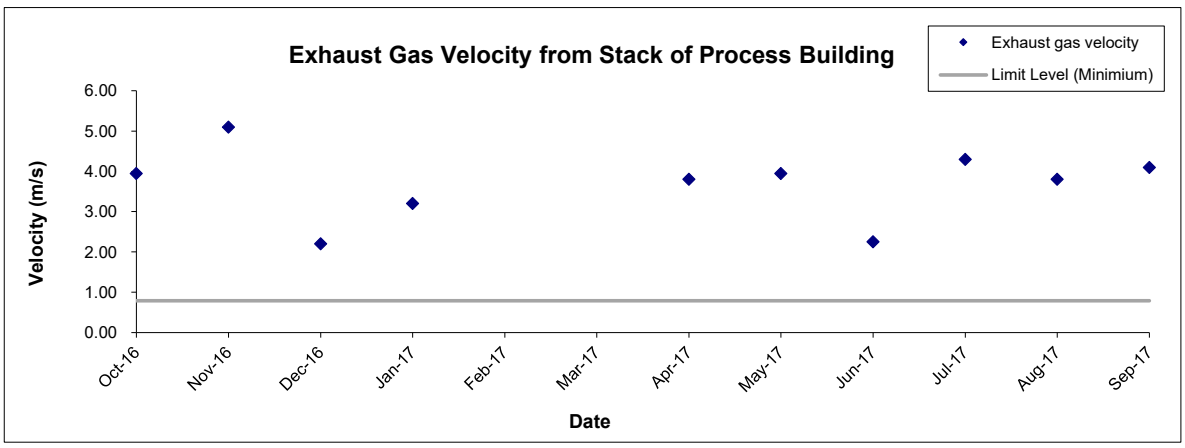



Remark: As there was no production in February 2017 due to lacking of feedstock, emission from stacks of boiler, biogas flare and process building cannot be sampled.
As there was limited biogas production in April 2017, emission from stack of biogas flare cannot be sampled.
As the wastewater treatment plant is under maintenance (no biogas was generated) in July 2017, emission from stack of biogas flare cannot be sampled.

| | | | |
|---|---|---|---|
| Title: Development of a Biodiesel Plant at Tseung Kwan O Industrial Estate<br>Graphical Presentation of Monitoring Results – Air Quality (Emission from Stack of Biogas Flare) | Scale: N.T.S<br>Date: Sep 17 | Project No.: MA15052<br>Appendix: D-4 | CINOTECH |

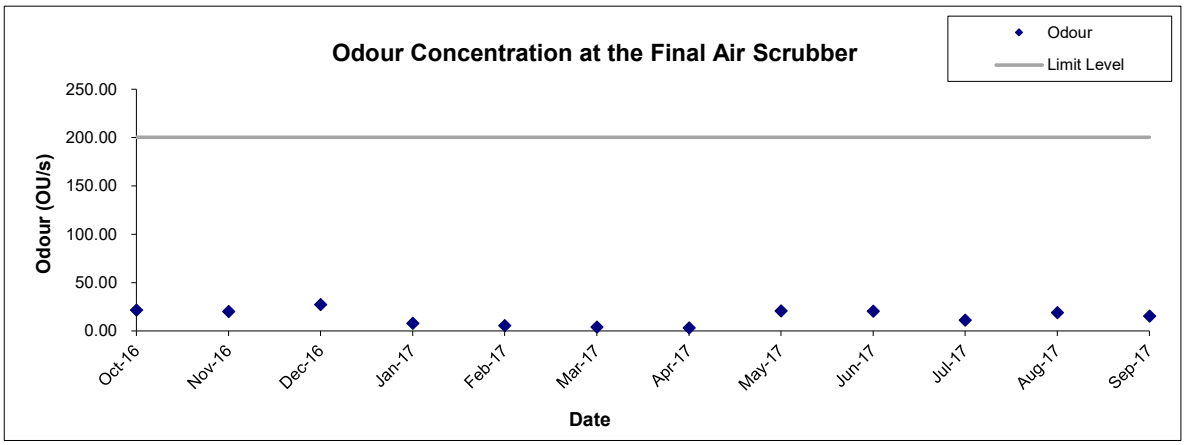


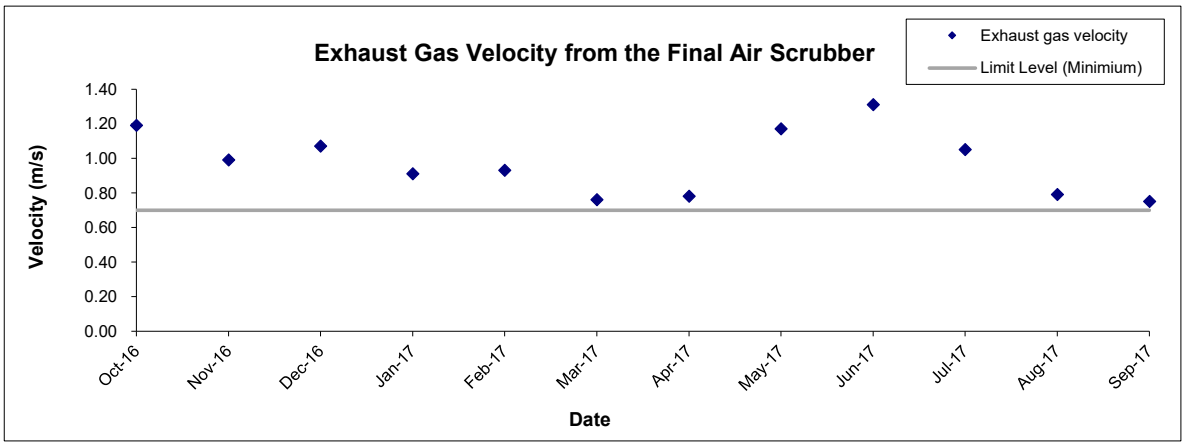



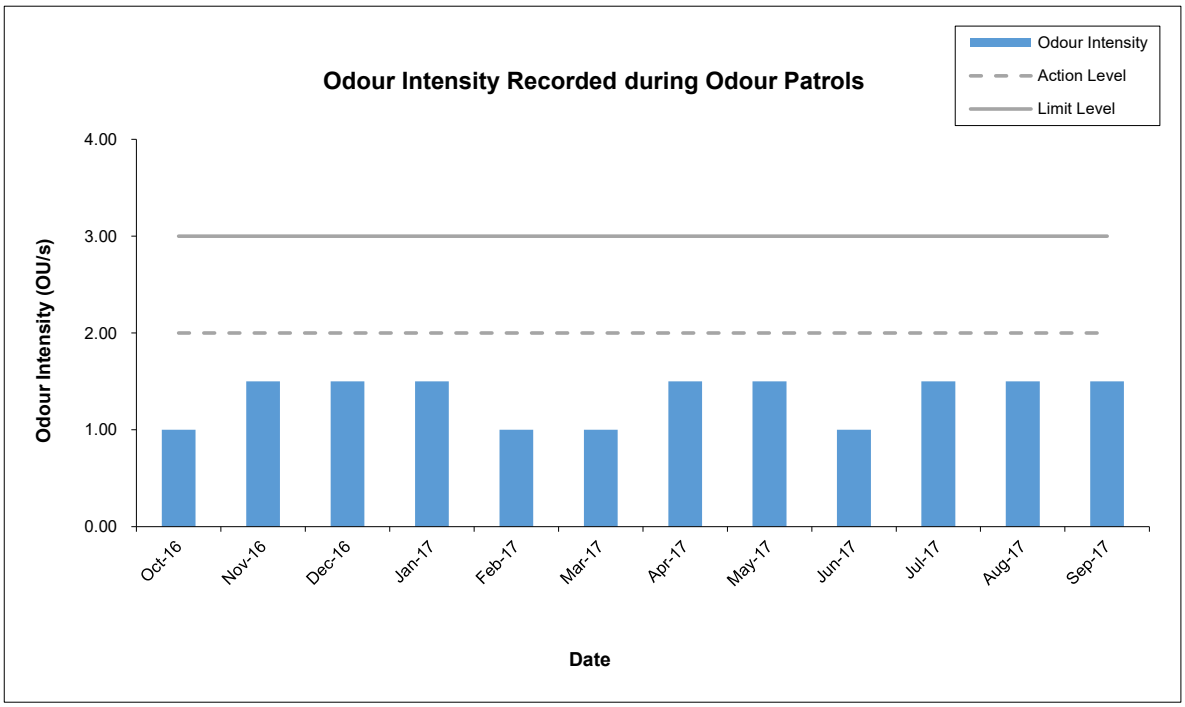

Remark: As there was no production in February 2017 due to lacking of feedstock, emission from stacks of boiler, biogas flare and process building cannot be sampled.
As there was limited production in March 2017 due to the lack of feedstock, emission from stacks of boiler and process building cannot be sampled.

| Title | | Scale | Project No. | |
|---|---|---|---|---|
| | Development of a Biodiesel Plant at Tseung Kwan O Industrial Estate | N.T.S | MA15052 | CINOTECH |
| Graphical Presentation of Monitoring Results – Air Quality (Emission from Stack of Process Building) | | Date: Sep 17 | Appendix: D-5 | |



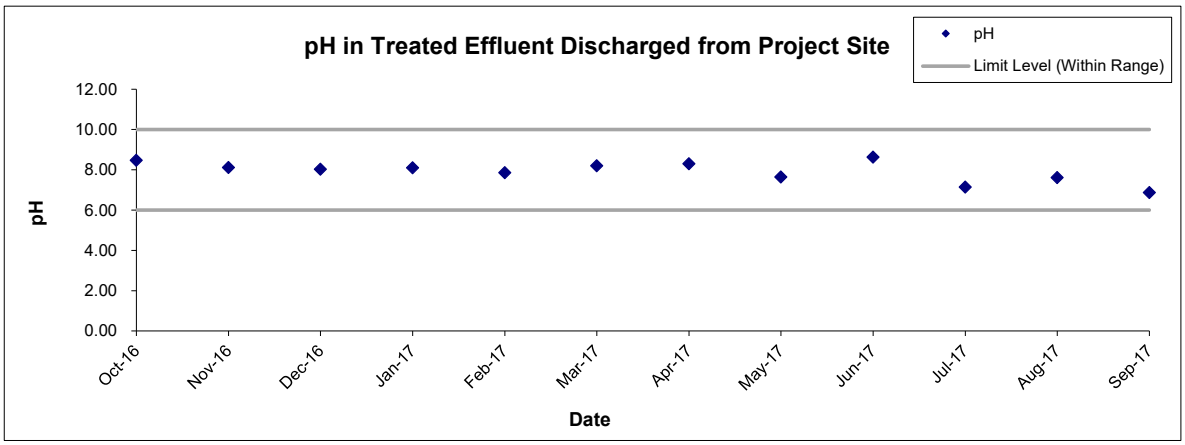



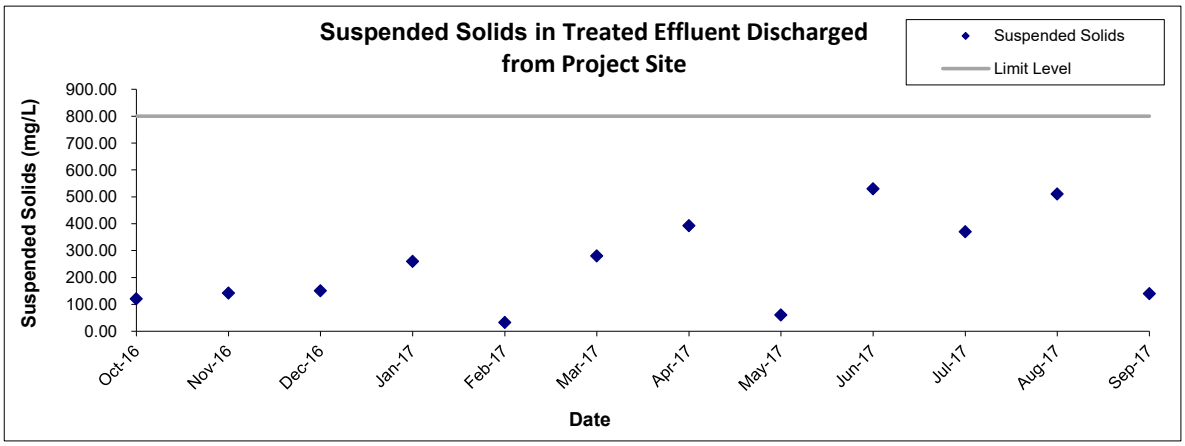

| | | | |
|---|---|---|---|
| Title: Development of a Biodiesel Plant at Tseung Kwan O Industrial Estate<br>Graphical Presentation of Monitoring Results – Air Quality (Odour Concentration at the Final Air Scrubber) | Scale: N.T.S<br>Date: Sep 17 | Project No.: MA15052<br>Appendix: D-6 | CINOTECH |

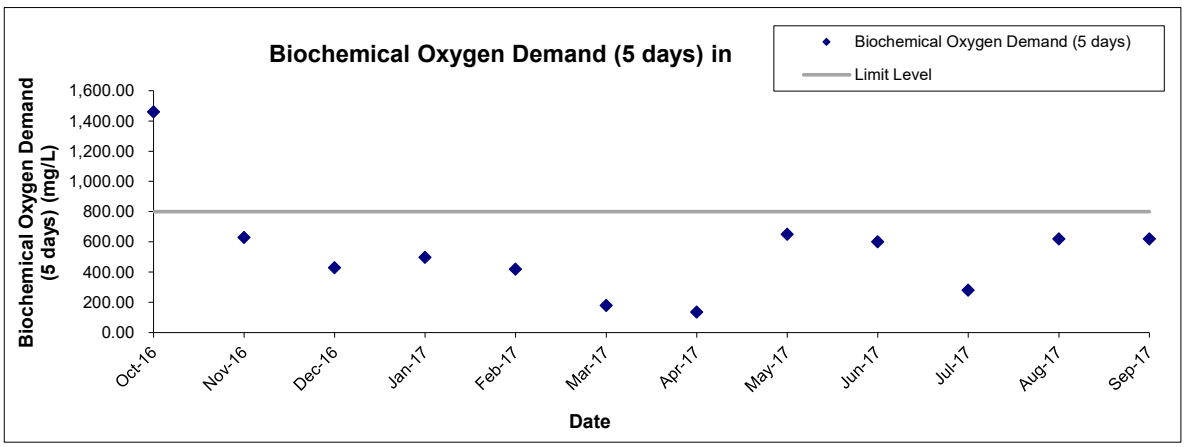


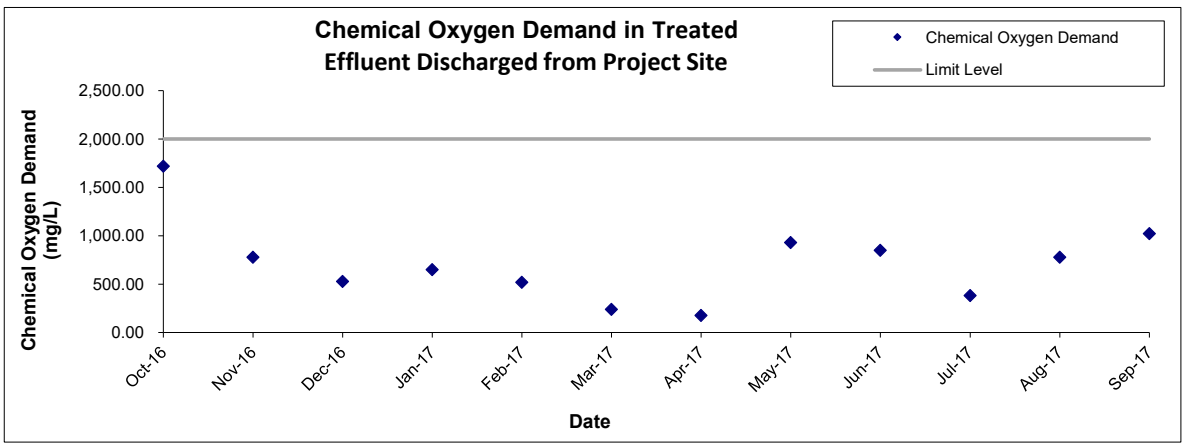

| | | | |
|---|---|---|---|
| Title: Development of a Biodiesel Plant at Tseung Kwan O Industrial Estate<br>Graphical Presentation of Monitoring Results – Air Quality (Odour Intensity Recorded during Odour Patrols) | Scale: N.T.S | Project No.: MA15052 | CINOTECH |
| | Date: Sep 17 | Appendix: D-7 | |

**APPENDIX E**
**Graphical Presentation of Monitoring Results – Water Quality**

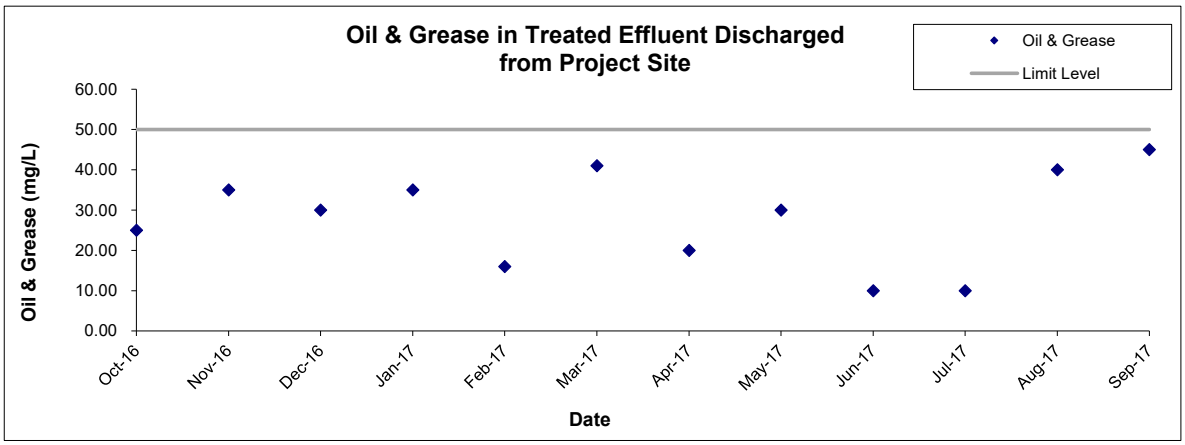


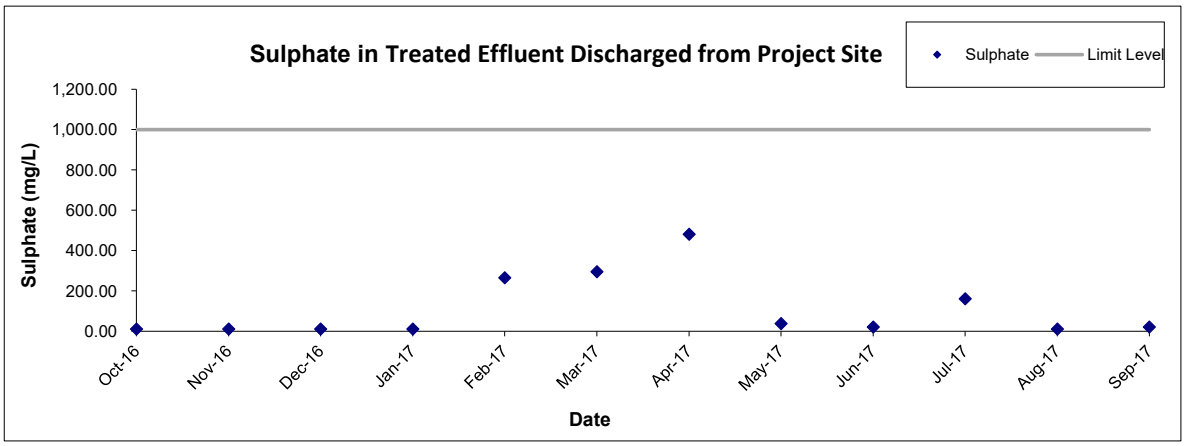



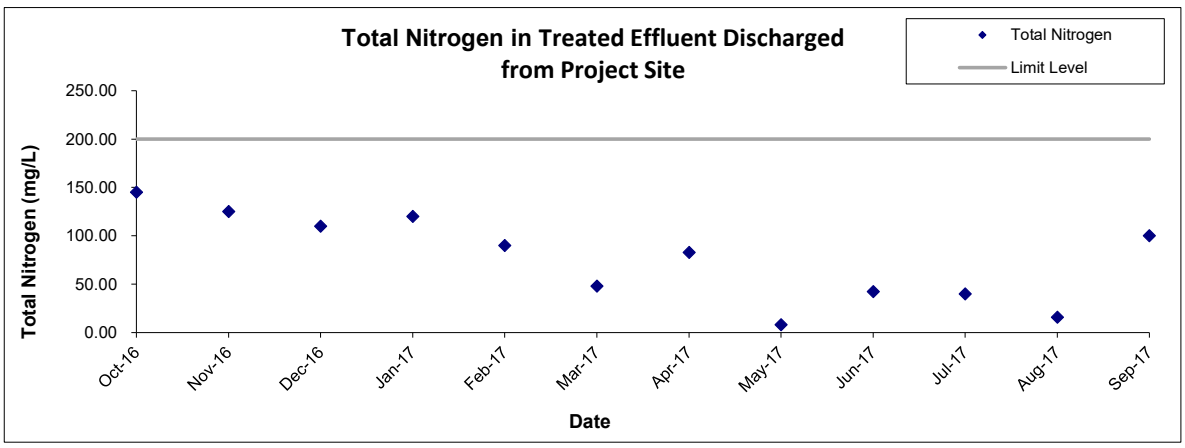



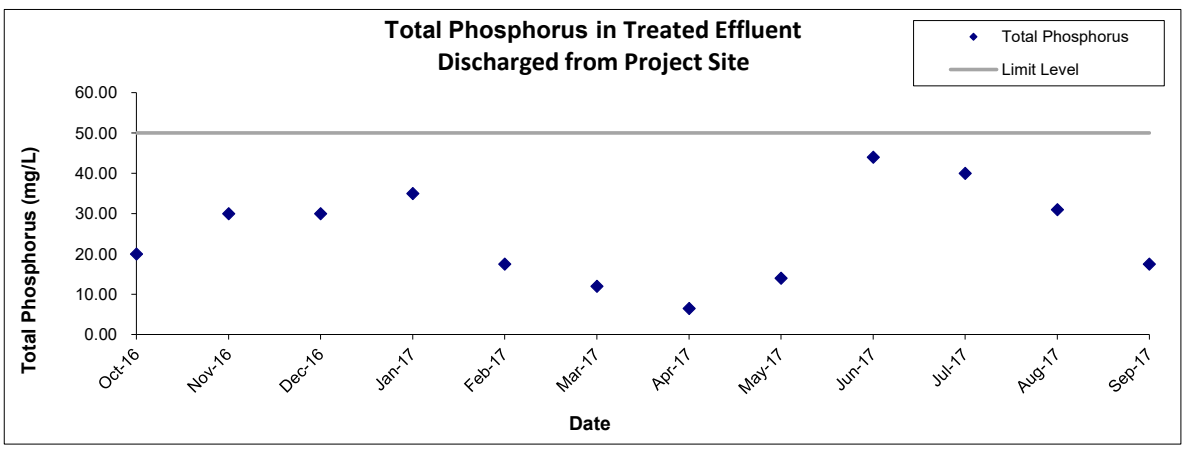




| | | | |
|---|---|---|---|
| Title: Development of a Biodiesel Plant at Tseung Kwan O Industrial Estate<br>Graphical Presentation of Monitoring Results – Water Quality (Treated Effluent Discharged from Project Site) | Scale: N.T.S | Project No.: MA15052 | CINOTECH |
| | Date: Sep 17 | Appendix: E-1 | |

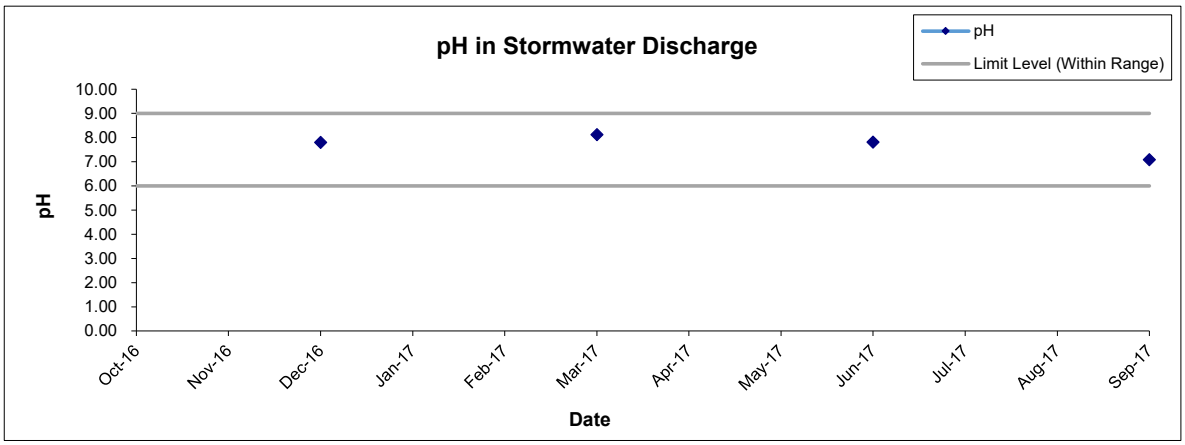


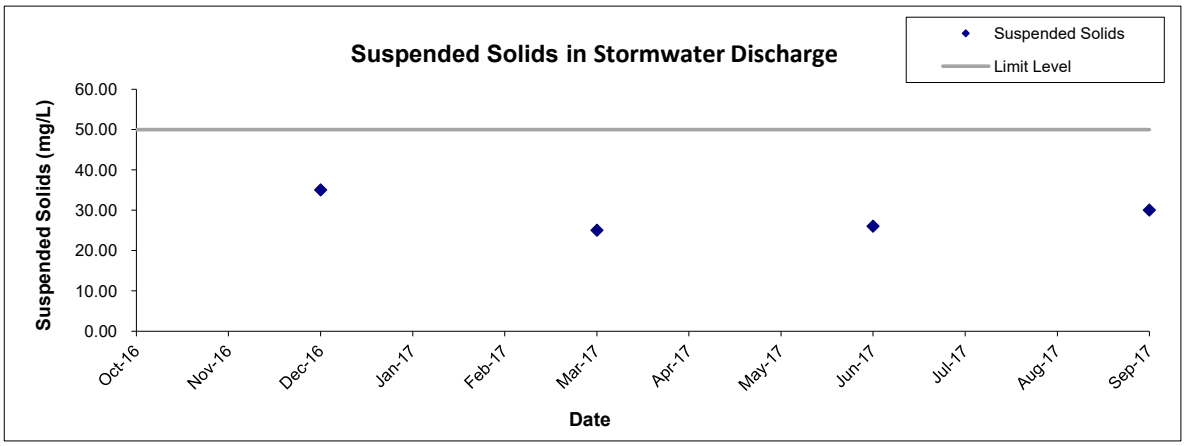



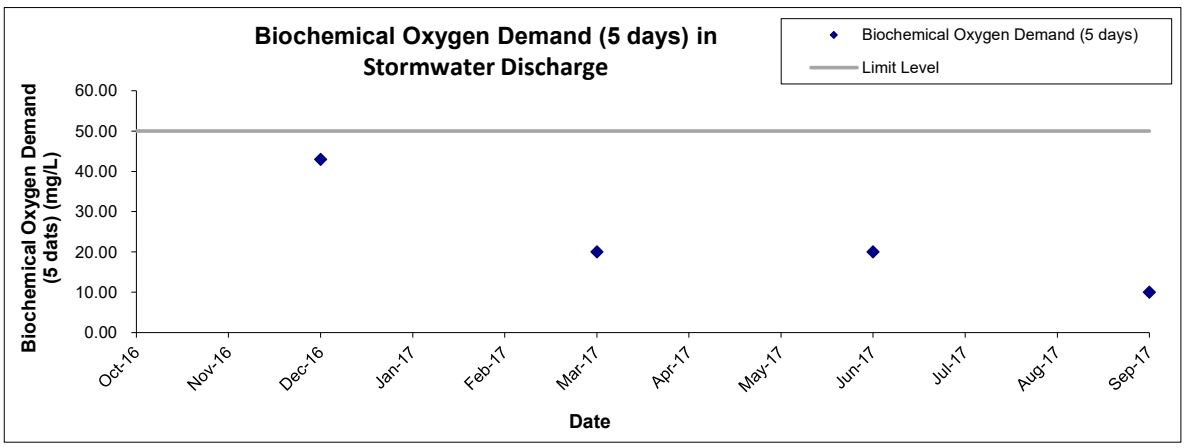



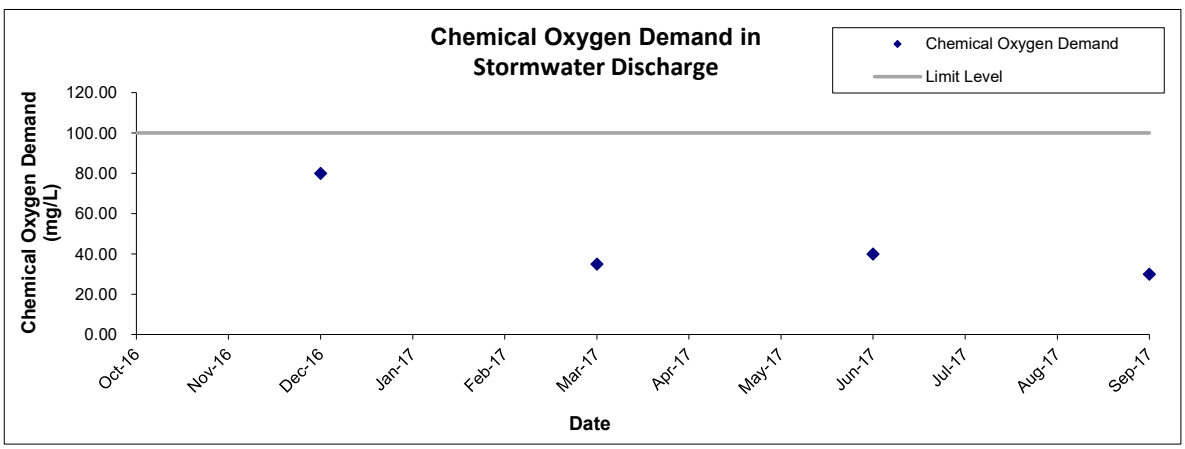




| | | | |
|---|---|---|---|
| Title: Development of a Biodiesel Plant at Tseung Kwan O Industrial Estate<br>Graphical Presentation of Monitoring Results – Water Quality (Treated Effluent Discharged from Project Site) | Scale: N.T.S | Project No.: MA15052 | CINOTECH |
| | Date: Sep 17 | Appendix: E-2 | |

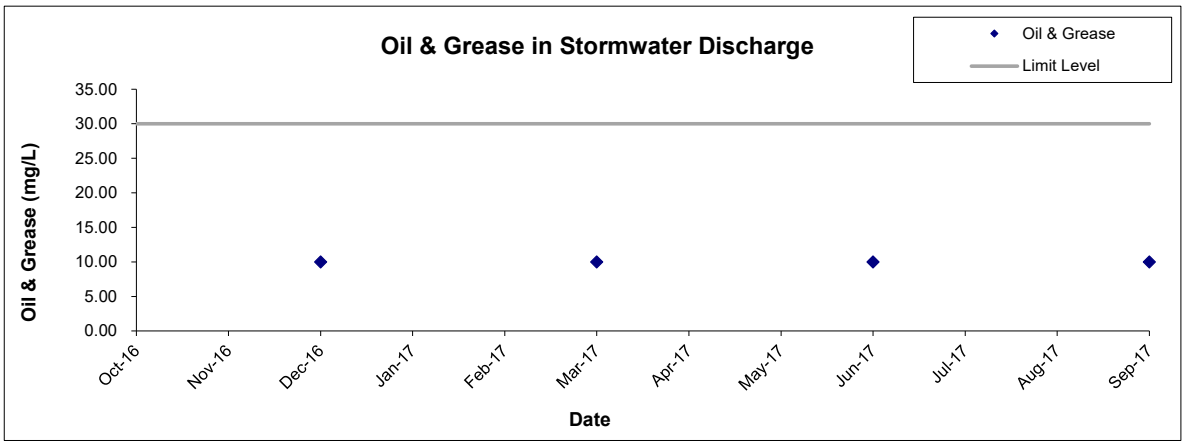


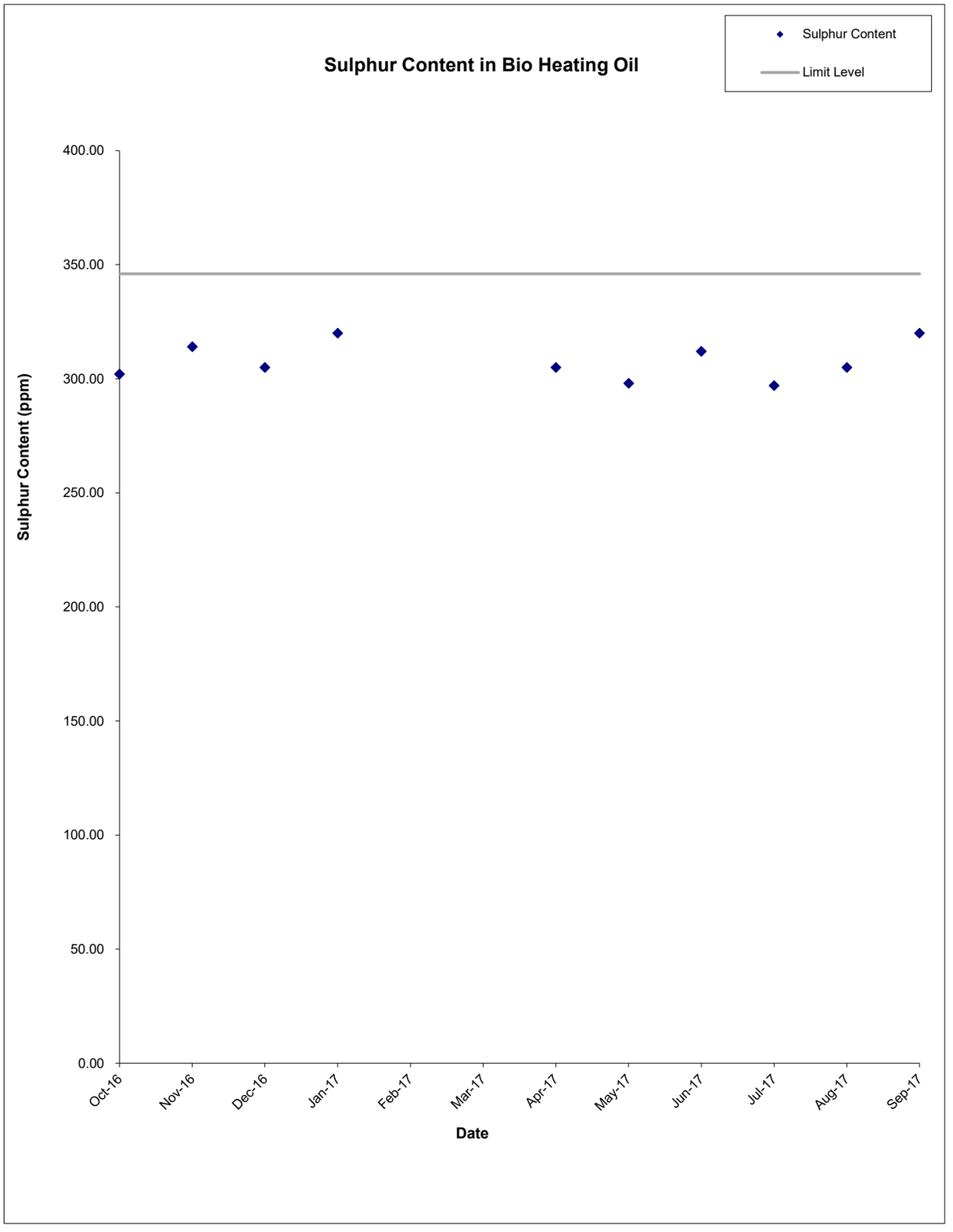




| | | | |
|---|---|---|---|
| Title: Development of a Biodiesel Plant at Tseung Kwan O Industrial Estate<br>Graphical Presentation of Monitoring Results – Water Quality (Stormwater Discharge) | Scale: N.T.S | Project No.: MA15052 | CINOTECH |
| | Date: Sep 17 | Appendix: E-3 | |




| | | | |
|---|---|---|---|
| Title: Development of a Biodiesel Plant at Tseung Kwan O Industrial Estate<br>Graphical Presentation of Monitoring Results – Water Quality (Stormwater Discharge) | Scale: N.T.S | Project No.: MA15052 | CINOTECH |
| | Date: Sep 17 | Appendix: E-4 | |

**APPENDIX F**
**Graphical Presentation of Monitoring Results – Sulphur Content in Bio Heating Oil**




Remarks: As the BHO tank was not filled/refilled in February and March 2017, no monitoring was carried out in these reporting months.

| | | | |
|---|---|---|---|
| Title: Development of a Biodiesel Plant at Tseung Kwan O Industrial Estate<br>Graphical Presentation of Monitoring Results – Sulphur Content in Bio Heating Oil | Scale: N.T.S<br>Date: Sep 17 | Project No.: MA15052<br>Appendix: F | CINOTECH |

**APPENDIX G**
**Exceedance Report**

## Exceedance Report

(A) Exceedance Report for Air Quality

| Environmental Monitoring | Sources | Parameter | No. of Exceedance | |
|---|---|---|---|---|
| | | | Action Level | Limit Level |
| Air Quality | Stack of Boiler | Nitrogen oxides ($NO_X$) | N.A. | 0 |
| | | Carbon monoxide (CO) | N.A. | 0 |
| | | Sulphur dioxide ($SO_2$) | N.A. | 0 |
| | | Non-methane Organic Compounds (NMOC) | N.A. | 0 |
| | | Exhaust gas velocity | N.A. | 0 |
| | Stack of Biogas Flare | Nitrogen oxides ($NO_X$) | N.A. | 0 |
| | | Carbon monoxide (CO) | N.A. | 0 |
| | | Sulphur dioxide ($SO_2$) | N.A. | 0 |
| | | Non-methane Organic Compounds (NMOC) | N.A. | 2 |
| | | Exhaust gas velocity | N.A. | 0 |
| | Stack of Process Building | Acetyldehyde | N.A. | 0 |
| | | Methanol | N.A. | 3 |
| | | Exhaust gas velocity | N.A. | 0 |
| | Odour Concentrations at the Final Air Scrubber | Odour | N.A. | 0 |
| | | Exhaust gas velocity | N.A. | 0 |
| | Odour Patrols | Odour | 1 | 0 |

(B) Exceedance Report for Water Quality

| Environmental Monitoring | Sources | Parameter | No. of Exceedance | |
|---|---|---|---|---|
| | | | Action Level | Limit Level |
| Water Quality | Treated Effluent Discharged from Project Site | pH | N.A. | 0 |
| | | Suspended Solids | N.A. | 0 |
| | | Biochemical Oxygen Demand (BOD) (5 days, 20°C | N.A. | 0 |
| | | Chemical Oxygen Demand (COD) | N.A. | 0 |
| | | Oil & Grease | N.A. | 0 |
| | | Sulphate | N.A. | 0 |
| | | Total Nitrogen | N.A. | 0 |
| | | Total Phosphorus | N.A. | 0 |
| | Stormwater Discharge | pH | N.A. | 0 |
| | | Suspended Solids | N.A. | 0 |
| | | Biochemical Oxygen Demand (BOD) (5 days, 20°C | N.A. | 0 |
| | | Chemical Oxygen Demand (COD) | N.A. | 0 |
| | | Oil & Grease | N.A. | 0 |

(C) Exceedance Report for Sulphur Content in Bio Heating Oil

| Parameter | No. of Exceedance | |
|---|---|---|
| | Action Level | Limit Level |
| Sulphur Content | N.A. | 0 |

**APPENDIX H**
**Complaint Log**

## APPENDIX H – COMPLAINT LOG

**Reporting Quarter**: July – September 2017

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
|---|---|---|---|---|---|
| COM-2016-09-001 | Not Specified | 24th September, 2016 | 2 Gammon engineers complained about strong odour and oily discharge at 9:15 am | The incident was due to the pump P101A was tripped and leaded to an overflow of wastewater at Influent Pit T101.<br>According to the project proponent, at 8:45 am, high level alarm at Level Indicator of T101 was triggered and the water level in Influent Pit T101 was over 100%. Investigation found out that wastewater was flooding from Bar Screen Room to road because the pump P101A was not operating in the field (although the pump was indicated operating in Process Control System).<br>Operator then immediately stopped the wastewater feeding to Influent Pit T101, and put sand bags around the stormwater grating outside the pedestrian walkway of Bar Screen Room to block wastewater leaking into storm water drainage. Afterwards, operator cleaned up the area. The problem was resolved at 10:30 am at the same day, and no irritation smell was sensed outside the project site.<br>To prevent recurrence, the following measures are recommended:<br>- Cover the storm water grating outside the bar screen room pedestrian walkway by steel plate;<br>- Modify the pump P101A temporary control circuit to feedback overload trip signal back to Process Control System. Maintenance will set up periodic inspection programme to monitor pump performance; and<br>- Review the emergency handling procedures. | Closed |
| COM-2016-10-002 | Not Specified | 5th October, 2016 | EPD referred that a councilor complained about constant smell released from the Project | Investigation found out that housekeeping of the plant was unsatisfactory and improvements are required.<br>Operator has improved housekeeping, including:<br>- Always keep the gate of the grease trap waste screening room closed;<br>- Always keep sludge containers closed;<br>- Frequent cleaning of drainage system; and<br>- Always keep the work site clean and tidy | Closed |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
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| COM-2016-10-003 | Not Specified | 18th October, 2016 | EPD referred that a complaint on malodour from the Project was received on 11th October 2016 | Investigation found no process upset during that week.<br>Operator has put the best effort housekeeping (e.g. keeping sludge containers and rooms closed and frequent cleaning of drainage system), and staff have been trained on housekeeping. | Closed |
| COM-2017-02-004 | Not Specified | 6th February, 2017 | EPD referred complaints from Drainage Service Department (DSD) and neighboring sites regarding the blockage of public sewerage system along Chun Wang Street. DSD reported to EPD that some oily substances and debris had blocked the sewerage system. | Investigation found similar substances (i.e. oily substances and debris) at the foul manhole within the Plant. Investigation also found that untreated effluent was discharged to a foul manhole within the Plant.<br>Follow-up action (i.e. cleaning of internal sewerage system, from FMH01 to TFMH01) was carried out in early February. In addition, operator has put the best effort (e.g. carry out staff training) to ensure that all effluent are treated properly by wastewater treatment facilities before discharge. | Closed |
| COM-2017-07-005 | Not Specified | 4th July, 2017 | EPD referred that resident of LOHAS Park complained operation of ASB plant caused noise nuisance (low frequency machinery noise continuously round the clock) and emitted unpleasant malodour on 19 June, 2017. | <u>Noise Nuisance</u><br>Since there are other noise sources which operate continuously round the clock (e.g. cooling tower from other buildings) between the Project Site and LOHAS Park, the noise nuisance could be due to other noise sources. In addition, investigation found no process upset on that day. Considering the long distance (at least 900m) between the Project Site and LOHAS Park, the noise nuisance may not be caused by the operator.<br><u>Unpleasant Malodour</u><br>Investigation found no process upset during the week. Since the regular odour monitoring (i.e. odour measurement at the Final Air Scrubber and odour patrol along Site boundary) did not report any exceedance event (except this complaint) in June and July 2017, the unpleasant malodour may not be caused by the Project considering the long distance (at least 900m) between the Project Site and LOHAS Park.<br>Operator has, and will, put the best effort housekeeping (e.g. keeping sludge containers and rooms closed and frequent cleaning of drainage system) to minimize odour nuisance. | Closed |

| Log Ref. | Location | Received Date | Details of Complaint | Investigation/Mitigation Action | Status |
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| COM-2017-07-006 | Stack of Boiler | 4th July, 2017 | EPD referred that a complaint on continuous dark smoke emission from Stack of Boiler on 30 June, 2017 at about 6 pm. | Investigation found that a Pressure Control Valve had malfunctioned, causing unsteady oil flow into burner. This led to a low air to fuel ratio which ultimately led to dark smoke emission.<br>The Valve was repaired on 1st July 2017 morning, and no dark smoke was emitted. | Closed |