MATERIALAB CONSULTANTS LIMITED
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Website : www.fugro.com

Date : 14 August 2018
Our Ref. : MCL/ED/0396/2018/C

The EIA Ordinance Register Office,
Environmental Protection Department
27/F., Southorn Centre,
130 Hennessy Road,
Wanchai, Hong Kong

BY HAND

Attn.: Mr. Matthew Tang

Dear Sir,

Agreement No. CE 21/2014 (EP)
Environmental Monitoring and Audit (EM&A) for Operation of
Tai Po Sewage Treatment Works Stage V Phase 2B – Investigation
EP Condition 6.6 – Monthly EM&A Report

Pursuant to Condition 6.6 of the Environmental Permit (EP No. EP-265/2007/A) for the captioned contract, we are pleased to submit the certified Monthly EM&A Report for January 2018 for your retention.

Should you require further information, please do not hesitate to contact our Mr. Vincent Lu at 3565 4158 or the undersigned at 3565 4114.

Assuring you of our best attention at all times.

Yours faithfully,
for and on behalf of
MATERIALAB – WASTE
& ENVIRONMENTAL TECHNOLOGIES JOINT VENTURE

Colin Yung
Environmental Team Leader

CY/vl

c.c. DSD – Ms. Ricky Lau
Mott MacDonald – Ms. Dulcie Chan, Mr. Thomas Chan

MOTT MACDONALD

Mr. LEUNG Wing Yuen
Chief Engineer/Sewerage Projects
Drainage Services Department
Projects and Development Branch
Sewerage Projects Division
44/F, Revenue Tower,
5 Gloucester Road,
Wan Chai, Hong Kong

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mottmac.hk

Contract No. SPW 09/2016
Independent Environmental Checker for Environmental Monitoring and Audit for Operation of Tai Po Sewage Treatment Works Stage 5 Phase 2B
EP Condition 6.6 – Monthly EM&A Report

13 August 2018

Dear Sir,

With reference to the ET's letter ref: MCL/ED/0380/2018/C dated 8 August 2018 associated with the revised Monthly EM&A Report for January 2018 (submitted on 3 August 2018), we have no further comment.

This letter serves as verification of the captioned submission in line with the requirements as set out in the EM&A Manual.

Should you have any queries, please feel free to contact the undersigned at 2828 5970.

Yours faithfully
FOR MOTT MACDONALD HONG KONG LIMITED

Dulcie Chan
Independent Environmental Checker
T 2828 5970
Dulcie.Chan@mottmac.com

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Website : www.fugro.com

Date : 8 August 2018
Our Ref. : MCL/ED/0380/2018/C

Mott MacDonald Hong Kong Limited
3/F, Mapletree Bay Point
348 Kwun Tong Road
Kowloon
Hong Kong

BY HAND

Attn.: Ms. Dulcie Chan, IEC

Dear Madam,

Agreement No. CE 21/2014 (EP)
Environmental Monitoring and Audit (EM&A) for Operation of
Tai Po Sewage Treatment Works Stage V Phase 2B – Investigation
EP Condition 6.6 – Monthly EM&A Report

Pursuant to Condition 6.6 of the Environmental Permit (EP No. EP-265/2007/A) for the captioned contract, we are pleased to submit the certified Monthly EM&A Report for January 2018 for your onward submission.

Should you require further information, please do not hesitate to contact our Mr. Vincent Lu at 3565 4158 or the undersigned at 3565 4114.

Assuring you of our best attention at all times.

Yours faithfully,
for and on behalf of
MATERIALAB – WASTE
& ENVIRONMENTAL TECHNOLOGIES JOINT VENTURE

Colin Yung
Environmental Team Leader

CY/vl

Encl.

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MONTHLY ENVIRONMENTAL MONITORING & AUDIT REPORT

January 2018

Client : Drainage Services Department

Project : Agreement No. CE 21/2014(EP) Environmental Monitoring and Audit (EM&A) for Operation of Tai Po Sewage Treatment Works Stage V Phase 2B – Investigation

Report No. : 0151/15/ED/1035

Prepared by: Vincent Lu & Kelvin Kwong

Certified by: _____
Colin Yung
Environmental Team Leader

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EXECUTIVE SUMMARY

This Monthly Environmental Monitoring and Audit (EM&A) Report is prepared for Agreement No. CE 21/2014 (EP) – "Environmental Monitoring and Audit for Operation of Tai Po Sewage Treatment Works Stage V Phase 2B – Investigation" (hereafter referred to as "the Assignment") for the Drainage Services Department (DSD) of Hong Kong Special Administrative Region. MateriaLab – Waste & Environmental Technologies Joint Venture (hereafter referred to as "MLAB") was appointed as the Environmental Team by DSD.

The Assignment is part of the Tai Po Sewage Treatment Works (TPSTW) Stage V extension (hereinafter referred as "the Project") which is a Designated Project under Schedule 2 of the Environmental Impact Assessment (EIA) Ordinance (Cap. 499) and for which an EIA Report (Register No. AEIAR-145/2009) was prepared and approved. The Environmental Permit (EP) for TPSTW Stage V, namely No. EP-265/2007 was issued in March 2007. A Variation Environmental Permit (VEP) EP-265/2007/A was issued on 30 April 2014. These documents are available through the EIA Ordinance Register.

Commencement of the Assignment took place on 9 June 2015 while the operation phase of EM&A programme commenced on 1 March 2016.

This is the twenty-third Monthly EM&A Report for the Assignment which summaries the progress of the EM&A programme during the reporting period from 1 January 2018 to 31 January 2018 (the "reporting period"). The monthly EM&A programme was undertaken in accordance with the EM&A Manual for TPSTW Stage V. According to the EM&A Manual, air quality and marine water quality are the key environmental concerns from the Project.

Breaches of Action and Limit Levels

Air quality monitoring was carried out from 12 January 2018 to 13 January 2018. Exceedances of Action/Limit levels at three ASRs (AS1, AS4 and AS12) were recorded.

There was no marine water quality impact monitoring and seawater intake monitoring conducted during this reporting period and therefore, no marine water quality monitoring and seawater intake monitoring result is reported.

Complaint Log

There were no complaints received in relation to the environmental impact during the reporting period.

Notifications of Summons and Successful Prosecutions

There were no notifications of summons or prosecutions received during this reporting period.

Reporting Changes

There was no reporting change during the reporting period.

Future key issues

There were no construction activities and no future key issue is reported during this reporting period.

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1. INTRODUCTION

1.1 Background

1.1.1 Tai Po Sewage Treatment Works (TPSTW) is located within the Tai Po Industrial Estate. It currently comprises four Stages: I, II, IVA and IVB works. The TPSTW Stage V aims to upgrade the existing TPSTW to provide additional sewage treatment capacity from the present design flow of 88,000 m^3/day to 130,000 m^3/day to meet the demands of both existing and future developments and to meet the revised discharge license requirements. The TPSTW Stage V will be implemented in two phases, i.e. Phase 1 and Phase 2. The design capacity of Phase 1 is 100,000 m^3/day and Phase 2 is 130,000 m^3/day.

1.1.2 The TPSTW Stage V is a Designated Project under the Environmental Impact Assessment Ordinance (Cap. 449). A study of Environmental Impact Assessment has been carried out to evaluate the environmental impacts associated with the project. An EIA Report and Environmental Monitoring and Audit (EM&A) Manual were approved by the Environmental Protection Department on 28 October 2004. An Environmental Permit (EP) No.EP-202/2007 and a Variation Environmental Permit (VEP) No. EP-202/2007A were issued on 22 March 2007 and 30 April 2014 for TPSTW Stage V Phase 2B (hereafter referred to as "the Project") to DSD as the Permit Holder. The EP stipulates that an EM&A programme is required to ensure the mitigation measures recommended in the EIA Report and the EM&A Manual, are implemented during the construction and operation of the Project.

1.2 Project Description

1.2.1 MateriaLab – Waste and Environmental Technologies Joint Venture (MLAB) was commissioned by DSD to undertake the EM&A services of the Project including Odour Monitoring, Odour Complaint Register and Marine Water Quality Monitoring during the operation phase, under the Agreement No. CE 21/2014 (EP) Environmental Monitoring and Audit for Tai Po Sewage Treatment Works Stage V Phase 2B – Investigation (hereafter referred to as "the Assignment").

1.3 Project Organisation

1.3.1 The Project Organisation for Environmental Works is shown in **Appendix A**. The contact person and telephone numbers of key personnel for the captioned project are shown in **Table 1.1**.

Table 1.1 Contact Persons and Telephone Numbers of Key Personnel

Party	Role	Position	Contact Person	Telephone No.	Fax No.
DSD	SP Division	Engineer	Ms. Suki Pun	2594 7472	2519 3615
Mott MacDonald	IEC	IEC	Ms. Dulcie Chan	2828 5970	2827 1823
MLAB	Environmental Team	Environmental Team Leader	Mr. Colin Yung	3565 4114	2450 8032

2. AIR QUAILITY MONITORING

2.1 Methodology

2.1.1 The H_2S analyzer, type Jerome 631-X, was used for the air quality monitoring. The analyzer is capable of measuring H_2S concentration in the range of 1 ppb to 50 ppm, with a resolution of 1 ppb. The analyzer operates within a temperature range of 0ºC to 40ºC, at an air flow rate of 0.15 L/min. Grab air sample is drawn by built-in suction pump of the analyzer and passes through a gold film sensor. The electrical resistance of the gold film changes according to the change in mass of hydrogen sulphide in the gas sample. **Table 2.1** summaries the equipment used in air quality (H_2S) monitoring.

Table 2.1 Equipment for Air Quality (H_2S) Monitoring

Equipment	Manufacturer / Model	Serial Number	Sensor Number	Calibration Date	Next Calibration Date
Gold Film Hydrogen Sulphide Analyzer	JEROME X631 0003	2966	14-11-23-R2D	22 June 2017	1 June 2018
Gold Film Hydrogen Sulphide Analyzer	JEROME X631 0003	2967	16-4-13-V2DS	4 August 2017	3 August 2018

2.2 Monitoring Locations

2.2.1 Five monitoring stations were set up inside and outside of TPSTW. **Table 2.2** and **Figure 2.1** show the description and location of the H_2S monitoring stations. The level for odour monitoring agreed with the DSD and EPD is 1.5m from the ground.

Table 2.2 Air Quality (H_2S) Monitoring Stations

ID No.	EM&A Ref.	Monitoring Location	Description
PRI 203[1]	OSM1	Stage I/II Primary Sedimentation Tank	Source
PRI 401[1]	OSM2	Stage IV Primary Sedimentation Tank	Source
AS 12[1,2]	OAM1	Government Staff Quarter (Inside)	ASR
AS 4[1,2]	OAM2	Interpac Containers Ltd (Outside)	ASR
AS 1[1,2]	OAM3	Watson's Water Centre (Outside)	ASR

[1]EIA Reference No.
[2]Air Sensitive Receiver

2.3 Monitoring Frequency and Duration

2.3.1 The sampling duration and frequency of air quality (H_2S) monitoring is summarised in **Table 2.3**.

Table 2.3 Air Quality (H_2S) Monitoring Programme

Sampling Duration	Frequency	
24 hour	Year 1	Once every three months after operation of Stage V Phase 2B works; frequency would increase to monthly interval if exceedances are recorded.
	Year 2 and Year 3	Once every six months after operation of Stage V Phase 2B works; frequency would increase to monthly interval if exceedances are recorded.

2.3.2 A 15-min integrated gaseous H_2S sample was collected every 3 hours for a period of 24 hours at the monitoring locations. Maximum and minimum H_2S levels for each monitoring station were recorded.

2.3.3 The monitoring schedule for the present and next reporting period is provided in **Appendix B**.

2.4 Action / Limit Level

2.4.1 **Table 2.4** shows the Action and Limit Levels for air quality (H_2S) monitoring at ASRs.

Table 2.4 Action and Limit Levels for Air Quality Monitoring at ASRs

Monitoring Stations	Action Level	Limit Level*
AS12: Government Staff Quarter	2.5 ppb	2.5 ppb
AS4: Interpac Containers Limited		
AS1: Watson's Water Centre		

*Limit Level at ASRs only.

2.4.2 The event and action plan for air quality monitoring is provided in **Appendix C**.

2.5 Quality Assurance / Quality Control

2.5.1 In order to ensure the analyzer is functioning properly, manual sensor regeneration and zero adjustment were performed before each set of odour monitoring.

2.5.2 Calibration of the analyzer is conducted every year at the laboratory of the manufacturer. The calibration certificates for the analyzers are shown in **Appendix D**.

2.5.3 To obtain accurate results from the H_2S monitoring at Stage IV Primary Sedimentation Tanks, sulphide formation at the bottom shall be cleaned and minimised.

2.6 Monitoring Results and Observations

2.6.1 The twentieth odour impact monitoring was carried out from 12 January 2018 to 13 January 2018 after the commissioning of the Project.

2.6.2 The meteorological data including temperature, wind speed and direction of the monitoring period obtained from the HKO's Tai Mei Tuk weather station is summarised in **Table 2.5**.

Table 2.5 Summary of meteorological data of the monitoring period#

Date	Mean Temperature(° C)	Prevailing Wind Direction	Mean Wind speed (km/h)
12 January	12.1	South East	8.9
13 January	12.1	East	10.0

The meteorological data was extracted from the website of HKO.

2.6.3 The monitoring results are summarised in **Table 2.6**. Graphical plots of results and details of monitoring data are shown in **Appendix E** (24-hour average, maximum and minimum H_2S concentration) and **Appendix F** (site record).

Table 2.6 Summary of Monitoring Results

ID No.	EM&A Ref.	Monitoring Location	24-hour Average H_2S Concentration (ppb)
PRI203[1]	OSM1	Stage I Primary Sedimentation Tank	95.3
PRI401[1]	OSM2	Stage IV Primary Sedimentation Tank	163.9
AS12[1,2]	OAM1	Government Staff Quarter (Inside)	14.5
AS4[1,2]	OAM2	Interpac Containers Ltd (Outside)	11.1
AS1[1,2]	OAM3	Watson's Water Centre (Outside)	12.1

[1]EIA Reference No.
[2]Air Sensitive Receiver

2.6.4 Comparison of the average H_2S concentration for ASRs and the corresponding Action/Limit levels established in the odour baseline study is shown in **Table 2.7**.

Table 2.7 Comparison of Average H_2S Concentration with Action/Limit Levels

Location	H_2S Concentration (ppb)			Exceedance	
	Odour Impact monitoring	Action Level	Limit Level	Action Level	Limit Level
AS12	14.5	2.5	2.5	Y	Y
AS4	11.1	2.5	2.5	Y	Y
AS1	12.1	2.5	2.5	Y	Y

2.6.5 Exceedances of A/L levels of 2.5 ppb H_2S concentration at three Air Sensitive Receivers (AS1, AS4 and AS12) were recorded.

2.6.6 Odour mitigation measures such as the use of weir launders at Stage I/II and Stage IV Primary Sedimentation Tanks and addition of chemical (calcium nitrate) at Tai Yuen Sewage Pumping Station Package No. 4 were implemented during the odour impact monitoring. However, exceedances of A/L levels of H_2S were resulted.

2.6.7 Even though specific sources of odour that would contribute to the odour nuisance at ASRs was not observed in this monitoring exercise. It is important to consider the location and surrounding environment of the Tai Po Sewage Treatment Works. Located at the Tai Po Industrial Estate, the TPSTW is surrounded by different industrial buildings. Exceedances of A/L levels at ASRs might be attributed to other sources such as nearby Refuse Collection Station and the industrial nature of the surrounding environment. These potential sources may cause odour nuisance to the Air Sensitive Receivers and hence, the high H_2S levels measured at ASRs may be contributed by the emissions from sources other than that of the TPSTW.

2.6.8 In accordance with the Event and Action Plan for Operation Phase Air Quality Monitoring, the following actions have been taken in response to the exceedance of limit level.

2.6.9 The ET had repeated measurement to confirm exceedance. Then they had tried to identify the causes of exceedance and took photos for record. The operation team and DSD/SPD had been notified immediately when exceedance was recorded. After finishing the odour monitoring, the operation team was reminded to have better housekeeping of the TPSTW.

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3. MARINE WATER QUALITY MONITORING

3.1 Monitoring Requirements

Tolo Harbour Marine Water Quality Impact Monitoring

3.1.1 There was no marine water quality impact monitoring conducted during the reporting period and therefore, no marine water quality monitoring result is reported.

Water Quality Monitoring at Seawater Intakes

3.6.1 There was no water quality monitoring conducted during the reporting period and therefore, no water quality monitoring result is reported.

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4. ADVICE ON THE SOLID AND LIQUID WASTE MANAGEMENT STATUS

4.1.1 TPSTW had registered as a chemical waste producer for this Project. The license number of Chemical Waste Producer Registration is 0014-727-D2226-15 which is presented in **Appendix H**.

4.1.2 TPSTW is reminded that chemical waste should be properly handled and stored temporarily in designated chemical waste storage area on site in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. TPSTW should also engage a licensed waste collector to collect the chemical waste for proper disposal.

4.1.3 Sludge cake of TPSTW was temporarily stored within the dewatering house. Normally, all the sludge cake was disposed to Sludge Treatment Facility (STF). If STF breaks down, the sludge cake will be disposed to WENT landfill.

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5. IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES

5.1.1 A summary of the Implementation Schedule of Environmental Mitigation Measures (EMIS) for operation phase is presented in **Appendix G**. Most of the necessary mitigation measures at this stage of works were implemented properly.

5.1.2 Implementation status of operational landfill gas monitoring was confirmed with operation team of TPSTW. There is no accumulation of landfill gas at area for normal occupation inside TPSTW. When confined space works were being conducted, gas monitoring was performed before entry in accordance with Code of Practice on Safety and Health at Work in Confined Spaces.

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6. SUMMARY OF COMPLAINTS, NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

6.1.1 There was no complaint received in relation to the environmental impact or notifications of summons or prosecutions received during this reporting period.

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7. CONCLUSION AND RECOMMENDATIONS

7.1.1 The twentieth odour impact monitoring was carried out from 12 January 2018 to 13 January 2018 during this reporting period in accordance with the EM&A requirements.

7.1.2 Air quality monitoring of hydrogen sulphide (H2S) was conducted at five monitoring stations including three Air Sensitive Receivers around TPSTW. Exceedances of A/L levels of 2.5 ppb at three ASRs (AS1, AS4 and AS12) were recorded.

7.1.3 There was no marine water quality impact monitoring conducted during this reporting period and therefore, no marine water quality impact monitoring result is reported.

7.1.4 There was no water quality monitoring conducted during this reporting period and therefore, no water quality monitoring result is reported.

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Figure 2.1

Air Quality (H2S) Monitoring Stations

MateriaLab – Waste & Environmental Technologies Joint Venture

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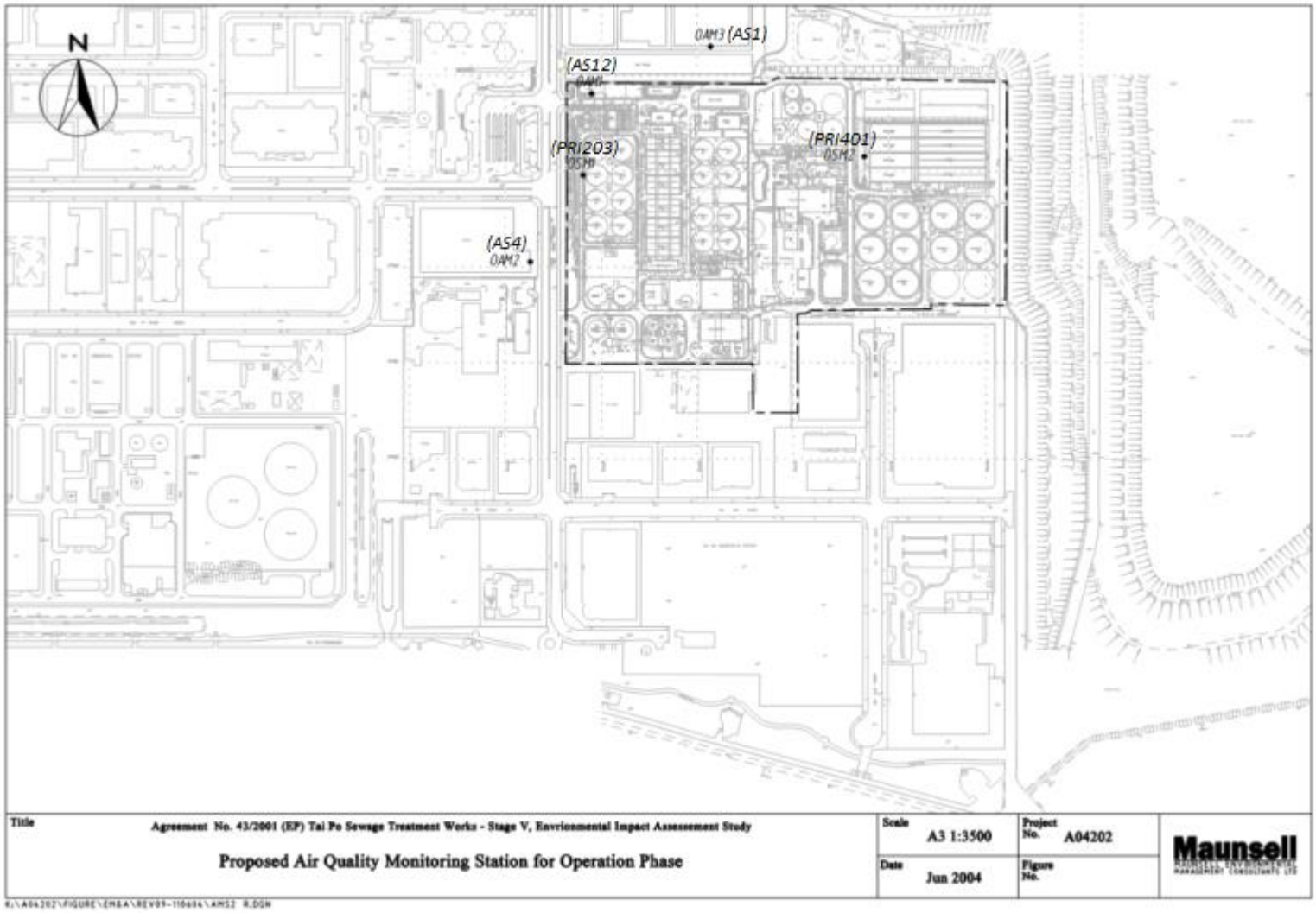

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Appendix A

Project Organisation Chart

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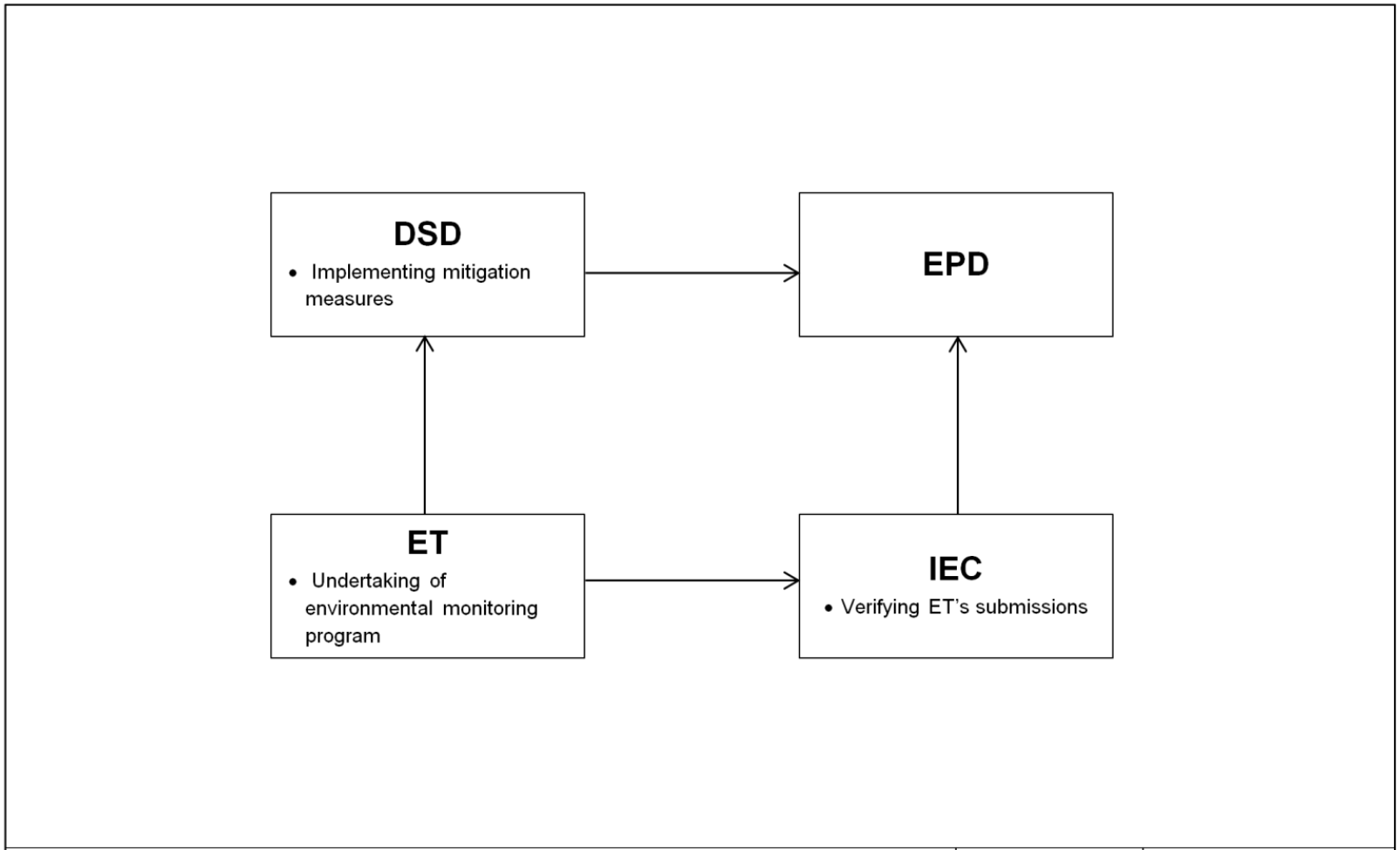

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Appendix B

Monitoring Schedule

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Report No.: 0151/15/ED/1035

Tentative Air Quality Monitoring Schedule for January 2018

Jan-2018						
Sun	**Mon**	**Tue**	**Wed**	**Thu**	**Fri**	**Sat**
	1	2	3	4	5	6
7	8	9	10	11	12 **Air Quality (H_2S) Monitoring**	13 **Air Quality (H_2S) Monitoring**
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

Note: There was no marine water quality monitoring conducted during January 2018

Air Quality Monitoring Schedule for February 2018

Feb-2018						
Sun	**Mon**	**Tue**	**Wed**	**Thu**	**Fri**	**Sat**
				1	2	3
4	5	6	7	8	9 **Air Quality (H_2S) Monitoring**	10 **Air Quality (H_2S) Monitoring**
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28			

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Appendix C

Event / Action Plan for Air Quality Monitoring (Operation Phase)

Event	Action		
	TPSTW Enginneer –in-charge of Odour Monitoring	**DSD ST1**	**DSD/SP / E &MP (*)**
Exceedance of action level or receipt of any odour complaints	1. Identify source/ reason of exceedance or odour complaints; and 2. Repeat measurement confirm finding.	1. carry out investigation to identify the source / reason of exceedance or complaints. Investigation shall be completed within 1 week; 2. rectify any unacceptable practice; 3. amended working methods if required; 4. inform DSD SP/E&MP if cause of complaints or exceedance is considered to be caused by civil or E &M design problems; 5. Correspond to the complaints within 10 days to inform the cause of nuisance and action taken; and cause of nuisance; and 6. Implement amended working methods.	1. Assist ST1 to find the root cause of the complaint or exceedance; and 2. modify or improve design as appropriate.
Exceedance of Limit level or receipt of two or more complaints in 3 months	1. Identify source / reason of exceedance or odour complaints; 2. Repeat measurements to confirm findings ; 3. Increase monitoring frequency to monthly; and 4. If exceedance stops, cease additional monitoring.	1. Carry out investigation to identify the source / reason of exceedance or complaints. Investigation shall be completed within 1 week; 2. rectify any unacceptable practice; 3. amended working methods if required; 4. notify DSD SP / E&MP; 5. formulate remedial actions; 6. ensure amended working methods and remedial actions properly implemented; 7. if exceedance continues, consider what portion of the work is responsible and stop that protion of work until the exceedance is abated; and 8. correspond to the complaints within 10 days to inform the cause of the nuisance and action taken.	1. Assist ST1 to find the root cause of the complaint or exceedance; 2. modify or improve design as appropriate; and 3. formulate remedial actions in association with ST1

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Appendix D

Calibration Certificate

ARIZONA INSTRUMENT LLC
3375 N. Delaware St., Chandler, AZ 85225
(800) 528-7411 • (602) 470-1414
www.azic.com • customerservice@azic.com

Certification of Instrument Calibration

Guyline (Asia) Ltd
Rm 1611, Eastern Harbour Centre
Quarry Bay,

RMA # 2459849

This is to certify that the Jerome **X631 0003** Gold Film Hydrogen Sulfide Analyzer, Serial Number **2966**, with Sensor Number **14-11-23-R2D**, was calibrated with standard units traceable to NIST.

Calibration Status as Received: **Out of Calibration**

		Actual		Calibration Gas		Allowable Range
Incoming:	Range 1	0.346	ppm H2S	0.500	ppm H2S	+/- 6%
	RSD %	10.17				<5%
Outgoing:	Range 1	0.476	ppm H2S	0.500	ppm H2S	+/- 6%
	RSD %	2.18				<5%

Calibration Status as Left: **In Calibration**

Estimated Uncertainty of Calibration System: 2.8%

Calibration Date: 02-Jun-2017 Recalibration Date: 01-Jun-2018

Temperature °F: % Relative Humidity:

Approved By: Cheryl Hradek Date Approved: 05-Jun-2017
Title: Cheryl Hradek - Quality Control

Equipment Used:

H2S Calibration Standard: CC-57152 **NIST#:** 1385481
Calibration Date: 17-Aug-2016 **Calibration Date Due:** 18-Aug-2019

Mass Flow Controller B: 124604 **NIST#:** 152971
Calibration Date: 28-Nov-2016 **Calibration Date Due:** 28-Nov-2017

Mass Flow Controller D: 124602 **NIST#:** 151792
Calibration Date: 08-Nov-2016 **Calibration Date Due:** 08-Nov-2017

Digital Multimeter: 66961028 **NIST#:** 7000660
Calibration Date: 28-Mar-2017 **Calibration Date Due:** 28-Mar-2018

Flowmeter: US10H44183 **NIST#:** 1813; 1817; 1796
Calibration Date: 08-Nov-2016 **Calibration Date Due:** 09-Nov-2017

Calibration Procedure Used: 730-0032

Arizona Instrument certifies that the above listed instrument meets or exceeds all published specifications and has been calibrated using standards whose accuracy are traceable to the NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY within the limitations of the Institute's calibration services, or have been derived from accepted values of natural physical constants, or have been derived by the ratio type of self-calibration techniques.
Disclaimer: Any unauthorized adjustments, removal or breaking of QC seals, or other customer modifications on your Jerome Analyzer WILL VOID this factory calibration. Because any of the above acts could affect the calibration and readings of the instrument, their certification will no longer be valid and, further, Arizona Instrument LLC WILL NOT be responsible for any liabilities created as a result of using the instrument after such adjustments, seal removal, or modifications.
As long as a functional test is within range, according to the procedure outlined in the Operator's Manual, the instrument is performing correctly.

ARIZONA INSTRUMENT LLC
3375 N. Delaware St., Chandler, AZ 85225
(800) 528-7411 • (602) 470-1414
www.azic.com • customerservice@azic.com

Certification of Instrument Calibration

Guyline (Asia) Ltd
Rm 1611, Eastern Harbour Centre
Quarry Bay,

RMA # 2473663

This is to certify that the Jerome **X631 0003** Gold Film Hydrogen Sulfide Analyzer, Serial Number **2967**, with Sensor Number **16-4-13-V2DS**, was calibrated with standard units traceable to NIST.

Calibration Status as Received: **In Calibration**

		Actual	Calibration Gas	Allowable Range
Incoming:	Range 1	0.512 ppm H2S	0.500 ppm H2S	+/- 6%
	RSD %	1.64		<5%
Outgoing:	Range 1	0.518 ppm H2S	0.500 ppm H2S	+/- 6%
	RSD %	1.38		<5%

Calibration Status as Left: **In Calibration**

Estimated Uncertainty of Calibration System: 2.8%

Calibration Date: 04-Aug-2017 Recalibration Date: 03-Aug-2018

Temperature °F: 74.40 % Relative Humidity: 62.00

Approved By: Cheryl Hradek
Title: Cheryl Hradek - Quality Control

Date Approved: 04-Aug-2017

Equipment Used:

H2S Calibration Standard: CC-57152 **NIST#:** 1385481
Calibration Date: 17-Aug-2016 **Calibration Date Due:** 18-Aug-2019

Mass Flow Controller B: 124604 **NIST#:** 152971
Calibration Date: 28-Nov-2016 **Calibration Date Due:** 28-Nov-2017

Mass Flow Controller D: 124602 **NIST#:** 151792
Calibration Date: 08-Nov-2016 **Calibration Date Due:** 08-Nov-2017

Digital Multimeter: 66961028 **NIST#:** 7000660
Calibration Date: 28-Mar-2017 **Calibration Date Due:** 28-Mar-2018

Flowmeter: US10H44183 **NIST#:** 1813; 1817; 1796
Calibration Date: 08-Nov-2016 **Calibration Date Due:** 09-Nov-2017

Calibration Procedure Used: 730-0032

Arizona Instrument certifies that the above listed instrument meets or exceeds all published specifications and has been calibrated using standards whose accuracy are traceable to the NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY within the limitations of the Institute's calibration services, or have been derived from accepted values of natural physical constants, or have been derived by the ratio type of self-calibration techniques.

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Profit Industrial Building,
1-15 Kwai Fung Crescent, Kwai Fong,
Hong Kong.

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Email : mcl@fugro.com

Appendix E

Air Quality (H_2S) Monitoring Data and Graphical Plots

MATERIALAB – Waste & Environmental Technologies Joint Venture

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Report No.: 0151/15/ED/1035

Location	Time Interval	H_2S concentration (ppb)*							
		20th Odour Impact Monitoring (12-13 January 2018)							
		15-minute integrated average	24-hour average	Maximum	Minimum	Action Level	Exceedance	Limit Level	Exceedance
AS12[1,2]	0700-1000	6.0	14.5	36.3	4.7	2.5	Yes	2.5	Yes
	1000-1300	9.7							
	1300-1600	7.7							
	1600-1900	29.7							
	1900-2200	36.3							
	2200-0100	4.7							
	0100-0400	17.0							
	0400-0700	5.3							
AS4[1,2]	0700-1000	13.3	11.1	21.3	4.0	2.5	Yes	2.5	Yes
	1000-1300	8.7							
	1300-1600	7.3							
	1600-1900	9.3							
	1900-2200	5.0							
	2200-0100	21.3							
	0100-0400	19.7							
	0400-0700	4.0							
AS1[1,2]	0700-1000	8.7	12.1	53.0	3.7	2.5	Yes	2.5	Yes
	1000-1300	5.3							
	1300-1600	7.7							
	1600-1900	6.0							
	1900-2200	6.7							
	2200-0100	6.0							
	0100-0400	53.0							
	0400-0700	3.7							
PRI401	0700-1000	253.3	163.9	344.3	5.0	NA	NA	NA	NA
	1000-1300	152.7							
	1300-1600	87.3							
	1600-1900	126.3							
	1900-2200	320.0							
	2200-0100	344.3							
	0100-0400	5.0							
	0400-0700	22.3							
PRI203	0700-1000	25.0	95.3	270.0	8.3	NA	NA	NA	NA
	1000-1300	8.3							
	1300-1600	24.7							
	1600-1900	23.7							
	1900-2200	45.3							
	2200-0100	159.0							
	0100-0400	270.0							
	0400-0700	206.7							

*Accuracy is not guaranteed by the manufacturer for readings that are lower than 0.003 ppm (3 ppb).

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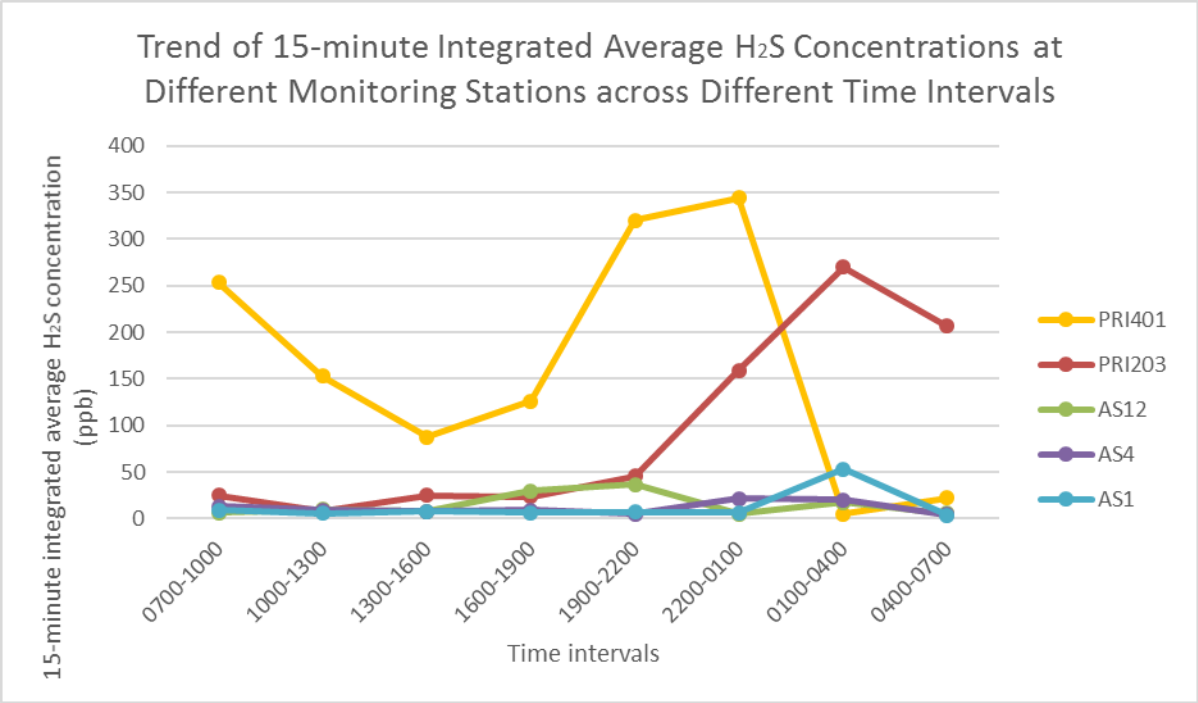
Report No.: 0151/15/ED/1035

	0700-1000	1000-1300	1300-1600	1600-1900	1900-2200	2200-0100	0100-0400	0400-0700
PRI401	253.3	152.7	87.3	126.3	320.0	344.3	5.0	22.3
PRI203	25.0	8.3	24.7	23.7	45.3	159.0	270.0	206.7
AS12	6.0	9.7	7.7	29.7	36.3	4.7	17.0	5.3
AS4	13.3	8.7	7.3	9.3	5.0	21.3	19.7	4.0
AS1	8.7	5.3	7.7	6.0	6.7	6.0	53.0	3.7



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Appendix F

Site Record

MaterialLab

Form 3.1 **Air Quality (H_2S) Monitoring Data Record Sheet**

General Information	
Monitoring Station	PR1401
Date	12/1/2018
Weather	Fine

Monitoring Results

Sample No.	Time	*Wind Speed (m/s)*	*Wind Direction*	*Level (ppm)*
Sample 1	Start: 0721	0	—	0.11
	Stop: 0731	0	—	0.63, 0.02
Sample 2	Start: 0957	0	—	0.17, 0.15
	Stop: 1007	0	—	0.138
Sample 3	Start: ~~1009~~ 1302	~~1~~ 1.2	~~S~~ S	~~0.004, 0.005~~ 0.053, 0.13
	Stop: ~~1019~~ 1312	~~1.4~~ 0	~~S~~ —	~~0.026~~ 0.079
Sample 4	Start: 1600	1.6	SE	0.139, 0.12, 0.12
	Stop: 1610	1.1	SE	
Sample 5	Start: 1900	0.7	S	0.38, 0.40
	Stop: 1910	0.5	S	0.18
Sample 6	Start: 2205	~~0.3~~ 0	—	0.003, 0.43
	Stop: 2215	0	—	0.60
Sample 7	Start: 0005	0	—	0.006, 0.004
	Stop: 0015	0	—	0.005
Sample 8	Start: 0400	0	—	0.027, 0.021
	Stop: 0410	0	—	0.019
Other Observations				

	Name & Designation	Signature	Date
Recorded by:			
Checked by:			

MateriaLab

Form 3.1 **Air Quality (H_2S) Monitoring Data Record Sheet**

General Information	
Monitoring Station	PR1203
Date	12/1/2018
Weather	Fine

Monitoring Results

Sample No.	Time	*Wind Speed*	*Wind Direction*	*Level(ppm)*
Sample 1	Start: 0825	0	/	0.049, 0.016, 0.010.
	Stop: 0835	0	/	
Sample 2	Start: 1105	0	/	0.007, 0.013 0.005
	Stop: 1115	0	/	
Sample 3	Start: 1410	1.5	~~0~~ S	0.017 0.02 0.037
	Stop: 1420	0.9	S	
Sample 4	Start: 1710	0.5	S	0.040 0.015 0.016
	Stop: 1720	0.7	S	
Sample 5	Start: 20:11	0	/	0.031 0.015 0.090
	Stop: 20:21	0	/	
Sample 6	Start: 2303	0	/	0.077 0.22 0.18
	Stop: 2313	0	/	
Sample 7	Start: 0125	0	/	0.29 0.27 0.25
	Stop: 0135	0	/	
Sample 8	Start: 0510			0.22 0.20 0.25
	Stop: 0520			
Other Observations				

Name & Designation **Signature** **Date**

Recorded by:

Checked by:

MaterialLab

Form 3.1 **Air Quality (H_2S) Monitoring Data Record Sheet**

General Information	
Monitoring Station	AS4
Date	12/1/2018
Weather	Fine

Monitoring Results

Sample No.	Time	*Wind Speed*	*Wind Direction*	*Level(ppm)*
Sample 1	Start: 0838	0	/	0.007
	Stop: 0849	0	/	0.026 0.007
Sample 2	Start: 1118	0	/	0.014
	Stop: 1128	0	/	0.005 0.007
Sample 3	Start: 1424	0	/	0.008 0.005
	Stop: 1434	0	/	0.009
Sample 4	Start: 1723	0	/	0.009 0.012
	Stop: 1733	0	/	0.007
Sample 5	Start: 20:25	0	/	0.006, 0.004
	Stop: 20:35	0	/	0.005
Sample 6	Start: 2315	0	/	0.043
	Stop: 2325	0	/	0.011 0.010
Sample 7	Start: 0140	0	/	0.016
	Stop: 0150	0	/	0.023, 0.020
Sample 8	Start: 0525	0	/	0.004
	Stop: 0535	0	/	0.004 0.004
Other Observations				

	Name & Designation	Signature	Date
Recorded by:			
Checked by:			

MaterialLab

Form 3.1 **Air Quality (H_2S) Monitoring Data Record Sheet**

General Information	
Monitoring Station	AS12
Date	12/1/2018
Weather	Fine

Monitoring Results

Sample No.	Time	*Wind Speed (m/s)*	*Wind Direction*	*Level (ppm)*
Sample 1	Start: 0853	0	/	0.007
	Stop: 0903	0	/	0.007 0.004
Sample 2	Start: 1133	0	/	0.009
	Stop: 1143	0	/	0.011 0.009
Sample 3	Start: 1439	0	/	0.007 0.009
	Stop: 1449	1	S	2007
Sample 4	Start: 1736	0.7	S	0.026 0.055
	Stop: 1746	0.4	S	0.008
Sample 5	Start: 20:40	0	/	0.034, 0.038
	Stop: 20:50	0	/	0.037
Sample 6	Start: 2330	0	/	0.003
	Stop: 2340	0	/	0.006 0.005
Sample 7	Start: 0145	0	/	0.017
	Stop: 0205	0	/	0.015 0.019
Sample 8	Start: 0540	0	/	0.006
	Stop: 0550	0	/	0.005, 0.005
Other Observations				

	Name & Designation	Signature	Date
Recorded by:			
Checked by:			

MaterialLab

Form 3.1 **Air Quality (H_2S) Monitoring Data Record Sheet**

General Information	
Monitoring Station	AS1
Date	12/1/2018
Weather	Faine

Monitoring Results

Sample No.	Time	*Wind Speed*	*Wind Direction*	*Level (ppm)*
Sample 1	Start: 0908	0	—	0.011
	Stop: 0918	0	—	0.01 0.005
Sample 2	Start: 1150	0	—	0.006
	Stop: 1200	0	—	0.005 0.005
Sample 3	Start: 1456	0	—	0.008 0.007
	Stop: 1506	0	—	0.008
Sample 4	Start: 1750	0	—	0.008, 0.004
	Stop: 1800	0	—	0.006
Sample 5	Start: 20:57	0	—	0.009, 0.005
	Stop: 21:07	0	—	0.006
Sample 6	Start: 2342	0	—	0.006 0.008
	Stop: 2352	0	—	0.004
Sample 7	Start: 0210	0.8	W	0.056 0.052
	Stop: 0220	1.3	W	0.046
Sample 8	Start: 0553	0	—	0.004
	Stop: 0603	0	—	0.004 0.003
Other Observations				

	Name & Designation	Signature	Date
Recorded by:			
Checked by:			

MATERIALAB – Waste & Environmental Technologies Joint Venture

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Hourly Temperature of the Monitoring Period:

Date	Time	Temperature (° C)
12-Jan-18	7:00	8
	8:00	9
	9:00	11
	10:00	14
	11:00	15
	12:00	15
	13:00	15
	14:00	15
	15:00	15
	16:00	15
	17:00	14
	18:00	13
	19:00	12
	20:00	11
	21:00	10
	22:00	10
	23:00	10
13-Jan-18	0:00	9
	1:00	9
	2:00	9
	3:00	10
	4:00	11
	5:00	10
	6:00	9
	7:00	8

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Appendix G

Implementation Schedule of Environmental Mitigation Measures (EMIS) for Operation Phase

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EIA Ref.	Environmental Protection Measures	Location of the measures	Implementation Status
Air Quality			
S3.7.5 & 3.7.8	Exposed area at Stage I/II & IV of inlet pumping stations, sludge digestion tank outlet chambers should be covered, with the foul air drawn through deodorization units and discharged after treatment. The grit removal & flume channel at Stage I/II inlet works and the grit removal at Stage IV inlet works should be covered.	TPSTW	Completed
S3.7.6	Weir launders of the Stage I/II and Stage IV primary sedimentation tanks should be covered to control odour emission. Chemical should also be added to the sewage at Tai Yuen Sewage Pumping Station No.4 for the control of odour at Stage IV inlet pumping station, screen house and primary sedimentation tanks.	TPSTW	Completed
S3.7.7	The sludge gravity thickeners, sludge consolidation tanks, screening unit (next to dewatering house), exposed area of wet well of Stage I/II returned activated sludge pumping station and wet well of Stage I/II sludge pumping station should be enclosed to ensure no leakage of odorous gas whereas foul air from the sludge gravity thickeners and sludge consolidation tanks would be discharged via deodorizers.	TPSTW	Completed
Water Quality			
S4.8.10	Silt curtains should be installed at the Shatin and Tai Po Seawater Intakes. Relevant government departments including EPD and WSD should be informed of then maintenance.	TPSTW	Not applicable in this reporting month.
S4.8.11	Dual power supply or ring main supply from CLP should be provided for the Project to avoid any loss of electrical supply. In addition, standby facilities for the main treatment units, standby parts/accessories to the equipment should also be provided in order to minimize the chance of emergency discharge.	TPSTW	Completed
S4.8.10 S4.8.12	Shutdown of the THEES, if unavoidable, should be shortened as far as possible. The relevant procedures established in the contingency plan as attached in Appendix 4.5 of the EIA report should be properly followed.	TPSTW	Not applicable in this reporting month.
S4.8.13	Dye test is recommended for detection of pipe leakage.	Submarine pipeline at Tolo Harbour	Not applicable in this reporting month.
S4.10.1	Effluent monitoring is recommended to ensure the effectiveness of the proposed treatment process. Details of the monitoring requirements are specified in the EM&A.	Exit of disinfection facilities	Completed
S4.10.2	A post project monitoring (PPM) programme for Victoria Harbour should be implemented to confirm the predictions of the water quality made in the EIA report. The PPM would consist of one- year baseline monitoring before commissioning and one-year impact monitoring after commissioning of the Project. The extent of PPM programme is subject to the prevailing environmental conditions at the time before commissioning of the Project. A more detailed description of the PPM requirements is given in the standalone EM&A Manual	Victoria Harbour	Not applicable in this reporting month.
S4.10.3	A PPM programme will be also implemented in the Tolo Harbour during the operational phase. The PPM would involve water quality monitoring at the Tai Po and Sha Tin seawater intake during the first wet season (June to August) after full commissioning of the Project. Marine water quality parameters including SS and NH3-N should be monitored. The water quality monitoring frequency shall be twice per month and should cover the effects of different tidal status (at least one for high tide and one for low tide) for each seawater intake.	Tolo Harbour	Not applicable in this reporting month.

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S4.8.10 &S4.10.4	Marine water quality monitoring should be carried out under emergency condition or during maintenance of the THEES tunnel to verify the findings of the water quality modelling. It is recommended that the maintenance of the THEES tunnel, if unavoidable, should be conducted during winter season or low flow periods and to avoid the ”blooming” season of algae (normally from April to June)if practicable. Details of the monitoring requirements are specified in the EM&A Manual.	Tolo Harbour	Not applicable in this reporting month.
Waste Management			
S5.5.9	Chemical Waste For the disposal of spent UV lamps, the STW operator would be required to register with the EPD as a Chemical Waste Producer and to follow the requirements stated in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. A chemical waste producer must engage a licensed waste collector to transport and dispose of the chemical wastes in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.	TPSTW	Completed
Landfill Gas Hazard			
S6.6.9	When service voids, manholes or inspection chambers within the proposed site are entered for maintenance, monitoring and a checklist system of safety requirements should be performed before entry in accordance with Code of Practice on Safety and Health at Work in Confined Spaces.	Area of TPSTW within 250m consultation zone	Completed
S6.6.10	For newly built permanent structures, gas- resistant polymeric membranes shall be incorporated into floor or wall construction to act as a continuous sealed layer for the structure. In addition, forced ventilation shall be installed in such rooms or buildings. Gas detection systems should also be proposed where there is an organization involved in the long-term or frequently use of the development in order to monitor internal spaces inside buildings.	Area of TPSTW within 250m consultation zone	Completed
S6.6.11	Forced ventilation should be used if methane of more than 0.5% (by volume) in the internal atmosphere (e.g. In service voids, manholes, inspection chambers or rooms as mentioned above) is detected.	Area of TPSTW within 250m consultation zone	Completed
S6.6.12	No person should enter or remain in any confined spaces or trenches where the carbon dioxide concentration exceeds 1.5% (by volume).	Area of TPSTW within 250m consultation zone	Completed
S6.6.13	Oxygen concentration should be monitored and no person shall enter or remain in any confined spaces or trenches where the oxygen content of air has fallen below 18 % by volume.	Area of TPSTW within 250m consultation zone	Completed
S6.6.14	All the access to these confined spaces should be restricted only to authorized personnel who should be aware of the LFG hazard. No member of general public should be permitted or allowed to access these confined spaces, manholes or inspection chambers.	Area of TPSTW within 250m consultation zone	Completed

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Appendix H
Chemical Waste Producer Registration License

MATERIALAB – Waste & Environmental Technologies Joint Venture
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(30)

MEMO

From : Director of Environmental Protection
Ref. : ( ) in EP CW/D2226/727/15
Tel. : 2634 3884 Fax 2685 1155
Date : 19 APRIL , 2000

To : Director of Drainage Services
(Attn. Mr. Ho Wai Hung) 2/5
/ Tai Po STW
Your Ref. : _____ in TP/A57
dated : _____ Fax no 26660207

Waste Disposal Ordinance (Cap.354)
Waste Disposal (Chemical Waste) (General) Regulation
Registration as a Chemical Waste Producer
Tai Po Sewage Treatment Works

I refer to your memo under reference.

2. Our records show that there are duplicate registration as a chemical waste producer (CWP) for the Tai Po Sewage Treatment Works. As per your request, we have removed one of the CWP registration (WPN of 0014-727-D2158-02 dated 26.10.1992) from the register with effect from the date of this memo. As a result, the registration form (Form EPD 130) with WPN of 0014-727-D2158-02 dated 26.10.1992 for the above premises is no longer valid.

3. On the other hand, I am pleased to inform you that your revised registration (WPN of 0014-727-D2226-15) with this Department as a CWP has been completed. Your assiged Waste Producer Number (WPN) and the particulars of your establishment are printed in the enclosed form (EPD 130). Please check these entries in the form and notify this Department immediately in any irregularities are detected. Please note that this registration is not transferable and will be valid only in respect of the applicant and the premises registered. In case of any change in the registration particulars, you should inform this Department as soon as possible so that our record so that our record can be amended accordingly.

4. Should you have any queries, please contact our Mr. YIU on 26851156 or the undersigned.

(W.C. SUN)
Local Control Office (Territory North)
for Director of Environmental Protection

Encl.

MATERIALAB – Waste & Environmental Technologies Joint Venture
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Tel : (852)-24508238
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Email : mcl@fugro.com

Report No.: 0151/15/ED/1035

Environmental Protection Department
環境保護署

Waste Disposal Ordinance (Chapter 354)
香港法例第354章廢物處理條例
Waste Disposal (Chemical Waste) (General) Regulation
廢物處理(化學廢物)(一般)規例
Registration of Waste Producer
廢物產生者登記證

To: 致

Waste Producer 廢物產生者

Full Name (English) DIRECTOR OF (Chinese) 渠務署署長
全 名：(英 文) DRAINAGE SERVICES (中 文)
I.D. Card No. (if any) - - -
身份證號碼：(如有者)
Business Reg. Cert. No. (if any)
商業登記證號碼：(如有者) - - -
Address for Correspondence
通訊地址：DSD, TAI PO SEWAGE TREATMENT WORKS,
7 DAI KWAI STREET, TAI PO INDUSTRIAL ESTATE, TAI PO, N.T.
Tel. No. 26640011 Fax No. 26660207
電 話： 圖文傳真：

With reference to your application dated 09 / 03 / 2000 for registration as a Waste Producer under the Waste Disposal (Chemical Waste) (General) Regulation, the Waste Producer Number, WPN [0|0|1|4]-[7|2|7]-[D|2|2|2|6]-[1|5] is assigned to you in respect of the location or premises listed below:—

前於 二000 年 三 月 九 日根據廢物處理(化學廢物)(一般)規例而來信，申請登記為廢物產生者，茲特配予廢物產生者編號第 [0|0|1|4]-[7|2|7]-[D|2|2|2|6]-[1|5] 號，予下開地點或樓宇：—

Location or Premises where the waste is produced 產生廢物的地點或樓宇

Name of Establishment
機構名稱：DSD, TAI PO SEWAGE TREATMENT WORKS
Business Reg. Cert. No. (if any)
商業登記證號碼：(如有者) - - -
Nature of Business
業務性質：SEWAGE TREATMENT
Major chemical waste types
主要化學廢物種類：SPENT LUBRICATING OIL & SPENT SOLVENT

Address
地址：DSD, TAI PO SEWAGE TREATMENT WORKS, 7 DAI KWAI STREET,
TAI PO INDUSTRIAL ESTATE, TAI PO, N.T.
Tel. No. 26640011 Fax No. 26660207
電 話： 圖文傳真：
Contact Person (Full Name) HO WAI HUNG (Capacity) WORKS MANAGER
聯絡人：(全 名) (職 位)

香港特別行政區 環境保護署 HONG KONG ENVIRONMENTAL PROTECTION DEPARTMENT

(W.C. SUN)
for *Director of Environmental Protection*
環境保護署署長 (辛清才 代行)
Date
日期 19 / 04 / 2000

WARNING: Any registered waste producer who fails to inform the Director of Environmental Protection of any change in his registration particulars commits an offence and is liable on conviction to a fine of $10,000.
警 告： 任何已登記的廢物產生者，若其登記資料有任何改變而不知會環境保護署署長，即屬違法，被定罪者最高罰款港幣10,000元。