

Annex K

Investigation Report

Annex K1

Investigation Report –
Odour Sampling
Exceedances

Investigation Report of Odour Sampling Exceedances

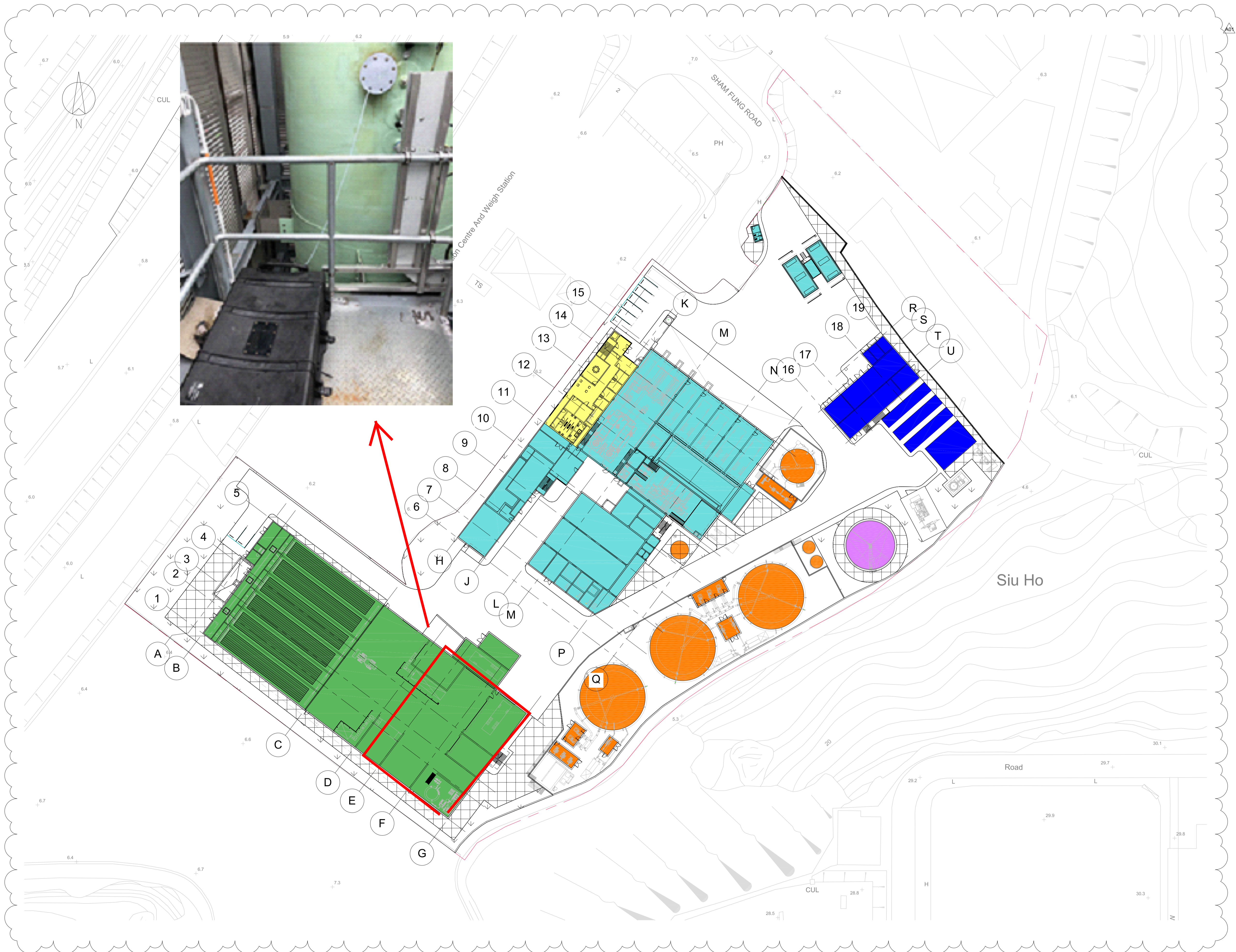
Date	10, 11, 19 and 27 December 2018; 16 January 2019
Time	Sampling times were shown in Appendix B .
Monitoring Location	Centralized Air Pollution Control System (CAPCS) ((Detailed location and photos shown on the marked drawing DR-OAP-20-0-CA-1001 attached as Appendix A)
Weather	Fine
Parameter	Odour
Exceedance Description	<ol style="list-style-type: none"> 1. On 10, 11, 19 and 27 December 2018 and 16 and 29 January 2019, air samples were collected from the outlet of the CAPCS by ALS for measurement of the odour concentration (in term of Odour Unit (OU) by olfactometry analysis at the laboratory. The EM&A Manual, has set an odour limit of 220 OU/Nm³ for the CAPCS stack. The odour concentrations of the odour samples collected from the CAPCS on 10, 11, 19 and 27 December 2018; 16 January 2019 have exceeded the odour limits. The odour analysis results are shown in Appendix B. 2. According to the Contractor, the plant was operated normally. Odour emitting activities, including waste reception and pretreatment process, AD process, wastewater treatment plant, sludge dewatering and composting process were operating on the sampling days. The CAPCS was operating during the odour sampling periods. 3. The plant received an average of 100 tonnes of SSOW daily in the reporting period. 4. The Contractor reported that the chemical dosing system of the CAPCS have some problems resulting in a high concentration of odorous gases H₂S and NH₃ in the exhaust air, which led to exceedances of the odour limit. In addition, the Contractor reported that the prepared of the chemical dosing system took longer than anticipated resulting in a prolonged exceedances recorded during December 2018.
Action Taken / Action to be Taken	Once it was identified that there was a problem with the chemical dosing system, the Contractor added the chemical to the system manually to minimise the exceedances. The Contractor has also contacted the supplier of the chemical dosing system to carry out repairing work so that the system can function properly.
Remedial Works and Follow-up Actions	The Contractor is recommended to closely monitor the operation of the chemical dosing system to avoid the reoccurrence of similar problem. The system is fixed and the odour concentration of the air sample taken on 29 January 2019 showed compliance with the odour limit.

OSCAR Bioenergy Joint Venture
EP/SP/61/10 – Organic Resources Recovery Centre Phase 1

Prepared by: Bonia Leung, ET Representatives
Date 09-Apr-2019

Appendix A

Monitoring Location



A01	05/03/15	CW	MB	IMTECH BACKGROUNDS UPDATED
A00	18/02/15	CW	MB	DRAFT ISSUE
REV	DATE	BY	APP	DESCRIPTION

CLIENT
EP ENVIRONMENTAL PROTECTION DEPARTMENT
 GOVERNMENT OF THE HKSAR

CLIENT'S CONSULTANT
AECOM
 AECOM ASIA CO. LTD.

CONTRACTOR
Suez SITA ATAL RosRoca
 OSCAR BIOENERGY JV

LEAD DESIGNER
ARUP
 Ove Arup & Partners Hong Kong Limited

ENVIRONMENTAL TEAM
ERM
 ERM HONG KONG LIMITED

INDEPENDENT CONSULTANTS
MEINHARDT
 Meinhardt Infrastructure and Environment Limited
 邁達基建築環保工程顧問有限公司

PROJECT
 ORGANIC WASTE TREATMENT FACILITIES
 PHASE 1
 EP/SP/61/10

STATUS
 DRAFT ISSUE

DRAWING TITLE
 SITE LAYOUT

DRAWN CW	CHECKED RS	APPROVED DP
SCALE 1:500@A1 / 1:1000@A3	DATE 12/02/15	
JOB NO. 239956	DRAWING NO. DR-OAP-20-0-CA-1001	REV. A01

Appendix B

Odour Sampling Results Summary

OSCAR Bioenergy Joint Venture
 EP/SP/61/10 – Organic Resources Recovery Centre Phase 1

Sampling Date	Sampling Time	Odour Concentration (OU /Nm ³) ^{Note}
10 Dec 2018	11:36-11:41	828
10 Dec 2018	11:41-11:46	886
10 Dec 2018	11:56-12:02	773
10 Dec 2018	12:02-12:07	674
11 Dec 2018	15:13-15:17	476
11 Dec 2018	15:19-15:23	510
11 Dec 2018	15:34-15:38	414
11 Dec 2018	15:38-15:43	443
19 Dec 2018	15:08-15:12	1164
19 Dec 2018	15:29-15:33	1016
27 Dec 2018	14:07-14:10	1026
27 Dec 2018	14:11-14:14	1026
27 Dec 2018	14:45-14:48	1087
27 Dec 2018	14:49-14:53	1087
16 Jan 2019	13:42-13:45	444
16 Jan 2019	13:48-13:52	476
16 Jan 2019	15:54-15:57	546
16 Jan 2019	15:58-16:02	509
29 Jan 2019	14:00-14:04	116
29 Jan 2019	14:04-14:08	93
29 Jan 2019	15:03-15:07	93
29 Jan 2019	15:03-15:07	154

Note: According to the EM&A Manual and EP requirements, it is considered an exceedance if the odour level is more than 220 OU/Nm³.

Annex K2

Investigation Report – Stack Monitoring Exceedances

Investigation Report of CEMS Exceedances

Date	1 - 31 March 2019
Time	Continuous Monitoring throughout March 2019
Monitoring Location	Continuous Environmental Monitoring System (CEMS)
Parameter	Various emission parameters of the Centralised Air Pollution Control System (CAPCS), Cogeneration Units (CHP) and Ammonia Stripping Plan (ASP)
Exceedance Description	<p>1. Continuous monitoring was carried out for CAPCS, CHP and ASP throughout the reporting period using the CEMS. According to the EM&A Manual, exceedance is considered if the emission concentration of the concerned pollutants is higher than the emission limits stated in Tables 2.2, 2.3 and 2.5 of the EM&A Manual (Version E) for CAPCS, CHP and ASP respectively. The concentration of the concerned air pollutants were monitored on-line by the CEMS. Exceedances of various emission parameters were recorded on the CEMS including:</p> <ul style="list-style-type: none"> • Odour in the CAPCS; • SO₂ in the CHP; and • CO, NO_x, SO₂, VOCs and NH₃ in the ASP. <p>The detail monitoring results are shown in <i>Annex G</i> of the EM&A Report.</p> <p>2. According to the Contractor, the plant was receiving around 100 tonnes of SSOW daily and was operated normally.</p> <p>3. The exceedances of odour in CAPCS was due to problems in the chemical dosing system resulting in high concentrations of odorous gases H₂S and NH₃ in the exhaust air.</p> <p>4. According to the Contractor, the SO₂ exceedances recorded in the CHP and ASP could be due to the tripping of the circulation pump resulting in incomplete desulphurisation of biogas in previous process.</p> <p>5. The Contractor explained that the exceedances recorded in CO, NO_x, VOCs and NH₃ in the ASP was because the thermal combustion unit of the ASP still require tuning to optimise the combustion efficiency. In addition, the Contractor reported that the tuning of the thermal combustion unit took longer than anticipated resulting in the many exceedances recorded during the reporting period.</p>
Action Taken / Action to be Taken	<ul style="list-style-type: none"> • Once it was identified that there was a problem with the chemical dosing system, the Contractor added the chemicals to the system manually to minimise the exceedances. The Contractor has also contacted the supplier of the chemical dosing system to carry out

	<p>repairing works so that the system can function properly.</p> <ul style="list-style-type: none"> • The Contractor put on-line additional activated carbon filters to counter the incomplete desulphurisation process. • Tuning of the thermal combustion unit was carried out to optimise the combustion efficiency in order to remove the pollutants in the biogas.
<p>Remedial Works and Follow-up Actions</p>	<p>The Contractor is recommended to closely monitor the processes, including the chemical dosing system in the CAPCS, the desulphurisation process, and combustion of biogas in the ASP to avoid the reoccurrence of similar problems. MT will carry out follow-up audit regarding the progress next month.</p>

Prepared by: Bonia Leung, MT Representative
 Date: 29-Apr-2019

Annex K3

Investigation Report - April 2019

Investigation Report of CEMS Exceedances

Date	1 – 30 April 2019
Time	Sampling times were shown in Annex G of the EM&A Report.
Monitoring Location	Continuous Environmental Monitoring System (CEMS)
Parameter	Various emission parameters of the Centralised Air Pollution Control System (CAPCS), Cogeneration Units (CHP) and Ammonia Stripping Plan (ASP)
Exceedance Description	<p>1. Continuous monitoring was carried out for CAPCS, CHP and ASP throughout the reporting period using the CEMS. According to the EM&A Manual, exceedance is considered if the emission concentration of the concerned pollutants is higher than the emission limits stated in Tables 2.2, 2.3 and 2.5 of the EM&A Manual (Version E) for CAPCS, CHP and ASP respectively. The concentration of the concerned air pollutants were monitored on-line by the CEMS. Exceedances of various emission parameters were recorded on the CEMS including:</p> <ul style="list-style-type: none"> • Odour in the CAPCS; • NO_x and SO₂ in the CHP; and • CO, NO_x, SO₂, VOCs and NH₃ in the ASP. <p>The detail monitoring results are shown in <i>Annex G</i> of the EM&A Report.</p> <p>2. According to the Contractor, the plant was receiving around 100 tonnes of SSOW daily and was operated normally.</p> <p>3. The exceedances of odour in CAPCS was due to problems in the chemical dosing system resulting in high concentrations of odorous gases H₂S and NH₃ in the exhaust air.</p> <p>4. CHP setting was undergoing fine-tuning for performance optimisation which leads to the ineffective removal of NO_x at a certain period of time.</p> <p>5. According to the Contractor, the SO₂ exceedances recorded in the CHP could be due to the tripping of the desulphurisation column resulting in the incomplete desulphurisation of biogas in previous process.</p> <p>6. The Contractor explained that the exceedances recorded in CO, NO_x, SO₂, VOCs and NH₃ in the ASP was because the thermal combustion unit of the ASP still require tuning to optimise the combustion efficiency. In addition, the Contractor reported that the tuning of the thermal combustion unit took longer than anticipated resulting in the many exceedances recorded during the reporting period.</p>
Action Taken / Action to be Taken	<ul style="list-style-type: none"> • Once it was identified that there was a problem with the chemical dosing system, the Contractor added the

	<p>chemicals to the system manually to minimise the exceedances. The Contractor has also contacted the supplier of the chemical dosing system to carry out repairing works so that the system can function properly.</p> <ul style="list-style-type: none"> • Continuous optimisation of CHP and re-adjustment of NO_x control for CHP has been carried out. • Continuous monitoring and routine maintenance of the desulphurisation column to reduce the duration of desulphurisation column tripping. • Tuning of the thermal combustion unit was carried out to optimise the combustion efficiency in order to remove the pollutants in the biogas.
<p>Remedial Works and Follow-up Actions</p>	<p>The Contractor is recommended to closely monitor the processes, including the chemical dosing system in the CAPCS, the desulphurisation process, and combustion of biogas in the ASP to avoid the reoccurrence of similar problems. MT will carry out follow-up audit regarding the progress next month.</p>

Prepared by: Bonia Leung, MT Representative
 Date 14 May 2019

Annex K4

Investigation Report - May 2019

Investigation Report of CEMS Exceedances

Date	1 – 31 May 2019
Time	Continuous monitoring throughout May 2019
Monitoring Location	Continuous Environmental Monitoring System (CEMS)
Parameter	Various emission parameters of the Cogeneration Units (CHP) and Ammonia Stripping Plan (ASP)
Exceedance Description	<ol style="list-style-type: none"> 1. Continuous monitoring was carried out for CAPCS, CHP and ASP throughout the reporting period using the CEMS. According to the EM&A Manual, exceedance is considered if the emission concentration of the concerned pollutants is higher than the emission limits stated in Tables 2.2, 2.3 and 2.5 of the EM&A Manual (Version E) for CAPCS, CHP and ASP respectively. The concentration of the concerned air pollutants were monitored on-line by the CEMS. Exceedances of various emission parameters were recorded on the CEMS including: <ul style="list-style-type: none"> • NO_x and SO₂ in the CHP; and • Dust, CO, NO_x, SO₂, VOCs, NH₃ and HF in the ASP. 2. According to the Contractor, the plant was receiving around 100 tonnes of SSOW daily and was operated normally. 3. CHP setting was undergoing fine-tuning for performance optimisation which leads to the ineffective removal of NO_x at a certain period of time. 4. According to the Contractor, the SO₂ exceedances recorded in the CHP could be due to the tripping of the desulphurisation column resulting in the incomplete desulphurisation of biogas in previous process. 5. The Contractor explained that the exceedances recorded in Dust, CO, NO_x, SO₂, VOCs, NH₃ and HF in the ASP was because the thermal combustion unit of the ASP still require tuning to optimise the combustion efficiency. In addition, the Contractor reported that the tuning of the thermal combustion unit took longer than anticipated resulting in the many exceedances recorded during the reporting period.
Action Taken / Action to be Taken	<ul style="list-style-type: none"> • Continuous optimisation of CHP and re-adjustment of NO_x control for CHP has been carried out. • Continuous monitoring and routine maintenance of the desulphurisation column to reduce the duration of desulphurisation column tripping. • Tuning of the thermal combustion unit was carried out to optimise the combustion efficiency in order to remove the pollutants in the biogas.
Remedial Works and Follow-up Actions	The Contractor is recommended to closely monitor the processes, including the desulphurisation process, and

	combustion of biogas in the ASP to avoid the reoccurrence of similar problems. MT will carry out follow-up audit regarding the progress next month.
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Prepared by: Bonia Leung, MT Representative

Date 10 June 2019

Investigation Report of Treated Effluent Leakage

Date	21 May 2019
Time	15:30
Monitoring Location	ORRC1 Treated Effluent Pump Room
Parameter	Treated Effluent
Description	<ol style="list-style-type: none"> 1. Wastewater generated from plant operation is treated onsite and stored in treated effluent tank before its discharge to the public sewage system. The treated effluent pump room is equipped with discharge pumps to discharge the treated effluent to the sewage system or back to the plant as process recycled water. 2. At 15:30 on 21 May 2019, brown liquid was found leaking out of the treated effluent pump room by the staff of the maintenance team (MT). Staff of the operation team (OPS) was informed immediately. MT and OPS checked the pump room and found the brown liquid was leaked from a treated effluent discharge pump. 3. It was identified that the brown liquid was treated effluent. The leaked treated effluent entered the nearby storm water channel and was found in the nullah.
Action Taken / Action to be Taken	<ul style="list-style-type: none"> • The teams stopped the pump and isolated the valves before and after the leaked pump. • Sandbags were put in the storm water channel to block the treated effluent leakage to the nullah. • The means cleaned up the remaining treated effluent in the storm water system using an interceptor. The remaining treated effluent was pumped back to the the plant’s wastewater treatment system. • It was identified that the gasket on the pump was damaged. The damaged gasket was replaced on 21 May 2019. • After the clean-up and the replacement of the gasket, no brown liquid was found at the discharge outlet and the nullah.
Remedial Works and Follow-up Actions	The Contractor is recommended to arrange routine preventative maintenance on discharge pumps to avoid damage of gasket; regular patrol of treated effluent pump room to closely monitor the situation; and put sandbags inside the pump room for easy access.

Prepared by: Bonia Leung, MT Representative
 Date: 21 October 2019

Extract of the Incident Notification Form on Treated Effluent Leakage Prepared by the Contractor

Description of the Process

Wastewater generated from plant operation is treated before discharge to Drainage Service Department (DSD) sewage system. Treated wastewater/ Treated Effluent is temporary stored inside treated effluent tank. Treated effluent pump room is equipped with discharged pumps to discharge the treated effluent to DSD or discharge back to the plant as process recycle water.

Description of the Incident

On 21st May 2019 around 15:30, brown water was found leaked out from the treated effluent pump room by maintenance team (MT) technician. Operation team (OPS) was immediately informed. MT and OPS immediate checked the pump room inside and found that the brown water was leaked from a treated effluent discharge pump (5084PS601). The team immediate stopped the pump and also isolated the valves before and after the pump.

The brown water was treated effluent and was leaked to nearby storm water channel. The teams also immediate put sandbags to block the leakage. A small amount of treated effluent was found leak to the nullah.

The teams then opened the petrol interceptor to clean up the residue treated effluent in the storm waste system and pump back to the plant's wastewater system. A water sample was also taken by on-site EPD representatives at the outlet and preliminary measured result was pH 7.

Figure.1 Brown water was found leak from treated effluent pump room



Figure.2 Leakage Location (photo was taken after the incident)

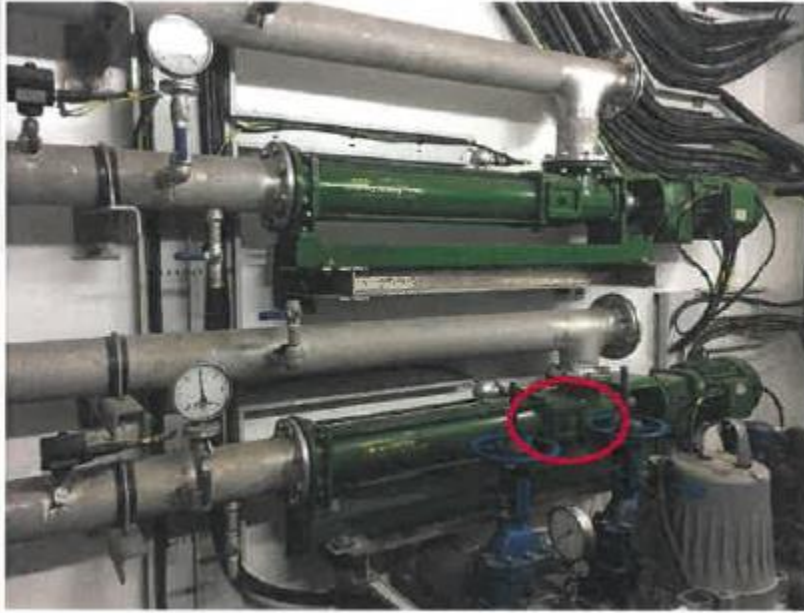


Figure.3 Sandbags were placed at the nearby storm water channel



Figure.4 Brown water was found on the stormwater outlet of the plant



Figure.5 Sample was taken at the discharge outlet



It was found that a gasket on the pump was damaged. MT was then arranged to replace the gasket and the system was resumed to normal on the same day.

There was no brown water found at the discharge outlet and the nullah after the cleanup work completed on the same day.

Root Cause Analysis

1. The gasket on the pump was found damaged.
2. The treated effluent was leaked from the damaged gasket.

Description of Corrective Actions ⁽¹⁾

1. Stopped the discharged pump
2. Isolated the pump by closing the valves before and after the pump
3. Placed sandbags in the storm water channel to block the treated effluent leak to nullah
4. Cleaned up the remaining treated effluent inside the storm water system and pump back to plant's wastewater treatment system

Description of Preventive Actions ⁽²⁾

1. Arrange routine preventive maintenance on the discharge pumps
2. Arrange routine patrol at treated effluent pump room
3. Prepare sandbags inside the pump room in order to have a faster response

(1) The corrective actions have been closed on 21 May 2019

(2) The preventive actions have been closed on 31 May 2019