

Annex F

Investigation Report

Annex F1

Investigation Result for March 2023

Investigation Report of CEMS Exceedances

Date	1 – 31 March 2023
Time	Continuous monitoring throughout March 2023
Monitoring Location	Continuous Environmental Monitoring System (CEMS)
Parameter	Various emission parameters of the Centralised Air Pollution Unit (CAPCS), Cogeneration Units (CHP), Ammonia Stripping Plant (ASP) and Standby Flaring Gas Unit
Exceedance Description	<ol style="list-style-type: none"> Continuous monitoring was carried out at the CAPCS, CHP, ASP and Standby Flaring Gas Unit 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, 2.4 and 2.5 of the EM&A Manual (Version F) for CAPCS, CHP, ASP and Standby Flaring Gas Unit 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"> VOCs (including methane) from CAPCS; NO_x and SO₂ from the CHPs; NO_x, SO₂, NH₃ and HCl from ASP; and HF from Standby Flaring Gas Unit. The Contractor is still investigating the cause of the exceedances of VOCs (including methane) from CAPCS The Contractor has investigated the cause of the exceedance and identified that <ul style="list-style-type: none"> The exceedances of SO₂ from the CHPs and ASP occurred due to tripping of the de-sulphurisation system resulted from the residue of sulphur accumulated at the exhaust heat exchangers. The exceedances of NO_x from CHPs, NO_x, NH₃ and HCl from ASP and HF from Standby Flaring Gas Unit occurred due to system instability caused by prolonged usage of the CHPs, ASP and Standby Flaring Gas Unit.
Action Taken / Action to be Taken	The sample on CAPCS stack for VOC testing was taken on 29 March 2023 for investigating the cause of the exceedances of VOCs (including methane) from CAPCS. The Contractor has arranged cleaning of the heat exchangers of all CHPs to remove potential sulphur residue from the exhaust gas system. The Contractor has also replaced all catalytic convertors with an aim to improve the CO removal efficiency of the system.
Remedial Works and Follow-up Actions	The Contractor has arranged a specialist to review the CEMS system performance and accuracy. The specialist will carry out in-depth investigation and propose any remediation needed. The reason for CAPCS exceedance is still under investigation by the Contractor. This investigation report will be updated once available.

OSCAR Bioenergy Joint Venture

EP/SP/61/10 – Organic Resources Recovery Centre Phase 1

Prepared by: Chris Ng, MT Representative

Date 23 April 2023

Investigation Report of Discharged Sample Exceedances

Date	9 March 2023
Time	The monitoring of the discharge sample of the Outlet Chamber of the Effluent Storage Tank
Monitoring Location	Outlet Chamber of the Effluent Storage Tank
Parameter	Total Nitrogen
Exceedance Description	<ol style="list-style-type: none"> According to EM&A Manual, the monitoring of the effluent discharge from the outlet chamber of the Effluent Storage Tank shall be carried out monthly under Section 21 of the Water Pollution Control Ordinance (WPCO) license. Exceedance is considered if the concentration of discharged effluent sample from the Interceptors is higher than the discharge limits stated in Part B2 of the WPCO. Exceedances of discharge parameter was recorded on the monitoring of effluent discharge from the outlet chamber of the Effluent Storage Tank including: <ul style="list-style-type: none"> Total Nitrogen The Contractor has investigated the cause of the exceedance and found that <ul style="list-style-type: none"> The exceedances of Total Nitrogen from the effluent discharge from the outlet chamber of Effluent Storage Tank occurred due to an unexpected surge of Kjeldahl Nitrogen in Treated Effluent and leading to high Total Nitrogen in Treated Effluent sampled on 9 March 2023.
Action Taken / Action to be Taken	The Contractor investigated the reason for the exceedance. It was found that the reason for the exceedances of Total Nitrogen was due to an unexpected surge of Kjeldahl Nitrogen in the Treated Effluent sample.
Remedial Works and Follow-up Actions	The Contractors will further arrange a longer aeration in SBR and a monitoring of settlement, to prevent further high nitrogen content entering Treated Effluent Tank and discharge to DSD, to make sure the discharge effluents complies with the discharge limit.

Prepared by: Chris Ng, MT Representative

Date: 23 April 2023

Annex F2

Investigation Result for April 2023

Investigation Report of CEMS Exceedances

Date	1 – 30 April 2023
Time	Continuous monitoring throughout April 2023
Monitoring Location	Continuous Environmental Monitoring System (CEMS)
Parameter	Various emission parameters of the Centralised Air Pollution Unit (CAPCS), Cogeneration Units (CHP) and Ammonia Stripping Plant (ASP)
Exceedance Description	<ol style="list-style-type: none"> Continuous monitoring was carried out at the 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 F) 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"> VOCs (including methane) from CAPCS; NO_x and SO₂ from the CHP1; Dust, NO_x, SO₂, HCl and HF from the CHP2; and NO_x, SO₂ and NH₃ from ASP. The Contractor is still investigating the cause of the exceedances of VOCs (including methane) from CAPCS The Contractor has investigated the cause of the exceedance and identified that <ul style="list-style-type: none"> The exceedances of SO₂ from the CHPs occurred due to tripping of the de-sulphurisation system resulted from the residue of sulphur accumulated at the exhaust heat exchangers. The exceedances of dust, NO_x, HCl and HF from CHPs occurred due to system instability caused by prolonged usage of the CHPs. The exceedances of NO_x, SO₂ and NH₃ from ASP occurred due to ASP pump failure which caused equipment trip.
Action Taken / Action to be Taken	The sample on CAPCS stack for VOC testing was taken on 29 March 2023 for investigating the cause of the exceedances of VOCs (including methane) from CAPCS. The Contractor has arranged cleaning of the heat exchangers of all CHPs to remove potential sulphur residue from the exhaust gas system. The Contractor has also replaced all catalytic convertors with an aim to improve the CO removal efficiency of the system. The Contractor has replaced the ASP pump on 21 April 2023.
Remedial Works and Follow-up Actions	The Contractor has arranged a specialist to review the CEMS system performance and accuracy. The specialist will carry out in-depth investigation and propose any remediation needed.

	The reason for exceedance is still under investigation by the Contractor. This investigation report will be updated once available.
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Prepared by: Chris Ng, MT Representative

Date 22 May 2023

Investigation Report of Discharged Sample Exceedances

Date	Effluent Storage Tank: 13 April 2023 Petrol Interceptor 1: 20 April 2023
Monitoring Location	Outlet Chamber of the Effluent Storage Tank, Petrol Interceptor 1
Parameter	Effluent Storage Tank: Total Nitrogen Petrol Interceptor 1: Suspended Solids
Exceedance Description	<ol style="list-style-type: none"> According to EM&A Manual, the monitoring of the effluent discharge from the outlet chamber of the Effluent Storage Tank and Petrol Interceptors shall be carried out monthly and bi-monthly, respectively, under Section 21 of the Water Pollution Control Ordinance (WPCO) license. Exceedance is considered if the concentration of discharged effluent sample from the Effluent Storage Tank and Interceptors is higher than the discharge limits stated in Part B2 of the WPCO. Exceedances of discharge parameter was recorded during the monitoring of effluent discharge from the outlet chamber of the Effluent Storage Tank (Total Nitrogen) and Petrol Interceptor 1 (Suspended Solids). The Contractor has investigated the cause of the exceedances and found that <ul style="list-style-type: none"> The exceedance of Total Nitrogen from the effluent discharge from the outlet chamber of Effluent Storage Tank occurred due to an unexpected surge of Kjeldahl Nitrogen in Treated Effluent and leading to high Total Nitrogen in Treated Effluent sampled on 13 April 2023. The exceedance of Suspended Solids from the effluent discharge from Petrol Interceptor 1 occurred due to small amount of leaves and branches in the sample, leading to high Suspended Solids in the sample taken on 20 April 2023.
Action Taken / Action to be Taken	The Contractor investigated the reason for the exceedance. New effluent sample has been taken on 28 April 2023.
Remedial Works and Follow-up Actions	The Contractors will further arrange a longer aeration in SBR and a monitoring of settlement, to prevent further high nitrogen content entering Treated Effluent Tank and discharge to DSD, to make sure the discharge effluents complies with the discharge limit.

Prepared by: Chris Ng, MT Representative

Date: 22 May 2023

Annex F3

Investigation Result for May 2023

Investigation Report of CEMS Exceedances

Date	1 – 31 May 2023
Time	Continuous monitoring throughout May 2023
Monitoring Location	Continuous Environmental Monitoring System (CEMS)
Parameter	Various emission parameters of the Cogeneration Units (CHP) and Ammonia Stripping Plant (ASP)
Exceedance Description	<p>1. Continuous monitoring was carried out at the 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 F) 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"> • Dust, VOCs, NO_x and SO₂ from the CHP1; • Dust, NO_x and SO₂ from the CHP2; • NO_x and SO₂ from the CHP3; and • CO, NO_x, SO₂, NH₃ and HF from ASP. <p>2. The Contractor has investigated the cause of the exceedance and identified that</p> <ul style="list-style-type: none"> • The exceedances of SO₂ from the CHPs and ASP occurred due to tripping of the de-sulphurisation system. • The potential cause of exceedances of Dust, VOCs and NO_x from CHPs, as well as the exceedances of CO, NO_x, NH₃ and HF from ASP was system instability. • The underlining reasons for the exceedances are still under investigation. This investigation report will be updated once more information is available.
Action Taken / Action to be Taken	The Contractor investigated the reason for the exceedance and arranged Remedial Works and Follow-up Actions (see below).
Remedial Works and Follow-up Actions	<p>The Contractor has arranged the CHP supplier to inspect, analyse and improve CHP performance from the end of May to early June 2023. Improvement recommendation will be provided once the report is completed.</p> <p>The Contractor has also arranged cleaning of the ASP in early June 2023 to restore the treatment efficiency of the ASP.</p>

Prepared by: Angela Yung, MT Representative

Date: 23 June 2023

Investigation Report of Discharged Sample Exceedances

Date	5 May 2023
Monitoring Location	Outlet Chamber of the Effluent Storage Tank
Parameter	Total Nitrogen
Exceedance Description	<p>1. According to EM&A Manual, the monitoring of the effluent discharge from the outlet chamber of the Effluent Storage Tank and Petrol Interceptors shall be carried out monthly and bi-monthly, respectively, under Section 21 of the Water Pollution Control Ordinance (WPCO) license. Exceedance is considered if the concentration of discharged effluent sample from the Effluent Storage Tank and Interceptors is higher than the discharge limits stated in Part B2 of the WPCO. Exceedances of discharge parameter was recorded during the monitoring of effluent discharge from the outlet chamber of the Effluent Storage Tank.</p> <p>2. The Contractor has investigated the cause of the exceedances and found that the exceedance of Total Nitrogen from the effluent discharge from the outlet chamber of Effluent Storage Tank was potentially caused by the poor performance of the Sequential Batch Reactor (SBR), leading to an increased level of Nitrogen in the Treated Effluent sampled on 5 May 2023.</p>
Action Taken / Action to be Taken	The Contractor investigated the reason for the exceedance. New effluent sample has been taken on 31 May 2023.
Remedial Works and Follow-up Actions	The Contractors has arranged thorough cleaning of all tanks and the replacement of diffusers of the SBR.

Prepared by: Angela Yung, MT Representative

Date 21 June 2023