



ANNEX F

INVESTIGATION REPORT

Investigation Report of CEMS Exceedances	
Date	1 – 31 May 2024
Time	Continuous Monitoring throughout May 2024
Monitoring Location	Continuous Environmental Monitoring Systems (CEMS)
Parameter	Various emission parameters of the Cogeneration Units (CHPs), Ammonia Stripping Plant (ASP), and Standby Gas Flaring Unit
Exceedance Description	<ul style="list-style-type: none"> • Continuous monitoring was carried out at the CAPCS, CHPs, and ASP throughout the reporting period using the CEMS. According to the EM&A Manual, an 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 the CAPCS, CHPs, Standby Flare, and ASP respectively. The concentrations 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 from CHP1; ○ NO_x and SO₂ from CHP2; ○ NO_x and SO₂ from CHP3; ○ NO_x, SO₂, NH₃, and HCl from the ASP; and ○ HF from the Standby Gas Flaring Unit • The Contractor has investigated the cause of the exceedances and identified that: • The exceedances of NO_x and SO₂ and from the CHPs; NO_x, SO₂, and NH₃ from the ASP occurred due to system instability. • Regarding the NO_x exceedances from CHP1, the Contractor has identified that the Co-gen unit may have been burning lubrication oil, which caused many of the exceedances. • Regarding the NO_x exceedances from CHP2, the Contractor has identified that the exceedances may be attributed to the frequent stopping/ starting of the system. • Regarding the NO_x exceedances from CHP3, the Contractor has identified that the exceedances may be reduced by various fine-tuning measures. • Regarding the SO₂ exceedances from the CHPs, SO₂ sampling and testing was completed by a third-party laboratory that showed lower SO₂ values than those reported by the CEMS. The lower values measured by the laboratory was attributed to methane gas interference. Based on this study, it was proposed to implement a correction factor in the CEMS to adjust for the methane gas

Investigation Report of CEMS Exceedances

	<p>interference. After review by MT and IEC, the correction factor was implemented on 17 May 2024.</p> <ul style="list-style-type: none"> The various exceedances from the ASP can be attributed to the frequent starting and stopping of the system which has been causing unstable process conditions during operation. The exceedances at the Standby Gas Flaring Unit were attributed to system instability (start-up/ shut-down procedures) and a power outage on 28 May 2024.
Action Taken / Action to be Taken	The Contractor investigated the reason for the exceedances and arranged Remedial Works and Follow-up Actions (see below).
Remedial Works and Follow-up Actions	The Remedial Works and Follow-up Actions to be implemented by the Contractor to address the above exceedances (as well as updates on any exceedances from recent months) are detailed in the following table below.

Remedial Works and Follow-up Actions

Monitoring Location	Measures/ Actions to Address any Exceedances	Implementation Timeline & Status
Centralised Air Pollution Unit (CAPCS)	<ul style="list-style-type: none"> To address the exceedances for Total Odour (ou/Nm³) recorded in January 2024 and February 2024, the Contractor ordered a new H₂S / ORP sensor to replace the faulty one which was installed on 23 May 2024. The cleaning of the ventilation pumps was conducted in April 2024. 	<ul style="list-style-type: none"> All measures have been implemented.
Cogeneration Unit 1 (CHP 1)	<ul style="list-style-type: none"> To address the ongoing NO_x exceedances recorded from October 2023 – April 2024, the Contractor ordered 3 new cylinder heads from the supplier to replace the old ones and improve performance which were installed in May 2024. To address the SO₂ exceedances recorded from October 2023 – April 2024, SO₂ sampling and testing was completed by a third-party laboratory that showed lower SO₂ values than those reported by the CEMS. The lower values measured by the laboratory was attributed to methane gas interference. Based on this study, it was proposed to implement a correction factor in the CEMS to adjust for the methane gas interference. After review by MT and IEC, the correction factor was implemented in May 2024. To address the HCl exceedances recorded from October 2023 – April 2024, the Contractor implemented in May 2024 fine tuning measures such as reviewing the ignition temperature curve, spark plug condition check and adjusting the intake & exhaust valves on the cylinder to reduce the fluctuations in HCl emissions and keep within the permissible limit. 	<ul style="list-style-type: none"> The new cylinder heads were installed on 5 May 2024. The updated SO₂ correction factor was implemented on 17 May 2024. The fine-tuning measures were implemented during May 2024. The CHP expert visited in from 20-24 May 2024, and the report is expected in June 2024. The Contractor will receive additional training in December 2024.

Remedial Works and Follow-up Actions		
	<ul style="list-style-type: none"> • A CHP expert from Europe visited the ORRC1 facility from 20-24 May to review the performance of the CHPs. • The Contractor will receive additional advanced training from the manufacturer for the operation and maintenance of the equipment. 	
Cogeneration Unit 2 (CHP 2)	<ul style="list-style-type: none"> • To address the NO_x exceedances recorded from October 2023 – April 2024, fine tuning of CHP 2 such as reviewing the ignition temperature curve, spark plug condition check and adjusting the intake & exhaust valves on the cylinder was conducted to reduce the fluctuations in NO_x emissions and to keep within the permissible limit. • To address the SO₂ exceedances recorded from October 2023 – April 2024, SO₂ sampling and testing was completed by a third-party laboratory that showed lower SO₂ values than those reported by the CEMS. The lower values measured by the laboratory was attributed to methane gas interference. Based on this study, it was proposed to implement a correction factor in the CEMS to adjust for the methane gas interference. After review by MT and IEC, the correction factor was implemented in May 2024. • To address the HCl exceedances recorded from November 2023 and April 2024, the Contractor implemented fine tuning measures such as reviewing the ignition temperature curve, spark plug condition check and adjusting the intake & exhaust valves on the cylinder to reduce the fluctuations in HCl emissions and keep within the permissible limit. • A CHP expert from Europe visited the ORRC1 facility in May 2024 to review the performance of the CHPs. • The Contractor will receive additional advanced training from the manufacturer for the operation and maintenance of the equipment. 	<ul style="list-style-type: none"> • The fine-tuning measures were implemented in May 2024. • The updated SO₂ correction factor was implemented on 17 May 2024. • The CHP expert visited in from 20-24 May 2024, and the report is expected in June 2024. • The Contractor will receive additional training in December 2024.
Cogeneration Unit 3 (CHP 3)	<ul style="list-style-type: none"> • To address the NO_x exceedances, fine tuning of CHP 3 such as reviewing the ignition temperature curve, spark plug condition check and adjusting the intake & exhaust valves on the cylinder is being conducted to reduce the fluctuations in NO_x emissions and to keep within the permissible limit. • To address the SO₂ exceedances recorded from October 2023 – April 2024, SO₂ sampling and testing was completed by a third-party laboratory that showed lower SO₂ values than those reported by the CEMS. The lower values measured by the laboratory was attributed to methane gas interference. Based on this study, it was proposed to implement a correction factor in the CEMS to adjust for the methane gas interference. After review by MT and IEC, the correction factor was implemented in May 2024. • A CHP expert from Europe visited the ORRC1 facility in May 2024 to review the performance of the CHPs. 	<ul style="list-style-type: none"> • The fine-tuning measures were implemented in May 2024. • The updated SO₂ correction factor was implemented on 17 May 2024. • The CHP expert visited in from 20-24 May 2024, and the report is expected in June 2024. • The Contractor will receive additional training in December 2024.

Remedial Works and Follow-up Actions		
	<ul style="list-style-type: none"> The Contractor will receive additional advanced training from the manufacturer for the operation and maintenance of the equipment. 	
Ammonia Stripping Plant (ASP)	<ul style="list-style-type: none"> To address the NO_x exceedances recorded from October 2023 – April 2024, the Contractor conducted an overhaul of the ASP and arranged for a visit by the supplier to improve the reliability and performance of the system. To address the SO₂ exceedances recorded from October 2023 – April 2024, SO₂ sampling and testing was completed by a third-party laboratory that showed lower SO₂ values than those reported by the CEMS. The lower values measured by the laboratory was attributed to methane gas interference. Based on this study, it was proposed to implement a correction factor in the CEMS to adjust for the methane gas interference. After review by MT and IEC, the correction factor was implemented in May 2024. To address the NH₃ exceedances recorded from October 2023 – April 2024, the Contractor conducted an overhaul of the ASP and arranged for a visit by the supplier. To address the HCl exceedances recorded from October 2023 – April 2024, the Contractor conducted an overhaul of the ASP and arranged for a visit by the supplier. 	<ul style="list-style-type: none"> The overhaul of the ASP was completed 6 May 2024, and the supplier will visit in June 2024. The updated SO₂ correction factor was implemented on 17 May 2024.

Prepared by: Alex Khawaja Waheed, MT Representative

Date: 31 October 2024

Investigation Report of Environmental Complaint (Odour Nuisance) – 2 May 2024

Project Ref. No.	ORRC-EC-007-20240502
Date	2 May 2024
Date of Notification	5 May 2024
Location	Site boundary along Sham Fung Road
Description	<p>During the daytime hours of 2 May 2024 (Thursday), a complainant from outside of ORRC1 site premises called the government hotline to lodge a complaint as quoted below:</p> <p><i>陳先生投訴 大嶼山深豐路5 號 O·PARK1 (有機資源回收中心) 傳出強烈臭味 · 造成嚴重滋擾 · 影響附近上班人士 · 要求環保署處理及回覆。(original version)</i></p> <p><i>Mr. Chan has complained that there is a strong foul odour coming from O·PARK1 (Organic Resources Recovery Centre) located at 5 Sham Tseng Road, Lantau Island, causing serious disturbance and affecting nearby office workers. He has requested the Environmental Protection Department to address the issue and provide a response. (English translation)</i></p>
Action / Limit Levels	Since a documented odour complaint has been received the Action Level of Odour Nuisance was triggered (ref: Table 2.7 EM&A Manual Rev. F – July 2019, pg. 25).
Possible reason for Non-compliance	The Contractor has conducted an initial investigation immediately following the verbal notification of the complaint received on 2 May 2024. The source of the odour nuisance was likely related to the moving of soya bean material from Building 2 in the bunker using an open skip.
Action Taken / Action to be Taken	The Contractor investigated the reason for the Environmental Complaint (odour nuisance) and arranged Remedial Works and Follow-up Actions (see below).
Remedial Works and Follow-up Actions	<p>Following verbal notification of the odour complaint from EPD, OSCAR immediately implemented various mitigation measures to address the odour in accordance with Table 2.8 – Event and Action Plan for Odour Monitoring of the EM&A Manual (Rev. F – July 2019):</p> <ul style="list-style-type: none"> • Upon detecting the malodour, a top cover for the open skip was provided to temporarily reduce the odour intensity during the material transportation process; • Centralised Air Pollution Control System (CAPCS) system review was conducted to improve airflow and reduce the odour intensity; • Material movement operation was stopped at 15:00; • OSCAR's regular daily odour patrols from 30 April 2024 until 3 May 2024 found no sampling locations with an Odour Intensity of Level 2 or higher; and • Ad-hoc independent odour patrol was conducted on 3 May 2024, which also found no sampling locations with an Odour Intensity of Level 2 or higher.

Prepared by: Alex Khawaja Waheed, MT Representative

Date: 13 June 2024