

Annex F

Investigation Reports

Annex F1

Investigation Report for September 2021

Investigation Report of CEMS Exceedances

Date	1 - 30 September 2021
Time	Continuous monitoring throughout September 2021
Monitoring Location	Continuous Environmental Monitoring System (CEMS)
Parameter	Various emission parameters of the Cogeneration Unit (CHP) and Ammonia Stripping Plan (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"> • NO_x and SO₂ in CHP 2 and CHP 3 • NO_x, SO₂ and NH₃ in the ASP According to the Contractor, exceedance of NO_x occurred mainly at CHPs operated at loading with less than 150 tonnes of SSOW. The Contractor explained that the exceedances recorded in the CHPs were due to the low biogas loading which resulted in the poor performance efficiency in CHP. The Contractor explained that the exceedances in ASP were caused by unstable temperature and blockage of the column and temperature instability in the thermal oxidiser, which have led to incomplete combustion of biogas and NH₃ in ASP. The Contractor explained that the SO₂ exceedances in the CHPs and the ASP occurred due to equipment tripping of the air blower of the desulphurisation system.
Action Taken / Action to be Taken	<ul style="list-style-type: none"> • The quantity of SSOW was around 120 tonnes per day in this reporting month, which was lower than the desirable quantity. The Contractor will continue to actively liaise with EPD in their monthly meeting with an aim to increase the quantity of SSOW that can be treated daily, such that sufficient biogas can be generated for the CHP to be able to operate at optimal efficiency. • The Contractor has been fine-tuning and upgrading the ASP and its parts for better control. The Contractor has also replaced the blocked column in October 2021. • The malfunctioned parts in the de-sulphurisation system was replaced.

	<ul style="list-style-type: none">• CHP 1 was shut down for maintenance in this reporting period and for the preparation of overhaul in the coming months.
Remedial Works and Follow-up Actions	<p>The Contractor is recommended to closely monitor the processes, including the modification works and follow-up emission monitoring of the CHP and ASP to avoid exceedance.</p> <p>As similar issues have been re-occurred for sometimes, the Contractor is advised to undertake a comprehensive review of the operation of the concerned systems and the effectiveness of the existing mitigation measures and proposed further measures to avoid the exceedance.</p>

Prepared by: Angela Yung, MT Representative

Date 15 October 2021

Annex F2

Investigation Report for October 2021

Investigation Report of CEMS Exceedances

Date	1 - 31 October 2021
Time	Continuous monitoring throughout October 2021
Monitoring Location	Continuous Environmental Monitoring System (CEMS)
Parameter	Various emission parameters of the Ammonia Stripping Plant (ASP)
Exceedance Description	<ol style="list-style-type: none"> 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: <ul style="list-style-type: none"> • NO_x, VOCs and NH₃ in the ASP 2. The Contractor explained the exceedances occurred due to system instability caused by unstable stripping column temperature, blockage of stripping column and high ammonia content in the ASP inlet.
Action Taken / Action to be Taken	<ul style="list-style-type: none"> • To ensure stripping efficiency and stable operation of the ASP, the Contractor has arranged acid cleaning for the stripping column in this reporting month and packing cleaning in the next reporting month.
Remedial Works and Follow-up Actions	<p>The Contractor is recommended to closely monitor the processes, including the modification works and follow-up emission monitoring of the ASP to avoid exceedance.</p> <p>As similar issues have re-occurred in the ASP for sometimes, the Contractor is advised to undertake a comprehensive review of the operation of the concerned systems and the effectiveness of the existing mitigation measures and proposed further measures to avoid the exceedance.</p>

Prepared by: Angela Yung, MT Representative

Date: 11 November 2021

Annex F3

Investigation Report for November 2021

Investigation Report of CEMS Exceedances

Date	1 - 30 November 2021
Time	Continuous monitoring throughout November 2021
Monitoring Location	Continuous Environmental Monitoring System (CEMS)
Parameter	Various emission parameters of the 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"> • NO_x, VOCs and NH₃ in the ASP <p>2. The Contractor has investigated the cause of the exceedance and identified that the exceedances was due to system instability caused by unstable water flow resulted from the malfunctioning of a few equipment (including the hot water circulation pump), leakage of piping and the blockage of the steam generator.</p>
Action Taken / Action to be Taken	To ensure stripping efficiency and stable operation of the ASP, the Contractor has arranged clearing of the blockage, cleaning of the column and adjustment of the operation parameter since mid-November. The Contractor has also arranged packaging cleaning in the next reporting month.
Remedial Works and Follow-up Actions	<p>The Contractor is recommended to closely monitor the processes, including the modification works and follow-up emission monitoring of the ASP to avoid exceedance.</p> <p>The Contractor should review the routine inspection and maintenance schedule of the ASP and conduct preventative maintenance to avoid similar re-occurrence of the equipment failure.</p>

Prepared by: Angela Yung, MT Representative

Date 13 December 2021