

Annex F

Investigation Reports

Annex F1

Investigation Reports for October 2022

Investigation Report of CEMS Exceedances

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| Date | 1 - 31 October 2022 |
| Time | Continuous monitoring throughout October 2022 |
| Monitoring Location | Continuous Environmental Monitoring System (CEMS) |
| Parameter | Various emission parameters of the Cogeneration Units (CHP) and 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 and SO₂ from the CHPs • NO_x and NH₃ 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 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 occurred due to system instability caused by prolonged usage of the CHPs. • The exceedance of NO_x and NH₃ from ASP occurred due to system instability caused by ASP column and heat exchanger deteriorated condition. |
| Action Taken / Action to be Taken | <p>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 converters with an aim to improve the CO removal efficiency of the system.</p> <p>The Contractor has arranged cleaning of the ASP column and heat exchanger to resume performance.</p> |
| Remedial Works and Follow-up Actions | <p>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.</p> <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> |

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| | 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. |
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Prepared by: Chris Ng, MT Representative

Date 13 November 2022

Annex F2

Investigation Reports for November 2022

Investigation Report of CEMS Exceedances

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| Date | 1 - 30 November 2022 |
| Time | Continuous monitoring throughout November 2022 |
| Monitoring Location | Continuous Environmental Monitoring System (CEMS) |
| Parameter | Various emission parameters of the Cogeneration Units (CHP) |
| 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, SO₂ and HCl from the CHPs <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 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 occurred due to system instability caused by prolonged usage of the CHPs. • The exceedance of HCl from CHP 2 occurred due to system instability caused by CHP 2 column and heat exchanger deteriorated condition. |
| Action Taken / Action to be Taken | 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. |

Prepared by: Chris Ng, MT Representative

Date: 13 December 2022