

Introduction

This document is submitted to meet the requirement of section 4.2.2 (a) of the EPR Permit that is for an annual 'review of the results of the monitoring and assessment carried out in accordance with the Permit including an interpretive review of that data'.

Manual Extractive Monitoring

Annual and six monthly monitoring together with quarterly compliance monitoring was undertaken, by the prescribed methods, and reported as per the Permit requirements for Emission Points A, C, D, F, G and Y. Any emission breaches were notified under Schedule 5 Part A Notifications with follow up Part B Notifications.

Annual manual monitoring for Emission Point A Cupola After Oxidiser stack, for the parameters of fluorides (as hydrogen fluoride), hydrogen sulphide and metals (Group 1 and Group 2 as defined in the Permit) are measured in triplicate. The results recorded for these parameters are consistently low by comparison and consistently below their respective emission limit values.

In order to address air emissions of chlorides (as HCl), Knauf Insulation installed secondary abatement comprising a lime dosing system, which injects hydrated lime, at an appropriate rate, into the exhaust gas stream. This abatement system was installed in quarter one of 2019 with subsequent equipment commissioning, operator training and further tweaks to the engineering designs (dosing unit weather protection); thus the system was operational from April 2019. This additional abatement was subject to a Permit Variation (issued on 29th November 2018 (EPR/BR9383ID/V010)), which comprised a requirement to undertake quarterly emissions testing of chlorides in order to demonstrate compliance with the emission limit value. This compliance testing commenced in quarter one prior to the installation of the abatement system and thus, the HCl exceedances were accordingly. The lime dosing system was operational by the quarter two compliance monitoring and the emissions of chlorides were below the ELV for two (Run 2 & Run 3) of the three runs. The variability between the runs were believed to be a reflection in the lime powder flow to the gas stream; thus, modifications were made to the feed system to maintain steady powder flow and prevent blockages. In relation to quarter three monitoring, the average result (testing in triplicate) for HCl was 7.98mg/m³ with a range of measurement uncertainty of +/- 0.59mg/m³ which is below the emission limit of 10 mg/m³. Stability of the feed system has been further improved by reducing the flow rate of the carrier air from the lime powder blower, which has been deemed effective as the monitoring results from quarter four were all well below the emission limit value.

For Emission Point C Mainline Forming Stack, there is a six monthly monitoring requirement to determine, by triplicate measurement, particulate, volatile organic compounds (as carbon) (VOCs), ammonia, formaldehyde, phenol and amines. The first monitoring visit, undertaken in June, recorded concentrations of particulates and phenol in excess of their respective emission limit values (all tests). The results of the re-test in September showed phenol results to be compliant; however, particulate results were in excess of the ELV. In October, due to a rise in differential pressures, remedial works on the ceilcote abatement system was undertaken and six baskets and the tellerettes packing were changed. The second, six monthly monitoring undertaken in November recorded results below the emission limit values for all parameters.

For Emission Points D and F, there is an annual monitoring requirement to determine, by triplicate measurement, particulate, VOC as C, ammonia, formaldehyde, phenol and amines. There are no permit limits applied to Emission Point "D" Binder Plant Local Exhaust Ventilation; however, the monitoring results are considered to be low and comparable with historic annual data.

With respect to Emission Point F Mainline Oven Oxidiser, all of the parameters monitored returned results lower than the permitted emission limit values. In September, a fire in the oven and oxidiser unit would have resulted in the un-authorised release of parameters and this event was reported under the Part A and B requirements.

For Emission Point G Mainline Cooling Zone, there is an annual monitoring requirement to determine, by triplicate measurement, particulate, VOC as C, ammonia, formaldehyde, phenol and amines. The monitoring recorded results below the emission limit values for all parameters. With respect to the parameters of particulate and ammonia, there is a requirement to undertake quarterly compliance monitoring and of the four monitoring periods, quarter one and quarter four showed compliance, however, there were breaches within the quarter two monitoring (all results for both parameters) and quarter three monitoring (particulate on two runs and ammonia on one run).

It is believed that no permanent harm will result from the breaches as the Plant's ELV for ammonia and particulate are considerably lower than BAT AELs (which are for combined downstream emissions) and when the release rate is combined as a weighted average, the downstream emissions are compliant with BAT-AEL. In addition, emissions from Emission Point G have previously been modelled using worst case data (Dispersion Modelling using ADMS Model) to ascertain any adverse impact to the environment and whether the environment would suffer any harm; the results of the of the dispersion modelling indicated that the emissions from the cooling zone are not expected to cause significant harm.

The Plant continues to strive towards compliance with the ELVs. The plant have investigated and implemented numerous improvement measures, both remedial (such as regular cleaning and removal of blockages) and engineering measures (such as improvements to impact jets; oven seal works) with variable success. Thus, the Plant are now commissioning a Consultant to undertake an Abatement Options Review of Emission Point G for ammonia and particulate. This review will be completed in stages and will focus on identifying a suitable alternative system(s) that complies with the permit ELVs and can be justified as BAT whilst taking into account cost-effectiveness.

For Emission Point Y Cold End Dust Extraction No. 2, there is an annual requirement to measure particulate in triplicate. The results were lower than the permitted emission limit value.

Continuous Emissions Monitoring (CEMs)

A differential optical attenuation spectroscopy (DOAS) system, working in both infrared and ultraviolet light, is employed for direct measurement of carbon monoxide, oxides of nitrogen and oxides of sulphur with particulate monitoring by triboelectric probe. To enable continuous correction to the required conditions of NTP at 8% oxygen and dry gas the equipment monitors Hydrogen Sulphide, Oxygen, temperature, barometric pressure and also flowrate to enable mass emission calculations. The equipment is serviced and calibrated, by technicians from the equipment suppliers, every six months using certified gases for the gas calibrations.

The CEMs data for Emission Point A Cupola Stack After Oxidiser are reported quarterly in monthly summaries as required by the Permit. The validated data demonstrates compliance with the limits, enables reporting of un-authorised releases and the calculation of period averaged concentration data.

In relation to four parameters measured by CEMs, there were the following breaches:

- Reporting of no CEMs data during CEMs servicing by external specialist. The equipment is serviced twice annually and the servicing visits are usually undertaken during a shutdown period, however, in 2019, both services were undertaken whilst the plant was running. The first servicing visit of 2020 has been scheduled for a planned shutdown.
- Reporting of carbon monoxide and oxides of sulphur breaches due to engineering equipment failure. The Environmental Critical Equipment list and Engineering Maintenance Plans & Schedules reviewed.
- An issue with the CEMs Durag probe resulted in carbon monoxide, oxides of nitrogen and particulate breaches; however the plant carry a spare durag probe and this was changed on the next available shutdown to once again show compliance.
- There have been issues with the oxygen probe and fibre optic cable during 2019 which have resulted in instantaneous increases in oxygen readings, which have resulted in the oxides of sulphur values not being corrected to the specified reference conditions in accordance with the environmental permit (EPR/BR9383ID) and therefore this subsequently resulted in CEMs data recording SO₂ values in excess of the Emission Limit Value (however, these have been 'false' readings). The oxygen probe, whilst repairable, has been scrapped given its potential of a faster failure rate as opposed to a new probe and therefore, the Plant has purchased a new probe (there are two probes and the other probe was purchased new in August 2018). In addition, a new fibre optic cable was installed.

Storm Water

For storm water, the concentrations of suspended solids, pH and chemical oxygen demand (COD) are measured on a six monthly basis as required by the Permit from each of the four release points referenced as L3 to L6 that are discharging.

During 2019, the storm water sampling was undertaken during the Months of May and November and samples were analysed by an independent, UKAS accredited laboratory. The Permit does not impose any limits on the discharge of the stated parameters, however, the analytical results for both monitoring periods are generally within the expected ranges normally seen for storm water discharges from the site. During 2019, the surface water outfall protection valves located on discharge points L3, L4, L5 and L6 were serviced by an external specialist.

Conclusion

Process emissions are monitored in accordance with the Permit requirements and show that the controls and abatement normally result in the emissions being maintained within permitted limits. Where there are problems with un-authorized emissions, equipment breakdown and/or other unforeseen situations, every effort is made to ensure the plant regains compliance as soon as is possible within practical timescales.

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29.01.2020