

AGC Chemicals Europe, Ltd.
Environment Agency discussion
17th February 2023

1. Introductions

- Environment Agency: [REDACTED]
- AGC: [REDACTED]

2. R22 emissions concerns following:

- Incident reported on the 19 December 2022 caused R22 and R125 to be released above permitted limits
- Incident of the 23 December 2022 caused an exceedance of R22, by a small margin.
- How AGC account for climate change in our risk register
- Climate change adaptation audit

3. Update on Thermal Oxidiser

4. Air quality modelling request

5. Effluent treatment system trial

R22 Emissions – Concerns

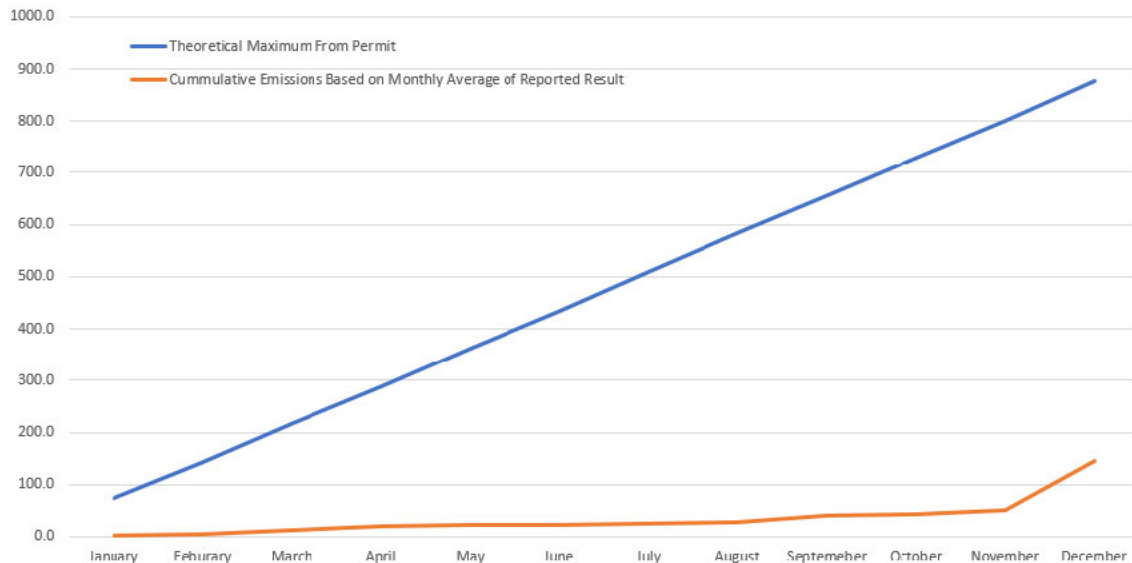
The incident reported on the 19 December 2022 caused R22 and R125 to be released above permitted limits

R22 is an ozone depleting substance. The use of R22 should be closed loop. The Montreal Protocol allows exceptions, but the loss of R22 should be unavoidable and incidental.

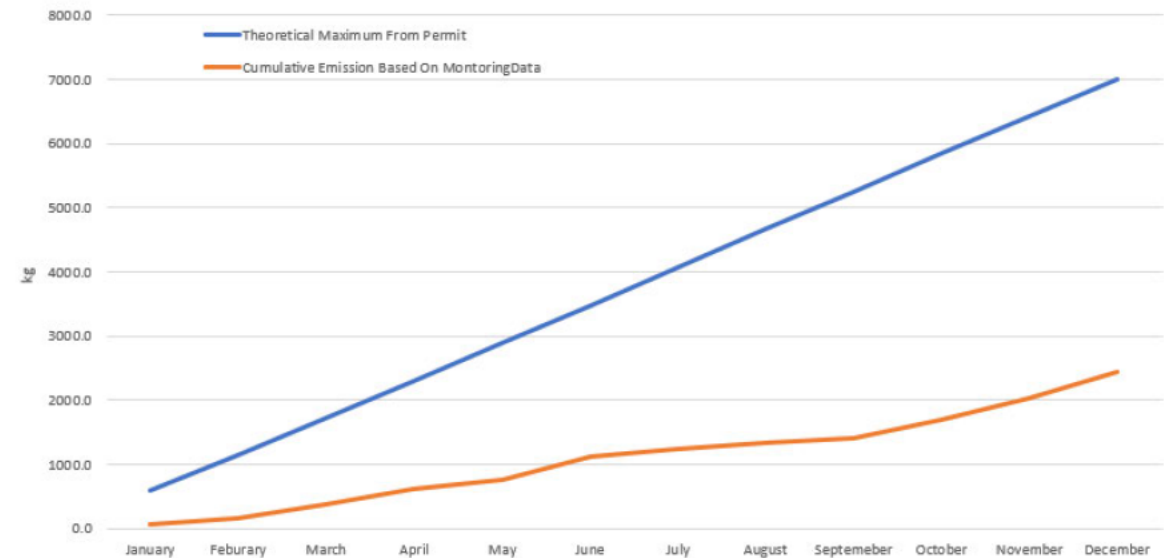
The impact of R22 is from cumulative emissions over a period leading to ozone depletion and acute long term impacts. AGCCE do not believe that the breach of permit limits on this occasion would cause significant contribution to environmental harm.

The cumulative emissions from AGCCE for a 12 month period (including the breach) are only 16.5% of the cumulative emissions deemed acceptable by the Environment Agency based on the AGCCE permitted emission levels

Emission Point A1 R22 Cumulative Emissions 2022



Emission Point A2 R22 Cumulative Emissions 2022



R22 Emissions – AGCCE Methodology for Calculation

Permit Requirement A1 & A2

Table S3.1 Point source emissions to air – emission limits and monitoring requirements – Producing Organic Chemicals - Activities A1 and A2

Emission point ref. & location	Parameter	Source	Limit (including unit)	Reference Period	Monitoring frequency ^{Note 1}	Monitoring standard or method
A1 [Point 8 on drawing number 60529901/ENV/PPC 000a, Release points to air]	Chlorodifluoromethane Class A VOC	Low Boiler Stack	100 g/hour Note 2	A period of stable operation	Weekly	In-house method
A2 [Point 9 on drawing number 60529901/ENV/PPC 000a, Release points to air]	Chlorodifluoromethane Class A VOC	Waste Acid Stack	800 g/hour Note 2	A period of stable operation	Weekly	In-house method

Note 1: Monitoring frequency may be reduced by prior agreement in writing by the Environment Agency.

Note 2: Class A VOCs to be expressed as individual VOCs and Class B VOCs to be expressed as carbon.

- There is no definition for “A period of stable Operation” AGCCE interpret this as being during shutdown or startup of the plant.
- There is a potential argument that as the plant operation was not stable during the incident leading to the breach, the result is irrelevant and should not have been included in the monitoring result.
- AGCCE test more frequently and generate an average of multiple data to provide a more accurate picture of emissions and provide improved consistency of data and therefore are potentially being penalised for exceeding permit requirements, indeed the suggestion in Note 2 is that weekly testing is potentially not necessary.
- Had AGCCE simply taken a single weekly sample once per week on a Monday, there would have been no requirement to document or report a breach of limits to the Environment Agency.

R22 Emissions from A1 – Unavoidable and Incidental?

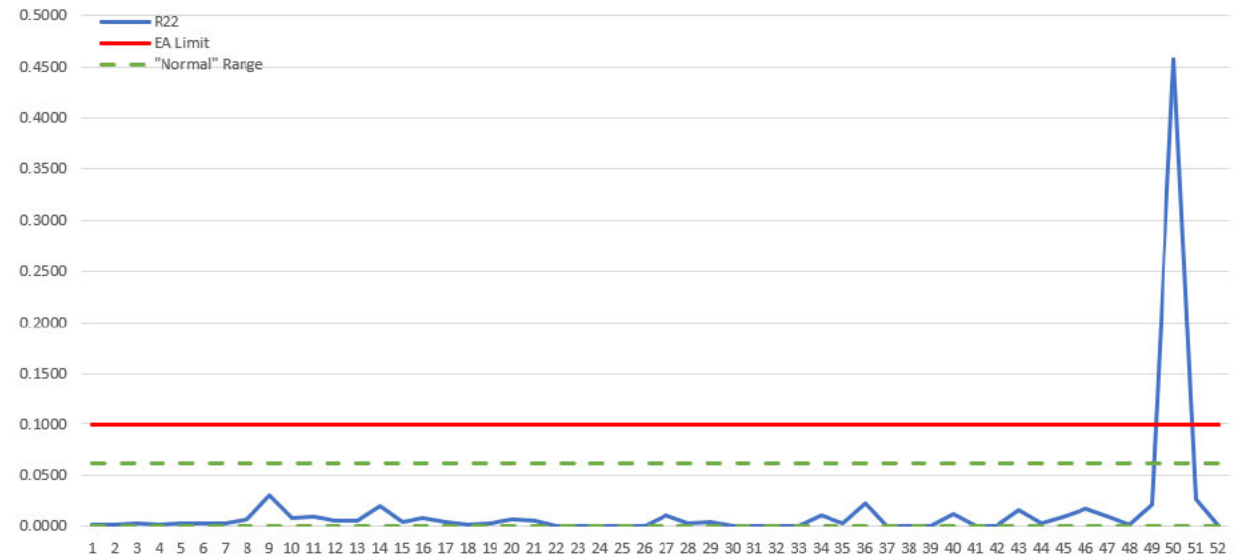
There was a specific incident (steam condensate froze in a small bore instrument impulse line) as reported on the 19 December 2022 which caused R22 and R125 to be released above permitted limits.

On detection of the abnormal event action was taken to reduce emissions. In responding to the abnormal situation AGCCE minimised further emissions and restored normal operating conditions.

Attempting to cease the emissions would have required plant shutdown which would have generated further emissions during the shutdown and re-start processes, increased risks through abnormal operation and caused further resource inefficiencies with generation of waste materials and baseline energy consumption.

The R22 emission as a result of the event were unavoidable and incidental to the operation of the AGCCE distillation process and restoration of normal operating conditions.

Emission Point A1 - 2022 Weekly Average R22 Emissions kg/hr



R22 Emissions from A1 – Unavoidable and Incidental?



The emissions was abnormal and for a limited period while normal operation restored.

Time hh:mm	Time since 1st test	CO ppm	TFE ppm	R23 ppm	R32 ppm	3FE ppm	R125 ppm	R22 ppm	Use For Reporting
		612	501	43.0	11.6	501	5.0	7.0	
10:58	869	90.7	77.3	0.6	0.6	0.0	0.3	N	
13:38	02:40	701	589.3	26.4	0.0	0.0	55.9	127.4	Y

R22 Emissions – AGCCE Methodology for Calculation

AGCCE Methodology

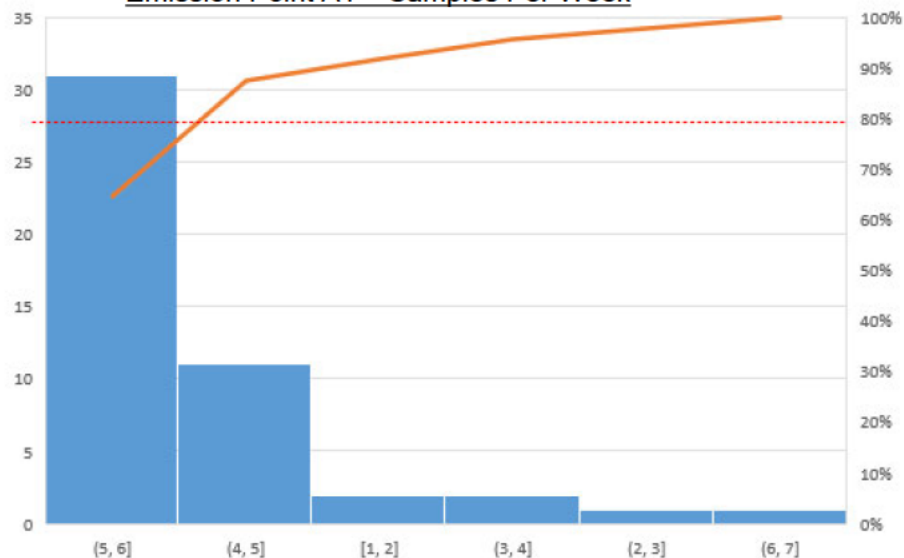
At least one sample is taken per week Mon to Fri of the Low Boiler Stack (A1) and Waste Acid Stack (A2) (except periods when plant is shutdown / restarting from shutdown).

As there are natural fluctuations a 4 hour re-test period to validate any “abnormal results” is included, if the 4 hour window is exceeded, the latest result is used as the “daily result”.

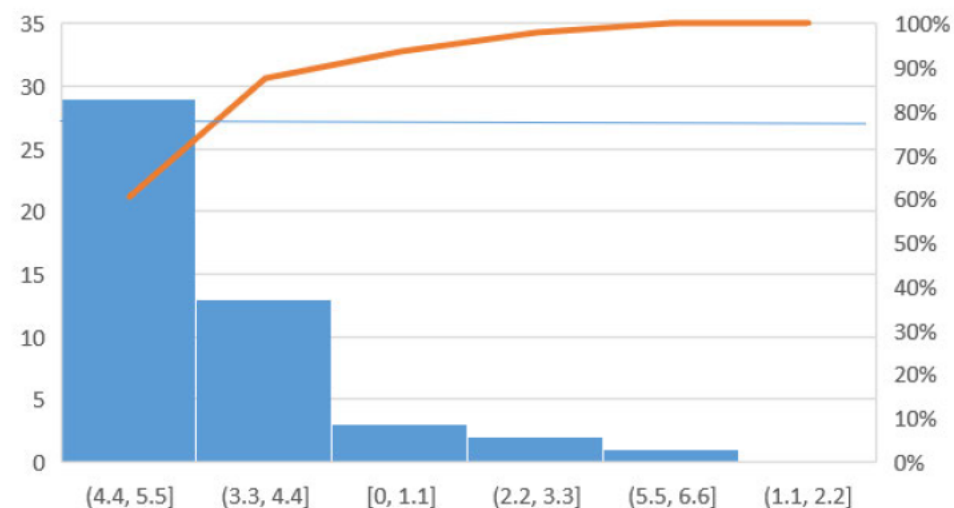
The “daily result” is then used to calculate a weekly average which is used to determine permit compliance.

The graph below shows the number of samples taken per week for 2022 (excluding shutdown periods)

Emission Point A1 – Samples Per Week



Emission Point A2 - Samples Per Week



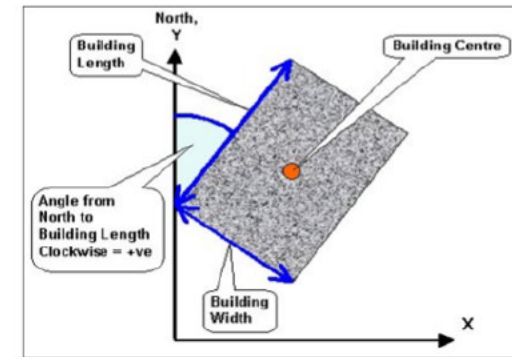
Further Actions by AGCCE R22 Emissions

- The pipework has been lagged to avoid future freezing, this has not been identified in AGCCE winterisation programmes and has not occurred in previous periods of extreme cold.
 - AGCCE will implement a mandatory follow up test, where the 4 hour daily sampling windows, to determine the extent of any abnormal release.
 - AGCCE will include in the Hazard Study Review commencing March 2023 a new guideword for each node (Severe Weather extremes resulting from Climate Change), *note ambient temperature high and low is already including in the HAZOP.*
 - AGCCE where installing new project are including mitigation / adaption for climate change (e.g. increasing max ambient design temperature) this was included on a new ETFE chilling system that operated successful without issue during the extreme heat periods in 2022, as higher extreme temperatures were included in the specification.
 - AGCCE will update the Aspects and Impacts held as part of ISO14001 to explicitly include climate change, currently it is implicit in a number of areas and this could be made clearer.
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Historic PFOA emissions from a permitted facility

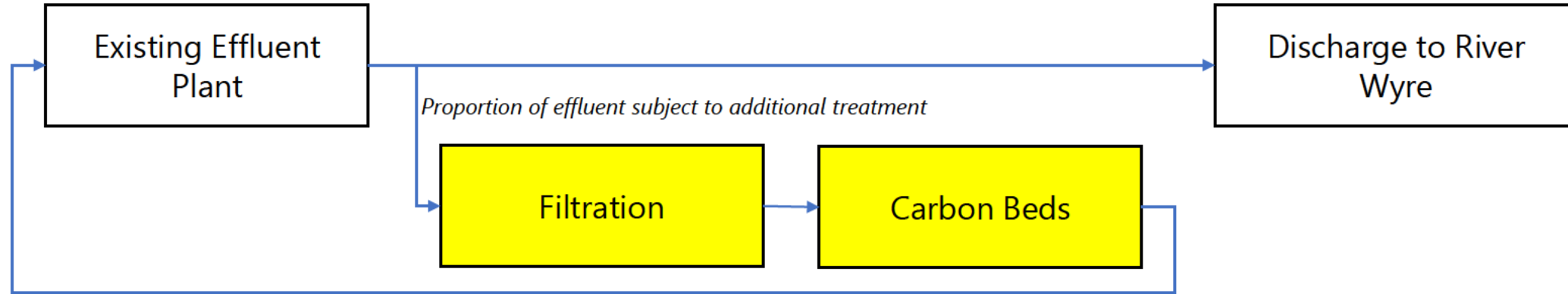
EA modelling group, AQMAU, have asked for some additional information to support the modelling request for the site. Can you help with the information below:

1. The site building location and dimensions for the main building the stack was placed on plus any other significant site buildings.
2. width, length, angle to north
3. grid reference of the centre point (see schematic below)
4. Ideally the grid reference of the stack.

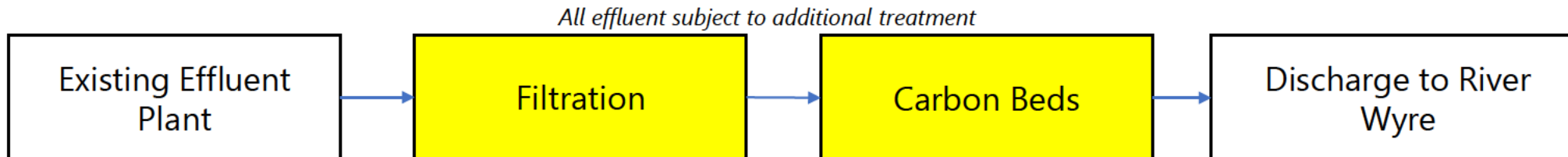


Effluent Treatment Improvements (site tour)

Trail – Q1 2023



Full Scale – Q3 2024



Any other questions / comments?
