



January 22

IQE Europe performance review 2020.
Environmental Operating Permit
EPR/KP3235SS

2021

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Introduction

This report has been prepared for Natural Resources Wales “the regulator” in line with the requirements of IQE EU “the operator” environmental operating permit EPR/KP3235SS to satisfy permit condition 4.2.2.

General Information

This is the fourth report submitted by IQE since the issue of the consolidated operating permit by the regulator on 25th July 2017 and as such it may continue to evolve as future iterations are submitted.

Owing to the strong growth in VCSEL demand from 2017 as previously reported, IQE installed and commissioned the IQE Newport mass-manufacturing plant, principally to transfer volume production. Significant VCSEL research & development and some legacy products are still prevalent at the IQE Europe plant, as well as GaAs edge-emitter products, using arsine. Phosphine-related production has increased significantly and captured wholly by the IQE Europe plant and future demand looks strong. As a result, phosphine-related production will remain here for the foreseeable future. The G5+ ammonia-based reactor is now projected to become more productive, having been largely in research & development mode, hence ammonia-related use will also continue for the foreseeable future.

Monitoring Results (Condition 4.2.2 (a))

The table below summarises the results from the latest round of emission monitoring conducted in line with the requirements of permit condition 3.3.1 (a) and table S3.1 of KP3235SS for emission points A1 and A3.

Emissions to Air			
Emission Point	Substance/Parameter	Emission Limit Value	Result ⁽¹⁾
A1	Ammonia ⁽⁷⁾	10 mg/m ³	1.13mg/m ³
A1	Hydrogen Chloride	10 mg/m ³	0.04mg/m ³
A3	Arsine ⁽⁶⁾	0.42 mg/m ³	0.01mg/m ³
A3	Phosphine ⁽⁶⁾	0.42 mg/m ³	0.02mg/m ³
A3	Ammonia ⁽⁷⁾	9 mg/m ³	0.25mg/m ³

2019 v 2020 Comparison

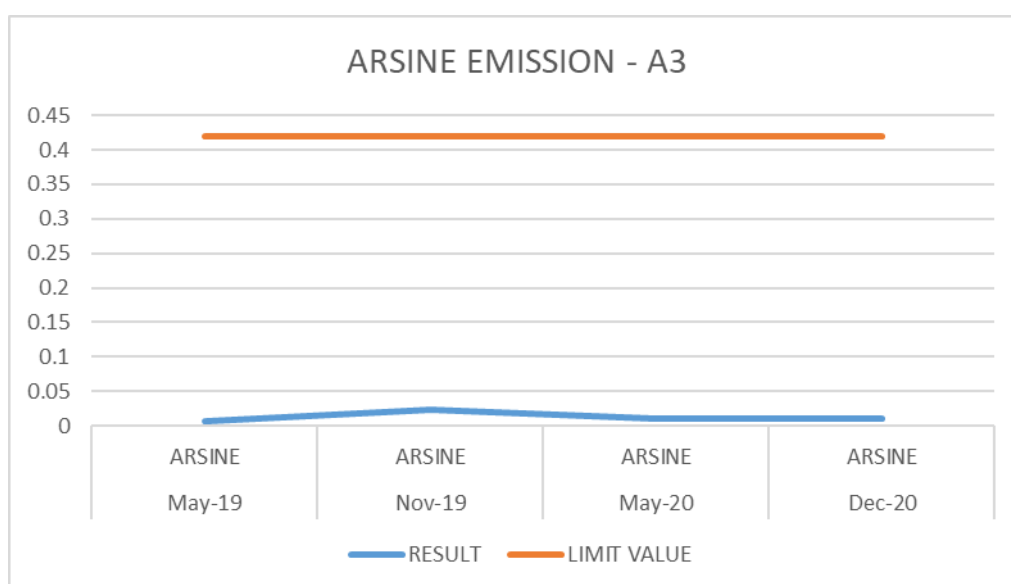
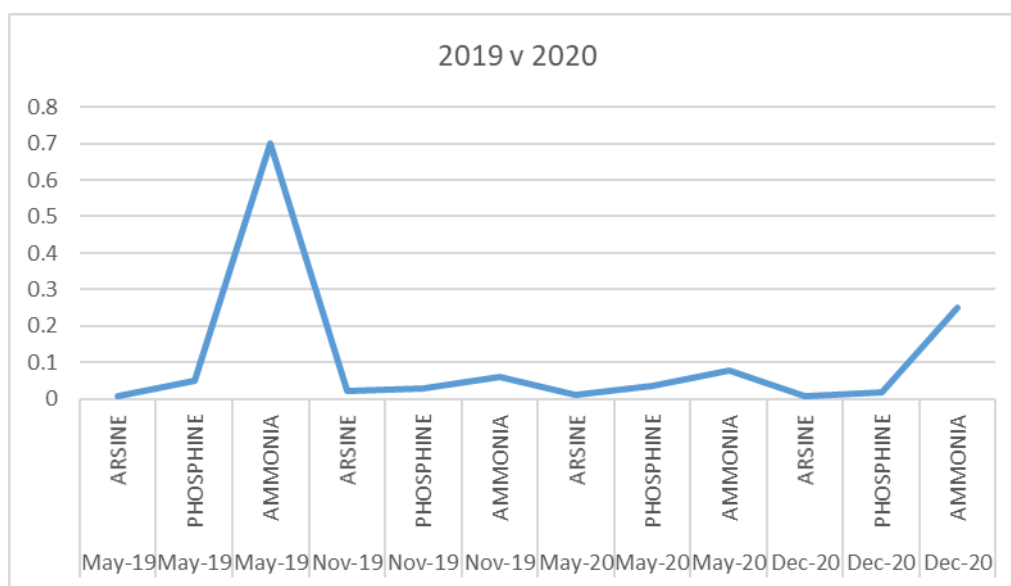
Emission Point	Substance	Emission Limit Value	2019 Result	2020 Result	+ / - Balance
A1	Ammonia	10mg/m ³	0.03mg/m ³	1.13mg/m ³	+ 1.1mg/m ³
A1	Hydrogen Chloride	10mg/m ³	0.15mg/m ³	0.04mg/m ³	- 0.11mg/m ³
A3	Arsine	0.42mg/m ³	0.02mg/m ³	0.01mg/m ³	- 0.01mg/m ³
A3	Phosphine	0.42mg/m ³	0.03mg/m ³	0.02mg/m ³	- 0.01mg/m ³
A3	Ammonia	9mg/m ³	0.06mg/m ³	0.25mg/m ³	+ 0.19mg/m ³

As we can see from the data table ‘Emissions to Air’ IQE EU remains significantly lower than the emission limit value of 10mg/m³ for ammonia & hydrogen chloride for emissions point A1.

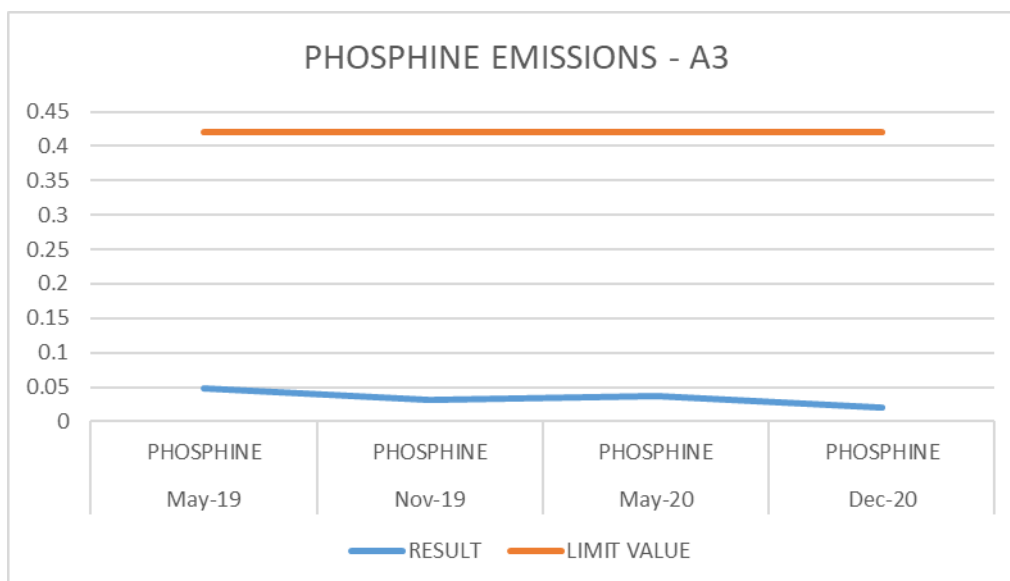
Data Review

Evaluation of 2020 monitoring results for arsine emissions via point A3 against 2019 show a decrease in emissions from 0.02mg/m³ to the current result of 0.01mg/m³ obtained on the 16th December 2020.

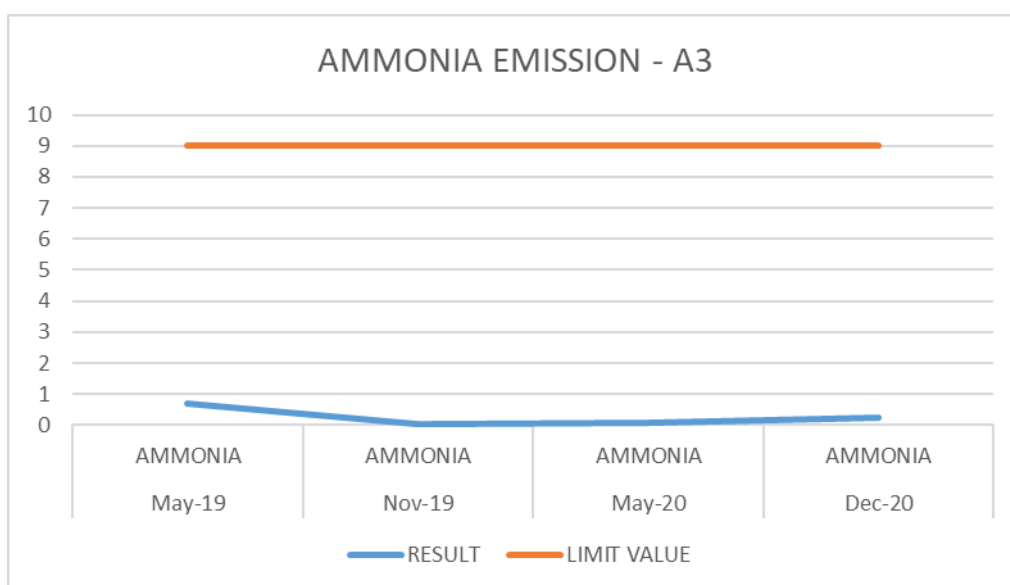
Whilst emissions remain significantly lower than the limit value of 0.42 mg/m³, the results are also potentially reflective of the transfer of large-volume processes to the Newport plant, as evidenced in the charts below.



The EU facility continues to operate a minimum of three production tools where phosphine is required. Phosphine emissions have steadily decreased throughout 2020 and remain well within limits set as evidenced in the chart below.



Throughout 2020 Ammonia emissions from the facility have remained steady and at low levels. Showing no sign of further spikes as noted in the report of 2017. 2019 to 2020 ammonia emissions remain steady. Emissions to air remain below the prescribed limit.



As required under permit condition 4.2.2 (table S4.2) for the period 01/01/20 – 31/12/20 the annual amount of raw ammonia used was 690kg / 0.69tonnes.

All emissions to atmosphere from emission point A3 are significantly below prescribed limits and IQE EU continues to operate in compliance with the conditions laid down in EPR/KP3235SS.