

Natural Resources Wales permitting decisions

Broughton Aircraft Factory (Airbus) Decision Document

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Permit variation

The permit variation number is:	EPR/BM3965IA/V008
The Operator is:	Airbus UK Ltd
The Installation is located at:	Broughton Aircraft Factory, Broughton, Chester

Our decision

This variation authorises the installation of a new paint booth within the existing Final Single Aisle Wing Painting Facility (building number 160). The paint booths, carry out detailed painting of wing elements and the installation of the new booth will increase the production throughput of the Final Single Aisle Wing Painting Facility.

The new paint booth will be operated in the same manner as the existing Final Single Aisle Wing Paint Shop booths and will use the same compliant coating and solvent cleaning materials. The new booth will have a dedicated vent stack and will contribute to the site's overall emission to air. The stack will release air containing particulate matter and volatile organic compounds as a result of the painting activities. Particulates shall be abated by in line filter bags, while releases of volatile organic compounds shall be controlled by the site's compliance with their agreed Solvent Reduction Plan. The assessment of these stack emissions is outlined in this report.

In conclusion, we have decided to issue the permit variation for Broughton Aircraft Factory operated by Airbus UK Ltd.

We consider in reaching that decision we have taken into account all relevant considerations and legal requirements and that the permit will ensure that the appropriate level of environmental protection is provided.

As part of this variation the following changes have been made to the permit documentation;

1. Update to table S1.2 to include the operating techniques of the new booth
2. Addition of emission point A186 to table S3.1 to reflect the new booth's vent stack
3. Update to Schedule 7 of the permit to include a detailed site plan and separate emission point plan

In addition, we have used this variation as an opportunity to make the following NRW initiated changes to permit;

4. Change of activity classification of the site's existing Effluent Treatment Plant to a part A listed activity

5. Update to table S1.3 to reflect discharge of improvement conditions IC02, IC03, IC04, and IC05.
6. Update to the reporting form VOC1 (and table 'S4.4 Reporting forms') to clarify the VOC data required at annual submission

Purpose of this document

This decision document:

- explains how the application has been determined
- provides a record of the decision-making process
- shows how all relevant factors have been taken into account
- justifies the specific conditions in the permit other than those in our generic permit template.

Unless the decision document specifies otherwise we have accepted the applicant's proposals.

How we reached our decision

Receipt of application

The Application was received on 21 December 2017. The application could not be duly made as an environmental risk assessment had not been included in the application documentation. Additionally, the site plan provided with the Application did not clearly show the emission points of the site. The additional evidence was provided by the Applicant on the 15 January 2018. We then notified the Applicant that the application was duly made on the 15 January 2018. This means we considered it was in the correct form and contained sufficient information for us to begin our determination, but not that it necessarily contained all the information we would need to complete that determination.

The legal framework

European Directives

All applicable European directives have been considered in the determination of the application.

The installation

Description of the installation

The operation at Airbus Operations Ltd comprises the whole process of manufacture of aircraft wings and components, from delivery of raw materials, to the despatch of the completed wings. The specific activities authorised by the permit are:

- Operation of natural gas-fired dispersed combustion plant for space and process heating;
- Surface treatment of wing components and completed structures, comprising cleaning and anodising;
- Surface coating of wing components and finished structures in enclosed booths; and
- Operation of Combined Heat and Power (CHP) units providing electrical power and heat to three of the buildings on the site.

Whilst the majority of the installation is controlled by Airbus Operations Limited, there is an associated activity operated by Metal Improvement Company LLC.

This involves the treatment of metal surfaces by shot blasting, to shape the surface and to condition it by producing indents, which increase the resistance of the surface to tension cracking. Metal

Improvement Company LLC also operate a small space heating plant. The overall site is therefore a multi-operator installation.

The decision on the facility was taken in accordance with 'RGN02 Understanding the meaning of regulated facility'.

The permitted activities

The regulated facility is an installation which comprises the following activities listed in Part 2 of Schedule 1 to the Environmental Permitting Regulations and the following directly associated activities.

Listed Activities:

- **Section 1.1 Part A(1)(a):** *Burning any fuel in an appliance with a rated thermal input of 50 or more megawatts.*
Dispersed combustion plant including CHP and associated reserve boilers;
- **Section 2.3 Part A(1)(a):** *Unless falling within Part A(2) of this Section, surface treating metals and plastic materials using an electrolytic or chemical process where the aggregated volume of the treatment vats is more than 30m³.*
TSA anodising (including etch and pickling) on LCM and SMC facilities until conversion process is complete, then TSA anodising only;
- **Section 5.4 Part A(a):** *Disposal of non-hazardous waste with a capacity exceeding 50 tonnes per day (or 100 tonnes per day if the only waste treatment activity is anaerobic digestion) involving one or more of the following activities, and excluding activities covered by Council Directive 91/271/EEC concerning urban waste-water treatment—*
 - (i) *biological treatment;*
 - (ii) *physico-chemical treatment;*
 - (iii) *pre-treatment waste for incineration or co-incineration;*
 - (iv) *treatment of slags and ashes;*
 - (v) *treatment in shredders of metal waste, including waste electrical and electronic*
 - (vi) *equipment and end-of-life vehicles and their components.*Treatment of effluent from TSA Anodising.
- **Section 6.4 Part B(a):** *Unless falling within Part A(1) or Part A(2) of this Section or Part A(2)(c) of Section 2.1, any process (other than for the re-painting or re-spraying of, or of parts of, aircraft or road or railway vehicles) for applying to a substrate, or drying or curing after such application, printing ink or paint or any other coating material as, or in the course of, a manufacturing activity, where the process may result in the release into the air of particulate matter or of any volatile organic compound and is likely to involve the use in any 12-month period of—*

- (i) 20 or more tonnes of printing ink, paint or other coating material which is applied in solid form,
- (ii) 20 or more tonnes of any metal coating which is sprayed on in molten form,
- (iii) 25 or more tonnes of organic solvents in respect of any cold set web offset printing activity or any sheet fed offset litho printing activity, or
- (iv) 5 or more tonnes of organic solvents in respect of any activity not mentioned in subparagraph (iii).

Painting and sealing of wing structures;

Directly Associated Activities

- Manufacture of wing structures;
- Machining;
- Autoclaves;
- Surface Cleaning using organic solvents: and
- Coating wing structures using organic solvents.

The listed activities governing the site have been updated following communications with the operator (IC02, 06 February 2016) where it was clarified that the waste water entering the effluent treatment plant had an operating capacity of 84 m³/day; which is above the lower threshold of 50 tonnes/day as stated in the listed activity as stated in EPR schedule 1 part 2 section 5.4 part A(1)(a). The density of water was used to convert between these two sets of units. Table S1.1 has been updated to reflect this.

As part of the operator's review of the draft documentation it was raised and supported with supplementary information (Letter on 'Confirmation of chromium removal dates', November 2017), that the chrome anodising activity has ceased at the site and that this should be removed from the activity descriptions in table S1.1. This has changed the descriptions of listed activities Section 2.3 Part A(1)(a) and Section 5.4 Part A(a). Clarifications were also provided by the applicant that explained how emission to air from effluent treatment is room ventilation only, not process extraction. This was corrected in the permit.

An error was also corrected in the IED references used in the descriptions of the Surface Cleaning using organic solvents and Coating wing structures using organic solvents DAAs. The following correction was made;

DAA	Error	Correction
Surface Cleaning using organic solvents	IED solvent emission activities as specified in Annex VII, Part 2 of the Industrial Emissions Directive (2010/75/EU) (IED), line 5 "Other surface cleaning"	IED solvent emission activities as specified in Industrial Emissions Directive (2010/75/EU) (IED), Annex VII, Part 1(11)
Coating wing structures using organic solvents	IED solvent emission activities as specified in Annex VII, Part 2 of the Industrial Emissions Directive (2010/75/EU) (IED), line 8 "Other coating, including metal, plastic, textile, fabric, film and paper coating".	IED solvent emission activities as specified in Industrial Emissions Directive (2010/75/EU) (IED), Annex VII, Part 1(3)

Operator

We are satisfied that the Applicant (the Operator) is the person who will have control over the operation of the facility after the variation is issued. The decision was taken in accordance with EPR RGN 1 Understanding the meaning of Operator.

The site

The Operator has provided a plan which we consider is satisfactory, showing the extent of the site of the facility including the location of the part of the installation to which this permit applies on that site.

The new plan submitted by the operator includes the location of the new emission point as part of the new paint booth.

A plan is included in the permit and the Operator is required to carry on the permitted activities within the site boundary.

Biodiversity, Heritage, Landscape and Nature Conservation

The Application is within the relevant distance criteria of a site of heritage, landscape or nature conservation, and/or protected species or habitat.

The following sites are within the relevant screening distances of the installation and were considered as part of the habitats assessment.

Site	Designation	Screening Distance (from the installation)	Actual Distance (to nearest point)
River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid (Wales)	Special Area of Conservation	10 km	0.69 km

Site	Designation	Screening Distance (from the installation)	Actual Distance (to nearest point)
River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid (England)	Special Area of Conservation	10 km	2.43 km
Deeside and Buckley Newt Sites	Special Area of Conservation	10 km	4.26 km
The Dee Estuary (Wales)	Ramsar Site	10 km	4.29 km
Dee Estuary / Aber Dyfrdwy (Wales)	Special Area of Conservation	10 km	4.29 km
The Dee Estuary (Wales)	Special Protection Area	10 km	4.29 km
Dee Estuary / Aber Dyfrdwy (England)	Special Area of Conservation	10 km	8.14 km
The Dee Estuary (England)	Ramsar Site	10 km	8.41 km
The Dee Estuary (England)	Special Protection Area	10 km	8.41 km

A full assessment of the Application and its potential to affect the habitats has been carried out as part of the permitting process. We consider that the Application will not affect the features of the sites or local protected species.

Environmental Risk Assessment

Air

This section of the decision document deals primarily with the dispersion modelling of emissions to air from the stack and its impact on local air quality.

The Applicant has assessed the Installation's potential emissions to air against the relevant air quality standards, and the potential impact upon human health. These assessments predict the potential effects on local air quality from the Installation's stack emissions.

The air impact assessments, and the dispersion modelling has been based on the Installation operating continuously at the relevant long-term or short-term emission limit values, i.e. the maximum permitted emission rate.

The Air Quality Assessment considered the following substances;

- Particulates (PM10)
- Volatile Organic Compounds

The modelling was performed with 5 years (2012-2016) of meteorological data from the Met Office observing station at Hawarden. The Hawarden observing station is located on the site of the installation.

We are in agreement with this approach. The assumptions underpinning the model have been checked and are reasonably precautionary.

The way in which the Applicant used dispersion models, its selection of input data, use of background data and the assumptions it made have been reviewed by Natural Resources Wales modelling specialists to establish the robustness of the Applicant's air impact assessment. The output from the model has then been used to inform further assessment of health impacts.

Consideration of Key Air Pollutant: Particulates

The impact on air quality from particulate emissions has been assessed against the Environmental Quality Standards for PM10 (particles of 10 microns and smaller). For PM10, the European Union Environmental Quality Standards (EUEQS) are a long term annual average of 40 µg/m³ and a short term daily average of 50 µg/m³.

The Applicant has used the maximum concentration of PM10 particles, as defined by their aerial scrubbing equipment design, to assess the impact of the installation on the local area. The equipment to be used in the particulate abatement will be a four-stage disposable dry filter system, which is designed to meet the PG6/40(11)¹ PM10 emission benchmark of 50 mg/m³.

In this report the Applicant has identified sensitive receptors in the area surrounding the installation. The maximum modelled long and short term process contribution (PC) for PM10 across all of the receptors was found to be at Bretton Lane houses, Chester Road, CH4 0DX. The NRW assessment results of this receptor are shown below;

Receptor	Background concentration ² µg/m ³	Process Contribution (PC) µg/m ³	Predicted Environmental Concentration (PEC) µg/m ³	Breach EU Environmental Quality Standards?
Bretton Lane houses, Chester Road, CH4 0DX	12.83	8.10 (short term)	33.70	No
		2.60 (long term)	15.43	No

¹ Process Guidance Note 6/40(11), Statutory guidance for coating and re-coating of aircraft and aircraft components, June 2013 ("PG6/40(11)")

² Defra UK Ambient Air Quality Interactive Map (2015 data), <https://uk-air.defra.gov.uk/data/gis-mapping>, accessed 13/02/2018

In their PM10 modelling submission the Applicant did not assess the short-term predicted environmental concentration (PEC) correctly³. Both the long term and short term PEC values are used to assess the expectation of EUEQS'. The correct calculation for the short-term PEC value is shown below;

$$PEC_{\text{short-term}} = PC_{\text{short-term}} + (2 \times \text{Background Concentration}_{\text{long-term}})$$

In their PM10 report the Applicant incorrectly assessed the risk of short-term EUEQS breaches by applying the long-term PEC calculation ($PEC_{\text{long-term}} = PC_{\text{long-term}} + \text{Background Concentration}_{\text{long-term}}$) to derive the $PEC_{\text{short-term}}$. The applicant had correctly calculated their $PEC_{\text{long-term}}$ values.

The results of correcting the applicant's data is show in the following table.

Receptor Ref	Receptor	Background concentration ⁴ µg/m ³	Process Contribution (PC) µg/m ³	Predicted Environmental Concentration (PEC) µg/m ³	Breach of Environmental Quality Standards?
D1	Kingfisher house day nursery, CH5 3QZ	12.31	1.23	25.85	No
D2	Manor Lane houses CH5 3PW	11.91	1.16	24.98	No
D3	Manor Close houses CH5 3PT	13.02	3.55	29.59	No
D4	Beeches farm, CH4 0BB	11.95	3.40	27.30	No
D5	Ewart Street houses, CH4 0BR	12.31	1.61	26.23	No
D6	St David's High School, CH4 0AE	12.51	1.09	26.11	No
D7	Celyn Crescent houses, CH4 8UL	12.51	0.79	25.81	No
D8	Fir Trees Caravan and Lodge Park, CH1 6QF	11.84	0.53	24.21	No
D9	Bretton Lane houses (Chester Road) CH4 0DX	12.80	8.10	33.70	No

³ Guidance: Air emissions risk assessment for your environmental permit, <https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit>. Accessed 13/02/2018

⁴ Defra UK Ambient Air Quality Interactive Map (2015 data), <https://uk-air.defra.gov.uk/data/gis-mapping>, accessed 13/02/2018

Receptor Ref	Receptor	Background concentration ⁴ µg/m ³	Process Contribution (PC) µg/m ³	Predicted Environmental Concentration (PEC) µg/m ³	Breach of Environmental Quality Standards?
D10	5 Chester Road house CH4 0DF	11.97	3.13	27.07	No
D11	45 Simonstone Road house (Chester Road) CH4 0BU	15.06	2.12	32.24	No
D12	1 St Mary's Way house (Chester Road) CH4 0DL	15.06	1.41	31.53	No
D13	Cherry Orchard farm Cottage, CH4 0EQ	12.18	0.15	24.51	No
D14	Broughton Primary School 119-129 Broughton Hall Rd CH4 0QQ	13.28	0.73	27.29	No
D15	14-16 Chester Road	12.51	1.24	26.26	No

We have reviewed the Applicant's particulate matter impact assessment and considering the above correction to their short-term EUEQS breach assessment, we are satisfied with the Applicant's conclusions.

Consideration of Key Air Pollutant: Volatile Organic Compounds

As VOCs cover a range of organic chemicals, the Applicant has made their quantitative assessment of these emissions by using the substitute of Butan-1-ol (butanol). The Applicant has justified this on the basis that butanol is a common component of the paints used in the facility, and typically 50-75% of the composition. The use of butanol is also considered precautionary as it also warrants a low Workplace Exposure Limit. We are in agreement with this approach of using butanol as the representative chemical in the VOC assessments.

The Applicant has assessed the long term and short-term releases of VOCs against the following limits.

Short Term Limit (hourly)	15400 µg/m ³
Long Term Limit (annual)	600 µg/m ³

These limits were derived using the H1 methodology for permit application V007 (the addition of the first Final Single Aisle Wing Paint Shop, FSAPS, in 2016). These limits are also appropriate for the assessment as the V008 FSAPS will perform the same process and use the same materials as the paint shop installed in the V007 variation. This methodology, and these limits, were therefore accepted by NRW.

The Applicant has assessed their expected VOC emissions by using their monitored data for their existing FSAPS booths and have compared it to their expected increase in productivity following this variation. The Applicant reports that the present FSAPSs process 13 sets of products each week and has a VOC emission of 30,789 kg/year. The addition of the new FSAPS booth will increase productivity by 25% (from 13 to 16 product sets per week) and this will lead to the additional release of 7697 kg/year of VOC.

The Applicant has calculated that a maximum theoretical output of all current FSAPS booths to be 44,930 kg/year and with the new FSAPS booth adding $44930 \times 25\% = 11,233$ kg/year. This is reported as representing a 6.9% VOC emission increase when considered against the 162,770 kg/year theoretical maximum VOC emissions from all of the site's paint shops

Using the H1 risk assessment tool for calculating associated process contributions, the additional PC as a result of the installation of the new booth will be 16 µg/m³ and 459 µg/m³ for the long and short term PC respectively. The table below compares this to the accepted environmental assessment levels (EALs);

	New FSAPS Booth (V008) PC µg/m³	EAL µg/m³	PC/EAL	Threshold of insignificance	Are emissions insignificant with respect to EAL?
Short Term	459	15400	3.0%	10%	Yes
Long Term	16	600	2.7%	1%	No

As the short-term PC is less than 10% threshold compared to the associated EAL, it is considered insignificant and therefore is screened out from further assessment.

The long-term PC is above the 1% threshold compared to the associated EAL, therefore the PEC was considered. An ambient background concentration was not available for butanol. As such, it can be reasonably assumed that the total VOC PC from all the on-site paint shops is indicative of the maximum background concentration around the site.

The Applicant included details from a 2016 VOC assessment which shows the total long-term VOC PC from site paint shops to be 238 µg/m³. Using this as the background value, the long-term PEC is calculated to be 254 µg/m³, which is 42% of the long term EAL. At this level the PEC (and therefore PEC) is considered to be not significant and screens out of any further assessment requirements.

	New FSAPS Booth (V008) PEC µg/m ³	EAL µg/m ³	PEC/EAL	Threshold of significance	Are emissions not significant with respect to EAL?
Long Term	254	600	42.3%	70%	Yes

Emission limits

We have decided that specific emission limits are not required for the emissions of VOCs or particulates as a result of this variation.

The Applicant participates in the Solvent Reduction Scheme, which looks to control solvent emissions on a site-wide basis. Reporting requirements and liaison with NRW ensures that the site remains compliant with the requirements of the scheme.

The applicant has stipulated that the abatement technology will use a four-stage disposable dry filter system and is designed to meet the 50 mg/m³ of PM10 benchmark as specified in PG6/40(11). In considering this design, as well as the design of the stack, we are satisfied that the benchmark emissions limits will be maintained without additional monitoring requirements.

Water

This variation makes no changes to any water discharges for the site. Based upon the information in the application we are satisfied that the appropriate measures will be in place to prevent pollution of ground and surface water.

No amendment has been made to the roster of water emission points within the installation's permit because of this variation, or because of the reclassification of the effluent treatment activity to an EPR listed activity.

Soil

As the variation is to an existing building on the site, and the boundary of the installation is not being changed, we are satisfied that there is no additional risk to soil as a result of the new paint booth.

Odour

We are satisfied that appropriate control measures are in place to prevent odour. We consider that the operation of the new paint booth will not contribute significantly to odours on site.

Noise

It has been identified that the primary source of noise following the installation of the new paint booth will arise from the spraying activity and the aerial scrubbing system.

As part of their Application the Applicant has reported on techniques and features that will be employed to limit any noise arising from the paint booth. These methods will include;

- Noise dampening wall materials used to construct the booth and scrubber stack casings
- Equipment stand-by modes (reduced operation) when not being used to minimise noise creation
- Automated restriction systems to disable the spray equipment should the paint booth doors open

Additionally, it is expected that the buildings surrounding the new paint booth stack will also contribute to the protection of local sensitive receptors from any nuisance noise. We are in agreement and satisfied with this approach.

Fugitive emissions

Based upon the information in the Application we are satisfied that the appropriate measures will be in place to prevent or where that is not practicable to minimise fugitive emissions and to prevent pollution from fugitive emissions.

Monitoring

We are satisfied that the current monitoring requirements are sufficient to manage the emissions from the site following the variation, and therefore no additional monitoring conditions will be imposed on the permit.

Reporting

Reporting requirements already exist in the permit and it has been assessed that these will also be

appropriate to satisfy the reporting requirements following the inclusion of the new paint booth into the permit.

Following discussions with the Operator with regard to the clarity of the VOC data being submitted to us, the reporting form VOC 1 has been updated to clearly align recorded data with the definitions contained within the Industrial Emissions Directive⁵.

This update has also required an update to table 'S4.4 Reporting Forms'.

Operating techniques

We have specified that the Installation must be operated in accordance with the techniques set out in table S1.2 of the Permit. The details referred to in that table describe the techniques that will be used for the operation of the Installation that have been assessed by Natural Resources Wales as BAT; they form part of the Permit through condition 2.3.1 and Table S1.2 in the Permit schedules.

We have reviewed the techniques used by the Operator and compared these with the relevant guidance note; PG6/40(11) aircraft coating guidance. The proposed techniques/emission levels for priorities for control are in line with the benchmark levels.

The permit conditions

Raw materials

The Applicant has reported that the new paint booth will utilise the same type of raw materials as other paint booths, therefore we are satisfied that no additional controls are required upon the raw materials for this facility on the site.

Improvement conditions

As part of the supporting information for the variation, the Applicant submitted an air dispersion modelling report which assessed the particulate output of emission points A184, A185 and A186, which are the emission points from variations V007 and V008. It has been confirmed that the submission of this report satisfies the improvement condition IC05.

The applicant has also, separately, submitted data and information to resolve improvement conditions IC02, IC03, and IC04.

⁵ Directive 2010/75/EU of the European Parliament and of the Council [2010] on industrial emissions (integrated pollution prevention and control), Annex VII Part 7

The permit documentation has been updated to reflect the changes to the status of these improvement conditions.

OPRA

In considering the magnitude of the change to the emission profile of the site did not change the OPRA score for the site, however the reclassification of the Effluent Treatment activity has increased the OPRA score from 173 to 175.

Published by:
Natural Resources Wales
Cambria House
29 Newport Road
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CF24 0TP

Issued 03 May 2018

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