Permitting decisions

Bespoke permit

We have decided to grant the permit for the Tenax Road PVA Plant operated by EOC UK Limited.

The permit number is EPR/NP3437YR.

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.

Purpose of this document

This decision document provides a record of the decision making process. It:

- highlights key issues in the determination
- summarises the decision making process in the decision checklist to show how all relevant factors have been taken into account
- shows how we have considered the consultation responses.

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

Read the permitting decisions in conjunction with the environmental permit.

Key issues of the decision

1 Overview of the installation

EOC UK Limited have applied to operate a chemical plant for the production of polyvinyl acetate (PVA) from vinyl acetate monomer (VAM) with a maximum projected annual throughput of 5,000 tonnes of PVA at a regulated installation located on Tenax Road, Trafford Park, Manchester.
This activity is regulated under Section 4.1 A(1)(a)(viii) of Part 2 to Schedule 1 of the Environmental Permitting (England and Wales) Regulations 2016.

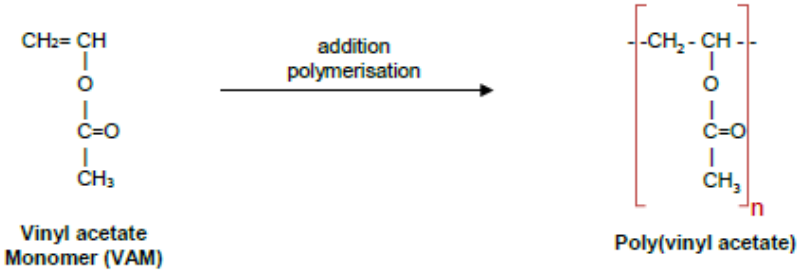
Within the same site, the applicant produces adhesives and compounds for use in various industries in a pre-existing non-regulated facility mainly consisting of chemical blending equipment.

The PVA produced by the regulated chemical plant will be stored within the permitted installation prior to being exported offsite as a finished product or to being partially used within the pre-existing downstream chemical blending activity for adhesives production.

The permitted PVA production plant consists of the following main process stages:

- Receipt and offloading of bulk VAM and its storage in a 80 m^3 tank;
- Receipt, handling and storage of other chemical raw materials in lower quantities as intermediate bulk containers and drums;
- PVA manufacturing through the free radical polymerisation of VAM in aqueous solution;
- Finished PVA product storage in two storage tanks with a volume of 30 m^3 each and loading to tankers for offsite export or transfer to the downstream non-regulated adhesive production process.

The manufacture of PVA will be undertaken by the free radical vinyl polymerisation of VAM by addition polymerisation reaction. This will constitute the sole chemical reaction carried out to produce PVA within the proposed installation. The reaction is depicted as a chemical equation in figure below:



The PVA production plant also includes the following directly associated activities:

- Process cooling via a primary closed circuit cooling system and a secondary evaporative cooling system, including an emergency cooling system;
- Steam generation;
- Emergency diesel generator and diesel fire water pump;
- Process waste handling and dispatch to authorised disposal.

The installation lies within the Trafford Park Industrial Estate, surrounded by heavy and light industrial units, distribution premises and retailers. There are no residential receptors within close proximity. The nearest ecological receptor is the Trafford Ecology Park Local Nature Reserve, located at approximately 600 meters to the North-East of the site, whilst the nearest European conservation area within relevant screening distance is the Manchester Mosses Special Area of Conservation, at approximately 8.4 km to the West.

The site operates according to an environmental management system certified to standard ISO 14001:2015 that covers the operations of the non-regulated chemical blending activities and will be extended to the permitted installation prior to start of operations.

2 The regulated facility

We have considered the extent and nature of the facility at the site in accordance with RGN2 'Understanding the meaning of regulated facility', Appendix 2 of RGN 2 'Defining the scope of the installation', Appendix 1 of RGN 2 'Interpretation of Schedule 1'.

2.1 Chemical blending activity for production of adhesives and compounds

Within the same site, the applicant produces adhesives and compounds for use in various industries in a pre-existing non-regulated facility mainly consisting of chemical blending equipment.

The applicant has explained in the application documents ('Supporting documentation for application NP3437YR', dated September 2018) that they consider the chemical blending activity for production of adhesives and compounds downstream of the regulated PVA production plant is not part of the permitted installation.

However, part of the PVA produced by the regulated installation will be used in the downstream chemical blending for production of adhesives. Thus, we have reviewed the interconnection between the regulated activity and the downstream chemical blending activity against Appendix 2 of our guidance RGN 2 'Defining the scope of the installation', in order to determine whether the entire site may qualify as a single integrated stationary technical unit (STU).

We have tested the applicability of the following requirements set within RGN 2 - Appendix 2 (section A2.5):

"If there are two or more STUs on the same site they will be treated as a single STU if they are ***technically connected and one of the following criteria is met****:*

(a) they carry out successive steps in an integrated industrial activity;

(b) one of the listed activities is a Directly Associated Activity (DAA) of the other; or

(c) both units are served by the same DAA."

When considering the regulated PVA production activity and the downstream chemical blending, criteria (a) and (c) are satisfied (the latter because the two activities share a steam boiler which we consider a DAA to the PVA production plant, as explained in the next section). Criterion (b) is not satisfied as the chemical blending activity is not directly associated with the regulated production of PVA because there is not an asymmetrical relationship where the chemical blending activity serves the PVA production (or vice versa).

We have therefore tested the technical connection requirement set by RGN2 - Appendix 2 as a necessary condition to happen in conjunction with either criteria (a), (b) or (c) above for the entire site to qualify as a single STU. According to our guidelines, we have carried out three tests:

- **Inevitability test:** "*if two activities cannot readily be separated then they will be regarded as technically connected".*

  We consider that this test is not satisfied in this case because the PVA production activity can be readily separated from the downstream production of adhesives and compounds. The PVA manufacturing process is functionally self-contained and can undertake the regulated activity on its own, independently of the operation of the adhesive plant, and vice versa.

- **Technical need test: "***considers whether there is a technical need for one activity to follow another in quick succession"*.

  We consider that there is not a technical need for the downstream chemical blending activity to follow in quick succession to the production of PVA, as the adhesive production can be run on imported PVA feedstock (as per current operations).

- **Practicality test:** "*considers whether there is an alternative, practical method for linking two activities which could replace the existing configuration. If there is no such alternative, then the existing link is likely to be regarded as a technical connection*."

We consider that importing the PVA feedstock for adhesive production as the alternative method required by this test. The downstream chemical blending activity is pre-existing to the regulated installation and the applicant has stated that it will retain the flexibility to import the PVA raw material in full and to operate independently from the permitted STU for a sustained period of time, depending on market and operating circumstances. The applicant has also stated that the production capacity of PVA in the permitted installation is 50% higher than the maximum capacity of the downstream chemical blending activity.

Ultimately we consider that the intermediate storage of PVA breaks the technical connection link between the listed activity and the downstream pre-existing non-regulated chemical blending activity. This assessment is based on RGN - 2 Appendix 2, section A2.12, excerpted in the following:

"Storage of product/raw material within a multi-unit site can also break the technical connection if it is large enough to allow individual units on the site to operate for sustained periods independently of each other. A break is normally demonstrated where an intermediate store allows for the export and import of significant proportions of the total mass flow. […] Where an intermediate storage is between two units, one of which is neither a listed activity nor meets the criteria for serving the listed activity, there is a break between the two main activities anyway, and EP regulation applies only to one side."

We therefore agree with the applicant's proposal and we consider that the regulated PVA production activity and the downstream chemical blending activity do not constitute a single integrated stationary technical unit, according to the criteria set in our guidance RGN2.

2.2 Steam generation

The PVA production plant is supplied with steam for process heating from an existing on-site steam generator with a rated thermal input of 1.19 MWth that also supplies stream to the non-regulated chemical blending activity.

Section A2.18 of our guidance RGN 2 Appendix 2 requires that if an activity serves a stationary technical unit carrying out a listed activity and some other industrial unit carrying out non-listed activities, then the activity will only be directly associated with the stationary technical unit if that unit is the principal user of the activity. The applicant has applied the "principal user" test to the steam boiler and concluded that regulated activity will be the principal user of the steam boiler. The steam boiler is therefore considered a DAA to the scheduled activity S4.1 A(1)(a)(viii). We agree with the assessment carried out by the applicant.

2.3 Effluent treatment plant

Waste water generated in the polymerisation process is minimised through internal recycling within the system by reusing rinse water effluents. Excess process wastewater that cannot recycled is dispatched for authorised disposal offsite.

The only process waste water emission sources to sewer from the regulated installation consist of:

- the spent cooling water effluent (cooling water blowdown) from the cooling system;
- the blowdown effluent from the steam generation system.

These effluent streams are routed to sewer under a trade effluent discharge consent with United Utilities Limited via the final pit of an existing on-site effluent treatment plant providing treatment to waste waters discharged by the non-regulated chemical blending activity. The effluent treatment plant is currently operated as a non-permitted activity under our Regulatory Position Statement 033 'Environmental permits for 'orphan' waste treatment plants'.

Section A2.18 of our guidance RGN 2 Appendix 2 requires that if an activity serves a stationary technical unit carrying out a listed activity and some other industrial unit carrying out non-listed activities, then the activity will only be directly associated with the stationary technical unit if that unit is the principal user of the activity. The first consideration to define the principal user under the requirements of RGN2 Appendix 2 is which activity is "the most dependent" user.

The application states that spent cooling water and boiler blowdown streams from the regulated activity will be discharged to the final pit of effluent treatment plant, as this provides suitable routing to the final discharge point to sewer. However these streams do not require treatment within the effluent treatment plant in order to meet the limits of the trade effluent discharge consent.

The non-regulated pre-existing chemical blending activity relies on the use of the effluent treatment plant and is therefore its most dependent and principal user.

We therefore consider that the effluent treatment plant is not an activity directly associated with the regulated installation and that it will continue to be operated as a non-permitted activity under our Regulatory Position Statement 033 ‘Environmental permits for ‘orphan’ waste treatment plants’.

3 Operating techniques

We have reviewed the techniques used by the applicant and compared these with the relevant guidance notes and we consider them to represent appropriate techniques for the facility. We consider the following BAT reference documents (BREF notes) and associated BAT conclusions (when available and applicable) relevant to the installation:

- Environment Agency: Sector Guidance Note EPR 4.02: Additional guidance for the Speciality Organic Chemicals Sector;
- European Commission: Reference Document on BAT (BREF) in the production of polymers (2007);
- European Commission: Best Available Techniques Conclusion (EU) 2016/902: Common waste water and waste gas treatment / management systems in the chemical sector;
- European Commission: Reference Document on Best Available Techniques on Emissions from Storage (2006).

The operating techniques for the proposed installation are detailed in the application document titled ‘Supporting documentation for application NP3437YR’, dated September 2018 and included in Table S1.2 of the permit. A summary of the general process design BAT incorporated in the Tenax Road PVA Plant, as found in the application documents, is provided below (use of BAT to minimise emissions to air is addressed in section 4 of this decision document):

- The design of the installation includes a range of safety devices and emergency systems to cope with deviations from normal operating conditions. These safety systems include:
    - Pressure relief valves (PRVs)
    - Pressure, flow, level and temperature sensing systems and automated programmable logic controller (PLC);
    - Emergency shutdown system allowing operators to stop dosing activities or the entire process;
    - Process condition interlocks, stopping equipment or closing valves should abnormal conditions arise;
    - Alarmed and interlocked gas detection systems for the VAM storage tank and production buildings;
    - Fire detection and sprinkler systems, serving the VAM storage and unloading facility and activated carbon filtration unit;
    - Overfill prevention system, preventing overfilling of the VAM storage tank by shutting off the offloading pump;
    - Reactor emergency reaction quench programme, which would dump water into the reactor to halt uncontrolled reactions and prevent exothermic runaway;
    - An emergency cooling system, which would supply potable water to the cooling water system in the event of a cooling system failure;

    - A dump tank to rapidly remove non-conforming products or anything posing a risk of solidification from the polymerisation reactor;
    - ATEX-rated electrical equipment within the areas assessed as potentially hazardous according to the Dangerous Substances and Explosive Atmospheres Regulations 2002, as amended.

- The applicant has stated that the design of the installation, process control and safety devices described in the application documents has been based on the formal hazard identification and operability studies (HAZOP) undertaken by the applicant for their existing PVA production plants in Belgium, Portugal and Poland that consist of similar technology and process configuration. These HAZOP studies will form the basis of a full HAZOP validation study for the proposed installation, which will be used to determine additional improvements during the detailed design of the facility. We have set a pre-operational condition in the permit to follow up on the outcome of this detailed engineering HAZOP study. Refer to section 5 of this decision document;
- Instrumentation for process control at the installation has been determined and selected based on a safety integrity level analysis approach;
- Power failures will be detected by voltage measurement. In the event of an outage, a backup emergency generator will automatically operate, supplying the entire installation and permitting controlled shutdown to prevent uncontrolled reactions. Additionally, all PLC systems will be supported by battery-based uninterruptible power supply;
- The design of the secondary and tertiary containment systems for the installation has been based on a source-pathway-receptor risk assessment and risk classification carried out according to the methodology set out in CIRIA Report C736 ‘Containment systems for the prevention of pollution’;
- The capacities of the secondary containment bunds for the bulk storage of VAM and VAM unloading bay have been reviewed against CIRIA Report C736 and confirmed that they meet the capacity requirements set by this standard, which are in excess of 110% of the largest storage volume protected by the bunds. The secondary containment system for the bulk storage of PVA product is shared with a process vessel (pre-mix tank) and provides a combined secondary containment capacity exceeding 110% of the largest tank and 25% of the combined storage capacity of all the tanks the bund is protecting, as required by our web guidance.
- The application documents explain that the yard area within the installation will provide tertiary containment in the event of a fire, this is in addition to any local containment of firewater within the secondary containment bunds. Manually operated penstock valves will be installed at the outlets of the surface water drainage system, providing tertiary containment in the event of a spill, fire incident in the yard area, overflow of secondary containment systems and activation of the VAM tank cooling system. The penstock valves will be tested weekly, with leak tests on a six monthly basis. The closure operation of the penstock valves will be integrated within the emergency procedures developed as part of the environmental management system.

We consider that the proposed design of the new process implements the appropriate best available techniques in line with the applicable BAT reference documents and standards listed above.

4 Emissions to air

The emissions to air from the regulated installation consist of:

- Localised and fugitive emissions of VAM, that is a Volatile Organic Compound (VOC);
- Localised emissions of oxides of nitrogen and carbon monoxide from the combustion of natural gas to raise steam in a medium combustion plant boiler.

4.1 Emissions of Volatile Organic Compounds

4.1.1 Operating techniques for activities emitting VOC

Emissions of VAM are minimised through implementation of BAT including the following:

- A vapour balancing system returns vapours arising during VAM offloading to the tanker;
- VAM vapours that evolve in the polymerisation reaction step are condensed and returned to the reactor. Emissions of vapours not recovered by the condenser are treated by an emission abatement system consisting of an activated carbon filtration unit prior to emission to air (emission point V1);
- High integrity gaskets are used to prevent and minimise fugitive emissions from equipment handling VOCs.

We consider that the techniques proposed by the applicant for activities emitting VOC provide the adequate level of environmental protection.

4.1.2 Risk assessment for emissions of VOCs to air

The applicant has carried out a screening assessment of emissions of VAM from the reactor and carbon filtration unit abatement system (emission point V1) using the Environment Agency's H1 methodology, and screening tool (version 2.7.8).

The emission inventory used as input for the risk assessment, has been based on design estimates based on design configuration of similar installations owned by the same operator in Portugal, Belgium and Poland.

The H1 methodology uses a concept of "process contribution (PC)", which is the estimated concentration of emitted substances after dispersion into the receiving environmental media at the point where the magnitude of the concentration is greatest. The guidance provides a simple method of calculating PC primarily for screening purposes and for estimating process contributions where environmental consequences are relatively low. It is based on using dispersion factors. These factors assume worst case dispersion conditions with no allowance made for thermal or momentum plume rise and so the process contributions calculated are likely to be an overestimate of the actual maximum concentrations. More accurate calculation of process contributions can be achieved by mathematical dispersion models.

Once short-term and long-term PCs have been calculated, they are compared with Environmental Standards (ES), for example, Ambient Air Directive limit values, or UK Environmental Assessment Levels (EALs), referred to as "benchmarks" in the H1 Guidance. PCs are considered **insignificant** if:

- the **long-term** process contribution is less than **1%** of the relevant ES; and
- the **short-term** process contribution is less than **10%** of the relevant ES.

However, where an emission cannot be screened out as insignificant, it does not mean it will necessarily be significant. For those pollutants which do not screen out as insignificant, we determine whether exceedances of the relevant ES are likely by considering the PEC (Predicted Environmental Contribution) which takes account of background pollutant concentrations. We consider the environmental risk not to be significant (and not requiring further detailed assessment) where the following criteria are met:

- the short-term PC is less than 20% of the short-term ES minus twice the long-term background concentration
- the long-term PEC is less than 70% of the long-term ES

When the PEC criteria set above are not met, we require the applicant to carry out detailed modelling for any PECs not screened out as insignificant.

Using the H1 methodology, the applicant has assessed that the process contribution of VAM emitted by the installation is below the screening criteria outlined above for both the long term and short term environmental standards.

Table 1– Applicant's H1 risk assessment for VAM from emission point V1

	Long-term impacts				Short-term impacts			
Substance	**ES µg/m³**	**PC µg/m³**	**PC/ES %**	**Screening test: >1% ES?**	**ES µg/m³**	**PC µg/m³**	**PC/ES %**	**Screening test: >10% ES?**
Vinyl Acetate	360	0.762	0.212	**No**	7,200	42.3	0.587	**No**

Emissions with PC that are less than the criteria indicated (screening test) can be considered to have an insignificant impact. We agree with the assessment carried out by the applicant.

4.1.3 Emission limits for VOCs (emission point V1)

We have not set a limit for emissions of VAM as a VOC emitted from emission point V1. The reasons are:

- We have reviewed the significance of these emissions and we consider them to be insignificant according to our guidelines;
- We have reviewed the emission rates of VOC estimated by the applicant against the requirements of our Sector Guidance Note EPR 4.02: 'Additional guidance for the Speciality Organic Chemicals Sector' and we consider these significantly below the thresholds requiring specification of an emission limit. Further explanation is given in the following.

We consider VAM a Class B VOC, according to our guidance: 'The Categorisation of Volatile Organic Compounds'. According to our Sector Guidance Note EPR 4.02, the specification of an emission limit for Class B VOCs is not required when their emissions are below the threshold of 5 tonne/yr or 2 kg/h, whichever is the lower (expressed as carbon). The emission inventory reported by the applicant consists of the figures below:

- 0.010833 g/s of VAM, corresponding to 0.00605 g/s = 21.8 g/h of VOC (expressed as carbon), below the 2 kg/h threshold for Class B VOC set within EPR 4.02;
- 0.1623 tonnes/y of VAM, corresponding to 0.0907 tonne/y, below the 5 tonne/y threshold for Class B VOC set within EPR 4.02.

The applicant has stated that the emission figures reported above represent a conservative worst case scenario as the vapour emissions from the process will not be subject to an appreciable level of flow and airborne VAM evolved will not be subject to any form of extraction.

Based on the emission inventory and results of the risk assessment we consider that the specification of an emission limit for VOCs is not necessary. However, as the emission inventory reported by the applicant is based on estimated emissions at design stage, we have set an improvement condition requiring the operator to validate this conclusion, by sampling and testing emissions during the first year of operations of the installation. Additional details on the improvement conditions we have set are discussed in section 5.

4.1.4 Odorous emissions

The principal raw material used by the installation (VAM) is an odorous substance. The applicant has carried out a qualitative odour risk assessment in the application document and identified measures that will be taken to prevent, mitigate and manage this risk. Overall, the applicant has assessed the risk associated with odour nuisance caused by their proposed operations to be "low".

Odorous emissions of VAM may arise from the following operations:

- Bulk storage of VAM;
- Bulk loading operation of VAM;
- Reaction system (emission point V1);
- Accidental spills of VAM.

The key preventative measures to limit odorous emissions associated with the bulk storage of VAM consists of storing this raw material within a sealed tank under nitrogen blanketing, continuously monitoring the temperature, pressure, level in the tank and cooling the tank through a sprinkler system in case of an exceedance of a temperature set point to reduce potential out-breathing.

The key preventative measures to limit odorous emissions associated with the bulk loading operations of VAM consists of using a sealed vapour balancing system, returning vapours arising during offload to the tanker; providing the VAM tank with overfill prevention system, automatically shutting down offloading pump; drainage arrangement will be in place to prevent fugitive releases of VAM from hoses and offloading pipework after deliveries.

The key preventative measures to limit odorous emissions associated with the operations of the polymerisation reactor consist of designing the reactor vessel as a sealed system, condensing the vapours arising during the reaction step and returning them to the reactor vessel and abating the residual vapours using activated carbon filtration prior to venting to air.

In case of accidental spills or leaks of VAM that could result in the generation of nuisance odours, a decomposing agent would be applied to reduce and mitigate odours at the source.

The applicant has proposed that daily logged odour monitoring by smell will be carried out by designated staff members.

Based upon the information in the application, we are satisfied that the risk assessment carried out by the applicant is commensurate to the risk posed by the installation and that the appropriate measures will be in place to prevent or where that is not practicable to minimise pollution from odour. These measures are included by reference to the application documents in the operating techniques table of the permit (Table S1.2).

We consider that the permit standard conditions relating to odour pollution prevention and control, along with inclusion of the applicant's operating techniques in table S1.2 of the permit, are sufficient and no additional measures are necessary.

4.2 Emissions from combustion (steam generation)

4.2.1 Operating techniques

The PVA production plant is supplied with steam for process heating from an existing on-site steam generator (rated thermal input of 1.19 MWth) that is shared with the pre-existing non-regulated adhesive and compounds production activity. The application states that steam boiler is predicted to operate in support of the regulated activity for two hours during each batch production, corresponding to 5.9% of yearly hours.

Gaseous products of natural gas combustion are discharged from the steam boiler via an existing stack (emission point A1). According to the application documents, the burner installed is a low NOx model capable of generating NOx emissions of up to 130 mg/Nm^3. This medium combustion plant is therefore anticipated to meet the forthcoming emissions limit value of 250 mg/Nm^3, as an 'existing' medium combustion plant of rated thermal input less than or equal to 5 MWth, under the Medium Combustion Plant Directive. This emission limit will become applicable from 2030.

4.2.2 Risk assessment

The applicant has provided a screening assessment of the impacts on air quality from the emissions of carbon monoxide and nitrogen oxides associated with the operation of the steam generation boiler in support of the regulated activity (emission point source A1). The screening assessment has been based on the Environment Agency H1 methodology that is described in section 4.1.2 of this decision document. The results of the applicant's H1 assessment are presented in Table 2:

Table 2– Applicant's H1 risk assessment for carbon monoxide and nitrogen oxides emissions from emission point A1

H1 Screening Test 1								
	Long-term impacts				**Short-term impacts**			
	ES µg/m³	**PC µg/m³**	**PC/ES %**	**Screening test: PC>1% EAL?**	**ES µg/m³**	**PC µg/m³**	**PC/ES %**	**Screening test: PC>10% ES?**
Carbon Monoxide	--	--	--	**--**	10,000	13.8	0.138%	**No**
Nitrogen Dioxide	40	0.336	0.839	**No**	200	72.9	36.5%	**Yes**
H1 Screening Test 2								
	Long-term impacts				**Short-term impacts**			
Particulate, assumed to consist of:	**Long-term Background (BG) µg/m³**	**PEC µg/m³**	**PEC/ES %**	**Screening test: PEC>70% ES?**	**Short-term BG (2 x long-term BG) µg/m³**	**Headroom (ES – short-term BG) µg/m³**	**% PC of Headroom**	**% PC of Headroom > 20%?**
Nitrogen Dioxide	22.9 (Note 1)	Screened out at Test 1	Screened out at Test 1	Screened out at Test 1	45.8	154.2	47.3	**Yes**

Notes:

1. The background concentration used by the applicant is based on the five year average data from the Air Quality Assessment report for the Greater Manchester Combined Authority "2016 Air Quality Annual Status Report, (ASR) for Greater Manchester , In fulfilment of Part IV of the Environment Act 1995 Local Air Quality Management, Date: 31st July 2017".
   The applicant has also carried out a review of 2018 NO_2 background maps published on the DEFRA website at discrete locations in proximity of the site. DEFRA data is consistent with the background figure used by the applicant.

We have reviewed the inputs of the H1 screening carried out by the applicant and the underpinning assumptions and we have found them consistent with our web guidance on the H1 screening methodology. In particular, in line with our guidance, the applicant has considered that 100% of the nitrogen oxides emitted are converted to nitrogen dioxide in the long term and that 50% of nitrogen oxides emitted are converted to nitrogen dioxide for short term screening.

Using the H1 methodology, the short-term risk associated with the emissions of carbon monoxide is screened out as insignificant as the PC is below 10% of the short-term environmental standard for this pollutant.

Similarly, the long-term risk associated with the emissions of nitrogen oxides is screened out as insignificant as the PC is below 1% of the long-term environmental standard for this pollutant.

The short-term impact associated to the emissions of nitrogen oxides cannot be screened out as insignificant at test 1 and test 2 of the H1 methodology and would require detailed dispersion modelling to further assess the impacts. A detailed air dispersion model was not provided by the applicant. The applicant provided a justification (reference: Response to Schedule 5 Notice received 22/10/2018) that this requirement was disproportionate to the environmental risk presented by this emission source. This justification was based on the fact that this medium combustion plant is already existing and contributing to the background concentrations of nitrogen dioxide in the area; the short term PC predicted by the H1 tool would be representative of any short-term operation of the steam boiler, including the operating hours when the boiler does not operate in support of the regulated activity, as per current non-regulated operations. The applicant made also an interpretation of the results of the H1 software, attributing the reason for not screening out to the fact that the H1 software uses conservative dispersion factors to carry out screening testing of emission sources whose effective release height is assumed to be zero.

We have considered the applicant's stance non-satisfactory because the installation is adjacent to the boundaries of the Greater Manchester Air Quality Management Area that is designated for nitrogen dioxide. Therefore, we have carried out additional assessment to fill the gap in the applicant's assessment and be satisfied that the short-term process contribution of nitrogen dioxide associated with this emission source is not significant.

Our additional assessment has consisted of a more refined screening exercise carried out using an air dispersion screening tool developed by the Environment Agency and based on the US EPA AERMOD air dispersion model.

Table 3 – Environment Agency's screening model assessment of short-term nitrogen oxides emissions from emission point A1

	Averaging Period	ES µg/m^3	PC µg/m^3	PC/ES %	Screening test: PC>10% ES?
Nitrogen Dioxide (99.78th Percentile)	1 hour	200	14.5	7.4%	**No**

The results of our additional assessment are presented in Table 3 and show that the predicted 99.78th percentile hourly average process contribution of nitrogen dioxide is below 10% of the short term environmental standard. Therefore, based on the results of our assessment, we are satisfied that the environmental risk associated with the additional operation of the existing steam boiler in support of the regulated activity can be considered non-significant.

5 Pre-operational conditions and improvement programme

5.1 Pre-operational conditions

As the design of the installation was based on preliminary HAZOP studies carried out for similar facilities owned by the applicant, we have set a pre-operational condition (PO.1) requiring the operator to submit for approval to the Environment Agency a written report confirming that the preliminary HAZOP studies undertaken for the installation and referred in the application documents have been formally validated within a 'detailed engineering HAZOP study' for the specific design, sizing, piping, equipment layout and technical details of the proposed permitted installation and design of pressure relief devices. The report shall provide a summary of the key areas of risk identified during the detailed engineering HAZOP study and how these risks have been minimised and mitigated through the detailed design of the installation.

As the current ISO 14001:2015 Environmental Management System (EMS) covers only the operations of the non-regulated chemical blending activities and will have to be extended to the permitted installation prior to start of operations, we have set a pre-operational condition (PO.2) requiring the operator to submit for approval a summary of the updated site EMS and make available for inspection all documents, procedures and operating instructions which form part of the system.

5.2 Improvement conditions

We have set an improvement condition (IC.1) requiring the operator to submit a written report to the Environment Agency on the commissioning of the installation, summarising the environmental performance of the plant as installed against the design parameters set out in the application and including a review of the performance of the facility against the conditions of this permit and details of procedures developed during commissioning for achieving and demonstrating compliance with the permit.

As the emission inventory of VAM reported by the applicant and the activated carbon change-over frequency are based on emissions estimated at design stage, we have set an improvement condition (IC.2) requiring the operator to validate the activated carbon change-over frequency and the risk assessment associated with these emissions, by sampling and testing emissions during the first year of operations of the installation.

Decision checklist

Aspect considered	Decision
Receipt of application	
Confidential information	A claim for commercial or industrial confidentiality has not been made.
Identifying confidential information	We have not identified information provided as part of the application that we consider to be confidential. The decision was taken in accordance with our guidance on confidentiality.
Consultation	
Consultation	The consultation requirements were identified in accordance with the Environmental Permitting Regulations and our public participation statement. The application was publicised on the GOV.UK website. We consulted the following organisations: • Local authority (Trafford Borough Council) • Local sewerage undertaker (United Utilities Limited) • Public Health England and the relevant Director of Public Health • Health and Safety Executive • Local fire service • North Western Fisheries and Conservation Authority The comments and our responses are summarised in the consultation section.
Operator	
Control of the facility	We are satisfied that the applicant (now the operator) is the person who will have control over the operation of the facility after the grant of the permit. The decision was taken in accordance with our guidance on legal operator for environmental permits.
The facility	
The regulated facility	We considered the extent and nature of the facility at the site in accordance with RGN2 'Understanding the meaning of regulated facility', Appendix 2 of RGN 2 'Defining the scope of the installation', Appendix 1 of RGN 2 'Interpretation of Schedule 1'. Refer to the key issues section for details of how we have made this decision. The extent of the facility defined in the site plan and in the permit. The activities are defined in table S1.1 of the permit.

Aspect considered	Decision
The site	
Extent of the site of the facility	The operator has provided a plan which we consider is satisfactory, showing the extent of the site of the facility. We have extended the boundary of the plan provided by the applicant to the East, to include within the permit the entire area of the tertiary containment system, as shown by the applicant in the drawing titled 'Tertiary containment Arrangements', part of the document titled 'Supporting documentation for application NP3437YR', dated September 2018. The plan is included in the permit.
Site condition report	The operator has provided a description of the condition of the site. The site is located above a principal aquifer, but is not within a groundwater protection zone. The Site Condition Report outlines relevant hazardous substances (RHS), their hazard characteristics and quantities on site at any time. Pollution prevention measures will be in place to ensure containment of these materials during storage, handling and use. These measures include secondary and tertiary containment systems that have been designed based on a source-pathway-receptor risk assessment and risk classification carried out according to the methodology set out in CIRIA Report C736 'Containment systems for the prevention of pollution'. Refer to the key issues section 3 for additional details on operating techniques. The applicant commits to maintaining site infrastructure during the lifetime of the permitted facility such that land and groundwater quality are not adversely impacted by permitted activities. The applicant has carried out ground investigation of the site which included gas and groundwater sampling for Relevant Hazardous Substances (RHS). The results of the ground investigation for soil and groundwater are included in the application reports ('Factual Ground Investigation report', dated April 2018 and 'Supplemental Addendum site condition report' provided in reply to Schedule 5 Notice dated 02/08/18). We consider that the description of the condition of the site provided by the applicant is satisfactory. The decision was taken in accordance with our guidance on site condition reports and baseline reporting under the Industrial Emissions Directive.

Aspect considered	Decision
Biodiversity, heritage, landscape and nature conservation	The application is within the relevant distance criteria of sites of heritage, landscape or nature conservation, and/or protected species or habitat. In particular: - The installation is within 10 km screening distance from the Manchester Mosses Special Area of Conservation (SAC) that is protected under the Conservation of Habitats and Species Regulations 2017; - The installation is within 2 km screening distance from the Trafford Ecology Park Local Nature Reserve (LNR); - The installation is within 2 km screening distance from the Bridgewater Canal local wildlife site (LWS). We have assessed the application and its potential to affect all known sites of nature conservation, landscape and heritage and/or protected species or habitats identified in the nature conservation screening report as part of the permitting process. We have carried out a Habitats Regulations assessment to assess the impacts of the proposed installation on the statutorily protected site Manchester Mosses SAC, as required by our procedures. We consider that the application will not affect any sites of nature conservation, landscape and heritage, and/or protected species or habitats identified. In particular, we consider that the application will not cause likely significant effects on the statutorily protected Manchester Mosses SAC and significant pollution on LNR and LWS within relevant screening distance. The combustion process in the pre-existing steam boiler is not considered 'relevant' for assessment under the Agency's procedures which cover the Conservation of Habitats and Species Regulations (Habitats Regulations) because its rated thermal input is below 5 MWth. This was determined by referring to the Agency's guidance 'AQTAG014: Guidance on identifying 'relevance' for assessment under the Habitats Regulations for installations with combustion processes.' Thus no detailed assessment of the effect of the releases from the installation's steam boiler on the statutorily protected sites and other ecological receptors is required. We have not consulted with Natural England on our Habitats Regulations assessments for the Manchester Mosses SAC, but we have issued our assessment for their information. The decision was taken in accordance with our guidance.

Aspect considered	Decision
Environmental risk assessment	
Environmental risk	We have reviewed the operator's assessment of the environmental risk from the facility. In general, the operator's risk assessment is satisfactory. However, we have considered unsatisfactory the operator's assessment of the environmental risk associated with emissions to air of nitrogen oxides from the steam boiler and thus we have carried out additional assessment of this specific risk. Emissions to sewer Emissions to sewer from the single proposed point source from the installation (spent cooling water) were screened using the H1 software tool. The applicant used the H1 tool to assess the impact of cooling water treatment chemicals (corrosion inhibitor and biocide) on the Manchester Ship Canal at the outfall from the Davyhulme Sewage Treatment Works. The pollutant tested with the H1 tool were the constituent chemicals of the cooling system corrosion inhibitor and biocide, namely: hydrogen peroxide, acetic acid, peracetic acid, 2-acrylamido-2-methylpropanesulfonic acid - acrylic acid copolymer, tetrasodium phosphonoethane - 1,2-Dicarboxylate, hexasodium Phosphonobutane - 1,2,3,4 - tetracarboxylate, tetrapotassium pyrophosphate and orthophosphoric acid. Published environmental quality standards (EQSs) are not available for any of the chemicals present within biocide and corrosion inhibitor. In the absence of these values, the applicant determined predicted no effect concentrations (PNECs) for the constituents of the biocide and corrosion inhibitor following methodology under Annex VIII to the Industrial Cooling Systems BREF Note. The H1 risk assessment carried out by the applicant using the estimated PNEC as EQS, shown that the process contributions for the above mentioned substances could be screened out as insignificant according to Test 2 of the H1 methodology as they were below 4% of the Annual Average EQS. We agree with the applicant's conclusion. Emissions to air and odour Refer to the key issues section 4 for details on the risk assessment of emissions to air.
Operating techniques	
General operating techniques	We have reviewed the techniques used by the operator and compared these with the relevant guidance notes and we consider them to represent appropriate techniques for the facility. Refer to the key issues section 3 for details on the BAT reference documents (BREF notes) and technical guidance notes relevant to the installation. The operating techniques that the applicant must use are specified in table S1.2 of the environmental permit.

Aspect considered	Decision
Operating techniques for emissions that screen out as insignificant	Emissions of Vinyl Acetate Monomer (a Class B - Volatile Organic Compound potentially emitted by the installation) from emission source V1, carbon monoxide and long-term emissions of nitrogen dioxide from emission source A1 have been screened out as insignificant, and so we agree that the applicant's proposed technique is BAT for the installation. Short-term emissions of nitrogen dioxide from the pre-existing emission source A1 have not screened out as insignificant with our H1 software. Therefore we have carried out additional assessment consisting of a more refined screening exercise carried out using an air dispersion screening tool internally developed by the Environment Agency and based on the US EPA AERMOD air dispersion model. The additional assessment has shown that the short-term process contribution of nitrogen dioxide can also be considered insignificant, and so we agree that the applicant's proposed technique is BAT for the installation. Refer to the key issues section 3 for additional details.
Permit conditions	
Raw materials	We have specified limits and controls on the use of raw materials and fuels.
Pre-operational conditions	Based on the information in the application, we consider that we need to impose pre-operational conditions. Refer to the key issues section 5 for details on the requirements of the pre-operational conditions.
Improvement programme	Based on the information on the application, we consider that we need to impose an improvement programme. Refer to the key issues section 5 for details on the requirements of the improvement programme.
Emission limits	We have decided that emission limits are not required in the permit. Refer to the key issues section 4 for details on this decision.
Monitoring	We have decided that monitoring should be carried out for the parameters listed in the permit, using the methods detailed and to the frequencies specified. We have specified monitoring of emissions of Volatile Organic Compounds (VOCs) from emission point source V1 (off-gases emitted from activated carbon bed abatement system). These monitoring requirements have been imposed in order to obtain sufficient information on emissions of VOCs from the installation and allow on-going benchmarking of these emissions against the levels stated in our technical guidance EPR 4.02. We made these decisions in accordance with in our technical guidance EPR 4.02 and TGN M16 – 'Monitoring volatile organic compounds in stack gas emissions'.

Aspect considered	Decision
Reporting	We have specified reporting in the permit with annual frequency. We consider the reporting frequency specified commensurate to the level of environmental risk of the activities carried out at the installation. We made these decisions in accordance with our guidance.
Operator competence	
Management system	There is no known reason to consider that the operator will not have the management system to enable it to comply with the permit conditions. The decision was taken in accordance with the guidance on operator competence and how to develop a management system for environmental permits.
Relevant convictions	The Case Management System has been checked to ensure that all relevant convictions have been declared. No relevant convictions were found. The operator satisfies the criteria in our guidance on operator competence.
Financial competence	There is no known reason to consider that the operator will not be financially able to comply with the permit conditions.
Growth Duty	
Section 108 Deregulation Act 2015 – Growth duty	We have considered our duty to have regard to the desirability of promoting economic growth set out in section 108(1) of the Deregulation Act 2015 and the guidance issued under section 110 of that Act in deciding whether to grant this permit. Paragraph 1.3 of the guidance says: "The primary role of regulators, in delivering regulation, is to achieve the regulatory outcomes for which they are responsible. For a number of regulators, these regulatory outcomes include an explicit reference to development or growth. The growth duty establishes economic growth as a factor that all specified regulators should have regard to, alongside the delivery of the protections set out in the relevant legislation." We have addressed the legislative requirements and environmental standards to be set for this operation in the body of the decision document above. The guidance is clear at paragraph 1.5 that the growth duty does not legitimise non-compliance and its purpose is not to achieve or pursue economic growth at the expense of necessary protections. We consider the requirements and standards we have set in this permit are reasonable and necessary to avoid a risk of an unacceptable level of pollution. This also promotes growth amongst legitimate operators because the standards applied to the operator are consistent across businesses in this sector and have been set to achieve the required legislative standards.

Consultation

The following summarises the responses to consultation with other organisations, our notice on GOV.UK for the public, and the way in which we have considered these in the determination process.

Responses from organisations listed in the consultation section

Response not received from
Local Authority (Trafford Borough Council), the Health and Safety Executive, local fire service, North Western Fisheries and Conservation Authority

Response received from
Public Health England (PHE), 13/07/2018
Brief summary of issues raised
PHE recommended that any Environmental Permit issued for this site should contain conditions to ensure that both point and fugitive emissions to air and odours, are controlled and managed adequately.
Summary of actions taken or show how this has been covered
The risks posed by emissions to air and odours have been assessed as part of the permit determination process and we consider adequate conditions are included in the permit as follows: - Point source emissions to air are specified within Table S.3.1 of the permit ('Point source emissions to air – emission limits and monitoring requirements') as referred to condition 3.1 of the permit ('Emissions to water, air or land'); - Fugitive emissions to air are regulated by condition 3.2 of the permit ('Emissions of substances not controlled by emission limits'); - Odorous emissions are regulated by condition 3.3 of the permit ('Odour'). Refer to the key issues section 4 for further details.

Response received from
Local sewerage undertaker (United Utilities Limited), 05/07/2018
Brief summary of issues raised
Confidentiality was requested for the response.
Summary of actions taken or show how this has been covered
The matters raised have been fully considered by our determination and are reflected throughout the decision document and permit.