

Environment Agency permitting decisions

Bespoke permit

We have decided to grant the permit for North Tees Storage Installation operated by SABIC UK Petrochemicals Limited

The permit number is EPR/LP3335RM/A001

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:

- 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.

Structure of this document

- Description of main features of the installation
- Key issues
- Annex 1 the decision checklist
- Annex 2 the consultation and web publicising responses

Description of the main features of the Installation

The North Tees Storage Terminal installation is located on the north bank of the River Tees approximately 2km north of Middlesbrough. The installation includes combustion activities regulated under Section 1.1 Part A(1)(a) of the Environmental Permitting Regulations owing to the aggregated thermal input of 56.8 MW for three steam raising boilers associated with liquid ethane heating and the import (Kaldair) heater associated with liquid propane heating.

The North Tees Storage installation comprises separate operations in separated areas:

- i. Ethane Storage including associated utilities. Storage up to 42 kt. Approximate throughput initially 250 ktpa rising to 600 ktpa maximum.
Liquid ethane is imported from ships across jetty 3. It is stored before being heated using steam from the boilers for transfer by pipeline to the operator's Wilton Site.
- ii. Ethylene liquefaction and storage. Storage up to 5.6 kt. Throughput approximately 400 ktpa.
Some of the ethylene from the Wilton to Grangemouth pipeline can be liquefied and stored before transfer to ships across jetty 1A.
- iii. Propane Import and Export. No storage within the installation boundary. Throughput maximum approximately 422 ktpa but expected to be significantly lower.

Liquid propane can be imported and exported over jetty 3 and stored in the cavities as an alternative feed stock for operations on the operator's Wilton site.

The jetties are included within the boundary of the associated North Tees Aromatics Installation permit.

Expected emissions to air from off-gassing of the volatile process materials are all intermittent and via flares. Other point source emissions to air are from the boilers via three 15m stacks and from the 8.4m stack of the Kaldair heater. Point source emissions to water from the three parts of the installation are via drains to the Effluent Treatment Plant and from there to the River Tees. This is regulated under the associated North Tees Aromatics Installation permit. There are no process discharges to land or groundwater.

The operator has an Environmental Management System which is certificated to Responsible Care ISO14001.

Key issues of the decision

1. The nature and extent of the site and activities.

After discussions with the Environment Agency the operator submitted a bespoke application to cover:

- A new ethane import, storage and heating terminal to be built on land formerly used for liquid hydrocarbon storage and surrendered from permit EPR/BU4503IW
- The existing ethylene liquefaction, storage and export plant (not formerly permitted under EPR).
- The existing propane import, heating and export terminal (not formerly permitted under EPR). There is no propane storage within the installation.

All non-combustion activities were described as Directly Associated Activities (DAA) to the combustion activities in the application. We do not accept this reasoning as DAAs have an asymmetric relationship to the activity they serve. In this case the combustion activities serve the non-combustion storage and supply activities. The non-combustion activities serve operations on the operator's other site at Wilton but the pipeline connection of around 10km (>5km straight line distance) is too far for them to be included in the Wilton site permits. We therefore agreed to permit these three separate plants on the North Tees site as one permit, as the applicant has requested, but the non-combustion activities cannot be described as DAAs.

The only activity listed in Part 2 of Schedule 1 to the Environmental Permitting Regulations for the regulated facility is Section 1.1 A(1) (a) Burning any fuel in an appliance with a rated thermal input of 50 or more megawatts owing to the aggregated capacity of three new boilers (3 x 13.6MW) and the existing propane plant import (Kaldair) heater (approximately 16MW). The regulated facility is therefore an installation. However, as the aggregate of plant >15MW individually is <50MW the installation is not subject the Large Combustion Plant annex provisions of the Industrial Emissions Directive. The ethylene liquefaction plant and the import/export and storage elements of all three areas are not part of the scope of the scheduled activity in Table S1.1.

In the application the installation is referred to as the Ethane Terminal but in the Schedule 5 notice response the applicant confirmed it is to be called the North Tees Storage installation to cover the ethylene and propane plants. The applicant also confirmed it is to be part of the multi-operator installation to which it is connected by supplying steam and treatment of drains effluent. The names and permit numbers of the operators of other parts of the installation are detailed in the permit's introductory note.

Methanol storage and injection to the propane export and handling of propylene used on the ethylene liquefaction plant are regulated under the North Tees Aromatics Installation permit EPR/BU4503IW.

2. Emissions to air

Air emissions from the flares are assessed as very unlikely to have a significant environmental impact because their pilots are small and they only operate very intermittently and not usually at the same time.

The applicant considered potential emissions of oxides of nitrogen, carbon monoxide and sulphur dioxide from the scheduled combustion activities.

Sulphur dioxide emissions were assessed as insignificant as the compositions of all the potential fuels have very low (ppm levels) of sulphur.

Carbon monoxide emissions are controlled by ensuring adequate excess air for complete combustion although this must be balanced against boiler efficiency. All the boilers are equipped with oxygen analysers in the flue stack to facilitate control of excess air to minimise carbon monoxide. The impact from carbon monoxide emissions via elevated stacks is therefore very unlikely to be significant beyond the installation boundary.

Oxides of nitrogen (NO_x) are also dependent on the amount of excess air present during combustion as well as the burner temperature. All the boilers will be fitted with ultra-low NO_x burners. An H1 assessment was performed and submitted considering four emission stacks. The three new ethane plant boilers were assessed against a long term emission limit of 100mg/m³ when running on fuel gas or natural gas and a short term 200mg/m³ emission limit when running on ethane boil off gas under emergency or maintenance conditions for shorter periods, because the ethane fuel is expected to result in higher flame temperatures and greater NO_x formation.

The Schedule 5 notice response confirms propane will not now be used as a fuel component for the boilers. The propane import heater was assessed in H1 against an emission limit of 102.7 mg/m³ (calculated from averaged usage time over the year) for both long and short term because it is only run when the propane ships are being unloaded (~15 times a year).

The resulting worst case calculated ground level impacts from the H1 calculation were well in excess of the levels for screening out as insignificant. More detailed modelling was therefore performed. This calculated oxides of nitrogen concentrations and nitrogen and acid deposition (where appropriate) at identified human receptors and ecological habitat receptors around the site boundary. The maximum predicted ground level concentrations from this modelling were inputted to H1 but could still not be screened out for ecological receptors (see below). The full modelling data and conclusions that showed insignificant impacts at the identified receptors were therefore submitted with the application, for audit by the Environment Agency.

H1 Assessment Results Summary	Long Term (LT)		Short Term (ST)	
	NO ₂	NO ₂ (Ecological Annual Mean)	NO ₂	NO ₂ (Ecological Daily Mean)
EAL µg/m ³	40	30	200	75
H1 calculated Process Contribution (PC) µg/m ³	93	93	3678	3678
Using worst case modelled value PC µg/m ³ (maximum on modelled grid)	3.53	3.53	30.4	30.4
Modelled PC as % of EAL	8.8	11.8	15.3	40.6
>1% LT or >10% ST?	Yes	Yes	Yes	Yes
Background NO _x µg/m ³	21.8	21.8	21.8	21.8
Predicted Environmental Contribution = PC + background	25.4	25.4		
Modelled PEC as % of EAL (maximum on modelled grid)	63.4	84.5		
>70% of EAL?	No	Yes		
Headroom = EAL – 2 x background			156.4	31.4
Modelled PC as % of Headroom (maximum on modelled grid)			19.4	96.8
>20% of headroom?			No	Yes

We audited the submitted air quality modelling assessment and found:

- The assumed stack diameters in the model did not match those in the submitted design data.
- The flow rates had not been corrected for oxygen or moisture.
- The modelling assumptions resubmitted in response to the incorrect stack diameters did not model the worst case of all emissions at full capacity.

We therefore do not have confidence in the submitted modelling details (and consequently they are not reported here). However, we then performed detailed check modelling to all aspects of the submitted assessment and have undertaken sensitivity analysis regarding our observations. Based on our generated emission rates, we agree with the applicant's conclusions that maximum ground level concentration is within the site boundary and the impacts at all specific identified human and ecological receptors are likely to be insignificant at <1% of Long term EAL and <10% of Short Term EAL.

During the determination the applicant revised section 2.2.2 of the submitted supporting documentation to include intermittent releases from the ethylene liquefaction plant during maintenance from vents on ethylene storage tanks and the ethylene compressors. The occasional nature of these releases means their environmental impact is unlikely to be significant if they are minimised. The proposed procedures to minimise the releases have been referenced in the Operating Techniques table S2.1.

3. Environmental Management System

In response to Question 2 of the Schedule 5 notice the applicant provided additional information regarding their EMS certification to Responsible Care 14001:

The SABIC Corporate Position is that business are certified to RC 14001 rather than ISO 14001. ISO 14001 is incorporated into RC 14001, as per the technical specification. Currently there is no option to have RC 14001 certification in the UK, as it originated from the American Chemical Council therefore their certificate for RC 14001 is issued by their auditor's (DNV) USA office. DNV (USA office) are 'ANAB approved' to issue this certificate.

ANAB and UKAS are members of the International Accreditation Forum and signed up to the Multi-Lateral Agreement to confirm equivalence of standards hence the DNV (ANAB) RC 14001 certificate is equivalent to a UKAS accredited ISO 14001 certificate. The scope of the certification already includes the newly permitted areas.

In the submitted OPRA charging spreadsheet the applicant had not ticked any form of externally certificated EMS but this still yields an Operator Performance of the top Band A. Although the RC14001 certifying body is not strictly UKAS accredited it does count as an EMS subject to external third party audit. This does not change the band A rating but moves it further from the grade boundary.

The applicant also stated in the Schedule 5 response that it is their intention for the installation to be covered by a Climate Change Agreement but cannot yet confirm whether it will be under the North Tees or Wilton Site CCA.

Annex 1: decision checklist

This document should be read in conjunction with the application, supporting information and permit/notice.

Aspect considered	Justification / Detail	Criteria met
		Yes
Receipt of submission		
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 commercial confidentiality.	✓
Consultation		
Scope of consultation	<p>The consultation requirements were identified and implemented. The decision was taken in accordance with our Public Participation Statement and our Working Together Agreements.</p> <p>For this application we consulted the following bodies:</p> <ul style="list-style-type: none">• Environmental Health Unit, Stockton-on-Tees Borough Council• Director of Public Health, Stockton-on-Tees Borough Council• Public Health England• Food Standards Agency• Health and Safety Executive	✓
Responses to consultation	<p>The consultation responses were taken into account in the decision. We only received one response which was from Public Health England (see Annex 2).</p> <p>The decision was taken in accordance with our guidance.</p>	✓
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 what a legal operator is.	✓
The facility		
The regulated	The extent/nature of the activities and operations taking	✓

Aspect considered	Justification / Detail	Criteria met Yes
facility	<p>place at the site required clarification. See Key issues.</p> <p>The decision on the facility was taken in accordance with Appendix 2 of RGN 2 “Defining the scope of the installation” and Appendix 1 of RGN 2 “Interpretation of Schedule 1”</p>	
European Directives		
Applicable directives	All applicable European directives have been considered in the determination of the application.	✓
The site		
Extent of the site of the facility	<p>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.</p> <p>The applicant has indicated in the reply to Question 2f of Application from B2 that the installation would not be part of the North Tees Multi-operator installation. However, in the response to question 1 of the Schedule 5 notice this was corrected to confirm it will be part of the multi-operator installation with Sabic Aromatics Installation BU4503IW, Anglian Water Services Water treatment plant BU5771IB and BOC Hydrogen Plant BJ7522IJ.</p> <p>A plan is included in the permit and the operator is required to carry on the permitted activities within the site boundary being the land shown edged in green on the site plan, which is within the area edged in red that represents the extent of the installation covered by this permit and those of other operators of the installation.</p>	✓
Site condition report	<p>The operator has provided a description of the condition of the site.</p> <p>We consider this description is satisfactory. The decision was taken in accordance with our guidance on site condition reports and baseline reporting under IED–guidance and templates (H5).</p> <p>The operator has chosen not to perform a baseline investigation because the nature of the materials, with low vapour pressures, covered by this permit is that they are</p>	✓

Aspect considered	Justification / Detail	Criteria met Yes
	unlikely to contaminate the ground if released.	
Biodiversity, Heritage, Landscape and Nature Conservation	<p>The application is within the relevant distance criteria of a site of heritage, landscape or nature conservation, and protected species and habitats including: Teesmouth and Cleveland Coast SPA and Ramsar site Tees and Hartlepool Foreshore and Wetlands SSSI Seal Sands SSSI Cowpen Marsh SSSI Teesmouth National Nature Reserve Greenabella Marsh Local Wildlife Site (1&2) Greatham Creek North Bank</p> <p>No significant change is expected in emissions to water from these permitted activities. The impact on protected species (for whom this was the pathway of effect) is therefore assessed as unchanged and insignificant from this application. There are no emissions to land.</p> <p>For emissions to air all emissions from boiler and heater stacks and flares were screened out as insignificant using our H1 assessment tool except for combined emissions of oxides of nitrogen from the boiler and heater stacks (see Key issues).</p> <p>A full assessment of the application and its potential to affect the sites and habitats has been carried out as part of the permitting process. Although we do not agree with the absolute numerical values of the modelling we have tested for sensitivity to the parameters where we may differ from the applicant.</p> <p>We agree with the applicant's conclusion that the application will not affect the features of the sites and habitats.</p> <p>We have not formally consulted on the application. The decision was taken in accordance with our guidance. An Appendix 11 form relating to the SPA and Ramsar site has been sent to Natural England for information only.</p> <p>We have checked the Operation requiring consent list and SSSI reportable features database citations for each of the SSSIs and, in light of our air emission assessment audit we consider that the applicant's activities are unlikely to damage the SSSIs. An Appendix 4 form was therefore not required.</p>	✓

Aspect considered	Justification / Detail	Criteria met Yes
Environmental Risk Assessment and operating techniques		
EIA	In determining the application we have considered the Environmental Statement.	✓
Environmental risk	<p>We have reviewed the operator's assessment of the environmental risk from the facility. The operator's risk assessment is satisfactory.</p> <p>The applicant has considered potential risks from:</p> <ul style="list-style-type: none"> • Point source emissions to air (see Key issues) • Point source emissions to water No significant change is expected in emissions to River Tees from the Site Effluent Treatment Plant as a result of these permitted activities. • Emissions to land. There are no emissions to land. • Fugitive emissions. Low levels of fugitive emissions of volatile organic compounds (VOCs) are possible from leaks. A leak detection and repair survey is conducted annually to minimise this. • Noise and odour Although flare operation can cause some noise this is not expected to be significant beyond the installation boundary. The materials used are not particularly odorous as the sulphur content of the fuel gas and materials handled is low. • Intermittent emissions <ul style="list-style-type: none"> i) Flare operation (1 ethane, 1 propane, 3 ethylene) Flare pilots run continuously but have an insignificant environmental impact compared to the boiler and heater stacks due to their small volume. The flares in operation are also considered to have an insignificant impact as any VOCs are efficiently combusted and the frequency of operation is low. ii) Ethylene liquefaction plant vents and ethylene storage tanks. During maintenance activities on the flare, it is necessary to route some relief valve streams to atmosphere for vessels that it is not practical to fully deinventory (for example, the ethylene 	✓

Aspect considered	Justification / Detail	Criteria met Yes
	<p>storage tanks). Procedures are developed to manage these events such that releases to atmosphere are minimised. This is an infrequent activity, typically of the order of once every 10 years.</p> <p>iii) Ethylene compressors. During maintenance activities, the Ethylene compressors on 2A and 2B Ethylene Liquefaction plants are vented to atmosphere to remove the ethylene that remains in the compressor when they are shut down and isolated. This activity typically occurs once per year. This is not expected to be a significant VOC impact when conducted correctly.</p> <p>iv) The application also considered the Kaldair heater an intermittent release as it only operates during the propane unloading (around 15 times per year). But as this is part of the scheduled activity it has been considered as a point source emission to air in the key issues.</p> <p>The assessment shows that, applying the conservative criteria in our guidance on Environmental Risk Assessment, all emissions may be categorised as environmentally insignificant</p> <p>There will be no significant increase in impact from air emissions at any human or habitat receptors as a result of this variation, and consequently no increase in environmental risk (see Key Issues)</p>	
Operating techniques	<p>We have reviewed the techniques used by the operator and compared these with the relevant guidance notes. Although this installation includes a Section 1.1 Part A1 (a) scheduled activity owing to the aggregated total of three ethane terminal boilers and the propane plant heater exceeding 50MW it does not meet the criteria for Large Combustion plant under the Industrial Emission Directive because each boiler is <15MW.</p> <p>We have therefore compared the proposed operating techniques to our technical guidance notes for combustion processes. The applicant has proposed that combustion efficiency in the boilers will be maintained by continuous monitoring of excess oxygen concentrations and using ultra low-NOx burners.</p> <p>The operator has submitted composition data for the Site</p>	✓

Aspect considered	Justification / Detail	Criteria met Yes
	<p>fuel gas, natural gas and ethane boil off gas that the boilers can use as fuel. Based on these compositions and the proposed emission point characteristics all potential exhaust gas components other than oxides of nitrogen were screened out as insignificant in the worst case.</p> <p>Further modelling was performed and submitted for the NO_x emissions (see Key Issues). After audit and sensitivity testing we agree with the conclusion that that there are not likely to be any significant contributions, as a result of nitrogen oxides emissions, at any human or ecological receptor. We therefore agree that the Applicant's proposed techniques are BAT for the installation.</p> <p>The proposed techniques/ emission levels in the installation permit are in line with the benchmark levels contained in the TGN and we consider them to represent appropriate techniques for the facility. The permit conditions ensure compliance with relevant BREFs.</p>	
The permit conditions		
Use of conditions other than those from the template	Based on the information in the application, we consider that we do not need to impose conditions other than those in our permit template, which was developed in consultation with industry having regard to the relevant legislation.	✓
Improvement conditions	<p>Based on the information on the application, we consider that we need to impose improvement conditions.</p> <p>The four Improvement Conditions are to validate the energy efficiency and emissions assumptions made in the application.</p> <p>If the Environment Agency approves the report submitted in response to IC1 concerning spot sampling of drains effluent emission points W1, W2 and W3 then we may confirm in writing the discontinuance of monitoring and reporting for W1, W2 and W3.</p> <p>Similarly the results for NO_x monitoring at A1, A2, A3 &A4 submitted in response to IC4 will allow a suitable minimum monitoring period to be agreed.</p>	✓
Incorporating the application	We have specified that the applicant must operate the permit in accordance with descriptions in the application, including all additional information received as part of the	✓

Aspect considered	Justification / Detail	Criteria met
		Yes
	<p>determination process.</p> <p>These descriptions are specified in the Operating Techniques table in the permit.</p>	
Emission limits	<p>We have decided that emission limits should be set for the parameters listed in the permit.</p> <p>See Key issues</p>	✓
Monitoring	<p>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.</p> <p>We made these decisions in accordance with our Combustion Activities Technical Guidance Note</p>	✓
Reporting	<p>We have specified reporting in the permit of the oxides of nitrogen monitoring results.</p> <p>This reporting will be an annual reporting of six-monthly monitoring.</p> <p>Reporting of spot sample monitoring for total organic carbon and pH of drains emissions to the site effluent treatment plant (regulated under permit BU4503IW) is included in the permit but may be discontinued if approved by the Environment Agency after receipt of a report about the first set of monitoring results under Improvement Condition IC1.</p>	✓
Operator Competence		
Environment management system	<p>There is no known reason to consider that the operator will not have the management systems to enable it to comply with the permit conditions. The decision was taken in accordance with our guidance on what a competent operator is.</p>	✓
Relevant convictions	<p>The Case Management System has been checked to ensure that all relevant convictions have been declared.</p> <p>No relevant convictions were found.</p>	✓

Aspect considered	Justification / Detail	Criteria met
		Yes
Financial provision	There is no known reason to consider that the operator will not be financially able to comply with the permit conditions. The decision was taken in accordance with our guidance on what a competent operator is.	✓

Annex 2: Consultation and web publicising

Summary of responses to consultation and web publication and the way in which we have taken these into account in the determination process. (Newspaper advertising is only carried out for certain application types, in line with our guidance.)

There were no responses to the web publicising.

<i>Response received from</i>
Public Health England
<i>Brief summary of issues raised</i>
No significant concerns provided the applicant takes all appropriate measures to prevent or control pollution in accordance with relevant sector guidance and best practice.
<i>Summary of actions taken or show how this has been covered</i>
The applicant assessed the potential NO _x emissions from the proposed development under two operating scenarios and we have audited their modelling with sensitivity analysis where we consider the assumptions made are not the worst case. We agree with the overall conclusions of no significant impact. Compliance with these modelled emissions (or better) is ensured by the inclusion of emission limit values and monitoring requirements in the permit.