Permitting decisions

Variation

We have decided to grant the variation for Vertellus Specialties UK Limited operated by Vertellus Specialties UK Limited.

The variation number is EPR/BU0311IX/V005.

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; and
- 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 and the variation notice. The introductory note summarises what the variation covers.

Key issues of the decision

Permit Variation Number

This permit is listed on the Permit Access System (PAS) as V006, however it is actually V005. This error is likely to continue into future variations, therefore this statement has been added to clarify why there will be a discrepancy in the permit variation numbers.

Installation:

The facility manufacturers a number of organic chemicals and utilises a Multi-Product Protocol. This variation authorises the manufacture of a new organic chemical, caprylene (trans 2-octene) (CAS Number: 111-67-1), produced by reaction of capryl alcohol (octan-2-ol) with an Amberlyst resin catalyst. This will be regulated under a new scheduled activity in the permit, which is:

- Section 4.1 A (1) (a) (i) – production of organic compounds such as hydrocarbons.

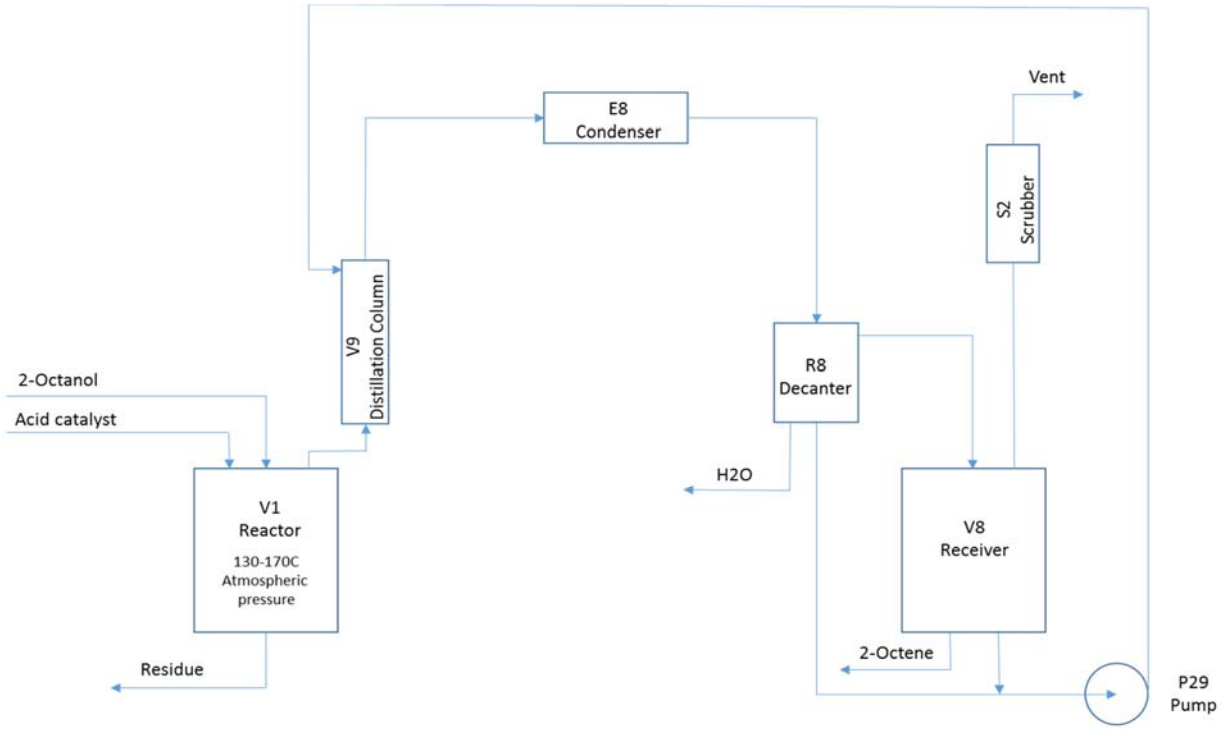
The production of caprylene will be carried out on a batch basis, using existing downtime and largely existing equipment within the Plant 4 building on the site. The only new equipment being added to Plant 4 to facilitate the production of caprylene is a new distillation column to enable the distillation of the final product.

Gaseous releases from the new process will be discharged through an existing vent, following wet scrubbing that is primarily is used to cool the vent. The third-party operated on-site effluent treatment plant (ETP) is being decommissioned in favour of a direct discharge to Northumbrian Water Bran Sands Water Treatment Plant. Aqueous discharges from caprylene manufacture will be kept separate from other aqueous effluents and transported separately to the off-site water treatment plant.

There are two minor solid waste streams from the process, spent catalyst and distillation residues, which will be sent off-site to approved disposal facilities.

Gaseous Releases:

The caprylene process (as shown in the diagram below) utilises a glass-lined reactor vessel (V1), from which products can be distilled out by using a new distillation column (V9) and collected in a glass-lined receiver vessel (V8). The process is vented to atmosphere through the existing water scrubber (S2). Given the low vapour pressures of the materials being handled, the concentrations of potential pollutants in the air stream are very low. Since the materials themselves (volatile organic compounds [VOCs]) are largely insoluble in water, the main effect of the water scrubber is to cool the off-gases prior to discharge. This is also the case for the other organic chemicals produced in Plant 4 under the Multi-Product Protocol at other times.



The gaseous discharge from reactor 1 (V1) is routed in turn to the new distillation column (V9), to the condenser (E8), to the decanter (R8) and to the receiver (V8) before any gaseous carry over into the scrubber (S2) and eventual release to atmosphere via the existing vent. Recirculation of liquors is contained by a closed loop pumping return system to the distillation column (V9). The condensation process reduces and recycles the gaseous VOC loading at source and facilitates the transfer of potential pollutants from the waste gas phases into the liquid phase. The liquid phase effluent is not discharged directly from the site and is transferred to Northumbrian Water Bran Sands Water Treatment Facility by tanker, where it undergoes further treatment.

Gaseous releases from the process will occur only during charging/discharging of vessels (for a duration of 8.6 hours of a 125-hour cycle) as, during reaction/distillation stages, there will be no emissions as the system is maintained under a nitrogen blanket. A typical caprylene production campaign will consist of three batches of reaction and three batches of distillation. The total operating time for the three batches will be 375 hours, therefore gaseous releases will occur for a total of 25.8 hours. To fit in with other production campaigns in Plant 4, there will be three campaigns of caprylene manufacture, producing 45 tonnes in total, carried out over the year, so total gaseous emissions from caprylene production will occur for 77.4 hours per year. This is less than 1% of the annual available reactor time.

The operator has assessed the potential impact of these gaseous releases using the Environment Agency's H1 Risk Assessment tool. Because neither caprylene nor capryl alcohol were in the H1 database, they were assessed as a Category B VOC using toluene as the exemplar substance. The discharges screened out as insignificant, which is defined as the Process Contribution (PC) being less than 1% of the Environmental Assessment Level (EAL).

Long Term EAL ug/m^3	Short Term EAL ug/m^3	PC ug/m^3	Long Term %PC of EAL	>1% of EAL?	PC ug/m^3	Short Term %PC of EAL	>1% of EAL?
1,910	8,000	0.00798	0.000418	No	47.3	0.591	No

The operator has confirmed that they will continue to comply with existing permit compliance limits for gaseous discharges from the Plant 4 vent (A12) during periods of caprylene production, which is 2.0 kg/hour ($75mg/m^3$) for total Class B VOCs. The concentration limit applies if releases exceed the mass/hour emission limit.

Where appropriate, the emission limit values in the permit have been updated as a result of this variation to those values that were to take effect after the date of issue of the previous permit variation and before the date of issue of this permit variation.

Aqueous Releases:

In the application, the operator stated that aqueous emissions from the caprylene production process would be directed initially to the on-site effluent blending plant and then, once mixed with effluents from other plant areas to an agreed specification, directed to the third-party operated on-site effluent treatment plant. Treated effluent was then discharged to the River Tees.

The operator calculated the estimated concentrations in the aqueous effluent from caprylene production as - capryl alcohol (1.1 mg/l) and caprylene (0.004 mg/l).

In the absence of either substance in the H1 database, they compared these discharge concentrations to the LC50 values for capryl alcohol (75mg/l) and caprylene (6mg/l) and determined that discharge of either of these substances at these concentrations would have an insignificant impact on receiving waters.

During the determination process, the operator confirmed that the on-site effluent treatment plant was being decommissioned and aqueous effluent was instead being sent by road tanker to Northumbrian Water Bran Sands Treatment Plant. This method of transport would continue until the installation of a dedicated pipeline to transfer the effluent directly from the Vertellus site to the Bran Sands Treatment Plant. Further information supplied by the operator indicated that aqueous wastes from the caprylene manufacturing process would not be transferred to the effluent blending plant, but would be kept separate from all other plant effluents and transported separately to the Bran Sands Treatment Plant.

As there is no direct discharge from the caprylene production process, nor from any other activity carried out on the Vertellus site, into the River Tees, the aqueous discharges from the process cannot impact upon the watercourse.

The third-party operated effluent treatment plant remains within this permit variation as its removal is not part of the variation for which the operator applied. The best mechanism for addressing its removal from the permit will be assessed and will form the basis of a future permit variation application.

Containment:

The reaction vessels and equipment containing liquids within Plant 4 are not bunded. There are no specific bunds housing individual vessels, reaction equipment or combinations of these.

The specification of the equipment is such that it meets recognised industry standards for that equipment or the process by which it will be operated, such as glass-lined, carbon steel, Teflon-lined or complying with pressure vessel regulations. Inspection and maintenance regimes are in place for the equipment.

In the event of leak/spillage from any of the equipment within Plant 4, containment is based on retaining that material within the building itself. The Plant contains an internal drain which directs spillages to a sump. There is no direct access to the site drainage system from this internal sump. Smaller containers of waste liquids and flammable materials are located in individually bunded contained units.

The operator has demonstrated that the total quantity of liquids within Plant 4 during a caprylene production batch would be approximately 7,600 kg in-process fluids and 2,000 kg process off-liquor in IBC's for collection (which are separately contained). They have also demonstrated that the total containment volume within Plant 4 would be approx. 7.8m^3 (6.2m^3 internal floor area + 1.1m^3 drainage channels + 0.5m^3 drainage sump). This capacity is sufficient to contain 110% of the volume of the largest vessel or 25% of the contents of all vessels.

Although this does demonstrate a degree of containment and is the system in place in Plant 4 when other chemicals are being produced under the Multi-Product Protocol (for potentially more than 300 days per year), it does not represent best practice with regard to containment and protection of soil/groundwater. There are a number of unresolved issues including whether the materials of construction of flooring/sump are compatible with the materials that may come into contact with them; whether the flooring/sump are watertight and whether there are robust procedures to empty the sump and clear away any spillages on the Plant 4 floor.

We have included an Improvement Condition, IC11, in the permit requiring the operator to review the containment in Plant 4 and submit a report to the Environment Agency for approval that outlines, with timescales, any proposals for improvement.

The raw material for the caprylene production process, capryl alcohol, will be delivered to site in iso-tankers. The iso-tank itself would be uncoupled from its unit and parked adjacent to the Plant 4 building. From there, via a series of fixed and flexible hosing and offloading infrastructure, the capryl alcohol is pumped to the process within Plant 4. The iso-tank metal frame delivers a degree of impact protection. However, in the event of leak or spillage from this iso-tank, the material would fall onto the concrete roadway and flow, because of the fall of the roadway, towards an existing intermediate bulk container (IBC) holding area. This area comprises a number of individual bays separated by raised kerbing, each containing a blind sump which cannot automatically pump to any existing surface water or effluent channel.

As there will be three proposed caprylene production campaigns per year, each lasting 375 hours, the maximum time the iso-tank would be located outside Plant 4 would be 1,125 hours (approx. 47 days). It would not be full with capryl alcohol for all this period as the contents of the tanker will reduce as the material is used in the production process.

However this practice does not represent Best Available Techniques (BAT) and does not follow the guidance given in CIRIA, C736, “Containment systems for the prevention of pollution. Secondary, tertiary and other measures for industrial and commercial premises”. There are also unresolved issues on whether the materials of construction of the roadway/sump are compatible with the capryl alcohol that may be released onto them; whether there are any surface water drains in the vicinity that could be impacted upon from a loss of capryl alcohol; whether there are procedures for inspecting, testing and emptying the sumps and how any material within the sump that may potentially contain capryl alcohol will be disposed of.

We have not accepted the operator’s proposal to locate the iso-tanker containing capryl alcohol outside of Plant 4 building.

The operator then proposed that the iso-tanker, containing capryl alcohol to be used in subsequent caprylene production batches, be located within the Production Storage Bund area whilst not in use. This is a covered area of an existing building (used for storage of flammable materials) with a sump that, along with the volume of the building floor, would deliver more than 110% containment of the contents of the iso-tanker. The operator did not demonstrate that the materials of construction of the sump and building floor were compatible with the chemicals to be stored in the area, that the range of chemicals to be stored within the building were fully compatible with each other and that the floor of the building and sump were liquid-tight.

We have not accepted the operator’s proposal to locate the iso-tanker containing capryl alcohol within the Production Storage Bund Building whilst it is not in use.

We have included a Pre-Operational Condition within the permit requiring the operator to submit a proposal to the Environment Agency for approval demonstrating that the storage, transfer, handling and use of the capryl alcohol are in accordance with Best Available Techniques (BAT) before capryl alcohol can be stored on site during its use in the production of caprylene.

The operator has identified a mild steel tank within a dedicated storage bund that could possibly be used to store capryl alcohol. However the use of this, or another existing asset for caprylene duty, will require a full mechanical, electrical and civil engineering survey to determine the extent of cleaning, inspection and repair that would be necessary. It could, the operator believes, take upwards of six months to cost, approve and carry out a programme to bring an existing asset into use for capryl alcohol storage. The assessment necessary may conclude that no existing assets are suitable for this purpose and other options such as temporary hiring of adequately bunded storage systems are required.

Until this is completed and the response approved by the Environment Agency, no bulk storage of capryl alcohol can be carried out unless the operator demonstrates that the storage, management and use will be in line with BAT guidelines.

Ground & Groundwater Protection:

The site has an existing Site Protection and Management Programme (SPMP) based on ten boreholes and a sampling/testing regime carried out every six months. No baseline testing of soil/groundwater was carried out for capryl alcohol or caprylene prior to submission of this permit variation and the operator has confirmed in writing that they will accept a zero contamination status for the site in respect of these two substances.

The operator is adding capryl alcohol and caprylene to the SPMP testing suite.

However it has not been demonstrated by the operator that the existing boreholes are currently functioning satisfactorily as they are over 20 years old and silting or damage could have occurred. In addition, the operator has not demonstrated that existing borehole locations, the suite of monitoring parameters and frequency of sampling/testing are adequate for addressing the risks to ground/groundwater from the new caprylene process. Because of this, we have included Improvement Condition, IC10, in the permit requiring the operator to review the SPMP sampling and testing regime following caprylene production.

Existing Improvement Conditions:

Limited information is available on the completion of Improvement Conditions in the original permit and subsequent variations. Where information is available that the operator submitted a response to these, the relevant IC is accepted as complete and any further issues raised in relation to these specific issues would be assessed and managed by the Environment Agency through permit regulation.

IC1 – this required a review of provision of MCERTS accreditation for monitoring equipment, personnel and organisations and a timetable for achieving MCERTS standards for those not certified. A review and timetable were submitted on 13/07/04. This IC is now complete.

IC2 – this required a survey of drains, roadways and hardstanding with regard to containment/integrity and remediation where defects were identified. A letter was submitted by the operator on 24/01/05 outlining the outcome of the survey and proposals for remediation of a number of bund walls and areas of hardstanding. The Environment Agency response required feedback on the timescales of these and answer to some further questions on sumps and drainage by 22/04/05. Although no record of operator response by this date is available, the IC is accepted as complete due to the original operator response.

IC3 – this required submission of a BAT assessment for two on-site boilers and timetable for any upgrades identified. A report on the operation of these boilers (only one of which was deemed serviceable) and the preferred future operational scenario was submitted on 13/07/04. Timescales for future implementation were not available as the operator required further information. The Environment Agency requested, on 29/04/14, that an updated report be submitted when these timescales were available. Although no record of operator response to this request is available, this IC is complete as the initial review was submitted.

IC4 – this required a review of alternative reactor systems with regard to BAT in place of stirred tank reactors for all batch reactions. A letter from the Environment Agency to the operator is available acknowledging a letter received from the operator on 17/01/05 which included a table of alternative reactor technologies. However a copy of this table of alternative technologies is not available. We have not closed out this IC as complete and have set a new completion date of 01/09/19.

IC5 – this required the operator to submit and implement a written procedure for regular review of fugitive releases from the installation along with the outcome of the first review. A letter from the Environment Agency to the operator acknowledges receipt of a letter dated 20/01/04 about this IC. Although the Environment Agency letter requests further information on a number of fugitive releases, it does confirm that a first review of fugitive releases was completed by the operator. This IC is accepted as complete.

IC6 – this required the operator to undertake an assessment of the operation/design of their sulphur trioxide scrubber. A letter dated 06/05/05 from the Environment Agency to the operator acknowledges receipt of a response to this IC on 25/02/05 which proposed to defer this review and incorporate it into a proposed expansion of Plant 2.

In 2018, the operator proposed to replace its existing 10m^3 sulphur trioxide storage tank with a new 115m^3 storage tank. As part of this process, we required the operator to demonstrate that the scrubber unit was of sufficient capacity to deal with the larger storage tank. The provided this demonstration and we now regard this IC as complete.

IC7-IC9 – these required the operator to review HAZOPs and change controls (IC7 specified particular production processes for SASMAC, DMAP, Topanol and amino pyridine while IC8-IC9 addressed all other products manufactured at the permitted facility). We are currently addressing these issues through the operator's management of change and risk assessment processes under COMAH which has superseded these ICs and therefore IC7 – IC9 is considered to be complete.

New Improvement Conditions arising as a result of this variation:

IC10 - As the operator has not demonstrated that the existing Site Protection and Monitoring Programme (SPMP) testing regime and infrastructure is suitable for addition of caprylene production to site activities, the operator shall review the entire SPMP to ensure it delivers the required degree of protection to soil and groundwater.

IC11 - In order to ensure that containment systems for vessels, distillation columns, other reaction equipment, pipework and chemical storage within the Plant 4 area is robust and adequate to ensure no loss of material outside of the building to the environment, the operator shall review all aspects of Plant 4 operation that may contribute to containment such as flooring, sumps, drainage channels and systems for collecting and disposing of spills.

IC12 - in order to assess whether further gaseous abatement is required in Plant 4 to abate potential releases of volatile organic compounds (VOCs), the operator shall review the existing process against sector guidance notes and produce, if required, an upgrade programme with timescales.

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.
Consultation/Engagement	
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: • Stockton-on-Tees Borough Council Environmental Health Department; • Stockton-on-Tees Borough Council Planning Department; • Health & Safety Executive; • Public Health England; • Director of Public Health; • Marine Management Organisation; • Inshore Fisheries and Conservation Authority; • PD Ports (Teesport); • Centre for Environment, Fisheries and Aquaculture Science; • Northumbrian Water Limited; and • Natural England. The comments and our responses are summarised in the consultation section.
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’, guidance on waste recovery plans and permits. The extent of the facility is defined in the site plan and in the permit. The activities are defined in table S1.1 of the permit. This permit applies to only one part of the installation. All activities with the exception of the effluent treatment plant are under the control of the applicant. The names and permit numbers of the operators of other parts of the installation are detailed in the permit's introductory note.

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. The plan is included in the permit.
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. 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 consider that the application will not affect any sites of nature conservation, landscape and heritage, and/or protected species or habitats identified. We have consulted Natural England on our Habitats Regulations and SSSI assessments, and taken their comments into account in the permitting decision.
Environmental risk assessment	
Environmental risk	We have reviewed the operator's assessment of the environmental risk from the facility. The operator's risk assessment is unsatisfactory and required additional Environment Agency assessment, see the Key Issues section for further details. We have addressed potentially concerns on management of risk from loss of containment through Improvement Conditions.
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 with the exception of gaseous abatement and containment of liquids in Plant 4. Improvement Conditions have been included in the permit requiring the operator to review existing abatement and containment against BAT and best practice and propose improvements with timescales if required. The operating techniques that the applicant must use are specified in table S1.2 in the environmental permit.
Operating techniques for emissions that screen out as insignificant	Emissions of caprylene to atmosphere have been screened out as insignificant, and so we agree that the applicant's proposed techniques are BAT for the installation. We consider that the emission limits included in the installation permit reflect the BAT for the sector.

Aspect considered	Decision
Permit conditions	
Updating permit conditions during consolidation	We have updated permit conditions to those in the current generic permit template as part of permit consolidation. The conditions will provide the same level of protection as those in the previous permit.
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, except for condition 2.2.1 where we have added "The area marked on the Site Plan as "Effluent Treatment Plant" is excluded" in order to help understanding of the installation boundary.
Pre-operational conditions	Based on the information in the application, we consider that we need to impose pre-operational conditions. Further information is included in the key issues section of this document.
Improvement programme	Based on the information on the application, we consider that we need to impose an improvement programme. Further information is included in the key issues section of this document.
Emission limits	No emission limits have been added, amended or deleted as a result of this variation.
Monitoring	Monitoring has not changed as a result of this variation.
Reporting	Reporting has not changed as a result of this variation.
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.
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

Aspect considered	Decision
	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 received from
Public Health England (PHE)
Brief summary of issues raised
PHE noted that the main emissions of potential concern from the regulated facility were volatile organic compounds (VOC's) which the modelling data had indicated would be insignificant under worst case scenario. They noted that the facility is a Control of Major Accident Hazards (COMAH) Regulations site and, as such, would be subject to stringent regulatory controls and monitoring to prevent accidents occurring at the site. Based on the information provided in the application, PHE confirmed they had no significant concerns regarding the risks to the health of the local population from the proposed activity provided the applicant took all appropriate measures to prevent or control pollution in accordance with the relevant sector technical guidance or industry best practice.
Summary of actions taken or show how this has been covered
No actions required.

Response received from
Stockton-on-Tees Borough Council Planning Department
Brief summary of issues raised
The consultee noted that a Hazardous Substances Consent had recently been approved for the facility for the increase in storage of sulphur trioxide from 35mt to 200mt (Application, 17/2325/HAZ). No further comments were made.
Summary of actions taken or show how this has been covered
No actions required.

Response received from
Natural England
Brief summary of issues raised
Natural England concurred with the findings of the HRAS document submitted to them that the permit variation would have no significant effect on protected sites, Teesmouth and Cleveland Coast Special Protection Area and Ramsar site. They made no further comment.
Summary of actions taken or show how this has been covered
No actions required.

No representations received from:
• Stockton-on-Tees Borough Council Environmental Health Department; • Health & Safety Executive; • Director of Public Health; • Marine Management Organisation; • Inshore Fisheries and Conservation Authority; • PD Ports (Teesport); • Centre for Environment, Fisheries and Aquaculture Science; • Northumbrian Water Limited.