Immingham Green Energy Terminal

9.3 Applicant's Responses to the Examining Authority's First Written Questions

(Responses to "Q1.12. Major Accidents and Hazardous Substances")

Infrastructure Planning (Examination Procedure) Rules 2010

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1 Introduction

Overview

1.1 This document has been prepared to accompany an application made to the Secretary of State for Transport (the "Application") under section 37 of the Planning Act 2008 ("PA 2008") for a development consent order ("DCO") to authorise the construction and operation of the proposed Immingham Green Energy Terminal ("the Project").

1.2 The Application is submitted by Associated British Ports ("the Applicant"). The Applicant was established in 1981 following the privatisation of the British Transport Docks Board. The Funding Statement [TR030008/APP/3.3] provides further information.

1.3 The Project as proposed by the Applicant falls within the definition of a Nationally Significant Infrastructure Project ("NSIP") as set out in Sections 14(1)(j), 24(2) and 24(3)(c) of the PA 2008.

The Project

1.4 The Applicant is seeking to construct, operate and maintain the Immingham Green Energy Terminal, comprising a new multi-user liquid bulk green energy terminal located on the eastern side of the Port of Immingham (the "Port").

1.5 The Project includes the construction and operation of a green hydrogen production facility, which would be delivered and operated by Air Products (BR) Limited ("Air Products"). The Applicant will be the first customer of the new terminal, whereby green ammonia will be imported via the jetty and converted on-site into green hydrogen, making a positive contribution to the UK's net zero agenda by helping to decarbonise the United Kingdom's (UK) industrial activities and in particular the heavy transport sector.

1.6 A detailed description of the Project is included in **Chapter 2: The Project** of the Environmental Statement ("ES") **[TR030008/APP/6.2]**.

Purpose and Structure of this Document

1.7 This document contains the Applicant's responses to those of the Examining Authority's Written Questions 1 **[PD-008]** grouped under the theme "Q1.12. Major Accidents and Hazardous Substances". It represents one of a collection of eighteen such documents, each of which addresses a different theme.

1.8 Responses are ordered ascendingly by reference number, replicating the structure of the Examining Authority's Written Questions 1.

1.9 Responses are provided in a table. The text of the question appears on the lefthand side, with the Applicant's answer to its right.

1.10 Further materials pertinent to the Applicant's response are included at the end of the document as appendices where necessary.

2 Applicant's Responses to the Examining Authority's First Round of Written Questions

Q1.12. Major Accidents and Hazardous Substances	
Q1.12.1 Hazardous Substances	
Q1.12.1.1	
Question	**Response**
Total Nitrogen Generated on Site The Non-Technical Summary [APP-042, Paragraph 3.4.13] states the nitrogen produced from the splitting of ammonia, will be used across all operational areas. Can you confirm this would be the case for All the nitrogen generated and that storage of nitrogen for possible use offsite would not be required?	**Paragraph 3.4.13** in the **Non-Technical Summary [APP-042]** is not correct. Nitrogen generated in the hydrogen production unit will be (harmlessly) emitted with flue gas, not used on site (see errata no. 14 in the **Table of Errata [PDA-010]**). The nitrogen at the required purity to purge pipelines, pipes and vessels will be generated on site by a nitrogen generation unit (a process package) as referred to in **Paragraph 3.4.4** J of the **Non-Technical Summary**. It is not economic to purify the flue gas nitrogen and nitrogen for purge must be available when the facility is not operating as it is used for making equipment safe. There is also backup storage of nitrogen incorporated in the nitrogen generation unit. There are currently no plans to use the nitrogen from the nitrogen generation unit off site.
Q1.12.1.2	
Question	**Response**

Granting Consent The Consents and Agreements Position Statement [APP-236, Table 1, No 1] states it anticipates the HSE to advise against the granting of consent due to the existing residential properties on Queen's Road. Explain why this may be the case?	The **Consents and Agreements Position Statement [APP-236]** reflects the position more fully set out in the **Statement of Reasons [AS-008]** at **Paragraphs 4.23-4.36** concerning the Queens Road residential properties. • In order to operate the hydrogen production facility, Air Products must obtain hazardous substances consent for the storage and industrial process of certain controlled substances. • The Health and Safety Executive ("HSE") is a statutory consultee for such consent; part of its role is to advise North East Lincolnshire Council ("NELC") (as the hazardous substance authority) whether it considers the associated risks are at an acceptable level for the hazardous substance consent to be granted. • In carrying out this assessment, the HSE establishes land use planning zones (categorised as inner, middle or outer zones) around major accident hazard sites (and pipelines) for planning control purposes, based on the type of development existing within the zone, the vulnerability of those likely to be present and the societal tolerance of the associated risk. The inner zone is closest to the major hazard where risks and hazards are greatest and restrictions on development are the strictest. • Air Products has commissioned specialist advisors to carry out risk modelling using methodology that is considered to reflect that to be used by the HSE to establish the inner, middle and outer zones in relation to the hydrogen production facility. Early studies (by specialist advisors DNV) were undertaken prior to submission of the Development Consent Order ("DCO") application. The results demonstrated that the Queens Road residential properties are

	expected to fall within or close to the inner zone associated with the operational Project. Further safety studies by Gexcon have since been commissioned which demonstrate that the Queens Road residential properties are expected to fall within the inner zone. • The HSE publishes guidance online on its application of the land use planning methodology. This explains how the HSE determines whether it should 'advise against' certain proposed development with reference to the level of sensitivity (ranging from 1 – 4) and the relevant land use planning zone it falls within (inner, middle, outer). • For the inner zone, the guidance states that the HSE will 'advise against' development types of sensitivity levels 2 to 4. Housing (development type DT2.1) generally falls within sensitivity levels 2 and 3 (very small developments may fall within sensitivity level 1). As a result, it is considered that the HSE is likely to 'advise against' the grant of hazardous substances consent whilst the Queens Road residential properties remain in residential use. NELC are unlikely to grant the hazardous substances consent having received that advice. The hydrogen production facility cannot operate without hazardous substances consent. • Indeed, in preliminary discussions with the HSE prior to submission of the hazardous substances consent application by Air Products and upon review of the DNV study, the HSE indicated that it would likely 'advise against' grant of hazardous substances consent with the Queens Road residential uses remaining in place. HSE indicated that it would not likely 'advise against' hazardous

	substances consent if such residential uses were not in place (the formal advice is awaited from HSE). Compulsory acquisition powers have therefore been included within the **draft DCO [PDA-004]** in respect of the relevant Queens Road properties.
Q1.12.1.3	
Question	**Response**
Environmental Permit – Anhydrous Ammonia Storage a) Can the Applicant confirm the total amount of Anhydrous Ammonia that can be stored on site by design? b) Would Part 2, Section 4.8, Part B(a)(iii) of the Environmental Permitting (England and Wales) Regulations 2016 also applies, in addition to other listed activities in these regulations [APP237, Table 1]?	a) The total amount of ammonia to be stored on site by design is 65,000 tonnes. An application has been submitted to North East Lincolnshire Council ("NELC") for hazardous substances consent for this quantity. Below is an extract from Table A of the hazardous substance consent application (reference DM/0088/23/HS) which includes the proposed maximum inventory of hazardous substances totalled for all tanks, vessels process equipment and mobile containers.

Table A

Name, or relevant category or description of substance	*Part number in Schedule 1 to the Regulations, and entry number if Part 2, category if Part 1, identity if Part 3*	*Do you have a current PHS consent* in respect of this substance? (Yes/No)*	*If "yes", state quantity for which consent granted*	*Maximum quantity proposed to be present in tonnes*
Hydrogen	15	No	n/a	270
Anhydrous (refrigerated) Ammonia Included in generic substances (B2, B10)	35	No		65000
Liquefied Petroleum Gas	18	No	n/a	1
Acetylene	19	No	n/a	0.25
34 c Petroleum Products (diesel, lube oil)	34	No	n/a	150
Aqueous Ammonia	E1	No	n/a	228
P2 Flammable GASES	Category 1 or 2	No	n/a	1
P4 OXIDISING GASES	Category 1	No	n/a	1

* a hazardous substances consent.

b)

The Applicant can confirm that Schedule 1, section 4.8, Part B(a)(iii) of the Environmental Permitting (England and Wales) Regulations 2016 (storage of anhydrous ammonia > 100 tonnes) also applies. The Environment Agency and Air Products have agreed in the Environmental Permit Pre-Application Discussions that the relevant Best Available Technique guidance will be applied to the installation. Please also see Table 1 of the Consents and Agreements Position Statement **[APP-236]** (an updated version has been submitted at Deadline 1).

Q1.12.2 Identifying and Managing Risk	
Q1.12.2.1	
Question	**Response**
Identifying Events Leading to Major Incidents Scoping Report [APP-167] lists the credible scenarios, that could cause a major incident, however, details of events that would lead up to these scenarios have not been provided. a) Explain if and how these events have been derived. b) Demonstrate how you can be sure that these risks would be reduced to an acceptable level.	a) The methodology used in the Major Accidents and Disasters ("MA&DS") chapter within the **Scoping Report [APP-167]** and **Environmental Statement ("ES") Chapter 22: Major Accidents and Disasters [APP-064]** to identify credible major accidents relevant to the Project is based on an assessment of the properties of dangerous substances which could be present during the lifecycle of the Project, and the activities and operations involving these substances, from construction and operation to decommissioning and demolition. The geographical location of the Project is also considered, to identify additional major accident scenarios and credible potential disaster scenarios. The Project location establishes the susceptibility of the Site to impacts such as climatic and seismic events and the vulnerability of receptors. The Institute of Environmental Management and Assessment ("IEMA") guidance Major Accidents and Disasters in EIA: A Primer (2020) defines a risk event as an identified, unplanned event, which is considered relevant to the development and has the potential to result in a major accident and/or disaster, subject to assessment of its potential to result in a significant adverse effect on an environmental receptor. The assessment of credible scenarios for the major accidents also considered the outputs of the Hazard Identification ("HAZID"), and Hazard and Operability ("HAZOP") studies (see paragraph 22.9.11 of Chapter 22: Major Accidents and Disasters [APP-064] and part b) below) undertaken to identify scenarios to consider for further detailed assessment, these

	studies included consideration of all reasonably foreseeable events that could lead up to these scenarios. Credible scenarios identified in the **Scoping Report [APP-167]** for Major Accidents and Disasters, together with some of the events that could lead up to the scenarios are summarised below: • Loss of containment of flammable gas from equipment or pipework could occur as a result of accidental damage, equipment failure, a dropped object or other mechanisms. Identified credible scenarios associated with loss of containment (dependent on the substances involved) included fire, explosion, release of toxic gas and release of ammonia. • Credible scenarios during construction included contact with high voltage electricity (e.g. during lifting of materials/equipment using a crane) and damage to oil pipelines or high pressure gas pipelines (e.g. through contact with an excavator backhoe). • Loss of containment from marine vessels was also identified as a credible scenario, for example, through accidental release of ballast/grey/blackwater) or ammonia (during ship-to-shore transfer operations). For each credible scenario identified, there may be several individual or sequential causal triggers. For example, a release of hydrogen gas (potentially leading to an explosion) could be triggered by: • Failure of containment arising from mechanical failure of a vessel/pipeline, flange, valve, etc. • Failure of pumps and safety control systems due to a loss of power

	• External damage to infrastructure (e.g. collision with vehicles/plant) • Human error (e.g. accidental activation of a release valve during substance transfer) It is extremely difficult to foresee or predict all of the potential triggers or sequence of triggers which could lead to a credible scenario, and for this reason the focus has been on identifying the credible risk events / scenarios and the subsequent mitigation measures to minimise the likelihood of them occurring, in line with the IEMA guidance. b) The regulatory framework requires risk to be reduced to an acceptable level. The likelihood of a credible risk event occurring will be minimised through the adoption of embedded mitigation in the design and construction elements of the Project, or through the adoption of safety management systems and safe systems of work. All of the these matters fall under the Control of Major Accident Hazards Regulations 2015 ("the COMAH Regulations"). The COMAH regulatory regime is a separate but parallel regulatory regime to planning, administered by the Competent Authority (for non-nuclear sites in England jointly comprising the Health and Safety Executive ("HSE") and the Environment Agency ("EA")). The volume of hazardous substances likely to be present at the Site is considered to meet the threshold for designation of the hydrogen production facility as an Upper Tier COMAH site. Regulation 8 of the COMAH Regulations states that every operator of an Upper Tier COMAH establishment must prepare a COMAH Safety Report.

	As the operator of the site, Air Products is therefore required to prepare a COMAH Safety Report which must be updated at key stages during the design (pre-construction), construction (pre-operation) and every five years during operation. The COMAH Safety Report remains an 'evergreen' document throughout the life of the hydrogen production facility. Also of relevance: • Regulation 5(1) of the COMAH Regulations states "*Every operator must take all measures necessary to prevent major accidents and to limit their consequences for human health and the environment*". • Regulation 5(2) of the COMAH Regulations states "*Every operator must demonstrate to the competent authority that it has taken all measures necessary as specified in these Regulations.*" Air Products will be required, through the Safety Report, to demonstrate to the Competent Authority that risk has been reduced to as low as reasonably practicable ("ALARP") in accordance with Regulation 5 of the COMAH Regulations, and as outlined in **ES Chapter 22: Major Accidents and Disasters [APP-064]**. Key elements of the Safety Report are to: • Demonstrate that a major accident prevention policy ("MAPP") and safety management system ("SMS") is in place, including a Management of Change system; • Demonstrate that major accident hazards/possible major accident scenarios have been identified and necessary measures taken to prevent them and limit their consequences;

	• Demonstrate that adequate safety and reliability have been taken into account in the design, construction, operation and maintenance of the facility in terms of major accident hazard; • Set out an internal emergency plan which, for example, the local authorities and emergency services will use in external emergency planning for the areas; and • Consider neighbouring establishments which could be the source of or increase the risk or consequences of major accidents and domino effects – this requires liaison with neighbours in a 'Domino Group'. For example, a blast incident on one site could impact equipment on another site which could lead to a bigger incident than the initial blast. In order to be sure that risk would be reduced to an acceptable level, Air Products have commissioned a series of studies and risk analyses underpinning the Safety Report. These studies are initially completed during the design of the facility. Further studies are carried out during the operating phase of the facility should any changes be identified. Some are reviewed at regular intervals to ensure that changing regulations are accounted for. The studies undertaken include, but are not limited to: • Consequence Analysis and Quantified Risk Assessment ("QRA"), including Blast Analysis or Building Risk Analysis and Toxic Release Modelling. This comprises a quantified assessment on the risk to individuals, both within and beyond the Project boundary. These studies are completed early in the design and were used as the basis for the DCO application.

	• HAZOP Hazard and Operability review ("HAZOP") – a formal, internationally recognised type of safety study which splits the process into nodes (sections) and uses guidewords and parameters for a group of experts to assess the potential causes and worst case consequences of hazards associated with the design and operation of all parts of the process. The group assesses available safeguards to prevent or mitigate the consequences and makes recommendations to add further safeguards if the existing design is considered insufficient. The HAZOP can also include a 'Risk Matrix' which helps the group to assess whether the design meets the companies Risk Criteria. The first phases of the HAZOP have been completed, but the process continues throughout the design phase. • Safety Integrity Level review ("SIL") – a formal, internationally recognised and regulated safety study which assesses the required reliability of safety systems used as safeguards in the design of a process. The safety systems identified are implemented in a separate system to the normal control system of the process plant and are regularly proof tested. This study is completed during the detailed design stage. • Vent and emergency flare dispersion analysis which models the dispersion of vapour from controlled process vents and emergency vents or flares and ensures that they are located safely for both on site and off site people. The model may include assessment of the dispersion of radiant heat and toxic or asphyxiant vapour, both in normal operation and at start up or shut down of the facility. This study is completed during the detailed design stage.

	These studies contain highly sensitive and confidential information and as such are not put into the public domain. Not all of the details are required to be submitted as part of the COMAH documentation, but the COMAH documentation must prove that they have been completed. As noted above, the outcome of the studies and analyses informs the proposed safety measures. To demonstrate reduction of risks to ALARP, Air Products will have to comply with HSE Technical Assessment Criteria from the Safety Report Assessment Manual ("SRAM"). Different Technical Assessment Criteria are available covering design, construction, operation, maintenance, and modification activities. If the proposed safety measures do not meet or demonstrate ALARP, then the HSE can refuse to validate the COMAH Safety Report, and not consent the facility for operation until further improvements are undertaken such that ALARP can be demonstrated or met. In summary, the reduction of risks to acceptable levels is secured through the separate COMAH regime and the Applicant and Air Products are confident through the studies undertaken to date that the requirements of that regime can be appropriately met.
Q1.12.2.2	
Question	**Response**

Compatibility of Hydrogen Facility with Properties The ES [APP-064, Paragraph 22.3.9] states "continued residential use of those properties is therefore considered incompatible with the operation of the hydrogen production facility", whereas in paragraph 22.3.10 of the same chapter, it states "It is considered that the ongoing operation of those businesses will be compatible with the operation of the hydrogen production facility". Explain the differences in compatibility between residential and business premises.	**Paragraphs 22.3.8** and **22.3.9** of **Environmental Statement ("ES") Chapter 22: Major Accidents and Disasters [APP-064]** refer to certain residential properties located on the west side of Queens Road. **Paragraph 22.3.10** refers to businesses also present on the west side of Queens Road. The paragraphs conclude that the residential properties are incompatible with, and the businesses are compatible with, the operation of the hydrogen production facility. **ES Chapter 22** explains that this is based on a study commissioned by Air Products and completed by specialist risk and process safety advisors, DNV. DNV estimated the planning zones based on an assessment methodology which in DNV's experience reflects that used by the Health and Safety Executive ("HSE") in assessing whether it considers the risks associated with a proposal seeking an application for a hazardous substances consent to be at an acceptable level to recommend grant of that consent, as explained further below. In considering an application for hazardous substances consent for the hydrogen production facility, the HSE will assess the hazards and risks presented by the hazardous substances and divide the risk contours from the facility into three zones, termed inner, middle and outer zones for the purposes of Planning. These are referred to as Land Use Planning Zones (LUZ). The new zones are used to adjust existing zones for an area such as this where there are already a large number of facilities with hazardous substances.

	The HSE Land Use Planning[1] guidance explains the HSE's approach to advice if it is consulted in relation to proposed development within these zones, which is usually determined by a combination of the applicable zone and the 'Sensitivity Level' of the proposed development. The Sensitivity Level depends on the 'Development Type' of the proposed development and its size and scale. The Land Use Planning guidance contains a decision matrix which explains, based on the zone and Sensitivity Level, whether the HSE's advice would typically be "AA" (advise against) or "DAA" (do not advise against) (additional rules apply in particular circumstances). A subsequent study commissioned by Air Products (undertaken by specialist process safety advisors Gexcon) has confirmed that the relevant residential properties are anticipated to lie within the inner zone, and the business properties anticipated to lie within the inner, middle and outer zone, once those zones are set by the HSE. In terms of the businesses, the HSE categorises workplaces providing for less than 100 occupants in each building and less than three occupied storeys as Sensitivity Level 1[2]. Small indoor cafes will also fall within Sensitivity Level 1. The decision matrix on which HSE bases its advice states that Sensitivity Level 1 activities in the inner zone or middle zone are classed as DAA which means that HSE 'Do not Advise Against' any such development. On this basis, the businesses present on the west side

[1] HSE's Land Use Planning Methodology Paragraph 42, https://www.hse.gov.uk/landuseplanning/methodology.htm

[2] HSE Decision Matrix (HSE's Land Use Planning Methodology Paragraph 35, https://www.hse.gov.uk/landuseplanning/methodology.htm#matrix)

	of Queens Road are considered to be compatible with the operation of the hydrogen production facility. In terms of the residential properties, the HSE categorises most housing developments as Sensitivity Level 2 or above depending on size or scale (only developments of 1 or 2 dwellings are categorised as Sensitivity Level 1). The decision matrix on which HSE bases its advice states that Sensitivity Level 2 activities in the inner zone are classed as AA which means that HSE 'Advise Against' any such development. On this basis, the residential properties located to the west of Queens Road are considered to be incompatible with the operation of the hydrogen production facility.
Q1.12.2.3	
Question	**Response**
Identification of Hazards from all Manufacturing Facilities The ES [APP-064, Paragraph 22.4.4], explains how bulk fuel storage and chemical manufacturing facilities, can increase the risk and is referred to as domino effects. Has the Applicant considered the risk from all such facilities, whether these facilities meet the threshold for relevant notifications/ registrations or not?	It is confirmed that, in considering the risk of domino effects arising, Air Products has taken into account all facilities such as bulk fuel storage and chemical manufacturing facilities, whether or not those facilities meet the threshold for relevant notifications or registrations. As outlined in the response to Q1.12.2.1 and Q1.12.2.2, Air Products commissioned early studies of likely risk arising from the hydrogen production facility, including initial consequence modelling studies undertaken by third party specialist consultants. The findings of these initial studies formed the basis of the Development Consent Order ("DCO") application and subsequently Air Products has engaged with stakeholders as part of the consultation process and on an ongoing basis, as detailed in the **Consultation Report [APP-022]**. As part of Consequence Analyses carried out as referred to in Q1.12.2.1,

	potential impacts on surrounding sites were identified as detailed in **Environmental Statement ("ES") Chapter 22: Major Accidents and Disasters [APP-064].** Air Products and the Applicant have engaged with neighbours both as part of the statutory consultation before submission of the DCO application and specifically with neighbours that could potentially be impacted by Major Accident Hazard scenarios identified through the preliminary Quantified Risk Assessment ("QRA") work. Air Products and the Applicant engaged with neighbouring facilities to determine if there are additional impacts, and used the list of Environmental Permitting Regulations ("EPR") and Control of Major Accidents and Hazards ("COMAH") sites, advice from the COMAH competent authorities and the current land use planning zones to determine which facilities might be impacted or be in COMAH domino groups. All of the above have been taken into account in assessing whether the proposed development is vulnerable to a possible major accident, as covered in **ES Chapter 22: Major Accidents and Disasters [APP-064]**. Consultation with neighbours will also continue as part of the COMAH process.
Q1.12.2.4	
Question	**Response**

Site COMAH Envelope Confirm the extent of the COMAH envelope for the site, in particular whether or not it includes docked vessels containing ammonia, i.e. does it mirror the site boundary [APP-074].	The Applicant confirms that the Control of Major Accidents and Hazards ("COMAH") establishment/envelope proposed by Air Products includes the operational area of Work Numbers 1-7 within the order limits, including the operational topsides of the jetty associated with the import of ammonia. The COMAH envelope is not proposed to include docked vessels carrying ammonia. This is subject, at the time of writing, to formal confirmation from the Competent Authority comprising the Health and Safety Executive ("HSE") and the Environment Agency ("EA").
Q1.12.2.5	
Question	**Response**
Impact on Surrounding Area and Environment NELC has expressed concern [RR-022] around the extent of the COMAH zones that would be associated with the proposed development and how that may affect the surrounding area in regard to future development growth. a) NELC - Further to the discussion at ISH2 [EV4-004] [EV4-005], expand on your relevant representation [RR-022], by providing further explanation on your position in relation to COMAH constraining future development opportunities. b) Applicant – What are the expected significant adverse effects, the Proposed Developments vulnerability to potential major accidents and/ or disasters, could have on the surrounding area and environment.	b) As identified in **Paragraph 22.11.6** of the **Environmental Statement Chapter 22: Major Accidents and Disasters [APP-064]**, risk must be managed by a comprehensive safety and environmental protection programme, implemented by engineering design, operational measures and management to achieve a level as low as reasonably practicable ("ALARP"), as required by the Control of Major Accident Hazards Regulations 2015 ("the COMAH Regulations"). In light of that risk management and regulation, the Applicant does not therefore expect that significant adverse effects on the surrounding area and environment are likely to arise as a result of the Project's vulnerability to potential major accidents and/or disasters, except for the impacts on the owners and occupiers of the Queens Road residential properties as a result of the compulsory acquisition of those properties (as explained in the response to Q1.12.2.2).

c) Applicant – provide details of the potential cumulative effects of overlapping COMAH zones and how this may affect future land use planning and development opportunities.	The setting by the Health and Safety Executive ("HSE") of Land Use Planning ("LUP") zones (often termed COMAH zones) and the compatibility of the hydrogen production facility with nearby businesses is also explained in the response to Q1.12.2.2. In terms of future development, the Applicant has considered the position in terms of allocated sites for development as detailed in the North East Lincolnshire Council ("NELC") adopted local plan [1] and does not consider that the Project would have any significant adverse effects on the future development of such sites. This reflects the fact that allocated sites in proximity to the site of the Project are allocated for employment purposes. In respect of the emerging North East Lincolnshire Local Plan – which is in any event at an early options stage of the process – the Applicant notes that specific reference is made to the Project as a key employment project within the emerging document so would appear to be being taken account of in the development of the land use strategy coming forward through the emerging plan process. As far as the Applicant can determine, there are no suggested new development sites being put forward within the emerging plan that would raise concerns for the Project in respect of this issue. As explained further in the response to Q1.12.2.2, the HSE categorises 'Development Types' which fall within defined 'Sensitivity Levels' [2] and assigns workplace buildings with less than 100 occupants and three occupied storeys as Sensitivity Level 1 [3]. Based on the assessments commissioned by Air Products and described in the response to Q1.12.2.2, it is not anticipated that the HSE would advise against such proposed employment developments following the commencement of operation of the hydrogen production facility.

	c) As detailed in the response to part (b), LUP zones are determined by the HSE. It is Air Products' understanding that the difference between outer, middle and inner zones is based on order of magnitude differences in quantified risk. Combining the risk from two facilities would result in an increase in risk but this is unlikely to be of a sufficient order of magnitude to change the zone designation. For example, overlaying a new middle zone onto an existing middle zone would not result in that zone changing to an inner zone. On this basis, it is not expected that the hydrogen production facility will result in changes to LUP zones because of cumulative effects with existing facilities.
Q1.12.2.6	
Question	**Response**
Figure 22.1 Major Accidents and Disasters Study Area The ES [APP-067, Paragraph 22.1.9] refers to Figure 22.1: Major Accidents and Disasters Study Area. However this is not present in the EL. Applicant provide this.	**Environmental Statement ("ES") Figure 22.1: Major Accidents and Disasters Study Area** was omitted from the ES in error. A copy of this missing figure is included as **Appendix 1** of this document.
Q1.12.3 Risk Reduction Measures	
Q1.12.3.1	
Question	**Response**

Ammonia Storage Tank Overfill Protection The Planning Statement [APP-226, Paragraph 4.6.2] refers to refrigerated liquid ammonia being transferred from the Terminal to the ammonia storage tank, via pipelines. Explain the layers of protection you will have in place to ensure the risk of overfilling the ammonia storage tank are in line with the HSE's principles of acceptable risk, where a major offsite incident is possible	The hazard of overfilling the ammonia storage tank during transfer from the ship will be protected against by the following layers of control: • The tank filling operation is monitored by operators via tank level and offloading flow indication, those operators communicate directly with operators on the ship • There will be an independent tank high level automated shutdown system (provided by Safety Instrumented Systems following BS EN 6151). • The maximum tank operating level is set to allow sufficient capacity for safe operator shut down (following communication between operators as above), but also storage capacity in the unlikely event that does not occur and the automated shutdown system referred to above applies. Quantified Risk Assessment will be used to assess the risk presented by the tank overfill hazard and to determine the required risk reduction provided by the layers of protection in order to ensure the risk both meets company acceptable risk criteria and is also tolerable and demonstrated to be as low as reasonably practicable ("ALARP") in line with the Health and Safety Executive ("HSE") principles of acceptable risk. Additionally, in the unlikely event of tank overfill occurring, a secondary containment system would contain released liquid ammonia. Note that the tank containment area is designed to prevent releases to the surface water drainage system.
Q1.12.3.2	
Question	**Response**

Ammonia Flare Stack Design In the event of an emergency/ abnormal situation and use of the flare being required [APP-064, Table 22-4], what assurances can you provide, that in such instances complete combustion of any released ammonia will occur, with no risk of ammonia slippage occurring.	The performance of the installed ammonia flare system is assured through the combination of good design, high-quality components and a rigorous maintenance programme and testing regime and will be regulated by the Environmental Permit that will be secured for the hydrogen production facility: • The flare installation will be an industry standard pilot-lit system designed to American Petroleum Institute standard API 521 Pressure-relieving and Depressuring Systems to ensure the complete combustion (>98%) of ammonia and includes in-built redundancy to ensure availability when called into service. • The flare installation will be sourced from specialist vendors with industry expertise in the provision of such systems. • The maintenance programme for the flare stack will meet (or indeed exceed) the manufacturer's recommendations. • There will be regular checks by Air Products to ensure that the flare is operational. There are industry standard instrumented safety functions that will alert the team to a failure of the equipment before it is called into use. • Flares stacks are installed for each operational unit; if a flare system is not operational then the safety systems will ensure that the associated production unit is taken offline until such time that the flare can be repaired.

3 Appendices to the Applicant's Responses to the Examining Authority's First Round of Written Questions

Appendix 1 - Environmental Statement ("ES") Figure 22.1: Major Accidents and Disasters Study Area