Immingham Green Energy Terminal Green Hydrogen Production Facility

EPR/VP3425SV/A001

Environmental Permit Application

Appendix H – Odour Management Plan

Environmental Permitting (England and Wales) Regulations 2016

Applicant: Air Products BR Ltd

May 2024

Environmental Permitting (England and Wales) Regulations 2016

Immingham Green Energy Terminal Green Hydrogen Production Facility

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Appendix H – Odour Management Plan

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Revision 1	02 April 2024	EPR Application
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1 Report Context

1.1 Introduction

1.1.1 This document has been prepared by AECOM Limited ('AECOM') on behalf of Air Products (BR) Limited ('APBRL'), referred to as 'the Operator', in support of an Environmental Permit application for the proposed Green Hydrogen (H_2) Production Facility ('proposed installation') which forms part of the wider Immingham Green Energy Terminal ('IGET') Nationally Significant Infrastructure Project (NSIP) being developed by Associated British Ports ('ABP') on the eastern side of the Port of Immingham, situated in northeast Lincolnshire on the south bank of the Humber Estuary.

1.1.2 This report has been prepared to support the permit application and details the Odour Management Plan (OMP) for the site. The report should be read in conjunction with other supporting application documents.

1.2 Proposed Installation

1.2.1 The proposed installation comprises the development of a green H_2 production facility which includes infrastructure for the offloading and transfer of green ammonia (NH_3) from ships to ammonia storage facilities, the main H_2 production facility and vehicle and trailer H_2 refuelling facilities.

1.2.2 The proposed installation will be located in North East Lincolnshire on the south bank of the Humber Estuary on the eastern side of the Port of Immingham. The installation location will be approximately centred on National Grid Reference (NGR) E520783 N415271.

2 Background

2.1 Scope

2.1.1 This OMP has been developed in accordance with the Environment Agency's (EA) Horizontal Technical Guidance Note H4 – Odour Management (April 2011).

2.1.2 Section 4 of the H4 Guidance states that all OMPs should as a minimum contain the following elements:

- an assessment of the risks of odour problems, from normal and abnormal situations, including worst case scenarios, for example of weather, temperature, or breakdowns, as well as accident scenarios;
- the appropriate controls (both physical and management) needed to manage those risks;
- suitable monitoring;
- actions, contingencies and responsibilities when problems arise;
- regular review of the effectiveness of your odour control measures; and
- emission limits where appropriate.

2.1.3 The OMP also requires inclusion of clear statements to demonstrate that the Operator understands and accepts its responsibilities. In particular, it should show that the Operator:

- either directly or through its contractors or subcontractors, will ensure that any odour control equipment is designed, operated and maintained such that it operates effectively to control odour at all times;
- is familiar with the characteristics of the processes and equipment on site and have identified the areas of risk of emissions from odour;
- will reduce or cease operations, if necessary, to avoid serious odour pollution;
- will engage with neighbours to minimise their concerns and complaints; and
- will respond to complaints.

2.1.4 The remainder of this OMP follows the outline below:

- Section 3 – Overview of process and location
- Section 4 – Assessment of odour risk;
- Section 5 – Proposed management arrangements;
- Section 6 – Normal operational odour control;
- Section 7 – Routine maintenance and inspection requirements;
- Section 8 – Odour control during abnormal events / maintenance; and
- Section 9 – Monitoring, recording and reporting.

3 Overview of Process and Location

3.1 Process

3.1.1 The facility is designed to receive imports of green ammonia from International Markets, to be converted to green hydrogen to supply the UK's hydrogen for mobility (H_2fM) market.

3.1.2 Vessels will bring a total of 660,000 tonnes of green ammonia (comprising 12 ships each transporting 55,000 tonnes) to the Terminal from the Middle East and Netherlands.

3.1.3 The following activities will be situated within the installation boundary:

- NH_3 ship offloading infrastructure to facilitate the receipt of NH_3 for H_2 production. The offloading infrastructure will be located on a new jetty being constructed by Associated British Ports (ABP). Only the offloading infrastructure is incorporated in the application and the jetty itself remains outside the installation boundary.
- NH_3 transfer pipeline which links the ship offloading infrastructure with the NH_3 storage tanks located on the east site.
- East site which comprises:
    - (a) a NH_3 storage tank and related plant including an NH_3 tank flare stack and boil-off gas compression system to liquefy the generated boil-off gas during offloading from Ship and static boil-off from Ammonia Tank.
    - (b) H_2 production facility comprising up to three H_2 production units including associated flue gas and flare stacks.
    - (c) Power distribution buildings for NH_3 and H_2 production plant.
    - (d) Instrumentation buildings for NH_3 and H_2 processes.
    - (e) Analyser shelters for the H_2 production plant.
    - (f) Pipe-racks, pipelines, pipes, utilities and other infrastructure associated with both NH_3 and H_2 equipment.
    - (g) Welfare facility.
- West site which comprises:
    - (a) H_2 production facility comprising up to three H_2 production units including associated flue gas and flare stacks.
    - (b) Up to four liquefier units.
    - (c) H_2 storage tanks.
    - (d) H_2 trailer filling stations.
    - (e) H_2 vent stack and associated process equipment.
    - (f) H_2 vehicle and trailer filling stations.
    - (g) H_2 compressors and associated process equipment.
    - (h) Control room and workshop building.
    - (i) Security and visitor building.
    - (j) Contractor building.
    - (k) Warehouse.
    - (l) Driver administration building.
    - (m) Safe haven building.
    - (n) Electrical substation and metering station.
    - (o) Power distribution buildings.

(p) Process instrumentation buildings.
(q) Analyser buildings.
(r) Process and utility plant including cooling towers and pumps, fire water tank, instrument air equipment, pipe racks, pipelines, pipes, cable racks, utilities and other infrastructure nitrogen generation package (HPN) with LIN Tank and LIN Vaporizers and steam generation package.

- Pipeline corridor for underground pipelines, pipes, cables and other conducting media for the transfer of NH_3, H_2, nitrogen (N_2) and utilities, with cathodic protection against saline corrosion.

3.2 Location

3.2.1 As stated above, the installation location will be approximately centred on National Grid Reference (NGR) E520783 N415271. The proposed installation will be situated to the east of the Port and largely outside of the operational area of the Port. The area surrounding the Port is industrial in nature and dominated by chemical manufacturing, oil processing and power generation facilities. Residential and commercial properties are present to the south of the Port on Queens Road and lie within, and adjacent to, the proposed site boundary. Beyond the industrial facilities, the wider area is largely agricultural. The nearest residential area is on the eastern edge of the town of Immingham approximately 460m from the western edge of the Site.

3.2.2 The location of the proposed installation is shown in Appendix A Figure 1 of the Supporting Document.

4 Assessment of Odour Risk

4.1 Introduction

4.1.1 This section outlines the approach taken to evaluate the odour risks associated with the operation of the proposed installation. The impact evaluation process has made reference to specific guidance within:

- Environment Agency Horizontal Technical Guidance Note H4 – Odour Management- How to Comply With Your Environmental Permit (April 2011)
- IAQM "Guidance on the Assessment of Odour for Planning".

4.2 Odour Risk Assessment Methodology

4.2.1 The evaluation methodology used involves three stages:

a. Source characterisation to identify the potential odour hazards and risks associated with the proposed installation;

b. Receptor evaluation to review the receptors that could be impacted by the odour hazards and risks from the operation of the proposed installation. This covers residential, commercial and industrial human receptors; and

c. Risk assessment that evaluates the odour hazards and risks in terms of the probability of occurrence and the severity of the impact on the identified receptors. The odour risk assessment also summarises the odour management plan approach that will be used to mitigate the identified risks.

4.3 Source Characterisation

Odour Hazard Identification

4.3.1 The odour hazard identification process draws on AP's and AECOM's knowledge of odour impact assessment on similar plants and applications.

Odour Characterisation

4.3.2 The proposed installation has been designed to operate in such a way as to not generate significant odour levels at the site.

4.3.3 In relation to odour releases at the proposed installation the following have been identified as potential release sources:

- Hydrogen production units (HPU's) and flares
- Control and containment fail resulting in fugitive releases
- Storage and transfer of materials

4.3.4 The application of best practice management measures, described in later sections of this OMP would, however, be capable of eliminating and minimising emissions to an acceptable level.

4.3.5 In terms of characterising odour, hedonic scores are used as a measurement scale for hedonic tones, typically ranging from +4 for very pleasant odours to

-4 for foul ones. Neutral odours score 0. This score refers to the type of smell, irrespective of its strength (intensity) and can help to decide how offensive an odour may be.

4.3.6 Assessment of the potential odour sources at the Installation indicates the potential hedonic scores for the installation in line with the EA H4 Odour Management Guidance and these are summarised in Table 4-1 .

Table 4-1 Hedonic Scores for Site Processes

Odour Source	Descriptors	Typical primary chemical odorants	Potential Hedonic Score
Ammonia and ammonia solution transfer and storage	Potential for sharp, pungent odour. Most likely to be present as a result of a leak from the transfer pipework or the storage tank	Ammonia	-2.47
H2 Production	Most likely to be present as a result of a leak from the transfer pipework or the storage tank	None expected	-
Natural Gas	Only present as a result of a leak from the transfer pipework	Mercaptan/sulfidic	-2.45
Diesel	Most likely to be present as a result of a leak from the transfer pipework or the storage tank for the emergency generator.	Gasoline, solvent	-1.16
Drains	Potential odour associated with build-up or blockage in the drainage system	Musty, earthy, mouldy	-1.94
Biocide	Potential for a pungent, irritating bleach smell. Most likely to be present as a result of a leak from the transfer pipework or the storage tank	Chlorine	-1.64
Phosphate and ortho-phosphate	Most likely to be present as a result of a leak from the transfer pipework or the storage tank	None expected	-
Sodium Hypochlorite	Potential for a pungent, irritating bleach smell. Most likely to be present as a result of a leak from the transfer pipework or the storage tank	Chlorine	-1.64

Odour Risk Potential of Site Processes

4.3.7 With respect to the identified odour risks these have been determined on the basis of:

- Nature/source of the potential releases;

- Potential offensiveness of the contaminant should the odorous element be released;
- Size of the area of the source release; and
- Mitigations present and their effectiveness.

4.3.8 This approach is in line with the IAQM odour guidance and is summarised in Table 4-2 below.

Table 4-2 Source Odour Risk Potential

Odour Source Potential	Magnitude	Potential Offensiveness	Mitigation
High	• Area sources of thousands sqm. • Compounds involved are very odorous (e.g. mercaptans). • Where known, compounds have a very low odour detection threshold (ODT).	• Process classed as 'Most offensive' in H4 Guidance; or • Compounds/odours have an unpleasant (-2) to very unpleasant (-4) hedonic score	Open air operation with no containment, reliance solely on good management techniques and best practice
Medium	• Area sources of hundreds sqm • Compounds involved are moderately odorous.	• Process classed as 'Moderately offensive' in H4 Guidance; or Compounds/odours have a neutral (0) to unpleasant (-2) hedonic score	Some mitigation measures in place but there is potential for significant odour to remain
Low	• Area sources of tens sqm. • Compounds involved are mildly odorous. • Where known, compounds have a relatively high odour detection threshold (ODT)	• Process classed as 'less offensive' in H4 Guidance; or • Compounds/odours have a neutral (0) to pleasant (+4) hedonic score	Effective, tangible mitigation measures in place leading to little or no residual odour

4.3.9 Taking the above into consideration, we have concluded that the odour source potential for the proposed installation would be medium on the basis that:

- Magnitude in terms of source areas (sqm) and volumes held would be medium;
- Releases are not continuous in nature and are generally associated with leaks/spills;

- The potential offensiveness of the odour would be described as moderate with hedonic scores in the range of 0 to -2.47; and
- Based on the potential for odour release measures being put in place, particularly in line with BAT, the proposed mitigation would lead to little or no odour.

Inventory of Odour Sources

4.3.10 An inventory of potential odour sources from the site treatment activities in accordance with H4 (April 2011) is provided in Table 4‑3:

Table 4-3 Inventory of Odour Sources

Source Description			Likely Odorous Compounds	Containment/ Release Point	Odour Description	Intensity at or Near Release Point	Pattern of Release	Potential
Source	Type of Emission	Source Odour Risk						
HPU flue gas stack	Fugitive	Low	None.	HPU areas	Very low, if any.	None expected	None expected	Not expected
HPU flares	Fugitive	Low	None.	HPU areas	Very low, if any.	None expected	None expected	Not expected
H_2 vent stack	Fugitive	Low	None.	Hydrogen storage areas	Very low, if any.	None expected	None expected	Not expected
NH_3 and ammonia solution storage and associated NH_3 flare	Fugitive	Medium	Odours associated with ammonia.	Ammonia and ammonia solution storage area. NH_3 transfer pipeline	Odour should be marginal.	None expected	None expected	Only in emergency scenario
Natural gas pipelines	Fugitive	Low	Odours associated with natural gas.	Whole site	'Rotten egg' smell from added mercaptan.	Close to pipelines	None expected	Not expected
Raw material storage (waste materials)	Fugitive	Low	Odours associated with raw material storage and use.	Raw material storage areas	Variable depending on material. Most raw materials have a low odour potential.	Odour is expected to be noticeable only in close proximity to the storage area (<0.5m).	Intermittent release, near to ground level.	Not expected Only in emergency scenario
Boiler treatment chemicals	Fugitive	Medium	Odours associated with leak/spill – chlorine like in nature	Storage tanks	Odour should be marginal.	None expected	None expected	Not expected unless leakages/ spills.
Drains	Fugitive	Medium	Odours associated with blockage in drains (e.g. leaves, etc.)	Surface water drains	Odour should be marginal.	None expected	None expected	Only if drain blocks
Diesel	Fugitive	Medium	Odours associated with leaks/spill - gasoline odour	Vehicle areas, diesel delivery and storage areas.	Odour should be marginal.	Odour is expected to be noticeable in close proximity to vehicle/ delivery/storage areas.	Intermittent release, near to ground level if leaks/ offloading of diesel taking place.	Not expected unless leakages/ spills.

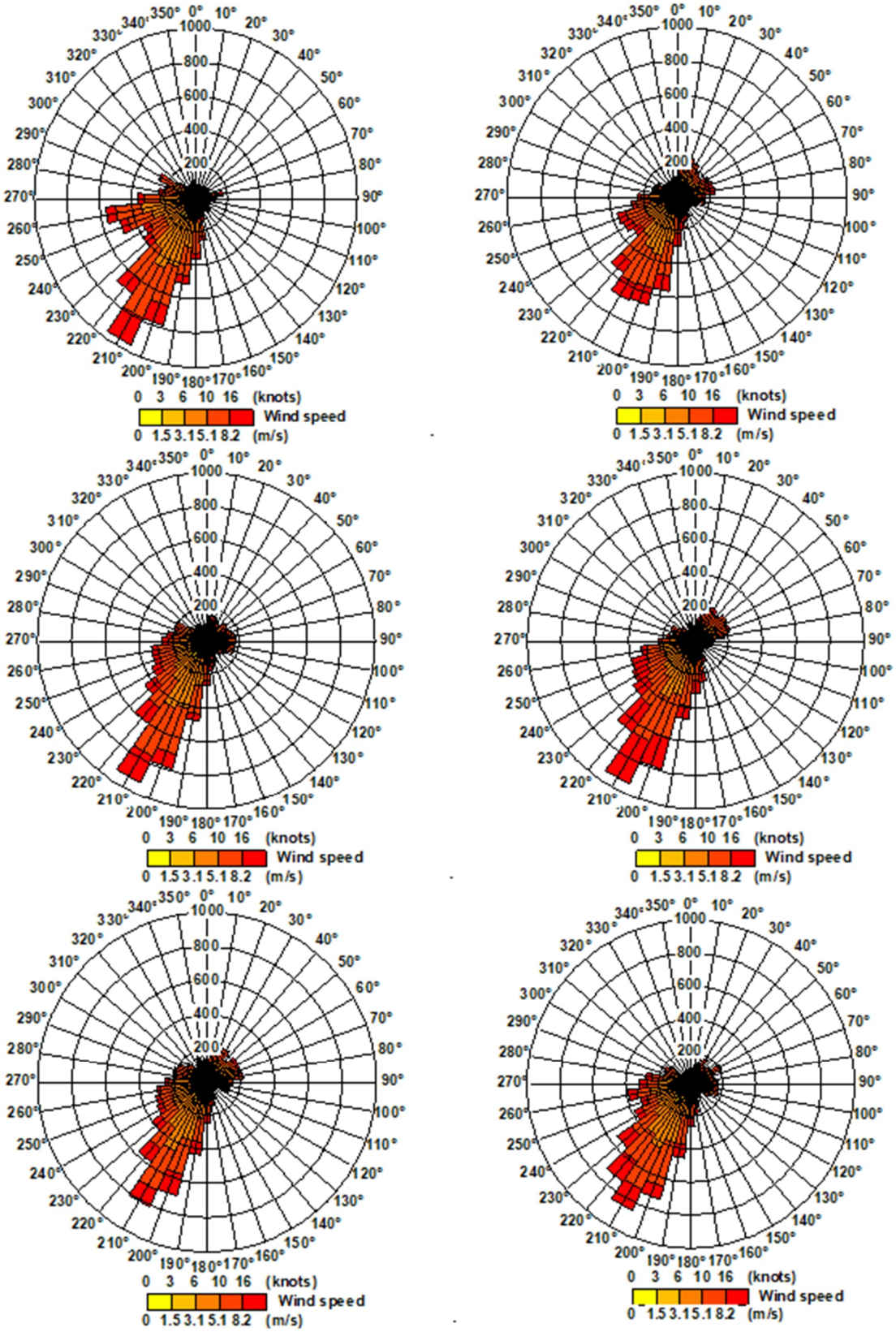
4.4 Meteorological Conditions

4.4.1 Wind rose plots for the six years of hourly sequential meteorological data from Humberside Airport are provided in Figure 4‑1.

4.4.2 Humberside Airport is approximately 10km to the southwest of the Project site and conditions experienced there are considered representative of conditions experienced in the air quality study area.

4.4.3 Figure 4‑1 shows how consistent wind speed and direction have been over the six years shown, with the clear prevalence of south-westerlies.

Figure 4‑1 Wind Rose Plots – Humberside Airport 2017 – 2022



4.4.4 Based on the 6 years of data, it is clear the strongest and most frequent wind is blow towards the southwest, particularly at 210°, resulting in any potential receptor in this direction becoming most impacted.

4.4.5 To assist in characterising the susceptibility of neighbouring odour sensitive receptors in relation to prevailing meteorological wind conditions, the potential risk from odour dispersal is classed as high, moderate, low or very low dependant on the direction receptor sits in relation to the installation and direction of wind blow.

Table 4‑4 Receptor Sensitivity Based on Meteorological Data and Distance

Direction from Installation	Sensitivity Based on Distance			
	High (< 0.25 km)	Moderate (0.251 – 0.5 km)	Low (0.501 – 0.75 km)	Very Low (>0.75 km)
N	Moderate	Low	Low	Very Low
NE	High	Moderate	Moderate	Low
E	Moderate	Moderate	Low	Low
SE	Moderate	Moderate	Low	Low
S	Low	Low	Low	Very Low
SW	Moderate	Low	Low	Very low
W	Moderate	Moderate	Low	Low
NW	Moderate	Low	Low	Very Low

4.5 Sensitive Odour Receptors

4.5.1 The air quality receptors selected for this assessment are those that are considered sensitive to air quality effects and most likely to experience worst-case impacts from the impact pathways considered, because of the installation's operation. Each selected receptor can be considered representative of other sensitive locations in their vicinity.

Table 4‑5 Principles for Determining Receptor Sensitivity

Potential Sensitivity	Principles to Consider
High	Surrounding land use where: • Users can reasonably expect enjoyment of a high level of amenity; and • People would reasonably be expected to be present here continuously, or at least regularly for extended periods, as part of the normal pattern of land use. As per H4/IAQM Guidance examples may include residential buildings, hospitals, schools/education, restaurants/bars and tourist/cultural.
Moderate	Surrounding land use where: • Users would expect to enjoy a reasonable level of amenity but wouldn't expect to enjoy the same level of amenity as in their homes; or

Potential Sensitivity	Principles to Consider
	• People wouldn't reasonably be expected to be present here continuously, or regularly for extended periods, as part of the normal pattern of land use. As per H4/IAQM guidance examples may include places of work, commercial/retail premises, industrial premises, and plying/recreation fields.
Low	Surrounding land use where: • Enjoyment of amenity would not reasonably be expected; or • There is transient exposure, where people would reasonably be expected to be present only for limit periods of time as part of the normal pattern of land use. As per H4/IAQM guidance examples may include farmland, footpaths, and roads.

4.5.2 However, in determining the sensitivity of any individual receptor, consideration also needs to be given to any pathway effects such as proximity to site, prevailing wind direction and the likely dispersion and/or dilution of any odour. Therefore, in this assessment, consideration has been given to:

- Receptor type (e.g. residential, commercial, industrial, etc) and associated occupation rate (e.g. present for extended periods of time, present for shorter periods or transient presence);
- The proximity of the receptors to the source of the odour (i.e. site activities) – in the assessment below a sensitivity factor based on distance is given such that receptors <250m from activity would be considered at a high sensitivity, those between 251 – 500m considered moderate and those between 501 – 750m would be considered low and those greater than 750m considered very low; and
- Direction from site and whether the receptor is located upwind or downwind of the site.

4.5.3 Receptors which could be potentially affected by odour from the facility and their associated sensitivity are detailed in Table 4‑6 below. A plan showing the location of the sensitive receptors is attached in Appendix A Figures 5 and 6 of the Supporting Document.

Table 4-6 Sensitive Odour Receptors

Receptor		Type	H4 / IAQM Sensitivity	Closest Distance from Site Boundary	Direction From Site	Sensitivity Based on Wind and Distance	Overall Sensitivity Rating	Justification
R1	Residential Property on Kings Road A1173	Residential	High	approximately 0.4km from West Site	W	High	High	Potentially highly sensitive receptor, within close proximity to the site and predominant winds in this direction.
R2	Residential Property on Chestnut Avenue	Residential	High	approximately 0.5km from West Site	W	Moderate	High	Potentially highly sensitive receptor, within close proximity to the site and winds moderately in this direction.
R3	Residential Property on Talbot Road	Residential	High	approximately 0.7km from West Site	W	Low	Moderate	Potentially highly sensitive receptor, within moderate proximity to the site and winds moderately in this direction.
R4	Residential Property on Somerton Road	Residential	High	approximately 0.5km from West Site	W	Moderate	High	Potentially highly sensitive receptor, within close proximity to the site and winds less frequently in this direction.
R5	Residential Property on Somerton Road	Residential	High	approximately 0.5km from West Site	W	Moderate	High	Potentially highly sensitive receptor, within close proximity to the site and winds moderately in this direction.
R6	Residential Property on Pelham Road	Residential	High	approximately 1.3km from West Site	W	Low	Moderate	Potentially highly sensitive receptor, not close to the site and winds less frequently in this direction.

Receptor		Type	H4 / IAQM Sensitivity	Closest Distance from Site Boundary	Direction From Site	Sensitivity Based on Wind and Distance	Overall Sensitivity Rating	Justification
R7	Residential Property on Margaret Street	Residential	High	approximately 1.5km from West Site	W	Low	Moderate	Potentially highly sensitive receptor, not close to the site and winds less frequently in this direction.
R8	Residential Property on Mauxhall Farm/ Immingham Road	Residential	High	approximately 1.1km from West Site	SW	Very Low	Low	Potentially highly sensitive receptor, not close to the site and winds infrequent in this direction.
R9	Residential Property on North Moss Lane	Residential	High	approximately 1.9km from West Site	S	Very Low	Low	Potentially highly sensitive receptor, not close to the site and winds infrequent in this direction.
R10	Residential Property on South Marsh Road	Residential	High	approximately 2.4km from West Site	S	Very Low	Low	Potentially highly sensitive receptor, not close to the site and winds infrequent in this direction.
R11	Residential Property on Church Lane	Residential	High	approximately 2.6km from West Site	SW	Very Low	Low	Potentially highly sensitive receptor, not close to the site and winds infrequent in this direction.
R12	Residential Property on Cleethorpe Road	Residential	High	approximately 8km from the East Site	SE	Low	Moderate	Potentially highly sensitive receptor, not close to the site and winds less frequently in this direction.
R13	Residential Property on Stone Creek	Residential	High	approximately 3.1km from the vessel berth	NE	Low	Moderate	Potentially highly sensitive receptor, not close to the site and winds frequently in this direction.
R14	Residential Property on Stone Creek approximately	Residential	High	approximately 3.7km from the vessel berth	NE	Low	Moderate	Potentially highly sensitive receptor, not close to the site and winds frequently in this direction.

Receptor		Type	H4 / IAQM Sensitivity	Closest Distance from Site Boundary	Direction From Site	Sensitivity Based on Wind and Distance	Overall Sensitivity Rating	Justification
R15	Residential Property on South Farm Road	Residential	High	approximately 3.6km from the vessel berth	NE	Low	Moderate	Potentially highly sensitive receptor, not close to the site and winds frequently in this direction.
R16	Stone Creek Farm	Residential	High	3.6km from the vessel berth	N/NE	Very Low	Low	Potentially highly sensitive receptor, not close to the site and winds less frequently in this direction.
R17	Salthaugh Sands Estate	Residential	High	approximately 4.2km from the vessel berth	N/NE	Very Low	Low	Potentially highly sensitive receptor, not close to the site and winds less frequently in this direction.

4.6 Odour Risk Assessment

Introduction

4.6.1 The magnitude of odour impact depends on a number of factors and the potential for complaints varies due to the subjective nature of odour perception. Both the EA H4 Guidance and the IAQM Odour Guidance consider a technique known as FIDOR as a useful reminder of the factors that will determine the degree of odour pollution. In undertaking the risk assessment we have applied the FIDOR Approach as detailed in Table 4-7 below.

Table 4-7 Application of FIDOR

FIDOR Element		Definition	Consideration
F	Frequency	frequency with which odours are detected	Consideration of frequency, intensity and duration has been evaluated by considering: • Nature/source of the incoming material; • Nature of the potential contaminants that could be present in the incoming waste and how they are bound (e.g. how easily the odorous compounds could be volatised); • Potential offensiveness of the contaminant should the odorous element be released; • Size of the area of the source release; and • Mitigations present and their effectiveness.
I	Intensity	the intensity of the odours detected;	
D	Duration	the duration of exposure to detectable odours	
O	Offensiveness	the level of pleasantness or unpleasantness of odours.	Consideration has been given to the relative offensiveness of the odour released from the key aspects of each process by considering the hedonic scores for each aspect.
R	Receptor	the sensitivity of the location where odours are detected, and/or the proximity of odour reassess to an odour sensitive location	Receptor sensitivity has been evaluated considering the IAQM principles, coupled with the direction and distance of each receptor from site and the frequency that wind blows in the direction of each receptor.

Assessment of Odour Impact

4.6.2 Within the assessment odour emissions from the site have been assigned a risk-ranking based on:

Effect = Impact (FIDO) * Receptor Sensitivity

4.6.3 The key factors that will influence the effects of odours are the magnitude of the odour source (s), the effectiveness of the pathway for transporting odours, and the sensitivity of the receptor. The methodology set out in the

IAQM guidance describes in detail the Source-Pathway-Receptor approach to odour risk assessment and includes tables and matrices to assist in determining the likely risk of odour effects. The IAQM methodology is outlined below, and it includes an element of professional judgement. The assessment examines the source odour potential of the site and then identifies the pathway effectiveness and receptor sensitivity applied in this assessment.

Table 4-8 Composition and Characteristics of Odour Sources

Source Odour Potential	Pathway Effectiveness	Receptor Sensitivity
Large Source Odour Potential: Large-scale odour source and/or a source with highly unpleasant odours (hedonic tone is -2 to -4); no odour control	Highly Effective Pathway: Very short distance between source and receptor, receptor downwind of source relative to prevailing wind; ground level releases; no obstacle between source and receptor.	High Sensitivity: Highly sensitive receptors (e.g. residential properties, schools, etc.)
Medium Source Odour Potential: Medium scale odour source and/or a source with moderately unpleasant odours (hedonic tone 0 to -2): basic control measures	Moderately Effective Pathway: Receptor is local to the source; releases are elevated; but compromised by building effects.	Medium Sensitivity: Moderately sensitive receptors (e.g. commercial and retail premises, recreation area, etc.).
Small Source Odour Potential: Small-scale odour source and/or a source with pleasant odours (hedonic tone +4 -0); best practice odour controls	Ineffective pathway: Long distance between source and receptor (>500m); receptors upwind of source relative to prevailing wind, odour release from stack/high level	Low Sensitivity: Receptors not sensitive (e.g. Industrial activities or farms).

4.6.4 The estimates of the Source Odour Potential (Table 4-2 and Table 4-8 above) along with the pathway effectiveness (Table 4-8) are considered together to predict the risk of odour exposure (impact) at the receptor location using the matrix in Table 4-9 below.

Table 4-9 Risk of Odour Exposure

Pathway Effectiveness	Receptor Sensitivity		
	Small	Medium	Large
Highly effective	Low	Medium	High
Moderately effective	Negligible	Low	Medium
Ineffective	Negligible	Negligible	Low

4.6.5 Taking this into consideration, the significance of odour impact at a specified receptor location through the interaction between sensitivity and risk can be determined using the IAQM approach as presented in Table 4‑10 below.

Table 4‑10 Significance of Odour Exposure

Risk of Odour Exposure	Receptor Sensitivity		
	Low	Medium	High
High	Slight	Moderate	Substantial
Medium	Negligible	Slight	Moderate
Low	Negligible	Negligible	Slight

4.6.6 Applying this to our assessment, the summary of odour effects at the existing sensitive receptors can be summarised as shown in Table 4‑11 Application of FIDOR below. To ensure a worst case is considered we have completed the assessment on the highest source odour potential.

Table 4‑11 Application of FIDOR

Receptor	Description	Direction	Type	Overall Receptor Sensitivity	Source Odour Potential	Pathway Effectiveness	Odour Exposure Risk	Likely Odour Effect
R1	Residential Property on Kings Road A1173 approximately 0.4km from West Site	W	Residential	High	Medium	Moderately effective	Moderate	Moderate
R2	Residential Property on Chestnut Avenue approximately 0.5km from West Site	W	Residential	High	Medium	Moderately effective	Moderate	Moderate
R3	Residential Property on Talbot Road approximately 0.7km from West Site	W	Residential	Moderate	Medium	Moderately effective	Low	Negligible
R4	Residential Property on Somerton Road approximately 0.5km from West Site	W	Residential	High	Medium	Moderately effective	Moderate	Moderate
R5	Residential Property on Somerton Road approximately 0.5km from West Site	W	Residential	High	Medium	Moderately effective	Moderate	Moderate
R6	Residential Property on Pelham Road approximately 1.3km from West Site	W	Residential	Moderate	Medium	Moderately effective	Low	Negligible
R7	Residential Property on Margaret Street approximately 1.5km from West Site	W	Residential	Moderate	Medium	Moderately effective	Low	Negligible
R8	Residential Property on Mauxhall Farm/ Immingham Road	SW	Residential	Low	Medium	Moderately effective	Negligible	Negligible

Receptor	Description	Direction	Type	Overall Receptor Sensitivity	Source Odour Potential	Pathway Effectiveness	Odour Exposure Risk	Likely Odour Effect
	approximately 1.1km from West Site							
R9	Residential Property on North Moss Lane approximately 1.9km from West Site	S	Residential	Low	Medium	Ineffective	Negligible	Negligible
R10	Residential Property on South Marsh Road approximately 2.4km from West Site	S	Residential	Low	Medium	Ineffective	Negligible	Negligible
R11	Residential Property on Church Lane approximately 2.6km from West Site	SW	Residential	Low	Medium	Ineffective	Negligible	Negligible
R12	Residential Property on Cleethorpe Road approximately 8km from the East Site	SE	Residential	Moderate	Medium	Ineffective	Negligible	Negligible
R13	Residential Property on Stone Creek approximately 3.1km from the vessel berth	NE	Residential	Moderate	Medium	Ineffective	Negligible	Negligible
R14	Residential Property on Stone Creek approximately 3.7km from the vessel berth	NE	Residential	Moderate	Medium	Ineffective	Negligible	Negligible
R15	Residential Property on South Farm Road approximately 3.6km from the vessel berth	NE	Residential	Moderate	Medium	Ineffective	Negligible	Negligible
R16	Stone Creek Farm approximately 3.6km from the vessel berth	N/NE	Residential	Low	Medium	Ineffective	Negligible	Negligible

Receptor	Description	Direction	Type	Overall Receptor Sensitivity	Source Odour Potential	Pathway Effectiveness	Odour Exposure Risk	Likely Odour Effect
R17	Salthaugh Sands Estate approximately 4.2km from the vessel berth	N/NE	Residential	Low	Medium	Ineffective	Negligible	Negligible

4.7 Risk Mitigation and Management

Introduction

4.7.1 In relation to mitigation and management of the potential odour risks associated with the site activities these have been summarised and are presented in a risk matrix attached in Annex A. The matrix uses a scoring mechanism, whereby scores are assigned to:

- The probability of the odour hazard occurring without the use of protective measures;
- The consequences of the odour hazard to the environment or human health without mitigation of control in place.

4.7.2 Multiplying these scores together provided an indication to the acceptably of the activity without the control/mitigation measures being employed.

Risk Factor = probability x consequence

4.7.3 The control and mitigations being employed are then detailed and a score for the expected effectiveness of the controls is given. A mitigated risk factor is determined:

Mitigated Risk Factor = Risk factor / mitigation factor.

4.7.4 The lower the mitigated risk, then the more effective the controls and mitigations employed are expected to be.

4.8 Scoring Mechanism

4.8.1 The scoring system used for the assessment is shown in Table 4‑13 below.

Table 4‑13 Risk Assessment Scoring Mechanism

Frequency of Occurrence		
Frequency	**Comment**	**Score**
Never	Incident occurs once every 100 to 10,000 years	1
Very Unlikely	Incident occurs once every 10 to 100 years	2
Unlikely	Incident occurs once every 1 to 10 years	3
Somewhat Unlikely	Incident occurs at least once per year	4
Fairly Probable	Incident occurs at least once per month	5
Probable	Incident occurs at least once per week	6
Consequence of Hazard to Environment or to Human Health		
Consequence	**Comment**	**Score**
Minor	• Vary faint odour. • Intermittent release • Onsite nuisance only no outside complaint • No breach of permit	1
Noticeable	• Faint odour • Odour may be noticeable but not unpleasant. • Odour unlikely to be strong enough or of sufficient duration to identify or characterise the odour.	2
Significant	• Distinct Odour • Intermittent release • Nuisance may be noticeable off-site. • Potential for 1 – 2 complaints • • Reportable breach of permit	3
Severe	• Strong odour • Likely to generate off-site complaints.	4

	• Severe sustained nuisance • Numerous public complaints • Reportable breach of permit	
Major	• Very strong odour • May be offensive enough to prevent working or playing outside. • Dependent of source partial plant shutdown may be required. • Replacement of part of plant may be required. • Major breach of environmental permit • Regulator (EA/HSE) involved	5
Catastrophic	• Extremely strong odour • Odour capable of causing nausea or headaches so highly objectionable. • Full plant shutdown potentially required. • Regulatory prosecution likely	6
Effectiveness of Mitigation		
Mitigation Factor	**Comment**	**Score**
Non-existent	• No mitigation in place	1
Ineffective	• Some minor controls in place but mitigation not achieved	2
Partly Effective	• Basic controls in place and hazard partly mitigated but significant residual risk remains	3
Effective	• Basic controls in place and hazard mitigated to an acceptable level although moderate level of residual risk may exist	4
Very Effective	• Processes fully controlled (basic/advanced) and hazard mitigated to recognised standard. Some minor residual risk may remain	5
Entirely Effective	• Processes fully controlled to level in excess of recognised standards. Hazard mitigation entirely effective and no residual risk remains	6

5 Management Arrangements

5.1 Structure

5.1.1 Environmental responsibility for individual operations will be assigned throughout the site management structure and are defined through the management system.

5.1.2 The Operations Manager is the designated management representative, with overall control of the management system at the plant including the ability to ensure programmes are realised and translated into activities on the plant.

5.1.3 Further details of the staff and their responsibilities can be found in Section 4 of the Supporting Document.

5.2 Training Provision

5.2.1 All staff will receive instruction and training, both verbal and documented, in all relevant aspects of operational procedures, permit requirements in relation to operations and the environment, health and safety and general requirements of the site management plan. A copy of the permit and approved site management plan will be kept available on site for reference when required by all site staff.

5.2.2 In relation to odour management, this will be incorporated into the general site operational training and will cover odour awareness in relation to normal, abnormal and maintenance situations and include management of odour complaints.

5.3 New Starters

5.3.1 Each position at the site will be covered by a general job description detailing key skills, responsibilities and reporting structure. Air Products has a training requirements matrix that defines the general and specific training for each role and job function and the tests of knowledge and competence required In addition, specific full training on key tasks will be given to both new and experienced operators as necessary.

5.4 Contractors

5.4.1 Site rules will be provided to all contractors using or visiting the site. These rules will describe basic safety and operational precautions to be observed while at the site. Instances of drivers or contractors not following site rules or behaving inappropriately will result in warnings. If necessary, requests to leave site and/or barring from future visits to the site will be implemented.

5.5 Management System

5.5.1 The Operator will have an integrated management system which meets the requirements of:

- BS EN ISO 9001:2015– Quality Management Systems
- BS EN ISO 14001:2015 – Environmental Management Systems

- BS OHSAS 18001:2007 – Occupational Health and Safety Management Systems

6 Normal Operational Odour Control

6.1 Material Storage

6.1.1 Storage of chemicals, including NH_3, H_2, catalysts and boiler treatment chemicals will be stored in suitable sized tanks and containers provided with:

- Tanks or containers designed in accordance with the relevant material specifications.
- Provision sufficient secondary containment for materials stored in tank, in accordance with the CIRIA C736 and regulatory standards.
- Tanks will be equipped with level monitoring, pressure relief and other controls specific to the material being stored. Monitoring will be controlled via the BPCS.

6.2 Material Transfer

6.2.1 For liquids and gases such as NH_3, H_2, natural gas and boiler treatment chemicals, transfer will be via dedicated pipelines.

6.2.2 Pipelines will be designed to manage the properties of the materials being transferred. Design will be optimised to minimise bends, valves and seals.

6.3 Flaring and Venting

6.3.1 NH_3 and H_2 systems will be routed to a flare system for safe disposal and to avoid odour release. Stack heights ensure maximum dispersion and therefore minimal effect on the receptors.

6.3.2 Venting of H_2 will occur infrequently through a vent stack at an appropriate height to ensure dispersal.

7 Maintenance and Inspection Requirements

7.1 Plans and Schedules

7.1.1 A series of maintenance and inspection procedures will be developed during the commissioning of the installation in line with AP's global procedures.

7.2 Plant and Equipment

7.2.1 All plant items and equipment will be serviced and maintained according to manufacturer's schedules and recommendations in order to minimise the risk of breakdown. Detailed inspection and testing of the equipment and pipework to prevent loss of containment.

7.3 Emergency

7.3.1 In the event of a site emergency, the Facility Manager will be notified immediately. The emergency measures in the major emergency plan will be implemented as a priority to mitigate the incident, as appropriate and are detailed in Section 8.

8 Odour Control During Abnormal Events

8.1.1 This section outlines a summary of foreseeable situations which may compromise the operator's ability to control and / or minimise odorous emissions and summarises the actions to be taken to minimise the impact.

8.2 Abnormal Situations

8.2.1 The following scenarios have been identified that may result in odour release associated with leak/escape of gases or chemicals:

- Accidents resulting in gas escape
- Vandalism to the installation
- Damage to pipelines
- Flooding/abnormal weather conditions

8.2.2 The risk assessment approach used for assessment of odour impact during normal operations has also been employed in the assessment of odour control techniques during abnormal situations. The risk and mitigation matrix is presented in Annex A and includes an appraisal of abnormal conditions where odour control may be compromised, the potential impact or consequences and how the conditions may be prevented and / or mitigated and controlled.

8.3 Mechanical Repairs and Breakdowns

8.3.1 Mechanical problems or breakdowns may require the replacement or repair of component parts and render plant/equipment required for odour control ineffective or non-operational.

8.3.2 To minimise and mitigate the potential impact of such breakdowns the following will be in place:

- A preventative maintenance schedule will be developed to reduce the risk of plant breakdown;
- A list of suppliers or contractors for critical equipment and/or standby equipment will be maintained; and,
- AP's maintenance personnel can be called to the site within a few hours in the event of any breakdown of critical plant.

8.4 Maintenance

8.4.1 Where planned and emergency maintenance of plant or equipment is required, and there is a likelihood of odour being released to atmosphere in quantities sufficient to result in detection of odour by offsite receptors, a detailed risk assessment of the activity will be conducted to assess potential for odour generation, release and control – the risk assessment will detail any additional odour controls that will be required. The detailed risk assessment methodology and accompanying forms for carrying out unplanned works will form part of the management system.

8.4.2 Maintenance will be carried out under a permit to work system and/ or via adherence to operating procedures and relevant workplace risk assessment.

8.5 Abnormal Events Management Plan

8.5.1 The site accident management plan will reflect the requirements of the COMAH regulations including:

- Major accident hazards/abnormal events will be identified including those where generation of significant odour could occur;
- The measures necessary to prevent such accidents/events will be identified including those necessary to limit their consequences for people and the environment;
- Adequate safety and reliability will be incorporated into the design, construction, operation and maintenance of the plant; and,
- An on-site abnormal events management plan will be developed.

8.5.2 Environmental accident prevention, including odour controls, will be managed within the overall site health, safety, quality and environmental management programme. Management and procedures relating to such emergency preparedness and response will be documented within an Emergency Procedure.

8.5.3 In respect of odour management individual elements of the abnormal events management plan are outlined below.

- Defect reporting procedures – maintained in the site Operations procedures covering all reasonably foreseeable incidents, the procedure will detail how to report the defect, communication routes and mechanisms for corrective and mitigating action;
- Investigation and reporting procedure – this will deal with the reporting, investigation and recording of any incidents relating to odour control at the site including those associated with external complaints;
- Incident Controller – this will normally be a site supervisor identified in the plan, who will have the responsibility to mobilise and co-ordinate a response team and will be responsible for all communications with external stakeholders and the regulator as necessary; and,
- Emergency equipment – including critical spares and standby plant arrangements.

9 Monitoring, Recording and Reporting

9.1 Overview of the Monitoring Plan

9.1.1 To ensure that odorous emissions from the facility do not result in nuisance at sensitive receptors, the Operator will monitor odour emissions by:

- Regular site inspection, using 'sniff tests' to assess odour;
- Regular monitoring of meteorological information and weather forecasts;
- Monitoring of odour complaints;
- Leak detection and repair programme (LDAR); and,
- If a sustained period of justified odour complaint should arise, the Operator will review existing procedures and other management and control techniques as necessary. Consideration will be given to the use of other monitoring measures such as odour diaries and dynamic olfactory monitoring in these instances.

9.2 Monitoring Plan

Sniff Testing

9.2.1 Sniff testing (sensory field odour assessment) is the most common form of odour monitoring and can provide evidence of an odour problem. Sniff testing will be undertaken as follows:

- As part of a daily inspection at the site boundary during normal operational conditions;
- At the site boundary during weather conditions that could contribute to poor dispersion of odours; and
- At sensitive receptor locations if necessary (e.g. in the event of a complaint being received).

Monitoring of Meteorological Information

9.2.2 Monitoring of meteorological information and weather forecasts can assist in the management of odour emissions from the site. Some meteorological conditions can exacerbate the risk of odour annoyance at sensitive receptors, for example low odour dispersion caused by cold temperatures and low wind speed.

9.2.3 Monitoring of meteorological information (temperature, wind speed, wind direction and precipitation) and checking of weather forecasts will be completed daily by the Facility Manager or nominated deputy.

9.2.4 The information will be used in the following ways:

- To predict when weather conditions are likely to cause poor odour dispersion, to enable site controls or planned activities such as maintenance to be amended if required;
- To plan where monitoring of the site boundary should take place during normal operations in order to correctly assess odour impacts;
- To predict the areas where potential odour impacts may occur during abnormal events; and

- During the investigation of odour complaints to ascertain complainant's observations.

Complaints Monitoring

9.2.5 The Operator recognise that complaints data is probably the most direct and reliable form of monitoring whether odours beyond the site boundary are causing an annoyance. Therefore, the Operator will record complaints, respond to them and communicate with the complainants.

9.2.6 Complaints will be collected, registered and investigated as described in section 9.3.

Leak Detection and Repair (LDAR) Programme

9.2.7 A Leak Detection and Repair (LDAR) programme for the control of fugitive releases will be developed for the installation.

9.3 Complaints Procedure

Complaints Procedure

9.3.1 AP's incident procedure will be incorporated into the site management system to ensure that odour complaints are handled correctly and systematically and acted upon. The complaints procedure will be maintained as part of the management system and will outline how The Operator will:

- Respond to odour complaints;
- Investigate odour complaints, take appropriate steps and actions and communicate with relevant stakeholders; and
- Communicate to appropriate bodies routinely and in response to any abnormal events or planned maintenance.

9.3.2 Initial details of the complaint will be recorded in Air Products incident tracking/event management system.

9.3.3 In order to assist with complaints monitoring the following additional information should be collected either by observation or further investigation:

- Meteorological conditions at the time of the complaint (e.g. wind direction, speed);
- Operational incidents at the time of the complaint; and
- Any off site activities ongoing at the time of complaint.

9.3.4 Initial screening of the complaint will be undertaken by the Shift Supervisor in order to establish if an odour incident has actually taken place. Screening will consider:

- Knowledge of potential odour sources at the facility;
- Knowledge of operational issues or plant defects that could contribute to odour release;
- Consideration of potential external odour sources;
- Location and distance of complainant from the site; and
- Results of any site monitoring already taking place.

9.3.5 If no such odour incident can be confirmed, then further investigation will not be required. However, if an odour incident is confirmed a more detailed investigation will occur. If the communication is significant, the Shift Supervisor shall notify the Facility Manager or nominated deputy as soon as possible.

9.3.6 Once screening has been completed the Operator will provide feedback to the complainant including details of any action that has/will be taken within 2 working days The output of all complaints investigation and associated corrective actions will be logged into the compliance database.

9.3.7 All complaints will be monitored quarterly for trend analysis.

9.4 Recording Results, Reporting and Actions

Recording Results and Reporting

9.4.1 Records of all odour monitoring undertaken, as described in this OMP, will be maintained by AP.

9.4.2 Records will be retained as stipulated in the Environmental Permit.

Reporting

9.4.3 The Operator will report monitoring results as stipulated by the Environmental Permit. Odour complaint reports will be reported to the EA in line with permit requirements.

9.4.4 Records will be retained for a minimum of 6 years.

Actions in the Event of Abnormal Emissions

9.4.5 In the event that daily odour monitoring indicates abnormal emissions from the installation are occurring, the site management team will implement the following actions:

- Check relevant items of plant in order to identify likely cause of abnormal emission;
- If possible, take immediate steps to eliminate the cause of the abnormal situation including contacting the maintenance operative if necessary - to obtain telephone support / advice or to request attendance on site; and
- Record response to abnormal emission and remedial action taken.

9.4.6 Details of the trigger parameters and associated contingency actions for odour control are presented in Annex E.

9.5 Odour Management Plan Review

9.5.1 The effectiveness of the OMP will generally be reviewed at least once per annum based on a review of the odour complaints recorded and upheld during the previous 12 months. The review of the OMP may be undertaken at a frequency of less than 1 year in the event of:

- A sustained period of justified odour complaints; or
- Following the introduction of new treatment processes or changes to existing processes;

Annex A Risk and Mitigation Matrix

Operating Status	Odour Source	Likelihood			Control Measures	Mitigation Factor	Residual Factor	Action if Odour Causes Problem	Responsibility
		Probability	Consequence	Risk					
Normal Operations	Storage	3	4	12	• Raw materials stored in sealed containers or tanks. • Secondary containment provided for tanks and containers for the storage of liquids and gas. • Tanks are monitored via the BPCS system. • Storage systems subject to planned preventative maintenance.	6	2.0	• LDAR monitoring to identify source • Plant to be isolated and repairs to be completed.	Competent person on site.
	Material transfer	3	4	12	• Tanks are monitored via the BPCS system. • Pipes and associated valves are subject to planned preventative maintenance.	6	2.0	• LDAR monitoring to identify source • Plant to be isolated and repairs to be completed.	Competent person on site.
	Flaring	2	4	8	Appropriate stack heights. Away from receptors.	5	1.6	Check flaring correctly.	Competent person to ensure plant working correctly.
Abnormal Conditions	Leaks	2	4	8	Implementation of LDAR Monitoring Plan Frequent preventative maintenance and repair.	5	1.6	Repairs to be undertaken as soon as possible	Competent person to ensure plant/equipment is repaired as

Operating Status	Odour Source	Likelihood			Control Measures	Mitigation Factor	Residual Factor	Action if Odour Causes Problem	Responsibility
		Probability	Consequence	Risk					
									quickly as possible
	Spills	3	3	9	Frequent inspections on site.	5	1.8	Clear spillage as soon as possible and contain within drainage system/bund if required.	Competent person to clear up and contain spillage.

Annex B Example of Sniff Testing Reporting Form

Odour report form					Date
Time of test					
Location of test e.g. street name etc					
Weather conditions (dry, rain, fog, snow etc):					
Temperature (very warm, warm, mild, cold, or degrees if known)					
Wind strength (none, light, steady, strong, gusting)					
Wind direction (e.g. from NE)					
Intensity (see below)					
Duration (of test)					
Constant or intermittent in this period					
What does it smell like?					
Location sensitivity (see below)					
Is the source evident?					
Any other comments or observations					
Sketch of Odour Monitoring Locations/Potential Odour Sources				↑	N

Intensity (Detectability)	Location sensitivity where odour detected
1 No detectable odour 2 Faint odour (barely detectable, need to stand still and inhale facing into the wind) 3 Moderate odour (odour easily detected while walking & breathing normally) 4 Strong odour 5 Very strong odour (possibly causing nausea depending on the type of odour)	0 not detectable 1 Remote (no housing, commercial/industrial premises or public area within 500m) 2 Low sensitivity (no housing, etc. within 100m of area affected by odour) 3 Moderate sensitivity (housing, etc. within 100m of area affected by odour) 4 High sensitivity (housing, etc. within area affected by odour) 5 Extra sensitive (complaints arising from residents within area affected by odour)

Note the above is an example of the format which may be used to record odour – actual site records may take the form of handwritten log or electronic record (e.g. in Word, Excel or similar).

Annex C Approach to Leak Detection and Repair Plan

During the detailed design stage for the facility a Leak Detection and Repair (LDAR) Programme will be finalised in order to detect and mitigate source of fugitive air emissions which might occur from leaking equipment (such as valves, pumps, and connectors) and storage and treatment areas.

The programme will adopt the following five basic elements:

1. Identifying Components.
2. Leak Definition.
3. Monitoring Components.
4. Repairing Components
5. Recordkeeping.

The potential sources of leaks identified at the proposed facility include:

Equipment - Pumps, valves, connectors, sampling connectors, compressors, pressure relief devices, open ended lines, tank/ vessel vents and emissions discharge points.

Identifying Components

- Physically tag each regulated equipment component with a unique ID number.
- Write the component ID number on piping and instrumentation diagrams.
- Institute an electronic data management system for LDAR data and records.
- Periodically perform a field audit to ensure lists and diagrams accurately represent equipment installed in the plant.

Leak Definition

A leak is detected whenever the measured concentration exceeds the threshold standard. Common definitions range between 500-10,000 ppm dependant on substance.

Monitoring Frequency

Monitoring intervals vary according to the applicable regulation, but are typically weekly, monthly, quarterly, and yearly. For connectors, the monitoring interval can be every 2, 4, or 8 years. The monitoring interval depends on the component type and periodic leak rate for the component type.

Repairing Components

Repair leaking components as soon as practicable, but not later than a specified number of calendar days (usually 5 days for a first attempt at repair and 15 days for final attempt at repair) after the leak is detected.

First attempts at repair include, but are not limited to, the following practices where practicable and appropriate:

- Tightening bonnet bolts
- Replacing bonnet bolts
- Tightening packing gland nuts
- Injecting lubricant into lubricated packing

If the repair of any component is technically infeasible without a process unit shutdown, the component may be placed on the Delay of Repair list, the ID number is recorded, and an explanation of why the component cannot be repaired immediately is provided. An estimated date for repairing the component must be included in the facility records.

Recordkeeping

For each regulated process we will:

- Maintain a list of all ID numbers for all equipment subject to an equipment leak regulation.
- For valves designated as “unsafe to monitor,” maintain a list of ID numbers and an explanation/review of conditions for the designation. Maintain detailed schematics, equipment design specifications (including dates and descriptions of any changes), and piping and instrumentation diagrams.
- Maintain the results of performance testing and leak detection monitoring, including leak monitoring results per the leak frequency, monitoring leakless equipment, and non-periodic event monitoring.

For leaking equipment we will:

- Attach ID tags to the equipment.
- Maintain records of the equipment ID number, the instrument and operator ID numbers, and the date the leak was detected.
- Maintain a list of the dates of each repair attempt and an explanation of the attempted repair method.
- Note the dates of successful repairs.
- Include the results of monitoring tests to determine if the repair was successful.

Monitoring Equipment

A handheld Photo Ionisation Detector (PID) will be used for initial detection purposes. Where applicable an impermeable enclosure may be placed over / around certain components and PID readings taken from a valve tap from the enclosure. In the event that a leak is detected, passive diffusive sampling and / or direct sampling e.g. via Suma canister will be carried out to analyse the composition and concentration of leaked contaminants. Calibration and maintenance of the PID will be carried out as

per the manufacturer's guidance and as required by operating conditions. Records of calibration and maintenance will be held on site.

Annex D Example Complaints Log

Year:			**Entry No:**		
Date: **Time:** **Rec'd By:**		**Name:** **Address:** **Telephone:**	(Home) (Work)		**Letter (____)** **Phone (____)** **Personal (____)**
Details of Communication					**Further Details** **Yes (____)** **No (____)**
Plant Details Relating To Communication					**Further Details** **Yes (____)** **No (____)**
Reported To: **Name:**	Supervisor (____)	Site Manager (____)	Other. (____)		Other (____)
Initial Response Given:					**Further Details** **Yes (____)** **No (____)**
Date:	**Time:**	**Print Name:**	**Sign:**		
Follow-Up To Communication:					**Further Details** **Yes (____)** **No (____)** **NCR No**
Date:	**Time:**	**Print Name:**	**Sign:**		
Conclusions:					
Date:		**Print Name:**		**Sign:**	
Site Manager: **Date:**		**Comments:**			

Annex E Trigger Values and Controls

Trigger	Frequency	Trigger Measure	Responsibility	Control/Contingency Measure
Site Inspection /Sniff Testing	Daily- actions taken same day or where a more significant repair is needed isolate the plant and schedule as a priority.	Spillage event	Site Manager	• Identify source and potential contaminant. • Utilise spill kits appropriate to the material. • Isolate drainage system using isolation valves
		Leak		• Implement LDAR monitoring to confirm source of leak and contaminant. • Isolate the source of the leak and effect repairs. • Isolate the drainage system
		Odour score >3 at 4 or more boundary locations		• Additional sniff checks to be undertaken at local community receptors dependent on wind direction. • Checks around the process to be undertaken to determine if source is located on site – using PID if necessary, dependent on the nature of the odour.
Complaints Monitoring	As received	Response to complaint	Site Manager	• Immediate checks around the process to be undertaken to determine if source is located on site – using PID if necessary, dependent on the nature of the odour in response to individual complaints. • Offsite sniff checks at complainant location and other appropriate receptors. • Complaints to be reviewed monthly for adverse trends.