maelor FOODS

OPERATIONAL ODOUR MANAGEMENT PLAN

Version Control

Version	Date	Changes	Issued By	Approval
1	November 2018	1st issue of operational OMP	A. Kesterson	M. Mehta
2	September 2018	First review for permit IC3 and to account for changes to odour management from primary tanks on WWTP	M. Howard	J. Colley
3	November 2018	Review following installation of enclosures around ETP emissions points	M. Howard	J. Colley
4	April 2019	Addition/ Amendment following comments from NRW (refer to CAR 15/03/2019)	M. Howard	J. Colley
5	November 2019	Review for permit variation application for new live bird holding building	M. Howard	

Contents

1 Introduction

Maelor Foods Ltd must implement an Odour Management Plan (OMP) for our poultry processing facility at Pickhill Lane, Wrexham, LL13 0UE.

The planning permission (Condition No. 4) for the site required us to implement an OMP:

> *"The use hereby granted permission shall not commence until an odour management plan has been submitted to an approved in writing by the Local Planning Authority. All odour control measures set out in the plan shall be installed prior to first use of the premises for the purposes hereby granted permission and the site shall thereafter be operated in strict accordance with the odour management plan as approved"*

Our environmental permit for the site (EPR/AB3591ZQ) is regulated by Natural Resources Wales (NRW) under the Environmental Permitting (England and Wales) Regulations 2010 (EPR).

An OMP was been prepared to support our environmental permit application and condition 3.3.1 requires us to implement an operational OMP:

> *"Emissions from the activities shall be free from odour at levels likely to cause annoyance outside the site, as perceived by an Authorised Officer of NRW, unless the Operator has used appropriate measures, but not limited to, those specified in any approved odour management plan, to prevent or where that is not practicable to minimise the odour"*

This OMP is designed to ensure that all reasonable measures are taken to control odour emissions, and if an adverse impact is caused then prompt action will be taken to identify the source and apply corrective measures. It provides a schedule of actions that will be taken to help minimise odour impact and sets out site management procedures for the management of odour.

2 Objectives & content

The objectives of this OMP are to identify all significant sources of odour present at the facility (an odour inventory) and then provide information on management practices and the infrastructure in place to abate or minimise odorous emissions from the facility.

The effects of emergency and abnormal circumstances on odour emissions are also considered. Monitoring procedures are described to help validate the effectiveness of measures taken to control odorous emissions. The plan also outlines measures taken in the event of the detection of excessive odour during monitoring, with a view to reducing this odour to an acceptable level as soon as possible.

Response procedures are described in case odour related complaints are received from a neighbour of the plant, with procedures for recording all relevant information and investigating the potential cause of the odour release emissions.

3 Guidance & review

The OMP has been produced with reference to the following guidance:

- Environment Agency, H4 Odour Management: How to comply with your environmental permit. April 2011.
- Institute of Air Quality Management, Guidance on the Assessment of Odour for Planning. 2014.

Under the environmental permit improvement programme (IC3), the first review of this OMP is due within 9 months of commencing operation at the site. Thereafter, this OMP will be reviewed on a regular basis (at least annually) or more frequently if there are any changes to the activities and/or if any specific issues in respect of odour have become apparent.

Any amendments stemming from these reviews may need to be agreed with, and approved by NRW and / or the Planning Authority to meet the terms of the planning condition (No. 4).

NRW and the Planning Authority should be consulted at an early stage to ensure that the OMP can be amended in future, with the prior written agreement of the authorities, to ensure that any necessary and beneficial changes to odour management practices can be implemented without breaching the terms of this condition and to allow compliance with the EPR permit.

Such changes may need to be made in the light of operating experience, complaint episodes or if new developments or technologies become available in future so that facilities or practices can be adapted and optimised to further reduce odour impacts.

4 Site Location and Plant Description

4.1 Site Location

The poultry processing facility has been developed on the site of the former Maelor Creamery, Pickhill Lane, approximately 1 km to the north-north-west of the village of Bangor-on-Dee and approximately 700m to the south-east of the residential area of Cross Lanes. The map in Appendix 1 shows the locations of potentially sensitive receptors around the plant.

There are small numbers of potentially sensitive residential properties located off Pickhill Lane, to the west of the proposed main poultry processing building, and isolated residences to the north of the plant at Pickhill Old Hall and Whitegate Cottage. The proximity of sensitive receptors on Pickhill Lane is such that there are risks of off-site odours being caused, and therefore means that high standards of odour management are required.

4.2 Plant Description & Risk Assessment

The plant is concerned with the slaughter and processing of broiler chickens to produce chicken meat and chicken meat products for the food and retail markets. The following paragraphs describe the key activities in each area of the plant, the odour risks in each area and the key

control measures which will be used to reduce odour emissions and/or disrupt the pathways for odours to potential receptors. The odour risk of each area has been assessed based on experience gained at other UK poultry processing plants and will be reviewed based on the operational experience of our plant.

4.2.1 Lairage / Intake

Live chickens from broiler production farms arrive at the plant in modules on HGV trailers. In order to reduce any potential odours from incoming live bird vehicles, movements are planned daily and drivers adhere to a "just in time" delivery schedule. Procedures are in place to ensure that prior to leaving the farm, modules are as clean as possible in order to minimise the volume of chicken manure transferred from farm to site.

The arrival of live bird vehicles is scheduled and timed to minimise the delay between arrival at site and offloading of the live birds in the lairage. Occasionally delays in transit or process line outages can mean that vehicles cannot be immediately sent to the lairage for offloading.

Many Operators choose to drive the vehicles around the site slowly to provide some ambient air cooling of the live birds to ensure their welfare. This can create additional noise, discomfort for the birds and other operational hazards due to vehicle movements.

Maelor Foods have a dedicated holding building where live bird vehicles can be parked inside so the live birds can be cooled by air fans in a less stressful manner. The live bird vehicles are moved to the lairage as soon as the lairage is available to receive them.

The HGV trailers enter a lairage area, before moving to the intake area where the modules are unloaded. All doors remain closed when not in use. Birds are transferred from the intake area to the preliminary processing area where the modules are loaded onto the intake line.

Lairage/intake and holding areas typically generate very low levels of odour emissions from the birds themselves. Ventilation is required to maintain good working conditions and particularly to provide comfort for the birds held in this area prior to slaughter. Suitable volumes of very low concentration building air are extracted to atmosphere through roof mounted vertical discharge fans which disperse emissions vertically at high level.

There are also fans which blow air into, and re-circulate air within the building and around the module cages to provide enhanced cooling for the birds in warmer weather. This cooling air is extracted from the building through the roof mounted extraction fans.

The lairage is cleaned daily with the manure manually scraped into collection bins and floors washed using trigger operated HPLV spray lances. The lairage floor has been designed to allow dry scraping and easy cleaning. This area is lined with smooth wall panels which allow easy cleaning.

This is a LOW odour risk area of the plant.

4.2.2 Preliminary Processing Area

Birds are transferred from the intake area to the preliminary processing area. The module cages are loaded onto the intake line and the birds are gas stunned, then removed from the modules and hung-on to the "shackles" of an overhead conveyor line and transferred to a bleeding area. In the bleeding area the birds' heads are removed and blood drained into, and collected in, a trough and pumped away at frequent intervals during the day to an enclosed and odour extracted blood storage tank in the offal collection bay. Blood is therefore removed from the bleeding area before there is any odorous decay and this area is thoroughly washed and sanitised at the end of each processing day, and this alleviates the risk of odours from the decay of residues.

The empty modules (crates/cages) are transferred to the "module washing" area and then transferred to the "box return" service area where they are loaded onto empty HGV trailers for subsequent re-use in the collection of birds from farms.

Very low intensity odour emissions can arise from handling the modules and the birds as they are hung on to the conveying system, but emissions are limited because:

- there is only a small number of birds in the stunning and hang-on areas at any one time
- there are no significant changes to the state or composition of the chickens within these areas

It is also noted that fresh blood has no significant odour. Building headspace air from the preliminary processing areas is extracted and dispersed through the roof mounted, vertical discharge, extraction fans.

Floors and walls of the kill and bleed area are washed down and sanitised during night shifts and at weekends. The live bird handling systems area will be cleaned every night and briefly in between kills so faecal contamination of the area will be minimal.

As we use a gas stun method there will be no live birds flapping wings during bird hang on as found at electric stun sites. Dust levels and associated odour are therefore much lower.

This is a LOW odour risk area of the plant.

4.2.3 AeroScalder & De-feather

The birds are slaughtered mechanically as they move around the conveying system. After bleeding the birds are conveyed in to a de-feather room where they are scalded by a saturated hot air system. The birds are conveyed through the scalding unit to loosen their feathers to facilitate mechanical plucking in the de-feather area. This technology provides a non-immersion scalding method that has much lower odour emissions as it avoids the large volumes of water containing decaying organic matter that are normally involved in scalding.

The AeroScalder system is entirely enclosed and consists of two chambers; an air conditioning chamber where the moisturised hot air is prepared and, next to it, the scalding chamber itself through which birds are conveyed and into which the scalding air is blown. Moisturised hot air is blown forcefully onto the most critical parts of the broiler, preventing over scalding of fragile

parts. It penetrates and separates the feather pack, transferring heat effectively to the feather follicle. Air temperature depends on whether products are to be hard, medium or soft scalded. Scald vapours are enclosed inside the unit, but any escape of odorous air is extracted directly into a chemical scrubber for abatement before dispersion to atmosphere through a tall stack.

The spent scald water within the scalder is filtered and recirculated in the system.

Scalding is normally a "High-risk" odour area as residual blood, and organic matter from the chicken's feet and feathers progressively decay in the warm water in conventional scald tanks during each production day. Odour emissions are much lower with the Aeroscalder technology, but as a precautionary measure provision we extract air from this area of the plant at high rates directly to our chemical scrubber odour abatement system.

There are also fresh air inlets to provide "cooling" air, which is also extracted to the chemical scrubbing abatement system.

This is a MEDIUM odour risk area of the plant.

4.2.4 Evisceration

After de-feather/plucking, the birds are mechanically eviscerated in an evisceration area. This involves removal of the birds' intestines and other internal organs (heart, lungs, gizzards, livers etc.). Evisceration does not generate significant emissions of odours because the intestines are not broken, and the other organs are not odorous. Chicken offal is fresh and there is no decay.

Inedible offal removed during the evisceration process is transferred by vacuum lines to the animal by-products trailer in the offal collection bay where it is collected daily for off-site processing. Edible offal is transported away from the evisceration area for chilling and onward dispatch to customers. No offal is therefore allowed to accumulate in the evisceration area, minimising its potential as an odour source.

Building headspace air in the evisceration areas of the factory is extracted directly to roof mounted extraction/dispersion fans for mitigation by high level dispersion.

This is a LOW odour risk area of the plant.

4.2.5 Offal Bays – Loading & Removal Building

Feathers are transferred in a water flume to the offal bay building where they are separated from the flume water (which is recirculated) and the flume water is drained down to the effluent treatment plant at the end of each day. The pressed feathers are loaded into bulk trailers for transport off-site to a rendering plant. Feathers are removed from the site daily.

Offal which is not fit for human consumption is also be transferred to the offal bay building where it is loaded into trailers and transported off-site to a rendering plant daily as to minimise any odours. Filled trailers are covered with sheets before removal outside for transfer offsite.

The building area is fully enclosed and extracted directly at a rate of at least 3 air changes per hour to the chemical scrubber and stack odour mitigation systems.

Although category waste materials are removed from site daily, before odorous decay becomes established, experience from other sites is that even small traces of animal protein residues on equipment and trailers do result in the generation of some odours. It is therefore acknowledged that due to any additional time spent in the offal building, the risk of odours from this activity is heightened to a degree and as such, a maximum offal residence time of 48 hours is in place.

This is a MEDIUM odour risk area of the plant.

4.2.6 Blood Storage Tanks

Blood from the bleeding area is pumped/transferred to the blood tank located inside a room housing the feather separation pit which has internal drains to the effluent treatment plant. Poultry blood is not sold on for further processing into foodstuffs for human consumption or pharmaceutical applications, so the blood tank is not refrigerated.

The blood tank is fitted with a lid and has a high level interlocked alarm to prevent overfill. It has capacity to hold at least 110% of the maximum kill capacity of blood to cover contingencies such as transport delays.
The blood tank is fully emptied at least daily and regularly cleaned to prevent odorous residues.

There is potential for very high intensity odour emissions from the storage of blood if the blood decays in warmer weather, although this decay is limited in larger processing plants, such as this plant, by the frequent collection and removal of blood from the site. Procedures are in place to ensure a consistent approach is taken with regards to blood collections. Use of a hopper bottomed tank means that all blood is removed each time the tank is emptied, and therefore there are no odorous residues in the tank. The blood storage tank is connected directly to extraction ducting to the chemical scrubbing odour treatment system.

Air displaced from HGV road tankers collecting blood from the storage tank is ducted directly into the odour extraction system. Tanker drivers connect the outlet/exhaust of their tanker vacuum pumps to a flexible hose which is directly connected to the chemical scrubber abatement system extraction ducting.

The building area is fully enclosed and extracted directly at a rate of at least 3 air changes per hour to the chemical scrubber and stack odour mitigation systems.

This is a HIGH odour risk area of the plant.

4.2.7 Offal Cold Store

Offal material which is fit for human consumption is transferred to chillers and cold storage areas, where it is stored before transport off-site. The cold storage buildings are kept refrigerated to prevent decay, and are largely “sealed” by means of a cold-store type door.

This is a V.LOW odour risk area of the plant.

4.2.8 Module Washing

Module cages for transporting chickens to site are washed in the "box washing" area. Low intensity odours may arise from handling of the empty modules, and building air from this area of the plant is extracted directly by roof mounted extraction fans for high level dispersion.

This is a LOW odour risk area of the plant.

4.2.9 Truck Washing

Unloaded HGV trailers are moved from the intake area to the "truck washing" area where they are completely washed down before moving to the "box return" area. Low intensity odour emissions may arise from truck washing operations, and air is extracted directly by roof mounted extraction fans for high level dispersion.

This is a LOW odour risk area of the plant.

4.2.10 Module Return Area

Washed and sanitised module cages are returned to the "box return" area where they are loaded onto clean HGV trailers. Insignificant odour emissions arise from box loading operations as both the vehicles and the modules have been washed at this stage. Air is extracted directly by roof mounted extraction fans for high level dispersion.

This is a V.LOW odour risk area of the plant.

4.2.11 Effluent Treatment Plant (ETP)

Waste-water comprises of contaminated wash water from the abattoir and specifically from the de-feather areas and the feather flume system.

The ETP is located downhill beyond the factory buildings, well away from the Pickhill Lane residencies.

Raw effluent drains to an enclosed/housed raw effluent pump sump. Displaced air from this enclosure is ducted into a fixed passive activated carbon filter system. From the sump the raw effluent is pumped through an enclosed rotary drum screen on top of the balance tank to screen out larger solids from the effluent before treatment. The primary screenings fall into a skip which is enclosed on three sides with strip curtains on the fourth to minimise odours. Full skips are covered to minimise odour and keep rainwater out. The screenings are transferred into the ABP's trailer in the offal bays. Screenings are removed at a minimum frequency of 1 hour in order to minimise odour emissions and attracting vermin (principally flies). The screen and associated elements are cleaned daily.

The balance tank has a retention time at peak flow of 12 hours. This allows wastewater streams of high and low organic loading to be combined so the effluent plant is presented with more even or "average" and more consistent pollutant load flows and not peak or more "concentrated" flows such as occur at the time of discharge of scald tank contents at the end of each production day.

There is also a diversion tank which can occasionally be used to segregate effluent in abnormal events such as spillages or to recycle out of specification treated effluent. It is not envisaged that the diversion tank will be used other than very occasionally as a contingency. Low volumes of effluent produced by the Aeroscalder system are unlikely to overload the ETP and are adequately buffered in the balance tank.

The balance (and diversion tanks on the occasions when it is used) are agitated by two venturi mixers to mix and aerate the contents and to maintain aerobic conditions and prevent them from going septic and becoming odorous.

The balance and primary tanks are existing tanks from the former First Milk effluent treatment plant installation. These tanks were uncovered at the start of operations but the olfactometry survey undertaken under permit improvement programme condition IC2 in May 2018 identified that these tanks were a source of very high odour concentrations.

The olfactometry study found that the fugitive releases from the primary balance tanks at the ETP are amongst the most intense and offensive odorous from the installation. Measures to prevent these tanks becoming septic and to minimise the intensity of odour have been taken and include:

•Minimising the loss of solids to drains in the slaughterhouse by improving operating procedures and filtration systems
•Lowering the levels of wastewater held in the primary tank(s) and increasing the frequency of emptying and cleaning the tanks

However, odours from these tanks could still potentially contribute to offsite odour episodes so covers have been installed over these tanks and a powered fan extraction system draws the air from the headspace under the covers through a carbon filter unit. The outlet from the filter is discharged to air.

Modelling was used to assess the likelihood of odours from these tanks contributing to offsite impacts at the pre-operational phase with open topped tanks and showed that they should not result in unacceptable off-site odour impact. By fitting the covers and extraction unit the emissions should be no worse or better than the estimated figures used in the modelling exercise.

From the balance tank, effluent is transferred to a Dissolved Air Flotation (DAF) system to flocculate and separate/remove suspended solids, fats, oils and greases, from where the separated solids are pumped to a covered sludge storage tank.

DAF plants can generate small volumes of quite intense and offensive odours, so the DAF plant is fitted with a stainless-steel cover with removable inspection hatches and the headspace is vented directly to a passive carbon filter for odour removal.

The separated liquid from the DAF plant is transferred to an activated sludge system tank for aerobic (activated sludge) treatment, before final settlement and discharge to river.

The odour from the activated sludge tanks is much less offensive than from DAF plants and sludge facilities, and odours are not usually attributable to them unless the system has been overloaded and this has adversely affected the treatment.

Our activated sludge plant consists of an anoxic vessel followed by an aeration tank where the conditioned mixed liquor is injected with air via fine bubble air diffusion manifolds. A final settling clarifier tank removes the remaining suspended solids from the effluent backed up by a rotary disc ultrafilter to guarantee the final effluent quality.

This is a LOW odour risk area of the plant.

4.2.12 ETP Sludge Storage Tanks

A sludge holding tank stores the combined DAF and waste or surplus activated sludge prior to transfer off-site for land spreading or injection by contractors or other waste recovery method.

The sludge tank is covered, and a mixer keeps the sludge mixed. The off gas from the tank headspace is vented through a passive activated carbon filter.

Air displaced from HGV road tankers collecting sludge from the storage tank is ducted into a portable, passive activated carbon filter system. All collections are supervised and procedures are in place to ensure this is achieved and that tanker drivers connect the outlet/exhaust of their tank or tanker vacuum pumps to a flexible hose which is directly connected to the carbon filter. Odorous air thus passes through the filters for treatment before release to atmosphere.

This is a MEDIUM odour risk area of the plant.

4.2.13 Odour Control & Mitigation Systems

Odorous emissions from those areas of the plant which generate the most intense odours, and the de-feather, feathers/offal/waste removal areas, and the blood storage tanks are extracted to our chemical scrubbing system to abate odour. The abatement system comprises of a single stage chemical scrubber with caustic soda and sodium hypochlorite scrubbing liquor and a final mitigation stage of tall scrubber dispersion stack to disperse residual odours. The scrubbing system abates air extracted from the most odorous areas of the plant and effective scrubber operation is critical to controlling off-site odour impacts.

This is a HIGH odour risk area of the plant.

The off-site impact of room extraction air from the less odorous areas of the plant (lairage, hang-on area, bleeding, evisceration, and the module and trailer washing areas) is mitigated by dispersion of building headspace air at high level through roof mounted fans.

This is a LOW odour risk area of the plant.

4.3 Key Odour Control Measures

The key odour controls at the plant are summarised below:

1. The de-feather area is fully enclosed and building air is extracted to the chemical scrubber odour mitigation systems.
2. The waste removal or offal bays building are fully enclosed and building air is extracted to the chemical scrubbing system.
3. All feathers, offal and by-products are removed from the site on a regular basis (before odorous decay sets in) and/or stored within a fully enclosed cold store.
4. All blood is stored in a covered tank inside the offal bay building which is extracted by duct work which transfers extracted air to the chemical scrubbing system.
5. All vacuum tankers collecting blood and sludge "back vent" displaced air from the tanker vacuum pumps through flexible hoses into a duct which transfers air to the odour abatement systems (scrubber and carbon filters respectively). Spills will be reported by tanker drivers and remediated immediately by site staff.
6. The floors and walls of the lairage, module handling and truck washing areas, kill and bleed, scald, de-feather and evisceration areas are all washed down and sanitised daily during night shifts and at weekends, as required by the Meat Hygiene Regulations and the site's HACCP.
7. Factory headspace air is extracted and dispersed to atmosphere through high level, vertical discharge roof fans.
8. The effluent raw sump has been enclosed and any potential odorous air is ducted through a fixed passive activated carbon filter system.
9. The primary screenings fall into a skip which is enclosed on three sides with strip curtains on the fourth to minimise odours.
10. Covers have been installed over the balance tank and divert tank and an extraction system draws the air from the headspace under the covers through a carbon filter. The outlet from the filter is discharged to air.

5 "Waste" Inventory

5.1 Waste Storage and Disposal

Several potentially odorous wastes are generated onsite. Their potential to generate odour emissions is partly controlled by the duration of any storage on site. These wastes are stored temporarily on site before removal for disposal or recovery off-site, and in the case of offal and feather are removed daily. A summary of the maximum quantities of the key potentially odorous wastes stored on site is shown in Table 1 below:

Table 1 - Waste Inventory

Wastes	Daily Production (tonnes)	Maximum Storage on-site (tonnes)	Frequency of Removal from Site
Feathers	15	60	Twice Per Week
Blood	10	30	Daily
Offal (waste)	47	75	Daily
Effluent/Sludges	25	70	Daily

6 Source Identification & Review

Table 2 summarises the potential sources of odour for the poultry processing operations as well as factors which may influence odour emissions on site and the potential for variations in emissions.

Table 2 - Potential Odour Sources

Area / Source of Odour	Factors that may influence Odour Emissions
1.Lairage / Intake / holding	Cleanliness of floor and frequency of cleaning/washing are key controls. The building is sanitised daily
2.Module washing	Likely to be more odorous in warmer weather as chicken droppings decay more rapidly, but all modules are washed immediately after use so that no accumulations occur. Floor and equipment cleanliness all influence emissions.
3.Hang-on and bleeding area	Bird, floor and equipment cleanliness influence emissions. These areas are washed down at least once each day to prevent accumulations
4.Scalding unit & De-feather	Variations in levels of contamination of birds with droppings/litter (and resulting accumulations of solids in system). Effectiveness of air extraction system from factory to air treatment system influence emissions.
5.Evisceration	Effectiveness of air extraction system from factory to stack(s) system influence mitigation of emissions, but this is a low odour potential area of the plant and is sanitised daily as a food production area.
6.Bulk offal, feather handling and storage	Cleanliness of trailers, buildings and equipment all influence emissions. Collection trailers are thoroughly sanitised before delivery to site to meet Animal By-Product regulation requirements and trailers are covered before removal outside for offsite transfer. Length of storage of material on site is critical in warmer weather as odour potential can increase due to accelerated odorous decay of organic materials and residues and therefore a maximum residence time of 48 hours is in place for all category waste materials. The size of the plant is such that material is removed daily and procedures are in place to ensure a

Area / Source of Odour	Factors that may influence Odour Emissions
	consistent approach is taken with regards to category waste collections. Extraction to chemical scrubber provides effective disruption of odour path to receptors. The building area is fully enclosed and extracted directly at a rate of at least 3 air changes per hour to the chemical scrubber and stack odour mitigation systems.
7.Offal handling and storage in cold store	Promptness of material being transferred to the cold store. Material is used in food products so that prevention of decay is critical.
8.Blood and effluent storage tanks	Effectiveness of covers, extraction, abatement and operational controls on primary ETP tanks Operational procedures to minimise solids entering the effluent system Length of storage of material on site. Effectiveness of air extraction. Odour potential of blood and sludge higher in warm weather with accelerated odorous decay. Residues of blood and sludge in tank after emptying Spillages in tanker loading area (blood or sludge) can cause short term emissions. Extraction to chemical scrubber provides effective disruption of odour path to receptors
9.Main extraction and air treatment system	Effectiveness of air extraction system from factory to air treatment system influence emissions. Effectiveness of scrubber (evenness of air distribution and effectiveness of liquor pumping and dosing systems in maintaining optimum scrubber operations).
10. Tanker loading	Effectiveness of extraction hose/ducting system in controlling leaks of odorous air. Back vented into odour abatement systems (scrubber for blood or carbon filters for sludge tankers)

Table 3 addresses the nature of the odours and the key odour mitigation and control measures and provides commentary on the type and composition of odours in the various parts of the plant.

ADAS, our odour consultants' experience from Gas Chromatography-Mass Spectrometry (GC-MS) gas analysis on other comparable plants is that the odours associated with poultry and processing poultry specifically are typically complex mixtures of large numbers of different organic compounds and there are no predominant odorous compounds, Typically poultry processing odours will include alcohols, ketones, aldehydes acids, chlorine containing compounds, aliphatic, cyclic and aryl hydrocarbons and a number of sulphur containing compounds including sulphides. Sulphides are most likely to occur in the decay of feathers and blood, in vapours from the scald tanks, and in any anaerobic conditions in effluents and sludge.

Table 3 - Odour Sources, Characteristics & Controls

Odour Source		Odour Controls		
Source	**Type of odours**	**Odour Reductions Measures at Source**	**Containment or Enclosure**	**Source Receptor Pathway Disruption**
1. Lairage (bird reception & holding)	Low intensity chicken related odour from birds in modules and from droppings on floors. Odour from poultry faeces are likely to be caused by volatilisation of ammonia and other odorous compounds, including hydrogen sulphide, skatole, indole, amines, mercaptans and other organic compounds containing sulphur	Lairage, intake and holding areas cleaned and washed daily as part of daily hygiene routines. Bird feeding restricted on farms immediately prior to delivery to Maelor site so that gut content and droppings output are minimised. Floor and equipment are all washed daily as part of daily hygiene. High rates of extraction to keep birds cool will prevent odours building up	All activities within enclosed lairage building area	High level roof fans/stack dispersion of room air
2. Module washing	Low intensity chicken related odours from droppings on modules A range of organic compounds, possibly including octanal and nonanal	Floor and equipment are all washed daily as part of daily hygiene routine. Modules will be washed as soon as empty	All activities within enclosed building area	High level roof fans /stack dispersion of room air
3. Hang-on and bleeding area	Low intensity chicken related odours from birds in modules and when handled during hanging on to line. A range of organic compounds as above, and possibly including octanal and nonanal	Floor and equipment all washed daily as part of daily hygiene routine. Blood collection tanks will be emptied throughout each production day to ensure no decay odours.	Enclosed in primary processing area.	Localised air extraction and high-level dispersion through high level roof fans
4. Scald Tanks & De-feather	Odour emissions from Aeroscalder and de-feather are lower than from conventional scald tank systems Odours made up organic compounds typically including methyl mercaptan, dimethyl sulphide, 2, 3 butandione, dimethyl sulphide, and nonanal	Emissions reduced at source by restricting birds feed intake prior to slaughter and by the nature of the “dry” scalding system	The Aeroscalder system is enclosed within the de-feather rooms and the rooms are separately enclosed within the overall plant building.	Process air is extracted to chemical scrubbing systems for abatement and treated air then discharged at high level from scrubber stack to disperse residual odours.

Odour Source		Odour Controls		
Source	**Type of odours**	**Odour Reductions Measures at Source**	**Containment or Enclosure**	**Source Receptor Pathway Disruption**
5. Evisceration	Low intensity, inoffensive odours of fresh "meat" arising from organ and gut removal from carcasses.	Intestines are not broken during evisceration and feed is withdrawn prior to slaughter. Floor and equipment all washed daily as part of daily hygiene routine and wastes and products are removed from the room throughout each day.	All plant fully enclosed within evisceration room which is itself within the main umbrella building	Extraction of room air and high level dispersion of extracted air by roof fans/stacks
6. Bulk offal & feather handling/storage	Potentially offensive odours from decaying feather and by-products, but primarily from small traces or residues on surfaces. Odours are a complex mixture of organic compounds which may include dimethyl sulphide, dimethyl trisulphide, octanal and nonanal	Empty trailers are cleaned and disinfected before delivery to site. Plant washed down daily. Feathers and by-products removed daily. Offal bay building doors kept closed when not in use for vehicle movements While category 2 collections are twice per week, additional observations are conducted to ensure existing controls are working.	Offal trailers and loading equipment within enclosed building with air extraction at a rate of at least 3 air changes per hour. ABP and feather trailers to be covered (sheeted) inside the building before being moved outside for transfer offsite.	Building air extracted to chemical scrubbing system for abatement and treated air discharged at high level from scrubber stacks to disperse residual odours.
7. Product "offal" and carcass products for food use.	Low intensity, inoffensive fresh "meaty" odours from offal and carcase products	Handling and storage in dedicated chiller and cold storage area. Handling bins and building areas are washed after each use and kept clean for re-use.	Handling and storage in dedicated and enclosed food product area, with chiller and cold storage.	Although potentially putrescible all materials for human consumption will be stored in a refrigerated room/cold store area to maintain quality and thereby to prevent decay and control emissions.
8. Blood Storage Tank and feather pit room	Potential for highly offensive faecal/sulphidic odours from decaying feathers and blood and from traces of blood on surfaces. Odours are a complex mixture of organics which may include sulphides and mercaptans and indole if blood decays.	Frequent (daily) removal of blood from tank and the feather pit and flume cleaned out each day. Blood tank emptied completely to remove residues. Any spills washed away, and the tank area kept clean as part of daily hygiene routines.	The blood tank is fully enclosed to control emissions and evaporation and all feather pit facilities housed within a room. Direct odour extraction from the tanks headspace and the room to the odour control system.	Air/odour extracted from the tank headspace and the room to the chemical scrubbing systems for abatement. Treated air discharged at high level from scrubber stacks to disperse residual odours

Odour Source		Odour Controls		
Source	**Type of odours**	**Odour Reductions Measures at Source**	**Containment or Enclosure**	**Source Receptor Pathway Disruption**
9. Blood Tanker Loading	Potential for highly offensive faecal/sulphidic odours from decaying blood and from traces of blood on surfaces. Odours are a complex mixture of organics which may include Sulphides, mercaptans and indole if blood starts to decay	Frequent (daily) removal of blood from tank. Tank emptied completely to remove residues. A "hopper" bottomed tank will be used to facilitate complete emptying. Any spills washed away, and the tank area kept clean as part of daily hygiene routines.	The blood tank is housed within a building and air displaced from vacuum tankers during filling is back vented to the chemical scrubber odour treatment system through a flexible hose connected to the tanker air outlet/vacuum pump exhaust.	Air extracted from the tank headspace during tanker loading to chemical scrubbing systems for abatement. Treated air discharged at high level from scrubber stacks to disperse residual odours
10. Effluent Balance and Treatment Tanks	Some potential for offensive odours from decaying effluent. Odours from effluent are a complex mixture of organics which may include sulphides and mercaptans	Tank levels managed to minimum for effective effluent treatment and emptied routinely to prevent accumulations of solids. The balance tank is aerated by venturi aerators to maintain aerobic conditions in balance tanks. Activated sludge process is an aerobic process. Dissolved Air Flotation system is de-sludged and cleaned out at monthly intervals	Covers fitted over primary balance tanks and headspace extracted/vented using a powered fan through a carbon filter unit. Treated air is then vented to atmosphere. DAF unit has a removable cover with inspection hatches and is vented to a passive carbon filter. Sludge tanks are fully enclosed to control emissions and evaporation.	Effluent plant is located 200m from nearest receptors on Pickhill Lane and 280m from Pickhill Old Hall so that odours are diluted and dispersed over the distances between source and potential receptors.
11. Effluent Plant Sludge Storage Tanks	Potential for offensive odours from decaying sludge. Sludge and effluent odours are complex mixtures of organic compounds which may include sulphides and mercaptans if sludge is allowed to decay anaerobically.	Sludge tanks emptied routinely so that sludge "age" is limited. Any spills washed away, and the tank area kept clean as part of daily hygiene routines	Tanks fully enclosed to control emissions and evaporation, and tank headspace air displaced through an activated carbon filter.	Effluent plant is located 200m from nearest receptors on Pickhill Lane and 280m from Pickhill Old Hall so that odours are diluted by distance. Odorous air displaced to atmosphere through activated carbon filters (to abate organic compounds) with carbon impregnated with an oxidising agent (caustic soda or copper oxide) to oxidise sulphides.

Odour Source		Odour Controls		
Source	**Type of odours**	**Odour Reductions Measures at Source**	**Containment or Enclosure**	**Source Receptor Pathway Disruption**
12. Sludge Tanker Loading	Potential for offensive odours from decaying sludge. Sludge and effluent odours are complex mixtures of organic compounds which may include sulphides and mercaptans if sludge is allowed to decay anaerobically.	Sludge tanks emptied routinely so that sludge "age" is limited. Any spills washed away, and the tank area kept clean as part of daily hygiene routines	Tanks fully enclosed to control emissions and evaporation, and displaced tanker headspace air passed through an activated carbon filter.	Tanker drivers connect air hoses from tanker vacuum pumps exhaust outlets to activated carbon filters so that displaced air is abated during filling. Potential exposure limited by limited duration of the activity which at most is 2 x <20 minutes per day
13. Main Extraction and Chemical Scrubbing System	Treated odours may have a "chlorine" component from the sodium hypochlorite oxidising reagent and any chloro-amines generated in the scrubber.	Chemical scrubbing with automated controls on chemical dosing and liquor recirculation to ensure optimum treatment.	All odour extraction ducting maintained under extraction so that any air "leakage" is inwards and odours are contained.	Extraction system has sufficient flow rate to capture air emitted from odorous processes. Treated air discharged at high level through stacks to disperse residual odours.

7 Odour Risk Assessment

A qualitative odour risk assessment is included below in Table 4. The risk assessment has been prepared with reference to Horizontal Guidance Note H1- Annex (b) (2010) and is based on qualitative risk assessment methodology, where a judgement of risk of an odour impact is assigned based on the 'Source-Pathway-Receptor' Model.

A subjective risk score has been calculated for each identified odour source based on a potential Impact score "**I**" (scored from 1 to 5), which is a subjective measure of odour intensity/emission rates, multiplied by a Likelihood "**L**" score (also from 1 to 5). The overall risk score assumes that specified suitable control measures are in place, however, the bracketed scores with asterisks provide an assessment of the potential risk if odour controls are not effective or not effectively used/monitored.

As an example, if air is not effectively extracted from the de-feather area, then there is significant increase (from 2 to 4) in the likelihood of off-site odours.

The risk assessment has been based on the following risk matrix scoring system suggested by the Environment Agency for a poultry processing site in East Anglia and used in other sectors, including the National Health Service.

Risk Matrix

	Likelihood				
Impact	**1**	**2**	**3**	**4**	**5**
	Rare	**Unlikely**	**Possible**	**Likely**	**Almost Certain**
5 Catastrophic	**5**	**10**	**15**	**20**	**25**
4 Major	**4**	**8**	**12**	**16**	**20**
3 Moderate	**3**	**6**	**9**	**12**	**15**
2 Minor	**2**	**4**	**6**	**8**	**10**
1 Negligible	**1**	**3**	**3**	**4**	**5**

For grading risk, the scores obtained from the risk matrix are assigned grades, as follows;

	1 – 3	Low risk
	4 – 6	Moderate risk
	8 – 12	High risk
	15 – 25	Extreme risk

Table 4 - Odour Risk Assessment & Key Odour Controls to Minimise Risk

Inventory		What can harm/ be harmed?			Managing the risk		Assessing the risk	
Source	**Process (Location)**	**Hazard**	**Receptor**	**Potential Impact 'I'**	**Risk Management**	**Likelihood of exposure 'L'**	**Magnitude of Risk 'I' x 'L'**	**Overall Risk**
1. Lairage (bird reception & holding)	North-east section of factory (new extension)	Odour from birds in modules and from droppings on floors	Closest receptors (owned by Maelor) on Pickhill Lane at approx. 140 m West of lairage area of plant.	1 - Negligible	Lairage, intake and holding areas cleaned and washed daily as part of daily hygiene routines. Bird feed restricted on farms prior to delivery to processing site so that gut content and droppings output reduced	3 - Possible	3 - Low	Not significant if thoroughly washed routinely
2. Module washing	Southern section of factory	Odours from droppings on floors & equipment	Closest receptors on Pickhill Lane (approx. 140 m to West of bird reception area of plant.	1 - Negligible	Enclosed and floor and equipment are all washed daily as part of daily hygiene routine. Modules washed as soon as empty	1 - Rare	1 - Low	Not significant if well managed and kept clean
3. Hang-on and bleeding area	Central section of factory	Odours from birds in modules and when handled during hanging on to line	Closest receptors on Pickhill Lane (owned by Maelor) are approx. 140 m to West of primary bird reception area of plant.	3 - Moderate	Enclosed. Floor and equipment all washed daily as part of daily hygiene routine. Modules are all washed as soon as empty. Building air extracted and high-level dispersion through roof mounted fans.	1 - Rare	3 - Low	Low
4. Aeroscalder & De-feather	Central section of factory	Odour emissions from Aero-scalder and de-feather are a potential hazard.	Closest receptors on Pickhill Lane (owned by Maelor) are approx. 115 m to West of primary bird processing area of plant.	3 - Moderate	All fully enclosed. Aeroscalder design minimises odour and vapour releases. Process air (and thereby building air) extracted at source to the chemical scrubbing system. Main extraction system must have sufficient flow rate to capture all air emitted from scalder & de-feather process to building headspace.	2 - Unlikely	6 - Moderate	Medium dependant on effectiveness of extraction and abatement system

Inventory		What can harm/ be harmed?			Managing the risk		Assessing the risk	
Source	**Process (Location)**	**Hazard**	**Receptor**	**Potential Impact 'I'**	**Risk Management**	**Likelihood of exposure 'L'**	**Magnitude of Risk 'I' x 'L'**	**Overall Risk**
5. Evisceration	Northern section of factory	Odour from gut removal	Closest receptors on Pickhill Lane (owned by Maelor) are approx. 115 m to West of primary processing area.	1 - Negligible	Low odour because intestines are not broken All fully plant enclosed within building. Building air extracted odour mitigation system. Main extraction system must have sufficient flow rate to capture all air emitted from evisceration to building headspace.	2 - Unlikely	2 - Low	Moderate depending on effectiveness of extraction & mitigation
6. Bulk offal & feather handling/storage	Northern section of factory	Odours from decaying feather and by-products and residues on surfaces	Closest receptors on Pickhill Lane (owned by Maelor) are approx. 140 m to West of offal bay area.	3 - Moderate (4 - Major*)	Fully enclosed. Building air extracted to chemical scrubbing system. Extraction system must have sufficient flow rate to capture all air emitted from offal bays to building headspace. ABP and feather trailers to be covered (sheeted) inside the building before being moved outside for transfer offsite. Empty trailers should be cleaned and disinfected before delivery to site. Plant should be washed down daily. Feathers and by-products should be removed daily. Doors must be kept closed when not in use for vehicle movements	2 - Unlikely (4 - Likely*)	6 - Moderate (16 - Extreme*)	Medium to Extreme depending on both the effectiveness of extraction & abatement and the frequency of removal of offal and feathers. Risks are controlled with effective extraction and scrubbing
7. Offal Handling in Cold Store	North-west section of factory	Odours from decaying by-products and residues on surfaces	Closest receptor on Pickhill Lane (approx. 100m to West of processing area of plant.	2 – Minor (3 – Moderate*)	Fully enclosed and refrigerated Potentially putrescible materials stored in refrigerated building to maintain quality and thereby to reduce and contain emissions. Handling bins and building areas washed after each use and kept clean. Frequent removal of by-products should take place (daily)	1 – Rare (3 – Possible*)	2 – Low (6 – Moderate*)	Low - not significant if managed carefully

Inventory		What can harm/ be harmed?			Managing the risk		Assessing the risk	
Source	**Process (Location)**	**Hazard**	**Receptor**	**Potential Impact 'I'**	**Risk Management**	**Likelihood of exposure 'L'**	**Magnitude of Risk 'I' x 'L'**	**Overall Risk**
8. Blood Storage Tanks and feather pit area	Northern section of factory	Odours from decaying blood and feathers	Closest receptors on Pickhill Lane (owned by Maelor) are approx. 140 m to West of blood tank area.	4 – Major (4 – Major*)	Tanks fully enclosed to control emissions and evaporation. Air extracted to chemical scrubbing system. Frequent removal. Blood removed daily, and tanks emptied completely to remove residues. Feather pit area cleaned daily	2 – Unlikely (3 – Possible*)	8 – High (12 – High*)	Risk will be fully controlled if extraction is effective and if tanks emptied frequently. Elevated risk if extraction & abatement plant fails or if there are any spills.
Blood tank – collection by tanker	Northern section of factory	Odours from decaying blood	Closest receptors on Pickhill Lane (owned by Maelor) are approx.140 m to West of blood tank area.	4 – Major (4 – Major*)	Tanker drivers must ensure that they connect air extraction hoses to tanker vacuum pumps exhaust. Air displaced from vacuum tankers during filling vented to the chemical scrubber air treatment system. Ensure tanker drivers report any spills. Potential exposure during offloading limited by duration of the activity which at most will be <20 minutes per day.	2 – Unlikely (3 – Possible*)	8 – High (12 – High*)	Not significant if managed carefully and if account is taken of short term and infrequent nature of the activity, which is approximately 15-20 minutes once per day
9. Effluent Treatment Plant	Eastern edge of site activities	Odours from decaying effluent	Closest receptors on Pickhill Lane (owned by Maelor) are approx..290 m to West of effluent plant. Pickhill Old Hall is around	3 – Moderate (4 – Major*)	Enclosed drum screen and screenings collected in covered skip. Covered balance and divert tanks with extraction of headspace into carbon filter unit. Tanks are aerated by venturi to prevent anaerobic conditions. Divert tank only to be used to capture spillages / abnormal effluent streams to prevent overloading ETP and cleansed	2 – Unlikely (3 – Possible*)	6 – Moderate (12 – High*)	Not significant if plant is maintained within normal operating parameters and extraction and abatement is

Inventory		What can harm/ be harmed?			Managing the risk		Assessing the risk	
Source	Process (Location)	Hazard	Receptor	Potential Impact 'I'	Risk Management	Likelihood of exposure 'L'	Magnitude of Risk 'I' x 'L'	Overall Risk
			270m North of effluent plant		after use. DAF plant covered to control emissions and evaporation with air ducted to carbon filter.			effective. Elevated risk if plant malfunctions or extraction & abatement plant fails or if there are any spills.
10. Sludge Storage Tanks	Eastern edge of site activities	Odours from decaying sludge	Closest receptors on Pickhill Lane (owned by Maelor) are approx..290 m to West of effluent plant. Pickhill Old Hall is around 270m North of effluent plant	4 – Major (4 – Major*)	Tanks fully enclosed to control emissions and evaporation. Displaced air ducted to carbon filter treatment system.	2 – Unlikely (3 – Possible*)	8 – High (12 – High*)	Not significant if containment and abatement is effective. Elevated risk if extraction & abatement plant fails or if there are any spills.
11. Effluent plant sludge tanker loading	Eastern edge of site activities	Odours from decaying blood and sludge in air displaced from tankers during loading.	Closest receptors on Pickhill Lane (owned by Maelor) are approx..290 m to West of effluent plant. Pickhill Old Hall is around 270m North of effluent plant)	3 – Moderate (4 – Major*)	Tanker drivers ensure that they connect air extraction hoses to tanker vacuum pumps exhaust. Air displaced from vacuum tankers during filling vented to a carbon filter air treatment system. Ensure tanker drivers report any spills. Potential exposure limited by limited duration of the activity which at most is 2 x <20 minutes per week	2 – Unlikely (3 – Possible*)	6 – Moderate (12 - High*)	Not significant if managed carefully and if account is taken of short term and infrequent nature of the activity, which is likely to be approximately 15-20 minutes once or twice each week

Inventory		What can harm/ be harmed?			Managing the risk		Assessing the risk	
Source	**Process (Location)**	**Hazard**	**Receptor**	**Potential Impact 'I'**	**Risk Management**	**Likelihood of exposure 'L'**	**Magnitude of Risk 'I' x 'L'**	**Overall Risk**
12. Main Extraction and Chemical Scrubbing System	To east of main factory building	Treated air odours which are likely to be of a "chlorine" nature, possibly with undertones of "offal" type odours	Closest receptors on Pickhill Lane (owned by Maelor) are approx.190 m to West of scrubbers and their stacks and Pickhill Old Hall is approximately 300m from scrubbers and stacks	4 - Major (4 - Major*)	Extraction system must have sufficient flow rate to capture air emitted from odorous processes. Automated scrubber dosing / liquor replenishment system and controls. Plant must be carefully monitored to ensure that it is working within design parameters.	2 – Unlikely (3 – Possible*)	8 – High (12 – High*)	Low risk if performance optimised. High risk, if not, so performance is critical

8 Management of Odour

This OMP is a working document, intended to be used as a reference document for operational staff on a day to day basis. It provides a schedule of actions that must be taken to minimise odour and waste impact and details site management procedures for the management of odour.

The OMP is available on-site to all relevant site personnel and any visiting officers from Wrexham County Council or NRW.

Our environmental management system (EMS) addresses odour and we will use and review the OMP to ensure we minimise odour from the installation. The management systems include:

- Staff roles and responsibilities
- Training of staff
- Operating procedures
- Auditing and inspections
- Preventative and breakdown maintenance
- Housekeeping standards
- Incidents and emergency response
- Complaint handling and investigation
- Community liaison

The remainder of this document is structured according to aspects of the operation and management of the site.

All measures, contained in this OMP are to be implemented in the daily operation of the site. Additional measures that may be adopted in response to incidents or one-off events, detailed in the contingency procedures section.

9 Roles & Responsibilities

9.1 Site Management

The overall implementation of this OMP is the responsibility of the General Manager, supported as required by other Maelor Foods staff with specific roles relating to odour control. The roles and responsibilities of staff are documented under the EMS.

The General Manager can delegate certain tasks as required, although ultimate responsibility will remain with him / her.

A nominated deputy can be appointed for all times when the General Manager is not on site. In such circumstances, it will be the nominated deputy's responsibility to ensure that the requirements of the OMP are adhered to.

9.2 Staff Training

Staff training is a key aspect of ensuring that odour is controlled through effective management during daily operations. All key site operatives involved in "odour" related areas of the plants, and particularly the offal and effluent sections and maintenance personnel responsible for the scrubbers, must be trained on induction with "tool-box talks" to deal with odour management issues in the areas in which they will work. They must also be made aware of the existence of this OMP and its requirements through environmental training tailored to staff responsibility levels.

Training needs are reviewed for all staff on an annual basis and refresher training scheduled at set intervals. General odour management forms part of the site induction process to all new members of staff or contractors working in potentially odorous areas of the plant.

Where investigation of an incident identifies a gap in training or a need for refresher training this will be carried out as soon as possible.

9.3 Operating Procedures

All departments have a set of operating procedures that cover specific and generic tasks. These procedures identity areas where odour could be released and specify the measures that must be taken to ensure that odour is minimised. The procedures cover the measures to be taken if abnormal events occur, such as spillages and plant failure and spell out the reporting and recording criteria if abnormal events occur.

Plant whose failure could cause an odour event is covered by operational procedures, such as the chemical scrubber, carbon-filters and ETP.

9.4 Maintenance

Any plant item whose failure could cause an odorous release is covered on the preventative maintenance (PM) system which schedules a series of maintenance tasks at set frequencies. The PM system includes regular checks and maintenance of doors, extraction systems, building fabric, odour abatement plant, ETP and process plant to minimise failure events and keep odour control optimised. The tasks and their frequency are based on plant manufacturer's guidance or site experience of operating the plant.

We hold stocks of essential spare parts, so plant can be repaired as soon as possible, and we have same day call out contracts for the main elements of the plant if specialist help is required.

Breakdown maintenance is prioritised if there is potential for or an actual release of odour. We will undertake a bespoke environmental risk assessment if we need to undertake maintenance tasks that could release odour and will identify precautions and additional measures that we must take to control odour during the work. This could include work on building doors or roof if they need to be opened for prolonged periods. Wherever possible, we will schedule such work for non-production days and favourable weather patterns to minimise the potential for offensive odour releases to reach site neighbours. We may also issue neighbourhood bulletins to advise neighbours in advance of such work.

There is a clear structure of responsibility which allows operational staff to call in specialist contractors to deal with emergencies and unplanned events which may lead to an odour impact, such as leaks and spillages, damages to extraction ducts etc.

Such events, and appropriate remedial measures are normally the responsibility of the Site Manager, but lines of responsibility and delegation will be clarified in case the manager is off site when an unplanned event occurs. A list of approved contractors who can be called out to deal with incidents is maintained by the Engineering Manager and all staff with delegated responsibility are aware of this list.

9.5 Sub-Contractors

Any sub-contractors working at the site must adhere to the requirements of the OMP. Failure to comply with odour control measures will result in a formal warning to the operative and his or her employer. Failure to comply with the warning will result in the operative being banned from the site.

9.6 Measures for Reducing Odorous Emissions On-site – Auditing and Inspections

Maelor Foods will address all reasonable opportunities to reduce odorous releases from the site. Measures for reducing the risk have been detailed throughout the document. Audits and inspections are carried out across departments covering housekeeping and adherence to procedures where they address odour. Departmental Managers will also undertake their own checks, inspections and audits as part of the shift handover process.

The specific odour management and odour related checks and tasks are listed in Table 5 below. This list must be reviewed as experience of the plant is collected and if incident investigations identify any areas for improvement:

Table 5 - Routine Odour Management & Monitoring Tasks / Checks

No.	Tasks	Who?	Targets/Action Levels	Record form
1	Inspect the site for odour emissions at least daily during the hours of production (whether it be during the day or night), and record the findings to determine trends. Frequency to be increased in event of complaints	Environmental Manager/ Hygiene Manager and Security	Checks to include: 1. Not >1 live bird delivery waiting to get into the lairage 2. Doors closed on lairage & offal building when not in use for vehicle movements 3. Lairage & module handling areas clean 4. Doors closed on other process buildings 5. Offal bay building clean and in good condition 6. Screens on drainage in offal bays in place and being cleaned? 7. Blood tank area clean 8. ETP area clean and functioning normally. No abnormal parameters or odours, spills 9. Sniff check the carbon filters on primary balance tanks, DAF unit & sludge tank to confirm filters do not need changing. 10. Check that the extract fan on the primary balance tank carbon filter is operational and that there is a detectable flow from the duct. 11. Sludge or blood tanker loading (drivers back vent air from tankers) - spills cleaned up 12. External areas of the site, e.g. blood tanker loading area clean and free of any spillages or uncovered containers	Daily Odour Management Plan Site Checks Record Form - **Error! R eference source not found.**
2	Site perimeter odour assessments or SNIFF tests (daily initially -1st 6 months) at different times of day. To be carried out by personnel NOT involved in production or wastes areas to avoid odour desensitisation.	Environmental Manager/ Hygiene Manager and Security	Detectable/recognisable odours. Back track up plume if odours are detected and carry out site checks as set out at 1 above.	Sniff survey record form - Appendix 2
3	Check operation of extraction fans and odour scrubbing system daily. Scrubber pH and Redox levels and fan operation will be monitored and logged continuously, and the control system fitted with alarms to warn of exceptional conditions or failures	Maintenance/ Environmental Manager/ Hygiene Manager and Security	1. Ensure that fans are running, and any drive belts have not broken. 2. Check chemicals/reagent stock levels for scrubber. 3. Spot checks on scrubber monitoring system, pH and redox values. 4. Liquid level in scrubber 5. Check chemical dosing pump operation	Daily chemical scrubber checks record form - **Error! R eference source not found.**

No.	Tasks	Who?	Targets/Action Levels	Record form
	(To ensure that the air treatment system is operating within design parameters.)		6. Check air dampers/shutters are in correct positions. 7. Check scrubber blowdown/overflow drain. 8. Measure & or check and record pressure in extraction system is effective	

10 Abnormal Events and Emergency Operation

We have contingency measures to deal with the foreseeable abnormal events that could influence odour emissions from the installation. Table 6 describes several abnormal events or emergencies which may take place at the site and lead to odorous emissions and lists the response measures.

Table 6 - Abnormal Events and Emergency Operation

Scenario / Event	Location on Site	Likely effect on emissions inventory	Response Measures
Special event circumstances in locality or Extreme weather, e.g. periods of unusually hot weather	All wastes, effluents and by-products	Potential increased rate of bio-degradation of wastes and increased odour emissions	Greater focus on handling and storage practices for all wastes and effluents, plant cleanliness and abatement plant performance. Increase frequency of off-site odour checks. Increase frequency of tasks in checklist at Table 5
Failure of odour control measures	Site	The control measures proposed are all simple and low tech so the risk of failure is low. If failures do occur, then the potential effect would be an increased risk of off-site effects	All maintenance staff to be trained in identifying problems with control equipment or systems and applying simple fixes. For mechanical plant, such as fans and scrubber dosing and liquor circulation pumps, a supply of essential spares will be kept on site and on-call arrangements will be made to facilitate safe access.
Odour control flow/pressure anomaly – no flow, pressure drops too high or too low	Extraction systems	Odour may escape from de-feather & evisceration area roof space	Re-check/investigate fan operation. Check ducting for leaks or blockages (e.g. with flow meter). Investigate scrubber conditions Carry critical spares for fans and scrubbers
Unavailability of site staff	Odour control plant failure	Incidents occurring outside of site hours may be exacerbated by lack of staff available to attend.	Emergency contact details to be agreed such that someone is available on call to address issues which may arise.
Fire	Odour control plant	Low risk but potential increase of emissions at nearby properties	Follow emergency response plan and associated procedures

Flood	Entire Site	Potential increase of emissions at nearby properties	Follow emergency response plan and associated procedures
Site power cut	Entire Site – Production areas and odour controls	Odour emissions from most important primary process area sources are likely to fall. Emissions from effluent treatment plant sources may increase without treatment processes	Extraction systems should be prioritised as/when power systems are restored. A back-up generator contingency will be in place – unit to be supplied within 24 hours if power interruption persists.

Our Emergency Response Plan covers the generic aspects of how to respond and who to notify. We also have more specific procedures such as a spillage procedure to cover types of incident. Other events are covered in our standard operating procedures such as how to address effluent treatment plant faults.
We treat door faults, extraction or abatement plant failures and any other incidents that cause or could lead to an odour release as an environmental incident. Such incidents are handled in accordance with our Incidents & Non-conformances Procedure and we will ensure they are fully investigated and recorded once resolved, with preventative and corrective actions.

We will report incidents to NRW in accordance with our Environmental Licence Reporting Procedure of and Schedule 5 of our environmental permit. These notifications comprise of an initial report to notify NRW of a potentially significant incident as soon as possible followed by a report covering the incident investigations and conclusions.

11 Record keeping

Throughout the whole of the OMP, accurate and thorough record keeping are essential to ensure odour is controlled and will allow us to review and analyse performance. We keep records of maintenance of plant, production, waste management, monitoring, audits and inspections, communication, incidents, complaints and training.

Our Production Managers are responsible for keeping records of vehicle arrivals, departures, load details, materials processed and records of any incidents or issues that occur. They also maintain a shift log of processing stages which detail any abnormal events or faults requiring maintenance.

12 Odour Complaints Procedure

The measures outlined in this OMP are aimed at preventing odour emissions occurring to the extent where complaints may be made by neighbours of the site. Nevertheless, it is recognised that having an established complaints procedure is a necessary part of the OMP and we have a generic Environmental Complaint Procedure which we use for this purpose.

The primary purpose of this complaint procedure is to ascertain whether any complaints are linked to the site and associated operations and, if so, to identify the cause(s) and what action may be taken to remedy any on-going complaint episode and to prevent or minimise the probability of a recurrence. All complaints and investigations into them are recorded on an Environmental Complaint Investigation Record Form as shown in Appendix 3.

13 Odour Monitoring

13.1 Plant Monitoring

The checklist in Table 5 above details routine plant and odour mitigation monitoring checks.

We will be undertaking olfactometry testing of the chemical scrubber exhaust stack during the first 6 months of operation to check the odour destruction efficiency and confirm that the scrubber is meeting the design specification. This may be repeated in future on an ad hoc basis if odour episodes are thought to be linked to scrubber under performance.

13.2 Sniff Testing

Regular sniff testing is carried out in accordance with our Odour Sniff Survey Procedure to identify any off-site odours and assess odour strength in ambient air. This is based on:

1: A "slow" walk around the boundary of the premises (and not restricted to the process boundaries) and includes two assessments at pre-determined locations around the site boundary.

2: An off-site test, away from the immediate boundary (taking not of the wind direction) as odour released at high level my not necessarily be noticed at ground level within the boundary.

These assessments are to be carried out daily at different times of day for the first six months of plant operations, and then, if boundary odours are not experienced frequently the sniffing will be carried out on a weekly basis and as required in the event of an odour related complaint, as described above.

If odours are detected at any other point the assessor must stop and assess the intensity and persistence of the odour and make observations using the form in Appendix 2. The locations of any odours are to be marked on the map and cross-referred on the recording form.

Sniff tests are carried out by suitable person(s) with experience of the different types of odours generated in the various areas of the plant (e.g. lairage/chickens, de-feather, offal, effluent, sludge, blood tanks etc.), but it is very important the assessor does not work in any areas of the plant where they are routinely exposed to odours which would adversely affect their sensitivity to these odours. Odour is subjectively assessed using the following criteria:

Nature of odour		Odour severity		Extent & persistence	
0	No odour detected	**0**	No Odour Present - no odour perceived	**1**	Local and transient, not detected off Site
1	Lairage/chickens	**1**	Very Weak - probably some doubt whether odour present	**2**	Transient, detected off site for brief periods
2	Defeather/scalding	**2**	Weak - odour character is barely recognisable	**3**	Persistent but localised
3	Offal	**3**	Distinct - odour character is recognisable	**4**	Persistent and pervasive, detected over a narrow range
4	Effluent	**4**	Obvious - odour character is easily recognisable	**5**	Persistent and pervasive, detected over a wider range
5	Sludge	**5**	Strong - odour may be offensive if persistent		
6	Blood tanks	**6**	Very Strong - odour is offensive, exposure to this level considered undesirable		
7	Other (Describe)	**7**	Extremely Strong - odour is offensive, instinctive reaction to avoid further exposure		

The following information is also recorded when carrying out odour sniff monitoring:

- Any abnormal process conditions
- Any faults or overdue maintenance on odour abatement equipment
- Ambient temperature
- Information on any other odour generating activity taking place upwind of the plant
- Description of smell
- Time/duration of test
- Odour source (if apparent)

The results of sniff survey are recorded on the form in Appendix 2.

Odour monitoring results are regularly reviewed (initially monthly, and then quarterly after the first year of operation) to evaluate the effectiveness of the odour abatement measures in use at the plant, identify circumstances that cause increased odour emissions that may require additional odour abatement or mitigation measures and identify new techniques that could be effective in further reducing odour from the plant going forward.

This information is also used to review this Odour Management Plan and its effectiveness. It is envisaged that the odour abatement techniques described in this OMP will be effective at reducing the odorous emissions from the plant to an acceptable level and that the instances in which excess odour from the plant causes complaints from neighbours will be very infrequent.

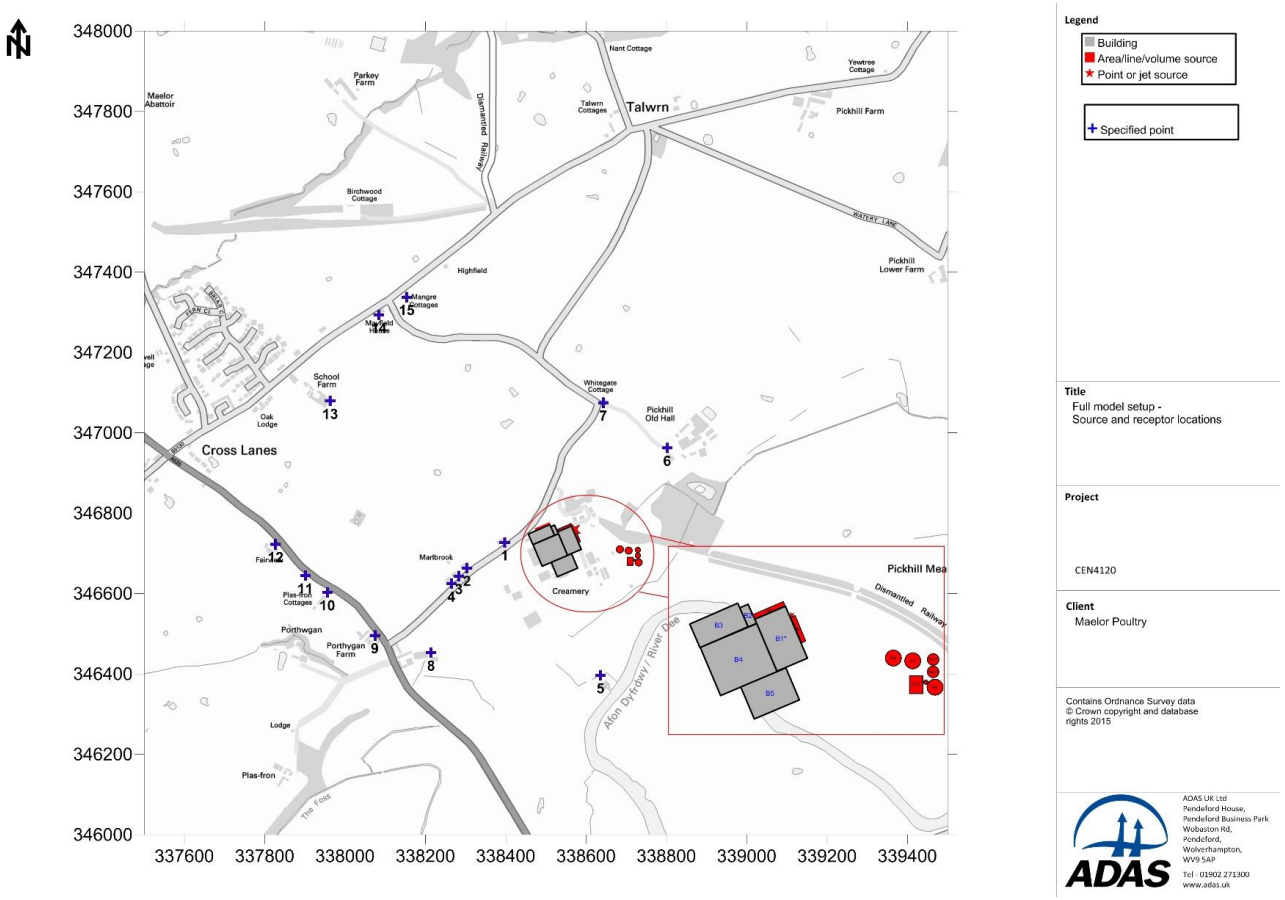
14 Community Liaison

We appreciate how important it is that our neighbours who could potentially be affected by odour from the plant are made aware that the we take odour control very seriously and take all reasonable measures to reduce our environmental impact on the local community. Our neighbours will be kept informed of new developments and if requested, we will issue contact details for them to notify the company or to complain in the event of unacceptable odours being experienced.

Our neighbours are encouraged to report any odours at the time they are experienced so that timely investigations can be carried out.

15 Appendices

Appendix 1 - Potential Odour Receptors



Legend

- Building
- Area/line/volume source
- Point or jet source
- Specified point

Title
Full model setup -
Source and receptor locations

Project
CEN4120

Client
Maelor Poultry

Contains Ordnance Survey data
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Appendix 2 – Daily Environmental Check Sheet

Commented [AK1]: Need to change site plan to match new installation boundary and move check point No1 to new south boundary and maybe add No7 to south west corner behind holding building

Daily Environmental Check Sheet

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General Information

Date of Inspection	Time of Inspection	Weather Conditions	Temperature	Wind Direction	Wind Strength

Odour Survey

Location	Time	Nature of Odour	Odour Severity	Extent/ Persistence	Other Observations
1					
2					
3					
4					
5					
6					

Scoring Guide		
Nature	Severity	Persistence
0 No Odour	0 No Odour	0 No Odour
1 Lairage/ Chicken	1 Very Weak	1 Localised, not off site
2 Defeather/ Aeroscald	2 Weak	2 Offsite for brief period
3 Offal	3 Distinct	3 Persistent but localised
4 Effluent	4 Obvious	4 Persistent over narrow range
5 Sludge	5 Strong	5 Persistent over wider range
6 Blood Tanks	6 Very Strong	
7 Other (Describe)	7 Extremely Offensive	

ETP Alarm (Y/N)		Scrubber Alarm (Y/N)		Redox:		pH:	

Additional Comments/ Actions.

General Site Management

Question	Yes/ No
Are vehicles observing speed limits?	
Are FLTs driving safely and loads secure?	
Are external yard areas clean and free of spills?	
Are spill kits sealed and contents full/ unused?	
Are correct containers being used/ labelled?	
Are noise controls working around the site?	
Are all chemicals bunded/ stored correctly?	
Are bunds in good condition/ no leaks?	
Is site drainage colour coded?	
Are hardstanding areas in good condition?	
Cleaning activities in correct area?	
W2 and W3 free of visible oil/ grease?	
Borehole secure and free from obstruction?	
Elec, Gas, Water meter readings taken?	

Odour Management

Question	Yes/ No
Is there no more than 1 vehicle waiting	
Are all offal/ lairage doors closed?	
Is lairage area clean	
Are all other process doors closed?	
Is offal bay clean and in good condition?	
Is blood tank area clean?	
Is ETP area clean?	
Are all carbon filters working?	
Are all containers covered?	
Is sludge tank back venting (where applicable)?	

Other Comments/ Actions.

Form Completed By	
Signature	
Date/ Time	

Document Reference: EMS5.3.1.1.2	Issue Date: 11/03/2015	Issue Number: 3
Issued By: Mike Howard	Approved By: James Colley	

Appendix 3 - Environmental Complaint Record Form

Date of Complaint	Time of Complaint	Date Noticed	Time Noticed

Name and Address of Complainant							
Description of Odour (what does it smell like?)							
Odour Severity	1 Very Weak Probably cannot detect whether odour present	2 Weak Odour character barely recognisable	3 Distinct Odour character is recognisable	4 Obvious Odour character is easily recognisable	5 Strong Odour may be offensive if persistent	6 Very Strong Odour is offensive – exposure considered undesirable	7 Extremely Strong Odour is offensive, instinctive reaction to avoid further exposure
Constant or Intermittent			Duration				
Does the complainant have any other comments about the odour?							
Are there any other complaints relating to the installation, or to that location?		If yes please give details (dates etc.)					

Location of complaint

Please mark on map location of complaint. ✕

Wind Direction Log

	Time	Direction
30 minutes before complaint	15.00	30
20 Minutes before complaint	15.10	98
10 Minutes before Complaint	15.20	5
Time of Complaint	15.30	331
10 minutes after complaint	15.40	304
20 minutes after complaint	15.50	252
30 minutes after complaint	16.00	174

Plot the above direction data onto the wind chart below

Weather Information (Please attach screenshot of weather station data log)

Weather Conditions	Average Wind Speed	Average Wind Direction	Average Temperature

Operating Conditions at time of complaint	
Describe what was happening on site at the time? Any abnormal events, weather conditions or maintenance issues at the time or ongoing? E.g. power cut, abnormal weather (very hot or cold), chemical scrubber or ETP fault?	
ABP and sludge collection times	

Appendix 54 - Daily Checks Record Form - Chemical scrubber

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Daily Checks Record - Chemical Scrubber						
Week commencing						
Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Time						
Main scrubber (see Notes 1, 2, 3, 4 & 5) - "Yes" answers confirm systems ok & working. "No" answers indicate a problem and action required.						
General inspection of the plant - No leaks, drips or spillages?						
Check - is water up to level in the scrubber reagent tank?						
Hypochlorite IBC level ok?						
Caustic IBC level ok?						
When system is running observe reagent flow through the observation windows in the scrubber side - free flowing ok?						
Control panel (see notes 6 & 7)						
pH reading						
Redox reading						
Air Extraction System (8)						
Measure & or check and record pressure in extraction systems is effective						

Notes:

1. Please refer to the Scrubber operating manual for full details of required checks and corrective actions.
2. All work to be carried out by trained personnel in accordance with instructions.
3. Wear appropriate PPE.
4. Main scrubber checks to be carried out with scrubber operational and pumps running.
5. Replacement chemical IBCs to be reordered when levels are low.
6. The normal operating levels and ranges are: **(pH: approx. 9.0 as an upper limit) & (Redox: approx. 700 - 750 mV)**
7. If either is not correct it should adjust when the dosing pumps are running. Dosing pumps only run when the circulation pumps are running so that the reagents are mixed in the liquor and do not settle in a concentrated layer on the tank floor beneath the probes. If the readings remain outside these settings call an engineer immediately.
8. The normal pressure ranges are: **(add range)**

Comments & any actions taken	
Form completed by	
Signature	
Date	