

Environmental Risk Assessment





MSD Animal Health

Intervet UK Ltd

Project number: 60576703
LORP003

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Quality information

Prepared by	Checked by	Verified by	Approved by
			
Melanie Brack Environmental Consultant	Lynn Morgan Associate	Bob Hudson Technical Director	Bob Hudson Technical Director

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Prepared for:

Intervet UK Ltd
MSD Animal Health
Walton Manor
Walton, Milton Keynes
MK7 7AJ

Prepared by:

Melanie Brack
Environmental Consultant
E: melanie.brack@aecom.com

AECOM Infrastructure & Environment UK Limited
St. George's House
5 St. George's Road
London SW19 4DR
United Kingdom

T: +44 (207) 963 9800
aecom.com

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1. Introduction

AECOM Infrastructure & Environment UK Limited (“AECOM”) has been appointed by Intervet UK Limited, trading as MSD Animal Health (“MSD AH”) to develop an application for an Environmental Permit to operate under the Environmental Permitting (England and Wales) Regulations 2016 (as amended) (EPR). MSD is a trade name of Merck & Co., Inc., with headquarters in Kenilworth, N.J., U.S.A. The site is part of the manufacturing division, specialising in vaccines for the animal health market.

The Environment Agency (EA) requires that an Environmental Risk Assessment (ERA) be provided in support of the permit application for MSD’s production site located at Walton Manor, Walton, Milton Keynes, MK7 7AJ (which will be referred to as “the site”).

MSD AH in Milton Keynes is an existing production facility, manufacturing and packaging animal health vaccines.

2. Risk Assessment

The aim of this document is to complete an Environmental Risk Assessment (ERA), which has been developed in accordance with the Environment Agency Guidance Note H1 Environmental Risk Assessment (the “H1 Guidance”). This guidance promotes the following four step process:

- Identifying potential environmental risks from the activity;
- Assessing the identified risks;
- Choosing appropriate measures to control the identified risks; and
- Presenting the assessment.

The methodology and approach used to complete this ERA is detailed in this section, followed by the ERA itself, which is summarised in tabular form.

This report is made in support of the Environmental Permit Application report for the site (60576703: LORP001).

2.1 Risk Identification

In accordance with the H1 Guidance, the operator has assessed the potential for the following hazard categories associated with the facility:

- Odour;
- Noise and vibration that could lead to impacts beyond the site boundary;
- Fugitive emissions such as:
 - Releases to air (volatile organic compounds, dust etc.) from storage and processing activities, including services;
 - Leaks and spills from storage and processing activities, including services;
 - Storm water run-off, e.g. from storage areas;
 - Wind-blown litter; and
 - Transfer of mud off-site (from traffic movements);
- Visible plumes:
 - Visibility of combustion gases released to air, e.g. as a condensed plume; and
 - Visibility of other process vapours, e.g. as condensed plumes;
- Accidents and incidents causing fugitive emissions:
- Transferring substances (e.g. loading / unloading);

- Overfilling vessels;
- Plant or equipment failure (e.g. leaks, over-pressure of vessels and pipework, blocked drains);
- Containment failure (e.g. bund or overfilled drainage sumps);
- Fires;
- Failure to contain fire waters;
- Operational errors, e.g. making the wrong connections on process pipework, drains or other systems;
- Poor storage arrangements for hazardous substances;
- Incompatible substances coming into contact;
- Unwanted reactions and / or runaway reactions;
- Emission of an effluent before adequately checking its composition;
- Vandalism; and
- Flooding.

The environmental impacts associated with direct process emissions to air, water or land / groundwater have been assessed separately as part of the main Environmental Permit supporting documentation.

2.2 Risk Screening

The significance of the risks identified under Section 2.1 above have been considered with regard to the resulting hazard, the pathway into the environment and the effect on potential receptors.

In accordance with the H1 Guidance, the operator has considered whether there is the potential for an impact on designated environmental receptors specified within Table 2-1 and other receptors within Table 2-2.

Specific hazards and pathways for the site are set out within the ERA tables under Section 2.4.

Table 2-1. Designated Habitat Sites identified within 10km of the Installation

Habitat site	Designation	Area (Ha)	Distance from Installation
Wavendon Health Ponds	SSSI –Mire & Meadow (BOGS Lowland)	4.68	4.64km
Howe Park Wood	SSSI – Broadleaved, mixed and yew woodland (Lowland)	24.19	5.59km
Oxley Mead	SSSI – Neutral grassland (Lowland)	3.43	6.87km
Kings and Bakers Wood and Heaths	SSSI – Dward Shrub Heath, Broadleaved, mixed and yew woodland, Neutral Grassland, (Lowland)	20.77	6.87km
Double Arches Pit	SSSI – Exposure of Lower Greensand and Gault Clay	1.71	8.58km
Nares Gladley Marsh	SSSI – Neutral Grassland (Lowland)	5.37	8.86km
Marston Thrift	SSSI - Broadleaved, mixed and yew woodland (Lowland)	18.76	9.36km
Nine Acres Pit	SSSI – Shenley Limestone	20.42	9.83km

Table 2.2. Other Receptors in the Locality of the Installation (<2km)

Type of Receptor	Applicability to this Facility
Specially protected nature conservation sites and species (local and national) – Designated sites	<p>There are eight Sites of Special Scientific Interest (SSSI) within 10km of the site (see Table 1)</p> <p>The nearest SSSI is Wavendon Health Ponds, located 4.64km from the installation</p> <p>There are no SSSI's within 2km of the installation</p>
Single houses or groups of houses (estates, villages etc.)	<p>The installation is bounded by residential properties to the south and the west</p> <p>The nearest residential property is located along Abells Close approximately 20m south of the installation</p>
Schools, hospitals, factories, shops etc	<p>The Open University Campus is located approximately 300m north of the installation</p> <p>The closest hospital is Milton Keynes University Hospital, 1.0km north west of the site</p> <p>The surrounding land use is a mixture of commercial, residential and agricultural land</p>
Footpaths, recreation areas such as playing fields and playgrounds	<p>The closest footpath is approximately 200m west and runs along the River Ouzel</p> <p>The closest recreation area is Woughton Park, approximately 300m west of the site</p>
Fields and allotments used for growing food	The nearest agricultural land to the site is located 100m west of the site
Waterbodies (rivers, lakes, streams and ponds)	The River Ouzel is 215m west of the installation and was classified by the Environment Agency's General Quality Assessment (GQA) as River Quality C (fairly good) in 2000
Ancient woodland	The closest ancient woodland is located approximately 840m east of the site
Designated landscape sites (e.g. AONB, National Parks, Heritage Coast etc.)	There are no AONB, National Parks or Heritage Coast identified within close proximity (2km) of the site
Historic buildings, listed buildings, archaeological sites (e.g. Scheduled Ancient Monuments, Battlefields, Listed Parks and Gardens)	<p>The closest ancient monument is the Medieval Manor of Simpson, located approximately 250m west of the site</p> <p>There are no Registered Park and Gardens located within 1km of the site</p> <p>There are numerous Grade II listed buildings on-site including the Manor House, Stable Block and Barn (South of the Stable Block) and off-site between 100m and 1km of the site (the nearest of these being the Thatched Cottage located 100m north east of the site)</p>
Local geological sites (e.g. RIGGS sites)	None identified

Type of Receptor	Applicability to this Facility
Water abstraction points	<p>There are no groundwater abstractions within 2km of the site</p> <p>According to a Landmark Envirocheck Report (Ref: 168551121_1 dated 4 June 2018) there are four (x4) surface water abstractions within 1km of the installation</p> <p>Two water abstraction licences are located 815m south west and 1.14km south west of the site and are for impounding water associated with the River Ouzel & Caldecotte Lake and Simpson Brook</p> <p>The remaining two surface water abstractions are for makeup / top up water from Caldecotte Lake located approximately 1.63km south and for irrigation from the reservoir at Simpson located approximately 1.71km south west of the installation</p>
Underlying groundwater, particularly sensitive groundwater catchments, e.g. source protection zones	The installation is underlain by undifferentiated superficial deposits over unproductive bedrock (rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow)
Other nearby industry, e.g. Control of Major Accident Hazards (COMAH) sites	There are no registered COMAH sites within 1km of the site.
Sensitive land uses, e.g. commercial fish farms, farmland	See agricultural land – above (i.e. fields and allotments used for growing food).
Coastal / estuarine areas	None identified
Drainage systems / sewers	<p>Surface water run-off (rain water) from non-process areas is directed to the surface water drains which discharge off-site to the municipal surface water system, which flows to the River Ouzel located 215m west of the installation (emission points W1 and W2)</p> <p>Process wastewater from the production of vaccines, sterile liquids, storage areas, process wash downs, boiler blowdown and cooling water purge is directed to the on-site process / foul water drains and then to the waste water conditioning plant, where the wastewater is pH adjusted and circulated (there is no biological treatment).</p> <p>The treated wastewater is then discharged to the municipal foul sewer (Ouse Valley Trunk Sewer) to the west of the installation (emission point S1)</p> <p>The installation holds a Trade Effluent Discharge Consent issued by Anglian Water (Ref. TEDI-0133-2018, dated 21 November 2018) in relation to this discharge</p>

2.3 Control Measures

The "Risk Management" column of the ERA tables presents the current techniques used by the Operator to manage and mitigate the identified risks. The control measures include abatement equipment, monitoring systems and procedures to prevent the hazard and / or minimise its effects as appropriate.

The probability of exposure has been determined taking into consideration the presence of the control measures ("risk management"), and the events have been ranked as either very unlikely, unlikely, likely or very likely. This has been determined qualitatively, taking into consideration the severity of the hazard, the frequency of the hazard occurring, the sensitivity of the receptor, the ability of the hazard to be transferred through to the receptor and the level of control measures in place.

2.4 Risk Assessment Tables

In accordance with the H1 Guidance, the operator has considered the overall environmental risks from the facility which potentially remain once mitigated by the proposed control measures. This judgement has been based on consideration of the consequence of the hazard, i.e. how serious the impact harm might be and the probability (or likelihood). The overall risks have been qualitatively assessed as low, moderate or high.

The following Tables address:

- Table 2-3: Odour Risks;
- Table 2-4: Noise and Vibration Risks;
- Table 2-5: Fugitive Emission Risks;
- Table 2-6: Visible Plume Risks; and
- Table 2-7: Accident and Incident Risks.

Table 2-3. Odour Risks

Hazard	Receptor	Pathway	Risk Management	Probability of exposure	Consequence	What is the overall risk?
<i>What has the potential to cause harm?</i>	<i>What is at risk? What do I wish to protect?</i>	<i>How can the hazard get to the receptor?</i>	<i>What measures will you take to reduce the risk? If it occurs who is responsible for what?</i>	<i>How likely is this contact?</i>	<i>What is the harm that can be caused?</i>	<i>What is the overall risk that still remains? The balance of probability and consequence</i>
Odour from process, raw materials and waste – usage and storage	Local industrial neighbours Local residents	Air	<p>The vaccine manufacturing process is not highly odorous and the site has not received any odour complaints. The installation has adopted a procedure – “Information and Communication Systems” for dealing with nuisance complaints.</p> <p>Certain isolators are fumigated using Formalin (formaldehyde solution) in small quantities. Formaldehyde has an odour threshold of 0.2 to 0.4mg/m³. The formaldehyde emissions within the HVAC systems of building 71 (emission point A8) are very small and should not be above the odour threshold when discharged to the environment. No odour issues are anticipated and none have historically been observed.</p> <p>The anaerobic bacteria production unit in the production building produces anaerobic bacteria and there is the potential for odour generation. However, given that the processing of vaccines is undertaken inside buildings and although extractors are used primarily for hygiene air quality control, they also dilute any odours that may be released and therefore lessen the potential for odour nuisance from the process.</p> <p>Procedures are in place to prevent the release of materials from site that are odorous. These include deliveries of raw materials being supervised to prevent fugitive emissions.</p> <p>The waste water conditioning plant is located inside a building and is subject to a regular planned inspection and maintenance regime. The tanks are closed units that breathe through a vent that is fitted with an in-line carbon filter, which is inspected</p>	UNLIKELY	Reduced local air quality Nuisance odours	LOW

Hazard	Receptor	Pathway	Risk Management	Probability of exposure	Consequence	What is the overall risk?
<i>What has the potential to cause harm?</i>	<i>What is at risk? What do I wish to protect?</i>	<i>How can the hazard get to the receptor?</i>	<i>What measures will you take to reduce the risk? If it occurs who is responsible for what?</i>	<i>How likely is this contact?</i>	<i>What is the harm that can be caused?</i>	<i>What is the overall risk that still remains? The balance of probability and consequence</i>
			yearly and within the PPM system. No biological treatment is undertaken at the waste water conditioning plant. A procedure – “Information and Communication Systems” covers odour complaints. Where received, complaints are investigated by the SHE Manager.			
Odours from on-site process wastewater network	Local industrial neighbours Local residents	Air	All vaccine processing equipment is operated within process areas and within buildings. Process waste waters are in closed drain systems and not in open gulley drains. The onsite waste water conditioning plant is not biological and hence no odours are anticipated from onsite waste water treatment. A procedure – “Information and Communication Systems” covers odour complaints. Where received, complaints are investigated by the SHE Manager.	UNLIKELY	Reduced local air quality Nuisance odours	LOW

Table 2-4. Noise and Vibration Risks

Hazard	Receptor	Pathway	Risk Management	Probability of exposure	Consequence	What is the overall risk?
<i>What has the potential to cause harm?</i>	<i>What is at risk? What do I wish to protect?</i>	<i>How can the hazard get to the receptor?</i>	<i>What measures will you take to reduce the risk? If it occurs who is responsible for what?</i>	<i>How likely is this contact?</i>	<i>What is the harm that can be caused?</i>	<i>What is the overall risk that still remains? The balance of probability and consequence</i>
Noise from vaccine manufacturing process sources (pumps,	Local industrial neighbours	Audio (air)	All vaccine processing equipment is operated within process areas, within	UNLIKELY	Noise nuisance to local residents	LOW

Hazard	Receptor	Pathway	Risk Management	Probability of exposure	Consequence	What is the overall risk? <i>What is the overall risk that still remains? The balance of probability and consequence</i>
<i>What has the potential to cause harm?</i>	<i>What is at risk? What do I wish to protect?</i>	<i>How can the hazard get to the receptor?</i>	<i>What measures will you take to reduce the risk? If it occurs who is responsible for what?</i>	<i>How likely is this contact?</i>	<i>What is the harm that can be caused?</i>	
compressors, fans, actuation valves etc.)	Local residents Local ecological receptors, e.g. roosting birds		buildings, which offers noise suppression. Process equipment is maintained in line with the site planned preventative maintenance programme, to prevent the degradation of equipment, that can then produce noise sources, e.g. pump cavitation, drive “whining”, fan vibration etc. Equipment maintenance schedules are in place. A noise impact assessment has been undertaken which indicates that operational plant noise emission levels exceed the existing daytime and night-time background levels, however they do not exceed the level at which there would be an onset of an adverse impact. The report concludes that, when considering the context, the overall impact of plant noise is considered to be of low impact for both the daytime and night-time periods. A procedure – “Information and Communication Systems” covers noise / vibration complaints. Where received, complaints are investigated by the SHE Manager.		Potential disturbance of ecology e.g. roosting birds	
Noise from boiler’s and ancillary equipment (e.g. pumps / fans etc.)	Local industrial neighbours Local residents Local ecological receptors, e.g. roosting birds	Audio (air)	All equipment enclosed within process areas and silencers are used on the boiler house emissions. Ancillary equipment is maintained in line with the site planned preventative maintenance programme, to prevent the degradation of equipment, that can then produce noise sources, e.g. pump cavitation, drive “whining”, fan vibration etc. Equipment maintenance schedules are in place.	UNLIKELY	Noise nuisance to local residents Potential disturbance of ecology e.g. roosting birds	LOW

Hazard	Receptor	Pathway	Risk Management	Probability of exposure	Consequence	What is the overall risk?
<i>What has the potential to cause harm?</i>	<i>What is at risk? What do I wish to protect?</i>	<i>How can the hazard get to the receptor?</i>	<i>What measures will you take to reduce the risk? If it occurs who is responsible for what?</i>	<i>How likely is this contact?</i>	<i>What is the harm that can be caused?</i>	<i>What is the overall risk that still remains? The balance of probability and consequence</i>
			<p>A noise impact assessment has been undertaken which indicates that operational plant noise emission levels exceed the existing daytime and night-time background levels, however they do not exceed the level at which there would be an onset of an adverse impact. The report concludes that, when considering the context, the overall impact of plant noise is considered to be of low impact for both the daytime and night-time periods.</p> <p>A procedure – “Information and Communication Systems” covers noise / vibration complaints. Where received, complaints are investigated by the SHE Manager.</p>			
Noise from vehicular access / egress	<p>Local industrial neighbours</p> <p>Local residents</p> <p>Local ecological receptors, e.g. roosting birds</p>	Audio (air)	<p>Vehicular deliveries / exporting materials are only accepted between 0800 to 1600 Monday to Friday.</p> <p>A procedure – “Information and Communication Systems” covers noise / vibration complaints. Where received, complaints are investigated by the SHE Manager.</p>	UNLIKELY	<p>Noise nuisance to local residents</p> <p>Potential disturbance of ecology e.g. roosting birds</p>	LOW

Table 2-5. Fugitive Emission Risks

Hazard	Receptor	Pathway	Risk Management	Probability of exposure	Consequence	What is the overall risk?
<i>What has the potential to cause harm?</i>	<i>What is at risk? What do I wish to protect?</i>	<i>How can the hazard get to the receptor?</i>	<i>What measures will you take to reduce the risk? If it occurs who is responsible for what?</i>	<i>How likely is this contact?</i>	<i>What is the harm that can be caused?</i>	<i>What is the overall risk that still remains? The balance of probability and consequence</i>
General						
Liquid leaks, fume emissions, dust emissions; from Valves, flange points, vessels, open ends or pipework	Local industrial neighbours and local residents and River Ouzel or Groundwater	Air and Surface water drains or overland flow or into ground water	Pipework, open ends, vessels, valves and flange points are inspected as part of the planned preventative maintenance programme and routine site walkovers. Fugitive emissions are investigated and remedial action taken under procedure "Emergency Preparedness and Response Policy". Standard Operating Procedures (SOPs) and operator training minimises the likelihood of operator initiated emission events. The surface water drainage system can be isolated (5 x isolation valves / bladders) preventing any lost / spilt material entering the River Ouzel.	UNLIKELY	Reduced local air quality Ground contamination, if hard standing breached River Ouzel contamination through storm water drains if not isolated	LOW
To Air						
Flue gas emissions from boilers	Local industrial neighbours and local residents	Air	Servicing of boilers and steam generators is routinely undertaken to ensure that the boilers are firing efficiently. Annual overhaul of boilers and statutory (pressure vessel) inspections of boilers. Boiler house operated by competent personnel (fully trained and operating to SOP's).	UNLIKELY	Reduced local air quality Potential health impacts for vulnerable people as pollutants within combustion emissions have Air Quality Standards, due to their irritant nature	LOW
Extracted emissions from the isolators	Local industrial neighbours and local residents	Air	Isolators are used to recover product. The isolators are sterilised using formalin vapour or hydrogen peroxide. The emission points from the isolators are	UNLIKELY	Reduced local air quality	LOW

Hazard	Receptor	Pathway	Risk Management	Probability of exposure	Consequence	What is the overall risk? <i>What is the overall risk that still remains? The balance of probability and consequence</i>
<i>What has the potential to cause harm?</i>	<i>What is at risk? What do I wish to protect?</i>	<i>How can the hazard get to the receptor?</i>	<i>What measures will you take to reduce the risk? If it occurs who is responsible for what?</i>	<i>How likely is this contact?</i>	<i>What is the harm that can be caused?</i>	
			either recycled within the process building or discharged to atmosphere through the HVAC system. The volume of formaldehyde vapour emitted into the large volumetric flowrate of the hygiene system is small.			
Discharge of emissions from fume cupboard extraction in the processing and R&D areas	Local industrial neighbours and local residents	Air	Fume cupboard is fitted with HEPA filters which are serviced and changed when required by competent persons.	UNLIKELY	Reduced local air quality	LOW
To Water						
Process / foul effluent discharged as trade effluent to municipal sewerage drains	Municipal sewage treatment works (STW) and thence to controlled waters (River Ouzel) Groundwater / soil if drain network fails	Trade effluent drains	Discharge is managed in accordance with an Anglian Water Trade Effluent Discharge Consent. Biologically active process water streams are heat treated (for decontamination) as an integral part of the vaccine production process, prior to discharge to the site's combined process/foul water drainage system which flows to the waste water conditioning plant. The waste water conditioning plant provides equalisation and neutralises the pH of the wastewater. The waste water conditioning plant does not biologically treat the waste water. Routine external monitoring and analysis for all consent parameters is undertaken to demonstrate compliance with the Discharge Consent. This is in accordance with the site's annual wastewater monitoring plan.	UNLIKELY	Potential negative impacts on the drainage network and the municipal STW Pollution of controlled waters Ground and ground water contamination	LOW to MODERATE (Trade effluent drains are not periodically inspected to make sure that they are not leaking)
Leaks or spills from containerised storage (e.g. water treatment chemicals, diesel tanks)	River Ouzel or Groundwater	Surface water drains to River Ouzel Ground pathway	Containers are of appropriate construction and are located within / on secondary containment. Containers are either located internally (within buildings) on hardstanding or externally within secondary containment.	UNLIKELY	Pollution of controlled waters Ground and ground water contamination	LOW

Hazard	Receptor	Pathway	Risk Management	Probability of exposure	Consequence	What is the overall risk? <i>What is the overall risk that still remains? The balance of probability and consequence</i>
<i>What has the potential to cause harm?</i>	<i>What is at risk? What do I wish to protect?</i>	<i>How can the hazard get to the receptor?</i>	<i>What measures will you take to reduce the risk? If it occurs who is responsible for what?</i>	<i>How likely is this contact?</i>	<i>What is the harm that can be caused?</i>	
		to groundwater	Mobile containers are inspected on reception. Spill kits are located throughout the site and staff are appropriately trained to manage spills. Site drainage manhole covers are appropriately colour coded.			
Leaks or spills from secondary containment	River Ouzel or Groundwater	Surface water drains to River Ouzel Ground pathway to groundwater	Secondary containment is inspected as part of the weekly site inspection where instrumented leak detection is not in place. Monthly HSE inspection of each manufacturing department is undertaken. Spill kits are located throughout the site and staff are appropriately trained to manage spills. Site drainage manhole covers are appropriately colour coded.	UNLIKELY	Pollution of controlled waters Ground and ground water contamination	LOW
Leaks or spills in transfer of chemicals and fuels (i.e. when filling on-site bulk tanks - sulphuric acid or diesel)	River Ouzel or Groundwater	Surface water drains to River Ouzel Ground pathway to groundwater	A 'Surface Water Management Plan (SWMP)' is held and maintained by the EHS department detailing site-specific spillage procedures and responsible personnel. The site also has a 'Spillage Prevention Policy'. These procedures cover chemical losses as well as fuel / oil spillages. Site drainage manhole covers are colour coded. Diesel offloading is undertaken on hardstanding which would flow to the process waste water drains and subsequently the onsite waste water conditioning plant. The diesel aboveground storage tanks (AST's) are fitted with level measurement, to protect against overfilling. There are site operational procedures for the filling of the diesel tanks which is supervised by MSD personnel. Sulphuric acid offloading (for wastewater treatment) is undertaken in a specified contained area within the waste water conditioning plant.	UNLIKELY	Pollution of controlled waters Ground and ground water contamination	LOW

Hazard	Receptor	Pathway	Risk Management	Probability of exposure	Consequence	What is the overall risk? <i>What is the overall risk that still remains? The balance of probability and consequence</i>
<i>What has the potential to cause harm?</i>	<i>What is at risk? What do I wish to protect?</i>	<i>How can the hazard get to the receptor?</i>	<i>What measures will you take to reduce the risk? If it occurs who is responsible for what?</i>	<i>How likely is this contact?</i>	<i>What is the harm that can be caused?</i>	
			There is a material offloading procedure in place that all delivery drivers must adhere to. Spill kits are located throughout the site and staff are appropriately trained to manage spills. Diesel for use in the generators is transferred to tanks which are integrally bunded.			
Leakage from waste storage and handling (e.g. vessel washings tank)	River Ouzel or Groundwater	Surface water drains to River Ouzel Ground pathway to groundwater	Waste containing bins throughout the site are stored on hardstanding. Waste containers are stored in dedicated areas on hardstanding or within secondary containment. The vessel washings tank (which contains trace thiomersal, which contains small levels of mercury) is bunded and provided with a blind sump. The tank is fitted with a level detection sensor, a high-level probe / alarm and high-high level probe / alarm with an interlock to the transfer pumps / vacuum system. The bund is also alarmed to detect any leaks. The vessel washings tank offloading area is also contained (kerbed and provided with a blind sump). Waste is managed by third party competently trained contractors.	UNLIKELY	Pollution of controlled waters Ground and ground water contamination	LOW
Leaks from site process wastewater drainage	Groundwater	Ground pathway to groundwater	The sites Environmental Programme inspects above ground site open drainage systems as part of the weekly and monthly site inspection.	UNLIKELY	Pollution of controlled waters Ground and ground water contamination	LOW to MODERATE (Trade effluent underground drains are not periodically inspected to make sure that they are not leaking)

Table 2-6. Visible Plume Risks

Hazard	Receptor	Pathway	Risk Management	Probability of exposure	Consequence	What is the overall risk?
<i>What has the potential to cause harm?</i>	<i>What is at risk? What do I wish to protect?</i>	<i>How can the hazard get to the receptor?</i>	<i>What measures will you take to reduce the risk? If it occurs who is responsible for what?</i>	<i>How likely is this contact?</i>	<i>What is the harm that can be caused?</i>	<i>What is the overall risk that still remains? The balance of probability and consequence</i>
Visible plume from stacks	Local industrial neighbours and local residents	Visual impact (air)	<p>Fermenter vessels, isolators and air handling units do not produce visible plumes from the emission points.</p> <p>The stack height, temperature and exhaust flow velocity for the boiler exhaust reduce the potential for visible plumes.</p>	UNLIKELY	Nuisance, i.e. visual impact / loss of light.	LOW

Table 2-7. Accident and Incident Risks

Hazard	Receptor	Pathway	Risk Management	Probability of exposure	Consequence	What is the overall risk?
<i>What has the potential to cause harm?</i>	<i>What is at risk? What do I wish to protect?</i>	<i>How can the hazard get to the receptor?</i>	<i>What measures will you take to reduce the risk? If it occurs who is responsible for what?</i>	<i>How likely is this contact?</i>	<i>What is the harm that can be caused?</i>	<i>What is the overall risk that still remains? The balance of probability and consequence</i>
Fire within process areas leading to fire-fighting run off water	River Ouzel or Groundwater	<p>Surface water drains to River Ouzel</p> <p>Ground pathway to groundwater</p>	<p>Site drainage manhole covers are appropriately colour coded.</p> <p>Firewater from process areas would be directed to the waste water conditioning plant area and sump. Firewater from external areas of the facility would either drain to the surface water drains or the waste water / foul sewerage drains both of which can be isolated.</p> <p>Containment procedures include:</p> <ul style="list-style-type: none"> - Spillage Prevention Policy. - Emergency Preparedness and Response 	UNLIKELY	<p>Pollution of controlled waters</p> <p>Ground and ground water contamination</p>	LOW

Hazard	Receptor	Pathway	Risk Management	Probability of exposure	Consequence	What is the overall risk?
<i>What has the potential to cause harm?</i>	<i>What is at risk? What do I wish to protect?</i>	<i>How can the hazard get to the receptor?</i>	<i>What measures will you take to reduce the risk? If it occurs who is responsible for what?</i>	<i>How likely is this contact?</i>	<i>What is the harm that can be caused?</i>	<i>What is the overall risk that still remains? The balance of probability and consequence</i>
<i>Policy.</i>						
Vandalism leading to spills etc.	River Ouzel or Groundwater	Surface water drains to River Ouzel Ground pathway to groundwater	The majority of the site is provided with perimeter fencing. The site is provided with a gatehouse to which drivers must check in. The site is provided with Closed Circuit Television (CCTV). Site security walkovers are undertaken twice daily (between 0600-0900 and 2100-2330).	UNLIKELY	Pollution of controlled waters Ground and ground water contamination	LOW

