Omega Proteins Ltd.

Penrith

Report Title:	**Environmental Permit Variation Application**
Permit:	**EPR/HP3238AF**
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Submitted to:

Environment Agency

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Contents

1 Introduction

The site is currently permitted by the Environment Agency as an A1 Installation and a variation application is being submitted for a replacement thermal oxidiser running on biomass fuel and one running on gas to replace the two existing units.

Planning permissions have been obtained for these changes where applicable. Technical information to support the application is submitted in the following additional documents:

- Updated H1 risk assessment
- Updated site condition report
- EMS summary
- BAT summary
- Dispersion modelling information
- Noise assessment

2 Process Need

2.1 General

The Permitted site utilises thermal oxidation as the prime odour abatement option for rendering process fumes and for specific odour source abatement. Although the thermal oxidisers are fitted with steam recovery for energy efficiency, the combustion of natural gas in the oxidisers leads to significant carbon dioxide releases. Site is continually looking at options to reduce carbon emissions and utilise renewable fuel options

The installation of the biomass plant offers alternative abatement capacity utilising proven technology and a choice of sustainable fuels. It also has the added functionality of electricity generation from excess steam, utilising a simple steam turbine.

The replacement of the two existing thermal oxidisers with one new unit is based on operational reasons – the existing units have been in place for more than ten years, technology has moved on and, although still serviceable, the company is also thinking forward.

2.1.1 Current Operations

Two recuperative thermal oxidisers are in use. Each is normally fired on natural gas but can switch to tallow if necessary. The two oxidisers link together via a control panel to give effective smooth abatement capacity and they also link to back up abatement equipment comprising of two air-cooled condensers and a boiler. The air cooled condensers are in use at the start up phase of processing, while the cookers are being heated up and before raw material is added, in addition to periods of variable effluent production and / or an oxidiser failure.

2.2 New Multi Fuel Oxidiser

2.2.1 Basis

This oxidiser will perform the same function as the existing oxidisers in providing odour abatement with steam production, but allow the use of non-fossil fuels. The equipment is also designed to run on tallow or gas, should future stocks of renewable fuel be limited. For further details on fuel see section 3.8.

The new equipment has an increased requirement for combustion air, therefore room air will be used to meet this demand. This will decrease the loadings on the bio filters (see section 2.3.5).

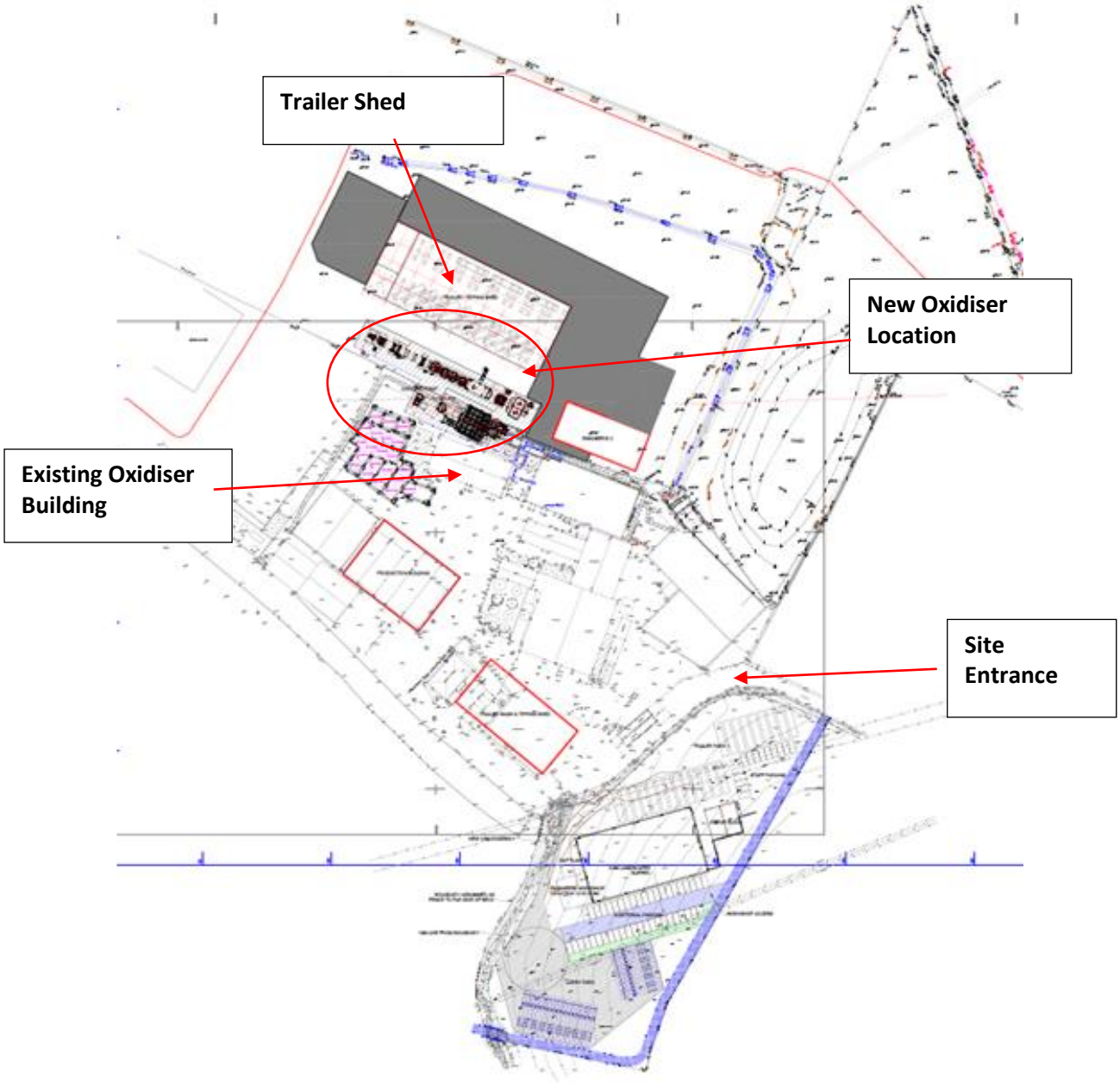
The initial phase will be to run the new unit alongside the existing plant and divert increasing amounts of process fume to the new unit. Once the new unit has been fully optimised and its actual capabilities assessed – this unit will be designated as primary odour abatement. A unit will be required as emergency back up and to cover when the equipment is off for maintenance (1-2 weeks per year).

The air dispersion model has allowed for a ‘worst case’ scenario of the new oxidiser operating with an additional oxidiser at the same time (as back up), should the new one fail or not operate at full capacity during commissioning, or at any other time during use.

2.2.2 Location

The new biomass oxidiser will be located on land behind the existing oxidiser building. This location allows ready diversion of existing ducts and steam systems to link to the new unit without adding additional ducting. All pipework will be above ground. Additionally, it allows for the fuel reception area to be located away from existing meal storage and handling to avoid any potential for cross contamination of finished product on site.

Deliveries to site will be through the existing access and weighbridge facility. Additional hard standing is being constructed around the trailer shed and oxidiser units to allow for vehicle access.



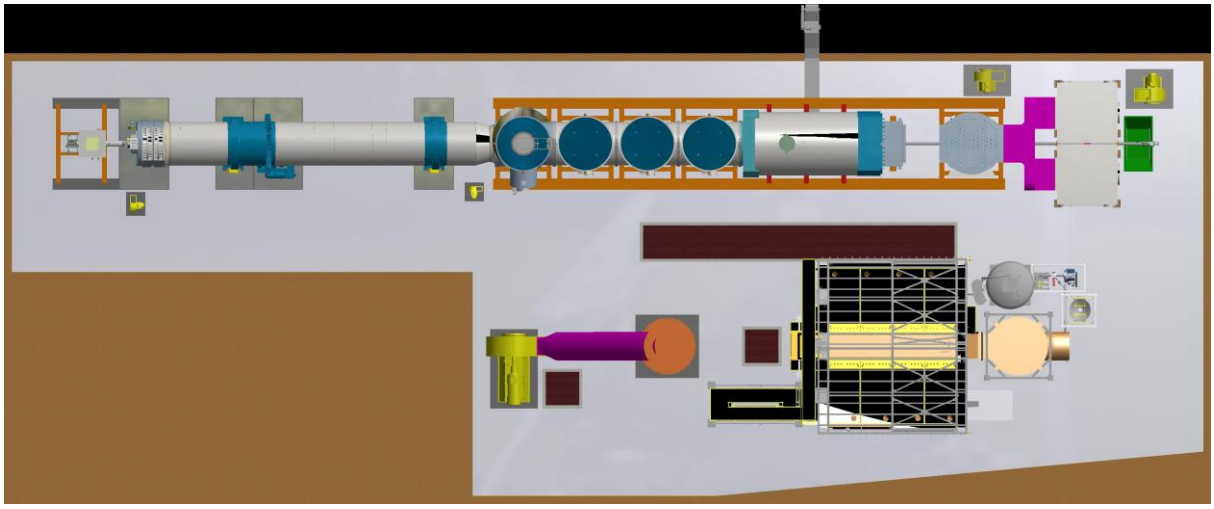
A back up oxidiser (gas powered, recuparative type) is being installed between the new multifuel oxidiser and the trailer shed. A roof will be built over the two units to provide weather protection.

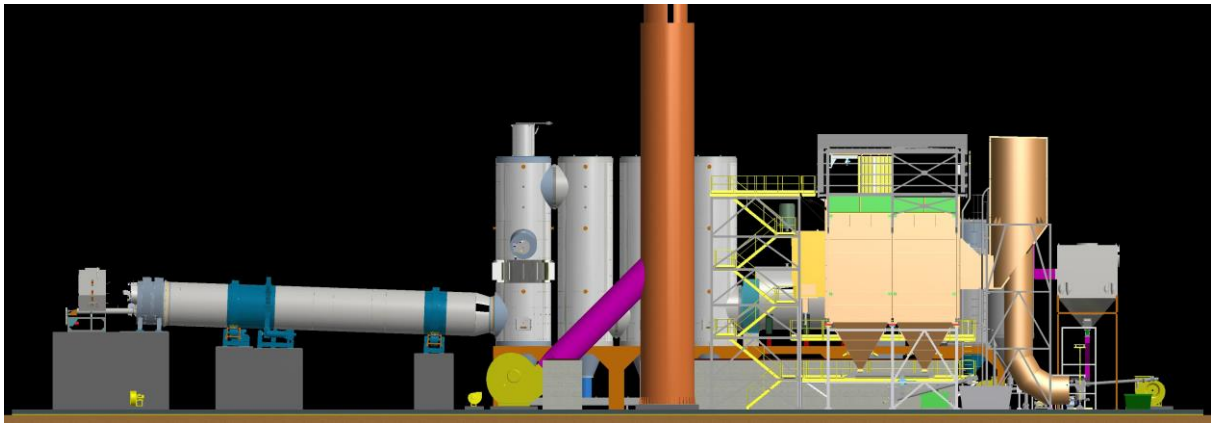
This back up oxidiser is of the same design as the existing two units and will replace them (see Appendix I for technical details).

2.2.3 Construction Detail

The Plant is designed and constructed to comply with the Waste Incineration Directive (WID 2000/76/EC).

A diagram of the layout of the equipment is shown below:





Solid fuel is introduced in a rotary kiln for burning and the gases from combustion pass through a post-combustion chamber (consisting of 4 units) that keeps the gases above 850ºC for more than 2 seconds. This enables the thermal oxidation and elimination of the volatile organic compounds (VOC) in the waste gas stream fed in for abatement.

The rotary kiln is made of high alumina refractory material with adjustable speed, buffer silo and automatic feeding system through variable speed screw conveyor. The combustion chambers are made of high alumina refractory material

There is a wet ashes discharge and extraction system for the kiln and the post-combustion chamber using a steel submerged chain transporter in closed conveyors.

There will be non-hazardous wet ash from the post combustion chambers, boiler hopper, pre-heater and multicyclones and non-hazardous dry ash from the boiler, pre-heater and multicyclones. These will be collected in covered containers for disposal.

The dry ash from the bag filter treatment will be treated and disposed of as hazardous (disposal by a local waste management company). The conveyors are enclosed and will discharge into a covered container.

There is a dedicated enclosed storage silo for the MBM fuel, this is built on the end of the trailer shed and filled by tipping material from bulk trailers.

As a second step, a system for energy recovery is applied to the gases. The energy recovery system is composed of:

- A boiler, which vaporises water using the high temperature of the gases. This steam is used for the production processes.
- An economizer, that pre-heats the vapor fumes before the kiln.
- Two multicyclones, which in addition to pre-heating the combustion air, also clean the gases of ashes and particles.

The third step is the cleaning of the exhaust gases before the emission to atmosphere. This system consists of:

- A reactor, in which is mixed activated carbon and sodium bicarbonate for neutralization of the gases.
- A bag filter to remove particulates.
- A chimney.
- A monitoring system is also in place here (CEMS – Continuous Emissions Monitoring System) to monitor the constituents of the exhaust gases (see section 4.0). After cleaning the emissions will be lower than the current WID standard.

The existing chimney stack will be replaced by a new one (multi flue) in approximately the same position, currently taking emissions from the existing Penrith oxidiser, and the biomass oxidiser. The associated emission point references are A5 and A7 – the stack at A5 being dismantled and replaced by the new stack, thereby not increasing the number of stacks, but providing an additional emissions point – A5 and A7 from the same location. The oxidiser connected to A5 will be decommissioned.

The main characteristics of the chimney will be:

- 25.3m high multi-flue chimney that is to be self-supporting and ground mounted.
- Design code to BS4076: 1989
- Chimney to contain 2No 25.3m high flue liners from 6mm thick grade 304 stainless steel which are to terminate inside the windshield just below inlet level.
    - 1No semi-circular or “D” shaped flue liner at 860mm radii for the existing plant (flue nº1)
    - 1No semi-circular or “D” shaped flue liner at 1480mm radii for the new plant (flue nº2)
- A platform on the outside of the chimney and sampling ports for testing - in accordance with the Environment Agency document Technical Guidance Note (Monitoring) M1. Platform and walkway designed to BS EN 1993-1-1 2005 Steel Structures and the ladder to BS4211 and tubular hand rail system with standards to BS6180. Platform to extend the full 360º of the

chimney circumference and wide enough to accommodate sampling equipment that traverses the chimney diameter.

- Further access is provided from the bag filter section by means of a stair case.

2.2.4 Steam Turbine

The multifuel oxidiser will be in operation over 6-7 days, with production being managed over the whole period. The excess steam not required for production will generate electricity for the site. The maintenance and cleaning processes currently carried out on a 'shut-down' day will be carried out on a rotational basis for each line to even out steam demand.

The steam turbine has been selected to be as small as possible (the foot print of a standard shipping container – 12x2x2.6m) for an efficient output and will be located close to the new plant to limit the length of pipework carrying steam. Consideration has been given to noise (the equipment is rated at 85 dB at 1m) the impact of which has been calculated in the noise assessment for the new oxidiser. Although the impact on site noise is assessed as 'low', the unit will be housed in the existing boiler shed.

The unit will consume a small amount of electricity (10kw) for the control panel, lubrication system and electric boards) and produce 770kw as the net output.

2.2.5 Capacity

The multifuel oxidiser has a rated thermal input of 29.8 MW and a steam generation figure of 26 tonne/hr
The estimated process fume treatment is 21,000 Nm3/hr (approximately 21 tonnes – dependent on the proportion of foul air/ process fume. Current capacity with 2 oxidisers is 19.6 tonnes/hr).
It also requires 46 tonnes per hour of combustion air, which will be a mix of room air and foul air. This is a large increase compared to the 5 tonnes per hour for the existing two oxidisers.

The Improvement Condition Report IC2 in Permit ref EPR/HP3238AF/A001 details the volumes of process fume and foul air currently dealt with by the existing system. Appendix I of this document (also reproduced in the Odour Management Plan (OMP) for the site) has figures updated for 2020 which show that the capacity is not being exceeded.

Source	2018 Evaporation Rate (t/hr process fume)	Primary Abatement (t/hr process fume) Existing 2 oxidisers	New Multifuel TO (t/hr process fume)
PAP (mixed species)	7.8	2 x RTO 19.6	21.0
Poultry Line	5.9-6.9	2 x RTO 19.6	21.0
Feather Line	3.7	WHE 5.98 t	No change
Total	18.4	19.6+5.98 (24.38)	21.0+5.98 (26.98)

Source	2020 Max Predicted Evaporation Rate (t/hr process fume)	New gas TO (t/hr process fume)	New Multifuel TO (t/hr process fume)
PAP (mixed species)	8.0	1 x RTO 22.8	21.0
Poultry Line	6.9	1 x RTO 22.8	21.0
Feather Line	4.3	WHE 5.98 t	No change
Total	19.2	22.8+5.98 (28.78)	21.0+5.98 (26.98)

2.2.6 Safety and Fire Prevention

The equipment is operated and controlled by means of a computerised system and alarms are programmed to ensure the correct settings are maintained. Full details will be documented in the Operating Manual and trained out to operators during the commissioning phase.

The quality of the fuel to be accepted is detailed in specifications and will be subject to periodic checks against these requirements.

The type of emergency covered would be plant failure caused by electrical failures, mechanical part failure or a fire in the kiln. As a complete failsafe mechanism there is an emergency release valve that would de-pressurise the system to prevent explosion, this is required by legislation. This would be extremely rare, as there are a set of alarms for each aspect of the control system and these would be activated first. The failsafe would only operate if all the other systems on the plant failed. The emergency release valve is fitted on all equipment of this type, but rarely or never used.

A fire prevention plan is being incorporated into the site Environmental Management System (EMS) in line with EA guidance. The procedure EID36 deals with manging fire water and preventing pollution, this will be updated and due consideration given to the content of the site Health & Procedures covering fire. All of the site fire risk assessments and safety procedures covering fire are reviewed with the local fire service.

The main aspects considered are:

Provision of an up to date site plan – to clearly show where fuel is stored and used

Fire prevention – correct storage of fuels, checking temperature of MBM on arrival, contingency for cooling material (e.g. by spreading out in the storage area), availability of the correct type of fire extinguisher, avoiding long term storage, control of dust, fire retarding measures on fuel intake to kiln.

Reducing the impact of fire – signs advising of the hazard, designated storage area, clear communication of fire precautions / how to deal with an incident, adequate methods to deal with a fire (emergency contacts, water supply, extinguishers)

The plan is provided as a separate document and is incorporated into the existing site H&S management systems for scheduled maintenance and review. The site H&S plans are reviewed by the Fire Service.

2.2.7 Commissioning Plans

The manufacturer will be directing the commissioning of the equipment during installation and this will cover both cold and hot commissioning work.

The main areas to consider during the process are:

- Cold Commissioning
    - Electrical safety
    - Mechanical safety
    - Effectiveness of control measures and instrumentation
    - Effectiveness of safety and emergency equipment
    - Calibration of sampling equipment
- Hot Commissioning
    - Preparation of equipment for first fire
    - Electrical and control testing

- Refractory drying
- Biomass feeding and combustion
- Effective combustion
- Effectiveness of control measures and instrumentation
- Effectiveness of safety and emergency equipment
- Continuous operation test
- Performance test

A certificate of operational acceptance will be provided on handover.

3 Potential Emissions and Control

3.1 Introduction

This section addresses the potential emissions and amenity impacts associated with the multifuel oxidiser and sets out the mitigation measures proposed and residual impacts.

3.2 Odour

The plant is designed to provide effective odour abatement. Combustion temperatures comparable to those already achieved at site with the existing oxidisers will be achieved and the combustion chamber will have a higher residence time than for the existing oxidisers (2 second vs 1-1.5 seconds). The residence time is expected to lead to odour destruction efficiencies at least as good as those currently achieved at site.

The additional requirement for combustion air (46 tonnes per hour) will allow improved routing of foul air and room air for abatement. This will be achieved by installing a collector vessel in the new (planned) production areas and take off ducting to the main effluent collector, following the lines of the existing buildings and pipe bridges.

3.3 Noise

The fans and conveyors associated with the new oxidiser are potential noise sources. Additionally the flue gas cleaning system can be a source of noise. Fans will have acoustic enclosures to minimise noise propagation and the flue gas abatement units will be specified with suitable insulation to minimise noise propagation and with sound reduction enclosures around moving parts such as valves and air blowers. The insulation will be fibreboard designed for use where greater levels of sound / acoustic insulation are required (to EN520 Type D standard) such as British Gypsum Soundbloc, Kingspan FibreBoard (or equivalent). See noise assessment for further detail. A roof is also to be constructed over the units for weather protection, which will also afford some additional noise shielding.

The steam turbine will be situated in a location close to the existing oxidiser locations, with screening from buildings to mitigate noise impact.

A noise assessment was carried out and this is referred to in the H1 Risk Assessment document in more detail. The conclusions of the assessment were that the new proposal would operate below existing noise levels at the boundary with the nearest residential property.

3.4 Vibration

The system does not use equipment that will have sufficient power to generate vibrations that could be felt beyond the installation boundary.

3.5 Dust

Tipping of dust material (such as MBM) will be carried out in a purpose built tipping shed, with air extracted to odour abatement. This extracted air will be kept separate from the trailer shed air. Cleaning schedules will be implemented to prevent excessive dust build up.

Ash from the combustion kiln and from the flue gas treatment unit will be collected via enclosed conveyors into closed vessels for recovery/disposal off-site.

3.6 Air

Flue gas treatment will be provided by a flue gas treatment system comprising an automated feeding and dosing system, contact neutraliser reactor and bag filter. Sodium bicarbonate and activated carbon will be added to neutralise and absorb the key pollutants. The spent reagents will be collected with fly ash in the bag filter.

This is covered in more detail in Section 4.0.

Anticipated emissions from the system are well within the current permitted values. This is discussed in more detail in the H1 Risk Assessment document, together with the results of the 2017 dispersion modelling and subsequent updated models.

Parameter *Results expressed as mg/Nm^3 unless otherwise stated*	Results Achieved With MBM (comparable equipment)	WID Standard	Current IPPC standard	2005 Values assessed as acceptable	2017 Values assessed as acceptable (max)
Particulates	18.2	30	100	250	42
CO	6.0	100	150	250	2.2
NOx	29.0	400	400	700	288
Volatile Organic Compounds	13	20	30	n/a	n/a
SO2	106	200	200	900	n/a
Metals	Below WID limits (trace levels)	<0.5	n/a	n/a	n/a
Dioxins	<0.01ng/Nm3	<0.1	n/a	n/a	n/a

The emissions from the multifuel oxidiser will not lead to any increased risk of a breach of the relevant AQS values. Impacts are further discussed in the dispersion modelling reports and the H1 risk assessment.

3.7 Waste

Flue gas treatment residues will be collected and sent for suitable off-site disposal such as Hazardous Waste landfill. Local options are available and samples will be analysed during the commissioning stage in order to finalise the type of treatment.

Estimated quantities are 1,200 kg per hour of non-hazardous ashes and 130 kg per hour of hazardous ashes.

TSE Regulations currently prevent the use of ash from MBM combustion as fertiliser without further assessment. From about 2012 Defra and the EA held a series of workshops seeking to develop a national Quality Protocol to allow options for the use of the ash. Such a Quality Protocol would have allowed ash produced in accordance with the protocol to be used in fertiliser. This option is no

longer available, although the industry are to begin discussions to evaluate the value of a similar approach.

The Penrith site will make an End-of-Waste application for the use of the combustion ash in fertiliser and seek to recover the waste ash via this route. Given the positive experience of other sites with End-of-Waste cases it is anticipated that the Omega application will be successful. In the interim period a suitable landfill option will be used.

The exit conveyor for the ash classed as hazardous is under the bag filter and is coloured yellow. A bespoke container will be placed underneath allowing for containment of the material prior to disposal.

3.8 Fuel Types

The existing thermal oxidisers have dual fuel burners allowing the use of natural gas and liquid biofuels such as tallow.

The new equipment will also use these fuels but in addition the kiln can burn the following:

MBM – meat and bone meal produced by rendering of animal by products

Woodchip – grade A waste wood chipped into suitable sized chips for combustion and classified as a biomass fuel under BLS (reference number – BLS 0512743-004)

DAF sludge (02 02 04) – dewatered sludge from the treatment of wash waters on site can be used together with wood chip to use as an alternative to MBM, providing the water content is restricted (this will be confirmed by laboratory analysis prior to use).

All fuel will have a specification to be agreed before use – so that calorific value, levels of metals or other hazardous components, particle size and potential for foreign body inclusion can all be assessed.

Examples of the specifications for the new fuels are reproduced below:

MBM Fuel Specification Version 1	
Minimum Net CV	16 MJ/KG as analysed
Total Moisture	8% as received
Ash	28% dry
Sulphur	0.7% as received
Chlorine	0.7% as received
Temperature delivered	60^0C Maximum
density m3/mg	450-750 kg/m3

Contaminant materials under 5 wt% as determined by an (Ofgem approved) Manual Sort technique
Note – this fuel may be substituted with bonemeal of a Category 3 origin if required.

BSL Approved Grade A Recycled Woodchip

Produced by Envirowaste Services Ltd: BSL 012743-0004

Maximum Moisture	30 wt%
Minimum Moisture*	10 wt%
Majority visual colour	Natural wood colours in pile
Typical Wood species	A Clean pine species derived from pallets or similar
Metal content	Not permitted
woodchip 45mm or under diameter across	75%
woodchip between 45-100mm diameter across	25%
100mm diameter woodchip	Not permitted

*It is preferred that moisture is kept above 10% as it allows the fuel delivery system to push, crush and handle the woodchip better.

The wood is subject to quality checks prior to chipping and metal removed as part of the process.

4 Emissions and Monitoring

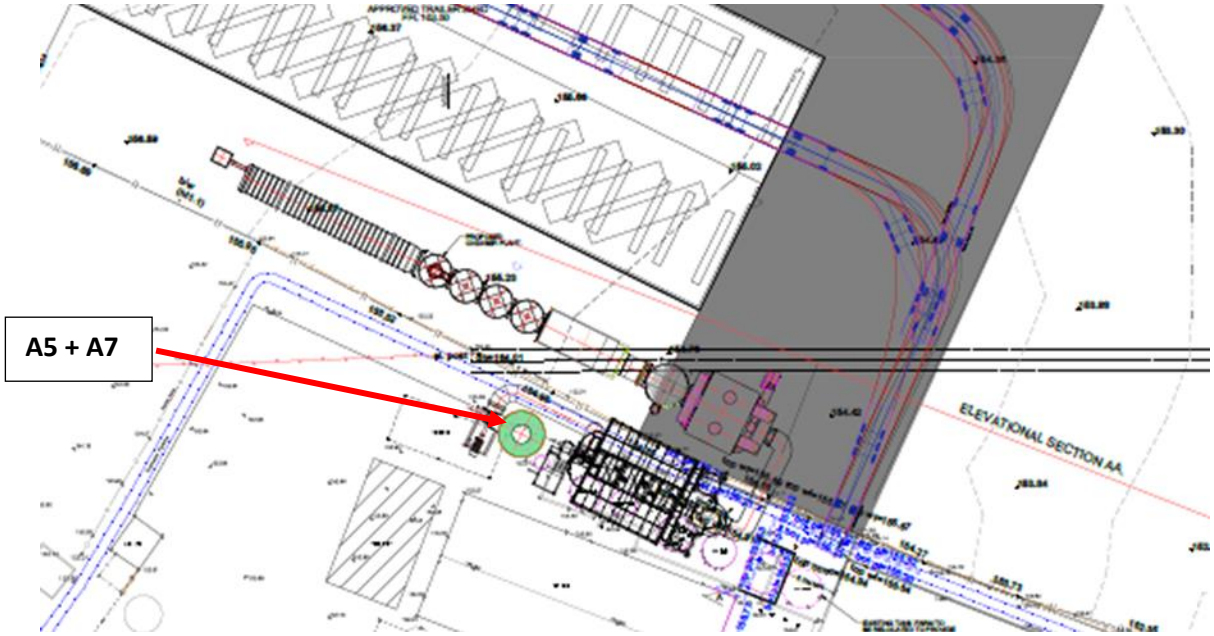
4.1 Introduction

This Section of the report identifies potential emissions from site and details the monitoring methods to be implemented.

4.2 Emissions to Air

4.2.1 Point Source Emissions

A neutralisation step and bag filter system will treat the exhaust gases and the outlet flue will be fitted with CEMS (Continuous Emissions Monitoring System). The new oxidiser (New point A7) will share a stack with the existing Penrith oxidiser (Existing point A5) until it is decommissioned.



4.3 Description of CEMS

The CEMS that is going to be installed is manufactured by SICK a German company with UK base – complying with MCERTS and EN14181.

- Extractive Multicomponent Analyser: SICK System MCS100 FT for all the IR components.
- Dust monitoring system: Model SICK Dusthunter SP100 for concentration measurement.
- Flow, temperature and Absolute Pressure on stack
- Emission Data Acquisition System consisting of an industrial computer located in the control room with the corresponding software. Emission software will be developed according the local regulations. Communication module to connect to the PC for the data evaluation.
- Full automatic calibration system, instead of gas cylinders.
- All the systems will be installed in an airconditioned cabinet in a designated area
- Sampling ports as per figure A2.3 of the Environment Agency document Technical Guidance Note (Monitoring) M1.

Sampling ports for the continuous monitoring are separate to the ports for annual extractive sampling.

4.4 Components to be measured

The following components are to be measured: HCl, HF, SO2, CO, NOx, TOC, Dust, H2O, CO2, O2, flow, pressure and temperature.

Measurement ranges are shown in the table below:

Component	Limit Value (Day)	Measuring Range
HCl	10 mg/m^3	0 – 20 / 120 mg/Nm^3
HF	1 mg/m^3	0 – 8 mg/Nm^3
SO_2	50 mg/m^3	0 – 100 / 400 mg/Nm^3
CO	50 mg/m^3	0 – 100 /1.000 mg/Nm^3
NOx (as NO_2)	200 mg/m^3	0 – 800 mg/Nm^3
NO		0 – 200 / 800 mg/Nm^3
NO2		0 – 100 / 500 mg/Nm^3
FID Analyser		
TOC	10 mg/m^3	0 – 40 mg/Nm^3
Additional measuring components		
H_2O		0 - 45 Vol.%
CO_2		0 - 20 Vol.%
O_2		0 - 21 Vol.%
Dust monitoring	10 mg/m^3	0 – 100 mg/Nm^3
Abs. Press		0 – 1600 mbar
Temperature		0 – 300 °C
Flow monitoring		0 – 100.000 m3/h

4.5 Sampling ports on chimney

Sampling ports designed and installed as per the Environment Agency document Technical Guidance Note (Monitoring) M1 and the diagrams below show typical locations on similar equipment.

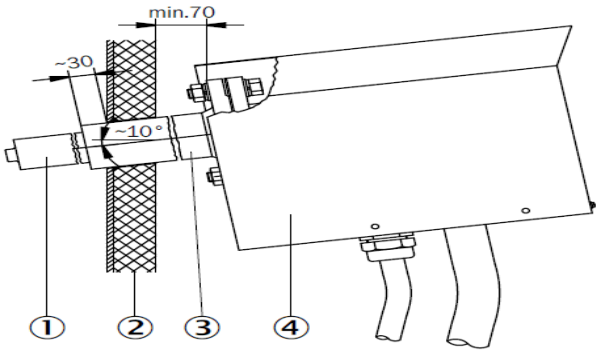
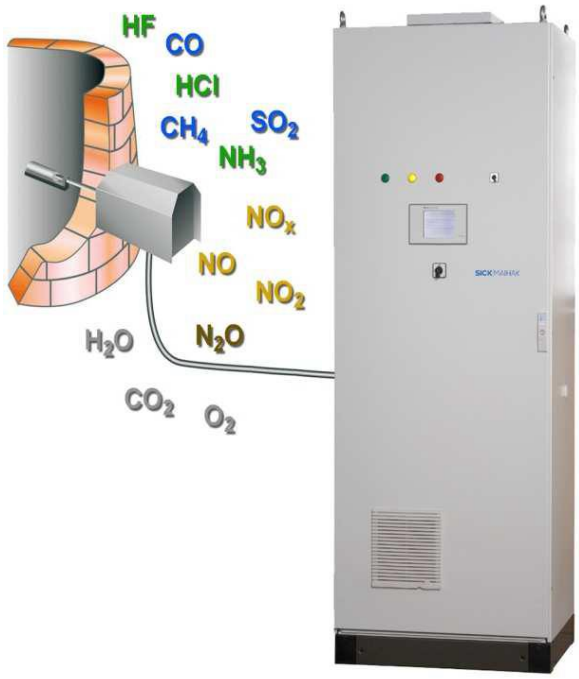
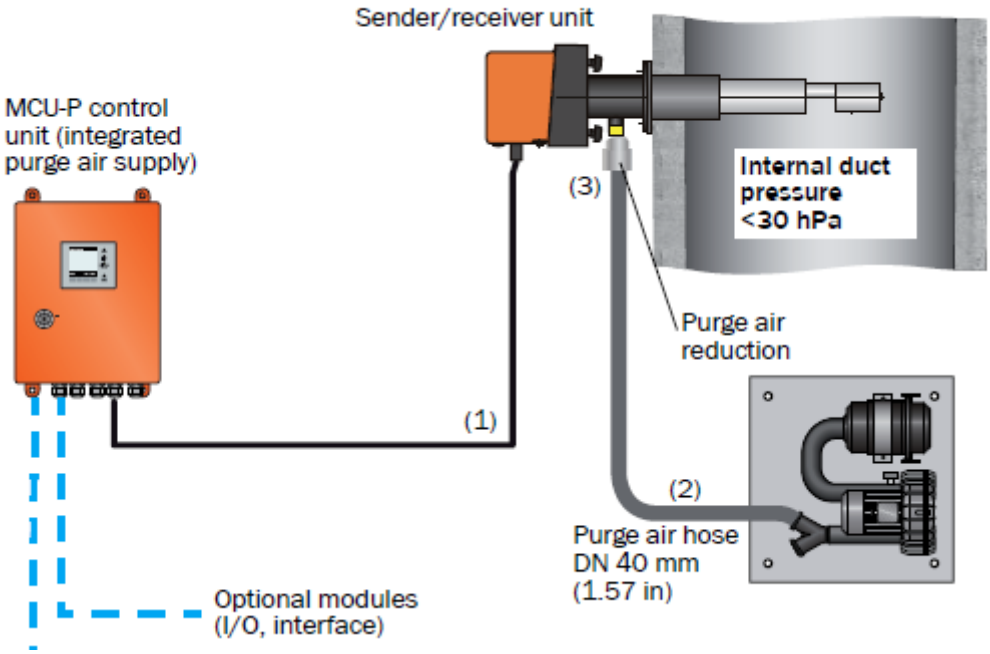


Figure 10: Installation requirements for welding neck flange

① Probe tube
② Stack
③ Welding neck flange
④ Gas sampling filter



- Flange nº 2 (Position 3 of the drawing Annex 1) for the “Dusthunter” SP100



- Flange nº 3 (Position 5 of the drawing Annex 1) for the “Flowsic” used for velocity measurement.

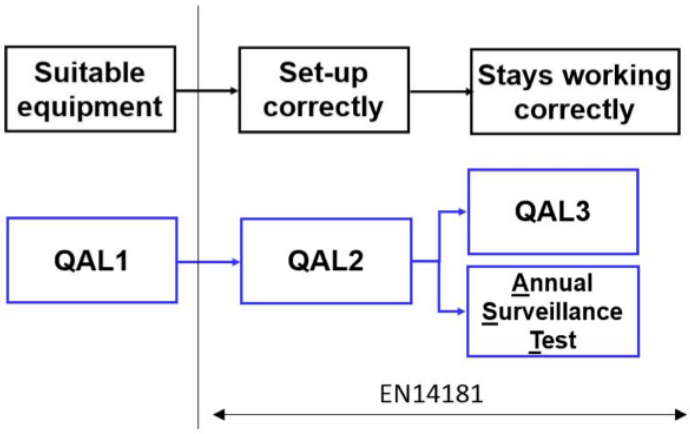
- Flange nº4 (position 6 of drawing Annex 1) for temperature and pressure.

CEMS system will be provided and installed with software called CEMSuite with MCERTS certification. The CEMSuite will run in a PC installed in a control room at the foot of the chimney.

4.6 Description of Quality Standards Applied

EN 14181 of Quality Assurance for continuous monitoring systems of this type specifies requirements for the three QAL (Quality Assurance Levels) and additional annual surveillance test (AST). These are:

- QAL1: process by which a suitable CEMS is selected as being potentially fit for the applications in terms of its measurement uncertainty capability etc. This requires a procedure to demonstrate that the CEMS is potentially suitable for its purpose generally before its sale and installation, by conformance testing (sometimes popularly known as 'type approval') to demonstrate that it can achieve the performance requirements specified in the EU Directives
- QAL2: The procedure for calibrating the CEMS against the appropriate SRM once the specific AMS has been installed at the WID or the LCPD plant.
- QAL3: A procedure for assessing, in an on-going manner, the quality of results when it is operating normally on the plant, in order to demonstrate and maintain the required quality of the results. This is done by checking the readings that are obtained when implementing zero and span checks on a regular basis, so as to confirm that the repeatability of these checks are consistent with those obtained during the QAL1 conformance tests.
- AST: A procedure to evaluate the system on a yearly basis to show that it continues to function correctly and the calibration function remains valid by comparison with the results obtained in QAL2.



The CEMS for this plant provides a QAL3 system, an automatic calibration system (span Check QAL3) consisting of filter wheel instead of gas cylinders for following components: HCl, HF, CO, NO, CO2, SO2, H2O.

4.7 Fugitive Releases to Air

The measures described above will reduce potential fugitive emissions to air to minimal levels.

5 Point Source Releases to Water

5.1.1 Surface Water Discharges

There is no direct discharge to surface water associated with this new plant. Any roof water will be dealt with as per the existing arrangements for the main installation. Contaminated and potentially contaminated surface water will be directed to the existing effluent system for treatment.

5.1.2 Foul Water Discharges

The biomass oxidiser plant does not need its own mess and toilet facilities so there are no specific foul water discharges associated with it.

5.1.3 Trade Effluent Discharges

Wash waters will be directed into the existing effluent system, no additional drainage is required for this installation

6 Fugitive Releases to Land and Water

The installation has in place an infrastructure monitoring programme designed to ensure there is no loss of integrity to the systems designed to prevent fugitive emissions to land and to controlled waters. The programme incorporates the elements listed below:

- Tank, bund and pipe work inspections;
- Impermeable surfaces;
- Drainage system.

Where deficiencies are encountered these will be reported as part of the EMS using the incident and corrective action structure and repairs instigated.

Appendix I Replacement Gas Oxidiser

The two existing oxidisers are to be replaced with a slightly larger recuperative oxidiser also running on gas. The vapour processing capacity is 22.8 t/hr (c.f. 19.6 from the existing 2 units).
The net thermal input of the unit is 23 MW.

Technical Details

The design and operation of the new gas unit is the same as the existing two oxidisers, therefore existing procedures for control, operation and maintenance can be easily applied to the new unit. This is a DEO recuperative thermal oxidiser manufactured by Babcock Wanson. Commissioning will be carried out by the manufacturer and will include setting the combustion controls, ensuring the correct balance of air, fuel and process fume across the operating range.
The chamber has been sized to provide minimum 1 second of residence time at 950°C (highest temperature / minimum dwell time) within the chamber with the process operating at full load. It is designed to process 22.8 tonne/hour of process fume plus a further 6.2 tonnes/ hour of foul air.
Continuous monitoring includes those parameters already documented in the current permit:

- Combustion chamber temperature
- Suction pressure
- Effluent fan speed
- Carbon monoxide and oxygen in exhaust gases.

Additional back up steam supply is provided by a Robey gas fired boiler of 6.9 MW thermal input.

Control measures include the following:
Starting Up:

The opening of the damper when the oxidiser chamber is at the correct temperature is automatic therefore the cooking process will not send fume to the oxidiser before the combustion chamber temperature is sufficiently high enough. There is communication between production operators and RTO operators in the boiler house to ensure that production only starts when everything is ready. These procedures are documented.

Stopping / Slowing production at the signal of the oxidiser :

On loss of suction pressure, the signal to the cookers is automatic and this will stop the raw material feed and the steam. Then the operator has to check with the boiler house to see if this is a short or longer term delay. As soon as pressure is restored the operator can run the plant again. There is no alarm as this is not a failure. Although the pressure has dropped, the fan is still running and the combustion temperature is maintained – it just stops any more fume being produced (by stopping the raw material feed and steam) and collected (no suction pressure). The operator cannot override it, but the air cooled condensers can be brought on line to assist with processing the fume (this is detailed in the OMP).

Sudden Stoppage/ Fault Mode:

In the case of oxidiser failure (electrical or fault status such as high or low water or a power failure) there is a visual alarm notification on the operators screen. The raw material feed and steam will also be shut down automatically and an alarm sounds in the boiler house.

If there is a temperature failure the audible alarm in the boiler house will be trigged and the effluent damper will automatically close (below 850 ^{0}C).

Odour Handling Capacity:

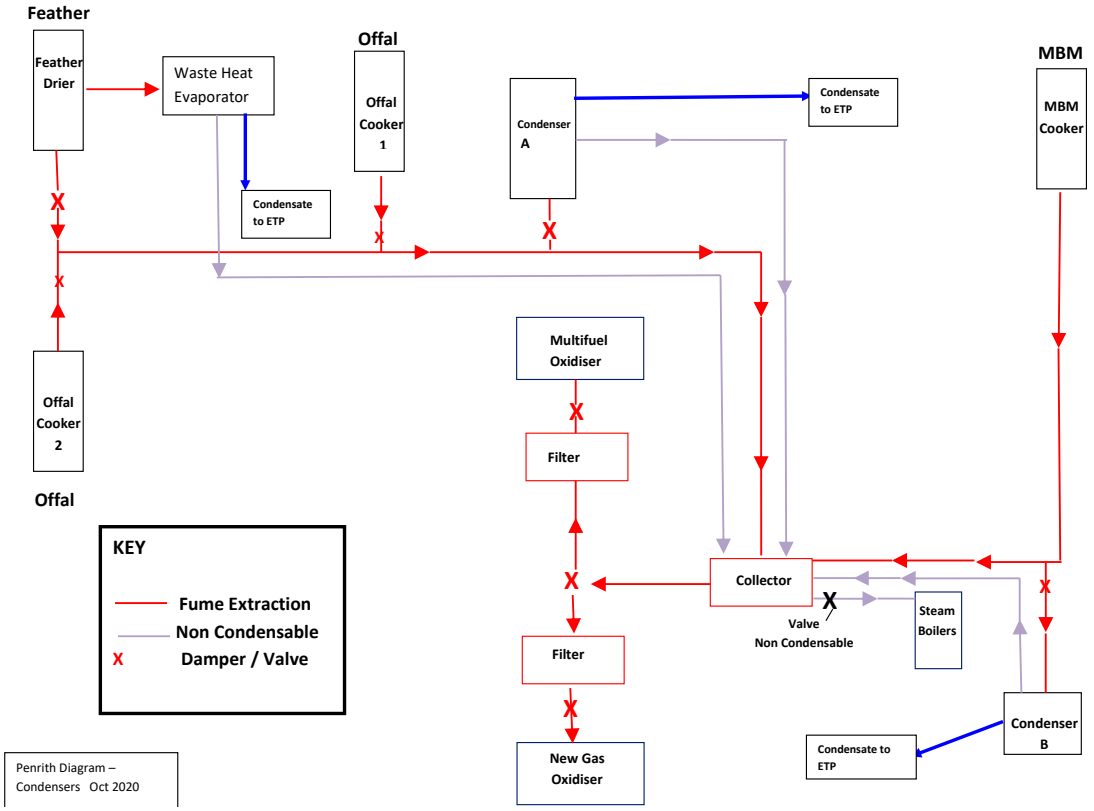
Scenario as per current permit variation:

Source	2018 Evaporation Rate (t/hr process fume)	Primary Abatement (t/hr process fume)	New TO (t/hr process fume)
PAP (mixed species)	7.8	2 x RTO 19.6	21.0
Poultry Line	5.9-6.9	2 x RTO 19.6	21.0
Feather Line	3.7	WHE 5.98 t	No change
Total	18.4	19.6+5.98 (24.38)	21.0+5.98 (26.98)

Scenario with replacement gas oxidiser:

Source	2020 Max Predicted Evaporation Rate (t/hr process fume)	New gas TO (t/hr process fume)	New TO (t/hr process fume)
PAP (mixed species)	8.0	1 x RTO 22.8	21.0
Poultry Line	6.9	1 x RTO 22.8	21.0
Feather Line	4.3	WHE 5.98 t	No change
Total	19.2	22.8+5.98 (28.78)	21.0+5.98 (26.98)

From the figures it is shown that the one oxidiser has the capacity to act as back up duty for the multifuel oxidiser if required.
A description of the operating and contingency scenarios is contained in the Odour Management Plan (OMP) for the site. A diagram of the connections is reproduced below:



Other permit considerations:

Emission Limits:

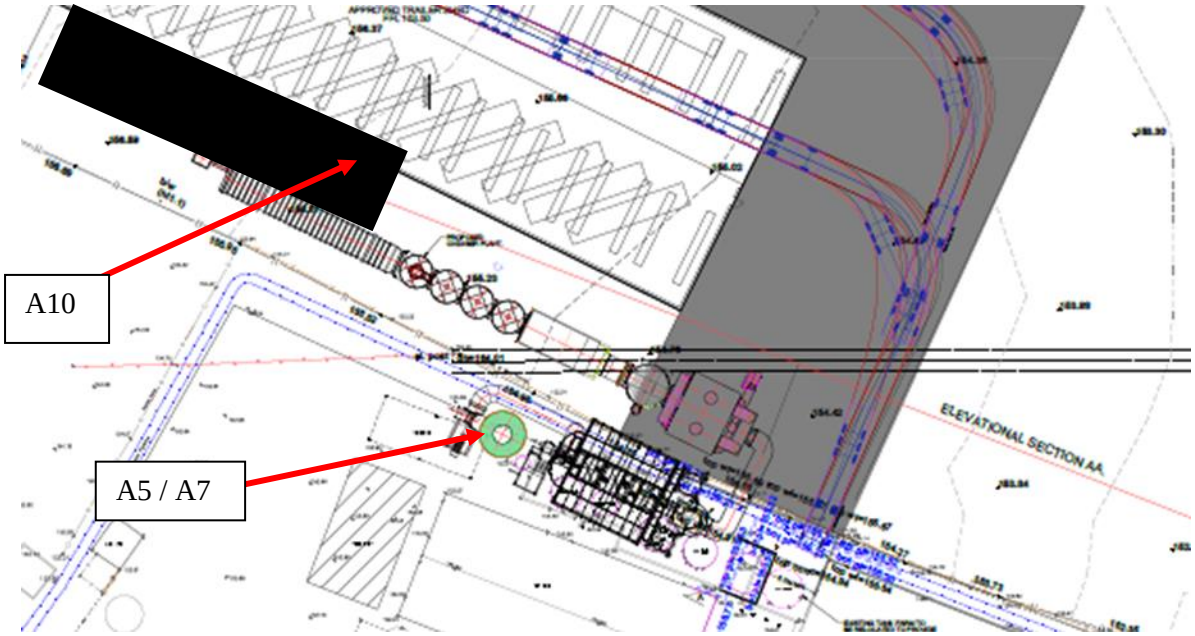
It is considered that SO_2 limits in the current permit are too low and the levels present are a function of the oxidation of compounds in the process fume. The NOx emissions will be within the existing ELV requirements as it is running on natural gas, although there will be the additional contribution from the process vapour.

Further details are set out in the Environmental Risk Assessment document and a dispersion model has been carried out.

Emission Points:

There will be a new emission point for this oxidiser, situated between the multifuel oxidiser (A7, sharing the stack with A5 – existing Penrith Oxidiser) and the trailer shed. The emission point for the existing Bradford Oxidiser (A6) will be removed. There will be no emissions through A5, although the stack structure will remain in place.

This will therefore result in a reduction of emission points. The new emission point is labelled A10.



Air Dispersion Model:
This has been updated for the new stack position and the results are discussed in the Environmental Risk Assessment document. The Dispersion reports are provided separately.

Stack Height:
The height of the new stack will be no taller than the existing one at point A7 (25.3m), the diameter will be 1.7m.

Other Emissions

The details provided in the main document (for the multifuel oxidiser) for point source emissions in respect of surface water, foul effluent and trade effluent plus fugitive emissions to land are the same.

Noise

As part of the planning application for the multifuel oxidiser a noise assessment was carried out by Sharpes Redmore and included the following table of results:

Distance Noise Level dB	L_{AeqT}	L_{A90T}	L_{Amax}
1 Oxidiser @ 10m	77	72-73	79-80
1Oxidiser@ 130m	48	43-48	52-65
2 Oxidisers @10m	81	75-77	83-84
2 Oxidisers @20m	71	69-70	82-84
1 Oxidiser @ 1m	86	84-86	88
2 Oxidisers @1m	88	86	89

The manufacturer's information for the new gas oxidiser states the Noise level to be 85dB at 1m, which puts the level at less than the two existing units and also lower than the multifuel oxidiser.