

Document reference: ECGE HACCP

**PROCESSING OF ANIMAL BY-PRODUCTS TO PRODUCE
TALLOW AND MEAT AND BONE MEAL BY HEATING AND
CENTRIFUGAL EXTRACTION**

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HACCP PLAN

January 2017

OUR REF: 15/2949/ippc

1. INTRODUCTION

1.1 This Hazard Analysis and Critical Control Points (HACCP) report has been prepared to assess the risks associated with the processing of animal by-products and is presented as part of the Environmental Permit application to operate a new process (the “New Process”) to extract oil (tallow) from animal by-products using centrifugal force and produce meat and bone meal as a residual product at premises adjoining the knackery and Intermediate Plant of F Redfern & Sons Ltd at Flagg, Derbyshire. The adjoining knackery and Intermediate Plant are licenced operations under the EU Animal By-Products Regulations (ABPR) and the relevant UK enforcement legislation, and an Environmental Permit is in force covering the operation of an animal carcass incinerator and associated pet carcass incinerator. This HACCP identifies similar issues and critical control points, but also identifies emissions and emission points critical to the control, mitigation or elimination of potential pollution to air, water, groundwater and land which is relevant to Environmental Permitting.

1.2 The animal by-products (ABP) to be used in the process are predominantly in the form of skinned carcasses which have been through the knackery process. The ABP will consist of:

- Bovine, being collected fallen stock forwarded on to premises licensed under the Animal By Products Regulations to receive and process, or incinerate, animal by products;
- Sheep, including animals tested and slaughtered under the national Scrapie Flocks Scheme;
- Pigs, dead animals occasionally brought in by farmers;
- Goats, dead animals occasionally brought in by farmers;
- Avian, being dead birds from poultry flocks or “dead on arrival” birds from processors; and
- Fish, such as recovered dead fish following a pollution incident in a river.

- 1.3 All material is dealt with as Category 1 ABP material.
- 1.4 A Licence is required in compliance with European Union Animal By-Products Regulations 1774/2002, Annex III, Chapter 1 and Chapter 2 and Article 25. The HACCP report is required in compliance with Article 25 of the Regulation which necessitates putting in place, implementing and maintaining a permanent procedure developed in accordance with the principles of HACCP. However, the HACCP report is also a means of identifying the critical points for control of potentially polluting emissions.
- 1.5 The HACCP system is principally recognised as a means for food safety management. It is a preventative approach based on seven principles:
1. Identify any hazards that must be prevented, eliminated or reduced;
 2. identify the critical control points (CCPs) at which control is essential;
 3. establish critical limits at CCPs;
 4. establish procedures to monitor the CCPs;
 5. establish corrective action to be taken if a CCP is not under control;
 6. establish procedure to verify the above procedures are working correctly;
and
 7. establish documents and records to demonstrate the effective application of the above measures.
- 1.6 This report applies these principles as appropriate to the specific operation, which is the reception and processing of animal by-products to extract animal oil (tallow) for use on site as a combustion fuel in the production of electricity and meat and bone meal for onward transshipment for use as a fuel elsewhere. There are specific controls on the handling, storage and processing of animal by-products at all stages and the regulatory regime (the EU ABPR) in large part identifies the critical control points. There are also specific controls to control, eliminate, or mitigate potentially polluting emissions in order to protect the environment.

2. PLANT and OPERATIONAL DESCRIPTION

- 2.1 The New Process is located in a new building to the rear (north) of the existing hides' building which forms part of the knackery; four silos to contain recovered water and waste water, and extracted oil, which form part of the New Process are positioned within a bund adjoining the new building, to the south, at the western end of the hides' building. The new building is located on previously undeveloped land.
- 2.2 Map ECGE SM 1 illustrates the new building, comprising the plant, and external yard area – the external yard is outwith the Installation and is part of the knackery.
- 2.3 “Product” description and characteristics:

1. Raw Material and Source:

Animal by-products from adjoining knackery or Intermediate Plant

2. Important despatched product characteristics:

- Identifiable bulked loads of meat and bone meal, a processed animal by-product, in the form of a dry, ground material, despatched in covered trailers;
- tallow, which must be heated to maintain liquidity, piped directly or via on-site storage to the adjoining Directly Associated Activity (DAA);
- waste water stream and wash down waters collected in an on-site storage tank for transshipment via tanker for off-site treatment;
- metal waste collected from scanning of macerated animal by-products, collected into boxes and transferred to the knackery for bulking up with metal material extracted in the knackery and sent off-site for recycling;

3. Ingredients:

- Bovines, with hides removed, sheep with fleeces removed if non-scrapie stock, goat and pig animals – whole, dismembered or split carcasses delivered from adjoining knackery;
- Sheep carcasses, slaughtered on adjoining site under Scrapie Flocks Scheme, delivered from adjoining Intermediate Plant;
- Avian ABP, whether whole carcasses or part;
- Fish, in whole or part.

4. Delivery and use of product:

- Animal oil (tallow) – delivered by pipe to electricity generating set within the building either directly or via external storage tank(s);
- Meat and bone meal for onward shipment in covered trailers for use as a fuel in generating plants, cement works and similar

2.5 The operations undertaken at the New Process are as follows:

1. Animal by-products are received into the reception area from the adjoining knackery or Intermediate Plant, transported in containers such as dolavs or as whole carcasses, and introduced directly into the lidded hopper which feeds a series of macerators.¹ The macerators are enclosed as are the screw conveyors between each macerator, the reception hopper and the buffer tank.
2. Inter-posed within the series of macerators is a metal detector; any residual metal which has not been removed during the knackery process, such as worming bolas, nails and wire ingested by animals, is removed and returned to the knackery from where it is dispatched for off-site recycling.
3. In the event of any liquid from carcasses this is mopped up and introduced into the hopper for processing. All wash down waters from cleaning

¹ Carcasses received in the knackery or Intermediate Plant are normally collected by F Redfern & Sons Ltd using their own vehicles. Each carcass is checked against the animal's passport and the necessary RPA and BCMS paperwork completed; recording of incoming material to Redfern's is by head against individual passports and not by weight.

equipment and floors drain to the enclosed drainage system. All collected wash down waters are collected and taken by tanker for off-site treatment.

4. The macerated material is passed through a kettle heater and thereafter into a heated vessel where the material is retained for a period; the material is repassed through a circulating kettle heater and into the vessel, homogenising it with other material.
5. Hot exhaust gases from the electricity generating set is recovered and used to produce steam in the boiler thus producing a “good quality” combined heat and power operation and reducing the temperature of the exhaust gases which are eventually emitted via the stack.
6. From the heated vessel the slurry material is pumped to the separation process that uses a specially designed three-phase decanter centrifuge, separating it into oil, solids, and water waste in a sealed process.
7. The solids are discharged via an enclosed auger screw conveyor to the protein dryer.
8. The protein dryer evaporates the residual moisture from the protein solids, and the evaporated moisture is condensed back into water in an air condenser and then mixed with the water removed by the centrifuge. The dried solids’ product (meat and bone meal) is discharged via a cooling screw into a covered trailer within the building for dispatch for use as a fuel elsewhere.
9. The dried non-condensable gases are ducted to the electricity generator air intake and burnt as combustion air in the generator engine.
10. The extracted animal oil from the centrifuge is then pumped to the oil storage tank, prior to use as fuel in the electricity generator engine.
11. The water from the centrifuge is pumped to storage tanks. Some water is drawn off and introduced into the raw material prior to being removed for approved disposal.
12. The whole process is contained between the points of raw material being introduced into the reception hopper and the discharge of meat and bone meal into trailers; the animal oil (tallow) and waste water are contained at

all times. The material passes through the process by displacement, being pushed through.

13. When there is a breakdown, any material in the New Process and carcasses from the knackery and Intermediate Plant are collected and removed together with all associated material, bedding, faeces, liquids, etc, using a bucket tractor and deposited into a trailer parked in the front (south) yard to the knackery for onward shipment to and disposal at a rendering plant.

3. Environmental Issues

- 3.1 The following have been identified as having potential for harmful emissions to air:

- Odour
- Noise

- 3.2 There is no reasonable potential for harmful emissions to water, groundwater or land. The plant is fully enclosed from beginning to end and within a building, and the potential for polluting emissions could only occur in the event of catastrophic failure of the containment. Additionally, the plant is required to be licenced in accordance with the EU Animal By-Products Regulations and required to have impermeable surfaces including all delivery and wash down areas; all wash down waters or spillages are contained. All liquids drain to a collection tank for off-site authorised disposal. Any spilt material is collected and introduced into the plant for processing, including any material caught in drain traps from washing down. Storage tanks for tallow and waste water are external to the building but contained within a bund in compliance with other legislation, to abate any potential leakage in the event of catastrophic failure of the tanks or associated pipework.

4. HACCP

4.1 This part of the report refers to each of the critical issues of:

1. raw material reception, handling and processing
2. odour control
3. noise

4.2 Each critical issue is reviewed under the following:

- Hazard Analysis
- Identification of Critical Control Points
- HACCP Plan for dealing with the Critical Control Points

4.3 Hazard Analysis

Ingredients/Processing	Potential Hazard	Significant Hazard	Justification for determination as a Significant Hazard	Preventative Measures for significant Hazards
<p>1. Raw Material (Treated as Category 1 mammalian)</p>	<p><u>Regulatory</u> 1. All received dead stock treated as Category 1 ABP</p>	<p>Yes</p>	<p>Plant designed and set up to handle carcasses and contained ABP only. Administrative and processing issues. All carcasses treated as Category 1 material.</p>	<p>Admin controls by RPA and its agent control source, type and identification of carcasses into knackery /Intermediate Plant; this material is introduced into the plant for processing in accordance with EU Regs.</p>
	<p><u>Biological</u> Potential for pathogens to be present in fallen stock</p>	<p>Yes</p>	<p>Animal may have died or be required to be put down because of disease.</p>	<p>Regulatory and admin – speedy introduction into New Process</p>
	<p>Growth of pathogens</p>	<p>Yes</p>	<p>Pathogens may be present – precautionary and regulatory requirement to handle speedily</p>	<p>Regulatory and admin – speedy introduction into New Process</p>
	<p><u>Physical</u> Potential for raw material be contaminated during transshipment</p>	<p>No</p>	<p>Not reasonably likely - mechanism in place to remove extraneous items</p>	

Ingredients/Processing	Potential Hazard	Significant Hazard	Justification for determination as a Significant Hazard	Preventative Measures for significant Hazards
2. Storage of Carcasses & ABP	<u>Biological</u> Potential for carcasses to become contaminated during storage	No	Not reasonably likely – any storage is at knackery or Intermediate plant	
	<u>Odour</u>	No	Not reasonably likely – storage is at knackery or Intermediate plant; material delivered to Installation and New Process when required	
3. Processing	<u>Biological</u> Pathogens	Yes	Material deteriorates and becomes putrescent if not processed speedily and appropriately	Process in accordance with EU Regulations and as Licensed
	<u>Physical</u> Extraneous items	Yes	Items found to be taken out, put in a container and transferred to knackery for off-site recycling	Metal detector within macerator line
	<u>Odour</u>	Yes	Potentially putrescent material and odours from processing	Fully contained process, limited emissions points with emitted air oxidised in electricity generation combustion
	<u>Noise</u>	Yes	Elements of the processing plant and generating set are noisy	Generating set to be in own attenuating container, noise attenuated other equipment and building

4. Cleaning	<u>Biological</u> Pathogens – cross-contamination	Yes	Potential spillages and wash down waters	Process in accordance with EU Regs, regular cleaning of process line and floors, maintain drain traps, containment of all wash down waters and off-site treatment and trapped material re-introduced into process
	<u>Odour</u>	Yes	Potentially putrescent material and odours from spillages and wash down	Regular cleaning of process line and floors and containment and off-site disposal

4.3.1.1 Identification of Critical Control Points

1. Raw Material

Hazards Identified:

1. Need to ensure received material consists of carcasses and contained ABP only
2. Pathogen contamination and growth

Preventative controls to combat both hazards are in place.

3. Processing

Hazards Identified:

1. Pathogen contamination and growth – appropriate processing in accordance with ABPR
2. Extraneous items in macerated raw material – maintain equipment and facilities to remove
3. Odour – need to ensure that material and process contained at all times, odorous air is collected and used as combustion air and the limited points of emission, including vents, are controlled and emissions treated
4. Noise – elements of the processing equipment are potentially noisy; need to abate both to environment and in interests of personnel health and safety

Preventative controls to combat both hazards are in place.

4. Cleaning

Hazards Identified:

1. Pathogen contamination and growth – containment of wash down waters and processing of material caught in drain traps
2. Odour – wash down waters to be contained and venting from storage tanks abated

Preventative controls to combat hazards are in place

4.3.1.2 HACCP Plan

Critical Control Point (CCP)	Significant Hazard	Control/ Preventative Measure	Critical Limits	Monitoring				Corrective Action and Records	Verification
				What	How	Frequency	Who		
1.Raw Material	Category 1 categorised material	Sourcing from adjoining knackery and Intermediate Plant	Only carcasses allowed, not loose animal by-products	Sourcing and conveyance of raw material	Identification of source of raw material and control of carrier (self) Visual check	Each batch	Plant Operatives (zzz)	1. As all material comes from adjoining facility there have been prior checks and records; carcasses and treated as Cat 1, and processed in accordance with EU Regs, Method 5 processing 2. Visual and records check before accepting material	1. By manager (M Redfern) 2. Maintenance and review of records 3. Visual check before acceptance of material
1.Raw Material	Pathogens/ contamination	Speedy processing	Regulatory and processing requirement for “fresh” material	Time of material introduction	Records of incoming material	Daily routine of receipt of material	Plant Operatives (zzz)	1. Receive material only when it can be directly introduced for processing, - no storage at Installation 2. Wash down/disinfect process plant and floors	1. By manager (M Redfern) 2. Scheduled daily wash down and disinfect

Critical Control Point (CCP)	Significant Hazard	Control/ Preventative Measure	Critical Limits	Monitoring				Corrective Action and Records	Verification
				What	How	Frequency	Who		
3. Processing	Pathogens/ contamination	Processing in accordance with ABPR	Regulatory requirement to meet specified standard	Meat and bone meal	Controls on temperature and residence time in drier	Continuous	Plant Operatives (zzz)	1. Re-process material that doesn't comply	1. Maintain and check records 2. By manager (M Redfern)
3. Processing	Extraneous items	1. Ensure clean material is received 2. Scan for and remove extraneous items	Regulatory and processing requirement for clean material	Introduced raw material and macerated material	1. Inspection of incoming carcasses and material 2. Scanning of material with metal detector	1. As raw material is collected from knackery and InterMed plant 2. Continuous	Plant Operatives (zzz)	1. Record incoming load of carcasses and material 2. Remove extraneous to knackery and record	1. By manager (M Redfern) 2. Maintain & check records
3. Processing	Odour	1. Introduce material to Installation only as required 2. Containment of material in processing line 3. Extract air from drier for combustion 4. Discharge MBM within curtained environment within building 5. Contain all waste water and wash down waters 6. Abate all vents	Regulatory and good neighbour	1. Raw material 2. Processing line 3. Ductwork and operation of DAA 4. Cooling auger & discharge equipment and curtain 5. Drainage network/ receptor tank and discharge to tanker 6. Buffer and storage tanks	1. Control reception of incoming carcasses and material 2. Ensure integrity of process line 3. Maintain integrity of ductwork; cease operation in event of DAA operation ceasing 4. Enclosed auger and curtain to	1. Monitoring of reception hopper 2. Planned inspection and testing regime 3. Planned inspection and testing regime 4. Visual inspection (CCTV) to ensure level filling and dust curtain in place 5. Planned CCTV inspection	Plant Operatives (zzz)	1. Establish planned maintenance and inspection schedules 2. Record scheduled actions and olfactory assessments 4. In event of malfunction, cease operation and stop raw material from entering Installation; remove any	1. By manager (M Redfern) 2. Maintain & check records

Critical Control Point (CCP)	Significant Hazard	Control/ Preventative Measure	Critical Limits	Monitoring				Corrective Action and Records	Verification
				What	How	Frequency	Who		
3. Processing	Odour – cont./				contain dust fitted inside trailer during discharge of MBM 5. Maintain integrity of drainage system and bunded reception tank 6. Vent tanks via charcoal filters, and maintain 7. Olfactory assessment at boundary	& visual inspection for leaks 6. Planned maintenance of filters 7. Daily during operation – within 1 hour of start-up and thereafter at 6 hourly intervals or as soon as any change is perceived		raw material, within process line for authorised disposal	
3. Processing	Noise	Attenuation of plant and buildings	Measured ambient levels at sensitive receptors & WHO nighttime 30 dB LAeq 8 hour; & daytime 35 dB LAeq 16 hour	Processing plant and electricity generating set (DAA)	Installation of quieter plant; Attenuate individual plant; attenuate building	By design at outset	Plant designer; ECGE Ltd	1. Install sound attenuating panels as specified in constructing building and areas within 2. Check correct installation of sound boxes and plant attenuation	1. Plant designer - Agritec 2. Construction project manager 3. By manager (M Redfern) 4. Post installation noise survey if required

Critical Control Point (CCP)	Significant Hazard	Control/ Preventative Measure	Critical Limits	Monitoring				Corrective Action and Records	Verification
				What	How	Frequency	Who		
4. Cleaning	Pathogens/ contamination	1. Containment of all waste water and wash down streams and removal off-site 2. Collect residual, spilt or wash down solids & reprocess 3. Impermeable surfaces	1. Regulatory 2. Regulatory 3. Regulatory	1. Waste & wash down waters 2. Drain traps 3. Installation floor surfaces	1. Flow records, visual inspection and tanker off-loads 2. Visual inspection 3. Visual inspection	1. Continuous and planned tanker off-loads 2. Daily inspection 3. Scheduled inspection	Plant Operatives (zz)	1. Regulate storage tanks and record out-going tanker loads 2. Remove all material, wash down/disinfect and put collected solids in reception hopper 3. Repair	1. By manager (M Redfern) 2. Scheduled removal of waste waters
4. Cleaning	Odour	1. Containment of all waste water and wash down streams and removal off-site 2. Collect residual, spilt or wash down solids & reprocess 3. Impermeable surfaces	Regulatory and good neighbour	1. Waste & wash down waters 2. Drain traps 3. Installation floor surfaces	1. Maintenance of equipment and surfaces 2. Cleaning 3. Visual & olfactory assessment	Planned maintenance and cleaning; olfactory inspections as specified	Plant Operatives (zzz)	1. Regulate storage tanks and check filters 2. Remove all material, wash down/disinfect and put collected solids in reception hopper 3. Olfactory records	1. By manager (M Redfern)