Generic RMP Model for Rendering

Prelims

Amendment 0

September 2009

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Website

A copy of this document can be found at http://www.nzfsa.govt.nz/animalproducts.index.htm

Review of the RMP Model

This RMP Model will be reviewed, as necessary, by the NZFSA. Suggestions for alterations, deletions or additions to this code of practice, should be sent, together with reasons for the change, any relevant data and contact details of the person making the suggestion, to:

Assistant Director (Production and Processing)
Standards Group
New Zealand Food Safety Authority
P O Box 2835
Wellington
Telephone: 04 894 2500

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1 Introduction

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1.1 Purpose of this document

This generic Risk Management Programme (RMP) model has been developed by the New Zealand Food Safety Authority, in consultation with industry, to assist rendering operators in the development of their RMP. It shows how HACCP principles can be applied and how RMP components could be written for a rendering operation. It is emphasised that this generic RMP model is not intended to represent the outcome of a complete RMP. Operators may develop their RMPs based on this model but they are expected to customise their RMP to their specific products, processes and premises.

This generic RMP model has been developed based on New Zealand requirements only. Exporters must ensure that they meet overseas market access requirements relevant to their product and process. In particular, exporters must be aware of specific market time/temperature requirements for rendering and drying.

The application of HACCP principles in this generic RMP model has been based on scientific information, industry surveys and industry data provided.

This generic RMP model replaces the Draft *Generic HACCP Plan for Rendering* published as part of *A Guide to HACCP Systems In The Meat Industry*. Its content and format have been updated to comply with the requirements of the Animal Products Act 1999 and associated legislation, particularly the Animal Products (Risk Management Programme Specifications) Notice 2008. RMP components that are not covered in a HACCP plan (e.g. management authorities and responsibilities, identification of hazards to animal health and risk factors associated with wholesomeness and false or misleading labelling) are included in this generic RMP model.

1.2 Contents of this generic RMP

Table 1 summarises the required components of an RMP, and indicates whether the particular component is covered or not in this generic RMP model. **For practical reasons, not all requirements regarding the documentation of the RMP are covered in this generic RMP.**

A brief instruction or explanation about the RMP component is given for each section in this model, followed by a worked example presented as a form or table. **Instructions and explanations are not part of the RMP and should be removed by the operator when preparing their own RMPs based on this generic model.** Operators do not need to follow the format used in this generic model but it is important that all required information is documented clearly in their RMP.

Supporting systems must be documented and form part of the RMP. A list of recommended supporting systems is given in this generic model, however, examples of documented supporting systems are not provided. Guidance on the documentation of supporting systems is given in Part 2 of the Code of Practice (COP).

A comprehensive discussion of the RMP requirements and components is given in the *Risk Management Programme Manual*, which is available on the NZFSA website.

Table 1: RMP components

Components	Section of this generic RMP Model
Operator, Business and RMP identification	Form 1
List of RMP documents	A list of the documents comprising the RMP, with their date and version, must be included in the RMP. An example is not shown in this generic RMP.
Management authorities and responsibilities	Form 2
Scope of the RMP	Form 3
Product description	Form 4
Process description	Form 5
Good Operating Practice (Supporting systems)	A list of recommended supporting systems is given in section 2.6. The supporting systems must be documented in the RMP Examples are not given in this generic RMP. Refer to Part 2 of the COP.
Application of HACCP (identification, analysis and control of hazards to animal health)	Forms 6, 7A, 7B, 7C and 8

Components	Section of this generic RMP Model
Identification and control of other risk factors (wholesomeness, false or misleading labelling)	Forms 9 and 10
Identification and competency of responsible persons	This must be documented in relevant sections of the RMP. Records of competencies are expected to be documented in a supporting system. An example is not shown in this generic RMP. Refer to Part 2 of the COP.
Recall procedures	This must be documented in a supporting system. An example is not shown in this generic RMP. Refer to Part 2 of the COP.
Corrective action procedures for unforeseen circumstances	This must be documented in a supporting system. An example is not shown in this generic RMP. Refer to Part 2 of the COP.
Notification requirements	This must be documented in a supporting system. An example is not shown in this generic RMP. Refer to Part 2 of the COP.
Operator verification	Form 11
Provision for external verification	RMP Specification 2008, Clause 17 should be copied or referenced in the RMP.
Document control and requirements for records	This must be documented in a supporting system. An example is not shown in this generic RMP. Refer to Part 2 of the COP.
Checks and validation of the RMP	Refer to the RMP Manual.

2 Generic RMP for rendering

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2.1 Operator, business and RMP identification

The name and address of the business operator must be documented in the RMP. The unique business identifier and the RMP identifier should also be included in this section of the RMP to assist in the traceability of documents.

Form 1: Operator, business and RMP identification

Information required	**Details**
Business identifier	*e.g. BPW1000*
RMP no.	*e.g. 01, 02*
Name of the operator	*Legal name of the business operator (i.e. the owner of the business)*
Address of the operator	*Business address of the operator (e.g. postal address of head office)*
Electronic address of the operator	*Email address of the operator*
Name of the business(es) covered by the RMP	*The registered company name, if different from the operator*
Physical address of the premises	*Location of the premises, if different from the operator's address*

2.2 Management authorities and responsibilities

The operator must document details of the person who is responsible for the day-to-day management of the RMP. It is recommended that a deputy be designated who can take over from the day-to-day manager, when necessary.

Form 2: Management authorities and responsibilities

Authority/responsibility	**Details**
Day-to-day manager	*Give name or, preferably, give position or designation*
Deputy for day-to-day manager	*Give name or, preferably, give position or designation*

2.3 Scope of the RMP

The operator must clearly define the coverage and application of the RMP.

Form 3: Scope of the RMP

Elements	Description/Details
Physical boundaries	Physical boundaries indicated on site plan given in Appendix xx. *Attach an accurate site plan. Ensure that amenities and external areas that may be a source of hazards and other risk factors are considered when establishing the physical boundaries. The site plan should also show any areas within the boundaries that are excluded from the RMP*
Risk factors covered by the RMP	Risk factors associated with: • Animal health (for products intended for animal consumption) • Wholesomeness • False or misleading labelling
Animal material being processed	• Meat (various species) and poultry material - trimmings, fat, offal, gastrointestinal tract, bone • Whole fish and fish material • Blood (various species)
Products [1, 2]	• Tallow • Fish oil • Meat & bone meal • Fish meal • Dried blood
Process [1]	From receipt of raw materials, to rendering, drying, storage and dispatch of the products Principal processing category: Rendering
Exclusions [3]	Identify those materials, products or activities excluded from the RMP, and the alternative regulatory regime they are under

1. The products and processes covered by this generic RMP are examples only based on a typical New Zealand rendering operation. The operator must ensure that their RMP accurately reflects their own products and processes.

   The hazard analysis shown in this generic RMP only covers the processing of meat & bone meal, tallow and dried blood to provide examples of how hazard analysis can be done. The operator must ensure that their RMP includes a hazard analysis for all products or product groups, and processes covered by their RMP.

2. Products should be listed either individually or as product groups with similar characteristics, processes and intended purpose. The list should be as specific as necessary for proper identification of hazards and their control, but at the same time should allow flexibility in terms of other products of the same group that can be processed without the need for a significant amendment.

3. If there is any animal material or animal product processed within the physical boundaries of the RMP but excluded from the scope of the RMP, the operator must identify the material or product, the alternative regulatory regime that they are under, and explain how the interfaces between regimes are managed. The operator must also document authorities and responsibilities, and the management of interfaces in relation to any activity undertaken by another person within the physical boundaries of the RMP.

2.4 Product description

The operator must describe the animal products covered by the RMP. This may be either individually or as product groups with similar characteristics, processes and intended purpose. The product description must include the intended use and consumer, any regulatory limit relevant to the product, and any operator-defined limits. Other information such as company specifications for packaging, labelling, and shelf life may be included under the product description, but these are not considered as operator-defined limits.

At present, no regulatory limit has been defined for any rendered product.

Form 4: Product descriptions and intended purpose

Product name	Intended consumer and use		Operator-defined limits	Packaging	Labelling
	Consumer	Use			
Tallow	Animals (used for food production or pets)	Direct use as animal feed or pet food As an ingredient in animal feed or pet food	No vegetative forms of bacterial pathogens in the product by subjecting the product to a thermal process of ≥ 90ºC for ≥ 10 min[1]	As per regulatory and company specifications Refer to supporting system xx.	As per regulatory and company specifications Refer to supporting system xx.
	-	Industrial use e.g. for further processing into soap			
Fish oil	Animals (used for food production or pets)	Direct use as animal feed or pet food As an ingredient in animal feed or pet food	Peroxide value[2]	As per regulatory and company specifications Refer to supporting system xx.	As per regulatory and company specifications Refer to supporting system xx.

Product name	Intended consumer and use		Operator-defined limits	Packaging	Labelling
	Consumer	**Use**			
Meat and bone meal	Animals (used for food production or pets)	Direct use as animal feed or pet food As an ingredient in animal feed or pet food	No vegetative forms of bacterial pathogens in the product by subjecting the product to a thermal process of ≥ 90ºC for ≥ 10 min[1] Moisture content.[3]	As per regulatory and company specifications Refer to supporting system xx.	As per regulatory and company specifications Refer to supporting system xx.
	-	Industrial use e.g. fertiliser			
Fish meal	Animals (used for food production or pets)	Direct use as animal feed or pet food As an ingredient in animal feed or pet food	Moisture content.[3]	As per regulatory and company specifications Refer to supporting system xx.	As per regulatory and company specifications Refer to supporting system xx.
	-	Industrial use e.g. fertiliser			
Dried blood	Animals (used for food production or pets)	Animal feed or pet food For further processing into animal feed or pet food	No vegetative forms of bacterial pathogens in the product by subjecting the product to a thermal process: - using blood drying specific parameters specified in Part 2 of the COP; or - of ≥ 90ºC for ≥ 10 min[1]	As per regulatory and company specifications Refer to supporting system xx.	As per regulatory and company specifications Refer to supporting system xx.
	Industrial use	Fertiliser			

1. The requirements outlined in the Animal Products (Specifications for Products Intended for Animal Consumption) Notice 2006 (AC Spec) clause 72(1) " … subject to a thermal process, or otherwise treated to destroy all vegetative bacteria, viruses and protozoa, and inactivate chemical substances that are potentially harmful if consumed by animals." can be achieved by subjecting product to a thermal process of ≥ 90ºC for ≥ 10 min. NZFSA identified that further investigation is required to determine what the current parameters achieve and establish the minimum necessary parameters. This investigation is identified as an industry issue project by the Meat Industry Association, who has assigned it a low priority.

   Operators who wish to propose alternative parameters need to confirm them as valid and show that the AC Spec clause 72(1) will be achieved on an ongoing basis.

2. The operator should define a peroxide value for fish meal. The peroxide value provides an indication of the rancidity of the oil, i.e. a measure of oxidation.

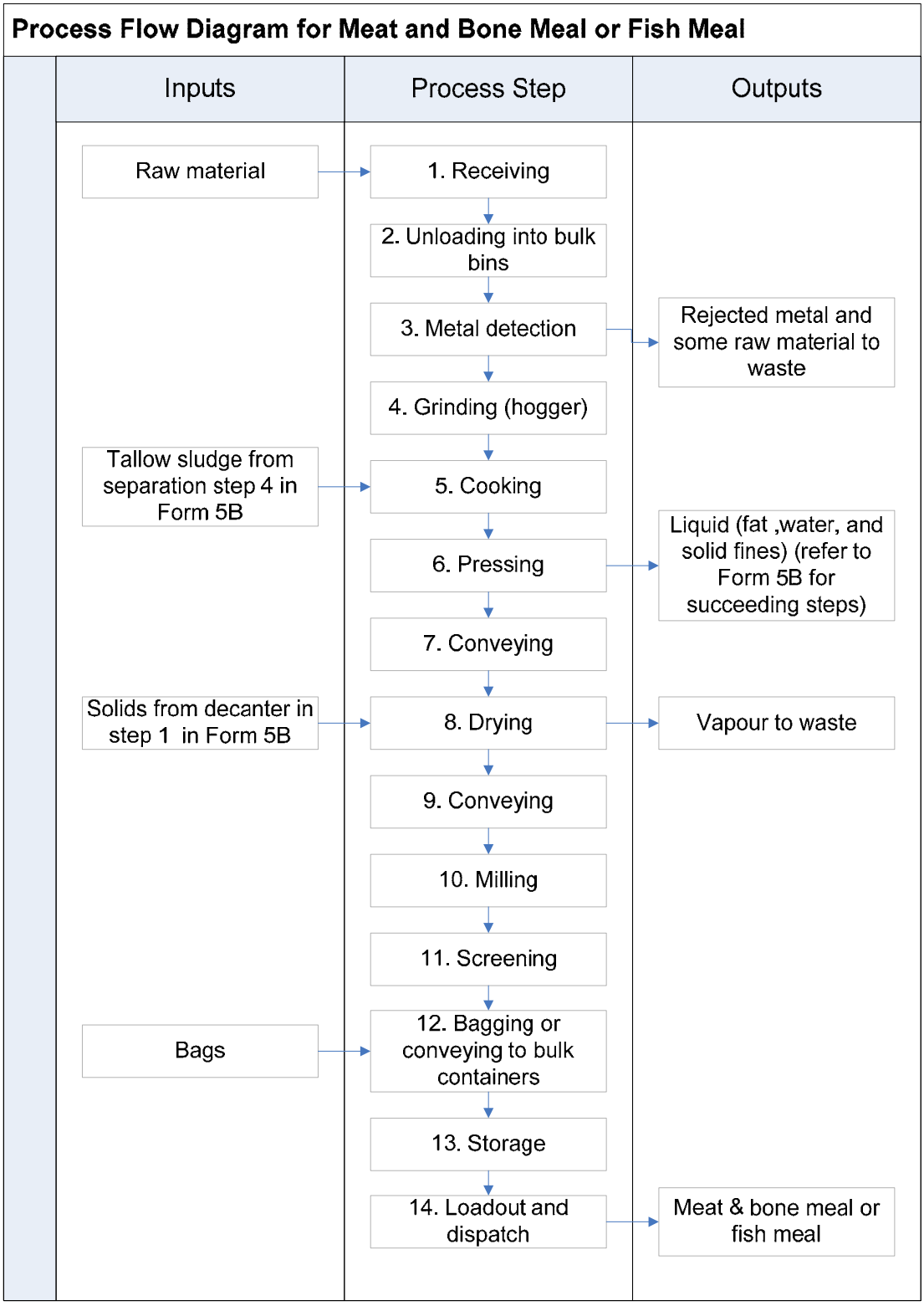
3. The operator should define a moisture content for meat & bone meal and fish meal. The control measure for achieving this limit can be a CCP or under GOP. Part 2 of the COP includes a procedure that meals must be dried sufficiently to prevent the growth of any post-drying microbiological contaminants and the deterioration of the product during storage. This includes sufficient drying to control mould formation. In addition, the COP provides guidance that meals dried to a moisture content of 10% or less will comply with that procedure. If the operator establishes an operator-defined limit greater than 10% moisture content, then justification must be provided in the RMP to show that the moisture content given is adequate to prevent microbiological growth in the product during storage.

2.5 Process description

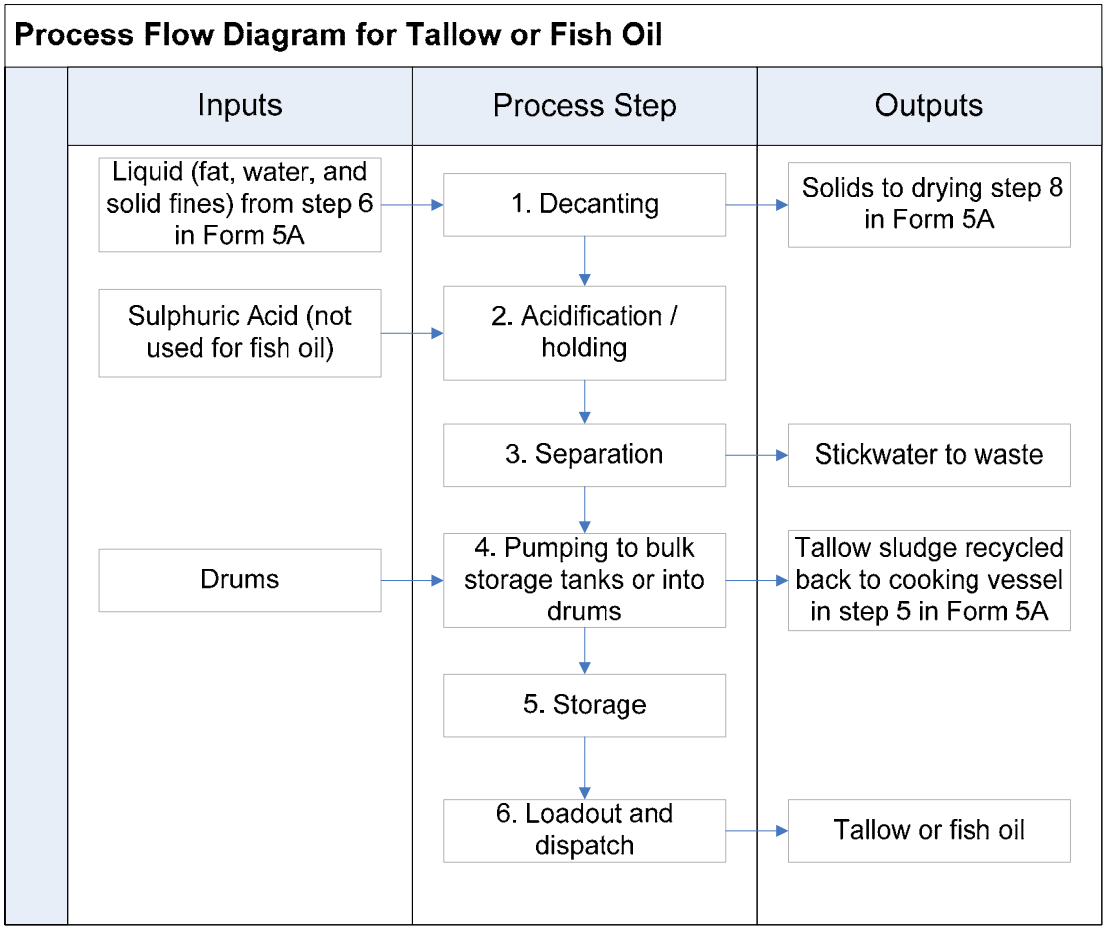
The processes covered in the RMP must be described accurately. This is usually done using process flow diagrams. There is no prescribed format to be used but the process flow should set out all steps in the process sequentially, and show relevant inputs and outputs. The process flow(s) must show the full extent of the process for all products covered by the RMP (i.e. up to dispatch of each product or product group, including any rework or recycling steps).

It should be noted that the examples given in this generic RMP are simplified presentations of the key steps based on a generic process. Only the main rendering processes are shown as examples in Form 5A – 5C.

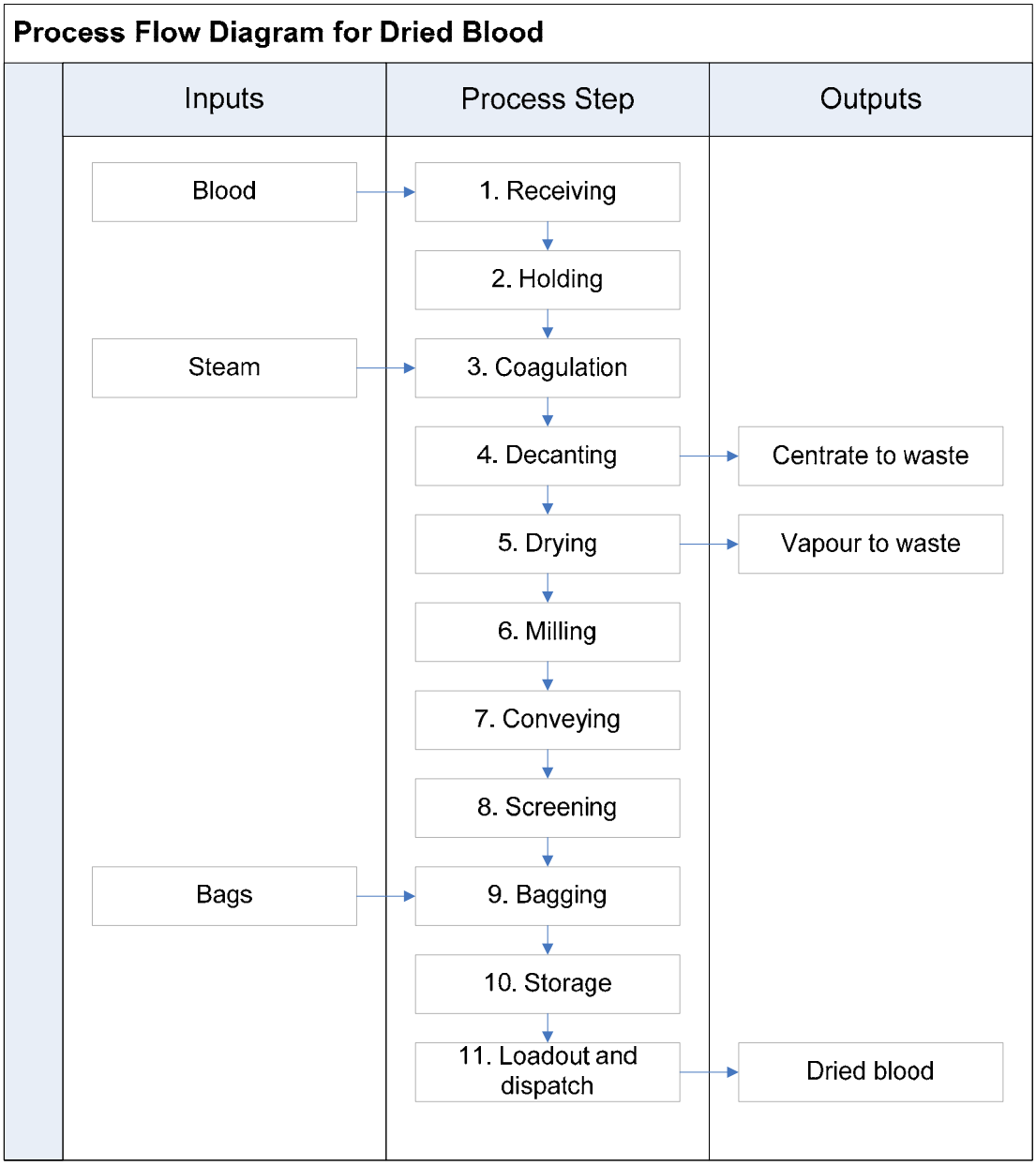
Form 5A:


Process Flow Diagram for Meat and Bone Meal or Fish Meal
Inputs
Process Step
Outputs
Raw material
1. Receiving
2. Unloading into bulk bins
3. Metal detection
Rejected metal and some raw material to waste
4. Grinding (hogger)
Tallow sludge from separation step 4 in Form 5B
5. Cooking
6. Pressing
Liquid (fat ,water, and solid fines) (refer to Form 5B for succeeding steps)
7. Conveying
Solids from decanter in step 1 in Form 5B
8. Drying
Vapour to waste
9. Conveying
10. Milling
11. Screening
Bags
12. Bagging or conveying to bulk containers
13. Storage
14. Loadout and dispatch
Meat & bone meal or fish meal

Form 5B:


Process Flow Diagram for Tallow or Fish Oil
Inputs
Process Step
Outputs
Liquid (fat, water, and solid fines) from step 6 in Form 5A
1. Decanting
Solids to drying step 8 in Form 5A
Sulphuric Acid (not used for fish oil)
2. Acidification / holding
3. Separation
Stickwater to waste
Drums
4. Pumping to bulk storage tanks or into drums
Tallow sludge recycled back to cooking vessel in step 5 in Form 5A
5. Storage
6. Loadout and dispatch
Tallow or fish oil

Form 5C:


Process Flow Diagram for Dried Blood
Inputs
Process Step
Outputs
Blood
1. Receiving
2. Holding
Steam
3. Coagulation
4. Decanting
Centrate to waste
5. Drying
Vapour to waste
6. Milling
7. Conveying
8. Screening
Bags
9. Bagging
10. Storage
11. Loadout and dispatch
Dried blood

2.6 Good Operating Practice

The operator must document Good Operating Practice (GOP) in relevant supporting systems (also known as prerequisite programmes, good hygienic practices) before applying HACCP principles to the process. These supporting systems must comply with all relevant regulatory requirements, particularly the Animal Product Regulations 2000 and the current version of the Animal Products (Specifications for Products Intended for Animal Consumption) Notice. Information in the documented supporting systems should include: authorities and responsibilities, procedures (including control, monitoring, corrective action and operator verification), and recording requirements.

Part 2 of the Code of Practice: Rendering provides guidance on supporting systems relevant to rendering. Supporting systems must address the activities and procedures listed below:

- Design, construction and maintenance of buildings, facilities and equipment;
- Water used for processing;
- Cleaning and sanitation;
- Personnel competency, health and hygiene;
- Control of chemicals;
- Pest control;
- Calibration;
- Process control;
- Packaging and labelling;
- Document control and record keeping;
- Traceability and inventory control;
- Handling of non-complying products, and recall;
- Operator verification and other operational requirements.

2.7 Hazard analysis and CCP determination

2.7.1 Identification of hazards from inputs

The operator must identify any hazards associated with each input considering any supplier agreements and raw material specifications.

Form 6: Identification of hazards from inputs

Inputs	Description/specification[1]	Biological hazard (B)	Chemical hazard (C)	Physical hazard (P)
Meat material, blood	Complies with regulatory requirements for supply of material for rendering Refer Part 2 of the Rendering COP	Bacterial pathogens - vegetative forms (e.g. *Salmonella* spp., *E.coli* 0157:H7) and spore formers (e.g. *Clostridium* spp.)	Chemical residues – e.g. pesticides, heavy metals, veterinary medicines[2]	Metal – e.g. spring wire from rumen capsules from ruminants, other metal objects (e.g. knives, hooks)
		Parasites – e.g. *Toxoplasma gondii*		
Fish material	Complies with regulatory requirements for supply of material for rendering Refer Part 2 of the Rendering COP	None	Heavy metals – e.g. mercury[3]	None
		Parasites[4]		
Sulphuric acid	Suitable for rendering use	None	Sulphuric acid[5]	None
Water, Steam	Complies with AC Spec clause 12	None	None	None
Bags, drums[6]	Complies with AC Spec clause 26	None	None	None

1. Agreed specifications and procedures for inputs must be documented in a supporting system.

2. Results from a national survey to determine the chemical residue status of tallow and meat and bone meal indicated that chemical residues (e.g. pesticides, heavy metals, veterinary medicines) can occur in these products. At present, there are no existing maximum residue limits for rendered animal products for animal consumption and there is insufficient information available on the impact of the rendering process on chemical residues to be able to carry out a complete hazard analysis. The hazard analysis for chemical residues will be reviewed when more information becomes available.

3. Mercury is considered to be an uncontrolled hazard. Therefore, they will not be considered further at subsequent steps in this generic RMP (Johnston, J.N. & Savage, G.P., 1991, Mercury Consumption and Toxicity with Reference to Fish and Fish Meal, Nutrition Abstracts and Reviews (Series A), 61, 74-116. Department of Biochemistry, Lincoln University, Canterbury, New Zealand).

4. At present, it is unclear whether parasites from fish are a hazard to animals. Even if parasites are a considered a hazard they are inactivated / killed by heating for 1 minute @ 60ºC (MacDonald 1996).

5. Sulphuric acid is added prior to the separation step to aid in the separation of fat and water. The acid is discharged with the stickwater.

6. For this generic RMP, it is assumed that clean bags and drums that are free of contaminants are used. Individual premises, particularly those that use recycled bags and drums, must consider potential hazards (e.g. chemical residues, microbiological contaminants, metal fragments from drums) associated with the type of container they use. These hazards must be addressed by a supporting system (e.g. supplier quality assurance programme, cleaning and sanitation) or be specifically considered during hazard identification within the RMP.

2.8 Hazard analysis and critical control point (CCP) determination

Form 7A: Hazard analysis and CCP determination (raw material, other inputs and process steps) for the processing of meat & bone meal [1]

Process step	Inputs	Hazard reasonably likely to occur on or in the product at this step	Justification	Q1. Is there a control measure(s) for the hazard at this step? If yes, identify the control measure and answer Q2 [2].	Q2. Is the control measure at this step essential to product safety as defined by a regulatory limit or an operator-defined limit? If yes, this step is a CCP [3] If no, this step is not a CCP.	CCP no.
1. Receiving	Meat material	B – bacterial pathogens and parasites	Refer to Form 6	No		
		C – chemical residues[4]	Refer to Form 6	No		
		P – metal objects	Refer to Form 6	No		
2. Unloading into bulk bins	Meat material	B – bacterial pathogens and parasites	Hazard carried over from the previous step	No		
		P – metal objects	Hazard carried over from the previous step	No		
3. Metal detection	Meat material	B – bacterial pathogens and parasites	Hazard carried over from the previous step	No		
		P – metal objects	Hazard carried over from the previous step	Yes – GOP. Metal detection will remove big pieces of metal (e.g. knives, hooks) but will not eliminate metal springs Refer to Supporting Sys. xx.	No	
4. Grinding (hogger)	Meat material	B – bacterial pathogens and parasites	Hazard carried over from the previous step	No		
		P – metal spring	Hazard carried over from the previous step	No		

Process step	Inputs	Hazard reasonably likely to occur on or in the product at this step	Justification	Q1. Is there a control measure(s) for the hazard at this step? If yes, identify the control measure and answer Q2 [2].	Q2. Is the control measure at this step essential to product safety as defined by a regulatory limit or an operator-defined limit? If yes, this step is a CCP [3] If no, this step is not a CCP.	CCP no.
5. Cooking	Ground meat material	B – bacterial pathogens and parasites	Hazard carried over from the previous step	Yes, heating at ≥ 90ºC for at least 10 min or equivalent thermal process[5] will eliminate vegetative pathogens	Yes	1
		P – metal spring fragments	Hazard carried over from the previous step	No		
6. Pressing	Cooked material	B – bacterial spores[6]	Bacterial spores will survive the cooking process	No[7]		
		P – metal spring fragments	Hazard carried over from the previous step	No		
7. Conveying	Press cake & solids from step 1b	B – bacterial spores	Hazard carried over from the previous step	No		
		B – bacterial pathogens	Contamination with pathogens from equipment, environment, birds etc. (e.g. *Salmonella*) can occur [8]	Yes – GOP. Cleaning and sanitation; Ventilation to prevent moist meal accumulation; and Vermin control will minimise contamination Refer to Supporting Sys. xx.	No	
		P – metal spring fragments	Hazard carried over from the previous step	No		
8. Drying	Press cake & solids from step 1b	B – bacterial spores	Hazard carried over from the previous step	No		
		P – metal spring fragments	Hazard carried over from the previous step	No		

Process step	Inputs	Hazard reasonably likely to occur on or in the product at this step	Justification	Q1. Is there a control measure(s) for the hazard at this step? If yes, identify the control measure and answer Q2 [2].	Q2. Is the control measure at this step essential to product safety as defined by a regulatory limit or an operator-defined limit? If yes, this step is a CCP [3] If no, this step is not a CCP.	CCP no.
9. Conveying	Dried meal	B – bacterial spores	Hazard carried over from the previous step	No		
		B – bacterial pathogens	Contamination with pathogens from equipment, environment, birds etc. (e.g. *Salmonella*) can occur [8]	Yes – GOP. Cleaning and sanitation; Ventilation to prevent moist meal accumulation; and Vermin control will minimise contamination Refer to Supporting Sys. xx.	No	
		P – metal spring fragments	Hazard carried over from the previous step	Yes – GOP. Magnets will remove some spring fragments but they will not be completely removed[7] Refer to Supporting Sys. xx.	No	
10. Milling	Dried meal	B – bacterial spores	Hazard carried over from the previous step	No		
		B – bacterial pathogens	Contamination with pathogens from equipment, environment, birds etc. (e.g. *Salmonella*) can occur [8]	Yes – GOP. Cleaning and sanitation; Ventilation to prevent moist meal accumulation; and Vermin control will minimise contamination Refer to Supporting Sys. xx.	No	

Process step	Inputs	Hazard reasonably likely to occur on or in the product at this step	Justification	Q1. Is there a control measure(s) for the hazard at this step? If yes, identify the control measure and answer Q2 [2].	Q2. Is the control measure at this step essential to product safety as defined by a regulatory limit or an operator-defined limit? If yes, this step is a CCP [3] If no, this step is not a CCP.	CCP no.
		P – metal spring fragments	Hazard carried over from the previous step	Yes – GOP. Magnets will remove some spring fragments but they will not be completely removed[8] Refer to Supporting Sys. xx.	No	
11. Screening	Dried meal	B – bacterial spores	Hazard carried over from the previous step	No		
		B – bacterial pathogens	Contamination with pathogens from equipment, environment, birds etc. (e.g. *Salmonella*) can occur [8]	Yes – GOP. Cleaning and sanitation; Ventilation to prevent moist meal accumulation; and Vermin control will minimise contamination Refer to Supporting Sys. xx.	No	
		P – metal spring fragments	Hazard carried over from the previous step	Yes – GOP. Magnets will remove some spring fragments but they will not be completely removed[8] Refer to Supporting Sys. xx.	No	
12. Bagging or conveying into bulk containers	Dried meal	B – bacterial spores	Hazard carried over from the previous step	No		
		B – bacterial pathogens	Contamination with pathogens from equipment, environment, birds etc. (e.g. *Salmonella*) can occur [8]	Yes – GOP Cleaning and sanitation; and vermin control will minimise contamination Refer to Supporting Sys. xx.	No	

Process step	Inputs	Hazard reasonably likely to occur on or in the product at this step	Justification	Q1. Is there a control measure(s) for the hazard at this step? If yes, identify the control measure and answer Q2 [2]. If no, this step is not a CCP.	Q2. Is the control measure at this step essential to product safety as defined by a regulatory limit or an operator-defined limit? If yes, this step is a CCP [3]	CCP no.
		P – metal spring fragments	Hazard carried over from the previous step	No		
	Bags / bulk containers	None				
13. Storage	Dried meal	B – bacterial spores	Hazard carried over from the previous step	No		
		B – bacterial pathogens	Potential for growth of microorganisms from isolated incidents of post-drying contamination in steps 9a to 11a[8]	Yes – GOP. Achieving a low moisture content at drying e.g. ≤ 10%, and correct storage conditions will prevent the growth microorganisms[7]	No	
		P – metal spring fragments	Hazard carried over from the previous step	No		
14. Loadout & dispatch	Dried meal	B – bacterial spores	Hazard carried over from the previous step	No		
		C – chemical residues[4]	Hazard carried over from the previous step	No		
		P – metal spring fragments[9]	Hazard carried over from the previous step	No		

1. Operators processing fish meal may base their Hazard Analysis and CCP Determination on the example given for the processing of meat & bone meal. Where the fish meal is produced from minimal risk raw material the Hazard Analysis and CCP Determination is likely to show that there are no CCPs for the process.

2. The procedures for the control measures must be documented in the RMP (e.g. in supporting systems or task instructions). The relevant supporting system should be referenced in this table.

3. A CCP is a step at which control can be applied and is essential to prevent or eliminate an animal feed safety hazard or reduce it to an acceptable level. The control measure at the step must be essential to animal feed safety as defined by the regulatory limit or an operator defined animal feed safety limit (i.e. no CCP if there is no defined limit). A critical limit, which is measurable and can be monitored on an ongoing basis, must be established for the CCP.

4. At present, there are no existing maximum residue limits for rendered animal products for animal consumption and there is insufficient information available on the impact of the rendering process on chemical residues to be able to carry out a complete hazard analysis on chemical residues. Therefore, chemical residues will not be considered at subsequent steps, except at the final step to reflect its presence in the final product.

5. In this example, the required thermal process is achieved at the cooking step. This requirement may also be achieved at other steps within the process such as at the drying step for meat and bone meal or the heating of tallow in the buffer tank.

6. Although heat treatments in rendering systems in New Zealand will kill vegetative forms of microorganisms like *Salmonella*, bacterial spores may survive (MIRINZ Bulletin No. 24). Any bacterial spores present in the dried meal will not grow at ≤ 10% moisture content.

7. Special care needs to be taken at the pressing step (D. Lowry, personal communication, 17 November 2008). Moisture released from the choke of the press may lead to a build-up of moist meal and the potential for growth of *Salmonella* at the earliest post cooking point in the process. The potential for this issue can be minimised by GOP, especially:
   - cleaning & sanitation;
   - ventilation to prevent moist meal accumulation; and
   - vermin control will minimize contamination.

8. *Salmonella* is the main pathogen of concern associated with meat and bone meal (ICMSF, 1998). Rendering yields products free of *Salmonella*, however, contamination can occur after cooking and drying. Contamination can occur in one of two ways (MIRINZ Bulletin No.24):

   a. one-off, which involves isolated accidental contamination incidents, for example from birds, boot scrapings, etc. Accidental, one-off contamination is almost never detected.

   b. endemic, which involves the presence of one or more sources of contamination within the process. These sources of contamination continually contaminate material passing through the system. These sources should be found and eliminated. The single most important factor causing endemic contamination is the presence of warm, moist meal at some point after the last heat treatment. Should *Salmonella* be accidentally introduced, it will grow in the moist meal. Effective drying and implementation of supporting systems (e.g. hygienic design and construction, cleaning and sanitation, pest control) will prevent or minimise endemic contamination. MIRINZ Bulletin No.24 provides guidance on solutions for common problem areas for endemic contamination.

A moisture content of ≤ 10% will inhibit the growth of any post-drying microbiological contaminants. Meals will therefore be stable, even if contaminated material such as scrapings from boots, bird droppings, or perhaps stray raw material has been accidentally introduced into the meal (MIRINZ Bulletin No.24). The *Salmonella* introduced are likely to survive in the meal, but they cannot grow unless the meal is moist.

9. There have been reported incidences of metal spring fragments from rumen capsules in meat and bone meal. Magnets minimise the amount of spring fragments from the product but do not completely eliminate this hazard. In this generic RMP the metal spring hazard have been identified as an uncontrolled hazard.

Form 7B: Hazard analysis and CCP determination (raw material, other inputs and process steps) for the processing of tallow [1]

Process step	Inputs	Hazard reasonably likely to occur on or in the product at this step	Justification	Q1. Is there a control measure(s) for the hazard at this step? If yes, identify the control measure and answer Q2 [2].	Q2. Is the control measure at this step essential to product safety as defined by a regulatory limit or an operator-defined limit? If yes, this step is a CCP [3]. If no, this step is not a CCP.	CCP no.
1. Decanting	Liquid (fat, water, solid fines) from step 6a	B – bacterial spores	Hazard carried over from step 6a	No		
		C – chemical residues[4]	Refer to Form 6	No		
2. Acidification / holding	Sulphuric acid	None	The sulphuric acid assists with effective separation of tallow and water. The acid remains in the aqueous phase and is discharged with the stickwater			
3. Separation	Tallow & acidified stickwater	B – bacterial spores	Hazard carried over from the previous step	No		
4. Pumping to bulk storage tanks or into drums	Tallow	B – bacterial spores	Hazard carried over from the previous step	No		
5. Storage	Tallow	B – bacterial spores	Hazard carried over from the previous step	No		
6. Loadout & dispatch	Tallow	B – bacterial spores[5]	Hazard carried over from the previous step	No		
		C – chemical residues[4]	Hazard carried over from the previous step	No		

1. Operators processing fish oil may base their Hazard Analysis and CCP Determination on the example given for the processing of tallow.

2. The procedures for the control measures must be documented in the RMP (e.g. in supporting systems or task instructions). The relevant supporting system should be referenced in this table.

3. A CCP is a step at which control can be applied and is essential to prevent or eliminate an animal feed safety hazard or reduce it to an acceptable level. The control measure at the step must be essential to animal feed safety as defined by the regulatory limit or an operator defined animal feed safety limit (i.e. no CCP if there is no defined limit). A critical limit, which is measurable and can be monitored on an ongoing basis, must be established for the CCP.

4. At present, there are no existing maximum residue limits for rendered animal products for animal consumption and there is insufficient information available on the impact of the rendering process on chemical residues to be able to carry out a complete hazard analysis on chemical residues. Therefore, chemical residues will not be considered at subsequent steps, except at the final step to reflect its presence in the final product.

5. All commercial rendering operations can be expected to yield tallow that contain bacterial spores (e.g. Clostridium spp.), the number of which will be largely determined by the initial number of spores in the raw material (Gill, 1988). Spores cannot grow in the dry fat, but may do so if it is mixed with moist materials in manufactured foods.

Form 7C: Hazard analysis and CCP determination (raw material, other inputs and process steps) for the manufacture of dried blood

Process step	Inputs	Hazard reasonably likely to occur on or in the product at this step	Justification	Q1. Is there a control measure(s) for the hazard at this step? If yes, identify the control measure and answer Q2 [1]. If no, this step is not a CCP.	Q2. Is the control measure at this step essential to product safety as defined by a regulatory limit or an operator-defined limit? If yes, this step is a CCP [2]. If no, this step is not a CCP.	CCP no.
1. Receiving	Blood	B – bacterial pathogens	Refer to Form 6	No		
2. Holding	Blood	B – bacterial pathogens	Hazard carried over from the previous step	No		
3. Coagulation	Blood	B – bacterial pathogens	Hazard carried over from the previous step	Yes, heating to specified temperatures during coagulation, holding and then drying in step 5c[3] will eliminate vegetative pathogens	Yes	2a
	Steam	None				
4. Decanting	Coagulated blood & water	B – bacterial pathogens	Hazard carried over from the previous step	No		
5. Drying	Coagulated blood	B – bacterial pathogens	Hazard carried over from the previous step	Yes, heating to specified temperatures during coagulation, holding and drying[3] will eliminate vegetative pathogens	Yes	2b
6. Milling	Dried blood	B – bacterial spores	Hazard carried over from the previous step	No		
		B – bacterial pathogens	Contamination with pathogens from equipment, environment, birds etc. (e.g. *Salmonella*) can occur[4]	Yes – GOP. Cleaning and sanitation; Ventilation to prevent moist dried blood accumulation; and Vermin control will minimise contamination Refer to Supporting Sys. xx.	No	

Process step	Inputs	Hazard reasonably likely to occur on or in the product at this step	Justification	Q1. Is there a control measure(s) for the hazard at this step? If yes, identify the control measure and answer Q2 [1]. If no, this step is not a CCP.	Q2. Is the control measure at this step essential to product safety as defined by a regulatory limit or an operator-defined limit? If yes, this step is a CCP [2]. If no, this step is not a CCP.	CCP no.
7. Conveying	Dried blood	B – bacterial spores	Hazard carried over from the previous step	No		
		B – bacterial pathogens	Contamination with pathogens from equipment, environment, birds etc. (e.g. *Salmonella*) can occur [4]	Yes – GOP. Cleaning and sanitation; Ventilation to prevent moist dried blood accumulation; and Vermin control will minimise contamination Refer to Supporting Sys. xx.	No	
8. Screening	Dried blood	B – bacterial spores	Hazard carried over from the previous step	No		
		B – bacterial pathogens	Contamination with pathogens from equipment, environment, birds etc. (e.g. *Salmonella*) can occur [4]	Yes – GOP Cleaning and sanitation; Ventilation to prevent moist dried blood accumulation; and Vermin control will minimise contamination Refer to Supporting Sys. xx.	No	
9. Bagging	Dried blood	B – bacterial spores	Hazard carried over from the previous step	No		
		B – bacterial pathogens	Contamination with pathogens from equipment, environment, birds etc. (e.g. *Salmonella*) can occur [4]	Yes – GOP, cleaning and sanitation; and vermin control will minimise contamination Refer to Supporting Sys. xx.	No	
	Bags	None				

Process step	Inputs	Hazard reasonably likely to occur on or in the product at this step	Justification	Q1. Is there a control measure(s) for the hazard at this step? If yes, identify the control measure and answer Q2 [1]. If no, this step is not a CCP.	Q2. Is the control measure at this step essential to product safety as defined by a regulatory limit or an operator-defined limit? If yes, this step is a CCP [2]. If no, this step is not a CCP.	CCP no.
10. Storage	Dried blood	B – bacterial spores	Hazard carried over from the previous step	No		
		B – bacterial pathogens	Contamination with pathogens from equipment, environment, birds etc. (e.g. *Salmonella*) can occur [4]	Yes – GOP, cleaning and sanitation; and vermin control will minimise contamination Refer to Supporting Sys. xx.	No	
11. Loadout & dispatch	Dried blood	B – bacterial spores	Hazard carried over from the previous step [5]	No		
		B – bacterial pathogens	Hazard carried over from the previous step	No		

1. The procedures for the control measures must be documented in the RMP (e.g. in supporting systems or task instructions). The relevant supporting system should be referenced in this table.

2. A CCP is a step at which control can be applied and is essential to prevent or eliminate an animal feed safety hazard or reduce it to an acceptable level. The control measure at the step must be essential to animal feed safety as defined by the regulatory limit or an operator defined animal feed safety limit (i.e. no CCP if there is no defined limit). A critical limit, which is measurable and can be monitored on an ongoing basis, must be established for the CCP.

3. In this example, the required thermal process is achieved by complying with the heating parameters for the coagulation, holding and drying of blood meal given in Part 2 of the Code of Practice. This will result in the elimination of vegetative forms of micro-organisms in the product. Individual premises may use different process parameters (e.g. time, temperature, pressure) provided that these parameters are validated as capable of eliminating vegetative forms of micro-organisms.

4. Effective drying and implementation of supporting systems (e.g. hygienic design and construction, cleaning and sanitation, pest control) will prevent or minimise endemic contamination.

5. Any bacterial spores present in the dried blood will not grow at ≤ 10% moisture content.

Form 8: Summary table for CCPs

This form only provides a summary of the CCPs and related procedures.

The procedures relating to monitoring, corrective actions and verification for each CCP must be fully documented (consider who, what, when, how) in the RMP. The documented procedures should be referenced in this summary table, where appropriate.

Process step	**Hazard**	**CCP no.**	**Critical limits**	**Monitoring procedures** **(consider who, what, when and how)**	**Corrective actions** **(consider who, what, when and how)**	**Verification procedures** **(consider who, what, when and how)**	**RMP records**
Meat and bone meal, tallow							
5. Cooking	B – bacterial pathogens	1	≥ 90ºC for ≥ 10 min.	Automatic recording of thermal process parameters Supervisor to check readings at a predetermined frequency	Supervisor to adjust cooker settings immediately Production Manager to determine disposition of the product (e.g. re-cook or reheat tallow, downgrade for industrial use) Production Manager to review records, investigate problem, and take steps to prevent reoccurrence	Validation of the cooking process Calibration of measuring devices Internal audit External audit (e.g. regulator, client)	Validation record Daily CCP monitoring worksheet Corrective action report Calibration record Internal audit report External audit report

	Hazard	CCP no.	Critical limits	Monitoring procedures (consider who, what, when and how)	Corrective actions (consider who, what, when and how)	Verification procedures (consider who, what, when and how)	RMP records
Dried blood							
3. Coagulation & 5. Drying	B – bacterial pathogens	2a & 2b	1. - Heating to 88-92ºC for 5-10 sec or longer; and - During any dwell time before drying, but not exceeding 35 minutes, the holding of coagulated blood at 60-65ºC or hotter; and - Feeding of coagulated blood into the drier where the combustion temperature is not less than 350ºC and the exit air temperature is not less than 90ºC. or 2. ≥ 90ºC for ≥ 10 min.	Automatic recording of drying process parameters Supervisor to check readings at a predetermined frequency	Supervisor to adjust machine settings immediately Production Manager to determine disposition of the product (e.g. reprocess, downgrade for fertiliser use) Production Manager to review records, investigate problem, and take steps to prevent reoccurrence	Validation of the drying process Calibration of measuring devices Internal audit External audit (e.g. regulator, client)	Validation record Daily CCP monitoring worksheet Corrective action report Calibration record Internal audit report External audit report

2.9 Identification and control of risks to wholesomeness

The RMP must identify the risk factors related to wholesomeness that are reasonably likely to occur for each animal product covered by the RMP. It must also identify the control measures for addressing the risk factors. The control measures must be documented, including procedures for monitoring, corrective action and verification, and records. Only examples for meat & bone meal, fish meal, tallow, fish oil and dried blood are shown in Form 9.

Form 9: Summary of identified risk factors and controls related to wholesomeness

Risk factor	Source or cause of risk factor	Control measure
Meat & bone meal, fish meal		
Spoilage	Mould due to high moisture content	GOP – drying, correct storage conditions etc. Refer to Supporting Sys. xx.
Insects and insect parts	Inadequate pest control	GOP – pest control etc. Refer to Supporting Sys. xx.
Tallow, fish oil		
Spoilage / oxidation	Fermentation due to high moisture content and/or high protein content	GOP – hygienic processing procedures, addition of antioxidants Refer to Supporting Sys. xx.
Protein sediments	Poor separation	GOP – hygienic processing procedures Refer to Supporting Sys. xx.
Dried blood		
Spoilage	Mould due to high moisture content	GOP – hygienic processing procedures Refer to Supporting Sys. xx.
Insects and insect parts	Inadequate pest control	GOP – pest control etc. Refer to Supporting Sys. xx.

2.10 Identification and control of risks from false or misleading labelling

Any information applied to the packaging must be correct and accurate. The RMP must identify the risk factors related to false or misleading labelling that are reasonably likely to occur for each animal product. It must also identify the control measures for addressing the risk factors. The control measures must be documented, including procedures for monitoring, corrective action and verification, and records. Only examples for meat & bone meal, fish meal, tallow, fish oil, and dried blood are shown in Form 10.

Form 10: Summary of identified risk factors and controls related to false or misleading labelling

Risk factor	Source or cause of risk factor	Control measure(s)
Packaged products		
Incorrect details on label or transportation outers, e.g. • product description • lot id • species • Biosecurity (Ruminant Protein) Regulations 1999 labelling requirements • storage directions	Incorrect label / packaging design	Procedures for ensuring correct label/packaging design Refer to Supporting Sys. xx
	Product put in wrong packaging	Procedures for ensuring correct packaging of products Refer to Supporting Sys. xx.
Bulk products		
[Where product can not be practicably be labelled] Incorrect details on accompanying documentation, e.g. • product description • lot id • species • Biosecurity (Ruminant Protein) Regulations 1999 labelling requirements • storage directions	Product put in wrong bulk transportation unit	Procedures for ensuring correct load out of products Refer to Supporting Sys. xx.

2.11 Operator verification

The operator must verify the effectiveness of their RMP against their documented procedures and any criteria defining the product's fitness for intended purpose (e.g. regulatory limit, operator-defined limits, GOP requirements, and critical limits). The verification procedures must be documented, including responsibilities, corrective action, frequencies, and records. The various verification activities may be summarised as shown in Form 11.

Form 11: Summary of operator verification activities

Activity	Description	Supporting System
Review of monitoring and corrective action records	All daily monitoring sheets checked to ensure that documented procedures are complied with, limits are adhered to, and appropriate corrective actions are taken	xxx
Microbiological testing of products / environment	Testing product for *Salmonella*	xxx
Moisture content testing	Testing product for moisture content	xxx
Calibration status of measuring devices	Checks to ensure measuring devices are calibrated	xxx
Internal audits	Internal audit involving: • review of records; • review of test results; • reality checks	xxx
Review of RMP including supporting systems	Review of effectiveness of RMP Reassessment of RMP (e.g. new hazards, changes in inputs, process steps, critical limits)	xxx
Other activities related to the verification of CCPs, regulatory limits, operator-defined limits, and supporting systems		

3 References

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