Development of Pre-requisite Programmes and HACCP Principles for Irish Beef Slaughterhouses

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Contents

	Page
Summary	1
Structure of this document	2
Introduction	3
Part one: Pre-requisites	4
Standard operating procedures	4
Pre-requisite programmes	6
1. Pre-requisite programme for slaughterhouse structure and equipment requirements	7
2. Pre-requisite programme for slaughterhouse maintenance	12
3. Pre-requisite programme for slaughterhouse services	13
4. Pre-requisite programme for operation of the slaughterhouse	18
Part two: The principles of HACCP	28
Assessment of conformance	29
HACCP implementation	29
Why keep records?	30
System review of CCPs	31
Example one: Visual carcass contamination inspection as a CCP	31
Example two: Steam pasteurisation as a CCP	32
Example three: Hot water washing as a CCP	33
Example four: Chilling as a CCP	34
Glossary of terms	36
Appendix one - Sanitation standard operating procedures	38
Appendix two - Standard operating procedures for maintenance	43
Appendix three - Standard operating procedures for cleaning	45
Appendix four - Standard operating procedures for waste management	52
Appendix five - Information on food safety training	60
Appendix six - Training course records	61
Appendix seven - Medical certification	63
Appendix eight - Standard operating procedures for product recall / withdrawal and traceability	68
Appendix nine – Pre-requisites checklist	72
Appendix ten – HACCP plan checklist	77
Appendix eleven – Example of a beef process flow diagram	79
Appendix twelve – Example of a beef HACCP plan	80
Appendix thirteen – Example of a summary of critical limits, monitoring, corrective actions, records and verification	83
Acknowledgements	84
References	85

Summary

The first step to developing a Food Safety Management System (FSMS) in a beef slaughterhouse is to implement pre-requisite programmes, i.e. Good Manufacturing Practices (GMP) and Good Hygiene Practices (GHP). These are required prior to the development of a Hazard Analysis and Critical Control Point (HACCP) plan. **Pre-requisite programmes** have been defined as *'practices and conditions needed prior to and during the implementation of HACCP and which are essential for food safety'* (Huss et al, 2003). HACCP is a science based preventative system and is currently the most effective method to control food safety hazards (Anon., 1997c).

GMP describes the requirements for hygienic design and construction of slaughterhouse premises and equipment. It is a combination of quality procedures and is described by standard operating procedures (SOPs). SOPs are aimed at ensuring that carcasses are consistently produced to their specifications i.e. minimising microbial, chemical and physical contamination (Brown, 2000). GHP describes the basic hygienic measures which management should have in place i.e. sanitation standard operating procedures (SSOPs). SSOPs describe how GHP is to be achieved.

The implementation of pre-requisite programmes is the responsibility of the slaughterhouse management. **These programmes may include,** but are not limited to:

- training,
- premises and equipment,
- storage,
- maintenance,
- cleaning / sanitation,
- residue control programme,
- services (e.g. water and pest control),
- waste management and
- product recall / withdrawal and traceability.

HACCP is a systematic, preventative approach that combines the principles of food microbiology and risk assessment. Codex Alimentarius, a subsidiary of the Food and Agricultural Organisation (FAO) and the World Health Organisation (WHO), have adopted HACCP as the international standard.

There are currently two hundred and seventy local slaughterhouses licensed for the domestic market in the Republic of Ireland and thirty-six approved bovine export slaughterhouses. This manual is applicable to all types and sizes of beef slaughterhouses.

Structure of this document

It is the intention of this document to:

- outline the guidelines for drawing up pre-requisite programmes,
- outline the seven HACCP principles,
    - highlight the records required for the implementation and verification of the HACCP principles and
    - outline the potential Critical Control Points (CCPs) in a beef slaughterhouse.

The document is divided into two parts:

Part one: The pre-requisite programmes

This section will assist the beef-slaughtering sector in addressing the fundamental challenge of documenting their own pre-requisite programme. It outlines the pre-requisite programmes that should be developed, implemented and documented in all beef slaughterhouses. It states the procedures that will ensure both the proper handling of carcasses and the cleanliness of the slaughterhouse.

Part two: The HACCP principles

This section will assist the beef-slaughtering sector in understanding the requirements of the HACCP principles. The principles of HACCP cannot be implemented independently and must be supported by a properly implemented pre-requisite programme i.e. Good Manufacturing Practices (GMP) and Good Hygiene Practices (GHP). This section of the document assumes that these pre-requisite programmes are in place and being implemented. This section will highlight records that slaughterhouse management should maintain in order to prove that their HACCP system is operational i.e. through verification. It will also outline the potential CCPs that may be used in a beef slaughterhouse.

Introduction

Following on from the publication of the White Paper on Food Safety in 2000, the European Commission carried out a major review of the hygiene directives. These Directives, seventeen in total, have been gradually developed since 1964 in response to the needs of the internal market, taking into account a high level of protection for the consumer. The multiplicity of these Directives, the intermingling of different disciplines, (hygiene, animal health, official controls) and the existence of different hygiene regimes for products of animal origin and other food, have brought about a detailed and complex situation. This has led to the separation of various aspects of food hygiene from animal health and official control issues.

This document makes reference to both current Irish and European legislation and also to the forthcoming hygiene regulations, as mentioned above. Current legislation will be revoked on the 1st January 2006 by the new Hygiene Package in accordance with Directive 2004/41/EC, repealing certain directives concerning food hygiene and health conditions for the production and placing on the market of certain products of animal origin intended for human consumption, and amending Council Directives 89/662/EEC and 92/118/EEC and Council Decision 95/408/EC.

The three hygiene regulations that are applicable to this document are as follows:

- Regulation (EC) No 852/2004 of the European Parliament and of the Council on the hygiene of Foodstuffs. This Regulation often referred to as Hygiene 1 sets out the rules applicable to all food – from the farm to the point of sale to the consumer and places primary responsibility for the safety of food on food producers.

- Regulation (EC) No 853/2004 of the European Parliament and of the Council laying down specific hygiene rules for food of animal origin. This Regulation, often referred to as Hygiene 2, includes specific hygiene rules for food of animal origin in addition to the general rules in Hygiene 1.

- Regulation (EC) No 854/2004 of the European Parliament and of the Council laying down specific rules for the organisation of official controls on products of animal origin intended for human consumption. This Regulation, often referred to as Hygiene 3, sets down detailed rules for official controls on products of animal origin.

There are also impending legislative changes that will influence such issues as traceability and product recalls / withdrawals. These are stated in **Regulation (EC) No 178/2002 Chapter II, Section 4 Articles 18 and 19,** which lays down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety. Also in **Regulation (EC) No 852/2004 Chapter II Article 5 Paragraph 1** it states that **"food business operators shall put in place, implement and maintain a permanent procedure or procedures based on the HACCP principles".**

Part one: Pre-requisites

To minimise the contamination of beef carcasses during slaughter, all aspects of the beef slaughter process must be properly controlled. This control is achieved using a food safety management system (FSMS). The FSMS should cover organisational and technical issues, address the needs of the customer and be based on the concept of continuous improvement and participation of all employees working in the slaughterhouse (Jouve, 2000). It involves three areas; GMP, GHP (pre-requisites) and the HACCP principles.

The HACCP principles cannot exist as a stand-alone programme and should be supported by a firm foundation of GMP and GHP, these are the pre-requisites to HACCP. (Figure 1).

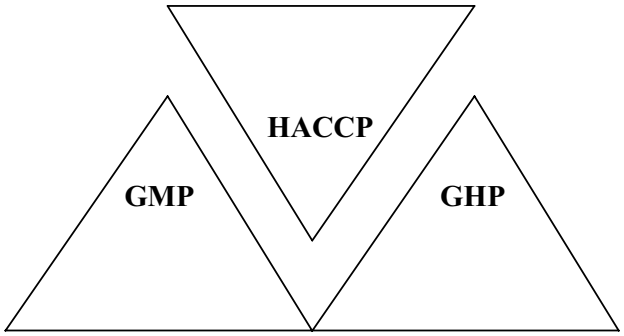


Figure 1: GMP and GHP are pre-requisite programmes for HACCP

Prior to the development of the HACCP plan, there is a requirement for management to have developed, documented and implemented GMP and GHP. These programmes need to be effectively monitored and verified before implementing the HACCP principles. The term **'pre-requisite'**, although not mentioned in Irish legislation is covered in the forthcoming Hygiene Regulations by inference to the components thereof. The pre-requisite documentation shall be reviewed by management and updated when any changes are made in the slaughterhouse process, or alternatively once a year i.e. through internal audits.

Standard operating procedures

Standard Operating Procedures (SOPs) are established methods that are followed routinely for the performance of designated operations within the slaughterhouse. Current guidelines recommend that management should have documented SOPs. SOPs relate to specific tasks and should address the following:

- the purpose and frequency of doing a task,
- who will do the task,
- a description of the procedure to be performed that includes all the steps involved and
- the corrective actions to be taken if the task is performed incorrectly.

SOPs are included under GMP, however they differ slightly as SOPs may or may not be related to the safety of carcasses. For example, the SOPs for handling cattle in the lairage before slaughter would not directly affect food safety, while the SOPs for the safe removal of bellies from carcasses on the slaughter line relate directly to food safety.

Slaughterhouse management should have the following information on file relating to SOPs:

- a numerical listing of all SOPs,
- all SOPs defined and fully documented,
- records that indicate that the SOP is verified,
- any non-conformances recorded,
- records of corrective action taken and
- records are signed and dated by slaughterhouse management.

Pre-requisite programmes

Good manufacturing practices and good hygiene practices are specified under the following four pre-requisite programmes:

1) structure

2) maintenance

3) services

4) operations

It is essential for management to keep accurate records of pre-requisite programmes that may include but are not limited to:

- training,
- premises and equipment,
- storage,
- maintenance,
- cleaning / sanitation,
- residue control programme,
- services (e.g. water and pest control),
- waste management and
- product recall / withdrawal and traceability.

This is for their own benefit and for the auditor(s) performing external audits. Complete, well-organised records can help ensure control over the maintenance of facilities and equipment. The key to maintaining records is continual updating ensuring that new information is added to existing inspection records, as they become available. **It must be noted that record keeping on its own does not ensure slaughterhouse hygiene.** Records only help to support the pre-requisite programmes.

There are a number of records that must be held, by law, for certain periods of time. The slaughterhouse owner must maintain records of all animals entering the slaughterhouse and slaughter products leaving, any checks carried out and the results of those checks and these records must be maintained for six months **[S.I. No. 434 of 1997; Part III, Paragraph (8: (b))].** Any microbiological checks carried out on the general hygiene of conditions of production and on production equipment must keep their results for a period of two years. **[S.I. No. 434 of 1997; Part III, Paragraph (12: (1:d))].** Carcase microbiological records must be kept for a period of at least eighteen months **[Commission Decision 2001/471/EC Annex 1].**

1. Pre-requisite programme for slaughterhouse structure and equipment requirements

Management shall have a programme in place to monitor and control all structural elements of the buildings, surroundings and equipment in a manner that facilitates the hygienic operation of the slaughterhouse and minimises contamination of carcasses. They should also maintain appropriate records.

1.1 The slaughterhouse premises

All buildings and yard area(s) on the premises shall be designed to permit proper cleaning and sanitation. The general area outside the factory shall have a perimeter fence. The yard area shall be free from all obstructions and accumulations of refuse. Buildings shall be of sound construction and maintained in good repair and shall not present chemical, microbiological or physical hazards to carcasses.

- **S.I. No. 152 of 1989; Part II, Paragraphs (5) (6) (7),**
- **S.I. No. 434 of 1997; Chapter I, Paragraph (1)** and
- on the 1st January 2006 the above will be repealed and replaced with **Regulation (EC) No 853/2004 Annex III Section I Chapter II and Chapter IV Paragraph (5).**

1.2 Design and layout of the slaughterhouse

1.2.1 Lairage

The lairage shall be suitably covered providing protection against adverse weather conditions for cattle awaiting slaughter. The lairage shall be constructed of suitable impervious materials so as to facilitate easy and thorough cleaning. There shall be a suitable crush present. There shall be appropriate facilities to allow ante-mortem inspection to take place and detention facilities for animals that require further inspection and / or evaluation. The lairage floors and passageways shall be impervious and properly sloped to ensure satisfactory drainage. The floor shall be surfaced to ensure that animals have a safe foothold. Lairage facilities shall have both natural and artificial lighting. The level of artificial lighting shall be such as to permit inspection of cattle at any time. The lairage shall contain feed troughs (only if cattle are kept at the slaughterhouse for longer than twenty-four hours prior to slaughter) and water troughs in each pen or stall. The latter shall be of a self-filling type and have a sufficient supply of potable drinking water at all times. There shall be facilities for the washing and disinfecting of all types of cattle transport vehicles. There shall be adequately equipped lockable facilities for exclusive use by the veterinary service.

- **S.I. No. 152 of 1989; Part II, Paragraphs (8) (9), Part III, Paragraph (58),**
- **S.I. No. 434 of 1997; Chapter I, Paragraph (9) and Chapter II Paragraph (14: (a))** and
- on the 1st January 2006 the above will be repealed and replaced with **Regulation (EC) No 853/2004 Annex III Section I Chapter II Paragraphs (1) (6) (7) (9).**

There shall be suitable facilities and equipment for the restraint and humane stunning of cattle. These facilities and equipment shall be maintained in proper working order.

- **S.I. No. 152 of 1989; Part II, Paragraph (44).**

The lairage, where animals are kept prior to slaughter, shall be completely separate from the production area and chill room(s) except for the connection allowing the animals to enter the slaughterhouse for slaughtering from the lairage.

- **S.I. No. 152 of 1989; Part II, Paragraph (12: (1)),**
- **S.I. No. 12 of 1998; Paragraph (3: (a)),**
- **S.I. No. 434 of 1997; Chapter II Paragraph (14: (h))** and
- on the 1st January 2006 the above will be repealed and replaced with **Regulation (EC) No 853/2004 Annex III Section I Chapter II Paragraph (2 (e)).**

1.2.2 Production line

All floors, walls, coving, doors, windows, ceilings / overhead fixtures and stairs, in the production area, shall be constructed of material that is durable, easy to clean and suitable for the arduous nature of a slaughterhouse. All production floors shall be sufficiently sloped for liquids to drain to grated-trapped outlets. Where Specified Risk Material (SRM) is removed drain traps must have a screen or mesh, of no more than 6 mm in size, fitted. All walls shall be light coloured and have coving at the bottom. All windows shall be equipped with close fitting screens. All doors shall have a smooth, non-absorbent surface and where appropriate be self-closing. All stairs and overhead structures shall be designed and installed in a manner that prevents the contamination of the product. All light fixtures that are suspended over the production area of the slaughterhouse and all other areas shall be protected in shatterproof diffusers, to prevent the contamination of carcasses. All parts of the slaughterhouse shall also be adequately lighted. The ventilation system shall eliminate, as far as possible, the build-up of condensation and remove contaminated air. The ventilation openings shall be equipped with close fitting screens and located in areas that prevent the intake of contaminated air. The sewage system shall be designed and constructed so that there is no cross-connection between the effluent of toilet waste and any other waste that comes from the production process.

- **S.I. No. 152 of 1989; Part II, Paragraphs (26) (27) (28) (29) (30) (31) (32) (55),**
- **S.I. No. 434 of 1997; Chapter I, Paragraph (1),**
- **Regulation (EC) No 1774/2002,**
- on the 1st January 2006 the above will be repealed and replaced with **Regulation (EC) No 852/2004 Annex II Chapter I Paragraphs (5) (6) (7) (8)** and
- **Regulation (EC) No 853/2004 Annex III Section I Chapter II Paragraphs (2: (a, c (i, iii) d, e)).**

The equipment used to decontaminate hand-held tools (knives, hooks and saws) during the production process is commonly referred to by industry as 'sterilisers'. This is an inaccurate description as the temperature of the water used is required to be at 82°C or higher and therefore does not result in sterilisation[3]. This equipment shall sanitise (clean and disinfect) the hand-held tools. There shall be sufficient numbers of 'sterilisers' correctly located near the operatives' workstations.

- **S.I. No. 152 of 1989; Part II, Paragraph (41),**
- **S.I. No. 434 of 1997; Chapter I, Paragraph (2: (b))** and
- on the 1st January 2006 the above will be repealed and replaced with **Regulation (EC) No 853/2004 Annex III Section I Chapter II Paragraph (3).**

The production line shall contain a sufficient number of conveniently located workstation wash hand basins with properly trapped waste pipes connected to drains. The workstation wash hand basins shall be non-hand / arm operable. The workstation wash hand facilities shall have a supply of pre-mixed water at a suitable temperature and anti-bacterial soap.

- **S.I. No. 152 of 1989; Part II, Paragraphs (38) (39),**
- **S.I. No. 434 of 1997; Chapter I, Paragraph (2: (a))** and
- on the 1st January 2006 the above will be repealed and replaced with **Regulation (EC) No 853/2004 Annex III Section I Chapter II Paragraph (4).**

1.2.3 Offal rooms

There shall be a suitable red offal area and facilities, adequately separated from unclean areas, for the hygienic dressing and preparation of red offals including hearts, tongues, livers and kidneys. Where green offal is prepared for human consumption, suitable facilities, physically divided from other rooms in the slaughterhouse, shall be provided. There shall be a separate area for the emptying and cleaning of stomachs and intestines. Also if the preparation of tripe and / or edible fat is carried out it shall be done so under hygienic conditions.

- **S.I. No. 152 of 1989; Part II, Paragraph (14)**
- **S.I. No. 434 of 1997; Chapter II Paragraph (14: (c-d))** and
- on the 1st January 2006 the above will be repealed and replaced with **Regulation (EC) No 853/2004 Annex III Section I Chapter II Paragraph (2: (b, c (iv-vi)).**

1.2.4 Chills and frozen storage

Due to the perishable nature of the end product chills shall be large enough to hold carcasses until the internal temperature (deep round muscle) is reduced to no more than + 7°C and + 3°C for offal. This is to reduce or prevent microbial growth. There shall also be adequate air circulating around carcasses. Temperature of frozen meat shall be maintained at - 12°C. Consideration shall be given to temperature rises that occur during loading, defrost cycles and periods when the chills are not in use.

[3] Sterilisation is the complete removal of all microorganisms and spores. Water at 82°C will destroy vegetative cells but not spores.

- **S.I. No. 434 of 1997; Chapter I, Paragraph (5), Chapter IV, Paragraphs (16) (17) and Chapter XIV, Paragraph (63),**
- **S.I. No. 12 of 1998; Paragraphs (3: (b-d, k (1) (3)))** and
- on the 1st January 2006 the above will be repealed and replaced with **Regulation (EC) No 853/2004 Annex III Section I Chapter II Paragraph (5) and Chapter VII Paragraph (2).**

1.3 Dry goods store

All dry goods, for example salt for preserving hides, shall be food grade, transported, stored and handled in a manner that prevents chemical, physical or microbiological contamination of carcasses. Management shall monitor and control this operation and maintain the appropriate records. Certification of incoming materials by letters of guarantee or other satisfactory means shall be demanded from suppliers.

- **S.I. No. 152 of 1989; Part II, Paragraph (24),**
- **S.I. No. 434 of 1997; Chapter I, Paragraph (4: (e))** and
- on the 1st January 2006 the above will be repealed and replaced with **Regulation (EC) No 853/2004 Annex II Chapter IX Paragraph (2).**

1.4 Sanitary facilities; changing facilities, toilets and hygiene lobby

There shall be suitable and adequate changing room facilities that include lockers (sloped at the top and located off floor level), washbasins and showers. All the toilets shall have self-closing doors, separate from and not leading directly into the slaughterhouse and be correctly ventilated and maintained. Current guidelines recommend that there should be at least one toilet and one wash-hand basin for every fifteen male employees and one toilet and one wash-hand basin for every ten female employees (Anon, 1997b). All toilet areas shall have hand-washing facilities with a supply of pre-mixed water at a suitable temperature, anti-bacterial soap, disposable paper towels, toilet paper and a cleanable bin. There shall be a sufficient number of maintained sinks with properly trapped waste pipes connected to drains. In the hygiene lobby there shall be a bootwash or equivalent for people to clean their boots on entering and / or leaving the slaughterhouse. The hand washing facilities shall be non-hand / arm operable. Also the hand washing facilities shall have a supply of pre-mixed water at a suitable temperature, anti-bacterial soap, disposable paper towels and a cleanable bin.

- **S.I. No. 152 of 1989; Part II, Paragraphs (53) (54) (55),**
- **S.I. No. 434 of 1997; Chapter I, Paragraphs (2: (a)), (11)** and
- on the 1st January 2006 the above will be repealed and replaced with **Regulation (EC) No 852/2004 Annex II Chapter I Paragraphs (3) (4) (9).**

1.5 Equipment design and installation

Management shall have equipment in place that is designed for the slaughtering of beef. The equipment shall be maintained in a manner that prevents contamination of carcasses. Management shall have a programme in place to monitor and control the use of all equipment and maintain the appropriate records. All production equipment and utensils shall be constructed of corrosion resistant material. All contact surfaces shall be non-absorbent, non-toxic, smooth, free from cavities, unaffected by the product and withstand repeated cleaning and sanitation**.** All equipment and utensils shall be installed and maintained in a manner that prevents the contamination of the product. Adequate space must be provided within and around equipment for maintenance, cleaning and inspection. All equipment shall be maintained in a clean and sanitary manner in accordance with the cleaning programme *(See section 3.4)*.

- **S.I. No. 152 of 1989; Part II, Paragraphs (40) (42) (43) (44) (45) (46) (47) (49) (50),**
- **S.I. No. 434 of 1997; Chapter I, Paragraph (4: (a-d)), Chapter II, Paragraph (14: (c)) and Chapter V, Paragraph (18: (c))** and
- on the 1st January 2006 the above will be repealed and replaced with **Regulation (EC) No 852/2004 Annex II Chapter I Paragraphs (1) (2: (a)) and Chapter V Paragraph (1).**

All food grade lubricants that are used in slaughterhouse production equipment shall conform to **Council Directive No 95/2/EC, Article 1 3(o) Food Grade Lubricants E472a**. The lubricant used shall be tasteless, odourless, resist bacterial growth and rancidity.

2. Pre-requisite programme for slaughterhouse maintenance

This programme shall outline procedures that ensure satisfactory conditions are maintained, areas to be inspected, tasks to be performed, person(s) responsible, inspection frequencies and records that shall be kept.

2.1 Planned maintenance / calibration

Current guidelines recommend that there should be a documented planned maintenance programme that lists all the equipment and utensils together with maintenance procedures (Anon, 2000). The SOP maintenance programme should include (See appendix two):

- the necessary servicing of the equipment,
- the frequency of service,
- minimum yearly calibration of measuring or recording devices and / or as per manufactures recommendations,
- the replacement of parts,
- the person(s) responsible,
- methods of monitoring and
- verification activities and record keeping.

All monitoring devices and any equipment that could impact on food safety are listed, together with their intended use. For example, this equipment may include thermographs and refrigeration control units. All critical food safety measuring equipment shall be calibrated to comply with recognised national standards. Protocols and calibration methods shall be established for equipment and monitoring devices.

3. Pre-requisite programme for slaughterhouse services

The management of the slaughterhouse shall maintain and document a full list of services. The list shall include details for water treatment, diagram of drainage flow, the storage of chemicals, cleaning programme, pest control and waste disposal for both animal waste and non-animal waste.

3.1 Water and steam quality programme

Council Directive 98/83/EC on the Quality of Water Intended for Human Consumption prescribes quality standards to be applied in relation to certain supplies of drinking water, including requirements as to sampling frequency and methods of analysis. The water used in the slaughterhouse must be potable i.e. water that is fit for human consumption and shall be evaluated from a microbiological, chemical and physical hazard perspective. Where applicable, this shall also include quality of the water used for the steam supply.

- **S.I. No. 439 of 2000** and
- on the 1st January 2006 the above will be repealed and replaced with **Regulation (EC) No 852/2004 Annex II Chapter VII Paragraph (5).**

This programme shall outline:

- the frequency of testing,

- procedures for testing and

- the person responsible and the records that shall be kept.

Management shall have procedures in place to deal with water that does not meet specified standards. All records of water potability tests and treatments applied shall be maintained and filed.

3.2 Water supply

Potable water shall be provided at pressures and in quantities sufficient for all production and cleaning requirements. All records of water potability testing shall be available upon request. When chlorination is carried out, the metering device used for adding the correct amount of chlorine must also be designed to readily indicate malfunction. It is important to indicate that chlorination is not the only control system, that other purification systems are available, for example, Ultra Violet Treatment (UVT). However, whatever system is used it must be validated to ensure potability of the water.

- **S.I. No. 152 of 1989; Part II, Paragraph (35),**
- **S.I. No. 434 of 1997; Chapter I, Paragraphs (6) (7) and Chapter V, Paragraph (21)** and
- on the 1st January 2006 the above will be repealed and replaced with **Regulation (EC) No 852/2004 Annex II Chapter VII Paragraph (1: (a)).**

There shall never be cross-connections between potable and non-potable water supply systems. **Non-potable water shall never be used in the production process**. It is permissible to use non-potable water for cleaning the lairage and animal transport vehicles. All hoses, taps and cross-connections shall be equipped with anti-backflow devices to prevent any possible contamination. When hoses are not in use they shall be properly stored. **[Regulation (EC) No 852/2004 Annex II Chapter VII Paragraph (2)].** A map of the water distribution system shall be available for inspection and indicate the following: (Anon, 2001).

- the source,
- the storage,
- the treatment,
- the distribution of both potable / non-potable water within the factory and
- water sampling points.

3.3 Sanitation standard operating procedures

Sanitation standard operating procedures (SSOPs) are written procedures that describe appropriate procedures used before production i.e. pre-operational sanitation and during production i.e. operational sanitation (See appendix one). For example, operational sanitation may include the cleaning, sanitising and disinfecting of production equipment at breaks and / or between shifts. Management should maintain these written procedures on file and they should be available upon request. It is management's responsibility to implement the procedures as they are written in the SSOPs. If management determine that the SSOPs fail to reduce contamination, they should implement corrective actions and include measures that prevent recurrence.

Sanitation standard operating procedures (SSOP) should cover the following:

- written SSOPs that describe what slaughterhouse personnel do on slaughter days,
- pre-operational procedures that cover the cleaning of food contact surfaces of facilities, equipment and utensils,
- SSOP frequency for each procedure,
- the employee(s) responsible for implementing and maintaining the procedures and
- records completed on a slaughter days in accordance with the SSOP as a means of monitoring the SSOP and carrying out any necessary corrective action.

3.4 Cleaning programme

The effectiveness of the cleaning programme depends on cleaning procedures, cleaning chemicals, competent cleaning staff and the structural standard of the premises (See appendix three). An appropriate microbiological sampling programme will verify this, as specified in **Commission Decision 2001/471/EC of 8th June 2001**. Production can commence only after a pre-slaughter visible inspection of the premises has been carried out and all cleaning requirements have been met. Records of monitoring, corrective actions and verification results shall be made available upon request.

Current guidelines recommend that there shall be a documented cleaning procedure to ensure that the slaughterhouse has been properly cleaned and disinfected before the commencement of production (Anon, 2000).

The cleaning programme shall specify:

- the areas, equipment to be cleaned, the frequency and the person(s) responsible,
- special instructions for cleaning food machinery and the person(s) responsible,
- the cleaning equipment that is to be used along with the instructions for its proper operation, for example pressure and volume of water,
- the detergent/sanitiser to be used including commercial and generic names, dilution factor, water temperature,
- the method of application of the solution, contact time, foam consistency, scrubbing if necessary, high/low pressure,
- the rinsing instructions, water temperature,
- the sanitising instructions, commercial and generic names, dilution factor, water temperature, contact time,
- the final rinsing instructions and
- the safety instructions for the handling of all cleaning chemicals.

3.5 Cleaning chemicals

All cleaning chemicals shall be received and stored in a lockable, dry, well-ventilated area i.e. a chemical store, which is separate from the slaughterhouse. There shall be no possibility of cross contamination of carcasses by the cleaning chemicals. All cleaning chemicals shall be mixed in clean, correctly labelled containers as specified under manufacturer guidelines. The chemicals shall be dispensed and handled only by authorised and trained cleaning personnel. All cleaning chemicals that are used in the slaughterhouse shall be of a food grade standard.

- **S.I. No. 152 of 1989; Part II, Paragraph (33),**
- **S.I. No. 434 of 1997; Chapter I, Paragraph (13) and Chapter V, Paragraph (23)** and
- on the 1st January 2006 the above will be repealed and replaced with **Regulation (EC) No 852/2004 Annex II Chapter I Paragraph (10).**

3.6 Microbial testing / recording

The **S.I. No. 434 of 1997; Part V, Paragraph (12: 1(a))** has been amended by the **European Communities (Fresh meat and poultry) (Checks on general hygiene) Regulations S.I No. 81 of 2003** that gives effect to **Commission Decision 2001/471/EC of 8th June 2001**. The latter regulations require all licensed slaughterhouses to implement *'checks on the general hygiene of conditions of production in the establishment, inter alia, by means of microbiological checks'*. The purpose of microbiological testing at various points around the slaughterhouse is to determine if surfaces are microbiologically acceptable. The Annex to Commission Decision 2001/471/EC was amended in accordance with Directive 2004/41/EC. There is also inference made to microbiological criteria in **Regulation (EC) No 852/2004 Chapter II Article 4 Paragraph (3: (a)).**

The protocol for microbiological testing shall provide for the following:

- procedures for sampling and the number of swabs to be taken daily,

- the microbiological method for examination of the samples,

- recording of test results and

- where results are unacceptable, corrective action shall be applied reviewing the process controls ensuring that a reoccurrence of unacceptable results is prevented.

The sampling protocol for bovine spongiform encephalopathy (BSE) for cattle aged over twenty-four and thirty months of age is outlined in **Commission Regulation (EC) No 1139/2003**. All records of BSE sampling and results shall be made available on request.

3.7 Pest control

Management shall have a properly documented pest control programme to monitor and regulate all elements of pest control. The pest control programme shall include:

- the name of a contact person(s) at the slaughterhouse for pest control,
- the name of the extermination company where applicable or the name of the person(s) responsible for the programme,
- the list of pesticides / rodenticides used for pest control treatment and the relevant Material Safety Data Sheets (MSDS),
- a map of bait locations and electric insectocutors,
- the frequency of inspection and
- pest survey and control reports.

The effectiveness of the pest control programme is verified by on-site inspection of areas for the presence of insect and rodent activity. Records of all monitoring results, recommendations and actions taken shall be available on request. Bait points and insectocutors should not be sited where they may compromise food safety.

- **S.I. No. 152 of 1989; Part III, Paragraph (86),**
- **S.I. No. 434 of 1997; Chapter I, Paragraph (3)** and
- on the 1st January 2006 the above will be repealed and replaced with **Regulation (EC) No 852/2004 Annex II Chapter I Paragraph (2: (c)).**

3.8 Waste disposal

There shall be facilities provided for the storage of all waste types prior to its removal from the premises (See appendix four). This area shall be properly drained for any run-off that may occur and located away from the production area, preventing contamination of the end product. Containers for waste material shall be clearly identified, leak proof and fitted with covers (if stored outside).

- **S.I. No. 152 of 1989; Part II, Paragraph (51) and Part III, Paragraphs (93) (94) (95) (96),**
- **European Communities (Specified Risk Material) Regulations, 2000 (S.I. No. 332 of 2000),**
- **Regulation (EC) No. 999/2001,**
- **Commission Regulation (EC) No. 270/2002,**
- **Regulation (EC) No 1774/2002,**
- **European Communities (Animal By-Products) Regulations 2003 (S.I. No. 248 of 2003),**
- **Commission Regulation (EC) No. 1139/2003** and
- on the 1st January 2006 the above will be repealed and replaced with **Regulation (EC) No 853/2004 Annex III Chapter II Paragraph (8) and Chapter IV Paragraph (15).**

4. Pre-requisite programme for the operation of the slaughterhouse

This programme is divided into two parts:

A) personnel working in the slaughterhouse and

B) the slaughter process.

For a successful pre-requisite programme, management and production operatives must be fully committed. A commitment by management will demonstrate an awareness of the benefits of using a pre-requisite programme.

A: Personnel

4.1 Training

This programme shall provide, on an on-going basis, the **necessary** training for all employees. Employees should receive documented training in personal hygiene, GMP, cleaning and sanitation procedures (where applicable) and their role in the HACCP principles (where applicable). Training shall be updated annually with records of all training kept on file. Also training shall be evaluated to determine the needs of those concerned using management and operatives to provide feedback as to how to improve training. Management shall monitor, control and maintain the appropriate records relating to personnel.

Training is necessary for all employees in the slaughterhouse as it provides employees with the capability of producing hygienically acceptable carcasses fit for human consumption. The training should ensure that management and key production operatives are familiar with the principles of HACCP and that production operatives are familiar with good manufacturing practices and good hygienic practices.

Slaughterhouse employees that attend a food safety type training courses will acquire a knowledge and understanding of the principles of a food safety system. Such training cannot be achieved simply by reading published articles or related textbooks. Training should not be seen as a one-off exercise, but one of continuous learning and improvement for all slaughterhouse employees.

4.1.1 Training legislation

It is a requirement under Irish law that employees working in a slaughterhouse should be provided with training in hygiene standards appropriate to bovine slaughter. It states that '*the person who is for the time being the owner or person in charge of the establishment approved under Regulation 4 shall in accordance with the directions of the veterinary inspector and subject to any time limits that he may specify, arrange a staff training programme enabling workers, who have not, in the opinion of the veterinary inspector, already received acceptable training, to satisfy the hygiene standards appropriate for that type of production'*. **S.I. No. 434 of 1997; Part V (12: (2)).** Training is also referred to in **Regulation (EC) No 852/2004 Annex II Chapter XII Paragraphs (1) (2) (3).**

HACCP is a legal requirement under European law. **Commission Decision 2001/471/EC** states that *'the operator of a meat establishment shall conduct regular checks on the general hygiene conditions of production in his establishment, by implementing and maintaining a permanent procedure developed in accordance with HACCP principles'*. HACCP is also referred to in **Regulation (EC) No 852/2004 Chapter II Article 5.**

4.1.2 Employee training

All food handlers and non-food handlers should demonstrate basic food safety and hygiene training. A food handler is any person involved in the slaughter process that directly handles carcasses in the course of his / her work. While a non-food handler is a person involved in the slaughterhouse business whose duties and responsibilities can impinge on food safety, for example, maintenance and cleaning staff. **Employees should be able to demonstrate the training that they received is consistent with their role in the slaughter process.**

Effective training is an important pre-requisite to the successful implementation of the HACCP principles. The HACCP team must have management commitment and include a cross-section of relevant personnel, for example a senior manager, maintenance, production, cleaning and quality assurance. For a local authority slaughterhouse owner(s) it is incumbent upon one or two individuals to take responsibility for the development of a HACCP plan. They will require external guidance and HACCP training.

There are a number of Food Safety Authority of Ireland (FSAI) documents that outline the guidelines involved in food safety training for management and production operatives (See appendix five). These include:

- Guidance Note Eight (Anon, 2002a),
- Guide to Food Safety Training Level one (Anon, 2001b),
- Guide to Food Safety Training Level Two (Anon, 2001c),
- Guide to Food Safety Training Level Three (Anon, 2003a) and
- Standard Operating Procedures for abattoir management and operatives manual (2003b).

4.2 Recommended training

It is the responsibility of the management to ensure that all staff are suitably trained. Slaughterhouses must have a documented staff-training programme as part of their pre-requisite programme.

The documentation for the staff-training programme should include the following:

- a training schedule,
- individual training records (See appendix six) and
- a copy of any training materials.

Particular attention must be paid to the procedures outlining the training of new operatives. In addition the veterinary inspector should, if necessary, recommend changes to the programme if he / she feels that any hygiene problems are related to insufficient training.

Management should endeavour to acquaint themselves with all courses offered to the operatives and advise accordingly. Every effort should be made to allow for language and literacy problems.

Management must satisfy themselves that the staff-training programme is adequate to ensure that all operatives have the appropriate level of knowledge, skills and ability to carry out their work in a hygienic manner.

This may be achieved by ensuring:

- that there is a fully documented training programme,
- an individual training record for each operative,
- that the programme of training completed by the operative is adequate for the skills / knowledge level required to do his / her work and
- that the operative is working in accordance with the expected hygienic / skills level required.

4.3 Minimum training requirements

The fundamental training requirements for employees working in a beef slaughterhouse are grouped into three categories:

1) food safety management system,
2) sanitation and
3) services.

These are the minimum training requirements that an auditor shall expect slaughterhouse personnel to have received.

4.3.1 Food safety management system

The HACCP team leader / co-ordinator should be familiar with all aspects of the Food Safety Management System (FSMS):

- basic food safety and hygiene,
- pre-requisite programmes (GMP and GHP),
- HACCP and
- SOPs for beef slaughter.

The FSMS should cover organisational and technical issues, address the needs of the customer and be based on the concept of continuous assessment and participation of all employees working in the slaughterhouse (Jouve, 2000). The FSMS provides a framework to create a favourable environment for the use of the HACCP principles. The HACCP co-ordinator is a person knowledgeable in HACCP, appointed by slaughterhouse management or self appointed (local authority slaughterhouse) to implement, lead and maintain the FSMS.

Management should have a fundamental understanding of

- basic food safety and hygiene,
- the slaughterhouses pre-requisite programme and
- the principles of HACCP.

Production managers and / or supervisors will need to be trained in SOPs for beef slaughter. Production operatives should be competent in basic food safety and hygiene. This should include a fundamental understanding of the likely hazards that may occur. This ensures that they understand both personal hygiene requirements and safe food handling practices when working.

- **S.I. No. 152 of 1989; Part III, Paragraphs (84) (85)** and
- **S.I. No. 434 of 1997; Chapter I, Paragraph (18: (a)).**

Production operatives should be fully trained in the SOPs for cattle slaughter with the level of training and knowledge relating to the nature of their task. There may be slight variations in slaughtering techniques in different slaughterhouses. These may be acceptable provided the critical objective of reducing or preventing carcass contamination is achieved. For example, production operatives should operate a two-knife technique during dressing, using colour-coded knives.

Training in FSMS may be acquired either through a formal training course or in-house and / or on the job training. There should be records and / or certificates to prove that management and key production operatives have received such training.

4.3.2 Sanitation

Employees involved in cleaning should be trained in basic food safety and hygiene, and sanitation standard operating procedures (SSOP). There should be records and / or certificates to prove that all cleaning personnel have received such training.

4.3.3 Services

a) Maintenance personnel should be trained in basic food safety and hygiene and the SOP for the maintenance of premises and equipment. There should be records and / or certificates to prove that all maintenance personnel have received such training.

b) Employees involved in services such as waste disposal and pest control should be trained in the SOPs for each service. Records should be provided on request and / or the auditor can observe these services being carried out.

4.4 Training in a local authority slaughterhouse

Management, (this may include the HACCP co-ordinator and / or local slaughterhouse owner), should be competent in basic food safety and hygiene. They should be able to outline any aspect of the slaughterhouses pre-requisite programmes. The co-ordinator should be able to describe the principles of HACCP in relation to their slaughterhouse. The owner / manager of a local slaughterhouse will also have to be as trained in the entire SOPs for cattle slaughter.

Staff who are responsible for the cleaning of the slaughterhouse should be aware of the sanitation standard operating procedures (SSOP) for cleaning. Management may in some cases be responsible for the cleaning of the slaughterhouse and should also be aware of this SSOP. There should be records and / or certificates to prove that management received SSOP training. In cases where there are no records and/or certificates available, the auditor may question the management and / or examine their cleaning and / or microbiological records.

Management may carry out their own maintenance of premises and equipment. If this is the case, there should be records and / or certificates to prove that training in SOP for maintenance has been received. In cases where maintenance work is contracted externally, records and / or certificates of such arrangements should be provided on request.

Management in local authority slaughterhouses that are in control of such services as water supply, waste disposal and pest control should be trained in the SOPs for each respective service. Records should be provided on request. In cases where these services are contracted externally there should be records available to prove this.

4.5 Communicable diseases / injuries

Management shall ensure that there is an annual renewal of medical certificates of all slaughterhouse employees (See appendix seven). No person, while known to be suffering from, or known to be a carrier of a disease likely to be transmitted through food, or carrying an infected wound, skin infection, sores or suffering from a gastroenteric illness, is permitted to work in the slaughterhouse. When returning from an illness, management must demand a medical certificate from that person indicating that they have no impediment to return to work. This is to prevent such a person contaminating the product with pathogenic microorganisms. A person with an open cut or abrasion shall not handle the product unless the cut is completely covered with a blue coloured, waterproof, metal-detectable covering.

- **S.I. No. 152 of 1989; Part II, Paragraph (52) and Part III, Paragraph (92) and**
- **S.I. No. 434 of 1997; Chapter V, Paragraph (24).**

The requirement for annual medical certification as specified in legislation above will no longer be necessary with the introduction of the Hygiene Package in January 2006. However, medical certification, should be used as an opportunity to ensure that food handlers have the requisite understanding of personal and food hygiene practices and the importance of reporting illness.

4.6 Personal cleanliness

All personnel working in the slaughterhouse shall maintain their own personal cleanliness. Protective clothing includes light covered overalls or a coat and trousers, chain mail gloves, an apron (where applicable), footwear, hair covering and / or a snood. These shall be worn and maintained in a sanitary manner i.e. light-covered overalls, coat and trousers shall be changed daily. All persons entering the slaughterhouse shall remove objects, for example a wristwatch and / or jewellery, the exception being a plain wedding ring / band from their person. All personal effects and clothing shall be stored away from the slaughterhouse in designated lockers. Smoking and eating and / or drinking are not permitted in the production area. Hand washing shall be conducted on entering and leaving the slaughterhouse, immediately after finishing any task that involved contact with intestinal contents / faecal material on the beef carcasses, and after using the toilet facilities. Washing hands thoroughly with pre-mixed water and anti-bacterial soap is necessary to remove undesirable microorganisms.

- **S.I. No. 152 of 1989; Part III, Paragraph (91),**
- **S.I. No. 434 of 1997; Chapter V, Paragraph (18: (a))** and
- on the 1st January 2006 the above will be repealed and replaced with **Regulation (EC) No 852/2004 Annex II Chapter VIII Paragraphs (1) (2).**

4.7 Controlled access

The access of visitors shall be controlled to prevent contamination of carcasses. All necessary precautions shall be taken to prevent cross-contamination, including the use of protective clothing, hair covering and footwear by all visitors.

- **S.I. No. 152 of 1989; Part III, Paragraph (89).**

B: Slaughter process

4.8 Chemical residues control programme

Chemical residues may arise from natural contaminants (such as mycotoxins, arising from feed), pesticides (arising from feed or from indirect or direct exposure of animals), veterinary drugs (including prohibited substances), or industrial / environmental contaminants. These chemicals may be ingested or absorbed by the live animal and chemical residues may remain in the animal tissue. This contamination should not be confused with surface contamination of the beef carcasses during slaughter, for example, oil from the machinery or chlorine from washing. Residues will be dealt with under their own programme while the control of contamination of carcasses from chemicals used on the slaughter line is part of the GMP programme (i.e. cleaning / sanitation and maintenance of plant and equipment).

Some substances are prohibited under EU and national laws, including growth promoting agents (typically natural or synthetic anabolic agents and β-agonists) and certain antimicrobials (chloramphenicol, nitrofurans, etc.). Others, such as licensed veterinary drugs and pesticides, are permitted for use but the levels that may be administered and the residue levels, which may occur in edible tissues at slaughter, are regulated.

The chemical residues of concern in beef are highlighted in Table 1. These are prioritised based on the consequences of exposure to the consumer. The 'A' grading refers to those residues that have a high priority. The 'B' grading refers to permitted veterinary drugs with maximum residue limits (MRLs) established under regulations such as Commission Regulation (EC) No. 508/1999 (Official Journal of the European Communities L60, 16-52, 9.3.1999) and subsequent changes to its Annexes. MRLs for pesticides are established by **Council Directive 86/363/EEC.** (Official Journal of the European Communities L221, 43, 7.8.1986) and its Annexes such as 93/57/EEC, 94/29/EC, 95/39/EC, 96/33/EC, 98/82/EC, 99/71/EC. The 'C' grading refers to those residues with a low priority i.e. they are ubiquitous in nature.

As with all other aspects of beef slaughter, the levels of chemical residues in the raw material (cattle) must be monitored and controlled. Until recently, this function was exclusively the responsibility of the Regularity Authority. The Department of Agriculture and Food (DAF) Residue Testing and Pesticide Monitoring plans are still the core regulatory activities covering residue monitoring. However, the beef slaughterhouses are now legally co-responsible for ensuring that their produce does not contain chemical residues above the MRLs. Under Council Directive 96/23/EC, Chapter III '*Self-monitoring and co-responsibility on the part of the operators*'

establishments which carry out initial processing of primary products' i.e. beef slaughterhouses are required to carry out their own checks to:

- accept only animals for which the producer is able to guarantee that the withdrawal periods have been observed and

- satisfy themselves that the animals / products do not contain residue levels which exceed maximum permitted levels or any trace of prohibited substances.

Table 1: Chemical residues of concern in beef

Residue Class	**Grading** *
Prohibited substances:	
Growth promoters	A
Chloramphenicol, Nitrofurans, etc	A
Veterinary drugs:	
Antimicrobials	B
Carbamates / Pyrethroids	B
Anthelmintics	B
Pesticides:	
Organochlorine	C

*Grading: A = high priority, B = medium priority, C = low priority

The surveillance for chemical residues in beef should be incorporated into the GMP programme. This programme should include sourcing of cattle from farms with a recognised quality assurance scheme and a requirement that a letter of guarantee, in compliance with correct veterinary procedures, accompany each supplied batch. The programme should include test monitoring of liver, kidney, urine, blood and / or muscle samples, as appropriate. Under the National Residue Plan[4], there is a statutory response that should be taken when carcasses are found to be positive.

[4] The National Residue Plan is provided for in the Animal Remedies Act, 1993 and other relevant legislation in particular, the Control of Animal Remedies and their Residues Regulations, 1998.

4.9 Animal intake

Cattle delivered to the slaughterhouse for slaughter shall be unloaded, moved and handled in such a manner that will cause no injury, cruelty or undue stress or excitement. **[S.I. No. 152 of 1989; Part III, Paragraph (57)].** Cattle are kept in the lairage in accordance with the **European Communities (Protection for Animals at Time of Slaughter) Regulations, 1995 [S.I. No. 114 of 1995]**, which covers the protection of animals at the time of slaughter. The regulations define rules for the treatment of animals prior to slaughter and for humane methods of slaughter.

4.10 Determination of animal identity

Cattle must be checked in the lairage on arrival that they have Department of Agriculture and Food (DAF) approved identity tags. The identity tags must be checked against the accompanying documentation i.e. passport, for correlation.

In the export plant, all cattle tag numbers are entered into a computer system called the cattle movement monitoring system (CMMS) by the operative. In a local slaughterhouse the cattle identity numbers must be faxed to the district veterinary office (DVO) for submission to the CMMS. The ER106 must be available to the veterinary inspector at ante-mortem. If an animal is rejected it must be isolated from other animals going for slaughter and the herd owner notified. Cattle over thirty months of age cannot be slaughtered in a local slaughterhouse however they may be slaughtered in an export plant. Where possible, cattle should only be purchased from farmers whose production system meets the standards described in a recognised quality assurance scheme.

- **S.I. No. 152 of 1989; Part III, Paragraph (59),**
- **S.I. No. 434 of 1997; Part III, Paragraph (8) and S.I. No. 328 of 1999; Paragraph (3)** and
- on the 1st January 2006 the above will be repealed and replaced with **Regulation (EC) No 853/2004 Annex II Section II Paragraph (2: (a-d)) and Section III Paragraphs (1) (2) (3) (4) (5) (6)**. This refers to food chain information that must be forwarded to the slaughterhouse management in respect of animals that are to be slaughtered.

4.11 Evaluation of livestock cleanliness

Under **S.I. No. 6 of 1998 Paragraph (3: (a))** the veterinary inspector at the slaughterhouse must make a determination of the cleanliness of cattle prior to acceptance for slaughter for human consumption. The Department of Agriculture and Food developed a clean livestock policy, as a guide, for all premises slaughtering cattle for human consumption (Anon, 1997a). Under the clean livestock policy, implemented by the Regulatory Authority, the cattle are categorised from one to five on arrival at the slaughterhouse depending on the amount of straw bedding, dirt and faecal contamination present on the hide. Category one and two are essentially clean cattle, category three and four cattle may be accepted subject to certain dressing procedures and category five cattle are rejected for slaughter for human consumption and returned to the farm of origin. Rejected cattle may be presented again when they

are suitably clean. **Management should have a programme in place to monitor, control and record all elements of the 'clean livestock policy'**. Records of all non-conformances and what actions were taken shall be available on request.

Some slaughterhouses have introduced clipping of the hide post-exsanguination for category four animals. This avoids returning the animals to the premises of origin or clipping the live animal. In theory, clipping should result in reduced carcass contamination, although this has not been demonstrated scientifically (Bolton and Sheridan, 2002).

4.12 Standard operating procedures for slaughter

SOPs are established methods that operatives follow routinely when slaughtering cattle. The objective of SOPs for cattle slaughter is to ensure that safe and hygienic food handling practices are adhered to. SOPs shall be documented and corrective actions in place in case of human error or mechanical failure. **There may be slight variations in slaughtering techniques in different slaughterhouses. These may be acceptable provided the critical objective of minimising contamination of carcasses is achieved.** Suitable conditions shall also be made available for post-mortem in accordance with the regulations below. Also there shall be precise correlation between a carcass and its associated offal / viscera / by-products. This is referred to in **Regulation (EC) No 853/2004 Annex III Section I Chapter IV Paragraphs (7) (8) (10) (11) (12) (13) (14) (16).**

4.13 Product recall / withdrawal and traceability

Regulation (EC) No 178/2002 Lays down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety. This legislation states that a food business must have a traceability system in place. Article 18 and 19 also requires that all information relating to traceability, recall / withdrawal be made available to the competent authorities on demand (See appendix eight).

As part of assessing a slaughterhouses product recall / withdrawal and traceability system, an auditor should examine the slaughterhouses recall / withdrawal plan which highlights the protocol for said procedure. An example of a recall / withdrawal plan is given in Guidance Note No. 10: Product Recall and Traceability, Appendix 1 (Anon, 2002b). The programme should be tested annually to validate its effectiveness (Anon, 2000; Anon, 2002b). In all cases where a recall / withdrawal takes place, the relevant Regulatory Authorities shall be informed.

Note: A pre-requisite checklist for slaughterhouse management is in appendix nine.

Part two: The principles of HACCP

HACCP principles are recognised under Codex Alimentarius as an internationally accepted standard for food safety (CAC/RCP 1 – 1969, Rev. 3, 1997). Slaughterhouse owners shall put in place, implement and maintain a permanent procedure based on the HACCP principles.

The HACCP principles are referred to in **Regulation (EC) No 852/2004 Chapter II Article 5 Paragraph (1)** and consist of the following:

1) identifying any hazards that must be prevented, eliminated or reduced to acceptable levels,

2) identifying the critical control points at the step or steps at which control is essential to prevent or eliminate a hazard or to reduce it to acceptable levels,

3) establishing critical limits at critical control points which separate acceptability from unacceptability for the prevention, elimination or reduction of identified hazards,

4) establishing and implementing effective monitoring procedures at critical control points,

5) establishing corrective actions when monitoring indicates that a critical control point is not under control i.e. a critical limit has been breached,

6) establishing procedures, which shall be carried out regularly, to verify that the measures outlined in subparagraphs (1) to (5) are working effectively and

7) establishing documents and records commensurate with the nature and size of the food business to demonstrate the effective application of the measures outlined in subparagraphs (1) to (6).

The methodology to develop the HACCP principles may be applied in twelve individual steps:
(P = Principle number)

1) to assemble a HACCP team consisting of individuals who have specific knowledge and expertise appropriate to the product and process (P 1),

2) to describe the products (P 1),

3) to state the intended use (P 1),

4) to draw a flow diagram (P 1),

5) to confirm the accuracy of the flow diagram (P 1),

6) to carry out hazard analysis by identifying and listing all the potential hazards associated with each step. Each identified hazard should be evaluated in terms of likelihood of occurrence and the severity of the effect (P 1),

7) to determine critical control points (P 2),

8) to establish critical limits (P 3),

9) to establish monitoring procedures for each CCP (P 4),

10) to establish the corrective action to be taken when monitoring indicates that a particular CCP is not under control (P 5),

11) to verify that the HACCP system is working effectively (P 6) and

12) to establish documentation procedures and records appropriate to these principles and their application (P 7).

Assessment of conformance

The HACCP system in place is deemed effective when the following criteria have been satisfied:

- the food safety management system is being met on a continual basis, with deficiencies addressed promptly followed by appropriate and documented review,

- the pre-requisite programmes are in place and are operating satisfactorily, with deficiencies dealt with accordingly and

- that the seven HACCP principles are being fully implemented.

It is necessary to recognise that, in certain food businesses, for example local authority slaughterhouses, it is not always possible to identify critical control points and that, in some cases, GMP and GHP can replace the monitoring of critical control points. In addition, the requirement of retaining documents needs to be flexible in order to avoid undue burdens for very small premises.

Note: A HACCP plan checklist for slaughterhouse management is in appendix ten.

HACCP implementation

Well-designed and implemented procedures based on HACCP principles should ensure that the potential risk from microbiological, chemical and physical food hazards on carcasses are minimised. When planning to implement the HACCP principles, those responsible, should be appropriately trained. The HACCP team should include, where possible, a senior manager and a cross-section of relevant personnel, for example, maintenance, production, cleaning and quality assurance / food microbiology. For a local authority slaughterhouse owner(s) it is incumbent upon one or two individuals to take responsibility for the development of the HACCP principles. They will require external guidance and HACCP training.

When implementing the HACCP principles, a comprehensive hazard analysis and a risk assessment of potential hazards should be carried out to identify all possible sources of carcass contamination. The establishment of monitoring and inspection procedures to evaluate compliance and measurable parameters that identify and maintain control of limits should be evident. The establishment of corrective actions and the establishment and implementation of an effective record keeping system assists in the verification and validation of the HACCP principles.

Why keep records?

"If it isn't written down, it didn't happen", an auditor cannot be expected to know whether the HACCP principles have been fully operational unless there is appropriate documentation which proves this. Record keeping is the foundation of the HACCP principles and contributes to verifying effectiveness.

There are a large number of records that can be used to assess the efficiency of the system. These may include but are not limited to:

- a detailed listing of the HACCP team, assigned responsibilities and any training received,
- product(s) description,
- process flow diagram,
- history of amendments of the HACCP plan,
- identification of potential hazards and likely sources,
- an assessment of the significance of each hazard and assignment to be controlled under the pre-requisite or HACCP programme,
- established CCPs,
- established critical limits,
- monitoring procedures,
- corrective action plans,
- record keeping procedures,
- validation records,
- calibration records i.e. with any associated instrumentation associated with CCPs,
- procedures for verification and
- internal audit reports records – non-conformance reports along with corrective action records.

System review of CCPs

The CCPs outlined by slaughterhouse management in the HACCP manual should be verifiable:

- documentation supporting CCP determination can be confirmed and shown to be scientifically / technically valid i.e. through validation and

- if new information / evidence arises (from scientific journals or other sources) then the HACCP procedures may be modified as required.

HACCP should only be applied to control hazards, which cannot be prevented or eliminated using pre-requisite programmes. Furthermore, CCPs must have critical limits which can be objectively measured, for example, temperature in degrees Celsius. The CCPs outlined by slaughterhouse management in the HACCP manual should also be verifiable, for example, through documentation supporting CCP determination and can be shown to be scientifically / technically valid i.e. validation. An example of a summarised flow diagram for beef slaughter is given in appendix eleven, a summary of a HACCP plan is given in appendix twelve and a summary of critical limits, monitoring, corrective actions, records and verification is given in appendix thirteen.

Potential CCPs may include thermal treatments such as steam pasteurisation or hot water washing, chilling carcasses, chilled / frozen storage and visual carcass contamination inspection. **The following are only examples of CCPs and are summarised as follows:**

Example one: Visual carcass contamination inspection as a CCP

Introduction

Contaminants, for example faecal and / or blood, found on the carcasses may be detected by visually inspecting the carcasses.

Critical limits

There should be no visual evidence of contamination on any of the carcasses.

Monitoring

Every carcass should be checked.

Corrective action(s)

The corrective action(s) include trimming off the affected area of the carcass and then returning the carcass to the slaughter line for re-inspection.

Example two: Steam pasteurisation as a CCP

Introduction

The commercial effectiveness of steam pasteurisation in on-line cabinet systems for 6-6.5 seconds has been established for beef (Gill and Bryant, 1997b; Nutsch *et al*., 1997; Nutsch *et al*., 1998). However, it was noted that some sites such as the neck did not receive as complete a decontamination treatment as others (Nutsch *et al*., 1998). This was attributed to the fact that the target temperature of 82°C was only maintained at the neck for about two seconds and this site cooled the fastest. All the hindquarter sites, where the majority of faecal contamination occurs, appeared to receive the maximum treatment temperatures. Steam pasteurisation may also discolour the cut surfaces on the beef carcass, but recovery often occurs during chilling. Steam pasteurisation systems, in some cases, operate a three-step process:

1) surface water is removed from the carcass,

2) steam is applied to kill pathogenic bacteria and

3) the carcass surface is cooled with chilled water.

The importance of water removal and cooling in this process should not be underestimated. Surface water acts as an insulator to the steam environment and must be effectively removed to allow for efficient steam application. Cooling facilitates subsequent chilling and minimises surface discolouration.

Critical limits

The critical limits for steam pasteurisation may vary depending on the source of information. Regardless, validation studies should be undertaken to ensure the stated reduction in pathogens such as *E. coli* O157 is achieved.

The suggested critical limits for steam pasteurisation are highlighted in table 1:

Table 1: Critical limits for steam pasteurisation

Water removal	Air velocity	1981 m/minute
	Air volume	170 m^3/minute
Pasteurisation	Atmospheric temperature inside steam chamber	82-94°C
	Time	6-8 seconds
Cooling	Water temperature	4.4°C
	Water pressure	27.6 Pa
	Surface temperature of carcasses	17.5-22.4°C
	Time	10 seconds

Monitoring

A continuous monitoring system (optional, but recommended) is available with the steam pasteurisation unit described above. As each side is processed, a printout will appear showing the side number, date, real time, process time, process temperature and any relevant process alarms. Should any side not attain the pre-programmed lower temperature limit or pasteurisation time, then an alarm will sound, the steam pasteurisation unit will shut down and the under-processed side will be automatically rejected for re-processing. The alarm information will be displayed on the operator panel screen and a hard copy sent to a printer. In the absence of this automated monitoring system, the relevant parameters should be checked manually at least once per hour.

Corrective action(s)

The affected carcasses are manually railed off and returned to the steam pasteurisation chamber for re-processing.

Example three: Hot water washing as a CCP

Introduction

Numerous studies have demonstrated the ability of hot water washing to reduce bacterial contamination of beef carcass tissue using a range of water temperatures and pressures (Gorman *et al*., 1995; Dorsa *et al*., 1996; Dorsa *et al*., 1997). Research on the effect of hot water washing of beef carcasses under commercial conditions has shown that this treatment may be commercially successful in reducing the levels of contamination on beef carcasses (Gill *et al*., 1999). Water at 75 - 90°C may be applied to carcasses under pressure as a spray or using a deluge system which delivers sheets of water at 85°C onto the carcass (Gill *et al*., 1999; Bacon *et al*., 1999). The latter system consists of two horizontal headers, each fitted with Floodjet™ nozzles arranged to deliver sheets of water in a free-fall manner rather than under pressure. The main bactericidal effect of these systems is thermal, although there may also be a physical effect involving the removal of some bacteria as a result of washing. Hot water is easier and more economical to generate than steam. Commercial hot water washing systems in the United States of America use 85 to 90 gallons of water per minute, which is automatically recycled. As with steam, the heat may discolour the cut surfaces of carcasses, which usually recover during chilling.

Critical limits

As with steam pasteurisation, the critical limits for hot water washing may vary depending on the source of information. Regardless, validation studies should be undertaken to ensure the stated reduction in pathogens is achieved.

The suggested critical limits for hot water washing using a spray system in table 2 are:

Table 2: Critical limits for a hot water spray system

Water temperature at nozzle	at least 85°C
Water pressure	9.7 – 13 Pa
Time	9-12 seconds

The suggested critical limits for hot water washing using a deluge system in table 3 are:

Table 3: Critical limits for a hot water deluge system

Water temperature at nozzle	at least 85°C
Water pressure	Not applicable
Time	10 seconds

Monitoring

The temperature of the water is monitored on a continuous basis and the application time should be checked at least once per day (at the start of production), to ensure carcasses are receiving sufficient treatment.

Corrective action(s)

If there is a failure with the hot water wash, the line stops, thus ensuring no carcass passes this stage without being treated. Carcasses are then washed again after the problem has been corrected.

Example four: Chilling as a CCP

Introduction

Chilling may prevent or reduce bacterial growth on beef carcasses (Gill and Bryant, 1997a; Nutsch *et al*., 1997; Bacon *et al*., 1999; McEvoy *et al*., 1999b) and the combination of chilling and chilled storage may be CCPs in beef slaughter HACCP.

Critical limits

At present, the critical limits for chilling should be set to achieve a temperature of 7°C or lower in the deep-round muscle within ten hours. Carcasses of similar proportions should be refrigerated together to achieve uniform results and should be spaced at least 6 cm apart to allow circulation of air (Mackey and Roberts, 1993). However, the chilling parameters (air temperature, relative humidity, airflow, carcass grade and spacing) that achieve the greatest reduction in bacterial levels on carcasses need to be determined so that these may be used as critical limits.

At present the critical limits for chilled storage of chilled bone-in meat (carcasses or parts of the carcass) require the maintenance of a temperature of 7°C or lower. Edible offals should be stored at 3°C or lower.

Monitoring

The temperature of the deep round muscle should be checked every hour in a set number of carcasses per rail, for example four, to give a set total of forty carcasses selected to represent the chilling performance in the entire chill room. Since pathogen contamination is essentially a surface phenomenon, it might make more sense to monitor the surface temperature of the carcass. However, EU regulations are based on the temperature of the deep round muscle.

The slaughterhouse may also establish the air chill pattern, which consistently achieves the critical limits based on the temperature of the deep round muscle and monitor air temperature instead. Such an approach permits automation as the air temperature may be automatically monitored and controlled on a continuous basis using a System Control and Data Acquisition (SCADA) or similar system. This would also alert the production manager (or other designated personnel) when the critical limits are breached, automatically take immediate corrective action and produce an on-going record of performance.

Corrective action(s)

Carcasses that have not reached the target temperature are chilled for an additional period until the target temperature is obtained. At present, this is the only corrective action available for chilling as a CCP.

Glossary of terms

Animal by-products: The entire bodies or parts of animals or products of animal origin not intended for human consumption.

Audit: A systematic and independent examination to determine whether activities and related results comply with planned arrangements and whether these arrangements are implemented effectively and are suitable to achieve objectives.

Control: (a) To manage the conditions of an operation to maintain compliance with established criteria. (b) The state where correct procedures are being followed and criteria are being met.

Control measure: Any action or activity that can be used to prevent, eliminate or reduce a hazard.

Corrective action: Any action to be taken when the results of monitoring at the CCP indicate a loss of control.

Critical Control Point: A step at which control can be applied and is essential to prevent or eliminate a food safety hazard or reduce it to an acceptable level.

Critical Limit: A maximum and/or minimum value to which a biological, chemical or physical parameter must be controlled at a CCP to prevent, eliminate or reduce to an acceptable level the occurrence of a food safety hazard.

HACCP: A system, which identifies, evaluates and controls hazards, which are significant for food safety.

HACCP Plan: A document prepared in accordance with the principles of HACCP to ensure control of hazards which are significant for food safety in the segment of the food chain under consideration.

HACCP System: The result of the implementation of the HACCP Plan.

HACCP Team: The group of people in a slaughterhouse who are responsible for developing, implementing and maintaining the HACCP system.

Hazard: A biological, chemical or physical agent in, or condition of, food with the potential to cause an adverse health effect.

Hazard Analysis: The process of collecting and evaluating information on hazards associated with the food under consideration to decide which are significant and must be addressed in the HACCP plan.

Monitor: The act of conducting a planned sequence of observations or measurements of control parameters to assess whether a CCP is under control.

Pre-requisite programme: Procedures, including Good Manufacturing Practices and Good Hygiene Practices that address operational conditions providing the foundation for the HACCP system.

Product recall: The removal of unsafe food from the distribution chain extending to food sold to consumers and therefore involving communication with consumers.

Product withdrawal: The removal of unsafe food from the distribution chain not extending to food sold to the consumer.

Quality control: A system by which a desired standard of quality in a product or process is maintained.

Risk assessment is the identification and quantification of the risk resulting from a specific use or occurrence of a hazard, taking into account the possible harmful effects on individual people or society from that hazard.

Severity: The seriousness of the effect(s) of a hazard.

Specified Risk Material: This is the skull, brain, eyes, tonsils, the vertebral column excluding the vertebrae of the tail, but including the dorsal root ganglia and spinal cord of bovine animals aged over twelve months and the intestines from the duodenum to the rectum of bovine animals of all ages.

Standard Operating Procedure (SOP): This is a detailed set of instructions, which describe how to carry out a repetitive task.

Sanitation Standard Operating Procedure (SSOP): This is a description of the methods applied to the slaughterhouse relating to hygiene and sanitation.

Traceability: The ability to follow a product batch forward through the slaughter process via the distribution chain to the immediate customer and backwards to the supplier of cattle, services and packaging etc.

Validation: that element of verification focused on collecting and evaluating scientific and technical information to determine if the HACCP plan, when properly implemented, will effectively control the hazards.

Verification: The application of methods, procedures, tests and other evaluations, in addition to monitoring to determine compliance with the HACCP plan.

Appendix one – Sanitation standard operating procedures (SSOP)

The Sanitation standard operating procedures (SSOP) should address each of the following points listed:

- written SSOP describe those procedures that slaughterhouse management / production operatives conduct daily to minimise contamination of carcasses,

- pre-slaughter procedures relating to the cleaning of the production area and equipment,

- the SSOP frequency is specified for each procedure,

- the employee(s) responsible for implementing and maintaining the procedures are identified,

- records are kept on a daily basis. These records show the implementation and monitoring of SSOP and any corrective action taken and

- the individual with overall authority on-site, signs and dates the SSOP upon initial implementation and signs and dates any new modifications.

The manager is responsible for implementing and monitoring the SSOP and also recording the findings and any corrective actions taken. All records pertaining to this SSOP should be maintained on file.

Essential points to remember:

- to sterilise is to remove all living organisms,

- to disinfect is to reduce microbes to a safe level and

- to sanitise is to clean and disinfect.

I. Pre-operational sanitation of equipment and slaughter-house cleaning

A. General equipment cleaning

All equipment used in the production process should be cleaned and sanitised prior to the commencement of slaughtering.

1. The cleaning procedure should insure that:

- equipment is disassembled properly and as necessary,
- dirt is removed from equipment,
- equipment parts are rinsed with water to remove any remaining dirt,
- a cleaning solution, (suitable water temperature), is applied to equipment surfaces and scrubbed as needed,
- equipment is rinsed with potable water (suitable water temperature),
- equipment is inspected for cleanliness and re-cleaned if necessary,
- equipment is sanitised with approved sanitiser and
- equipment is reassembled, re-sanitised, and re-rinsed, if necessary.

2. Implementation, monitoring and record keeping

The manager / supervisor performs a daily visual sanitation inspection after pre-operational cleaning and sanitising. The results of this inspection are recorded. Also consideration must be given to Commission Decision 2001/471/EC microbiological swabbing results. If the inspection is satisfactory, it is signed off on. If corrective actions are needed, such actions should be recorded and completed.

3. Corrective actions

When the manager / supervisor determines that the equipment or parts are not properly cleaned, the cleaning procedure and inspection are repeated. The manager / supervisor monitors the cleaning process and if necessary re-trains the employee(s) responsible for the cleaning. Corrective actions are recorded.

B. Cleaning of structures, including floors, walls and ceilings / overhead structures

1. Cleaning procedures are as follows:

- dirt is removed from the equipment,
- dirt is swept up and discarded,
- facilities are rinsed with potable water and
- facilities are cleaned with an effective cleaning chemical.

2. Cleaning frequency

Floors and walls are cleaned at the end of each processing day. Ceilings, overhead fixtures, corridors and chills are cleaned as needed, but at least once a week.

3. Implementation, monitoring and record keeping

The manager / supervisor performs a daily visual sanitation inspection after pre-operational cleaning of structures. The results of this inspection should be recorded. If the facilities are acceptably clean, then the records are signed off on. If corrective actions are needed, such actions need to be recorded and completed.

4. Corrective actions

When the manager / supervisor determines that the facilities are not properly cleaned, the cleaning procedure and inspection are repeated. The manager / supervisor monitors the cleaning process and if necessary re-trains the employees responsible for the cleaning. Corrective actions are recorded.

Slaughterhouse daily pre-production check list

Carried out by:_____ Date:_____ Time:_____

Structural Hygiene Check

S: Satisfactory U: Unsatisfactory

Area	Compliance	Objective evidence / comments
Floor	S: U:	
Walls	S: U:	
Ceiling	S: U:	
Doors	S: U:	
Lights	S: U:	

Equipment Hygiene Check

S: Satisfactory U: Unsatisfactory

Area	Compliance	Objective evidence / comments
Handwash Stations	S: U:	
Liquid soap	S: U:	
Suitable water temp	S: U:	
Paper towels	S: U:	
Waste paper bin	S: U:	
Sterilisers	S: U:	
Temperature	S: U:	
Cleanliness	S: U:	
Evisceration table	S: U:	
Head hook steriliser	S: U:	
Red offal rack	S: U:	
Hock cutters	S: U:	
Hide puller	S: U:	
Chutes / bins	S: U:	

Signed:_____

Position:_____

II. Operational cleaning of equipment and structures

A. Slaughter production should be performed under conditions that reduce contamination of carcasses

1. Established personal hygiene procedures for production operatives include:

- all employees working in the slaughterhouse must wear hair nets and / or snoods,
- all employees should wash their hands before and after breaks, visits to the toilets and as necessary during production,
- all employees should clean and sanitise, gloves, knives, aprons as necessary during production to minimise contamination and
- all equipment and tables are cleaned and sanitised throughout the day as needed.

2. Established procedures for insect and rodent control include:

- bait points and insectocutors should be present in non-food areas of the slaughterhouse and
- areas such as dry goods store, chill rooms, maintenance areas, should be checked for visible rodent droppings and insects.

3. Implementation, monitoring, and record keeping

The manager / supervisor is responsible for ensuring that GHP, pest and rodent control, and necessary cleaning procedures are maintained during production i.e. keeping drain covers clear. The manager / supervisor monitors these operational sanitation procedures once during each processing shift and these results are recorded.

4. Corrective actions

When the manager / supervisor identifies operational cleaning problems, he / she notifies employees to take appropriate action to correct the cleaning problems. If necessary, production is stopped and/or employees are re-trained. Corrective actions are recorded.

Appendix two – Standard operating procedures for maintenance

Purpose

The SOP for maintenance outlines a preventative maintenance programme that maintains a standard appropriate for all structures and equipment in slaughterhouses for their intended use.

Structural maintenance programme

The programme outlines the following procedures:

- the various areas / rooms within and surrounding the slaughterhouse,
- the structural items within these areas / rooms e.g. walls, floors, ceilings, doors light fittings and switches, ventilations, grids and extractors etc,
- the frequency of the checks,
- the person responsible for the checks,
- the work to be carried out when checks are made,
- the corrective action required where defects are noted,
- the documentation used to record the findings,
- the inspection and the subsequent corrective action if required and
- the closure off of the defects.

Equipment maintenance programme

The programme outlines the following procedures:

- the various types of equipment used within each area / room. Identifying each room and the equipment therein,
- the equipment used outside the slaughterhouse,
- the frequency of the checks,
- the person responsible for the checks,
- the work to be carried out while completing the checks,
- the corrective action required where defects are noted,
- the documentation (and its name) used to record the findings of the inspection and the subsequent corrective action if required,

- the closure off of the defects and
- those responsible for signing off on completed work.

Appendix three – Standard operating procedures for cleaning

As part of the slaughterhouses cleaning programme, management should maintain cleaning records that outline cleaning procedures for all areas of the slaughterhouse. The cleaning manual should specify the cleaning equipment, chemicals used and procedures applied for each area in the slaughterhouse. Each area, which is cleaned, should be described in step(s) / stage(s) format to be adhered to by the cleaning personnel in the order described.

A standard is set for each area in the slaughterhouse that is cleaned and should contain the following headings and be filled in accordingly:

Area to be cleaned	
Cleaning equipment used	
Instructions for handling cleaning chemicals	
Operator safety gear	
Frequency of clean	
Chemicals used	
Chemical concentrations	
Method of application	
Contact time	
Cleaning procedure used (tick as appropriate) - **Gross clean** - **Pre-rinse** - **Foam clean** - **Post rinse** - **Spray sanitise** - **Manual clean**	
Procedure(s) described for the cleaning of each area:	

The SOPs for the various types of cleaning methods applied in the slaughterhouse are outlined below.

1. Standard gross clean

Purpose

To remove thick deposits and pieces of product, waste, which may have accumulated during the slaughter process. If such dirt is not removed the effectiveness of the cleaning and sanitising stages will be greatly reduced, or in some cases, made worthless.

Method

1) physically remove dirt, for example, from working surfaces, from conveyers outside and inside, from crevices in machinery.

2) dismantle machinery if necessary.

3) remove any large items stuck on shackles or splattered onto walls.

4) using a hand scraper, scrape off any thick scums or accumulation.

5) sweep up any dirt on the floor, shovel carefully into bags or bins and remove from the area. Ensure that drain covers are clear and unobstructed.

6) check the thoroughness of your gross clean. Walk around and inspect the area and all surfaces and crevices. There should be no particles bigger than a Euro coin remaining and no loose soft scums or thick layers of grease and / or fat.

7) the floor should be clear of all waste, for example, plastic bags, cardboard boxes and all rubbish bins should be appropriately labelled i.e. category one or three waste and / or non-animal waste and be removed from the area.

8) if necessary, arrange items of equipment so that the next cleaning stage can be carried out unhindered.

2. Standard pre-rinse

Purpose

To remove gross dirt, for example layers of dirt and grease, from areas where manual picking will be too time-consuming, too difficult or ineffective; or as a follow up to a manual gross clean.

Method

1) after the standard gross clean (if applicable in that area) rinse the surfaces, using either warm pressurised water or cold low-pressure water.

2) rinse the dirtiest areas first.

3) care should be taken that this process does not facilitate the spread of dirt either directly or through aerosol formation.

4) generally work from top downward i.e. walls to floors.

5) remember the inside and underside of the surfaces.

6) direct rinsed debris toward the floor drain without blasting it. Use a squeegee to brush the loosened debris towards a drain if the particles are small. If possible, brush and shovel up any large accumulations of dirt.

7) check the thoroughness of your pre-rinse. Walk around and inspect the area and all surfaces and crevices. There should be no soft scums or particles remaining. All pools of liquid should have been washed away and squeegeed to the drains.

   Note: Do not use the pressure rinse or cold hose on any non-water-proofed equipment, especially if electrical.

8) satisfy yourself that all is ready for the next cleaning stage.

3. Standard foam clean

Purpose

To apply detergent foam to the surfaces so that the foam will remain in contact with the particular surface long enough to soften and loosen scum and grease so that they may be completely removed on rinsing. The advantages of applying detergent as foam are that it clings, it penetrates cracks and crevices, it is fast and easy to apply and it is easy to check for thoroughness.

Method

After the standard gross clean and pre-rinse apply the foam using the foam lance.

1) connect the injector to the high-pressure rinse outlet and connect the hose to the foam lance.

2) place a drum of the chosen foam detergent on the floor beneath the foam lance.

3) if the suction tube of the foam lance is full of detergent, which is either not known or is known to be different from the detergent now to be used, clean out the tube by first sucking up water before dropping the tube into the new chemical.

4) fit the foam lance to the gun and adjust the chemical injector for the concentration required. Check with the supervisor / manager if in doubt.

5) point the lance to the ground and squeeze the trigger until foam appears out of the lance.

6) apply foam as evenly as possible to all the surfaces generally, top to bottom, equipment first then walls, if included, then floors, if included.

7) on the vertical surfaces, especially smooth, metal surfaces, take care not to apply too thick a foam layer as this will drag down the foam with its weight. (For stubborn scales on vertical surfaces apply the foam lightly two or three times at five-minute intervals).

8) on the horizontal and intricate surfaces the foam will naturally cling more easily and may be applied more heavily in a one-coat application.

9) check the thoroughness of your foaming. Walk around your area, look at the back, the underside, the hidden parts of the equipment. Re-foam where necessary.

10) allow the foam to act for the appropriate time as per cleaning product specifications. If the foam is left on too long in warm conditions it may dry out. Very stubborn soils may be helped by physical agitation of the foam using brushes.

11) when finished with the foam lance, remove the suction tube from the chemical drum, suck up water for a few seconds then squeeze the gun trigger until the foam stops coming out of the lance.

12) remove chemical injector and foam lance and prepare for rinsing.

4. Standard post rinse (warm water)

Purpose

To remove all scums, scales, greases, etc softened and loosened by the previously applied chemical and leave all surfaces visually clean.

Method

After the foam has been applied, a sufficient period (as required by the manufacture) should be allowed prior to rinsing in a systematic way i.e. dirtiest areas first, generally top to bottom, equipment, then walls and finally floors, always avoiding splashing of previously cleaned areas.

1) do not direct pressure jet into electrical or other non-water proofed area.

2) check the thoroughness of your rinse. Walk around your area and re-rinse if necessary.

3) to help in the final removal of any loosely clinging small debris splashed up or any remaining suds, stand back and heavily mist the surfaces from about six feet away.

4) accumulations of foam and loosened debris on the floor are best removed by squeegeeing towards the drain. Do not use the water jet as a floor brush as this will invariably splatter previously cleaned surfaces as well as wasting water and adding to your effluent costs.

5) ensure that all stainless steel surfaces are thoroughly rinsed before sanitising.

5. Standard spray sanitise

Purpose

To ensure that all food contact surfaces are properly sanitised i.e. cleaned and disinfected.

Method

When surfaces are virtually free of all scums, scales and greases, a solution of a sanitiser is applied using a fine spray device.

1) make up a solution to the recommended strength using the chemical product and fill the sprayer container to the required level.

2) pressurise the sprayer, open the lance valve and spray to a fine mist.

3) allow to act as per label specifications.

4) some sanitisers at certain concentrations do not require to be washed off. Others need rinsing. Check the label for sanitising instructions.

6. Standard manual clean

Purpose

To clean by hand (if necessary using brushes, scouring pads and cloths) equipment and surfaces which, because of their design, i.e. electrics, control panels or location (in a dry area) are not suitable for foaming or high pressure hosing. To remove all scums, scales and leave surfaces visually clean.

Method

1) gross clean the general area and the equipment in question using hand picking, scraping or brushing.

2) make up chosen detergent solution to correct strength in a clean bucket. Apply the detergent solution using either a plastic handled and plastic bristle brush or a green pad.

3) where debris is stubborn, work in the detergent solution well.

4) allow a sufficient period (as required by the manufacturer) for the detergent to react or if a sanitiser is being used, allow a sufficient period (as required by the manufacturer) for the sanitiser to react.

5) remove loosened debris with a disposable cloth or a gentle water spray if suitable.

6) rinse disposable cloth out regularly, not in detergent bucket. Do not put a dirty cloth or brush into the detergent.

7) where rapid drying of the equipment is important and where a follow up sanitiser is not needed, dry with a very clean cloth or paper towel. Otherwise air dry.

7. Standard manual sanitise

Purpose

To ensure the maximum kill of bacteria and other microbes on previously cleaned surfaces, which are not suitable for spray sanitising, perhaps because of proximity to product.

Method

In less critical areas, which nevertheless require a measure of sanitising as well as cleaning, a combination detergent sanitiser may be used. It is very important not to use dirty brushes pads, cloths or to repeatedly dip them into detergent sanitiser solution without first rinsing out in a separate bucket of warm water. A dirty solution of sanitiser is an ineffective solution. It is impossible to sanitise through layers of dirt, scales or scums. These must be removed before the sanitiser can kill enough bacteria on the surface itself.

Appendix four – Standard operating procedures for waste management

Purpose

The SOP for waste management outlines the measures required to exclude Category 1 waste from the human food chain. Also to ensure that Category 2 and Category 3 material are also properly dealt with.

Responsibility

Slaughterhouse management must ensure that all waste produced from slaughter production is adequately dealt with. It is the responsibility of the on-site veterinary officer or local veterinary officer to ensure that this happens.

Legislation

Regulation (EC) No. 1774/2002 lays down the health rules concerning Animal By-Products. S.I No. 248 of 2003 transposes the Regulation into Irish Law. The purpose of this Regulation is to clarify and strengthen the rules governing which animal by-products may be used as part of the feed for farmed and pet animals.

The Regulation divides animal by-products into three categories. A summary of the three categories relating to the slaughterhouse is outlined below:

Category 1 (C1) material includes:

- BSE suspects,

- animals slaughtered in the context of Transmissible Spongiform Encephalopathy (TSE) eradication measures,

- **Specified Risk Material (SRM)** (including dead ruminant animals containing it) the following tissues are designated as SRM**:**

    - the skull, excluding the mandible and including the brain and eyes and all tonsilar material the vertebral column excluding the vertebrae of the tail, the transverse processes of the lumbar and thoracic vertebrae and the wings of the sacrum, but including dorsal root ganglia, and the spinal cord of bovine animals aged **over 12 months,** and the tonsils, the intestines from the duodenum to the rectum and the mesentery of bovine animals of all ages, and

    - the skull including the brain and eyes, the tonsils and the spinal cord of ovine and caprine animals aged over 12 months or which have a permanent incisor erupted through the gum and the spleen and ileum of ovine and caprine animals **of all ages**.

- parts of animals which have been administered certain prohibited substances under Directive 96/22/EC and Directive 96/23/EC,

- all animal material collected when treating waste water and

- floor waste in a slaughterhouse adjacent to where SRM is generated.

Category 2 (C2) material includes

- manure and digestive tract content (may be spread untreated on land if it poses no disease risk),

- animal material collected when treating waste water from Category 2 and 3 processing plants and slaughterhouses,

- non-ruminants which die, other than being slaughtered for human consumption (e.g. dead on arrival pigs and poultry) and

- products from animals which exceed permitted residue levels under Group B (1) and (2) of Annex I to Directive 96/23/EEC (e.g. therapeutic drugs).

Category 3 (C3) material includes:

- parts of slaughtered animals which have passed both ante- and post-mortem inspection and are fit for human consumption,

- parts of slaughtered animals which have passed both ante- and post-mortem inspection and are not fit for human consumption, but do not contain any signs of disease communicable to man or animals,

- hides and skins, hooves which derive from animals which have passed ante-mortem only,

- ruminant blood must derive from animals which have passed both ante-mortem and post-mortem,

- non-ruminant blood must derive from animals which have passed ante-mortem examination,

- animal by-products that have derived from the production of products intended for human consumption and

- former foodstuffs of animal origin (other than catering waste) which are no longer intended for human consumption for commercial reasons or due to problems i.e. manufacturing or packaging defects or other defects which do not present any risk to humans or animals.

The standard operating procedures for handling animal by-products

All category 1 material must be:

- stained when it contains or is in contact with SRM,
- placed in a leak proof container, which is properly marked '**SRM / for disposal only'** or '**for disposal only**' as appropriate,
- accompanied by a properly completed Category 1 form and
- dispatched to an approved C1 facility.

Category 2 material must be:

- placed in a leak proof container marked '**not for animal consumption**',
- accompanied by a properly completed Category 2 form and
- dispatched to an approved C1 or C2 facility.

Category 3 material must be:

- placed in a leak proof covered container labelled '**not for human consumption**',
- accompanied by a properly completed Category 3 form and
- dispatched to an approved C3 facility.

Note*: where C3, C2 and C1 materials are mixed it will be classified as C1; containers / skips need only be labelled as C1.*

Annex II, Chapter 1 of Reg. 1774/2002 states that during transport a label attached to the vehicle, container must clearly indicate the category of animal by-product.

The standard operating procedures for backbone / spinal cord SRM removal

- the bones of the vertebral column (backbone) of bovine animals over 12 months of age are considered SRM,
- in bovine animals over 12 months of age the following parts of the vertebral column are **not** regarded as SRM:
    - the transverse processes of the lumbar and thoracic vertebrae,
    - the wings of the sacrum and
    - the bones of the tail.

It is important to note that a small piece of the transverse process (approximately one-inch) must remain attached to the vertebrae.

- subsequent to their removal from retail cuts all vertebrae classified as SRM must be stored separately from other bone waste. **All bones other than the skull and the backbone are Category 3 waste**. Currently many slaughterhouses are mixing all bone waste and sending it as Category 1 so separation is not required,

- it is important that all parts of the back bone are identifiable as such and in this regard no further chopping / breaking of theses bones is permitted,

- spinal cord is removed from the **entire** length of the spinal canal. A red-handled knife should be available solely for this purpose,

- the spinal cord is stained and stored in a container, which is secure and leak proof and clearly marked SRM,

- the carcass should be **properly** split into two halves so as to facilitate the complete removal of the spinal cord (tunnelling is to be avoided),

- a visual inspection must be made to ensure that the tray marked SRM is available and used for placing under carcasses as they are being split,

- bovine heads (including tonsils) should be stained immediately after post-mortem examination and stored in secure leak proof containers clearly marked SRM,

- prior to its removal from the premises SRM must be placed in a secure, rigid, covered and leak proof container which is clearly marked SRM and dyed with E131 (Patent Blue V dye),

    - the approved ink for staining SRM is E131 Patent Blue V at 0.5% weight / volume solution,

    - where purchased in a concentrated form the ink should be diluted in accordance with the manufacturer's instructions,

    - it should be used in sufficient amounts to stain every part of the SRM until there is no colour other than blue visible,

- under no circumstances should plastic bags be included in materials sent for rendering and

- all SRM must be sent to a Category 1 rendering plant.

Documentation for waste disposal

The following records should be kept on file:

- records of purchases of dye,
- records of despatch of SRM from the slaughterhouse to the rendering plant should be available (See category one form),
- records of receipt of SRM. at the rendering plant,
- section 1 of Category 1 form should have been completed by the slaughterhouse management / owner including the number of heads or weight of SRM dispatched,
- where Category 2 or Category 3 materials are being sent to appropriate processing plants, Category 2 and Category 3 records should be submitted (See category two and category three form) and
- all documentation must be kept on the premises for at least two years.

RECORD OF CATEGORY 1 MATERIAL SENT FOR PROCESSING AT A PREMISES APPROVED TO STORE AND/OR PROCESS CATEGORY 1 MATERIAL
(N.B. A copy of the weighbridge docket should be attached to the original (white page) of this Cat 1, and be held on file at the Cat 1 Storage/ Processing plant)

TO BE COMPLETED BY A REPRESENTITIVE FROM THE PREMISES OF ORIGIN			*TO BE COMPLETED BY THE HAULIER DELIVERING CAT. 1 MATERIAL TO A CATEGORY 1 STORAGE/ PROCESSING PLANT*	
PREMISES OF ORIGIN			**CONTAINER NO./REG NO.**	
APPROVAL NO. OF PREMISES OF ORIGIN			**WEIGHT/QUANTITY COLLECTED**	
WEIGHT/QUANTITY* **EITHER THE AMOUNT OF Cat. 1 material i.e. 3 HEADS, OR WEIGHT MUST BE FILLED IN.**			**NAME & ADDRESS OF HAULIER** _____ **HAULIERS APPROVAL NUMBER**	_____
DESTINATION: (MUST BE A LICENSED CAT.1 PROCESSING/ STORAGE PLANT)			**I hereby declare that the requirements of Annex II of Reg. no. (EC) 1774/2002 are being met in relation to the consignment described opposite** (Hygiene Reqs for the collection and transport of ABPs)	
I hereby declare that the Cat. 1 material described above has been properly stained in accordance with Reg. no.(EC) 999/2001 and will be transported in accordance with Annex 11 of Reg. no.(EC)1774/2002			**SIGNED BY:**	
SIGNED BY (COMPANY REPRESENTITIVE)			**PRINT NAME:**	
PRINT NAME:			**POSITION IN COMPANY**	
DATE:			**DATE:**	

TO BE COMPLETED BY A REPRESENTATIVE OF THE CAT 1 STORAGE/PROCESSING PLANT				
CONTAINER NO./REG NO.		**RAW MATERIAL ADEQUATELY STAINED (TICK)**	YES	NO
WEIGHT RECEIVED (KGs)		**INTAKE TRUCK CLEANED AND DISINFECTED (TICK)**	YES	NO
HAULIERS APPROVAL NO.		Receiving Premises Stamp	**DATE:__ / __ / __**	
DATE OF DELIVERY		SIGNED BY **(COMPANY REPRESENTATIVE)**		

RECORD OF CATEGORY 2 ANIMAL BY-PRODUCTS SENT TO A CAT 2 OR CAT 1 STORAGE/PROCESSING PLANT

TO BE COMPLETED BY A REPRESENTATIVE FROM THE PREMISES OF ORIGIN

Premises of Origin			
Type of Premises (slaughter plant, cutting plant/butcher shop)			
APPROVAL NO. OF PREMISES OF ORIGIN			
WEIGHT/QUANTITY (Kgs)		*CONTAINER/ REG. NO*	
DESTINATION			

This consignment contains only Cat. 2 animal by-products as defined in Art. 5 of Reg. No. (EC) 1774/2002 and will be transported in compliance with Art. 7 of Reg. No. (EC) 1774/2002. **YES** **NO**

SIGNED BY: (REPRESENTITIVE FOR ABOVE NAMED PREMISES)		
NAME IN CAPITAL LETTERS		
POSITION WITHIN COMPANY		**DATE:**

FOR OFFICIAL USE ONLY

To be completed by veterinary surgeon at slaughter/cutting plants only

I, the undersigned veterinary surgeon, am satisfied, on the basis of the official checks in place, that Cat. 1 and Cat.2 material, as defined in Arts. 5 and 6 of Reg. 1774/2002 are being treated in accordance with that Reg. at the premises named in Section 1 above.

SIGNED BY	
DATE	___ / ___ / ___

TO BE COMPLETED BY THE HAULIER

CONTAINER/REG NO.	
WEIGHT/QUANTITY COLLECTED	
NAME & ADDRESS OF HAULIER	_____
HAULIER'S APPROVAL NUMBER (If Applicable)	

I hereby declare that the requirements of ANNEX II of Reg. no. (EC) 1774/2002 are being met in relation to the consignment described opposite **(Hygiene reqs for the collection and transport of ABP's).**

SIGNED BY:
(REPRESENTITIVE OF ABOVE NAMED HAULAGE COMPANY)

PRINT NAME:	
DATE:	

CONTAINER/REG NO: …….

WEIGHT RECEIVED: ……KGs

DATE RECEIVED: ___ / ___ / ___

TRUCK (INC. CONTAINER) CLEANSED & DISINFECTED BEFORE EXITING PREMISES

TO BE COMPLETED BY A REPRESENTATIVE OF THE CAT. 2 or CAT. 1 STORAGE/PROCESSING PLANT

(A copy of the weighbridge docket should be attached to the original (white page) of this Cat 2, and held on file at the receiving plant

Check for the absence of Cat. 1 material

			No	Yes
DATE OF CHECK	___ /___ / ___	**Cat.1 material found**		

Receiving Premises Stamp SIGNED BY
(COMPANY REPRESENTITIVE)

DATE:	___ / ___ / ___

RECORD OF CATEGORY 3 ANIMAL BY-PRODUCTS TO BE SENT TO AN APPROVED PROCESSING/STORAGE PLANT

TO BE COMPLETED BY A REPRESENTATIVE FROM THE PREMISES OF ORIGIN

Premises of Origin			
Type of Premises (slaughter plant, cutting plant/butcher shop)			
APPROVAL NO. OF PREMISES OF ORIGIN			
WEIGHT/QUANTITY (KGs)		*CONTAINER/ REG. NO*	
DESTINATION			

This consignment contains only Cat. 3 animal by-products as defined in Art. 6 of Reg. No. (EC) 1774/2002 and will be transported in compliance with Art. 7 of Reg. No. (EC) 1774/2002. **YES** **NO**

The consignment is derived from the following species:	
SIGNED BY	
NAME IN CAPITAL LETTERS	
POSITION WITHIN COMPANY	**DATE: ___ / ___ / ___**

FOR OFFICIAL USE ONLY

To be completed by veterinary surgeon at slaughter/cutting plants only

I, the undersigned veterinary surgeon, am satisfied, on the basis of the official checks in place, that Cat. 1 and Cat.2 material, as defined in Arts. 5 and 6 of Reg. 1774/2002, are being treated in accordance with that Reg. at the premises named in Section 1 above.

SIGNED BY & ***DATE***	
NAME IN CAPITAL LETTERS	

TO BE COMPLETED BY THE HAULIER

CONTAINER/REG NO.	
WEIGHT/QUANTITY COLLECTED	
NAME OF HAULAGE COMPANY	

I hereby declare that the requirements of ANNEX II of Reg. No. (EC) 1774/2002 are being met in relation to the consignment described opposite **(Hygiene reqs for the collection and transport of ABPs).**

SIGNED BY:
(REPRESENTATIVE OF THE ABOVE NAMED HAULAGE COMPANY)

PRINT NAME:	
DATE:	

CONTAINER/REG NO: …….

WEIGHT/QUANTITY: **…….KGs**

DATE RECEIVED: ___ / ___ / ___

TRUCK (INC. CONTAINER) CLEANSED & DISINFECTED BEFORE LEAVING (TICK)

TO BE COMPLETED BY A REPRESENTATIVE OF THE RECEIVING PLANT

(A copy of the weighbridge docket should be attached to the pink copy of this Cat 3,and be held on file at the receiving plant)

Check for the absence of Cat. 1 and Cat.2 material

			No	Yes	Specify
DATE OF CHECK		**Cat.1/Cat 2 material found**			

SIGNED BY & **DATE** **COMPANY REPRESENTATIVE**	
NAME IN CAPITAL LETTERS	

Appendix five – Information on food safety training

The Food Safety Authority of Ireland has constructed a database of training courses on food safety and hygiene that are currently running in Ireland. These courses are aimed at those working directly in the food industry. The database outlines contact details for the agencies responsible, as well as information on courses provided and can be viewed at www.fsai.ie or obtained by email or post.

Note: **This database is merely intended to provide information for those interested in obtaining data or contacts. It is not an endorsement or recommendation for any or all of the mentioned courses. It does not purport to be comprehensive or to constitute legal or other professional advice.** For further information please contact Training Compliance at (01) 817 1300 or e-mail info@fsai.ie.

The National Food Centre (NFC) provides training in all aspects of food safety, hygiene and HACCP for the Irish beef industry. For further information please contact the NFC at (01) 805 9500.

Appendix six – Training course records

External training course records

- **Name of slaughterhouse employee:_____**
- **State employees nationality & 1st language:_____**
- **Title of training course completed:_____**
- **Duration of the course:_____**
- **Date course took place:_____**
- **Included training in:**
    - **Food safety and hygiene: Yes: No:**
    - **SOPs for cattle slaughter: Yes: No:**
    - **Pre-requisites / HACCP: Yes: No:**
- **Was the course certified?: Yes: No:**

  If yes by which of the following:
    - **FAS: Yes: No:**
    - **Chartered Institute of Environmental Health (CIEH): Yes: No:**
    - **Royal Institute of Public Health and Hygiene (RIPHH): Yes: No:**
    - **Other:_____**
- **Was the employee awarded certificate / diploma on completion of the course?**
    - **Yes: No:**
- **Techniques / methods used during the training course e.g. visual aids?**

  _____

  _____
- **Did the training received adequately meet the requirements of the employee? i.e. relating to the nature of their task.**

Comment:_____

_____

_____

_____

In-house training course records

- **Name of slaughterhouse employee:_____**
- **State employees nationality & 1st language:_____**
- **Title of training course completed:_____**
- **Duration of the course:_____**
- **Date course took place:_____**
- **Training included:**
    - **Food safety and hygiene: Yes: No:**
    - **SOPs for cattle slaughter: Yes: No:**
    - **Pre-requisites / HACCP: Yes: No:**
- **Techniques / methods used during the training course included e.g. visual aids?_____**
  _____
  _____
  _____
- **Was the employee awarded certificate / diploma on completion of the course?**
    - **Yes: No:**
- **Did the training received adequately meet the requirements of the employee? i.e. relating to the nature of their task.**

Comment:_____
_____
_____
_____
_____
_____
_____

Appendix seven – Medical certification

The current legislation relating to medical certification will be revoked on the 1st January 2006 by Regulation (EC) 853/2004 and Regulation (EC) 854/2004. Medical certification is used for pre-employment screening, providing evidence of his or her fitness to work and for screening that may take place while in employment i.e. returning from sick leave or maternity leave. Management should ensure that medical certificates are available for inspection on request by a veterinary inspector.

Slaughterhouse management should ensure that all information relating to the conducting of medical examinations and the issuing of medical certifications should be documented and include the following information:

- the name of the doctor who conducts the medical examinations,
- the frequency of the medical examinations,
- the location of the medical examinations and
- where the medical records are kept.

All beef slaughterhouses should use the following templates when dealing with medical examination and certification[5].

1) food handler questionnaire.

2) medical certification of food handler: fitness to work.

3) Good Hygiene Practices (GHP) and reporting practices by the food handler.

[5] The following templates were adapted from the Report of the Food Handlers with Potentially Foodborne Diseases Sub-committee of the NDSC's Scientific Advisory Committee Preventing Foodborne Disease: A Focus on the Infected Food Handler.

1. Food handler questionnaire – Confidential

To be completed by person being screened:

Surname:_____ First Name:_____

Home address:_____ Name & Address of own Doctor:

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

Telephone No:_____ Telephone No:_____

Date of Birth:_____

Position applied for or currently held:

_____

Type of medical:

Pre-employment:_____ Return from maternity:_____

Assessment:_____ Other screening:_____

Medical History

Please read carefully and answer all questions by putting ticking yes or no

	YES	NO
1) Are you suffering now, or within the last seven days, from any of the following:		
(a) Diarrhoea?	☐	☐
(b) Vomiting?	☐	☐
(c) Jaundice?	☐	☐
2) Are you suffering from:		
(a) A skin infection or sore affecting the hands, arms, face, neck or scalp?	☐	☐
(b) Skin trouble affecting the hands, arms, face, neck or scalp?	☐	☐
(c) Discharge from the eye, ear, nose, mouth or gums?	☐	☐
(d) Sore throat with fever?	☐	☐
3) Do you suffer from:		
(a) A recurring bowel problem	☐	☐
(b) Recurring skin trouble	☐	☐
4) Have you ever been diagnosed as being ill with, or to be a carrier of Typhoid or Paratyphoid?	☐	☐
5) In the last 21 days have you been in contact with anyone, at home or abroad, who may have been suffering from Typhoid or Paratyphoid?	☐	☐
6) In the last 10 days have you been in contact with anyone in your household who may have been suffering from E.coli (VTEC) infection?	☐	☐

Declaration

The answers I have given and the statements I have made are true to the best of my knowledge.

Signed:_____ Date:_____

2. Medical certification of food handler: Fitness to work

Preventing transmission of diseases through food by infected food handlers

This is to certify that:

Name:_____

Address:_____

Date of Birth:_____

1) Is not today suffering from any impediment to employment as a food handler on public health grounds.

2) Has been informed of the need for good hygiene practice to prevent the transmission of foodborne disease.

3) Has been informed of the need to report conditions that might pose a risk to public health through food handling.

Signed:_____ Date:_____

Name / Stamp of Certifying Health Care Professional:

_____

_____

I understand the advice given to me during this consultation and have received a written summary of that advice.

Signed:_____ Date:_____

3. Good Hygiene Practices (GHP) and reporting practices by the food handler

Strict attention to good personal hygiene (especially handwashing) at all times is the most important means of preventing the spread of infection from the food handler to carcasses.

All employees working in the slaughterhouse should always observe the following:

1) employees should wash their hands thoroughly:

   - after using the toilet and

   - before and after handling food. This means thorough washing with anti-bacterial soap and water and thorough drying afterwards.

2) employees should report immediately any of the following conditions to their supervisor:

- diarrhoea or vomiting,

- any infection, sore or cut on exposed skin (i.e. on hands, arms, face, neck or scalp),

- any discharge from the eyes, ears, nose, mouth or gums,

- jaundice and

- sore throat with fever.

3) employees should not handle food if they are suffering from diarrhoea or vomiting.

4) employees should not handle food if they have an infection, a sore or a scaly area on exposed skin that cannot be totally covered during production.

5) employees should ensure that cuts and abrasions on exposed skin are totally covered with a distinctively coloured waterproof plaster.

Appendix eight – Standard operating procedures for product recall / withdrawal and traceability

Introduction

This SOP provides guidance for conducting product recalls / withdrawals and traceability. It explains what should be done when food products have to be removed from supply or use by consumers for public health and safety reasons. Recall / withdrawal of food product is in the common interest of the slaughterhouse management and in particular, the consumer.

Purpose and goals

The purpose of this SOP is to share information in a timely and effective manner so as to minimise the risk to the public and maintain confidence in the system. It includes information on why and how a product is to be recalled / withdrawn.

The goals expected to be achieved by this SOP are:

- to protect consumers from potential health risks arising from the consumption of affected carcasses,

- to facilitate the recall / withdrawal from the market of carcasses which may pose a risk to public health and

- to ensure the public is adequately notified of recalls that pose a risk to public health.

Legislation

Regulation (EC) No 178/2002 lays down the general principles and requirements of food law for establishing the European Food Safety Authority and lays down procedures in matters of food safety. This legislation states that a food business must have a traceability system in place. Articles 18 and 19 also require that all information relating to traceability, recall / withdrawal is made available to the competent authorities on demand. The Department of Agriculture and Food (DAF) is responsible for enforcing this legislation in beef slaughterhouses.

Regulation (EC) No. 1760/2000 of the European Parliament and of the Council of the 17th July 2000 establishing a system for the identification and registration of bovine animals and regarding the labelling of beef products. It was enacted in Ireland by S.I. No 435 of 2000 European Communities (Labelling of Beef and Beef Products) Regulations, 2000.

Compulsory labelling is the minimum information that is required on the labels and has to be backed up by an information system that is certified and monitored by DAF. It is mandatory for fresh chilled and frozen beef sold as cuts or as mince to have the following information displayed on the label:

- a batch number or code ensures that the beef can be traced back to the source,

- details of the slaughterhouse i.e. approval number and country of location,

- details of cutting plant where the beef was processed i.e. approval number and country of location,

- the country of birth of the animal,

- the country where the animal was reared and

- the country where slaughter took place. If all the above are the same then the label will state, for example 'Origin Ireland'.

The identification of the Member State or Third Country where the animal was born, fattened and slaughtered must also be included on the label. Coding of the product shall be explained in the written recall / withdrawal programme so as to permit positive identification and facilitate an effective recall / withdrawal. The carcass distribution records shall be maintained for a period of time that exceeds the shelf life of the product(s) (including fresh, vacuum packaged and frozen products). Records shall be designed and maintained to facilitate the location of a product in the event of a recall / withdrawal and shall be made available on request. **S.I. No. 152 of 1989; Part III, Regulation (59) and Regulation (EC) No 178/2002, Chapter II, Article 18.**

The regulatory authorities i.e. Department of Agriculture and Food (DAF), the Food Safety Authority of Ireland (FSAI) and / or a Local Authority Veterinary Inspector, also have a role in providing the slaughterhouse with advice on risk assessment. The slaughterhouse management should always consult the relevant authority if they decide to remove unsafe food from the market. The FSAI is also a source of risk assessment advice for slaughterhouses involved in recovering unsafe beef from the market. The FSAI has a role in co-ordinating national crises that may affect more than one foodstuff and more than one business. In addition, the FSAI co-ordinates the EU Rapid Alert for Food and Feed for Ireland and is obliged to report food incidents to the European Commission in cases where unsafe foodstuffs have been exported.

Product recall / withdrawal

The significant difference between product recall and product withdrawal is the involvement of the consumer. Product recall is the removal of unsafe food from the distribution chain extending to food sold to consumers and therefore involving communication with consumers. Product withdrawal is the removal of unsafe food from the distribution chain not extending to food sold to the consumer.

Role of the beef industry

In accordance with the Food Safety Authority Act 1988, the primary responsibility for the safety and suitability of food for human consumption is borne by the food business owner. Consumers demand for information and public health protection are also key drivers for an effective product recall / withdrawal system. As a result every slaughterhouse should have a written and visible product recall / withdrawal policy. This policy should be supported by a product recall / withdrawal procedure.

Initiation of a recall / withdrawal

A recall / withdrawal may be initiated as a result of reports / complaints referred to the slaughterhouse from a variety of sources. Manufacturers, wholesalers, retailers, medical practitioners, government agencies and / or consumers may refer the reports. To minimise the risk that may arise, recalls / withdrawals are usually carried out in the shortest time practicable. Slaughterhouse management are encouraged to develop their own recall / withdrawal procedure so that it can respond promptly to any emerging situation. The procedure should be able to achieve the purpose of stopping distribution and sale of an affected product, notifying the relevant authority of the problem and effectively and efficiently retrieving from the market any product that is potentially unsafe.

The following information should be included for the product being recalled / withdrawn:

- name of intended recipient (for example regulatory authority official(s)) of recall / withdrawal notification,
- recall / withdrawal number assigned by sender (if available),
- product name, trade or brand and generic,
- packaging information,
- batch or lot number(s) and expiration date (if any),
- date and method of recall / withdrawal (e.g. by letter, fax / phone, press release, etc.),
- reason for recall / withdrawal (a brief description of the problem or defect),
- slaughterhouses name, address, and contact information and
- product manufacturer's name and address (if different from recalling / withdrawal slaughterhouse).

Informing the consumer

Depending on the extent of the recall, slaughterhouse management should inform the consumer of the recall at the earliest possible moment. Information dissemination may take the form of a press release, letter to the concerned parties or paid advertisement in the media.

Product recovery

Products may be recovered by return from supermarkets, return via distribution chains or direct return from consumers. The product is to be recovered to a central site, or in the case of widely distributed product, to major recovery sites. The recovered product must be stored in an area that is separated from all other carcasses. Accurate records are to be kept of the amount of recovered product and the batch codes of the product

recovered. After recovery, products may be trimmed or re-processed before release to the market if fit for human consumption. Otherwise the product must be destroyed.

Follow-up action

The slaughterhouse initiating the recall / withdrawal should provide the relevant authority with an interim report as soon as a recall / withdrawal is completed, in any case not later than one month after the announcement of a recall / withdrawal. A final report should be ready within two months of the recall / withdrawal. The report should contain essential information such as:

- the circumstances leading to the recall / withdrawal,
- the action taken by the slaughterhouse including details of any publicity,
- the result of the recall / withdrawal (quantity of stock returned, corrected, outstanding, etc),
- the proposed method of disposal or otherwise of recalled / withdrawn stock with record of destruction and
- the action proposed to be implemented in future to prevent a recurrence of the problem.

The report helps to establish the effectiveness of the recall / withdrawal. Unless satisfactory reports are received, the relevant authority may consider taking further action, for example stepped-up inspection against the company concerned.

Effectiveness of recall action

To be effective, recall / withdrawal notification must reach as far as the product has been distributed. The effectiveness of the recall / withdrawal is assessed upon the amount of product returned as a percentage of the amount of product which left the slaughterhouse while taking into account the retail turnover of that product. These guidelines outline the procedures that would enhance efficiency and transparency of the recall / withdrawal. The implementation of such guidelines will hopefully minimise the loss inflicted on the slaughterhouse and the general public.

Appendix nine – Pre-requisites checklist

1. Checklist for slaughterhouse structure

Y: Yes N: No

Criteria	Y / N	Signed off & dated
1.1 Exterior: - building(s) - yard area		
1.2 Lairage: - roofing - impervious floors & passageways - drainage - lighting - water & feeding troughs - ante-mortem area - detained animal pen - veterinary facilities - transport vehicle wash		
1.3 Stunning equipment (includes back-up stunner) ***(Maintain records)***		
1.4 Production line layout (i.e. minimises risk of cross contamination from dirty to clean areas)		
1.5 Plant layout & structures (i.e. maintained, easy to clean and prevent build up of dirt): - yard area(s) - internal walls - floors/coving - windows - doors - ceilings/overhead fixtures - stairs		
1.6 Trapped drains (i.e. can handle over-spills and be easily cleaned)		
1.7 No evidence of excess condensation.		
1.8 Equipment for sanitising: - knives/hooks/saws - water temperature at 82°C or higher		
1.9 Workstation wash-hand basins at a suitable temperature i.e. 42°C +/- 3°C		
1.10 Facilities adequate in: - red offal room - green offal room		
1.11 Air temperature: - chill room 7°C or lower - frozen storage area - 12°C or lower ***(Maintain records)***		

1. Checklist for slaughterhouse structure (contd.)

Y: Yes N: No

Criteria	Y / N	Signed off & dated
1.12 Dry goods store provides for hygienic storage		
1.13 Bootwash or equivalent at entrance to production area in working order		
1.14 Changing rooms have adequate - lockers - showers - washbasins		
1.15 One WC & associated wash-hand basin per: - 1/15 males - 1/10 females		
1.16 Wash-hand basins: - non-hand/arm operable - supply of premixed water at a suitable temperature i.e. at 42°C +/- 3°C - liquid anti-bacterial soap ***(Maintain records)***		
1.17 Provision in the toilet(s) of: - paper towels - bin(s) - toilet paper		
1.18 Production equipment maintained		
1.19 Temperature monitoring equipment calibrated annually (e.g. thermographs, temperature probes) ***(Maintain records)***		
1.20 All equipment and food containers, used in production, constructed from non-toxic food grade materials. ***(Maintain records)***		
1.21 Food grade lubricants used on equipment used in the production process ***(Maintain records)***		

2. Checklist for slaughterhouse maintenance

Y: Yes N: No

Criteria	Y / N	Signed off & dated
2.1 Documented maintenance programme that includes: - schedules - procedures - records		

3. Checklist for slaughterhouse services

Y: Yes N: No

Criteria	Y / N	Signed off & dated
3.1 Water supply: - potable - chlorination levels i.e. 0.2 - 0.5 ppm ***(Maintain records)***		
3.2 Storage tanks for potable water are covered		
3.3 Documented flow diagram of the water distribution system ***(Maintain records)***		
3.4 Documented cleaning programme that included: - schedules - procedures - records		
3.5 Lockable storage area for all cleaning chemicals and cleaning equipment		
3.6 Wash-up troughs to facilitate washing and rinsing of production equipment		
3.7 Microbial testing conducted in accordance with 2001/471/EC or Hygiene Regulations 2006; Testing of surfaces: **TVC**: 0 – 10 / cm^2 acceptable > 10 / cm^2 unacceptable **Total Enterobacteriaceae Count**: 0 – 1 / cm^2 acceptable > 1 / cm^2 unacceptable		
3.8 Microbial testing conducted in accordance with 2001/471/EC and Hygiene Regulations 2006; Testing of product: **TVC**: < 3.5 acceptable 3.5 - 5.0 marginal > 5.0 unacceptable **Total Enterobacteriaceae Count**: < 1.5 acceptable 1.5 - 2.5 marginal > 2.5 unacceptable ***(Maintain records)***		
3.9 Records kept of BSE sampling/results. ***(Maintain records)***		
3.10 Pest control programme that includes: - location map of all bait points and electric insectocutors - record of inspections and if any corrective actions was taken - a safety data sheet of where the chemicals are used and stored (applicable only if pest control is carried out internally) ***(Maintain records)***		
3.11 Waste skips/containers: - covered (when not in use) - leak proof - located away from the food production site ***(Maintain records)***		

4. Checklist for slaughterhouse operation

Y: Yes N: No

Criteria	Y / N	Signed off & dated
4.1 Management personnel have received - food safety & hygiene training - pre-requisite/HACCP training - SOPs for cattle slaughter (where applicable) ***(Maintain records)***		
4.2 Production operatives have received - food safety & hygiene training - SOP training - CCP training (where appropriate) ***(Maintain records)***		
4.3 Cleaning employees have received - food safety & hygiene training - appropriate SOP training ***(Maintain records)***		
4.4 Maintenance employees have received - food safety & hygiene training - appropriate SOP training ***(Maintain records)***		
4.5 Service employees have received - food safety & hygiene training - appropriate SOP training ***(Maintain records)***		
4.6 Employees are free from health impediments ***(Maintain records)***		
4.7 Protective clothing is provided (i.e. adequate for the operations undertaken)		
4.8 Storage facilities for clean and dirty protective clothing provided		
4.9 Production employees wear no jewellery (Exception plain wedding ring/band)		
4.10 Production area had: - no smoking - no eating/drinking		
4.11 Visitors are provided with: - protective clothing - hair covering - footwear		
4.12 Documented & fully implemented chemical residue programme ***(Maintain records)***		
4.13 Documented & fully implemented clean livestock policy ***(Maintain records)***		
4.14 Identity records available of all cattle slaughtered e.g. ER 106 forms, kill sheets ***(Maintain records)***		
4.16 Carcasses & offal are easily identifiable with the use of coded tags / labels ***(Maintain records)***		

4. Checklist for slaughterhouse operation (cont.)

Y: Yes N: No

Criteria	Y / N	Signed off & dated
4.17 Documented product recall/withdrawal procedure has details on: - recall policy - recall plan - testing recall plan - initiation of product recall - managing product recall - reviewing product recall ***(Maintain records)***		

Appendix ten - HACCP plan checklist

Y: Yes N: No

Criteria	Y / N	Signed off & dated
1.1 HACCP co-ordinator appointed?		
1.2 HACCP team established?		
1.3 HACCP team responsibilities established and documented?		
1.4 Product description/product specification documented for carcasses that included - storage conditions - distribution conditions?		
1.5 Intended use of carcasses documented?		
1.6 All the process steps documented?		
1.7 Schematic / process flow diagram for each product that included -inputs -outputs -detection examination* -was the flow diagram verified?		
1.8 Records kept for alterations made to the slaughter process e.g. new equipment?		
Principle 1 – Hazard Analysis		
2.1 Any biological, chemical and/or physical food safety hazards identified at each process step?		
2.2 Each hazard assessed for significance?		
2.3 Records kept to support the identification of each hazard?		
Principle 2 - Critical Control Points		
3.1 Critical Control Points identified?		
3.2 CCPs provide effective control for each food safety hazards identified?		
Principle 3 - Critical Limits		
4.1 Critical limits established for each CCP?		
4.2 The critical limit effective in controlling the food safety hazard?		
4.3 Methods used to determine the critical limits were - experimental evidence - published results / reports / guidance documents - consultants - if other please specify?		

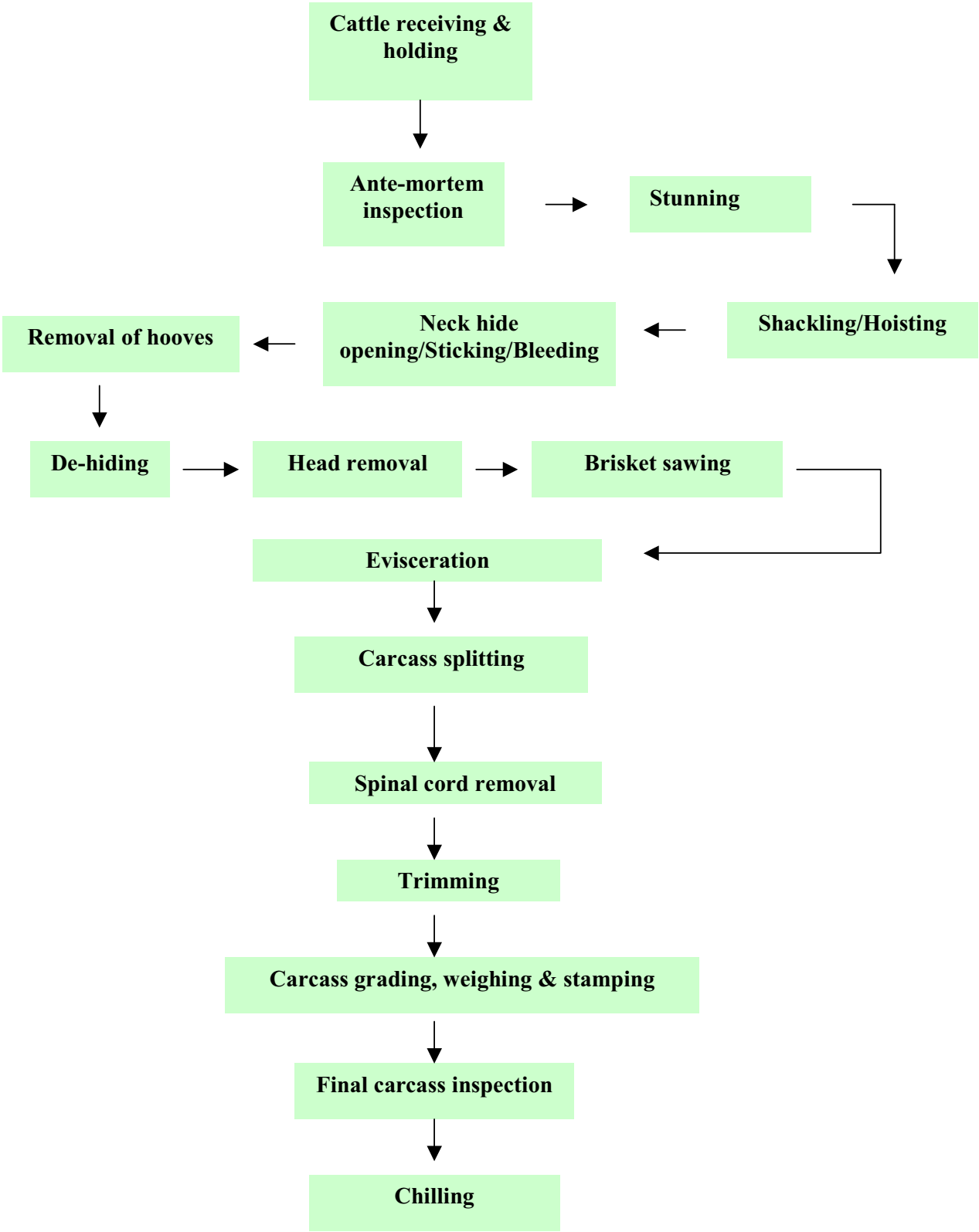
Responsibility of veterinary inspector and / or temporary veterinary inspector e.g. detained for trimming faecal stains.

HACCP plan checklist

Y: Yes N: No

Criteria	Y / N	Signed off & dated
Principle 3 - Critical Limits		
4.1 Critical limits established for each CCP?		
4.2 The critical limit effective in controlling the food safety hazard?		
4.3 Methods used to determine the critical limits were - experimental evidence - published results / reports / guidance documents - consultants - if other please specify?		
Principle 4 - Monitoring Procedures		
5.1 Monitoring procedures developed for each CCP?		
5.2 Monitoring procedures specified - what was monitored - when was it monitored - how was is monitored - where was is monitored - who monitored it?		
5.3 Frequency of monitoring sufficient to provide control over each CCP?		
5.4 Monitoring records up to date and signed off?		
Principle 5 - Corrective Action		
6.1 Corrective actions developed and documented for each CCP?		
6.2 Corrective actions ensured that the critical control point could be returned within the critical limit?		
Principle 6 – Verification Procedures		
7.1 Verification procedures in place?		
7.2 Critical limits validated?		
7.3 Verification activities demonstrated that the HACCP plan was effective?		
Principle 7 - Record Keeping		
8.1 Management signed off on the HACCP plan?		
8.2 HACCP summary sheet available?		
8.3 Records maintained for all HACCP verification activities?		

Appendix eleven - Example of a beef slaughter process flow diagram



Appendix twelve – Example of a beef HACCP plan

Stage	Hazard	Type of Hazard/Comment	Control Measures	Relevant Programme
Cattle receiving & holding	C: Yes P: Yes B: Yes	C: Chemical residues P: Needles etc. B: Human pathogens/parasites	On-farm programme On-farm programme/ante-mortem inspection On-farm HACCP type systems	
Ante-mortem inspection	N/A	N/A	N/A Clean Livestock Policy (DAFRD)	GHP
Stunning	C: No P: No B: Yes	B: Dispersal of CNS tissue (and prions) to edible organs	Use non-penetrative concussion or penetrative captive bolt system without pithing	SOP
Shackling/hoisting	N/A	N/A	N/A	SOP
Neck hide opening /sticking/bleeding	C: No P: No B: Yes	B: Transmission of bacteria from the stick knife to internal organs	Use of 2 knives Sterilised in water at temperature of at least 82°C	GMP GHP
Removal of hooves	C: No P: No B: Yes	B: Bacterial cross-contamination between animals	Dipping of the pneumatic snips in water at temperatures of at least 82°C	GHP
Dehiding	C: No P: No B: Yes	B: Transfer of faecal matter from the hide onto the carcass	Sterilise all equipment Steam vacuum system hock, brisket and flanks Check for faecal material and stains	GHP GHP SOP

Stage	Hazard	Type of Hazard/Comment	Control Measures	Relevant Programme
Head removal	C: No P: No B: Yes	B: The head, in particular the tonsils, are an important source of *E. coli* O157 and *Salmonella*	Follow correct procedures Sterilisation of the knives in water at temperatures of at least 82°C	SOP GHP
Brisket sawing	C: No P: No B: Yes	B: Bacterial cross-contamination between carcasses.	Place the saw in water at 82°C or higher	GHP
Evisceration	C: No P: No B: Yes	B: Inefficient debunging, leakage from the rectum/oesophagus or bursting of the viscera may contaminate the carcass with faecal pathogens.	Sterilisation of all equipment used Check for faecal material and stains	GHP SOP
Carcass splitting	C: No P: No B: Yes	B: Cutting through the spinal cord may contaminate the carcass with prions.	Follow correct procedures Place the saw in water at 82°C or higher	SOP GHP
Spinal cord removal	C: No P: No B: Yes	B: Spinal cord not completely removed	Follow correct procedures Check for spinal cord tissue	SOP SOP
Trimming (to remove excess fat)	C: No P: No B: Yes	B: Cross-contamination of carcasses	Place the knives in water at temperatures of at least 82°C	GHP
Trimming to remove faeces / ingesta / milk	C: No P: No B: Yes	B: Cross-contamination of carcasses	Place the knives in water at temperatures of at least 82°C	GHP

Hazards: C: Chemical P: Physical B: Biological

Stage	Hazard	Type of Hazard/Comment	Control Measures	Relevant Programme
Carcass grading, weighing and stamping	N/A	N/A	N/A	SOP

Hazards: C: Chemical P: Physical B: Biological

Stage	Control Measures	Relevant Programme
Visual carcass contamination inspection	Contaminants for example faecal and / or blood found on the carcasses may be detected by visually inspecting the carcasses	CCP 1
Steam pasteurisation	The commercial effectiveness of steam pasteurisation in on-line cabinet systems for 6-6.5 seconds has been established for beef (Gill and Bryant, 1997b; Nutsch et al., 1997; Nutsch et al., 1998). A synergistic effect between steam pasteurisation and chilling has also been reported (Gill and Bryant, 1997b).	CCP 2
Hot water washing	Numerous studies have demonstrated the ability of hot water washing to reduce bacterial contamination of beef carcass tissue using a range of water temperatures and pressures (Gorman *et al.*, 1995; Dorsa *et al.*, 1996; Dorsa *et al.*, 1997; Gill *et al.*, 1999).	CCP 3
Chilling	Chilling may prevent or reduce bacterial growth on beef carcasses (Gill and Bryant, 1997a; Nutsch et al., 1997; Bacon et al., 1999; McEvoy et al., 1999). At present the critical limits for chilling may be set at achieving a temperature of 7°C or less in the deep round muscle.	CCP 4

Appendix thirteen – Example of a summary of critical limits, monitoring, corrective actions, records and verification

Hazards	Control Measures	CCP No	Critical Limits	Monitoring procedures				Corrective action	Records	Verification
				What	How	Freq	Who			
E.coli 0157 Salmonella Listeria	Visual carcass contamination inspection	CCP 1	No visible faecal contamination	Visible faecal contamination	Visible inspection	C	QA	Faecal material removed under supervision by trimming. Cause identified and dealt with through review/retrain/replace/rotate	Daily, online – monitoring corrective – actions	Validation record review (before product is released from chillers) Online-monitoring record review Monthly audits Microbial tests
E.coli 0157 Salmonella Listeria	Steam pasteurisation	CCP 2	At least 82-94°C inside the chamber for at least 6-8 seconds	Temperature in the chamber	A	C	N/A	Re-route affected carcass through pasteurisation unit	Daily, Corrective – actions	Validation record review (before product is released from chillers) Monthly audits Microbial tests
E.coli 0157 Salmonella Listeria	Hot water washing	CCP 3	Water at 85°C or higher, Pressure: 9.7-13 Pa for at least 9-12 seconds	Temperature of water	A	C	N/A	Re-route affected carcass through hot water wash unit	Daily, Corrective – actions	Validation record review (before product is released from chillers) Monthly audits Microbial tests
E.coli 0157 Salmonella Listeria	Chilling	CCP 4	7°C or less within 24 hours & maintain	Deep round muscle temperature	Temp probe or A	1 hour or C	QA	Carcass re-chilled until 7°C or less is obtained in the deep round muscle, Repair chillers	Hourly, Corrective – actions	Validation record review (before product is released from chillers) Monthly audits Microbial tests

A: Automatic, C: Continuous, QA: Quality Assurance personnel

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