



Slaughter and Dressing

Red Meat Code of Practice Chapter 5

25 September 2017

TITLE

Operational Code: Slaughter and Dressing

COMMENCEMENT

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Introduction

This introduction is not part of the Operational Code, but is intended to indicate its general effect.

Purpose

The purpose of this Operational Code, also known as Code of Practice 5 (CoP5), is to summarise and provide guidance on the requirements relating to the hygienic handling and production of meat that is fit for the intended purpose. These requirements are set out in Regulations and Notices issued under the Animal Products Act 1999 (APA) and are applicable to farmed animals including sheep, lambs, cattle, bobby calves, deer, goats, pigs, horses, camelids, ostriches and emus. It also applies to dressing of killed wild animals, game estate animals and farmed gone feral animals of these species.

This Operational Code replaces Industry Standard 5 Slaughter and Dressing/Industry Agreed Standard 5 Slaughter and Dressing (IS5/IAS5).

Background

An important focus of New Zealand's view of hygienic dressing is preventing the contamination of meat at all stages of processing and, consequently, the prompt removal of any contamination by techniques that will avoid the spread of contaminants. Faecal/ingesta contamination of carcasses is the primary avenue for contamination with foodborne pathogens that may reside in the gastrointestinal tract and on the exterior surfaces of the slaughtered animal. Care should be taken when performing slaughter and dressing procedures to minimise the meat being contaminated with these bacteria.

This Chapter covers the hygienic slaughter and dressing process (from the point of stunning until dressing has been completed). Other requirements that are essential to producing meat that is fit for the intended purpose are summarised in other Chapters of the Code. Hygienic dressing may be achieved by following all guidance in this document or by validating an alternative process.

To successfully implement appropriate slaughter and dressing procedures, consideration should be taken to the procurement of the stock. In addition, post-slaughter management and processing have a significant impact on the final product. Consequently, all performance criteria in this Chapter are mid-process measurements and not end-point product specifications.

Appropriate training of slaughterhouse personnel is a major factor in achieving low microbiological levels on carcasses and is a prerequisite to producing meat that is fit for the intended purpose. Training is not covered in this Chapter.

The Operational Codes for red meat, are based on the [Codex Code of Hygienic Practice for Meat](#). These include principles and well recognised Good Hygienic Practice (GHP) that are set out in legislation and considered to be fundamental to meat processing.

Animal product standards in the form of Regulations and Notices issued under the Animal Products Act 1999 set outcomes to ensure flexibility and allow for innovation. These requirements must be met and this Chapter provides guidance on how that can be done. Alternative practices can be used provided they will achieve the requirements specified.

Who should read this Operational Code?

This code is relevant for persons who slaughter and/or dress red meat species.

Why is this important?

Those who slaughter and dress red meat species must ensure they comply with all relevant requirements under the APA, including requirements in Regulations and Notices issued under the Act. Failure to do so is an offence under Part 10 of the APA.

For operators of Risk Management Programmes (RMP) processing red meat for the New Zealand market only, this Operational Code provides guidance on acceptable ways to meet the requirements under the APA. If an RMP operator incorporates the whole or parts(s) of the Code into their RMP, then the incorporated part(s) of the Code becomes mandatory (i.e. is no longer a guide) and legally enforceable.

For RMP operators who intend export, they must comply with requirements under the APA, along with any additional export requirements. Some parts of this Code are mandatory for exporters and operators should refer to the relevant export requirements for additional details.

How do I read/use this Operational Code?

This Code begins with meat hygiene principles (Part 1) that should be applied when interpreting legislative requirements under the APA. These principles have been agreed between Ministry for Primary Industries (MPI) and the Meat Industry.

A regulatory requirement is identified by having a citation, at the end of the relevant sentence or clause, or the specific legislation from which the particular requirement is derived from. In many cases, the mandatory requirements have been paraphrased. Operators should refer to the cited legislation for the actual wording of the legal requirement.

Guidance material is presented in a box. They elaborate on relevant requirements (“must”) or recommended procedures (“should”) and provide options or examples for achieving a particular outcome or requirement. Some guidance is italicised to give supplementary guidance and examples to assist operators further.

This Chapter also summarises animal welfare issues that are covered by the [Code of Welfare \(Commercial Slaughter\)](#). Note that animal welfare requirements are covered by the Animal Welfare Act 1999 and the relevant codes of welfare.

Required outcomes are represented by performance criteria as appropriate.

Definitions

In this Code, unless context otherwise requires:

clean means the absence of visible contaminants

condemn, means a decision made by the competent post-mortem examiner or Animal Products Officer (APO), that meat is not fit for human consumption

condemned by the operator means a decision made by the company that meat is no longer fit for human consumption, usually as a consequence of processing defects

food safety means assurance that meat will not cause harm to the consumer when it is prepared and/or eaten according to its intended use

meat means all parts of an animal that are intended for, or have been judged as safe and suitable for human consumption

performance criteria means the limits the operators' process must achieve

process control criteria means the limits and subsequent alert levels, applicable to the operators' process, that elicit a response to bring the process back in to control

sanitise means the application of an authorised chemical or physical agent (e.g. hot water) to a clean surface, with the intention of reducing microbial contamination to an acceptable level

validation means obtaining evidence that a procedure(s), when properly implemented, is capable of consistently achieving a specified outcome

Abbreviations

HC Specs

[Animal Products \(Specifications for Products Intended For Human Consumption\) Notice 2016](#)

RMP Specs

[Animal Products \(Risk Management Programme Specifications\) Notice 2008](#)

AM and PM Notice

[Animal Products \(Ante-mortem and Post-mortem Examination of Mammals, Ostrich and Emu Intended for Human Consumption\) Notice 2015](#)

Commercial Slaughter Code of Welfare

[Animal Welfare \(Commercial Slaughter\) Code of Welfare](#)

Industry Standards

References to Industry Standards (IS) in this Chapter will be replaced by the following Operational Codes:

- **IS 2** to be replaced by Operational Code: Design and Construction (CoP2)
- **IS 3** to be replaced by Operational Code: Hygiene and Sanitation (CoP3)
- **IS 4** to be replaced by Operational Code: Procurement (CoP4)
- **IS6** to be replaced by Operational Code: Post Slaughter Management (CoP9)

In addition, CoP1 will be added to provide a general overview and principles of red meat processing.

Part 1: Guiding principles for slaughter and dressing process

- (1) Production of meat that is safe and suitable requires detailed attention be paid to the design, implementation, monitoring and review of process control to achieve relevant performance criteria.
- (2) The operator has the primary responsibility for implementing systems for process control. Where such systems are applied, independent evaluation should verify that they achieve all meat hygiene requirements.
- (3) Process control should limit microbiological contamination to levels set following a risk-based approach as appropriate.
- (4) Hazard Analysis Critical Control Point-principles should be applied wherever practicable to process control, and should be supported by prerequisite Good Hygienic Practice.
- (5) Process control should reflect an integrated strategy for control of hazards and/or risk as appropriate, throughout the food chain, with information available from primary production (farming) and pre-slaughter being taken into account wherever possible and practicable.
- (6) Performance criteria for the outcome of process control activities should be established by MPI as a part of defining food safety and suitability outcomes, and the achievement of these criteria should be subject to verification.
- (7) Statistically-based process control systems capable of change detection should be applied by the Operator as appropriate to show compliance with performance criteria.

Part 2: Overview of slaughter and dressing requirements

- (1) The APA requires RMP operators to comply with all legislative requirements. This includes requirements relating to the slaughter and dressing of animals to ensure health risks to humans and animals are managed.
- (2) RMP operators must also comply with the Animal Welfare Act 1999.

2.1 Summary of general requirements for slaughter and dressing

- (1) Before being slaughtered, all animals must have been subject to ante-mortem examination in accordance with any general or other specified requirements [AM and PM Notice].
- (2) Animals must be designated suitable for processing by a competent ante-mortem examiner [AM and PM Notice].
- (3) The procedure for the slaughter and dressing process must be documented by the RMP operator [RMP Specs].
- (4) Animal Welfare requirements must be met [Commercial Slaughter Code of Welfare].
- (5) Where guidelines do not exist or are not applicable (e.g. skin-on processing) the operator must validate their process to ensure meat is fit for the intended use and meets the relevant performance criteria. Validated procedures must align with the guiding principles of this document [RMP Specs].
- (6) Where animals have been deemed fit for processing at ante-mortem examination but designated as suspect animals and identified as such in accordance with IS 4, appropriate hygiene requirements (e.g. processing, cleaning and sanitation) and any specific requirements issued by the ante mortem examiner must be followed [AM and PM Notice].
- (7) Wild, game estate and farmed gone feral animals are exempt from ante-mortem examination; clause 2.1(1) and (2). The certified supplier must confirm that the animals showed no visible signs of being sick or dying prior to being killed to be eligible for processing [HC Specs].

Guidance

- (8) The operator should assess animals presented for slaughter and manage their welfare, the slaughter and dressing accordingly to facilitate the production of meat fit for the intended purpose.

2.2 Summary of requirements for slaughter (stunning, sticking and bleeding)

- (1) Slaughter must be carried out without unnecessary delay and in a way that manages the distribution and proliferation of contaminants [HC Specs 13.5(1)].
- (2) Slaughter must only be performed at a rate at which bodies of animals can be accepted for dressing [HC Specs 13.5(2)].
- (3) Animal Welfare requirements must be met [Commercial Slaughter Code of Welfare].

Guidance

Stunning, sticking and bleeding

- (4) Refer to the [Animal Welfare \(Commercial Slaughter\) Code of Welfare](#) for specific animal welfare requirements.

- (5) For clarity, any animals must be rendered insensitive before bleeding (or other processing) can begin and kept this way until death supervenes.
 - a) The use of a sharp knife to make the sticking incision is important to allow rapid voiding of the blood and to prevent occlusion of blood flow during bleeding out.
 - b) It is acceptable to use solid or frangible bullets, however the possibility of contaminants in the meat should be considered in the hazard analysis.
- (6) Whenever stunning becomes inadequate, the slaughter should cease until the problem is rectified, with the immediate welfare of the animal remaining a priority.

Collection of blood

- (7) Blood may be collected for the purposes of human consumption unless it has:
 - a) been collected from animals condemned for disease conditions; or
 - b) been collected from a reactor to a diagnostic test; or
 - c) come into contact with the outer surface of any slaughtered animal; or
 - d) become contaminated in any way that affects its fitness for purpose; or
 - e) been condemned by the operator prior to post mortem examination.
- (8) Traceability between the blood collected and donor animal(s) should be maintained until the donor animal(s) concerned has passed post-mortem examination.
- (9) Batch collection of blood is acceptable. All donors contributing to the batch must meet the above criteria otherwise all meat in the batch will be condemned.
- (10) Equipment (e.g. hollow knives), used for the collection of blood should be cleaned and sanitised after each animal or batch of animals.

2.3 Summary of requirements for dressing

2.3.1 Summary of general requirements relating to dressing

- (1) Carcasses and parts of carcasses must meet the requirements of Operational Code Chapter 6 (Presentation for Post-Mortem Inspection) [HC Specs 13.8(1)].
- (2) Traceability between parts of the animal, or animals in case of batch processing, must be maintained until post-mortem examination is completed [HC Specs 13.7(1)].
- (3) Dressing must be carried out hygienically and in a way that manages the potential distribution and proliferation of contaminants [HC Specs 13.7(5)]. The key components of the dressing process that must be managed include:
 - a) the de-hiding or de-pelting or hair removal operations;
 - b) evisceration;
 - c) cross-contamination.
- (4) Equipment designed to reduce contamination is permitted and must be constructed in accordance with IS 2 [HC Specs].

Guidance

- (5) During the de-hiding, de-pelting and evisceration, carcasses should be kept separated until after they have passed post-mortem examination, so that cross-contamination is managed.
- (6) Thyroid glands may be saved for pharmaceutical use but may not be salvaged for human or animal consumption (they are suitable for rendering).

2.3.2 Summary of requirements relating to de-hiding or de-pelting

- (1) Opening cuts and the process of hide removal and disposal must be carried out in a manner that manages contamination of the carcass from the hide/pelt [HC Specs 13.7(2)].

Guidance on dressing techniques (opening and cutting)

Equipment

- (2) All equipment used in slaughter and dressing and likely to contaminate meat needs to be clean and sanitised before use.
- (3) All equipment (including knives) which comes into contact with the exposed meat before inspection should be cleaned after each carcass and sanitised regularly.
- a) *In this context, "regularly" has been taken to mean every 6th carcass on a lamb chain*
- (4) All equipment should be cleaned and sanitised when contaminated.
- a) *Some examples of when it may be contaminated are:*
- i) *incision into a blind cavity, e.g. thoracic stick, ringing, brisket opening or pluck removal (this does not include incision into joints or the spinal column);*
- ii) *incision into contaminated tissues, e.g. weasand/trachea incision, bung removal;*
- iii) *excision of diseased or defective tissue, (e.g. removal of abscesses), except where sufficient clean surrounding tissue was removed;*
- iv) *many pieces of equipment are assumed to be contaminated following the principle that before inspection the exact status of the carcass is unknown.*
- (5) Viscera tables or buggies and equipment used for suspending carcasses, offal or other parts should be cleaned and sanitised when contaminated. The standard of cleaning and sanitation should be appropriate to the class of meat placed on it.

Operation

- (6) Where multiple operations are carried out on the same carcass by the same operator, the operations posing the least risk of contamination should be performed first.
- (7) The skin should be reflected before incisions are made into the carcass.
- a) *Examples of valid opening techniques are:*
- i) *the skin may either be opened with a small cut, then a spear cut used to extend the incision (blade directed outwards), or a strip of skin may be removed (provided that there is no sawing motion of the knife).*
- ii) *a spear cut which opens and continues the incision of the skin (blade outwards at all times) does not require an initial opening cut.*
- iii) *an extension of the strip of skin technique may also be used. The skin and tissue to be removed should be lifted (tension must be applied, by mechanical means if necessary) and a single cut should be used to sever the skin and tissues. The knife should not come in contact with underlying meat.*
- (8) Skin rollback should be prevented.
- (9) Trimming activities prior to post-mortem examination should ensure that no lymph nodes and parts which may affect disposition are removed.
- a) *Pathological lesions restricted to those parts normally not presented for post-mortem examination (e.g. hooves) can be removed, unless the post-mortem examiner requests to have them presented.*
- (10) Any visible contamination (including materials of plant origin) detected on post-mortem examination should be removed by the operator.

- a) *This can either be done on the detain rail or in an auxiliary area provided cross-contamination is managed.*
- (11) Udders should be removed without milk spilling onto the exposed carcass, and without the removal of associated lymph nodes. Milk spillage should be managed whilst it can be identified, e.g. by removal.
- a) *Milk is a potential source of microbiological hazard(s).*
- (12) The potential for contamination from the perineal (bung) area is high, and species- and class-specific dressing convention should be followed, see also clause 2.3.3.
- (13) Carcasses falling from the chain should be identified and dealt with appropriately.
- a) *Skin-off carcasses falling into drains should be condemned by the operator without trimming.*
b) *The use of metal mesh to prevent carcasses from landing in the drain is acceptable.*
- (14) Heads do not have to be completely skinned. The degree of skinning will depend on the intended end use of the head and tongue, methods of conveying heads and the presentation standard required for inspection.
- a) *For example, eyelids, pieces of scar and related tissue at the horn bud site (less than approximately 2 cm in diameter) and tissue within the lacrimal fossa (wax eye), but not extending beyond the rim of the depression, are not regarded as significant sources of cross-contamination. The head is still considered to be fully skinned if it still has these tissues.*
- (15) Where animals are condemned by the operator, parts unaffected by the reason for operator condemnation may still be saved for human consumption, e.g. tendons removed prior to carcass dropped in drain
- a) *To save parts, the animals must still pass post-mortem examination, aside from the reason for company condemnation.*

Bobby calves

- (16) The dried up portion of the umbilical cord should be removed to avoid potential contamination. This can either be done with hide removal or by trimming before that point.
- (17) Vells contaminated with faecal and/or ingesta can be saved but should be managed separately from non-contaminated meat.

Foetuses (unborn animals)

- (18) The carcass, blood and other tissues of foetuses should not be saved for human consumption however they can be saved for pharmaceutical or technical purposes.
- a) *Collection of blood from immature calves may occur on the slaughter board. Collection of other tissues and any further processing or packing should be undertaken separately. Foetal tissue should only be saved where the dam has passed post-mortem examination. Cross-contamination should be prevented at all stages from collection through to storage.*
b) *Foetuses and gravid uteri may be saved for human consumption subject to additional post mortem examination requirements. Refer to CoP7.*
- (19) Foetuses may be designated for use for animal consumption, e.g. petfood.

Skin on carcasses (e.g. pigs and goats)

- (20) Skin-on carcasses may come into contact with each other during the scalding process.
- (21) The area in which scalding and de-hairing (including gambrelling and singeing) are performed should be separated from the area in which carcasses are eviscerated and examined.
- (22) The hair may be removed by scalding or other suitable techniques.
- a) *Scalding should be completed at a minimum temperature of 59°C for adequate hair removal. Scalding water hotter than 64°C is likely to result in unacceptable damage to the skin surface.*

- (23) If scalding sprays or steam jets are used, they should be sufficient in number and type to maintain an adequate scalding operation.
- (24) As a minimum requirement, all scald tanks (irrespective of the nature of processing) should be emptied and cleaned at the end of each day's operation.
- (25) After scalding and scudding, carcasses should be scraped and washed to remove all hair, bristles, scurf and claws as appropriate to the species. These operations should precede removal of eyelids and ear canals, and trimming the stick wound. Hand held steam vacuum devices may be used for removal of hair, bristles and scurf.
- (26) No opening other than the stick wound should be made into the carcass before it enters the evisceration area.
- (27) Where lungs are saved for human consumption, scald water should be prevented from entering the lungs e.g. by bleeding for long enough to ensure involuntary breathing has ceased.
- (28) Where a wetting agent is added to scald water it should be an approved maintenance compound and used according to the manufacturer's instructions [[Food Standards Australia New Zealand](#)].

Sheep, lambs and goats

- (29) The anal sphincter should be left intact if water is applied to the hindquarter.
 - a) *Guidelines to hygienic dressing techniques (ovine) are available at:*
<http://www.foodsafety.govt.nz/password-protected/animal-products/meat-manuals/ovine-dressing/index.htm> (password protected)

Farmed deer

- (30) Tails may be removed by an incision directly through the skin providing the tail stub is subsequently removed and discarded.

Ostriches and emus

- (31) Feathers may be removed by either dry hand plucking or clipping with electrical or mechanical shears or clippers.
- (32) Mechanical pluckers, if used, should be installed as to be accessible for thorough and regular cleaning, including removal of accumulated feathers and contamination. They should be constructed to prevent the scattering of feathers.
- (33) Continuous collection and removal of feather from the defeathering and/or scalding areas should be carried out without contamination of the meat or processing area.
- (34) If feathers are removed by alternative methods, the principles given in Poultry Industry Processing Standard 5, section 3.2.4 apply.
- (35) Before evisceration, the outer surface of each carcass should be washed. The wash can be a spray or constant flow of potable water, chlorine solution or a solution of another approved maintenance compound. Birds should be washed after defeathering before any further incision is made in the carcass.
- (36) Where ostrich and emu are skinned, the skin is incised from the sternum to anus (cloaca) then laterally from the centre to the leg hock joint. The skin is then removed from front to back. The skin is removed from the legs and the hock joints on both sides. If the neck is removed from the carcass at this time, it must be positively identified with the carcass until post-mortem examination.

Killed wild mammals, game estate mammals and farmed mammals that have become feral and then been killed

- (37) Killed wild mammals should be presented for dressing with skin intact, protected from contamination and not washed. The neck should be cleared by removing the windpipe, and the ears should remain attached to the hide [HC Spec 11.28 (1)].
- (38) Heads may be detached provided positive identification of the carcass, viscera and head is maintained from the time of bleeding through to post-mortem examination. The method of positive identification must be documented. The system should be verified by the operator. The method used should be permanent and indelible, e.g. imprinted plastic tags fixed to the skin of the carcass, head and if necessary, the viscera [HC Spec 11.28 (2)].

2.3.3 Summary of requirements relating to evisceration

- (1) Evisceration, including the freeing of the bung, must be performed in a manner that manages contamination of the carcass and the viscera set. The dressing technique used must take into account the consistency of the faecal material associated with the animal [HC Specs].

Guidance

- (2) The gastro-intestinal tract, gall bladder, uterus and bladder should not be punctured during evisceration. Intestines should not be severed from the stomach during evisceration, unless the intestines are first effectively tied to prevent spillage.
- (3) Gall bladders should be placed in a chute or splash-proof container. Gall bladders can be opened or removed from condemned livers separate from edible meat.
- (4) For the purposes of quantifying an acceptable lapse between stunning and the completion of evisceration, a total time of 2 hours should not be exceeded.
 - a) *If this time is exceeded, carcasses and viscera should be assessed for suitability. Assessment should focus on indicators such as discoloration and smell unless such time has passed it is reasonable to suspect that cooling requirements may not be met. Viscera will need to be condemned by the operator unless they are still fit for their intended purpose. This includes diverting them to different processing than originally intended.*
 - b) *It is good practice to eviscerate the carcasses on the chain rather than to leave them intact if a process holdup is expected to last more than 2 hours.*

Cattle

- (5) The bung should not touch external surfaces of the carcass and should be bagged.

Bobby calves

- (6) The bung should not touch external surfaces of the carcass.
- (7) Care should be taken to prevent leakage onto the carcass when removing the gut set. This can be achieved by sealing or bagging the bung.
- (8) Equipment that can be sanitised should be used when ringing e.g. a metal ringing hook.

Skin on carcasses (pigs and goats)

- (9) The bung can be dropped into the abdominal cavity without bagging but should not touch external surfaces of the carcass.

Sheep, lambs and goats

- (10) The bung can be dropped into the abdominal cavity without bagging but should not touch external surfaces of the carcass.

Farmed deer

- (11) The bung can be dropped into the abdominal cavity without bagging but should not touch external surfaces of the carcass.

Ostriches and emus

- (12) The pericloacal skin must be trimmed in a way that prevents contamination of the carcass or cross-contamination.
- a) *The cloacal (anal) area provides a high risk to meat food safety due to its function and the nature of the cloacal contents.*
- (13) The cloaca should be circled cut and freed from the carcass.
- (14) The area should then be hooked, bagged and securely tied to prevent spillage of the cloacal contents and cross-contamination, then lowered into the anal area/pelvic cavity.
- (15) A facility for the rinsing of hands and implements used during the evisceration process should be provided.

2.3.4 Summary of requirements relating to cross-contamination

- (1) Exposed carcasses must not come into contact with surfaces, including equipment and other carcasses, unless associated risks are managed [HC Specs].
- (2) Cross-contamination, between carcasses or within the same carcass, must be managed [HC Specs].
- (3) Scraps, trimmings and waste should be disposed of into containers or chutes [HC Specs].

Guidance

- (4) Spillage of bodily fluids (e.g. urine and milk) should be prevented. Where spillage occurs, it should be removed while still identifiable.
- (5) Faecal and ingesta should not be removed using water.
- a) *The use of steam vacuum is acceptable, provided;*
- i) *good hygienic dressing practice is not compromised; and*
- ii) *steam minimum temperature should be 82°C or above*
- (6) The washing of heads and carcasses should be such that cross-contamination between carcasses, or from un-skinned to skinned parts of the same animal, does not occur.
- a) *Water or loose dirt should be prevented from falling from the hide or pelt on to exposed meat.*
- (7) Water should not enter body cavities or the rectum.
- a) *A full-carcass pre-evisceration wash is not recommended, except for ostrich and emu.*
- (8) The controlled use of water is acceptable, e.g. flushing head cavities.
- a) *Removing trotters by cutting through the skin is allowed.*
- (9) Waste water, splash and potentially contaminating aerosols should be confined.

Cattle

- (10) The carcass splitting saw should be cleaned and sanitised regularly or when contaminated.
- (11) Where the eviscerator stands on the viscera table, cross-contamination from the boots should be managed.

- a) *A cabinet designed to prevent cross-contamination between the eviscerator's boots and their other footwear can be provided at point of use. In this case, changing of footwear should take place at point of use.*
- b) *Boots worn by the eviscerator(s) on the viscera table should have a clear distinguishing mark. These boots should only be worn on the viscera table, eviscerating stand or in the washing compartment, and should be cleaned and sanitised regularly.*

Sheep and goats

- (12) Unskinned or incompletely skinned parts (e.g. heads and trotters) are permitted through a pre-evisceration wash if cross-contamination is prevented.
 - a) *High volume, low pressure washes should be used.*
 - b) *Exposed parts of the carcass should be above the unskinned or incompletely skinned parts.*

Skin on carcasses (pigs and goats)

- (13) Scraping should proceed from clean to dirty.
- (14) Where mechanical de-hairing is used, the scrapers should be cleaned regularly, at least once daily.

Part 3: Statistical Process Control

3.1 Purpose

- (1) The purpose of this Part is to explain the basics of the Statistical Process Control (SPC) system used.
- (2) MPI and the Meat Industry agree that SPC can be used to demonstrate management of the slaughter and dressing process by measuring the total faecal contamination at post-mortem examination or a validated equivalent.

3.2 Scope

- (1) Operator controls over slaughter and dressing processes must demonstrate that MPI's required outcomes and performance criteria are being met on a consistent basis. SPC is regarded as the tool of choice.
- (2) Operators must ensure that each slaughter process has a SPC-based monitoring programme using an arithmetic mean chart. This needs to be applied to each species processed under this Operational Code. A slaughter process can encompass all chains on a plant, or be separated as the operator sees fit, e.g. different chains or different shifts working to separate specifications.

Guidance

- (3) Monitoring for SPC purposes consists of recording faecal/ingesta contamination in a standardised way under conditions of normal processing speed with normal lighting over a defined time period. It is the tool of choice for monitoring faecal/ingesta contamination over time.
- (4) A relatively big variation between days is to be expected as are 'outlier events' or abnormal situations. The variation arises from;
 - a) differences regarding personnel inspecting the carcasses,
 - b) differences between the condition of the incoming animals, and
 - c) deviations due to issues on the production line that are corrected during processing.
 Note: Operators are required to take account of differences and deviations to produce meat that is fit for purpose
- (5) It is not realistic to fully eliminate contamination; however, experience shows that the overall prevalence of contamination can be reduced by the use of the guidelines and requirements contained in this Chapter.

- (6) Total faecal contamination at post-mortem examination has been assessed as an appropriate indicator of control of slaughter and dressing processes, supported by the less timely and responsive indicator of microbiological profiles. Other process indicators may be used; however these need to be validated. The validation needs to show an equivalent outcome in exercising and demonstrating process control.

Guidance

- (7) In alignment with the training for post-mortem examiners, faecal contamination (faeces and ingesta) should be identifiable by both:
 - a) colour (e.g. yellow, green, brown to black); and
 - b) texture (e.g. fibrous or plant-like, smooth or tarry, and may include grain particles depending on diet).
- (8) While this section deals with arithmetic mean charts, it may be acceptable to use other approaches to process control provided the selected approach can be determined to be equivalent. This would be

viewed as a significant RMP amendment thus require evaluation and re-registration.

Guidance

- (9) The mandatory SPC on the slaughter board is an interim requirement and may be reviewed once the main Codes of Practices have been issued.

3.3 Statistical Process Control

- (1) SPC uses control charts as an important component. A control chart is a graph of a quality characteristic that has been measured or computed from a slaughter process over time. When only random variation occurs, this indicates that the process is in control with regards to the specific characteristic.
- (2) As in the example below, the chart will contain a centre line that represents the arithmetic mean (average) of the quality characteristic, or the desired outcome. Two other horizontal lines, called the upper control limit (UCL, 3 standard deviations) and the upper warning level (WL, 2 standard deviations), are shown on the chart. In addition, the two dashed lines represent Upper Guide (UG) and Lower Guide (LG) at one standard deviation away from the mean. These are important for further analysis of the process, however, they don't need to be visualised on the chart.
- (3) Data must be collected on a run-by-run basis.
- (4) The data points collected must be plotted in the graph containing the relevant mean, UCL and WL to compare each point to the expected value. It is customary to connect the sample points on the control chart with straight-line segments, so that it is easier to visualize how the sequence of points has evolved over time

Guidance: Example of a process control graph

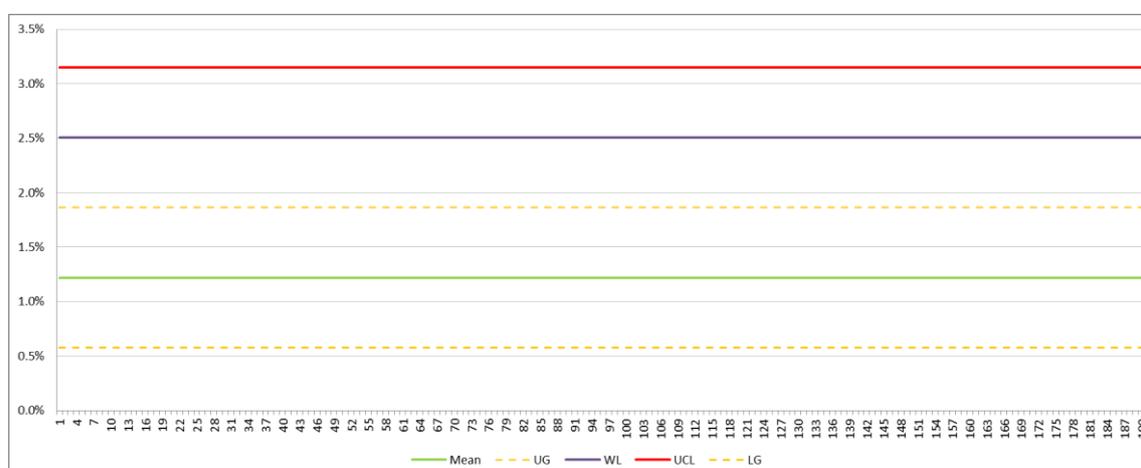


Figure 1: Process Control Graph Example

Note: While SPC charts normally have both upper and lower limits, only UCL, WL and, UG and LG are considered here.

- (5) The most important use of a control chart is to monitor the process.
 - a) Most processes require ongoing supervision and 'fine tuning' or interventions to operate in a 'control state'.
 - b) The control chart will indicate when the process has deviated from the mean (i.e. what is normal).
- (6) The UCL is chosen so that when the process is in control, nearly all (>99%) of the sample points will fall below it i.e. they are within 3 standard deviations of the outcome sought.

- (7) A point that plots outside of the control limits or a series of points meeting the defined criteria, ([Part 4: Performance Criteria](#)), is interpreted as evidence that the process is deviating, i.e. out of control or moving into an out of control state. This requires an investigation and corrective action to identify and eliminate any assignable cause or causes responsible for this behaviour.

Guidance

- (8) If the points plot in a systematic or non-random manner, this could indicate that the process is deviating, even if all the points plot below the UCL. For example, if the last 8 consecutive points are all plotted either above or below the mean, this might indicate that something is changing. If the process is in control, all the plotted points should have an essentially random pattern. Methods for looking for sequences or non-random patterns can be applied to control charts as an aid in detecting potential out-of-control conditions. Usually, there is a reason why a particular non-random pattern appears on a control chart.
- (9) In identifying and eliminating causes of a deviation, it is important to find the root cause of the problem and to address it. Management, process worker and/or engineering action will usually be necessary to eliminate or reduce the identified causes. If the root causes are not identified, then preventative actions rarely result in any real, long-term process control or improvement. An effective system for corrective action is an essential component of SPC implementation.
- (10) A template spreadsheet has been developed to assist operators in meeting the requirement to generate SPC charts and is available from animal.products@mpi.govt.nz.

Part 4: Performance criteria

4.1 Overview

- (1) MPI is responsible for setting performance criteria covering the outcomes of slaughter and dressing processes where there are potential risks to public health. These will be specified as 'National Performance Criteria' (NPC).

4.2 Performance criteria requirements

4.2.1 General requirements in relation to NPC

- (1) All meat must be safe, suitable, and derived from a process that is in control, judged by the monitoring criteria below.

4.2.2 General requirements relating to microbiological monitoring

- (1) Operators must conduct microbiological monitoring in accordance with the current [Animal Products Notice: National Microbiological Database Specifications](#). Red offal must be included in microbiological monitoring with operator defined limits.

4.2.3 General requirements relating to organoleptic monitoring of meat for human consumption

- (1) Operators must conduct monitoring in accordance with [Part 3: Statistical Process Control](#).
- (2) In addition, the maximum NPC for all visible faecal contamination of carcasses at the point of post-mortem examination are:

Table 1: NPC by species

Species	Faecal limit
Bobby Calves	20%
Cattle	13%
Deer	10%
Lamb	15%
Pig	6%
Sheep	15%
Other	20%

Note 1: The above table is the maximum NPC at post-mortem examination. All identified faecal findings must be removed before the meat leaves the slaughter board.

Note 2: Other includes wild, game estate and farmed gone feral animals.

- (3) Red offal must have no visible contamination by faecal matter or ingesta.

4.2.4 Post-mortem examination

- (1) Carcasses, red offal, green offal and any co-products must only be saved from animals that have been subjected to post-mortem examination and determined fit for purpose in accordance with the current version of the AM and PM Notice.

4.3 Operator Performance Criteria

- (1) Operator performance criteria are set by the operator, based on the normal operation of that specific chain, shift or plant, as appropriate.
- (2) Operators must ensure they have sufficient data to establish their SPC limits and to best reflect 'normal' patterns of process outcomes. The normal patterns may justify the need for more than one clearly defined SPC chart within a species or a year.
- (3) The following procedure outlines the principles on how to set the limits for SPC, using the data relating to the process to be controlled:
 - a) use sufficient data to be able to establish meaningful criteria for each species (e.g. the last three years' data);
 - b) confirm that no permanent major changes to the process have occurred (only data since the implementation of major changes should be used);
 - c) verify that the data relates to when the process was considered in control. Data pertaining to periods when the process is known or considered to not represent normal processing should be excluded;
 - d) calculate the arithmetic mean (average) and standard deviation from the data;
 - e) use the calculated arithmetic mean and standard deviation to establish limits of the SPC; and
 - f) re-assess the mean and the standard deviation when your monitoring indicates a change in the process, or at least annually.
- (4) A record of the initial and subsequent procedures, actions taken and justification must be kept as long as the related limits are in use.
- (5) The SPC system should monitor the process and identify trends.

4.4 Actions

- (1) The MPI actions specified below relate to actions that can be taken by an Animal Products Officer (APO) after judging that an operator is not managing their process and/or not complying with NPC. This does not limit the ability of any APO to exercise powers conferred under the APA when they have reason to believe there is a risk to food safety.

4.4.1 Action requirements – NPC

- (1) The actions required, and the escalation of response, when an operator is breaching NPC is outlined below.
- (2) These actions are to be undertaken as soon as practicable after the end of the run. It is advisable that operators have robust systems to quickly ascertain whether a breach has occurred, as any delay may quickly trigger escalating responses.
- (3) The process review that is required where the NPC has been breached is not intended to be a HACCP review, but an assessment of how well the process is adhering to the process description. This is also a good time to review documentation of any breaches of Operator Performance Criteria (OPC) that may have occurred in relation to the event.
- (4) When a breach occurs the following actions must be taken:
 - i) the process must be reviewed and documented (including actions taken, if any, and likely cause, if known);
 - ii) as relevant, downstream processing must be notified of the event to take appropriate precautions;
 - iii) MPI Verification Services (VS) must be informed;
 - iv) a window of 25 runs begins (window 1):

- 1) if no breach occurs within this 25 runs, the window ends and SPC monitoring continues.
 - 2) if a breach does occur within this 25 runs, the procedure in clause 4.4.1(4)i, ii) and iii) is to be followed and a new window of 25 runs begins (window 2)
- v) window 2:
- 1) if no breach occurs within this 25 runs, the window 2 ends and SPC monitoring continues.
 - 2) if a breach does occur within this 25 runs, the process is considered out of control and MPI will intervene directly in the process
 - 3) SPC monitoring must continue, start another 25 run window and await MPI direction.
- vi) MPI intervention may involve:
- 1) meat dispositions (e.g. market restrictions, downgrading);
 - 2) slowing the chain speed, or stopping the chain;
 - 3) any other action that is considered appropriate by MPI, such as enhanced regulatory oversight;
- vii) all alternative validated slaughter and dressing operations must be considered by the operator and MPI. Any of these processes that are likely to have contributed to loss of process control must be revalidated.
- viii) once MPI considers the process is back in control the window ends. This may involve gradual restoration to normal operating conditions.

Guidance: Example of actions and responses when breaches to NPC occur

- (1) First breach occurs:
 - review process and document. Notify downstream processes, if relevant. Inform MPI. Start a 25 run window (window 1)
- (2) In run 15 of the 25 window another breach occurs:
 - review process and document. Notify downstream processes, if relevant. Inform MPI. Start a new 25 run window (window 2)
- (3) In run 7 of the new 25 window (window 2) another breach occurs (process out of control):
 - review process and document. Notify downstream processes if relevant. Inform MPI. The Operator decides what actions should be taken immediately, e.g. slow process, restrict meat, etc., until directed by MPI.
 - Start another 25 run window to continue monitoring the SPC and await MPI direction

- (4) In taking actions as a result of breaches to performance criteria, the objective for:
- a) the operator is to identify the problems, deal with them and return to normal operating conditions as soon as possible.
 - b) MPI is to assist and ensure the operator meets their obligations.

4.4.2 Action requirements – Operator Performance Criteria

- (1) Operators should monitor their process in accordance with SPC and take action when:
 - a) a breach of operator-defined limits occurs; and
 - b) trends indicate possible changes in the process.
- (2) All breaches and trends, including actions taken (if any), should be documented.

4.5 SPC monitoring requirements for non-standard processing

- (1) The below requirements have been developed to address situations for non-standard processing.

4.5.1 Short runs

- (1) Short runs are runs where significantly less animals are processed than normal. This may bias the SPC results and falsely require actions to be taken. For the purposes of this Operational Code, short runs are defined as less than 25% of a typical run in that plant.
- a) This includes where multiple species are processed in the same run.

Guidance

- (2) *There may be circumstances where there is no “typical” run or the calculated 25% of a typical run would be too short to allow the operator to react to a process that is deviating. In this instance variation from 25% can occur provided that this is documented with appropriate justification.*
- (3) Where such a run occurs, the number of processed animals, and faecal findings, from the previous run are added to the number for the short run to generate a weighted result. Where the weighted result is still a short run, this process can be repeated once by using the run prior to the previous run to generate the weighted result.

Guidance: Example of weighted faecal detection results for short runs

If a normal run is 100 animals, a short run is less than 25 animals.

Table 2: Example of weighted faecal detection results for short runs

Run	Killed	Faecal Detection	Calculation	Percentage
1	100	5	5/100	5%
2	20	1	$(5+1)/(100+20)$	5%
3	4	2	$(5+1+2)/(100+20+4)$	6.5%
4	40	1	1/40	2.5%

4.5.2 Very low throughput

- (1) Operations that have very low throughput, compared with common operations for the same species, usually don't process enough stock to appropriately make use of SPC.

Guidance

- (2) Very low throughput is considered less than:
- a) 40 animals per week when processing large animals, e.g. cattle, Wapiti deer;
- b) 100 animals per week when processing small animals, e.g. sheep, Red deer
- (3) In these cases, the operator must be able to demonstrate compliance with the NPC but can use other documented methods to achieve this.

4.5.3 New processes

- (1) Where a new plant, or chain, is starting up the initial OPC should be set using data from a similar process or a desired outcome. If no such data is available, the criteria should be set in accordance with the table below. The set values should be reviewed after 150 runs to establish whether this is adequately describing the process. This allows for a settling in period for the process which may otherwise cause overreacting to data, or “hunting the process”.

Table 3: Mean and standard deviations of faecal contamination rates by species

Class	Mean	Standard deviation
Lamb	6%	3%
Sheep	6%	3%
Cattle	6%	2.5%
Bobby Calves	11%	3%
Deer	4%	2%
Pig	3%	1%
Other	11%	3%

- (2) In the course of the first processing year the possibility of unknown variations must be taken into account where the SPC indicates actions need to be taken, especially where these are significantly impacting the operator.

4.5.4 Abnormal situations

- (1) Abnormal situations are those events that are outside the normal process patterns, particularly associated with the presentation of animals. These events can be excluded from the normal SPC.
- (2) Examples of abnormal situations are:
- a) a line of 200 kg stags (e.g. Wapiti stags);
 - b) a line of feed lot cattle;
 - c) major weather events that will significantly affect the presentation of animals (i.e. heavy rain fall resulting in wide spread flooding).
- (3) All meat produced during abnormal situations needs to be processed in a manner that manages contamination and the operator must show that the resulting meat remain fit for purpose by subsequent actions (e.g. additional trimming).
- (4) All abnormal situations must be documented with appropriate justification of why the operator considers them as abnormal. (Note: abnormal situations are not an excuse for ineffective management of dressing).
- (5) If an abnormal situation (e.g. receiving feed lot cattle for processing), occurs repeatedly or frequently, they should be treated as a normal process with appropriate SPC limits. These processes may require variation of NPC. Contact animal.products@mpi.govt.nz for further information.