Ministry for Primary Industries
Manatū Ahu Matua

Operational Code

Slaughter and Dressing

Red Meat Code of Practice, Chapter 5

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Operational code issued by the Ministry for Primary Industries

New Zealand Government

TITLE

Operational Code: Slaughter and Dressing

COMMENCEMENT

This Operational Code is effective from 1 October 2015

ISSUING BODY

This Operational Code is issued Animal Products Team, Regulation & Assurance Branch MPI

Dated at Wellington this ... day of 2015

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Introduction

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

Purpose

(1) The purpose of this Chapter is to specify requirements for the hygienic handling of meat and the production of a safe and suitable product. The following chapter needs to be adhered to by the Operator during the slaughter and dressing of large mammals and birds unless local alternative has been validated. This includes farmed sheep, cattle, deer, goats, pigs, bobby calves, horses, camelids, ostriches and emus as well as killed wild animals, game estate animals and farmed gone feral animals of these species.

Background

(1) This chapter covers the hygienic slaughter and dressing process from the point of stunning until such a point where the requirements in this chapter are fulfilled. The way these are met may vary between Operators due to local procedures and this should be taken into consideration. Other chapters of the Red Meat Code of Practice covers a range of activities that are essential to produce safe and wholesome meat products. To successfully implement appropriate slaughter and dressing procedures, consideration should be taken to the procurement of the stock. In addition, the 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.

(2) An important focus of New Zealand's view of hygienic dressing is the prevention of contamination of meat at all stages of processing and, consequently, the prompt removal of any contamination by techniques that will avoid spread of contaminants.

(3) The NZ Code of Practice for Meat, which is based on the Codex Code of Hygienic Practice for Meat, has a hierarchical structure that gives principles, requirements and then details guidelines. The principles are immutable and the requirements are well recognised GHP that are set out in legislation and considered to be fundamental to meat processing as it is currently carried out. Despite this, there is the potential for significant innovation in the industry that would warrant a review of requirements leading to legislative reform. There is more flexibility in the guidelines and alternative practices can be validated without legislative reform provided the outcomes specified in the principles and requirements continue to be met. In this code of practice we have agreed guidance and supplementary guidelines as a way of dividing this chapter into what might be more open to innovative alternative procedures.

Who should read this Operational Code?

(1) This code applies to Risk Management Programme Operators that slaughter and/or dress red meat species

Why is this important?

(1) Those who operate in accordance with this Operational Code satisfy the New Zealand requirements for slaughter and dressing of red meat species.

(2) Meeting the New Zealand requirements is an essential part of meeting any export requirements

Layout

(1) The principles of meat hygiene applying to this chapter (slaughter and dressing) are defined by double lined boxes. These represent a common understanding between MPI and the Meat Industry and must be used when interpreting requirements and guidance.

(2) Regulatory/mandatory requirements can be found at the start of each section. In many cases, these mandatory requirements have been paraphrased to include requirements from several different notices. Operators should refer to the legislation for the actual wording.

(3) Guidance is defined by single lined boxes. Hygienic dressing must be achieved by following all guidance in this document or by validating an alternative process.

(4) In many cases, supplementary guidance (e.g. examples and clarifications) are guides to assist operators. These are italicised and in smaller font immediately following the relevant paragraph.

(5) Required outcomes are represented by performance criteria as appropriate.

Definitions

chapter refers to the stated chapter of this Code of Practice

cleaning means the removal of soil, food residue, dirt, grease or other objectionable matter

condemned by the Operator means a decision made by the company that the material or products are no longer fit for human consumption, usually as a consequence of processing defects

condemn, means a decision made by the competent post-mortem inspector, or Animal Products Officer, that the material or products are not fit for human consumption

disinfection means the reduction, by means of an approved maintenance compound and/or physical methods, of the number of micro-organisms in the environment, to a level that does not compromise safety or suitability

Good Hygienic Practice (GHP) means all practices regarding the conditions and measures necessary to ensure the safety and suitability of the animal products

performance criteria means the limits the operators' process must achieve

process control criteria means the limits, and subsequent alert levels, that are applicable to the operators' process

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

suitability means assurance that animal product is acceptable for human consumption according to its intended use

validation means obtaining evidence that a procedure or combination of procedures, when properly implemented, is capable of achieving a specified outcome

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: New Zealand Standard

2.1 General

(1) The Operator must slaughter and dress animals in a manner that meets legislative requirements and achieves specified performance criteria to ensure health risks to humans and animals are managed. This must be achieved by following the guidelines in this document or by validating an alternative process.

(2) Where guidelines do not exist or are not applicable (e.g. skin-on processing) product must be processed in accordance with validated procedures to ensure product is suitable for its intended use and meet the relevant performance criteria. Validated procedures must align with the guiding principles of this document.

(3) The procedure for the slaughter and dressing process must be documented by the Operator.

(4) Before being slaughtered, all animals must have been subject to ante-mortem examination in accordance with any general or other specified requirements in Chapter 4 (Procurement).

(5) Animals must be designated suitable for processing by a competent ante-mortem examiner.

(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 Chapter 4 (Procurement), appropriate hygiene requirements (e.g. processing, cleaning and sanitation) and any specific requirements issued by the ante mortem examiner must be followed.

(7) Animals presented for slaughter should be assessed and the process managed to facilitate hygienic dressing and the production of safe and suitable meat.

2.2 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.

(2) Slaughter must only be performed at a rate at which bodies of animals can be accepted for dressing.

a) Animal Welfare requirements must be met[1].

(3) **Stunning, Sticking and Bleeding**

a) Refer to the Animal Welfare (Commercial Slaughter) Code of Welfare for animal welfare requirements[1].

b) For clarity, any animals must be rendered insensitive before bleeding or other processing can begin and kept this way until death supervenes.

i) It is acceptable to use solid or frangible bullets; however, the possibility of contaminants in the product should be considered in the hazard analysis.

c) Whenever stunning becomes inadequate, the slaughter should cease until the problem is rectified.

(4) **Collection of blood**

a) Blood may be collected for the purposes of human consumption unless it has:

i) been collected from animals condemned for disease conditions; or

[1] http://www.mpi.govt.nz

ii) been collected from a reactor to a diagnostic test; or
iii) come into contact with the outer surface of any slaughtered animal; or
iv) become contaminated in any way.

b) Traceability between the blood collected and donor animal(s) should be maintained until the donor animal(s) concerned has passed post-mortem examination.
c) Batch collection is acceptable. All donors contributing to the batch must meet the above criteria otherwise all product in the batch will be condemned.
d) Equipment used for the collection of blood should be disinfected after each batch.
e) Any equipment directly coming into contact with exposed parts of the animal, e.g. hollow knifes, should be disinfected after each animal has been bled.

2.3 Dressing

2.3.1 General requirements

(1) Carcasses and parts must meet the requirements of Chapter 6 (Presentation for Post-Mortem Inspection).

(2) Traceability between parts of the animal, or animals in case of batch processing, must be maintained until post-mortem examination is completed.

(3) Dressing must be carried out hygienically and in a way that manages the potential distribution and proliferation of contaminants. The key components of the dressing process that must be addressed include:

a) The De-Hiding/ 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 Chapter 2 (Design and Construction).

a) During the de-hiding, de-pelting and evisceration, carcasses should be kept separated so that cross contamination is managed.
    i) *Carcasses should be kept separated until they have passed the post-mortem examination.*
b) Scraps, trimmings and waste should be disposed of into containers or chutes.
c) Thyroid glands may be saved for pharmaceutical use but may not be salvaged for human or animal consumption.

2.3.2 De-Hiding/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.

Dressing techniques (opening and cutting)

(2) **Equipment**

a) All equipment (including knives) which comes into contact with the exposed product before inspection should be cleaned after each carcass and disinfected regularly.
b) All equipment should be cleaned and disinfected when contaminated.
    i) *Some examples of when it may be contaminated are:*
        1) *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);*
        2) *Incision into contaminated tissues, e.g. weasand/trachea incision, bung removal;*

3) *Excision of diseased or defective tissue, e.g. removal of abscesses, except where sufficient clean surrounding tissue was removed.*

c) Any equipment likely to introduce unnecessary contamination into tissues should be cleaned and disinfected before use, e.g. carcass skewers.

d) Viscera tables or buggies and equipment used for suspending carcasses, offal or other parts should be cleaned and disinfected after each animal. The standard of cleaning and disinfection should be appropriate to the class of product placed on it.

(3) **Operation**

a) 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.

b) The skin should be reflected before incisions are made into the carcass.

i) *Examples of valid opening techniques are:*

1) *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).*

2) *A spear cut which opens and continues the incision of the skin (blade outwards at all times) does not require an initial opening cut.*

3) 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 product.

c) Skin rollback should be prevented.

d) Trimming activities prior to post-mortem examination should ensure that no lymph nodes and parts which may affect disposition are removed.

i) *Pathological lesions restricted to those parts normally not presented for post-mortem examination (e.g. hooves) can be removed, unless the post-mortem examiner has prohibited their removal.*

e) Any materials of plant origin detected on post mortem examination should be removed by the operator. This can either be done on the detain rail or in an auxiliary area.

f) Udders should be removed without milk spilling on to the exposed carcass. Milk spillage should be managed whilst it can be identified, e.g. by removal.

i) *Milk is a potential source of microbiological hazard(s).*

g) The potential for contamination from the perineal (bung) area is high, and species- and class-specific dressing convention should be followed, see also 2.3.3.

h) Carcasses falling from the chain should be identified and dealt with appropriately.

i) *Skin-off carcasses falling into drains should be condemned by the operator without trimming.*
ii) *The use of metal mesh to prevent carcasses from landing in the drain is acceptable*.

i) 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.

i) *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.*

j) 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

i) *To save parts, the animals must still pass post-mortem examination, aside from the reason for company condemnation.*

(4) **Bobby Calves**

a) 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.
b) Vells contaminated with faecal and/or ingesta can be saved but should be [managed] separately from [non-contaminated] product.

(5) **Fetuses (unborn animals)**

a) The carcass, blood and other tissues of fetuses should not be saved for human consumption but can be saved for pharmaceutical or technical purposes.

i) *Collection of blood from immature calves may occur on the slaughter floor. Collection of other tissues and any further processing or packing should be undertaken separately. Fetal tissue should only be saved where the dam has passed post-mortem examination. Cross contamination should be prevented at all stages from collection through storage.*

b) Carcasses of fetuses may be designated for use for animal consumption, e.g. petfood.

(6) **Skin on Carcasses (e.g. Pigs and Goats, Ostriches and Emus)**

a) Skin-on carcasses may come into contact with each other during the scalding process.
b) 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.
c) The hair may be removed by scalding or other suitable techniques.

i) *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.*

d) If scalding sprays or steam jets are used, they should be sufficient in number and type to maintain an adequate scalding operation.
e) 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.
f) 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.
g) No opening other than the stick wound should be made into the carcass before it enters the evisceration area.
h) 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.

(7) **Sheep, Lambs and Goats**

a) The anal sphincter should be left intact if water is applied to the hindquarter.

i) *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)*

(8) **Farmed Deer**

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

(9) **Killed Wild Mammals, Game Estate Mammals and Farmed Mammals That Have Become Feral and Then Been Killed**

a) 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.
b) 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.

(10) **Ostriches and Emus**

a) Where a wetting agent is added to scald water it must be an approved maintenance compound and used according to the manufacturer's instructions.
b) Feathers may be removed by either dry hand plucking or clipping with electrical or mechanical shears or clippers.
c) 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.
d) Continuous collection and removal of feather from the defeathering and/or scalding areas should be carried out without contamination of the product or processing area.
e) If feathers are removed by waxing methods, the principles given in Poultry Industry Processing Standard 5, section 3.2.4 apply.
f) Birds should be washed after defeathering before any further incision is made in the carcass.
g) Where Ostrich and Emu are skinned, the skin is incised from the sternum to anus (cloaca) then laterally from the center 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 postmortem examination.
h) 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.

2.3.3 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.

a) 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.
b) 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 product.
c) 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.

    i) *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.*
    ii) *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.*

(2) **Cattle**

a) The bung should not touch external surfaces of the carcass and should be bagged.

(3) **Bobby Calves**

a) The bung should not touch external surfaces of the carcass.
b) 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.
c) Equipment that can be disinfected should be used when ringing e.g. a metal ringing hook.

(4) **Skin on Carcasses (Pigs and Goats)**

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

(5) **Sheep, Lambs and Goats**

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

(6) **Farmed Deer**

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

(7) **Ostriches and Emus**

a) The pericloacal skin must be trimmed in a way that prevents contamination of the carcass or cross-contamination.

i) *The cloacal (anal) area provides a high risk to product safety due to its function and the nature of the cloacal contents.*

b) The cloaca should be circle cut and freed from the carcass.
c) 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.
d) A facility for the rinsing of hands and implements used during the evisceration process should be provided.

2.3.4 Cross contamination

(1) Exposed carcasses must not come into contact with surfaces, including equipment and other carcasses, unless associated risks are managed.

(2) Cross contamination, between carcasses or within the same carcase, must be managed.

a) Urine and milk spillage should be prevented. Where spillage occurs, it should be removed while still identifiable.
b) Faecal and ingesta should not be removed using water.

i) *The use of steam vacuum is acceptable.*

c) 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.

i) *Water or loose dirt should be prevented from falling from the hide or pelt on to exposed product.*

d) Water should not enter body cavities or the rectum.

i) *A full-carcass pre-evisceration wash is not recommended, except for Ostrich and Emu.*

e) The controlled use of water is acceptable, e.g. flushing head cavities.

i) *Removing trotters by cutting through the skin is allowed.*

(3) **Cattle**

a) The carcass splitting saw should be cleaned and disinfected regularly or when contaminated.
b) Where the eviscerator stands on the viscera table, cross contamination from the boots should be managed.

i) *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.*

ii) *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 disinfected regularly.*

(4) **Sheep and Goats**

a) Unskinned or incompletely skinned parts (e.g. heads and trotters) are permitted through a pre-evisceration wash if cross contamination is prevented.

i) *High volume, low pressure washes should be used.*
ii) *Exposed parts of the carcass should be above the unskinned or incompletely skinned parts.*

(5) **Skin on Carcasses (Pigs and Goats)**

a) Scraping should proceed from clean to dirty
b) 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 section is to outline methods for the development and monitoring of hygienic outcomes of slaughter and dressing via statistical process control (SPC). This must be achieved by measuring total faecal contamination at post-mortem examination.

3.2 Scope

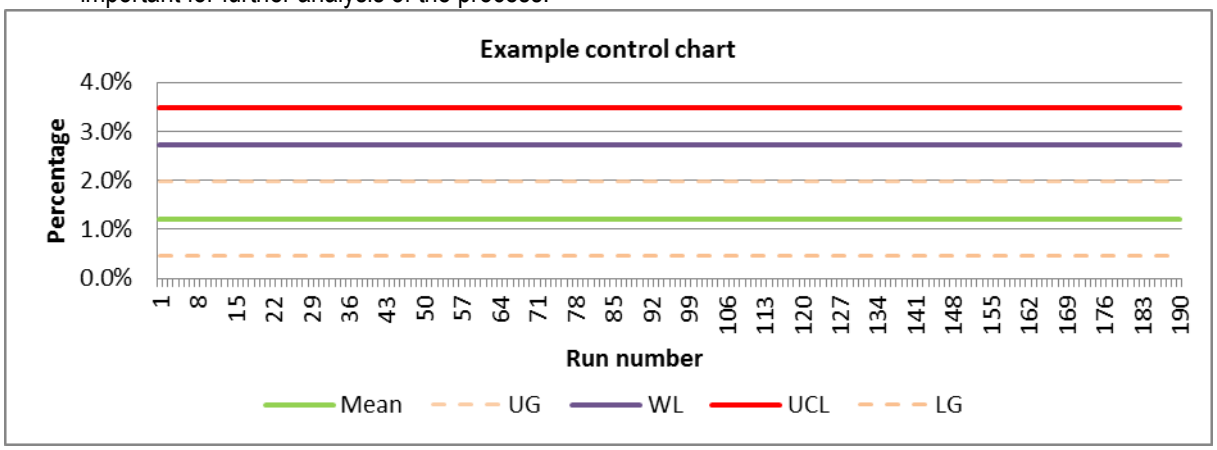
(1) Operator controls over slaughter and dressing processes must demonstrate that MPI's required outcomes and performance criteria are being met on a consistent basis. SPC is regarded as the tool of choice and Operators must ensure that each slaughter process has a SPC based monitoring programme using an arithmetic mean chart. This needs to be applied to each species processed under the Code of Practice 5 (CoP5). 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.

(2) Total faecal contamination at post-mortem examination has been assessed as the most appropriate indicator of control of slaughter and dressing processes, supported by the less timely and responsive indicator of microbiological profiles. Other process indicators may also be used; particularly when a validated alternative process is in place

(3) 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 change and thus require evaluation.

3.3 Introduction

(1) SPC uses 'control charts' as an important component. A control chart is a graphical display of a quality characteristic that has been measured or computed from a slaughter process over time. 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. When only random variation occurs, this indicates that the process is in control with regards to the specific characteristic. Two other horizontal lines, called the upper control limit (UCL, 3 standard deviations) and the warning level (WL, 2 standard deviations), are shown on the chart. Upper Guide (UG) and Lower Guide (LG) at one standard deviation are also important for further analysis of the process.



(2) Note: While SPC charts normally have upper and lower limits; for monitoring slaughter and dressing, upper and lower guide levels and upper control limits are considered.

(3) The most important use of a control chart is to monitor the progress:

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 (what is normal)

(4) The upper control limit line is chosen so that when the process is in control, nearly all (>99%) of the sample points will fall below them i.e. they are within 3 standard deviations of the outcome sought. A point that plots outside of the control limits or a series of points meeting defined criteria, (section 7: 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 find and eliminate the assignable cause or causes responsible for this behaviour. 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.

(5) Even if all the points plot inside the Upper Control Limits, if they behave in a systematic or non-random manner, then this could be an indication that the process is deviating. For example, if the last 8 consecutive points are all plotted either above or below the centre line, this might indicate that something had changed. 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.

(6) 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 effective preventative actions rarely result in any real, long-term process improvement, an effective system for corrective action is the essential component of SPC implementation.

(7) A template spreadsheet has been developed to assist Operators in meeting the requirement to generate SPC charts and is available from www.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'. Where appropriate, these are pathogen specific and relate to particular species, classes of animals within the species and the particular end use intended for the meat which may have relevance in terms of the likely critical control points where the hazards are reduced or eliminated and the potential risk mitigated. Such performance criteria will be science and risk based to the greatest degree possible but may be conservative where there are high levels of uncertainty and lack of scientific evidence.

(2) In the absence of the necessary scientific evidence linking hazards (pathogens) to risk and/or an inability to enumerate levels of pathogens in or on meat, MPI may set regulatory limits for APCs, faecal coliforms and/or organoleptic features where they are known to have an association to pathogens. This will generally follow consideration of aspects of processing such as the likely end use of the meat, general 'fitness for purpose', 'wholesomeness' (consumer expectations) and/or Government's expectations around trade in animal products and New Zealand's reputation.

4.2 Operator Performance Criteria

(1) Operator performance criteria are set individually, based on the normal operation of that specific chain, shift or plant, as appropriate.

(2) Operators should 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 and year.

(3) The following procedure outlines the principles on how to set the limits for statistical process control, 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 may 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 on the Statistical Process Control.
f) Re-assess the mean and the standard deviation when your monitoring indicates or at least annually.

(4) A record of the above procedure, actions taken and justification must be kept.

4.2.1 Short runs

(1) Short runs are runs that have significantly less animals processed in them. This may bias the result and falsely require actions to be taken. For the purposes of this Code of Practice, short runs are defined as 25% or less than a typical run in that plant.

(2) 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 weighed result. Where the weighed 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.

EXAMPLE: **If a normal run is 100 animals, a short run is less than 25 animals**				
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

4.2.2 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 statistical process control.

(2) In these cases, the operator must be able to demonstrate compliance with the National Performance Criteria but are allowed to use other documented methods to achieve this.

4.2.3 New processes

(1) Where a new plant, or chain, is starting up the initial operator performance criteria should be set using data from a similar process. 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".

Class	**Mean**	**Standard deviation**
Lamb	6%	3%
Sheep	6%	3%
Cattle	6%	2.5%
Calves	11%	3%
Deer	4%	2%

(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

4.3 National Performance Criteria

4.3.1 General

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

4.3.2 Microbiological monitoring

(2) 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.

4.3.3 Organoleptic monitoring

(1) Operators must conduct online monitoring in accordance with part 3.

(2) In addition the National Performance Criteria for all visible faecal contamination of carcasses at the point of post-mortem examination are:

Class	Faecal limit
Lamb	15%
Sheep	15%
Cattle	13%
Calves	20%
Deer	10%

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

4.3.4 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 Animal Products Notice: Ante-mortem and Post-mortem Examination of Mammals, Ostriches and Emu intended for Human Consumption.

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 controlling their process. This does not limit the ability of any APO to exercise powers conferred under the Animal Products Act 1999 when they have reason to believe there is a risk to food safety.

4.4.1 Action requirements – Operator Performance Criteria

(1) There are two levels of actions required, tier 1 and tier 2. Tier 1 actions are immediate responses that will need to be actioned by the person actively in charge of supervising the process and align with the required responses for breaching National Performance Criteria. Tier 2 actions require overview over a longer period of time and would typically be overseen by technical or QA personnel.

(2) It is recognised that that being outside any of these limits, by itself doesn't mean the process is out of control but they give an indication of where it is heading. Process review should be appropriate to see if there is anything obvious going on and if anything should be done to manage the process and is not intended to be full HACCP reviews.

Tier one

(3) Actions are required by the Operator when:

a) One point plots outside the Upper Control Level (UCL), or
b) Two out of three consecutive points plot beyond the warning level (WL)

(4) Actions should be undertaken as soon as practicable. It is advisable that the companies have robust systems to quickly ascertain whether a breach has occurred or not, as any delay will see the response escalate quickly.

(5) The minimum actions required for tier 1 are:

a) ***On the first occurrence***

i) The process must be reviewed. This must be documented, including actions taken, if any, and likely cause, if known.
ii) Downstream processing must be notified of the event to take appropriate precautions.

b) ***On the second occurrence in 25 runs***

i) The process must be reviewed. This must be documented, including actions taken, if any, and likely cause, if known.
ii) Downstream processing must be notified of the event to take appropriate precautions.
iii) MPI VS must be informed immediately; and be involved in the review.

c) ***On the third occurrence in 25 runs***

i) The process must be reviewed. This must be documented, including actions taken, if any, and likely cause, if known.
ii) Downstream processing must be notified of the event to take appropriate precautions.
iii) MPI VS must be involved immediately; Offsite VS must be involved in the review.

d) ***On the fourth occurrence in 25 runs***

i) MPI VS must be informed immediately.
ii) Downstream processing must be notified of the event to take appropriate precautions.
iii) MPI will intervene directly in the process. This may involve:

1) Products dispositions (e.g. market restrictions, downgrading);
2) Slowing the chain speed, or stopping the chain;
3) Any other action that is considered appropriate following the Verification Services internal procedures, such as enhanced Regulatory Oversight;

e) All alternative validated slaughter and dressing operations must be considered by MPI and the operator. Any of these processes that are likely to contribute to loss of process control must be revalidated.
f) Once MPI consider the process is in control the window is reset. This may involve gradual restoration to normal operating conditions.

Tier Two

(6) Actions are required by the Operator when:

a) Four out of five consecutive points plot beyond the upper and/or lower guide levels (GL), or
b) Eight consecutive points plot on one side of the centre line, (Lower issue or Upper issue).

(7) These are often used in practice for enhancing the sensitivity of control charts. That is, the use of these rules can allow smaller process shifts to be detected more quickly then would be the case if our only criterion was the usual upper control limit violation.

(8) When responding to tier 2 alerts, consider:

a) Is the stock presentation different?
b) Is the weather considerably worse/better than normal?
c) Are there staff missing from the chain?
d) Does the staff follow the task instructions?
e) Have we moved into a different ‘sub-season’, i.e. are the limits still relevant?

(9) Actions in responses to tier 2 alerts are deliberately kept very simple and generic. The factors that influence the performance are many and can be interdependent. The key consideration must be that the person/s responsible understands the slaughter and dressing process and can draw relevant conclusions. It is accepted that anomalies occur but this can never be the initial assumption. If there are repeated tier 2 actions, the statistics are no longer describing the operator’s process. In this case, an appropriate response may be to change to limits as long as the processes still satisfy the National Performance Criteria. When there is a clearly identified issue that is both temporary and outside of the control of the operator, e.g. good weather conditions, the process control criteria should not be adjusted solely based on tier 2 actions.

(10) As a minimum, tier 2 responses must be investigated and acted upon in accordance with the escalation below:

a) If 2 instances within 25 samples – company investigate and document
b) If 4 or more instances within 50 samples – investigate with local VS
c) If 6 or more instances within 75 samples – investigate with offsite VS
d) If 8 or more instances in 100 samples – MPI require limits to be changed

(11) During the escalating responses to tier 2 events, the relevant questions to ask starts with 'What has changed?' As more and more tier 2 events aggregate closely in time, the relevant question changes to 'How does this still reflect your process?' During this progression, the operator is free to make such adjustments they consider necessary to bring the process and the SPC in alignment.

4.4.2 Action requirements – National Performance Criteria

(1) The actions required, and the escalation of response, when an operator is breaching National Performance Criteria is outlined below.

(2) These actions are to be undertaken as soon as practicable after the end of the run. It is advisable that the companies have robust systems to quickly ascertain whether a breach has occurred or not, as any delay will see the response escalate quickly.

(3) The process review that is required where the National Performance Criteria 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 that may have occurred in relation to the event.

a) ***On the first occurrence***

i) The process must be reviewed. This must be documented, including actions taken, if any, and likely cause, if known.
ii) MPI VS must be informed immediately; and be involved in the review.
iii) Downstream processing must be notified of the event to take appropriate precautions.

b) ***On the second occurrence in 25 runs***

i) The process must be reviewed. This must be documented, including actions taken, if any, and likely cause, if known.
ii) MPI VS must be informed immediately. Offsite VS must be involved in the review. Downstream processing must be notified of the event to take appropriate precautions.

c) ***On the third occurrence in 25 runs***

i) MPI VS must be informed immediately.
ii) Downstream processing must be notified of the event to take appropriate precautions.
iii) MPI will intervene directly in the process. This may involve:

1) Products dispositions (e.g. market restrictions, downgrading);
2) Slowing the chain speed, or stopping the chain;
3) Any other action that is considered appropriate following the Verifications Services internal procedures, such as enhanced Regulatory Oversight;

d) All alternative validated slaughter and dressing operations must be considered by MPI and the operator. Any of these processes that are likely to contribute to loss of process control must be revalidated.
e) Once MPI consider the process is back in control the window is reset. This may involve gradual restoration to normal operating conditions.

(4) It is imperative that the Operator and MPI undertake these actions in a spirit of full cooperation and disclosure.

Appendix 1 – Validation of alternative processes

Background

(1) Validation determines whether control measures are capable of achieving the specified performance criteria. This is achieved by the collection and evaluation of scientific, technical and observational information. This will generally involve product testing, for a scope of indicators, or in some cases specific pathogens, for the measurement of the process.

(2) There is often confusion over the concepts of validation, monitoring and verification. Validation of control measures is different from monitoring and verification, which both take place after the validated control measures have been implemented. Monitoring and verification are the tools used to check whether the control measures are being adhered to and to demonstrate that they are operating as intended.

Prior to Validation

(1) The table below outlines the relationship between the guidance in this Code of Practice, changes required to the RMP and validation expectations.

	Guidance	Supplementary Guidance
RMP Change	Significant amendment to the RMP	Minor amendment with notification
Level of validation required	Document proposed changes and justification including a hazard analysis Document validation protocol, including rationale for validation data appropriate to the changes. At a minimum the following validation data will be required: *Microbiological*: - Indicator Organisms, e.g. APC - Pathogens of concern, where appropriate *Organoleptic* - Faecal contamination - Other types of contamination, as appropriate Establish if SPC changes are required	Document proposed changes and justification including a hazard analysis Rationale for validation data appropriate to the changes. Establish if SPC changes required
Step 1	Document proposal, including validation protocol and review with verifier	Notify MPI Animal Products team of intent to change
Step 2	Submit to evaluator and MPI Approvals, for registration of significant amendment subject to validation	Document proposal and review with verifier

Step 3	Collect data and analyse in accordance with validation protocol	Collect data and analyse
Step 4	Provide validation data to evaluator, submit report to MPI Approvals for registration and removal of conditions relating to validation	Notify MPI Approvals

Hazard Analysis

(1) Prior to validation the operator should:

a) Identify the hazards that are likely to be affected by the intended changes to the process, taking into account all relevant information.
b) Identify the food safety outcome required and determine performance criteria accordingly.

i) The operator should determine if there are existing limits or targets, established by the competent authority, relevant to the intended use of the product. In the absence of food safety outcomes or targets established by the competent authority, targets may be identified by the operator, as appropriate.

c) Identify the measures that are to be validated, taking into account whether the control measure has already been validated in a way that is applicable and appropriate to the proposed change.

(2) Some information on relevant hazards and the risk associated with them can be found in the MPI Hazard Register on the MPI website.

(3) Useful information can also be found in the RMP manual.

Developing a Protocol

(1) A protocol is needed to ensure that the results are robust and that the validation is done in a structured manner. The protocol should be explicit enough to clearly show what changes are being implemented but care should be taken that it also allows for the variation that will occur during normal processing.

(2) An important feature to be able to assess the validity of your design is an understanding of the variability that can be expected. For that reason it is strongly recommended that a baseline of at least 30 samples is established of the relevant metrics and included in the design considerations.

(3) Further help can be found in the statistical guidelines to trial in meat processing [currently under development].

(4) The protocol should be designed to deliver statistically significant indication (95% confidence ($p<0.05$) at a power of no less than 0.80) that the proposed changes will be in line with the desire outcomes, and contain:

a) desired outcome/end-state;
b) details of the evidence required and how it is to be collected;
c) a proposal for the disposition of animal material or product produced during implementation of the protocol; and
d) a timeframe for completion of the protocol, including follow-up testing after bedding in period.

(5) Other important considerations when developing the protocol include:

a) the use of calibrated equipment when any critical measurements are taken;
b) statistical sampling of each batch for a number of batches, including inputs as well as final product;
c) the use of challenge tests where appropriate;
d) variability within the operation may influence sampling numbers; and
e) practicality of sampling plan.

(6) A number of changes, whether at one time or over an extended time, may require a significant amendment to the RMP

(7) Where a change of process has been implemented in one RMP operation and the Operator wishes to utilise the same or similar documentation and validation protocol at other operations, the validation requirements may be reduced where agreed with MPI.