2. The slaughtering industry

Introduction

2.1 The slaughtering industry is central to the BSE story. Some of the legislative controls on BSE were designed to separate, at the slaughterhouse, potentially contaminated material that could infect humans and animals, either directly or indirectly, and to make special provision for the handling of this material. The introduction of these controls is discussed in vol. 5: Animal Health, 1989–96 and vol. 6: Human Health, 1989–96.

2.2 This chapter looks at key features of the industry before describing the various stages of the slaughtering process as they were in 1986. It describes how processes changed between then and 1996, with particular emphasis on changes resulting from the BSE-related legislation.

Some features of the industry

2.3 No meat can be sold for human consumption unless it comes from a licensed slaughterhouse. Therefore, farmers must have their animals killed in slaughterhouses in order to convert them into human food and associated by-products. For this reason, slaughterhouses have traditionally been a checkpoint for inspecting meat to ensure its fitness and quality, as well as the point at which a body such as the Meat and Livestock Commission (MLC) can conveniently levy its charges on animals. The statutory controls applying to slaughterhouses, and the responsibilities of the MLC and other bodies, are explained in vol. 14: Responsibilities for Human and Animal Health.

2.4 Slaughterhouses seek to maximise profits by maximising their throughput (the number of animals killed). This results in an emphasis on processing animals quickly, which can conflict with the interests of hygiene. The slaughterhouse depends crucially on those downstream of it, particularly the renderers, to handle the by-products and waste it produces. The Slaughterhouse (Hygiene) Regulations 1977 require that animal by-products be removed from the slaughterhouse within 48 hours of slaughter. While meat is the primary and most valuable product of the slaughterhouses, by-products are also important, as traditionally their sale has covered slaughtering costs. Indeed, they are often referred to as the ‘fifth quarter’ of the cow.

2.5 Over the last 20 years the number of slaughterhouses has fallen steeply in England, Scotland and Wales, as many smaller ones have gone out of business (see

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5 The slaughterhouse has a number of names, which are used interchangeably. The most common of these are the ‘abattoir’ and the more modern phrase preferred by the industry, the ‘meat plant’. For consistency, wherever possible, the term ‘slaughterhouse’ is used
6 M44 tab 4, p. 12
7 L1 tab 3C
8 Simon Harris and David H Pickard, Livestock Slaughtering in Britain: A Changing Industry, Ashford, Centre for European Agricultural Studies, 1979, p. 14 (M45 tab 3)
Figure 2.1). There has also been a gradual decrease in slaughterhouses in Northern Ireland.

Figure 2.1: Slaughterhouse numbers in England, Wales and Scotland, 1971/72–1995/96

This decline has been due to a number of factors, including a drive to take advantage of economies of scale, and the need to comply with higher environmental and health standards. At the same time, there has been a significant drop in the number of cattle slaughtered – from a high point of 5.4 million in 1975 to 2.3 million in 1996 (see Figure 2.2). By 1996/97, of the 391 slaughterhouses handling cattle in the UK, the 15 largest were accounting for 40 per cent of all kills. At the other end of the scale, the 212 smallest slaughterhouses – widely scattered throughout the UK, and often run as part of an individual butcher’s business, particularly in rural areas – handled 2.5 per cent of the market.

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2.7 The operations of a large slaughterhouse differ markedly from those of small premises, many of which open just a few times a week to deal with a few animals. Regulation and enforcement have had to take account of this wide difference in the size and nature of businesses in the industry.

2.8 Historically, ownership of slaughterhouses has been split between the private and public sector. The number of publicly owned slaughterhouses declined steadily over the 1960s, and more quickly after 1972, when local authorities were no longer required to provide slaughtering facilities. By 1974/75, of the 1,601 slaughterhouses in England, Scotland and Wales, only 9 per cent were publicly owned (and half of those were managed by private operators), although they were still responsible for 25 per cent of total throughput. Today, there are virtually no public slaughterhouses in Great Britain. In Northern Ireland there were 11 public slaughterhouses in 1969, but by 1994 there were only two.

**Domestic and export-approved slaughterhouses**

2.9 As explained in vol. 14: *Responsibilities for Human and Animal Health*, hygienic production of meat used to be governed in England and Wales by Regulations made under the Slaughterhouses Act 1974, the Food Act 1984 and the Food Safety Act 1990. Before the introduction of a single European standard on 1 January 1993, there was, effectively, a two-tier system of regulation. The Regulations required that every carcass slaughtered in a domestic slaughterhouse be subjected to inspection by a qualified inspector so as to establish the fitness for human consumption of all, or part, of the carcass. The Regulations for export slaughterhouses were largely the same as those for domestic plants with the addition of certain specific requirements relating to the infrastructure of the plant, the dressing procedures and the level of inspection.

2.10 The most important differences were in the level of inspection. For instance, in domestic slaughterhouses ante-mortem inspection of animals (ie, before slaughter) was not required until January 1991 and, before 1 January 1993, there was no requirement for veterinary supervision of meat inspection. Inspection procedures are described below. In 1988 about two-thirds of the cattle slaughtered in England and Wales were killed in slaughterhouses which had been approved as exporters to the European Community/Union.
Summary of the slaughtering processes in 1986

2.11 Figure 2.3 sets out the various stages in the slaughtering process.

Figure 2.3: The slaughter process

2.12 In a typical large slaughterhouse animals were unloaded from lorries into the ‘lairage’ or holding area. They were moved towards the slaughter hall in single file along passageways or ‘races’ and then fed one by one into a pen for stunning. Following stunning, the animal was shackled and hoisted onto an overhead rail – the slaughter line – which ran through the slaughter hall. The suspended animal was moved along the rail, until it was directly above a bleeding trough, where the large blood vessels in its neck were severed. Once bled, it was moved down the slaughter line to be dressed and cleaned. ‘Dressing’ meant converting the animal’s carcass into sides of meat suitable for sale to butchers and others. It included the removal of the head, hide and internal organs (evisceration).

2.13 The carcass was examined for disease and damage at designated points in the butchery process, namely at the head removal and evisceration stages, and again after the carcass had been dressed. In export-approved slaughterhouses, the animals were also inspected before slaughter (‘ante-mortem’).

2.14 The smallest slaughterhouses sometimes used the ‘cradle’ system of dressing a carcass, instead of the line system described above. Mr Duncan Fry of MAFF told the Inquiry:
The cradle system obviously is the old way, where you literally take one animal at a time, stun it, bleed it, strip the skin off, take the innards out, and have them inspected, and then have that quartered, and then move on to the next animal.\textsuperscript{19}

\textbf{Some features of the process}

2.15 No ‘textbook’ description such as the one set out below\textsuperscript{20} can convey the reality of killing a large beast and dissecting and disembowelling the carcass of a still warm animal. It is a bloody and messy business. For example, cutting a carcass in half with a band saw is not a precise, surgical procedure. Water and tissue are sprayed over the workers and the surrounding area. In July 1989, Mr Peter Lister of the Health and Safety Executive visited the largest slaughterhouse in the UK:

\ldots the tour convinced me that gross exposure to blood is virtually unavoidable in the slaughtering business \ldots This unit is well run and well kept but contamination of personnel is unavoidable despite the use of protective clothing. Skin exposure was very marked in some parts of the operation.\textsuperscript{21}

2.16 The difficulty of operating cleanly and with precision could be compounded in large slaughterhouses by the very high speed of the slaughtering and dressing processes. Mr Brian Etheridge, of the Association of District Councils, said in oral evidence that slaughterhouses:

\ldots were extremely busy places where, as I recall at the time, many operatives were on piecework, so they were being encouraged to be as quick as they possibly could, that any hold-up on the line was quite significant in slaughterhouse operational terms. I think from memory the point being made to us was this – the environment of the slaughterhouse did not lend itself to enable this task to be performed in the way in which the regulators might have imagined they should be.\textsuperscript{22}

2.17 An example of just how fast cattle were processed by a large slaughterhouse comes from a report on EC-approved slaughterhouses in the UK by the Directorate-General for Agriculture of the EC.\textsuperscript{23} One slaughterhouse inspected in 1991 had a slaughter rate of 60 cattle per hour on one slaughter line.

2.18 Problems arising from high line speed included the inability of workers to clean their hands and implements between carcasses, and the low priority given to ease of cleaning and disinfecting in the design of machinery intended to run at high speed.\textsuperscript{24} The Inquiry also heard of problems aggravated by a ‘very high turnover of staff and consequently a very low level of training’ within the slaughterhouse industry.\textsuperscript{25} Moreover, even in a well-run, properly supervised slaughterhouse with highly skilled and conscientious operatives, there will always be opportunities for human error.

\textsuperscript{19} T33 pp. 61–2, incorporating revisions proposed in S80A Fry
\textsuperscript{20} The description here relies heavily on the standard text on slaughterhouses: J F Gracey, \textit{Meat Plant Operations}, Lincoln, Chalcombe Publications, 1998 (M43A tab 14). The description also relies on a more general and brief description of the processes produced by the Health and Safety Executive in 1980 (YB80/5.00/2.2–2.3)
\textsuperscript{21} YB89/07.197.1
\textsuperscript{22} T65 p. 46
\textsuperscript{23} M22 tab 11
\textsuperscript{24} The Richmond Committee Report on ‘The Microbiological Safety of Food’ – Part I, 15 February 1990, para. 4.4 (M22 tab 3)
\textsuperscript{25} T65 p. 104, T62 p. 100
Details of the individual processes in 1986

(i) Lairage and ante-mortem inspection

2.19 Upon arrival at the slaughterhouse, animals were unloaded from lorries and ushered, via non-slip ramps, into the lairage to await slaughter.

2.20 In slaughterhouses in England, Wales or Northern Ireland with EC export approval, all animals were required to undergo ante-mortem inspection; in Scotland, ante-mortem inspection was carried out on all cattle. The inspection process is described below.

(ii) Stunning

2.21 The next stage involved subduing the beast prior to slaughter. Stunning renders an animal insensible before it is killed and takes place in a stunning pen. The Slaughterhouses Act 1974 stipulated that two methods of stunning could be used.\(^\text{26}\) The mechanical method was used for adult cattle, and the electrical method was sometimes used for calves. The two types of mechanical stunning used were captive bolt stunners, and non-penetrating concussion stunners. Captive bolt stunning used a bolt with a sharp, circular end, which was fired into the animal’s brain using a blank cartridge or compressed air. This method destroyed the animal’s brain, rendering it unconscious, and left a round hole in the animal’s skull. The non-penetrative concussion method used a mushroom-shaped head, again powered by a blank cartridge or compressed air. This latter method did not penetrate the brain or skull, but caused concussion and left the animal unconscious.\(^\text{27}\)

(iii) Pithing

2.22 Pithing is:

The insertion of a rod or coiled wire through the hole in the skull of cattle made by the captive bolt to destroy the brain and spinal cord . . . used to prevent reflex muscular action and possible injury to operatives . . . prior to bleeding and hoisting.\(^\text{28}\)

2.23 After the pithing rod had been inserted into the hole in the skull created by the bolt, it was forced through the brain towards the spinal cord.

2.24 Mr Nicholas Hibbett, former Senior Environmental Health Officer (EHO) of the Chartered Institute of Environmental Health (CIEH), said in oral evidence that, historically, pithing was used not to stop reflex kicking action, but rather to encourage a quicker bleeding process:

Pithing is more or less a slaughterhouse maul which has been going through centuries. The main reason was to ensure that the carcass bled properly. That was when the carcass was dressed laying on its back; it was part of the

\(^\text{26}\) L17 tab 2
\(^\text{28}\) J F Gracey, *Meat Plant Operations*, p. 98 (M43A tab 14)
process that you encouraged the animal to kick through prodding. I can remember seeing operatives prodding away like mad for five minutes and the animal kicking away like mad too. 29

2.25 Little evidence was received on exactly how widespread the practice of pithing was before 1986. Dr Joseph Gracey said in oral evidence that pithing was never used at his slaughterhouse, as he never found it to be necessary. 30 The Inquiry heard evidence both of its use in some slaughterhouses and of its exclusion in others. 31

(iv) Shackling and hoisting

2.26 Once the animal was unconscious, it was ejected from the stunning box. One of its hind legs was shackled and it was hoisted to the overhead rail, hanging with its head closest to the floor. 32 The suspended animal could then be moved around the plant to the various stages of the slaughtering process.

(v) Sticking

2.27 Sticking – the act of severing the animal’s blood vessels – took place after the stunning, shackling and hoisting. Death was caused by rapid loss of blood and consequent lack of oxygen to the brain. 33

2.28 A divergence from the standard practice described above occurred in slaughter practices under the Jewish, Muslim and Sikh religions. In all three, religious belief required that the animal be fully conscious at the time of sticking and bleeding. The Slaughterhouses Act 1974 expressly permitted the slaughter of animals without prior stunning in the case of the Jewish method (shechita) and Muslim method (halal). 34 The Sikh method, which involved the decapitation of the animal, was also legal provided a mechanical instrument such as a guillotine was used, as stunning was not legally required if the animal was slaughtered ‘instantaneously by means of a mechanically-operated instrument in proper repair’. 35

(vi) Bleeding

2.29 The object of bleeding was to remove as much blood from the carcass as possible before further handling. There were two methods of collecting blood. The more traditional method was to stick the animal when it was directly above a trough, into which the blood ran. The alternative method was vacuum collection of blood. A cut was made in the neck of the animal, and a hollow bleeding knife inserted in it. The knife was connected by a tube to a vacuum pump, which pumped the blood into collection tanks. A sterile blood collection unit allowed the sterilising of the hollow knives between each animal. 36

29 T56 p. 119
30 T56 p. 117
31 T62 p. 110, T62 p. 112
32 YB80/5.00/2.2
33 J F Gracey, Meat Plant Operations, p. 92 (M43A tab 14)
34 L17 tab 2, section 36(3)
35 L17 tab 2, section 36(1)
36 J F Gracey, Meat Plant Operations, p. 92 (M43A tab 14)
Bleeding was the first step in the slaughtering process at which a usable product was obtained. Each animal would produce about 13.6 kg of blood. It was used in processed food (e.g., black pudding, adhesives for sausages), adhesives for animal feed, pet food, fertiliser, glue, foam fire extinguishers, leather preparation, and pharmaceuticals.37

(vii) Removal of horns, feet, udder and pizzle

The horns were usually removed after bleeding. The forefeet of the animal were cut off with a knife either immediately before or after bleeding. The hindfeet were normally removed after removal of the udder or pizzle. The feet were sent to pet food manufacturers, or to renderers. The udder and pizzle of cattle were removed with a knife and usually disposed of to renderers.38

(viii) Removal of head, tonsils and tongue

The head was removed, either before or after skinning of the carcass. In the smaller slaughterhouses, using the traditional ‘cradle’ system of dressing:

... the head stayed on the carcass until very late on, but it was not skinned, of course. The skin would be taken off below the head and the carcass was then split, but my recollection is that the head was actually still on the carcass at the end of the line.39

By contrast, in the ‘line’ system of dressing, the head was normally removed immediately after the hide. It would then have been sent for boning (meat removal).

This was the first post-mortem inspection point for any animal slaughtered in an export-approved slaughterhouse in England and Wales.40 The tonsils were removed as part of the inspection process and sent to the renderers (although during a visit to an export slaughterhouse by Central Veterinary Laboratory (CVL) representatives in 1989, it was noted that the tonsils were being left in the head).41 The Inquiry heard evidence that most cattle were slaughtered in export slaughterhouses and therefore had their tonsils removed.42 Presumably, in the case of cattle slaughtered in domestic plants, the tonsils would have remained in the head on the way to head boners and renderers.43

The tongue was removed in the slaughterhouse, except when the head was to be sold to a butcher who also wanted the tongue. When the tongue was removed in the slaughterhouse, this was done either before or after the head was removed from the carcass. The Inquiry received no evidence about which of these practices was more common.

Heads were sent to butchers, specialist head boners or renderers. Butchers and specialist head boners removed the head meat, which was of a quality considered fit for pet food, although it could also be used in processed foods for people. Some

38 J F Gracey, Meat Plant Operations, p. 115 (M43A tab 14)
39 T33 p. 62 – Mr Duncan Fry of MAFF
40 L17 tab 3, Regulation 8, schedule 8
41 YB89/3.06/4.2
42 S44 Proud para. 7
43 T21 p. 71
slaughterhouses had their own head-boning sections, away from the slaughter line. These are considered separately in Chapter 3, on head boners.

(ix) Pulling of tail and dropping of bung

2.37 The tail was pulled away from the carcass and a circular cut was made around the anus (anus and vulva in female animals). The freed rectum (or bung) was tied with the neck of the bladder and dropped into the pelvic cavity. This prevented faecal matter from escaping and contaminating the carcass.

(x) Clearing of shanks and neck, and removal of hide

2.38 The hide was removed using an electric or pneumatic hide puller, powered flaying knife or curved hand knife. Hide pullers could be upward or downward pulling. When a downward-pulling hide puller was used, cuts were made inside the shanks of the rear legs, allowing the hide to tear so that it could be peeled off downwards, leaving the clean carcass behind. When an upward-pulling hide puller was used, incisions were made around the neck and inside the shanks of the forelegs so that the hide could be peeled off in an upward direction. The downward-pulling hide puller caused less contamination of the carcass, so was the preferred option.44

2.39 The hide was sent to the tanners to be processed further. Some hides were sent to gelatine manufacturers (see Chapter 8).

(xi) Evisceration

2.40 Evisceration is the process of removing the internal organs in the abdominal and thoracic cavities. The internal organs are also known as offal. Offal falls into two categories:

- red offal: this term encompasses all the internal organs which are not ‘green offal’, including those which are often used for human consumption, such as the heart, liver and kidneys. In the period around 1986, most of the kidneys, about 50 per cent of heart, 10 per cent of the thymus gland and 85 per cent of the liver went for human food;45 and
- green offal: offal, such as the stomach, or the intestines, which still contain faecal matter. Known as green offal for cattle and sheep, and black offal for pigs.46

2.41 While the term ‘green offal’ always refers to the digestive tract, ‘red offal’ is defined more fluidly. For instance, the spleen,47 larynx, oesophagus and trachea,48 blood and bone,49 have all been referred to as red offal, as have tongues.50

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44 J F Gracey, Meat Plant Operations, pp. 115–6 (M43A tab 14)
45 Leatherhead Food RA and the Meat and Livestock Commission, ‘Audit of Bovine and Ovine Slaughter and By-Products Sector (Ruminant Products Audit)’ (the Leatherhead Report), May 1997, figure B1 (b) (IB05 tab 17)
46 M12A tab 1
47 T58 p. 31
48 YB89/6.15/7.2
49 T11 p. 13
50 T58 p. 86
2.42 The initial incision in the evisceration process was made high up in the mid-line where the internal organs are not in contact with the abdominal wall. This allowed the ‘abdominal mass’ to be removed first. The abdominal mass is a group of organs that can be removed from the abdomen in a ‘bundle’, and includes the stomachs and large and small intestines (including faecal contents), together with their surrounding fatty membranes, the pancreas and the urinary bladder. The offal was removed from the highest point downwards. The large rumen was the first organ to emerge, followed by the intestines. These were pulled down, severed from under the spine, and came away along with the bung, bladder, vagina and uterus (where applicable). The spleen is attached to the rumen, and was also removed at this point.

2.43 The liver was removed separately by making a circular incision around the periphery of the diaphragm. The oesophagus was separated from the trachea and lungs in order to tie it, which allowed the lungs to be removed through the diaphragm without rupturing the oesophagus. The heart and larynx were also removed at this point. The kidneys were exposed, but not removed until later.

2.44 The above is a ‘walk through’ description of the evisceration process. In practice, evisceration was performed very quickly, and most of the organs tumbled from the suspended animal onto the inspection table in something of a shapeless mass.

2.45 This was the second post-mortem inspection point. The kidneys were removed after the inspection of the offal.

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51 M4 tab 1, para. 2.12
2.46 The treatment of the organs after evisceration appears to have varied from slaughterhouse to slaughterhouse depending on the use to be made of them. The red offal which a particular slaughterhouse had contracts to sell as human food would be separated and sent to an ‘offal room’ for sorting, then on to the chiller. The ‘abdominal mass’ and other offal not kept for individual sale by the slaughterhouse were sent to a separate area known as the gut room for sorting and disposal (see below for a description of the gut room operation). In a large slaughterhouse, the offal would be sent down chutes to this room; in small slaughterhouses it was moved in containers.

2.47 For some offal, such as the thymus, the market for use as human food was very small, so not all slaughterhouses would have had contracts to sell them for this purpose. In that event they were sent to the gut room as opposed to an offal room. Mr Peter Carrigan of Specialpack Ltd, which operated a number of gut rooms, said in oral evidence that the spleen was usually sent to the gut room along with the abdominal mass.52 However, other evidence received by the Inquiry indicated that it was removed separately and presented as red offal.53

(xii) Carcass-splitting and removal of spinal cord

2.48 Following evisceration, the hind legs of the carcass were anchored as far apart as possible. The carcass was then split vertically in half, using a band saw, reciprocating saw or circular saw (although meat cleavers were sometimes used in smaller slaughterhouses), so that the carcass could be further inspected and reduced to a manageable size. A power saw took about 15–25 seconds to complete the splitting. The cut was made through the mid-line of the spinal column although some veering from the mid-line would inevitably take place. Generally, the spinal cord was then removed, to improve the appearance of the meat, by drawing a thumb, knife or blunt hook down the length of the spinal canal. Most spinal cord was thrown into a receptacle to be sent for rendering, or washed to drains. A small amount would have remained stuck to the spinal column and been passed on to mechanically recovered meat manufacture or for rendering.54

2.49 Mr Raymond Bradley, the CVL’s BSE research coordinator, described the process of carcass-splitting in oral evidence:

...in all bovine adults carcasses are split, and there are a number of ways of doing it. Mostly they use, and today I think the majority, if not all of them, are reciprocating or band saws of some description. In...some...there were circular saws just like you would use for sawing through a large log of wood. And these were water-cooled. In order to stop the spray, the carcasses, at the point of splitting, were enclosed in what we might loosely call like a shower cabinet but it was made of polythene and it was thick polythene or that kind of material and it was incomplete in stopping the spray, and it was absolutely obvious to me, because I was getting sprayed that there was water, at any rate, coming out from this, and any carcass or person in the vicinity could potentially be exposed to this.55

52 T58 p. 31
53 YB89/6.15/7.1–7.3
54 The Leatherhead Report, ‘Audit of Bovine and Ovine Slaughter and By-Products Sector (Ruminant Products Audit)’, p. 4 (IBD6 tab 17)
55 T42 pp. 87–8, incorporating revisions proposed in S71C Bradley
2.50 Mr John Baker of the MLC said in oral evidence:

The reason we [removed the spinal cord] in those days was when you were transporting bone-in beef it made the beef arrive cleaner at the other end and it always presented the meat better; it is a presentation in as much as what we did it for in the early days. We obviously did not take it out as clean as we [do] today now.56

2.51 Conflicting evidence was received by the Inquiry as to whether or not the spinal cord could easily be removed intact. Mr Christopher Clark, from the Meat Hygiene Service (MHS), described the process in oral evidence:

[First] of all legislation requires carcasses to be split. Following splitting and final trimming of the carcass, ie neck trim, spinal cord, thymus and surplus fat, then the spinal processes would be washed to remove bone dust. It is best practice to wash in a downward direction with emphasis on water volume as opposed to pressure. There is a requirement to control this waste water. It is usual for the station where the splitting takes place to be screened to contribute to the control of that waste water, and also for health and safety reasons.

The spinal cord, in my opinion, remains intact after sawing. Many saws have a continuous flow; they are high speed saws. The water from that saw is then directed by means of a pipe into a receptacle or directly into a trapped drain with fine mesh. I think most plants would exercise these controls. As I have said I do not think there is maceration of the spinal cord.57

2.52 Other evidence received indicated that removing the entire spinal cord was not so easy. For example:

When you split a carcass, if you get it right down the mid-line, it is easy to remove the spinal cord but if you go slightly off centre, a piece of the spinal cord is trapped in the canal and is difficult to remove, and it is then quite a business to have to take the carcass back and either split open the canal with an axe or take it back to the saw, and this slows down the line and slows down production and so on. So if you are enforcing your order rigorously you have to make sure that that is done, whereas I think the feedback that was coming through at that time was that, you know, if that happens then nobody would have been particularly bothered about it. That side of beef would have gone through with that little piece of spinal cord still left in the vertebral column.58

There were certainly cases where it was difficult [to remove the spinal cord intact]. It relied on the quality of the saw, the expertise of the operator of the saw and very often it would come off in two or three pieces or . . . the meat inspector had to take additional bits of spinal cord out prior to stamping.59

During the carcass-splitting a mechanical splitting saw travels down the spinal axis of the suspended carcass. Whilst the spinal cord may be ‘pushed
aside’ by the blade of the saw, thus remaining generally complete, this is not usually the case. The spinal cord is usually severed, on occasions along its length, spreading cord tissue along the whole cut surface of the split carcass. The result is that both the carcass, the saw blade and the environment are contaminated, again potentially with the infective agent of BSE. As with the removal of the brain . . . washing of the cut surfaces merely acts to spread the contamination.60

. . . in smaller abattoirs, where either because the equipment was less well maintained or was less modern and because perhaps operatives in some cases were less skilled . . . it was possible for the saw to deviate off the midline, so that it would not expose the actual foramen through the spinal column, the hole where the spinal cord runs. So if the saw deviated there would be a section where the spinal cord would be not visible at that point. So, of course, removal at that point was not done.61

2.53 From this evidence, it appears that there were practical problems with both approaches to carcass-splitting: an accurate mid-line cut allowed clean removal of the spinal cord but could spread cord tissue along the saw and carcass; an off-centre cut would mean less contamination but left pieces of cord trapped in the canal.

2.54 Even when the entire spinal cord was removed intact, other nervous tissue was still left in the carcass. This included dorsal root ganglia, which were ‘swellings on the dorsal roots of spinal nerves [containing] the cell bodies of sensory neurons’.62

2.55 The carcasses of young calves were not split.63 Under the Fresh Meat Export (Hygiene and Inspection) Regulations 1981, export slaughterhouses were only required to split carcasses of bovines over 3 months old.64 Later, this requirement was changed so that only carcasses of bovines over 6 months old had to be split.65

2.56 This was the third post-mortem inspection point, where the dressed carcass was checked for such things as cleanliness and odour (see below for more information).

(xiii) Removal of thymus

2.57 The thymus is situated in the upper portion of the thoracic cavity. Its function is the development of certain immune responses and antibodies in early life and the processing of lymphocytes. The thymus decreases in size as the animal grows, so that in adult cattle only traces of the thymus remain near the neck and the heart. The part of the thymus near the heart was cut out during the evisceration process, while the neck thymus was removed later, after the carcass was split, but before the inspection referred to in the previous paragraph.

60 YB90/6.00/7.4–7.5 – Institution of Environmental Health Officers
61 T62 p. 11 – Dr William Swann, MHS
63 T80 p. 121 – Mr Ron Martin, Chief Veterinary Officer for Northern Ireland; T33 p. 117 – Mr Duncan Fry of MAFF
64 L17 tab 3 – The Fresh Meat Export (Hygiene and Inspection) Regulations 1981, schedule 7
65 L17 tab 6 – The Fresh Meat Export (Hygiene and Inspection) (Amendment) Regulations 1990, schedule 7, item (h)
(xiv) Washing the carcass

2.58 Water was used throughout the butchery process, to remove faeces, blood, bone dust and associated detritus.

(xv) Inspection

2.59 In both domestic and export slaughterhouses every carcass slaughtered had to be subjected to inspection by a qualified inspector to establish the fitness for human consumption of all, or part, of the carcass. The criteria for determining fitness were essentially the same in domestic and export-approved plants and depended on establishing the absence of bruising, bleeding or symptoms of proscribed diseases or conditions in the animals being inspected. Meat deemed fit would then be stamped indicating its fitness, the date and place of inspection, and the person responsible for it. There were a series of inspection points during the slaughtering process.

2.60 Before 1 January 1993, the level of inspection for domestic slaughterhouses was different from that for slaughterhouses approved to export meat to other countries – as outlined in paragraphs 2.9 and 2.10 above. This is explained in more detail in vol. 14: Responsibilities for Human and Animal Health, which also sets out who was responsible for carrying out inspections.

2.61 There were differences in standards of practice between the domestic and export-approved slaughterhouses. Mr Charles Capstick of MAFF said in oral evidence:

I began to appreciate when one was seeing the reports, and of course in discussion with my colleagues, that the standards in the domestically-approved slaughterhouses were generally less than in the export-approved.

It was totally irrational. How could we in the Food Safety Directorate defend the situation where in effect the inspection systems . . . were better for meat which was destined for foreigners than that destined for UK citizens? How could you defend that? It is impossible.

There were different types of problem. There were problems of what I would call the quality of the inspections by the meat inspectors, the frequency of their attendance. And there were what we call structural differences, the structure of a slaughterhouse, whether it was free of pests and vermin and so forth.66

2.62 Mr Iain Crawford, Director of MAFF’s Veterinary Field Service, said in oral evidence:

It was well recognised that the standards were poor. We had two categories of slaughterhouse in the early 1990s: export-approved and domestic. The export-approved had to come up to [EC] Directive requirements, had better supervision, and was of a higher standard than the domestic slaughterhouse.

66 T41 pp. 47–8
But many of the domestic slaughterhouses had major problems. These were well known.67

2.63 The number of Authorised Meat Inspectors (AMIs) present also varied with the size of the slaughterhouse in question. Mr Christopher Clark, an AMI, said in oral evidence:

. . . at the smaller abattoirs there was no meat inspector based there during the time of killing, whereas there is now. You possibly would not have seen actually what went on. What would happen in those small abattoirs, the meat inspector would be placed in a large plant and he would go to the smaller abattoirs at the end of his working day and just inspect.68

Ante-mortem inspection

2.64 Before January 1991, there was no requirement for ante-mortem inspection in slaughterhouses in England, Wales or Northern Ireland that were slaughtering animals only for the domestic market. In Scotland ante-mortem inspection was required both for cattle whose meat was exported and for those whose meat was sold domestically.69 In non-EC-approved Scottish slaughterhouses, this inspection was normally carried out by a lay meat inspector with a statutory meat inspection qualification.70

2.65 During ante-mortem inspection, the inspector looked for symptoms of any disease which could be transmitted to humans or animals, or which would otherwise render the meat unfit. No animal appearing to suffer from such a disease could be slaughtered for human consumption. Any animal that was injured, fatigued or stressed had to be rested for at least 24 hours and inspected again before it could be slaughtered.71

Post-mortem inspection

2.66 The main purpose of post-mortem inspection was to detect and eliminate abnormalities, including contamination, thus ensuring that only meat fit for human consumption was passed for food. The basis on which fitness for human consumption was determined is described in detail in vol. 14: Responsibilities for Human and Animal Health. Routine post-mortem inspection determined the character and extent of disease lesions, differentiating between localised and generalised conditions (the former being less important) and between acute, subacute and chronic conditions.72

2.67 All parts of the carcass in which any lesion was found, or any other condition or adulteration suspected, were retained for further inspection and labelled accordingly until the final (third) inspection was completed. Identification of all severed parts of the carcass was maintained in case it was condemned.73 If the
carcass was deemed fit, it was marked with a stamp applied by the meat inspector. It was then moved on for weighing and tagging.

First post-mortem inspection

2.68 Inspection of the head in both domestic and export-approved slaughterhouses consisted of an examination of the tongue, eyes, lymph glands and the inside of the mouth. In export-approved slaughterhouses, the throat was also examined and the tonsils had to be inspected and removed.

Second post-mortem inspection

2.69 After evisceration, the internal organs were examined at an inspection table. In export-approved slaughterhouses, additional organs such as the trachea, oesophagus, diaphragm and further parts of the alimentary tract were inspected, and the examinations were generally more detailed. In both types of slaughterhouse, the inspection involved a combination of visual examination, palpation (examination by touch) and incision of the various organs.

2.70 However, the inspection system did not always operate flawlessly. Dr William Swann, a veterinarian with the Meat Hygiene Service, told the Inquiry:

The spleen is something that should be inspected; it was not an uncommon finding to find that the spleens and intestines were disappearing off down to the gut room . . . It is very difficult, in some cases, to actually find out where it was going and what was happening to it.

Third post-mortem inspection

2.71 In both domestic and export-approved slaughterhouses, the dressed carcass was examined for such things as the state of nutrition of the animal, efficiency of bleeding, colour, cleanliness, odours, evidence of bruising or haemorrhage, and any other abnormalities.

2.72 When asked what might cause a carcass to be condemned as unfit, Mr David Taylor, a MAFF veterinarian, said in oral evidence:

It can be a variety of things. It might be simple bruising of the carcass. It might be a disease condition of the liver, such as liver fluke. It might be any parasitic infection of the carcass or indeed the offal itself. As I said, the requirement was that they were removed, put into a bin, and if they were going to be stained, they were stained black . . .

There would be occasions when the whole carcass and its offal would be condemned, the whole thing would be condemned. In many cases, in some cases, the meat that was left was judged as fit for human consumption by the Authorised Meat Inspector, whose responsibility it was to enforce it.
(xvi) Gut room operation

2.73 Slaughterhouses were obliged to maintain a separate facility, away from the slaughter hall and hanging space (considered to be ‘clean’ areas), for the opening of stomachs and intestines (operations likely to cause contamination of clean meat). This facility was known as the ‘gut room’. As noted above, any offal not to be sold separately by the slaughterhouse operator was sent via a chute or other means to the gut room, where it was sorted and the abdominal mass separated into its constituent parts. How the gut room was operated varied between slaughterhouses. Sometimes the operation was carried out by a specialist gut room contractor, which would buy the abdominal mass from the slaughterer, and employ its own staff to sort it. Mr Peter Carrigan of Specialpack Ltd said in oral evidence that, in the case of his company:

We equip the gut room, we provide the staff, laundry services, etc, and from the slaughterer opening the animal to allow the viscera to fall out, that is the last they see of it.

2.74 Organs which had valuable uses were separated: for example, the pancreas, which was used to make insulin; the intestines, which were occasionally used for sausage casings and sutures; and the stomach, which was cleaned and used for tripe, pet food or cheese manufacture. Higher quality fat was removed and sent separately to renderers. The rest of the organs were also sent, as waste, to renderers.

2.75 The contents of the stomachs and intestines were also removed in the gut room before the offal was transferred to renderers. As one renderer pointed out, however, this was not a precise process:

Whether offal contents are present or removed, even if they are removed, the large stomach contents would be removed but perhaps the intestinal contents in many cases would not be, never have been. Even if they were removed, they are not removed with absolute hygiene and cleanliness.

2.76 A report to the Chief Veterinary Officer at MAFF by Mr Raymond Bradley of the CVL on a visit to a casings factory describes the procedure for making casings from intestines as follows:

RUNNER STRIPPER

The Cow Mate (the intestinal tract from duodenum to rectum inclusive) enters the gut room from the slaughter hall with the tripe organs . . . . The mate is draped over the edge of the gut tray with the middle to the right and midrum to the left. Commencing at the liver (duodenum) end the runner is stripped from the midrum using a sharp knife . . . . The midrum with its prominent content of mesenteric lymph node . . . is sent for rendering.

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78 Slaughterhouses (Hygiene) Regulations 1977, Regulation 5 (d) (L1 tab 3C)
80 T58 p. 4
81 The Leatherhead Report, ‘Audit of Bovine and Ovine Slaughter and By-Products Sector (Ruminant Products Audit)’, p. 8 (IBD5 tab 17) suggests that less than 5 per cent of intestines was used for this purpose
82 M4 tab 1, para. 2.13
83 T20 p. 149 – Mr Paul Foxcroft, Prosper De Mulder
DEMANURING
[This] machine . . . squeezes out manure and crushes the runner.

DEFATTER
[This] machine . . . crushes and removes fat to a hot water bath.

MUCOSA STRIPPER
[This] machine . . . crushes the mucosa.

TURNING TANK
The runner is turned inside out so the mucosal surface is outside.

DESLIMER
[This] machine strips off the mucosa . . . The casing is passed through this machine twice in the standard process . . . and sometimes thrice.

HANKING
Five half runners are tied at their midpoint to form a hank.

SALTING
Hanks are thoroughly salted in a tray . . . then placed in salt in barrels where they remain for at least three weeks before filling.84

(xvii) Weighing and tagging the carcass

2.77 Once the carcass was dressed and passed as fit for human consumption, it was weighed and then graded for EU subsidy purposes by a fatstock inspector from the MLC, according to the amount of fat and quality of the meat. The grading was recorded on an identification tag attached to each quarter. The carcass was then sent to the chiller for chilling or freezing.

(xviii) Waste disposal

2.78 Slaughterhouses were required to dispose of animal by-products within 48 hours of slaughter.85 All meat and offal unfit for human consumption had to be disposed of in accordance with the Meat (Sterilisation and Staining) Regulations 1982.86

2.79 The principal destination for this material was rendering plants. Their operation is described in Chapter 6 below, and the regulatory framework is examined in more detail in vol. 14: Responsibilities for Animal and Human Health.

84 YB90/1.31/3.4–3.7
85 Slaughterhouses (Hygiene) Regulations 1977 (L1 tab 3C)
86 L17 tab 15
2.80 Some slaughterhouses disposed of blood by spraying it on fields as a fertiliser:

The use of unprocessed blood in this way must be subject to the agreement of the local authority responsible for the abattoir and the licensing of the recipient farm under the Control of Pollution Act. Legislative controls on this activity also exist in relation to animal health. These are contained in the Waste Food Order 1973. This prohibits livestock from access to unprocessed waste food, which includes blood. To comply with this requirement farmers must not allow livestock or poultry access to fields on which blood has been spread until sufficient time has elapsed so that none remains on the herbage or ground surface. 87

2.81 Slaughterhouses and other meat processing plants used large amounts of water during their operations. This waste water was generally filtered to remove any solid material. For instance, fat traps fitted on drains permitted the fat to be removed periodically and sent for rendering. The water could then be treated in an effluent plant and disposed of into the sewerage system. However, this disposal would have to comply with any relevant consents granted to the local water authority. The pollution control and waste disposal system is described in vol. 14: Responsibilities for Human and Animal Health.

(xix) Unfit meat disposal

2.82 Any unfit meat or offal ‘was taken from the carcass, put into a bin, and either sterilised on site, or stained, and removed for sterilisation, with the exception of green offal, which need not be stained’. 88 Mr Peter Carrigan referred in oral evidence to a ‘detained area’ to which unfit material was sent. 89

2.83 The evidence is not clear as to precisely what volume of unfit material was produced in slaughterhouses. Mr Iain Crawford of MAFF said in oral evidence that there was ‘a lot of unfit meat’. 90 However, this did not necessarily constitute a large proportion of the total material produced in slaughterhouses. For instance, Mr Paul Foxcroft of Prosper De Mulder Ltd (PDM) estimated that between 10 and 15 per cent of material which was rendered was:

. . . derived from animals which have not made it through their growth period, died on farm from things like milk fever, grass staggers, or whatever, or being condemned on arrival at the abattoir on ante-mortem inspection, or being condemned after slaughtering as unfit for human consumption. 91

2.84 Unfit meat and offal had to be handled and disposed of in accordance with the Meat (Sterilisation and Staining) Regulations 1982. 92 A full account of the requirements of these Regulations is in vol. 14: Responsibilities for Human and Animal Health. But, in brief, they required that unfit material be sterilised or stained, except in certain defined circumstances.

87 YB90/11.21/6.9
88 T34 p. 126
89 T58 p. 30
90 T125 p. 36
91 T20 p. 78
92 L1 tab 5. These Regulations were effective in England and Wales. The equivalent regulations in Scotland were the Meat and Poultry Meat (Staining and Sterilisation) (Scotland) Regulations 1983 (L10 tab 4) and, in Northern Ireland, the Meat (Sterilisation and Staining) Regulations (Northern Ireland) 1984
2.85 In practice, most unfit material was sent to renderers. Slaughterhouses rarely chose to sterilise unfit material. They preferred to stain it. The staining was done either by the slaughterhouse workers, or by the local authority meat inspector. Even so, because most unfit material did not have to be stained if it was going directly to renderers, the majority of unfit material received by renderers was unstained.

The effect of BSE-related Regulations on slaughterhouse practice

2.86 In order to comply with the successive Regulations dealing with Specified Bovine Offal (SBO), which were introduced as a result of the BSE epidemic, the slaughterhouse had to remove the SBO from the carcass, separate it from material fit for human consumption and dispose of it according to the Regulations. We shall consider each Regulation and explain its impact on slaughterhouses.

2.87 Some of the following paragraphs set out evidence that the Inquiry received from individuals about changes in slaughterhouse practice introduced in an attempt to comply with the Regulations. It is not possible to establish with certainty how many slaughterhouses adopted a particular change of practice, and when. This reflects the fact that slaughterhouse operators and local authorities were generally left to determine for themselves how to meet the requirements of the Regulations.

Lairage and ante-mortem inspection

2.88 BSE was made a notifiable disease from 21 June 1988 pursuant to the BSE Order 1988. If the slaughterhouse operator, or any of its staff, suspected that a cow there was infected with BSE, they had to detain the cow and notify the Divisional Veterinary Officer. Inspection in the lairage therefore also became a check to prevent animals showing symptoms of BSE from entering the human food chain.

2.89 On 8 August 1988, animals suffering from BSE became subject to compulsory slaughter and destruction under section 32 of the Animal Health Act 1981. If cattle were diagnosed at the slaughterhouse as suffering from BSE, they had to be slaughtered at a different time or in a different place from other animals.

Bovine Spongiform Encephalopathy Order 1988, including the ruminant feed ban (RFB)

2.90 The RFB prohibited the sale or supply for feeding to ruminant animals of any feedstuff containing any ruminant-derived animal protein in England, Scotland and Wales. The ban was originally to have effect only until 1 January 1989, but was
later extended, first for another year and then indefinitely.\textsuperscript{100} An RFB did not come into force in Northern Ireland until January 1989.\textsuperscript{101}

2.91 It was still open to animal food manufacturers to incorporate other animal protein, such as that from pigs and poultry, into ruminant feed. It would have been lawful to have manufactured non-ruminant derived MBM and feed this to ruminants. In order for renderers to do this, slaughterhouses would have had to separate ruminant material from all other material, such as porcine, before sending it to renderers. However, non-ruminant MBM was never manufactured. The Order therefore did not have any effect on the slaughterhouse process.

**Bovine Offal (Prohibition) Regulations 1989 (the 1989 SBO Regulations)**

2.92 The 1989 SBO Regulations were made under the Food Act 1984 and came into force on 13 November 1989.\textsuperscript{102} For detailed discussion of the introduction of this legislation, see vol. 6: *Human Health, 1989–96*.

2.93 The purpose of the legislation was to prohibit the sale and use of SBO in the preparation of food for human consumption. SBO was defined as the brain, spinal cord, spleen, thymus, tonsils and intestines of an animal over 6 months of age.\textsuperscript{103}

2.94 Mr Iain Crawford of MAFF said in oral evidence that:

\[
\ldots\text{ with cattle slaughtered, the weight of SBO is not standard. The weight varies from animal to animal, depending on the size of the animal, what it has been fed on, etc, whether the intestines are emptied or full.}\textsuperscript{104}
\]

2.95 According to estimates compiled by the authors of the *Leatherhead Report*, the average weight of a live cow is 536.57 kg.\textsuperscript{105} They used this figure as a starting-point to arrive at an estimate of the average total weight of SBO as 17 kg, or 3.2 per cent of the live cow. They also reported that the whole bovine head (excluding the tongue), which became ‘specified bovine material’ under the Specified Bovine Material Order 1996,\textsuperscript{106} weighed 12 kg on average.

2.96 In 1990, the first full year after the introduction of the 1989 SBO Regulations, approximately 3.48 million cattle (excluding calves) were slaughtered in UK abattoirs. On this basis, it is estimated that slaughterhouses produced and sent to renderers about 59,000 tonnes of SBO in 1990. In 1995, the last full year of the period to be covered by this Inquiry, the number of cattle slaughtered was approximately 3.27 million.\textsuperscript{107} Using the same basis for estimation, in that year, UK slaughterhouses would have produced 55,500 tonnes of SBO. (This figure does not include heads.)

\textsuperscript{100} L2 tab 4
\textsuperscript{101} L8A tab 3. See vol. 9: *Wales, Scotland and Northern Ireland*
\textsuperscript{102} L2 tab 3B. The equivalent Regulations in Scotland were the Bovine Offal (Prohibition) (Scotland) Regulations 1990 (L10 tab 9) and, in Northern Ireland, the Bovine Offal (Prohibition) Regulations (Northern Ireland) 1990 (L8A tab 6)
\textsuperscript{103} L2 tab 3B, regulations 2(1) and 3(1)
\textsuperscript{104} T125 p. 72
\textsuperscript{105} The *Leatherhead Report*, ‘Audit of Bovine and Ovine Slaughter and By-Products Sector (Ruminant Products Audit)’, p. 30 (IBD5 tab 17)
\textsuperscript{106} L2 tab 18
\textsuperscript{107} The *Leatherhead Report*, ‘Audit of Bovine and Ovine Slaughter and By-Products Sector’ (Ruminant Products Audit), p. 3 (IBD5 tab 17)
Removal of SBO from the carcass

2.97 The Regulations were silent on how to remove SBO from carcasses.

Separation and storage of SBO

2.98 Storage was governed by a specific regulation which applied to SBO once it had been severed from excluded matter (i.e., parts of the carcass which did not consist of or contain SBO) which was fit for human consumption. Meat fit for human consumption could not be stored in the same room as such SBO, unless the latter had been stained or sterilised and was stored in such a way that it was at all times separated from the meat fit for human consumption. It also required that SBO should not be stored unless the container, wrapper or other packaging used to hold it bore a notice setting out certain statements. 108 The Regulations did not require the separation of SBO material from other material which, while unfit for human consumption, might be fit for animals.

Staining, sterilising and disposal of SBO

2.99 In broad terms the effect of the 1989 SBO Regulations was as follows:

- slaughterhouses were required either to sterilise or to stain SBO immediately;
- SBO could not be taken from the slaughterhouse unless it was:
  - i. sterilised. This was done rarely by slaughterhouses; 109
  - ii. stained and sent to a processor (e.g., renderer) under a local authority movement order; or

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108 L2 tab 3B, regulation 14
109 T64 pp. 101–2
iii. sent to ‘excepted premises’ under a local authority movement order, in which case it did not have to be stained or sterilised. Among the ‘excepted premises’ were hospitals, medical and veterinary schools, ‘manufacturing chemists’ and ‘premises used for the manufacture of products other than food and not used for the manufacture of food’.

2.100 For further details about the introduction, requirements, monitoring and enforcement of this legislation, see vol. 5: Animal Health, 1989–96 and vol. 6: Human Health, 1989–96.

Transportation of SBO

2.101 The Regulations provided that SBO material had to be removed in a vehicle, or in an impervious container, which was kept locked and sealed at all times and which bore a notice to the effect that the SBO carried therein was not for human consumption. Actual practice varied between slaughterhouses. Mr Andrew Fleetwood of MAFF said in oral evidence:

> The smaller abattoirs would put the SBO in larger 80 gallon drums and the lorry that arrived would look like a rigid container lorry containing a large quantity of rigid drums. Some of the larger slaughterhouses operate skips, the sort of skips you can have delivered to your house to put your garden rubbish in, sheetable, obviously, to ensure no leakage. And the very largest slaughterhouses would have dedicated vehicles.

Stunning

2.102 The 1989 SBO Regulations made no specific provision as to methods of stunning. It came to be appreciated that, when a captive bolt was used in stunning (and this was the most common method), brain matter and cerebrospinal fluid might leak out of the resulting hole. This might lead to contamination of other parts of the carcass, such as the cheek meat.

2.103 Mr Colin Maclean, Director-General of the MLC, said in oral evidence that, starting in late 1995, the MLC had developed:

> . . . bungs to block the captive bolt hole in the head of the animal to prevent brain tissue and cerebral spinal fluid leaking when the animal is hanging up, this can leak also into the blood being drained from the animal at that time. Therefore if there was a way of preventing that, that could add value to the industry. We developed a degradable bung which could be put into that hole.

It is not known how many slaughterhouses were using these bungs. There was no requirement to use them.

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110 L2 tab 3B, regulation 11
111 T55 p. 64
112 T62 pp. 101–3
113 T59 pp. 33–4, incorporating revisions proposed in S147B Maclean C
Pithing

2.104 The 1989 SBO Regulations placed no restriction on pithing. The traditional coiled spring pithing rod regularly collected a build-up of brain matter. The accumulated brain matter could be spread to the slaughterer, or another animal if the rod was reused, or be sprayed onto the floor when the rod was hosed down.

2.105 In oral evidence, Ms Marja-Liisa Hovi, an Official Veterinary Surgeon, discussed the unhygienic pithing in one slaughterhouse:

There was quite a risk of cross-contamination from animal to animal, because the pithing rod was not sterilised or washed in any way; it was kept between the hot water pipes on the wall which was next to the man doing the pithing . . . I think by the time I left after four weeks there was a sterilisation system being put in at the time for the pithing rod system, since I was quite insistent on that.114

2.106 Mr Richard Lodge, Head of Food Health and Safety at Birmingham City Council, said in oral evidence that the traditional metal spiral rod ‘really could not be adequately cleaned or sterilised between uses’.115 The material used has since changed to easily cleaned smooth plastics, such as polypropylene.116

2.107 In recent years, pithing has been increasingly criticised by commentators such as Dr Joseph Gracey117 and Sir Mark Richmond,118 who viewed it as an unnecessary process, and potentially dangerous. The Advisory Committee on the Microbiological Safety of Food (the Richmond Committee) stated in its second report, published in 1991:

Where pithing is carried out in conjunction with captive bolt stunning to control post-stunning convulsions, this represents a significant microbiological risk, since blood is still pumping around the carcass and can carry to all parts of the body any micro-organisms introduced.119

2.108 Although some slaughterers continued to use pithing rods, the exact extent of their use by 20 March 1996 is not clear.

Removal of head, tonsils and tongue

2.109 Under the 1989 SBO Regulations the brain became specified bovine offal, but they made no specific requirements as to how the head should be removed or dealt with. Subsequent developments in practice and legislation did dramatically affect the handling of the head and head meat; these are discussed in Chapter 3.

2.110 The tonsils were made an SBO under the 1989 Regulations. They had to be removed from the heads of all slaughtered cattle, not just those slaughtered in export slaughterhouses, where tonsil removal was already required by the Fresh Meat
Export (Hygiene and Inspection) Regulations 1981. Domestic plants therefore had to undertake the removal of tonsils for the first time.

2.111 The tongue has always been excluded from the definition of SBO. Slaughterhouses still often choose to remove the tongue for meat before disposing of the head.

Evisceration

2.112 The evisceration process includes the removal from the carcass of the intestines and spleen, both of which were made SBO under the 1989 Regulations.

2.113 The intestines continued to go to the gut room, where they were separated from the rest of the abdominal mass and collected in SBO bins. In slaughterhouses in which the spleen was always sent to the gut room, separation continued to occur there. There is evidence that in other slaughterhouses the spleen was separated directly after the evisceration process and collected in separate bins.121

2.114 Slaughterhouses also introduced separate bins for SBO at the site of the evisceration, in response to the requirement that SBO had to be stored in separate containers. It is apparent from oral evidence that most slaughterhouses did start using separate bins.122 However, the Inquiry was unable to determine how well this worked in practice. By way of example, Mr Keith Burgess, an Official Veterinary Surgeon, told the Inquiry that:

In the morning there would be some separate containers, coloured sometimes, occasionally they were marked, and we used to kill in excess sometimes of 300 cattle a day. By the end of the day, because I had to leave by about 2 o’clock, things gradually started to deteriorate and the actual separation between the bins would be less obvious than it was earlier on, the level of waste material would build up in the abattoir. It was a question of the person cutting it off and throwing it into the bin. Occasionally they miss. Unless you are actually there watching it constantly you could not be sure it was being done absolutely correctly. But there were attempts made to separate it, but in practical terms it is actually quite difficult to do unless the line speed is such and there are enough operatives there that it can be done properly. It was adequate, but I would not say it was foolproof.123

2.115 Mr Ron Spellman, a local authority meat inspector, said that the disposal of SBO into the correct bin (that is, not the bin for unfit meat) ‘would have been a thing that inspectors would have taken note of’.124

Carcass-splitting and removal of spinal cord

2.116 Spinal cord was made an SBO under the 1989 Regulations. The legislation did not expressly regulate carcass-splitting and removal of the spinal cord. However, some investigations were made into ways to reduce contamination of the carcass by the spinal cord. These led to attempts to create a double-bladed
saw which could cut around the spinal column on both sides. Dr Gracey said in oral evidence:

What they have been trying to do with the . . . carcass-splitting saws is to have a double-bladed effort which not just removes the spinal cord but takes out the whole column. 125

2.117 One of the driving forces behind the attempts to perfect new methods of spinal cord removal was commercial pressure from the supermarkets, which were major buyers of fresh meat. Mr Colin Maclean, Director-General of the MLC, said that:

. . . some of the supermarkets became concerned about the spray caused by sagittal splitting of carcasses with saws that clearly sprayed spinal cord fragments on to the spinal column particularly, but perhaps also on to other parts of the carcass. And therefore for a presentational reason, because at that stage we did not believe that that was any major threat we started the work. Well, we did not believe it was a threat at all, I think is the honest answer at that stage.

But to deal with the perceived concern, we started work on sucking devices to try to suck the spinal cord out of the column without sagittally cutting the carcass. We spent a lot of time in our own workshops because we have a cutting plant and cutting rooms in our own offices where we can do that sort of work. And we spent about a year and a half trying to achieve removal of the spinal cord in a way that could meet the line speeds of the abattoir, obviously. It is not just a matter of getting it out, it has to meet the commercial needs of the industry.

We did not succeed at that time. Therefore we stopped that work not because the problem had gone away but because the supermarkets had retreated from their area of concern as more knowledge had been disseminated in the industry the concern associated with the sawing of carcasses had receded throughout the industry. It remained so until probably 1994/95, when the challenge returned again. Despite our failure with that sucking device we kept the equipment and so on and so forth but retreated from the research. 126

2.118 Other theoretical ways of removing the spinal cord completely which were mooted in the early 1990s included blowing out the cord from the intact carcass and cutting with lasers. These were found not to be commercially viable at the time. 127

2.119 It was already common practice in 1989 to remove the spinal cord from the vertebral column of adult cattle so as to improve the appearance of the meat, but after the introduction of the 1989 SBO Regulations, the spinal cord was dropped into a bin for staining. 128 Problems with removing it intact (see above, and paragraphs 2.48ff) are also considered in vol. 6: Human Health, 1989–96.

125 T56 p. 97
126 T59 pp. 26–7, incorporating revisions proposed in S147B Maclean C
127 SEAC6 tab 1
128 SEAC6 tab 1
Removal of thymus

2.120 The thymus was already removed from the carcass before 1986. Therefore, the only additional requirement of the 1989 SBO Regulations was that it was now thrown into the SBO bin and handled in the same manner as all SBO, as described above.

Gut room operation

2.121 Specific training for gut room staff was provided by some operators to ensure the abdominal mass was dissected into its various, significant parts. The parts which were now SBO (intestines and, in those slaughterhouses where it was not separated at the slaughter line, the spleen) had to be carefully separated from the other offal, and stored and disposed of separately from meat going for human consumption and from any other offal. The use of intestines from the UK in the manufacture of sutures, although not unlawful, stopped after the 1989 SBO ban.

Post-mortem inspection

2.122 The 1989 SBO Regulations did not lead to the introduction of additional inspection points in the slaughter line. However, District and Borough Councils were made statutorily responsible for enforcing the SBO ban within their jurisdictions. We will return again briefly to post-mortem inspections below.

Staining and disposal of SBO

2.123 It can be seen from the processes described above that the offal defined as SBO was removed from the carcass at different stages of the process. Yet removal was only the first step in dealing with it. Tonsils, spinal cord, brain (when removed) and thymus should have been placed in separate bins by the workers on the slaughter line. Similarly, in the gut room, the intestines and spleen (assuming it went to the gut room) should have been placed in separate bins too. The brain was usually sent on to head boners within an intact skull which, under the Regulations, had to be stained at the head boners.

2.124 SBO was pooled in a skip or other container for disposal to renderers, and generally stained periodically by hosing down with dye. After staining, it was removed to a vehicle and transported (usually by an employee of a renderer) pursuant to a local authority movement order, either to a renderer’s collection centre or directly to a rendering plant. At collection centres, small quantities of individual types of material could be consolidated before being sent on to the rendering plant. The subsequent reduction in transport costs was only possible, however, when the volume of waste material was high, and Prosper De Mulder in England and Wales, and William Forrest & Son in Scotland, were the only renderers that operated in this way.
2.125 SBO could still legally be used in animal feed, up until the introduction of the animal SBO ban in 1990 (see below). However, in response to the introduction of the SBO ban for human food, on 9 November 1989 members of the compound animal feed industry adopted a voluntary ban on the inclusion of SBO in all animal feed.\footnote{YB89/1/9/9.1} This meant that, in turn, most renderers insisted that slaughterhouses provide them with SBO separately from material that was free of SBO.\footnote{T64 p. 109}

### Bovine Spongiform Encephalopathy (No. 2) Amendment Order 1990 (the 1990 BSE Order)

2.126 The 1990 BSE Order, made under the Animal Health Act 1981, introduced a compulsory ban in England, Scotland and Wales on the inclusion of SBO in feedstuffs for all animals.\footnote{L2 tab 5A. The equivalent in Northern Ireland was the Diseases of Animals (Feedingstuffs) Order (Northern Ireland) 1990 (L8A tab 8). 'Animal' was defined as 'any kind of mammal, except man, and any kind of four-footed beast which is not a mammal', and 'feedingstuff' was defined to include pet food} As SBO could no longer be used in any human or animal food, it had very few permitted uses. In practice therefore it had little value.

2.127 The implications of this ban and its monitoring and enforcement, along with the voluntary ban which preceded it, are discussed in vol. 5: Animal Health, 1989–96.

2.128 From time to time the 1989 Regulations (the human SBO ban) and the 1990 Order (the animal SBO ban) were amended. Volume 5: Animal Health, 1989–96 and vol. 6: Human Health, 1989–96 describe and discuss these amendments. Here we outline the main provisions which affected slaughterhouse operations.

### Bovine Offal (Prohibition) (Amendment) Regulations 1992 (the 1992 Regulations)

2.129 The Bovine Offal (Prohibition) (Amendment) Regulations 1992 came into force in England and Wales on 12 March 1992 under the Food Act 1984, amending the 1989 Regulations.\footnote{L64 p. 109} They addressed two main areas: the definition of ‘excepted premises’, and the handling of bovine heads. The definition of ‘excepted premises’, to which SBO could be sent without staining or sterilisation now excluded the manufacturers of animal feedstuffs. This measure implemented domestically Commission Decision 90/200/EC.\footnote{L18 tab 9}

2.130 The definition also now no longer expressly included ‘manufacturing chemists’. However, as manufacturers of non-food products they still fell within the general definition of excepted premises.

2.131 These Regulations also prohibited the removal of any meat for human consumption from the head of a bovine animal after the skull had been opened or the brain had been removed.\footnote{L18 tab 9} A practice had developed of splitting the skull and removing the brain before sending the head to boners. Now, the cheek meat

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\footnote{L2 tab 5. The equivalent in Northern Ireland was the Diseases of Animals (Feedingstuffs) Order (Northern Ireland) 1990 (L8A tab 8). 'Animal' was defined as 'any kind of mammal, except man, and any kind of four-footed beast which is not a mammal', and 'feedingstuff' was defined to include pet food.}

\footnote{L2 tab 7A. The equivalent Regulations in Scotland were the Bovine Offal (Prohibition) (Scotland) Amendment Regulations 1992 (L10 tab 11). No equivalent Regulations were made in Northern Ireland}

\footnote{L2 tab 7A, section 2(e)}
could not be harvested if the skull had been split. Splitting of the skull is considered in detail in Chapter 3.

**Bovine Offal (Prohibition) (Amendment) Regulations 1994**

2.132 On 30 June 1994 the Government announced the preliminary results of an experiment to investigate the biological routes through which BSE developed in cattle. These showed that evidence of BSE infectivity had been found in the distal ileum (part of the intestines) of a calf aged 4 months. Following assessment of these results by SEAC and the Chief Medical Officer, it was decided to extend the definition of SBO to include most calf intestines. Further amendments were made to the 1989 SBO Regulations on 2 November 1994, under the Food Act 1984. The definition of SBO was changed, to cover all the following parts of a bovine animal which no longer formed part of the carcass of an animal:

i. the brain, spinal cord, spleen, thymus, tonsils and intestines of an animal over 6 months old, which had died or been slaughtered in the UK; and

ii. the thymus and intestines of an animal, between 2 months and 6 months old, which had died or been slaughtered in the UK; and

iii. the thymus and intestines of an animal, under 2 months of age, which had been slaughtered in the UK.

**Bovine Offal (Prohibition) (Amendment) Regulations 1995**

2.133 The principal change brought in by these Regulations concerned staining practice. Previously, staining had to be carried out using a solution of the colouring agent Black PN or Brilliant Black BN, which was also to be used generally for meat unfit for human consumption. After April 1995, the colouring agent Patent Blue V had to be used for SBO, at a concentration of 0.5 per cent. The stain had to cover the whole surface of the SBO.

2.134 The intention was that this would distinguish SBO from other unfit meat and ensure they were kept separate at all times. It helped slaughterhouse staff to differentiate between SBO and other unfit meat, and degraded more slowly than the black stains used previously, which sometimes faded after as little as 48 hours. There was, however, some evidence that the new blue stain was not always being used as prescribed. Mr Peter Soul of the Meat Hygiene Service said that:

. . . we were getting some good information . . . about the lack of staining with the new blue stain.

. . . at the same time, we were getting information that premises wanted to use up their supplies of black stain, for example. So there would have been concerns there that the risk of intermingling, mixing of SBO and other

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140 YB94/10.21/3.1
141 L2 tab 11A. The equivalent Regulations in Scotland were the Bovine Offal (Prohibition) (Scotland) Amendment Regulations 1994 (L10 tab 13). The equivalent in Northern Ireland was the Diseases of Animals (Feedingstuffs) (Amendment) Order (Northern Ireland) 1995, which extended the definition of SBO in the same way, as well as extending the ruminant feed ban to prohibit the sale or supply for feeding or the feeding to ruminant animals of any animal protein
142 L2 tab 11C. The equivalent Regulations in Scotland were the Bovine Offal (Prohibition) (Scotland) Amendment Regulations 1995 (L10 tab 12), and, in Northern Ireland, the Bovine Offal (Prohibition) (Amendment) Regulations (Northern Ireland) 1995 (L8A tab 17)
animal by-products would have continued to be greater than it should have been.

[The new blue stain was] much more expensive, so there was quite a lot of reluctance, I think, on the part of plant operators, to purchase it.\textsuperscript{143}

\textbf{Specified Bovine Offal Order 1995 (the 1995 SBO Order)}

\textit{2.135} The 1995 SBO Order\textsuperscript{144} came into force in Great Britain on 15 August 1995 under the Animal Health Act 1981, and consolidated and rationalised the existing legislation. The definition of SBO was largely retained, but extended to cover anything left attached to an SBO organ after dissection of the carcass, and any animal matter which came into contact with the organ after it had been removed from the carcass (not including a whole carcass).\textsuperscript{145}

\textit{2.136} Staining with Patent Blue V became the only acceptable method of treating SBO. Sterilisation ceased to be an option. Once treated, SBO was to be consigned to one of a number of premises for disposal or further treatment. All such destinations now needed Ministry approval.

\textit{2.137} This was also the first SBO Order to expressly require that, when an animal was slaughtered in a slaughterhouse, the slaughterhouse operator had to ensure that all SBO was removed from the carcass.\textsuperscript{146}

\textit{2.138} Brain and eyes could no longer be removed from the head, with certain limited exceptions; and spinal cord could only be removed in a slaughterhouse, again with certain limited exceptions.

\textbf{Other changes in slaughterhouse practices post-BSE}

\textit{2.139} The distinction between inspection standards in domestic and export-approved slaughterhouses was abolished under the Fresh Meat (Hygiene and Inspection) Regulations 1992,\textsuperscript{147} which are discussed in vol. 14: \textit{Responsibilities for Human and Animal Health}. From 1 April 1995 the Meat Hygiene Service (MHS) became responsible for enforcing the SBO bans in slaughterhouses and headboning plants. The introduction of the MHS is considered in vol. 6: \textit{Human Health, 1989–96}.

\textsuperscript{143} T37 p. 109
\textsuperscript{144} L2 tab 13. The equivalent Regulations in Northern Ireland were the Specified Bovine Offal (Treatment and Disposal) Regulations (Northern Ireland) 1995 (L8A tab 22) and the Specified Bovine Order (Northern Ireland) 1995 (L8A tab 23)
\textsuperscript{145} Existing legislation was revoked on the same day by the Bovine Offal (Prohibition)(England, Wales and Scotland)(Revocation) Regulations 1995 (L2 tab 14)
\textsuperscript{146} L2 tab 13, 6(1)
\textsuperscript{147} L17 tab 8