2. Setting the context

118 In this chapter we provide some basic information about the context in which BSE emerged and in which people, both within government and without, had to respond. We do this in order to assist readers in understanding the significance of various parts of the narrative story which follows. We set out thumbnail sketches of the industries that were principally affected by BSE and some key features of how government works. More detailed descriptions of all these are to be found in the background volumes. We also explain some of the concepts involved in handling risk.

The cattle industry

119 At the time BSE emerged, beef and dairy farming was the largest sector of UK agriculture (see vol. 12: Livestock Farming). The output from milk, fattened cattle and calves totalled some £5 billion, nearly 38 per cent of the entire UK agricultural output. With a cattle population of some 12.7 million, the UK produced 97 per cent of the beef and veal required to supply the needs of the domestic market, and sufficient liquid milk to supply 100 per cent of domestic demand for milk and almost 70 per cent of domestic demand for butter and cheese.

120 This impressive degree of self-sufficiency was the result of the policies of successive governments which, in the period after the Second World War, had sought to increase domestic food production in order to reduce reliance on imported food and to foster rural communities. Incentives to increase production levels even further were provided in 1973, when the UK joined the European Economic Community. The possibility of increased exports to Member States, coupled with the support regimes of the Common Agricultural Policy (CAP), encouraged farmers to maximise their outputs, even if this led to surplus production.

121 The increase in output from the cattle industry was achieved in a number of ways. The most important of these was a combined breeding and feeding programme which produced cows with a genetic capability to give high milk yields if fed with high-protein feeds. Thus it became regular practice for farmers to supplement the forage-based diet of cattle with protein concentrates that they would buy from special animal feed manufacturers. The protein in these concentrates might come from animal sources in the form of meat and bone meal (MBM), bloodmeal, feather meal or fishmeal, or from non-animal sources, mainly in the form of soyabean meal.

122 Although soya-derived protein may seem the more ‘natural’ option to the layman, animal-derived protein produced as great or a greater increase in milk yield, and its use provided an outlet for animal waste that would otherwise have had to be disposed of in some other way. Small quantities of animal by-products had been used in animal feed since the beginning of the 20th century. Most farmers were well aware of the practice and had no problem with it.
Since the purpose of protein concentrates in feed was primarily to facilitate the high milk yield of dairy cows, these concentrates were used more in dairy herds than in beef herds. Dairy calves would have protein concentrates included in their feed from a week after birth, whereas calves used for beef production were unlikely to receive concentrates until they were at least 6 months old. However, since almost two-thirds of beef produced in the UK originated in dairy herds, we cannot conclude that the cattle whose flesh we were eating had been fed less protein concentrate than those whose milk we were drinking.

Slaughterhouses

Cattle that were destined for human consumption had to be slaughtered in a licensed slaughterhouse or abattoir (see vol. 13: Industry Processes and Controls). Sick cattle or those that had died on the farm would instead be taken to a knacker’s yard or a hunt kennel and their meat and by-products would not enter the human food chain.

In the 1980s there were around 1,000 slaughterhouses in England, Wales and Scotland, although this number was steadily decreasing as economies of scale and higher health and environmental standards pushed the smaller premises out of business. This decline in the number of slaughterhouses meant that more cattle had to travel long distances between the farm and slaughterhouse, and it was not unusual for the largest slaughterhouses to receive cattle from all over Great Britain.

At this time the hygienic production of meat was governed in England and Wales by Regulations made under the Slaughterhouses Act 1974 and the Food Act 1984. There was in fact a two-tier system of regulation that differentiated between plants producing meat entirely for domestic consumption and those producing some or all of their meat for export to other EU Member States. The regulations for export slaughterhouses were more wide-ranging and required a more thorough system of inspections.

Slaughtering an animal, cutting it up and separating its constituent parts is a messy business however it is done. In the 1980s most large slaughterhouses had adopted a production-line type of procedure which enabled them to carry out the process as quickly as possible.

In a typical large slaughterhouse animals were unloaded from lorries into the holding area and then moved towards the slaughter hall in single file along special passageways. They were then fed one by one into a pen for stunning. There were two methods of stunning used for adult animals. The captive bolt method involved firing a metal bolt into the animal’s brain, leaving a hole in its skull; the non-penetrative concussion method involved firing a mushroom-shaped bolt at the animal’s head, thus rendering the animal unconscious without penetrating its brain or skull. It was common practice, following captive bolt stunning, to insert a pithing rod into the hole in the skull in order to cause further damage to the brain and spinal cord, and thus to prevent the animal from kicking due to reflex muscular action.

Once the animal was unconscious, its hind legs were shackled and it was hoisted to an overhead rail, known as the slaughter line. Hanging with its head...
closest to the floor, the animal could then be moved around the plant to the various stages of the slaughtering process. It would first be moved along until it was directly over the bleeding trough, where it would finally be killed by severing the large blood vessels in its neck. Blood would either be allowed to pour into the bleeding trough, or alternatively it would be sucked out through a hollow bleeding knife attached to a vacuum pump.

Once bled, the carcass was moved down the line to be dressed. First the forefeet, hind feet, udder or pizzle were removed with a knife, then the hide would be pulled off with a powered hide puller, and after that the head would be cut off. (Head meat would later be harvested either at the slaughterhouse or at special headboning plants.) Then the abdominal wall would be cut open and the internal organs would tumble out onto the inspection table. Organs such as liver and kidneys which would go for human consumption were separated out and sent to the ‘offal room’ for sorting. The rest of the ‘abdominal mass’ was sent, either down chutes or in containers, to a different area known as the ‘gut room’.

The final stage in the process involved splitting what was left of the carcass and removing the spinal cord. A cut would be made down the length of the spinal column using a mechanical saw.

Hygiene Regulations demanded that each carcass had to be inspected by a qualified inspector at various stages in the process in order to establish its fitness for human consumption. Only when parts unfit for human consumption had been removed from it could a ‘health stamp’ be applied to the carcass by the inspector.

Responsibility for the regulation of slaughterhouse practices was split between the Ministry of Agriculture, Fisheries and Food (MAFF) and the local authorities (see vol. 14: Responsibilities for Human and Animal Health). The Minister of Agriculture, Fisheries and Food was responsible for making Regulations under the Slaughterhouses Act 1974, and in particular had the power to make Regulations about the construction, layout and equipment in plants. The local District Councils or Unitary Authorities were responsible for the enforcement of these Regulations. They issued licences to slaughterhouses and to slaughtermen, they provided the meat inspectors, and they had the power to make byelaws (subject to confirmation by the Minister) to ensure that slaughterhouses were kept in sanitary conditions and were properly managed.

Meat and other animal by-products that were classified as unfit for human consumption had to be disposed of within 48 hours of slaughter. Complex Regulations prescribed how unfit meat was to be handled and much was sent direct to renderers for processing. Unprocessed blood could be sprayed on fields as a fertiliser, subject to the agreement of the local authority responsible for the slaughterhouse and the licensing of the recipient farm.

**Renderers**

The rendering process involved the crushing and heating of the raw material supplied from slaughterhouses (see vol. 13: Industry Processes and Controls). The process led to the evaporation of the moisture in the material, which then enabled
the fat, known as ‘tallow’, to be separated from the remaining high-protein solids, known as ‘greaves’. The greaves were further processed by pressing, centrifuging or by solvent extraction in order to remove more tallow. The resultant protein-rich material was then ground into meat and bone meal (MBM). In the 1980s both tallow and MBM had a good commercial value.

136 Rendering is not a new industry. It has existed in some form for centuries, producing tallow for candles and soap. However, it was only at the beginning of the 20th century that the production of MBM for animal feed became important. The production and use of MBM steadily increased throughout the first half of the century and, when national self-sufficiency became an important issue during the Second World War, Regulations actually prescribed its use in animal feed. The production of MBM and tallow continued to increase after the war.

137 From the 1960s onwards there was a change in technology from older-style ‘batch-processing’ systems to faster and more efficient high-volume ‘continuous rendering’ systems. By the 1980s most plants used a continuous rendering system, and the economies of scale forced older and smaller plants to close down, leaving fewer than 100 rendering plants in England, Wales and Scotland at this time. Two firms dominated the market, with Prosper De Mulder processing 64 per cent of the red meat waste in England and Wales by the early 1990s, and William Forrest & Son (Paisley) processing 74 per cent of the red meat waste in Scotland.

138 During the 1950s the process of solvent extraction became the preferred method of extracting tallow from greaves. The process involved pumping a benzene-based solvent through a heated vessel of greaves so that the tallow dissolved in the solvent. The tallow was then separated out from the solvent and the greaves were heated further so as to vaporise and remove any solvent that was still present. By the late 1970s this method was being phased out because of the increased price of solvents, the risk of fire and explosion entailed in their use, and because animal feed manufacturers wanted to buy MBM with a higher fat content.

139 Up until the 1980s the rendering industry was virtually unregulated in terms of quality control and production methods (see vol. 14: Responsibilities for Human and Animal Health). In 1981 Regulations came into force to ensure the microbiological safety of processed protein. In the context of increasing deregulation by government, it was decided that the best way to do this was by testing the microbiological safety of the finished MBM, rather than by prescribing set production procedures. In effect this gave renderers a lot of freedom in determining their preferred production processes and it allowed for a diversity of processes in different plants. Advice about new Regulations reached renderers through the UK Renderers’ Association (UKRA), the primary trade association representing renderers’ interests.

140 In the 1980s the end-products of the rendering process – MBM and tallow – were widely used in the manufacture of a diverse range of products. MBM was used as a protein source in animal feed, and in fertiliser. Tallow was used in the manufacture of many human foods, such as edible fats, and when further processed into glycerine it was used even more widely, for example in jellies and in baking. It was also used in animal feed and pet food, as well as in pharmaceuticals, cosmetics and in a range of industrial products. Meanwhile, gelatine, produced from the hide and bones of animals in a completely separate industry and process, was also used
in a wide range of products including human food, the coatings of tablets, cosmetics, glue, bone china and photographic chemicals.

The animal feed industry

141 In the 1980s animal feed was made up of a mixture of various constituents, primarily cereals and cereal by-products, as well as oilseed meals, MBM and other protein concentrates, fats, molasses, vitamins, minerals and, in some cases, small amounts of medicinal additives. Feed manufacturers produced both ready-to-use compound feeds and protein concentrates which farmers could use if they preferred to mix their own feed on the farm.

142 In the early 1980s there were about 400 feed companies, although this number was in decline. The five largest companies dominated the market, producing 54 per cent of the UK feed output between them, while farmer co-operatives and smaller local and regional compounders produced the rest.

143 Feedmills produced many different kinds of feeds for different animals. The nutritional composition of the feeds was determined according to the specific requirements of each species, and then the particular ingredients that would meet these requirements were chosen on the basis of cost-efficiency. Medicinal additives and growth stimulants were added when appropriate on a species-specific basis. Some species-specific feeds were potentially dangerous to other species. Most feedmills produced these different feeds in the same equipment. There were several points in the manufacturing process where material could build up on or in machinery and cause cross-contamination in the next batch. The UK Agricultural Supply Trade Association (UKASTA) drew up a Code of Practice to try to minimise cross-contamination of feedstuffs during the production process.

The meat industry

144 Meat that had been ‘health stamped’ as fit for human consumption in the slaughterhouse was sent to butchers or meat processors to convert it into the forms in which it is purchased and eaten (see vol. 13: Industry Processes and Controls). In the post-war period processed meat products had become more popular than fresh carcass meat, and by the early 1990s there were over 700 meat processors in the UK. Some processed meat products contained mechanically recovered meat (MRM). This is residual matter left attached to the bones of carcasses after the cuts of meat have been removed. The bones are then put under high pressure so that what is left can be stripped from them in a slurry. In the early 1980s a major source of bovine MRM was the bovine spinal column.

145 In the fresh meat sector there had been a shift away from high street butchers towards supermarkets as the preferred place to buy meat, and in the 1980s Tesco, Sainsbury’s and ASDA between them accounted for nearly 50 per cent of retail beef sales in the UK. One reason why supermarkets had become more popular was that they had sought to improve the quality of their meat and meat products. They had done this primarily through the development of quality assurance schemes which
provided an audit trail from farm to consumer and assurance about the origin, husbandry and health of the cattle (see vol. 12: *Livestock Farming*). These schemes had been actively encouraged by the Meat and Livestock Commission (MLC), a non-departmental public body whose role was to promote greater efficiency in the livestock industry.

**The pharmaceutical industry**

146 Bovine materials were, and are, also used in pharmaceutical, medical and veterinary medical products (see Annex 1 to Chapter 2 in vol. 7: *Medicines and Cosmetics*). The UK pharmaceuticals industry is one of the largest in the world. In 1997, for example, UK exports were worth over £5 billion and accounted for around 12 per cent of the world market. There were over 400 pharmaceutical manufacturers and research organisations in the UK, although the market was dominated by multinationals such as Glaxo Wellcome, SmithKline Beecham and Zeneca.  

147 Bovine materials from the slaughterhouse are used directly in pharmaceuticals. Several injectable medicines are derived directly from bovine sources. Hormones such as insulin and glucagon may be derived from bovine pancreases, and protein products such as aprotonin and heparin are derived from bovine lungs and intestinal mucous respectively. Sutures and some medical devices such as heart valves and pericardium patches are also derived directly from bovine materials, in this case the intestines, heart and serous membranes.

148 Bovine materials are also used indirectly in the manufacture of certain types of vaccine. Cells which are used to grow these vaccines are nourished in nutrient-rich cultures that contain serum from the blood of foetal or new-born calves, or bovine serum albumin, which derives from the blood of older cattle. Bacterial cells are grown in nutrient-rich broths containing peptone derived from bovine meat, and some allergens are produced in special culture media which contain digests of calf brain and ox liver. In all these cases the bovine materials are not a constituent of the final product, but they are used in an ancillary way in the manufacturing process.

149 Tallow and gelatine are also used in several pharmaceutical and medical products. Gelatine is widely used as a pill coating and tallow is a constituent of most creams and ointments.

**Other uses of bovine products**

150 Bovine materials are used in a wide range of processes and products in many different industries. They are used in toothpaste, chewing gum and pet food; in fertilisers and cosmetics; and in such varied products as fire extinguisher foam, buttons, handles, lubricants and racquet strings. Bovine materials are used in the manufacture of paint. Cattle skins are used for hides, and other bovine materials are included in cleaning agents used in leather processing.
Government and BSE

151 MAFF had lead responsibility on most BSE matters and was the ‘sponsor department’ for those industries which found themselves implicated in the generation and spread of the disease. This raises a question of conflict of interest which we shall discuss later in this volume. MAFF officials took the lead on research into the disease. Its veterinarians and scientists had particularly important advisory roles about its causes and nature and negotiated with their counterparts abroad about measures to control it. They had considerable national and international stature. On a number of occasions the Chief Veterinary Officer (CVO), or an Assistant CVO, acted as the authoritative government voice.

152 The risk from BSE to human health took matters beyond MAFF’s departmental borders. Acting as the authoritative public voice on the safety of beef was a role undertaken by the Chief Medical Officer (CMO) at the Department of Health (DH), and it was the CMO who had oversight of the response within his Department. He and his colleagues were closely involved in considering and agreeing with MAFF measures to reduce risks to human health via food, pharmaceuticals, occupational exposure and other pathways. They mainly relied on advice from outside experts and committees.

153 Measures affecting most aspects of agriculture and health in Wales, Scotland and Northern Ireland were the responsibility of Departments overseen by the Welsh, Scottish and Northern Ireland Offices. Others directly concerned with the response to BSE included the Health and Safety Executive (HSE), because of risks through occupational exposure; the Department of Trade and Industry (DTI) as sponsor Department for the cosmetics and toiletries industries; the Department of the Environment (DoE) in respect of the effects of various methods of waste disposal such as carcass burial and incineration; and the Department of Education and Science (DES), both in handling funds for the Research Councils sponsoring much of the BSE research, and in giving advice about dissecting bovine eyeballs.

154 Three general features of the arrangement of legislative powers and duties described in vol. 14: Responsibilities for Human and Animal Health bore directly on how BSE was handled:

- Although Departments in Wales, Scotland and Northern Ireland had responsibility for many agricultural and health matters, the guiding principle was that issues affecting the safety of food, medicines and other consumer products, and the prevention and control of infectious animal and human disease, should be dealt with consistently on a UK-wide basis.

- The main Acts of Parliament governing the different areas in which BSE impacted were a heterogeneous collection of legislation. Each of those covering animal health, food safety, wholesomeness of feedstuffs, control of pollution, medicines safety, consumer protection, and occupational risk had its own set of basic concepts, preferred approach and basic machinery on matters requiring public intervention. Associated with each major Act or EU instrument was a shoal of subordinate legislation reflecting the differing powers, duties, sanctions and enforcing agencies. There could be no uniform approach to the response to BSE.
• Although central government was largely responsible for the Regulations made about BSE, it usually fell to local government to enforce them.

155 Volume 15: *Government and Public Administration* explains how policy is developed and implemented within Departments, the main terminology and procedures that crop up throughout the other volumes, the relationship between Ministers and officials, and how accountability operates.

156 The volume also describes conventions for consultation and cooperation within and between Departments. The need for ‘joined-up government’ is not new. It reflects a basic characteristic of institutions. Policy matters rarely have neat boundaries or single solutions. Each Department, division or agency reasonably enough has its own agenda, reflecting its particular set of statutory responsibilities. It is necessary to secure agreement about the efforts of different agencies with different responsibilities, priorities and especially budgets, in order to achieve common objectives.

157 During the 1980s and 1990s decision-making was affected by legislative and financial control pressures, and by administrative developments:

• **the existing legislation.** Departments generally had to make do with existing primary legislation, although it was often not ideally suited to addressing the problems of BSE. New secondary legislation could be introduced, but this required clearance, consultation, and time to introduce;

• **resource planning.** Money to run Departments and finance their operations had to be voted by Parliament under itemised heads. The justification for bids was rigorously scrutinised by the Treasury as part of the control of government spending. Voted money could not be switched at will to different purposes, nor could Departments overspend. This system involved an annual cycle of bids and negotiations for resources for the next three years. The cost of any proposed new action was therefore a major consideration;

• **cuts in resources.** The heavy squeeze on public spending on administration year on year throughout the period, both in Whitehall Departments and in local government, required MAFF to make significant cuts in running costs; it reduced its staff numbers by 12 per cent between 1986 and 1996. Research budgets were being slashed. Making room for BSE work involved jettisoning something else. Strict staff ceilings were in operation. Unclear prospects made recruitment for many types of post difficult, and staff in post were overloaded;

• **value for money and charging.** There was increased emphasis on business efficiency, charging for services or certificates, and measured performance targets. Setting up Executive Agencies took considerable management time, including that involved in setting up systems for charges and fees; and

• **deregulation.** A key aim of the Government was to lift the burden of state regulation from industry, especially small businesses. Instructions and government papers were issued urging this on Departments. Proposals for new measures had to be tested against their cost to industry. Enforcement was expected to be done with a light touch.
Handling risk

158 In a primitive society, the major hazards are those posed by nature. In a complex modern society the acts of individuals or corporate bodies may also involve serious hazards to other members of society. All governments intervene in many different ways to reduce the exposure of their citizens to hazards created by nature or by human acts. Dealing with such hazards is one of the most important functions of government.

159 Every action taken to reduce exposure to hazard has its price. Many administrative actions taken for this purpose involve government expenditure, to be recovered in one way or another from the citizen. Statutory measures which prohibit or regulate potentially hazardous activities impose costs on those to whom the measures apply and may stifle innovation. Where the activities are commercial, these costs are likely to be passed on to the customer or consumer. Restriction of freedom of choice for the individual will usually be part of the cost of a safety restriction – sometimes the most significant part.

Risk evaluation

160 When considering whether to impose a safety measure the Government has to balance the benefits that will be achieved from reducing or eliminating exposure to a hazard against the costs that the measure will involve. This process involves what is sometimes described as ‘risk evaluation’.

161 A risk is not the same as a hazard. A hazard is an intrinsic propensity to cause harm. Natural phenomena, physical substances, human activities will be hazardous if they have an intrinsic propensity to cause harm. A risk is the likelihood that a hazard will result in harm. A risk can usually be evaluated once the nature of the hazard and the degree of exposure to it are identified. Risk evaluation involves considering both the likelihood that a hazard will cause harm and the severity of the harm that is threatened.

Risk management

162 Action to reduce or eliminate a risk may involve destruction of a substance or prohibition or regulation of an activity that gives rise to a hazard. Alternatively it may involve eliminating or reducing the exposure to the hazard. Risk management involves identifying the options for reducing or eliminating the risk and their likely efficacy, estimating the costs involved in each option, deciding which, if any, of the available options to exercise, implementing the chosen options and monitoring the results.

163 In some circumstances past experience enables the statistician or the epidemiologist to calculate with some precision the effect that an option will have on reducing risk. Management of the risks associated with road traffic is such an example. It is often possible to calculate the number of lives that a particular road safety measure is likely to save. In such circumstances one can decide on principles or guidelines that will govern risk management, such as the maximum expenditure that can be justified per life saved.
BSE and risk

164 BSE was not like that. Attempts could be made to evaluate the risk to cattle. So far as other animals, and humans, were concerned, however, nobody knew whether BSE was a hazard or not. In such a situation the Government has to decide what precautionary measures to adopt against the possibility that the risk exists. One technique that can be adopted is known by the acronym ALARP. This calls for weighing the efficacy that any particular measure will have in reducing the notional risk against the cost and other consequences of introducing the measure. The aim is to reduce the possible risk so that it is As Low As Reasonably Practicable. It involves an exercise in proportionality that often calls for nice judgement.