6. Animal feed

Introduction

6.1 The Bovine Spongiform Encephalopathy Order 1988 imposed a prohibition on the sale and supply for feeding to ruminants of any feedingstuff by a person who knew or had reason to suspect that ruminant-derived protein had been incorporated. However, such protein could still be incorporated in feed for non-ruminants. The ‘ruminant feed ban’ represented the primary control on the spread of the disease in cattle by preventing the recycling of the BSE agent in the ruminant feed chain on the assumption that meat and bone meal (MBM), a protein component of cattle feed, was the vector for transmission of the agent.

6.2 The ruminant feed ban was extended in September 1990 to prevent the inclusion in animal feeds of ‘specified bovine offals’ (SBOs); those bovine tissues thought most likely to carry the agent of BSE. This was a precaution against the transmission of BSE to other species. Both the ruminant feed ban and the ban on Specified Bovine Offal for animal consumption (the ‘animal SBO ban’) were introduced under the wide-ranging powers to deal with animal diseases provided by the Animal Health Act 1981. This chapter sets out those powers, so far as they related to the control of the production of feed stuffs, and describes the controls on the description, composition and fitness of feedstuffs provided for by the Agriculture Act 1970, and also controls on the incorporation of medicines in animal feed.

6.3 The gradual emergence of cases of BSE in animals born after the ruminant feed ban came into force raised questions about the degree to which full compliance with the ruminant and SBO bans had been achieved. As discussed in more detail in vol. 5: Animal Health, 1989–96, the occurrence of BSE in such animals was explained initially on the basis that existing stocks of ruminant feed containing contaminated MBM held on farms at the time that the ruminant feed ban was introduced had continued to be fed to cattle after the ban came into force. However, cases continued to occur in animals born a considerable time after the introduction of the ban, and investigations by the Ministry of Agriculture, Fisheries and Food (MAFF) suggested some failures to comply with both bans. It followed that some SBO was being rendered, and that the resulting MBM was being incorporated into feed for animals other than ruminants. It emerged that cross-contamination between ruminant feeds and non-ruminant feeds containing MBM was occurring in feedmills and possibly at storage facilities and on farms. For this reason, this chapter also considers industry codes of practice designed to reduce the potential for harmful cross-contamination.
6.4 Before the introduction of measures to control BSE, the statutory controls on animal feedstuffs were divided into three distinct though not entirely discrete parts. These were:

i. provisions of the Agriculture Act 1970 and Regulations made thereunder concerned with composition, labelling and sampling;

ii. feed Regulations concerned with the eradication of salmonella, made under the Animal Health Act 1981;

iii. Regulations concerned with medicated feedstuffs, made under the Medicines Act 1968.

The Agriculture Act 1970 and Regulations on feed composition, labelling and sampling

Introduction

6.5 This Act\textsuperscript{380} replaced the Agriculture Act 1947, amended the Diseases of Animals Act 1950, and made provision for a wide range of agricultural and related matters. The main provisions relevant to BSE were contained in Part IV, which dealt with fertilisers and feedstuffs. The Act applied throughout the whole of the UK, though for Northern Ireland there were specific separate provisions for its enforcement. The Ministers responsible were the Minister of Agriculture in England and Wales, and in Scotland and Northern Ireland, the appropriate Secretary of State.

6.6 Part IV of the Act imposed obligations on those responsible for selling or preparing for sale materials sold as fertilisers or feedingstuffs. Section 68 introduced the concept of the statutory statement in writing, to be prepared by the supplier, giving details of the nature, substance and quality of the material supplied and how it should be stored, handled and used. The aim of this and subsequent sections of the Act was to ensure that any material was fit for its purpose and that the contents and descriptions were present and clear to purchasers. The Minister of Agriculture could make Regulations prescribing the form and content of a statutory statement but, before doing so, he had to consult what appeared to him to be representative persons or organisations affected by the proposed Regulations. There was an implied warranty on all material sold for use as a feedingstuff that it was suitable for such use, though this suitability was limited when the material was sold as suitable only for particular types of animal, or when mixed feed was sold in an unmixed state.\textsuperscript{381}

6.7 Anyone selling material for use as a feedingstuff, or having material on their premises ready for sale for such use, was guilty of an offence if a sampled portion of it was found to be unwholesome or dangerous to animals. Purchasers of any material sold for use as a feedingstuff might request that samples be taken for testing, although the request had to be made within six months of the date of sale. The power to take samples, whether or not requested by a purchaser, was granted to

\textsuperscript{380} L3 tab 1
\textsuperscript{381} L3 tab 1 Section 72
responsibilities for human and animal health

inspectors’ who could at all reasonable times enter premises where they reasonably believed feedingstuffs were kept for sale. The samples were to be divided into three parts, one returned to the seller, one retained by the inspector, and the third sent to the agricultural analyst for the area. The purchaser and the seller of the sampled material could also request that the inspector’s sample be forwarded to the Government Chemist for analysis. Regulations could be made by the Minister to prescribe the circumstances of sampling and analysis, and before making Regulations he was required to consult persons or organisations that appeared to him to represent the interests affected. Such Regulations were subject to the negative resolution procedure in Parliament.382

6.8 Enforcement in England, Wales and Scotland was the duty of local authorities.383 However, in Northern Ireland the duty of enforcement was expressly placed on the Ministry of Agriculture for Northern Ireland. These enforcement bodies were responsible for appointing ‘such inspectors as may be necessary’ and an agricultural analyst and as many deputy agricultural analysts as necessary. Inspectors and agricultural analysts in Great Britain were local authority officers, but in Northern Ireland they were civil servants. A reserve power of enforcement and appointment was available to the Minister of Agriculture in Great Britain if it appeared to him that this Part of the Act had been insufficiently enforced in any area.

Feed composition, labelling and sampling

6.9 Part IV of the Agriculture Act 1970 regulated the sale of fertilisers and feedingstuffs. Section 73 made it an offence to sell, or hold for the purposes of sale, any feedingstuff containing any ingredient which was deleterious to animals for which the feed was intended.

6.10 Section 68(1) required a seller of prescribed feedingstuffs to supply a statement in writing (a ‘statutory statement’, basically a label) containing particulars of the content of the feed. These particulars were prescribed by regulation. Subsection 1 did not apply to the sale of two or more materials that had been mixed at the request of the purchaser. Nor did it apply where the material sold was, in the presence of the purchaser, taken from a ‘parcel bearing a conspicuous label on which are marked in the prescribed manner the matters which would . . . be required to be contained in a statutory statement’.

6.11 An offence occurred where the supplier failed to comply with the requirements for the provision of a statutory statement within the time specified by the Act. Provision of a falsified statutory statement was also an offence. Both offences were punishable by a fine or imprisonment. The failure to include any particulars was to be proved by analysis of a sample taken from the portion that was the subject of the charge. Section 69 of the Act stated that labelling of feedingstuffs should take place as soon as practicable, and before the feed was removed from the premises. The section made it an offence not to mark the feed unless the seller could show it was not practicable to do so.

382 Described in ch. 3, vol. 15: Government and Public Administration
383 In England, the county, London Borough, or metropolitan District Council for the area; in Wales, the relevant County Council; in Scotland the relevant District Council
Description of compound feeds for ruminants

6.12 The Fertilisers and Feedstuffs Regulations 1973 set out the particulars that were to be contained in the statutory statements required by Section 68 of the Agriculture Act 1970. In addition, the Regulations set down the manner in which samples should be taken by enforcement officers and the methods of analysis to be used in assessing their content.

6.13 For all fertilisers and feedstuffs, the Regulations required that the statutory statement contain particulars of the following, if they were added in the course of manufacture or preparation for sale:

a. any copper or magnesium: a statement of the total amount present (whether naturally present or added) of any copper (if present in excess of 50 parts per million) or magnesium (if present in excess of 0.5 per cent);

b. any antioxidant or colourant: either the words ‘contains permitted antioxidant’ or ‘contains permitted colourant’ as appropriate, or the name of the antioxidant or colourant;

c. any vitamin A, D or E: the name of the vitamin and a statement of the total amount present (whether naturally present or added) and an indication of the period during which that amount would remain present; and

d. any molybdenum or selenium: a statement of the total amount of molybdenum and selenium present (whether naturally present or added).

6.14 The Regulations listed those antioxidants, colourants and other additives which could be included in feedingstuffs and maximum levels of vitamin D, according to the species and age of the animal for which the feed was intended.

6.15 In addition to the general requirements listed above, the statutory statement of all compound feeds had to include the following particulars: the amount, if any, of protein (stating as being included therein the amount, if any, of protein equivalent of urea) and amounts, if any, of oil and fibre. In respect of MBM, the statutory statement had to provide particulars of the amounts of oil, protein and phosphoric acid.

6.16 The Regulations did not, therefore, require that the statutory statement indicate whether a compound feed contained MBM, or indeed any information as to the source of the protein contained in the feed. Equally, the statutory description of MBM sold as a feedstuff did not require that the species from which the MBM was derived be listed.

6.17 The Feeding Stuffs (Amendment) Regulations 1976 amended the 1973 Regulations by, inter alia, making the requirements more specific in respect of the particulars to be listed in the statutory statement. The relevant schedules were expanded to reflect the requirements in respect of the species of animal for which the feed was intended. In addition, the particulars to be included were, in many

---

384 L3 tab 1C
cases, extended. The following Table, derived from one in Schedule 1 to the 1976 Regulations, sets out the particulars required for categories of feedstuff relevant to BSE:

Table 6.1:

<table>
<thead>
<tr>
<th>Description of material</th>
<th>Particulars of contents to be contained in statutory statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compound feeding stuff for the following kinds of ruminant animals: bulls, cows, steers, heifers, calves, sheep or goats</td>
<td>Amount of protein (stating as being included therein the amount, if any, of protein equivalent of urea, biuret, isobutyridene diurea, or urea phosphate and, if 1% or greater, the amount of protein equivalent of uric acid) and amounts, if any, of oil and fibre respectively</td>
</tr>
<tr>
<td>Feed supplements for the following kinds of ruminant animals: bulls, cows, steers, heifers, calves, sheep or goats</td>
<td>Protein equivalent of urea, biuret, isobutyridene diurea, or urea phosphate, if any. Protein equivalent of uric acid if 1% or greater</td>
</tr>
<tr>
<td>Feeding meat and/or bone meal</td>
<td>Amounts of oil, protein and phosphorus respectively</td>
</tr>
</tbody>
</table>

**Limits on the information which could be given in the statutory statement**

6.18 Section 68(1A) of the Agriculture Act 1970\(^{385}\) limited the additional information that might be included in a statutory statement to that prescribed by Regulations under the Act. Any person giving a buyer a statutory statement containing additional information was subject to a fine. The Feeding Stuffs Regulations 1986 required that the statutory statement in respect of compound feeding stuffs should provide:

a. as previously, particulars relating to the addition, if any, of magnesium and copper; antioxidant; colourant; preservative; vitamins A, D or E; and copper;

b. for a compound feed stuff: an appropriate description of the compound feed as provided for by the Regulations; the species or category of animal for which the feed was intended; appropriate directions for use;

c. in terms of the attributes of the compound feed for ruminants, the following information: amount of protein, amount of oil, amount of fibre; amount of ash.

6.19 The Regulations allowed the inclusion of the following information in the statutory statement:

a. particulars of the manufacturer; the batch number of the product; expiry date for the feed; the trade name of the feed; the price of the feed; the country of origin or manufacture; and

b. particulars of the amount of moisture; starch; calcium; sodium; phosphorus; and other specific ingredients of the compound feed.

\(^{385}\) Inserted in 1982 by the Agriculture Act 1970 Amendment Regulations, SI 1982/980
6.20 The Regulations, therefore, did not permit the inclusion in the statutory statement of information on the source of the protein contained in a compound feed. The purchaser would not therefore know from the statement whether the compound contained protein derived from soya, for example, or MBM.

6.21 However, there was no statutory constraint on feed manufacturers providing full details of the ingredients and/or proportions of particular ingredients in their feed compounds. Mr Peter Sanderson, the Quality Assurance Manager of BOCM Foods, in oral evidence to the Inquiry, confirmed that there was nothing to stop a manufacturer from setting out in some other way what the actual ingredients were. 386

**Warranty**

6.22 Section 72 of the Agriculture Act 1970 provided that, on the sale of any material for use as a feeding stuff, a warranty by the seller was implied that the material was suitable to be used for that purpose. If material was sold as suitable only for animals of a particular description, or to be used as a feeding stuff only after being mixed with something else, the warranty applied only if it was used as specified. Such a warranty would have effect notwithstanding any contract or notice to the contrary, but in Scotland a contract of sale would not be treated as repudiated by reason only of a breach of the warranty.

**Sampling and analysis**

6.23 The 1970 Act also provided for the sampling and analysis of feed. Each local authority was required to appoint such inspectors as might be necessary, an agricultural analyst, and deputy analyst(s) if required. 387 If the Minister was not satisfied that the provisions of the Act were being sufficiently enforced, he could appoint one or more inspectors to carry out the duties provided by the Act, at the expense of the local authority. 388

6.24 Under Section 67(1), the purchaser of feeding stuffs was entitled to request that a sample be taken for testing by an inspector appointed by the enforcement body for the area. 389 The purchaser, the person who sold the material to him, and any other person against whom a cause of action might lie could each require the inspector to send part of the sample for analysis to the Government Chemist, 390 and to provide the person making the request with a copy of the Government Chemist’s certificate of analysis. 391

6.25 The Act authorised an inspector to enter premises and take samples of feeding-stuffs that had been purchased, or were being kept for the purpose of being sold. The Feeding Stuffs (Sampling and Analysis) Regulations 1982 392 set out the prescribed manner for sampling and analysing feeding stuffs, and also set out the qualifications

---

386 T17 p. 78
387 Section 67(3)
388 Section 67(8)
389 That is, County Councils, metropolitan District Councils and London Borough Councils
390 In 1986, this was a branch of the Department of Trade and Industry that, among other duties, provided a specialised analysis and consultancy service on aspects of chemistry and its application. It became a DTI agency on 30 October 1989 as the Laboratory of the Government Chemist (see ch. 6 of vol. 15: Government and Public Administration). In April 1996, the agency was privatised
391 Section 78(1)
392 L3 tab 1D
required for agricultural and deputy agricultural analysts. The Regulations also required that specific methods were employed for, among other things, the taking and sealing of samples, forms of certificates of analysis and periods following sampling within which the analysis had to be carried out.

6.26 Local authority Trading Standards Officers were the designated enforcement officers under the 1970 Act, and could institute prosecutions for a number of specified offences, including:

i. failure to provide a statutory statement, or providing one that was incomplete or false;

ii. selling or exposing for sale material that was incompletely or falsely labelled;

iii. failing to mark accurately material prepared for sale;

iv. selling or having for the purpose of sale material that contained any ingredient that was deleterious to specified animals or unwholesome for, or dangerous to, such animals; and

v. tampering with material that was to be sampled or with a sample.

**Legislative changes, 1986–96**

6.27 The 1976 and 1982 Regulations already mentioned were followed by further changes made in Regulations, which implemented a succession of European Directives and one Commission Decision. These measures, European and domestic, essentially tightened up the regulation of animal feedingstuffs by, for example, specifying:

i. maximum incorporation rates;

ii. maximum permitted levels of certain contaminants;

iii. requirements in respect of the quality of raw materials;

iv. marketing and labelling requirements, which became increasingly specific and detailed; and banning the use of certain ingredients in compound feed. However, these developments had no significance in relation to BSE following the imposition of the ruminant feed ban in July 1988 and the animal SBO ban in September 1990.

---

393 L3 tab 1D regulation 5. Each had to be a chartered chemist, being a Fellow or a Member of the Royal Society of Chemistry, and his practical experience of analysis and examination of feedstuffs had to be attested by another analyst appointed under the Act.


395 Section 68(4)

396 Section 68(4)

397 Section 69(4)

398 Section 73(1)

399 Section 73A(1)

400 Section 79(10)


402 The nature of these legislative measures is described in ch. 3 of vol. 15: Government and Public Administration.
The importance of feed labelling for BSE

6.28 The extent to which feed ingredients should be disclosed on labels was a point of contention between farmers and feed compounders. The National Farmers’ Union (NFU) campaigned for labelling to provide full disclosure of the contents of feed purchased. The two main objections expressed by feed manufacturers were that it was practically difficult to capture all the data concerning each batch and reflect them accurately on a label with the technology then available; and that manufacturers needed to keep their feed formulae confidential, as full disclosure risked giving competitive advantage to their commercial rivals.

6.29 If there had been a requirement for feed labels to indicate the source of protein contained in compound feedstuffs, this could have assisted farmers in identifying any compound feed for cattle, containing MBM, which they had on farm after 18 July 1988 when the ruminant feed ban came into force.

The Animal Health Act 1981: Controls on salmonella in feedstuffs

6.30 The main provisions of the 1981 Act, including the definition of ‘disease’, are described in Chapter 2 of this volume. Section 29 of the Act was specifically directed at reducing the risk to human health from any disease of, or organism carried in, animals. Ministers were entitled to designate as a zoonosis any disease or organism which in their opinion constituted such a risk. They could then make Orders under the Act introducing measures to control such diseases.

6.31 The Zoonosis Order 1989\(^{403}\) was made under the Animal Health Act and required all isolations of salmonella and brucella in samples of feedingstuffs to be reported to MAFF. The Order provided for inspections, sampling, movement restrictions, and cleansing and disinfection where appropriate. All these powers were vested in inspectors of the Minister (ie, members of the MAFF State Veterinary Service).

6.32 The legislation was underpinned by two Codes of Practice for the Control of Salmonella, issued by MAFF to the compound feed industry in 1989, which set out standards for storage, transport and manufacture, and for sampling for the presence of salmonella.\(^{404}\) The first Code dealt with general conditions for storage and handling of materials. The second Code, for premises producing more than 10,000 tonnes of feed a year, stated, among other things, that:

i. processed animal protein should only be obtained from manufacturers and suppliers who were registered under the Processed Animal Protein Order 1989;

ii. the production process and storage of materials had to be carried out so as to prevent the contamination of one product or raw material by another;

iii. samples had to be collected and tested without delay – the testing being in accordance with the methods laid down in the Schedule to the Processed Animal Protein Order 1989 – and records kept; and

\(^{403}\) L2 tab 3A
\(^{404}\) M13B tabs 4 & 5
iv. if a test proved positive, MAFF, the supplier, storekeeper, and haulier had to be notified and the sampling in respect of the relevant supplier was to be increased in frequency.

6.33 The approach outlined above was appropriate for the reduction of diseases such as salmonella, which could be easily identified by laboratory analysis. The difficulty in controlling BSE was that the disease was not detectable in feedstuffs other than by mouse bioassay.\textsuperscript{405} The considerable time taken to record results from such tests and the costs and resource implications weighed against such a testing regime being instituted for BSE.

The Medicines Act 1968: Medicated feedstuffs

6.34 The Medicines Act 1968 enabled Regulations to be made prohibiting the use of any medicinal product in animal feeding stuffs, or their subsequent sale, supply or export, other than in accordance with a product licence, animal test certificate or veterinary direction.

6.35 For feedingstuffs the relevant Regulations were the Medicines (Medicated Animal Feedingstuffs) Regulations 1989 (as amended). Under the Regulations all medicinal feed additives had to be licensed. The additives fell principally into two groups. The first group comprised certain cocidiostats, prophylactic medicines and antibiotics used for growth promotion. These did not require a veterinarian’s authority but could be sold only by registered merchants or pharmacists to compounders and on-farm mixers who were registered with the Royal Pharmaceutical Society of Great Britain. The second group of additives could only be incorporated into feedingstuffs by registered compounders under a veterinarian’s prescription and were used therapeutically to treat specific health problems in animals.

6.36 Post-licensing surveillance of all veterinary medicines was maintained through the suspected adverse reactions scheme operated by MAFF’s Veterinary Medicines Directorate.\textsuperscript{406} Agricultural merchants were informed of the scheme, and the procedures for submitting information on suspected cases.

On-farm mixing

6.37 Many farmers preferred to mix their own feed on the farm, from ingredients purchased from the feed manufacturers or merchants (including protein concentrates and MBM), rather than relying on feed compounded in a mill. The Feeding Stuffs Regulations 1991 applied some controls to feed produced on farms, but did not subject it to the full labelling and compositional requirements for other feedstuffs. In 1992, the Lamming Committee on Animal Feedingstuffs found that some farmers were not well-informed about their responsibilities under the Regulations. The Committee recommended that farm-mixed feeds be sampled and inspected to ensure they complied with the statutory limits for undesirable substances and additives in feedstuffs. It also recommended that on-farm mixers be

\textsuperscript{405} That is, by a test using a live mouse
\textsuperscript{406} FEG3 para. 8. See also The work of the VMD (M11D tab 15) 4th paragraph
provided with their own Code of Practice to encourage good manufacturing practice and to explain farmers’ obligations under the Feeding Stuff Regulations.\(^\text{407}\)

6.38 MAFF began work on such a code, but this was overtaken by discussions within the European Union, which resulted in Council Directive 95/69/EC.\(^\text{408}\) This laid down ‘the conditions and arrangements for approving and registering certain establishments and intermediaries operating in the animal feed sector’, and covered on-farm mixing. The National Farmers’ Union subsequently issued a Code of Practice for on-farm Mixers producing compound feeds.

**Code of Practice on Cross-Contamination in Animal Feedstuffs Manufacture**

6.39 In June 1984, the UK Agricultural Supply Trade Association (UKASTA) produced a revised Code of Practice for the industry as a result of concerns about the potential for cross-contamination between batches of feedstuffs containing medicinal additives.\(^\text{409}\) In its introduction, the Code said:

> The incorporation of medicinal additives has added to the complexity of compound manufacturing and, arising from the Medicines Act 1968, which controls the manufacture and sales of medicated feedingstuffs, it has also imposed increased responsibilities.

> The feed industry is, of course, alert to the need for these additives to be used responsibly; however, concern has been expressed about the risks of cross-contamination for feeds mixed in the same equipment immediately following a batch containing medicinal feed additives.\(^\text{410}\)

6.40 The Code defined the problem of cross-contamination as follows:

> The complexity of the plant and the manufacturing operation involved in compounding means that some degree of cross contamination is unavoidable where different types of feeds are manufactured through the same equipment.

> The Code of Practice which follows is intended as a set of principles covering those aspects of design, personnel training and plant operation to ensure that cross contamination is kept to minimal levels.\(^\text{411}\)

6.41 The Code divided medicinal additives into two groups:\(^\text{412}\)

1. Group I medicinal additives, which could be used without veterinary supervision. They were routinely included in feeds made for many classes of stock, to control disease or improve growth or performance. When the Code of Practice was published, about a third of the annual production of compounds included medicinal additives from Group I; and

---


\(^\text{408}\) L18 tab 34

\(^\text{409}\) M13 tab 3

\(^\text{410}\) M13 tab 3 p. 1

\(^\text{411}\) M13 tab 3 p. 7

\(^\text{412}\) M13 tab 3 p. 7
ii. Group II medicinal additives, which could only be used under veterinary supervision. They were usually for the treatment of disease, and were used in less than five per cent of total feeds manufactured.

6.42 It covered a number of areas of concern, including:

i. the design of new plant or modification of existing plant, which should take account of the possibility of cross-contamination;

ii. the training of staff, which should make clear the principles and implications of the medicinal additives being used, and the potential hazards of their misuse;

iii. the storage and handling of medicinal additives, including issues such as security, labelling and record-keeping;

iv. manufacturing, with attention to the scheduling of production and plant operation (see below), and the management and disposal of discarded material containing medicinal additives; and

v. packaging and delivery, which required clean equipment and bulk vehicles, and clear identification of medicated feed.\(^{413}\)

6.43 Of these, production scheduling and plant operation were the most important in the BSE context. In respect of production scheduling, the Code of Practice required that each mill draft rules based on the needs of that particular mill. The rules were to be divided into:

i. General programme rules based on the following:
   
   • operators should plan for the longest runs possible with minimal changes;
   
   • a medicated feed should be followed only by a feed for a species for which the medicament is licensed;
   
   • as a qualification to the above, particular care should be taken with breeder feeds; and
   
   • where feeds were made containing different concentrations of a medicinal additive, related to the age of stock within a species, they should be manufactured in descending order of concentration.

ii. Particular exclusions, for example:

   • feeds with high levels of copper should never be followed by a feed for sheep;
   
   • feeds containing monensin should never be followed by feed for horses.\(^{414}\)
6.44 As for plant operation, the Code of Practice required the following:

i. Monitoring of Plant Performance: regular assessment of plant performance should be made to ensure that the assessed potential for minimising cross-contamination was being fully realised;

ii. Nature of Premix: addition of concentrated medicinal additives should be avoided by suitable dilution;

iii. Point of Addition: the medicinal additive should preferably be added directly to the mixer; otherwise it should be added as near to the mixer as possible. Due consideration should be paid to accuracy and reliability of ‘in-mill’ communication. The point of addition should be a type enabling clean injection of the medicinal additives to be made;

iv. Time of Addition: the medicinal additive should be added to the main flow of ingredients and not at the beginning or end, both of which increased the likelihood of medicinal additives remaining in the system:

v. Flushing and Cleaning: this should be done by taking off the first 50 kg of the succeeding batch, except in the case where the same medicinal additive was being used at a lower concentration. If 50 kg was considered inadequate in relation to a particular plant and products, then the amount should be increased accordingly;

vi. Extruded Feeds: particular attention should be paid to the avoidance of an unacceptable level of recirculating feed in the subsequent batch. The level of this residue should be laid down for each production unit.

vii. Extra Provision for Group II medicinal additives: in addition, it was essential that dead spaces, such as elevator boot pockets and other accessible parts of the manufacturing plant, be physically cleaned out after production of a batch containing Group II medicinal additives. This must not be done beforehand.\textsuperscript{415}