Advisory Committee on Animal Feedingstuffs

ACAF REVIEW OF ON-FARM FEEDING PRACTICES

Recommendations on identifying hazards and minimising risks

ACAF REVIEW OF ON-FARM FEEDING PRACTICES

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IRECOMMENDATIONS – To be updated

II Executive Summary (New Section)

1. **Following discussions at its Open Forum held in July 2001, ACAF agreed that a review of on-farm animal feeding practices should be included in its forward work plan as a matter of priority as a consequence of the BSE Inquiry report in October 2000** and the outbreak of Foot and Mouth Disease in Spring **2001 both of which** which focussed attention on on-farm feeding and feed issues.

2. Since the review was undertaken, the legislation has been strengthened and new provisions, particularly those in Regulation 183/2005, now apply to on-farm feeding operations. In addition, farm assurance schemes have been extended and developed to cover feed safety issues and a significant proportion of livestock farmers are members of such schemes.

3. At its 26 February 2014 meeting ACAF Members agreed that the Committee should review and update the report on-farm feeding practices that it published in 2003. It is an important document that should provide consistent guidance and reflect current trends which are currently not included.

III Introduction

4. Over the past 10 years, since the publication of the first review in 2003, farming and the animal feed industry have continued to respond and adapt to the challenges of the 21st century. This document provides an update on on-farm practices, legislation and responsibilities since the publication of the ACAF Review of On-Farm Feeding Practices: Recommendations on identifying hazards and minimising risks in September 2003 and serves to highlight both improvements and new areas of risk. For completeness it should therefore be read in conjunction with the 2003 report.

Background (Paragraph 1 of original report).

5. The BSE Inquiry report in October 2000 concluded that the chain of animal feed manufacture, distribution, on-farm mixing and on-farm use was complex, and that the ease with which cross-contamination occurred within it was one of the most concerning issues in the BSE outbreak. The outbreak of Foot and Mouth Disease provided further focus on on-farm feeding and feed issues. Following discussions at its Open Forum held in July 2001, ACAF agreed that a review of on-farm animal feeding practices should be included in its forward work plan as a matter of priority.

6. The Committee undertook to carry out a review of on-farm feeding practices that would:

- identify current practices, with a view to issuing recommendations on "best practice" for all stakeholders and their advisors involved in supplying, transporting, storing and using feeds;
- include all aspects of feed sourcing, transport, storage, feeding on-farm, including on-farm mixing, liquid feeding systems, the use of bought-in feed materials (such as co-products from the food industry) and handling home-grown feeds; and

- identify the main hazards and risks arising from the above processes and increase awareness of these amongst the farming community and other stakeholders.

7. The Committee was mindful of the economic implications to farmers of further regulation or controls. It wanted the report of its review to be a tool to help farmers and others identify hazards and to implement controls and corrective action. It was agreed that any recommendations would be based on the need to protect human or animal health.

8. The report was published in September 2003. In tandem with the report a poster outlining main points when feeding livestock was also produced.

9. Since the review was undertaken, the legislation has been strengthened and new provisions, particularly those in Regulation 183/2005 (feed hygiene), now apply to on-farm feeding operations. In addition, farm assurance schemes have been extended and developed to cover feed safety issues and are widely adopted.

10. A sub- group was formed to consider reviewing the guidance provided in 2003 to ensure that it reflects current farming practices and technological developments and that it addresses compliance with the legislative requirements. This is in line with the Committee's terms of reference, viz to advise 'on the safety and use of animal feeds and feeding practices, with particular emphasis on protecting human health, and with reference to new technical developments'. The intention though was not to reproduce a manual for livestock farmers but rather to reflect the relevant changes since 2003.

Scope of the Review (Paragraphs 2-3 of original report).

11. The sub-group agreed that the revised document should highlight hazards and minimise risks in a concise guide that also reflects changes that have occurred

to current farming practices, technical developments and legislative requirements since the publication of the 2003 report.

Other Sectors (New Section)

Hobby Farming

12. There has been a rapid rise in hobby farming over the past twenty years or so. A hobby farm can be anything from a house with a large garden, a small holding or small farm but the key distinction is that it does not provide a main source of income and is a pastime rather than an occupation. It covers a wide spectrum of agricultural output from fruit and vegetables, free range poultry, small herds of goats and pigs and sheep flocks. Many hobby farmers often keep the rarer and traditional native breeds which are attractive, hardy and find support and advice from the breed societies and from agricultural shows.

13. It is estimated that almost half of the farms sold in England and Wales in recent years have been bought by non-farmers. In the south west for example it is estimated that up to 80% of all farms are bought by non-farmers. The trend is to live in the farm house but rent most of the land out to other farmers keeping a few acres to 'hobby' farm. Research by the Royal Institute of Chartered Surveyors indicates that hobby farmers are becoming the dominant producers on small farms of 40 acres or less.

14. Although for small hobby farms most of the agricultural production is for own consumption, doorstep sales and in particular selling through farmers markets has become increasing popular. For some producers of specialist livestock and artisan foods, selling at farmers markets has grown to the stage where their products are also to be found stocked in other outlets. Most are members of FARMA (National Farmers Retail & Markets Association) - a co-operative of around 500 businesses from across the UK that promote food which is grown and sold locally.

Aquaculture

15. The Agricultural Industries Confederation has advised that, apart from possible development work on feed for new species, on-farm production of fish feeds does not take place in the UK.

Target Audience (New Section)

16. This document primarily aims to provide advice and guidance to anyone supplying feed or feed materials to farms. Additionally, it may prove useful to those with a more general interest in feed safety related on to on-farm feeding practices.

Overview of current feeding practices: A summary of developments since 2003 (New Section).

17. Over the past 10 years, since the publication of the first review in 2003, farming and the animal feed industry have continued to respond and adapt to the challenges of the 21st century. On a global scale, fewer farmers are having to produce more for a growing population whilst responding to the challenges of climate change and environmental impact. Across the EU, the Common Agriculture Policy was reformed in 2003 with subsidy payments no longer being linked to production but to environmental, food safety and animal welfare standards. This had a significant impact on the farming system practised on many farms which will continue with the new scheme to run from 2015. In the UK consolidation and developments in the animal feed supply industry and feeding practices continue.

- The animal feed industry is worth about £4.4 billon per annum
- UK - wide there are approximately 200,000 businesses involved in feed.
- The UK livestock industry utilises approximately 22 million tonnes of feed per annum.

Feed Assurance (New Section).

18. The majority of UK livestock producers now belong to a farm assurance scheme because it is a requirement set down by many of the major food retailers. Production standards cover food safety, environmental protection, animal welfare issues and other characteristics deemed to be important by consumers. Scheme members must demonstrate that all feedstuffs used on the farm comply with current EU, and domestic legislation, be stored in good conditions and relevant records must be kept to ensure all feed is traceable. As membership of a scheme includes regular, independent checks to ensure that rules are adhered to, farm assurance is now recognised as being a valuable means of demonstrating best practice.

19. It is estimated that membership of assurance schemes varies by business type. In the feed manufacturing sector membership it is around 99%; in the farming sector it is approximately 46%.

Earned Recognition (New Section)

20. The Food Standard Agency introduced earned recognition for feed business in 2014. The principal of earned recognition is to reduce the burden of regulation on compliant businesses and there are three broad earned recognition approaches. Businesses can be members of an FSA approved assurance scheme which meets specific earned recognition criteria; demonstrate good levels of legal compliance via their previous inspection history or be part of the Primary Authority scheme. The first two approaches lead to businesses receiving less frequent inspections from local authorities, which in turn allow local authorities to focus their resources on businesses that are less compliant and higher risk.

21. The Primary Authority scheme, which is operated by the Better Regulation Delivery Office, offers businesses the opportunity to form a legally recognised

partnership with one local authority, which then provides advice for other councils to take into account when carrying out inspections. The scheme is designed to reduce the risk of inconsistent enforcement action taken against businesses.

Technology (New Section)

22. Following a number of food-related issues, the general public have increasingly demanded to know what is in their food, where it has come from and whether it is safe and wholesome. Developments in technology over the past ten years have made a big impact on farms with systems and processes being now widely available to manage and monitor inputs and outputs. This has led to increases in efficiency, data recording, traceability, food safety and product quality.

Feeding Practices (New Section)

23. Different approaches to feeding farm livestock continue to develop. A shortage and cost of labour on some farms has led to increased intensification and mechanisation, e.g. increased use of mixer wagons and robotic milking. In contrast, low cost systems of production requiring fewer off-farm inputs have developed widely, e.g. spring calving grass based systems of milk production, cattle outwintering, use of forage crops. Public demand for livestock to be reared in a ‘free range’ environment has resulted in increases in free range hens and outdoor pig rearing, and to a lesser extent free range broilers. . Organic food production, which saw a marked increase in the early part of the 21st century partly encouraged by government support payments, has now stabilised and now includes requirements related to food safety

Animal Feed (New Section)

24. The 2003 review recognised the many types of animal feed materials used for livestock production from forages through concentrate feeds to the various by-products. Whilst research continues to look at potentially new sources of animal feed such as insects, a major development has been the increased use and availability of genetically modified crops around the world. In addition the use of enzymes has increased and a wider rand of synthetic amino acids is now available. The ban on antibiotic growth promoters in 2006 has led to the significant growth of alternative products.

Digestive Physiology (New Section)

25. A greater understanding of digestive physiology over the past 10 years including gut health and immunity, rumen function and the impact of anti-nutritional factors has led to widespread use of feed additives. These include probiotics, enzymes, and highly available minerals such as chelates and proteinates. Knowledge of the importance of diet structure, amino acid requirements and availability, and the importance of different sources of dietary carbohydrate and fat have improved feed efficiency and utilisation.

Environmental Implications of Feeding Practices (New Section)

26. A significant development since 2003 has been a greater awareness of the impact of livestock production systems on the environment, e.g. introduction of nitrate vulnerable zones, the impact of excess phosphorus excretion on diffuse pollution and reduction of ammonia emissions from intensive livestock production. This has focused research on the nutrient requirements of livestock and for practical feeding on the dietary supply of protein and phosphorus with minimal wastage.

The Extent of On-Farm mixing of feeds (Previous paragraph 5 of original report

27. As a result of changes in departmental responsibilities, the Veterinary Medicines Directorate (VMD) holds records of, and approves, 560 on-farm manufacturers. Producers who incorporate additives (such as trace elements and vitamins) into manufactured feeds are required to be registered with their local Trading Standards Authority. Approximately 14,000 farms are registered with local authorities in Great Britain. It is thought that many farmers, who mix products containing additives with home-produced or other bought-in materials, are not officially registered.

28. Complete diet feeding is used increasingly to mix home grown forages, cereals, by-products and other bought-in feeds to produce rations for ruminants. Although detailed figures are not available, it has been estimated that there may be 6,000 feeder wagons used in Great Britain. This represents approximately 20% of all dairy farmers.

29. According to Defra's report "Agriculture in the UK" 2013[3], approximately 22.8 million tonnes of animal feed were purchased in 2013, with just over half this amount (12 million) being compound feed or blends. This is slightly up on the five-year average of 21.8 tonnes (of which 11.1 million tonnes is compound feed. While some of these will be fed without prior mixing with other feeds, a significant proportion will be mixed. Therefore, it would appear that on-farm mixing of feeds is widely practised.

Legislation and Codes of Practice (Previous paragraphs 8-10 of original report).

30. Since the publication of the 2003 report there have been changes in enforcement responsibilities. In Great Britain animal feed legislation is now enforced by local authorities normally through their trading standards offices, the Veterinary Medicines Directorate and Defra. In Northern Ireland

[3] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/315103/auk-2013-29may14.pdf

enforcement is by the Department of Agriculture and Rural Development (DARD).

31. There are a number of codes of practice, guides to good practice, and assurance schemes related to livestock production, but these generally do not go into detail regarding on-farm feeding. Although an assessment of these is not within the scope of this review, the Committee believes that codes and assurance schemes can provide a valuable means of achieving best practice. The Committee therefore urges such codes and assurance schemes to be further developed to address the particular hazards associated with on-farm mixing and feeding. The Food Standards Agency's guidance on the minimum requirement of assurance schemes is a useful reference document for those devising such schemes and drafting codes of practice.

32. Since the publication of the Committee's review of on-farm feeding practices the following legislative measures have been introduced.

Feed Hygiene Regulation (183/2005)

33. This legislation requires feed business establishments (including farms) to be approved or registered and adopt risk based practices Farms must follow certain operating procedures. This includes standards relating to the prevention of contamination and spoilage of feed, ensuring clean equipment for the storage and transport of feed and the maintenance of certain records.

34. The Veterinary Medicines Regulations 2013 apply to manufacturers of medicated premixtures and feedingstuffs the conditions of Regulation 183/2005 which govern the approval of feed business establishments.

35. In addition, farms that mix medicated feedingstuffs, certain feed additives (e.g. coccidiostats and histomonostats), vitamins and trace elements must apply the principles of HACCP (Hazard Analysis and Critical Control Points). Many of

the provisions of Regulation 183/2005 reflect practices recommended by ACAF in its report on on-farm feeding practices.

Marketing and Use of Feed Regulation (767/2009)

36. This sets out labelling declarations for feed, establishes a catalogue of commonly used feed materials and contains a list of prohibited ingredients.

Official Controls on Feed and Food Regulation (882/2004)

37. This lays down the principles to be followed by designated competent authorities in the enforcement of these controls and specifies the action to be taken both to check businesses' compliance with the rules and when breaches are found. The Regulation is enforced in England through the Official Feed and Food Controls (England) Regulations 2009. Separate but parallel legislation applies in Scotland, Wales and Northern Ireland. The Veterinary Medicines Regulations 2013 enforce Regulation 882/2004 with regard to Schedule 5 products.

Legislation on TSE and BSE

38. Feed measures relating to the control of animal disease, including transmissible spongiform encephalopathies (TSEs) and the use of animal by-products, are the responsibility of the Department for Environment, Food and Rural Affairs (Defra). However, the Agency maintains a close interest.

39. A ban on the feeding of almost all processed animal proteins (PAP), with very few specific exceptions, to all farmed livestock has been in force in EU legislation since 2001. This is to prevent the possible contamination of feed for ruminant animals (cattle, sheep and goats) with meat and bone meal which might contain the prion that is thought to have been the vector for BSE. The prohibition was relaxed with effect from June 2013 to permit the feeding of pig and poultry PAP to farmed fish. Feed containing this category of PAP must be manufactured, stored, and transported under very strictly controlled conditions

to prevent any possibility of cross-contamination with ruminant feed. Regular sampling and analysis of compound feed for non-ruminants and ruminants other than farmed fish must be carried out to confirm the absence of animal material other than pig or poultry, using a scientifically validated test. The EU Reference Laboratory has validated for this purpose a polymerase chain reaction (PCR) test capable of detecting very low levels of ruminant material in feed as described in Commission Regulation (EU) No 51/2013 . The results must be kept available for inspection by the competent authority for at least five years.

40. Compound feed manufacturers producing complete feed, which contains pig and poultry PAP, for farmed fish do not require specific authorisation from the competent authority so long as they comply with the following conditions:

a) they are registered by the competent authority;

b) they keep feed only for aquaculture animals;

c) they produce complete feed for aquaculture use only on the holding on which it is produced; and

d) the compound feed contains less than 50% total protein.

41. The existing strict controls which exclude all mammalian meat and bone meal from ruminant feed will remain in place. There are no plans to review these controls.

Legislation on Medicated Feeds

42. The Veterinary Medicines Regulations apply the conditions of approval in 183/2005 to feed business establishments manufacturing medicated feeds. They also make provision to enforce Regulation 882/2004.

Guidance and assurance schemes

43. Farm assurance standards have been refined since 2003 to take into account the legislative requirements of Regulation 183/2005 on feed hygiene and Regulation 767/2009 on the marketing and use of feed. In the egg production sector, Lion Quality Eggs has requirements on feed hygiene and traceability in accordance with relevant legislation. The Red Tractor Assurance standards include feed specific standards which relate back to the legislative requirements, and include some additional requirements (over and above those in the legislation) which enhance traceability.

44. The Red Tractor scheme produced a Code of Practice for On-Farm Feeding a decade ago and this was revised in 2010 to take account of legislative changes. The revisions were made in full consultation with the FSA and other stakeholders. The document is not restricted to scheme members and is available for free download from the Red Tractor website.

http://assurance.redtractor.org.uk/resources/000/824/525/rt_code_farm_feeding.pdf

45. Red Tractor Assurance and Lion Quality Eggs require feed to be supplied by recognised feed assurance schemes such as those run by the Agricultural Industries Confederation (AIC). The schemes for feed supply and farming dovetail well together; liaison between Red Tractor and AIC provides consistency of approach.

46. The three feed/ food safety schemes operated by AIC (Feed Materials Assurance Scheme, Trade Assurance Scheme for Combinable Crops and Universal Feed Assurance Scheme) have been reviewed and revised regularly throughout the last decade to take into account new legislative requirements, emerging risks and industry best practice. In addition, AIC has worked with inspection and certification companies operating the schemes to further

strengthen auditor competence and improve compliance with the standards. AIC would estimate that in excess of 98% of feed ingredients and compound feeds produced in the UK are now subject to independent inspection and certification under an AIC scheme.

47. AIC has also worked closely with scheme owners and trade associations at an international level to manage safety risks at source, and strengthened links with UK scheme owners such as Red Tractor, Quality Management System and Scottish Quality Crops.

48. Since 2005 the National Association of Agricultural Contractors has run an assurance scheme for mobile feed mixers and processing which ensures that assured mobile mixers comply with legislative requirements for traceability, hygiene and operator competence. For on-farm mixing, the industry produced Code of Practice is available to all on-farm mixers (not just assurance scheme members).

III Review of Current On-farm Practices (Paragraph 17 of original report)

49. The production, processing, storage, transport and distribution of safe and suitable feeds are the responsibility of all participants in the food chain, including farmers. It is essential therefore that farmers' adopt necessary controls to ensure production of safe feed and food. An overview of the main elements of sources of feeds, on-farm storage, mixing and feeding is given as a flow diagram in Annex I. The following sections identify areas that require particular attention.

Sources and Selection of Feedingstuffs (including feed materials, supplements and compounds) (Paragraphs 12-46 of original report)

50. In the 2003 report it was noted that feeding ruminant protein to ruminant animals, such as cattle and sheep, was prohibited in the UK from 1988 in response to the Bovine Spongiform Encephalopathy (BSE) crisis, with mammalian protein banned from such feed in the European Community from 1994. In the UK, mammalian meat and bone meal was banned from all feed for farmed animals on 1 August 1996, the date of the reinforced feed ban. The various feed bans have been part of a range of measures effectively controlling and reducing the number of new BSE cases from a height of 36, 682 confirmed cases in 1992, to 3 confirmed cases in 2013. In 2001, various controls on BSE and scrapie were consolidated into the Transmissible Spongiform Encephalopathies (TSE) Regulation (EC) No. 999/2001. The TSE Feed Ban part of this regulation, controlling the use of various animal proteins and processed animal proteins in farm animal feed has evolved since then, but remains a cornerstone in the prevention of new BSE cases arising or new novel TSEs developing. Further details on the current controls can be found in Annex V.

51. Livestock farmers have several choices regarding the types of feed they use and the form in which they are fed. Feeds may be either purchased or produced on the farm where they are used (on-farm produced). Purchased feeds may be

obtained directly from other farms, from compound feed mills, feed merchants, supplement suppliers or food processing factories.

52. On-farm produced feeds are primary agricultural products such as forages, cereals and pulses. Forages may be fed fresh (e.g. grass) or preserved (e.g. silage or hay). Cereals such as wheat and barley, and pulses such as peas and beans, are most commonly harvested at the point of maturity when the seed heads (grains) are at their fullest. These grains may be used on farm or sold for feed or food use. Generally, some form of processing is required to breakdown the seed coat (husk) and improve digestibility. The most common processing prior to feeding involves physical treatment of the grains, e.g. rolling or grinding. Ground cereals and pulses are used both for direct feeding on farms and by commercial feed manufacturers. On some ruminant farms, the entire grains may be treated with alkali (in liquid or solid form) such as caustic soda (sodium hydroxide) or ammonia, in order to degrade the outer seed coat and aid digestibility. Less common is the addition of propionic acid to barley to act as a preservative and aid digestion by beef cattle. Cereal grains harvested before they are fully mature may be crimped before storage as a means of improving the digestibility of the grain. A weak acid may be added to prevent aerobic spoilage. Cereal straw, which remains after the grains have been harvested, can also be fed to ruminant livestock, despite it having low digestibility in its natural state. However, as with grains this can be improved through treatment with caustic soda or ammonia. Cereals and pulses may also be harvested prior to maturity to produce whole crop cereal silage. This may be either ensiled and fermented or, when harvested at a later stage, treated with urea or alkali.

53. Co-products (also referred to as by-products) are associated with the production of food or drink for human consumption, and include cereal by-products after the extraction of flour for bread making (e.g. wheat feed), oilseed meals after oil extraction (e.g. soya bean meal) and liquid by-products (e.g. whey from the manufacture of cheese). By-products of a number of industrial processes,

including starch extraction and fermentation, are also used (e.g. maize gluten feed). Moist co-products are usually obtained from local food factories, whereas, dry products may be transported over long distances or imported and pass through intermediate stores.

54. Additionally, primary and manufactured foods intended for direct human consumption, which are either surplus to requirements or have been rejected for quality or presentational reasons (e.g. misshapen biscuits, crisps, vegetables) may either be sold direct to farms or via intermediate processors. However, **farmers buying direct from food factories should find out why the food has been rejected and be aware of the possible hazards to livestock. The UK Former Food Processors Association has been formed in the last two years to promote the industry standards**

55. Manufactured complementary compound feeds are purchased to complement home grown and other feed materials, and provide the animal with a properly balanced diet. These compounds will vary from vitamin/mineral supplements to higher inclusion/usage products. Many poultry and pig farmers will purchase complete compound feeds requiring no further mixing or dilution on farm. Feed blocks are another feedstuff used to feed livestock.

56. Details of type and quantities of some of the feed materials used on livestock farms are given in Annex VI. It should be noted that feeding ruminant protein to ruminant animals, such as cattle and sheep, was prohibited in the UK from 1988, with mammalian protein banned from such feed in the European Community from 1994. In the UK, mammalian meat and bone meal was banned from all feed for farmed animals in 1996. The latest EC controls prohibit feeding processed animal protein (including that from poultry) to all farmed animals, although there are some strictly controlled exceptions:

- the feeding to farmed animals other than ruminants of fishmeal;

- the feeding to farmed animals of gelatin derived from non-ruminant animals;
- the feeding to farmed animals other than ruminants of dicalcium phosphate;
- the feeding to farmed animals other than ruminants of hydrolysed protein;
- the feeding to farmed animals of milk and milk products.

Transport (Paragraphs 18-21 of original report)

57. The 2003 report made reference to requirements for the transportation of feed materials. In addition to the guidance provided in 2003, hauliers of animal by-products, which may be used in farm animal feed, including milk; processed animal proteins such as fishmeal or blood meal; or derived products such as blood products or dicalcium or tricalcium phosphate of animal origin need to be registered under the ABP Regulations and in certain instances the TSE Regulations. Dedication of use, or cleaning between loads is required after haulage in bulk of certain feeds, such as fishmeal, destined for use in only feed for non-ruminant animals and before haulage of feeds destined for use in ruminant animals.

58. New paragraph to be inserted: Non medicated feeds must be handled separately from medicated feedingstuffs to prevent contamination. [taken from Annex III of Regulation EC 183/2005].

Receipt and Handling (Paragraphs 22 -24 of original report)

59. This section deals with discharge of feeds on arrival at the farm. Ideally, feeds will be discharged to their point of final storage without being discharged to an intermediate point. Bulk feed deliveries may be made with tipper lorries which would preferably unload directly into the store/bunker or into an intake pit for conveyance to a bulk bin. Blower lorries discharge dry feeds directly through a blow line into lofts or bulk bins, etc. Bulk liquids are carried on tankers which

pump the liquid direct to the storage tank. Bagged deliveries are made on flatbed lorries with curtained sides or tarpaulin covers.

60. Revised paragraph 23: When direct discharge to the final point is not possible, or when farmers need to move feeds to different premises, they may use tractors fitted with front-end loaders or farm trailers. Feed Business Operators (FeBOs) should take adequate measures to keep clean, and where necessary after cleaning, to disinfect in an appropriate manner, facilities equipment, containers, crates and vehicles used for producing, preparing, grading, packing, storing and transporting feed.

For harvested forages such as silage or hay, farmers may use their own machinery, or that of specialist contractors to cut, transport and store the crops. While some of the machinery, particularly that involved in harvesting, is specific for the purpose, some will have multiple uses.

On-Farm Storage (new paragraph to follow paragraphs 25-26 of original report).

61. There are many options for on-farm storage. These include:

- storage bins or silos for bulk materials which may be sealed or unsealed;
- bunkers or bays for storing bulk materials on the floor, usually separated by concrete or wooden partitions;
- tanks for liquids;
- sheds or other farm stores for bagged ingredients; and
- feeds stored in heaps in unsealed buildings.

62. Due to the variety of feedingstuffs, there is a wide range of potential storage systems and associated mixing and feeding systems on farm. Storage is needed both before and after mixing. The physical nature of the material (i.e. whether dry, liquid or moist) will determine the type of storage facility. The feeding system on the farm will also be taken into account. Because of the over-riding influence of physical form of the material on the storage options, these are described separately below.

63. Separation during storage and use is required by the TSE Regulation, if feeds only eligible for use in non-ruminant animals, such as fishmeal, are present on farms where ruminants are kept.

Dry Feedingstuffs

64. Dry feeds or feed materials stored in bulk are held in sealed hoppers, lofts or bins. Surprisingly some may also be stored outside where they are exposed to the elements. Feed may be stored in bays or bunkers, on the floor, particularly on dairy and beef farms. Feeds and feed materials are usually moved from the storage hoppers or bins to the mixers or feeding troughs/hoppers by means of conveyors or augers, particularly on pig and poultry units. Pelleted, compound dairy feeds may be stored in a loft above the milking parlour for easy dispensing to dairy cows during milking. Materials stored in an unsealed bunker may be carried by front-end loader to a feeder wagon for mixing with silage to produce a ration for dairy cows. Low inclusion materials such as vitamin and trace element supplements included at less than 50 kg/tonne in the home mixed ration, and feeds used in relatively small quantities, are purchased and stored in sealed paper or plastic bags.

Moist Feedingstuffs and Dried Forages

65. These materials are most commonly found on ruminant farms although older pigs may occasionally be fed on moist materials (brewer's grains, pressed sugar beet pulp and bread) or on root crops (potatoes and fodder beet). Root crops may be fed *in situ* so avoiding the need for harvesting and storage. Whilst dairy cows, beef and sheep are able to graze grass for several months of the year, they also need preserved forages such as silage or hay. Silage is stored either in large bunkers (clamps) or in smaller bales sealed in plastic to prevent deterioration as a result of exposure to air. Once opened, the silage face is exposed to the elements; birds are a particular problem as far as whole crop

cereal silages are concerned. Hay and straw are stored dry (i.e. less than 18% moisture content) in buildings or under plastic sheeting, to prevent deterioration with exposure to moisture.

Liquid Feedingstuffs

66. Use of liquid feed materials is largely restricted to ruminant and pig farms although addition of soluble vitamins to drinking water is common on many poultry units. Liquid feed materials are stored in tanks of varying sizes. Some of these materials may be consumed directly (e.g. molasses may be 'licked' from specially designed feeders or metered into feeder wagons for inclusion in the complete diet). Others, particularly those found on pig farms, may be transferred by pipes to a liquid mixing tank for ultimate feeding via a pipeline feeding system.

Liquid Feedingstuffs (new paragraph to follow paragraph 29 of original report)

Medicated Feedingstuffs

67. Medicated and non-medicated feed intended for different categories or species of animals must be stored in a manner to reduce the risk of feeding to non-target animals. [Taken from Annex III of 183/2005].

Mixing and Feeding Practices (Amending paragraphs 30 and 31 in original report)

68. The principal objective of feed mixing is to ensure that there is a homogenous mix of the feed ingredients, particularly those added at low levels (e.g. minerals, trace elements, vitamins and medicinal or specified feed additives). This ensures that livestock consuming the feed receive neither an excess nor a deficiency of any particular ingredient or nutrient. There are many different types of farm mixing systems (including the shovel on very small units) ranging from dry mixers through to liquid mixing tanks, feeder wagons and,

visiting mobile mill and mix units. Since feeding systems and practices vary widely for different forms of livestock production, they are described separately in paragraphs 73-88 for pigs, poultry and ruminants.

69. Pigs are omnivores and the comparability of the pig's digestive system with that of humans has influenced how pigs have been fed over many generations. Feeding a variety of human foods and food co-products has been common practice. This has led to a number of different types of feeding systems, ranging from traditional dry home-mix units to liquid feeders.

70. The feeding of kitchen waste, waste from catering facilities and processed catering waste ('swill') was banned in the wake of the Foot and Mouth Disease outbreak in 2001. The incursion of exotic notifiable disease into the UK, from the use of catering waste in feed for farm animals, which has been generated from food waste brought into the UK from disease affected areas of countries outside the EU, through illegal movements by road, air or sea and destined for commercial or personal use, remains a potential threat to the agriculture industry and wider business community.

71. It is generally thought that approximately 50% of growing and finishing pig units involve some form of home- mixing activity. Sow breeding units are more focused on feeding purchased complete compound feeds, not least because an increasing proportion is kept out-of-doors on more extensive farming systems. Some examples of the main types of feed mixing activity are shown in Table 1.

Table 1 - Examples of Feed Mixing Activities on UK Pig Farms

Examples of Purchased Manufactured Feeds	**Examples of 'Home Mixing' Activity**
Complete compound feed.	No further mixing required. Provides the complete diet.

Complementary compound feed ranging from vitamin/ mineral supplements to higher inclusion (10-40%) mixtures.	Will be mixed on-farm with cereals (home grown or purchased) and, possibly, other dry feed materials (often purchased) including medicinal and/or ~~zootechnical~~ specified additives. Daily ration may also include moist feeds and vegetables.
Complementary compound feed (dry but designed to suit liquid systems).	Mixed with other liquid components and other dry feed materials including medicinal and/or ~~zootechnical~~ specified additives.

NB These are examples only and do not give an exhaustive summary of the possible feeding systems or combinations.

Feed Mixing Systems for Pigs (Addition of new text after paragraph 32b of original report)

72. The main feed mixing systems are:

(a)Dry mixing – takes place on small farms where relatively few pigs are involved, it may involve nothing more than a few feed materials, a bought-in complementary compound feed or vitamin/trace element premix and a shovel. However, dry mixing is generally mechanised. Feeds are usually mixed in batches suited to the size of the mixer and are transferred to other storage bins prior to feeding. The majority of pig home-mixers produce feed entirely for their own use.

(b)Liquid feeding – a proportion of growing and finishing pig farms, historically those sited close to suitable food factories, feed liquids requiring a mixing tank and delivery pipelines to each pen. Many farmers feed a combination of liquid feed materials and dry feeds, mixed in the liquid mixing tank.

Farmers who are liquid feeding medicated premixes, should refer to the VMD Good Practice Guide – Liquid Pig Feed on the VMD website. http://www.vmd.defra.gov.uk/pdf/LiquidPigFeed.pdf

(c)Mobile mill and mix services – in addition to static mixers on farms, a number of service companies operate mobile mill and mixing services. These visit farms,

processing homegrown cereals, and mixing them with purchased feed materials, including sources of protein and minerals.

Feeding Practices for Pigs

73. The choice of feed type and feeding system is dictated, in part, by the scale and type of housing. There is a preponderance of indoor pig units, although an increasing proportion of UK breeding pigs are now kept out-of-doors.

Indoor Pig Units

74. Traditional dry mixers tend to produce feeds in meal form; few have the facilities to manufacture pelleted feeds. It is estimated that approximately 20% of pigs are fed on diets which include liquids. Although liquid feeds tend to be cheaper than dry feeds, the need for specialised storage and handling facilities means that they tend to be used more on larger sized units. The majority of pig farmers, including home mixers, buy in their piglet starter feed as this is difficult to produce in most farm situations. This high quality, milk-based feed is usually supplied in small pellet form from specialist manufacturers and encourages early feed consumption helping the piglets during the weaning phase. After weaning, dry feeds in meal or pellet form are generally fed in troughs, although 'on-floor' pelleted feeds may be fed. Liquid feeds are pumped into troughs for direct consumption by pigs. Groups of growing and finishing pigs usually consist of animals of similar age and this permits formulation or purchase of diets that meet their specific nutritional requirements depending on the weight of the animals. Straw based systems have become increasingly prevalent

Outdoor Pig Units

75. Outdoor sows may be fed in a variety of ways (e.g. by hand or by a mechanical feeder). Home mixing is rarely practised on these farms, as loose 'meal' and even pellets would quickly be wasted when cast on the ground. Instead, farmers tend to purchase compound feed in large nugget form to minimise wastage. Sows are sometimes fed on root crops or moist food co-products. Some growing pigs are reared outdoors for specialist markets e.g. free range and organic.

Poultry

76. There are four main types of producer as far as the size and scale of feed purchase and on-farm mixing are concerned. These are:

a) integrators who make their own feed, keep their own birds and even run their own processing factory or egg packing station. Some of these will also sell feed;

b) those who have farms and undertake processing but do not make feed, and buy compounds from commercial feed manufacturers;

c) independent flock farmers who buy all of their feed from commercial feed manufacturers; and

d) independent flock farmers who have feed mixing facilities to produce their own 'home-mix' ration(s). There are not many producers in this group.

Integrators who produce feed for their own use and for sale could be categorised as both home mixers and as commercial feed manufacturers. They are of a scale at least as big as, if not bigger than, the largest independent commercial feed businesses.

77. **Some examples of the main types of feed mixing activity are shown in Table 2.**

Extent of Home-Mixing for Poultry (amending Table 2 of original report)

Table 2 - Examples of Feed Mixing Activities on UK Poultry Farms

Examples of Purchased Manufactured Feeds	**Examples of 'Home-Mixing' Activity**
Complete compound feed.	No further mixing required. Provides the complete diet.
Complementary compound feed ranging from vitamin/ mineral supplements to higher inclusion (10-40%) mixtures.	Will be mixed on-farm with cereals (home-grown or purchased) and possibly, other dry feed materials (often purchased) including medicinal and/or ~~zootechnical~~ specified additives.

NB These are examples only and do not give an exhaustive summary of the possible feeding systems or combinations.

78. All the activities outlined in Table 2 involve dry feeds and dry feeding. Apart from integrators described in paragraph 36(a), the majority of poultry farmers now purchase proprietary compounds. Indeed, even integrators may buy-in feed, particularly low volume lines. There are a few traditional 'home mixers' who purchase either a proprietary complementary compound feed (high protein concentrate) for mixing with cereals, or a mineral/vitamin premix for mixing with cereals and protein materials.

<u>Feed Mixing Systems for Poultry</u>

79. The main feed mixing systems for poultry are as follows.

a) Dry mixing – on a smaller scale, mixing is done with a grinder, a standalone weigher, a static mixer with associated tip-in hopper and a bagging-off point. As

the scale increases, so does the complexity until at the extreme end there may be several bulk raw material bins feeding one or more weighers, a mixer with additives incorporated via a blow-line from the tip-in point, grinders, pelleting lines with different sized presses to form different pellet sizes, coolers, fat sprayers and bulk bins for finished product storage.

b) Mobile mill and mix services – some poultry farms employ the services of a mobile mill and mixing service.

Feeding Practices for Poultry

80. In general, the choice of feeding system is dictated more by the scale and type of housing than by whether the feed is a home mix or purchased compound feed. Most of the feed produced by traditional home mixers will be in meal form. Larger scale mills are able to produce feeds in a variety of forms, including meals, crumbled pellets (crumbs) for very young poultry, or pellets (ranging from 2.0 mm for smaller birds to 4 mm for adult turkeys). Thus, even home mixers may choose to buy their starter feeds from a commercial feed mill to encourage higher early feed consumption by chicks or poults using crumbs or very small pellets. Early uptake is further encouraged by sprinkling the crumbs on sheets of cardboard to give the young birds easy access to the feed. Broiler producers may have a bin of wheat which is mixed proportionately with the complete feed or may have the feed delivered in combination with wheat,

81. For poultry reared or bred on the floor in sheds, the feed will be delivered around the house from the bulk feed container by track feeders. Such a system is common for broilers, broiler breeders and replacement laying hens. Alternatively, hoppers or pan feeders may be arranged around the poultry house. This type of regime is more common for turkeys. Laying hens in barn systems or cages may be fed from troughs or chain feeders. For free range or ‘outdoor reared’ poultry, feeding systems within the available housing are

similar. However, some flocks may be fed out-of-doors in troughs. In addition to the 'compound' feed, free-range flocks also have access to the land or pasture, so giving them freedom to peck at the soil and vegetable matter, also pick up worms, insects and small mammals.

Ruminants

Extent of Home Mixing for Ruminants

82. 'Home mixing' in the broadest possible sense is practised on a high proportion of dairy, beef and sheep farms. The feeds used and the types of systems employed are a direct consequence of the ruminant's unique digestive capabilities to digest and utilise large quantities of home grown forages such as grass and other arable and fodder crops with little additional supplementation. However, the available forages are frequently insufficient to meet the nutritional needs of modern livestock, particularly during the colder winter months, and so supplementation with other forages, concentrates and compound feeds is common practice. Conserved forages, which form the basis of cattle diets during the winter, are bulky and therefore difficult to mix with other feeds. As a result there has been increasing use of feeder wagons to mix together all of the dietary components to produce a complete diet.

83. Some examples of the main types of feed mixing activity are shown in Table 3.

Extent of Home-Mixing for Ruminants (Amending Table 3 of original report)

Table 3 Examples of Feed Mixing Activities on UK Ruminant Farms

Examples of Purchased Manufactured Feeds	**Example of 'Home-Mixing' Activity**

Complete compound feed.	No mixing required. Most ruminant compounds are 'complementary' feeds requiring a forage element to complete the daily ration.
Complementary compound feed for feeding with forages.	No actual mixing required but animals also require access to silage, hay or other moist feeds or forage crops. Alternatively the compound may be used to supplement a semi-complete diet that has been mixed in a feeder wagon.
Complementary compound feed ranging from vitamin/ mineral supplements to higher inclusion (10-40%) mixtures.	Mixed in a static mixer with cereals (home grown or purchased) and other dry feed materials (sometimes including medicinal and/or ~~zootechnical~~ specified additives). Daily ration will include forages (fresh or preserved) and possibly moist feeds and root crops fed separately.
Complementary compound feed ranging from vitamin/ trace element premixes to higher inclusion (10-40%) mixtures.	Mixed in a feeder wagon, if necessary, with cereals (home grown or purchased) and other dry feed materials (often purchased), silage and other forages, moist feeds and root crops to produce a complete diet.

NB **These are examples only and do not give an exhaustive summary of the possible feeding systems or combinations.**

Feed Mixing Systems for Ruminants

84. The main feed mixing systems are:

a) Feeder wagons - the bulky nature of forages means that they are generally difficult to mix with other feeds without the use of specialist machinery. However, a significant and increasing proportion of dairy and beef farmers now use feeder wagons or complete diet feeders to mix forages with other feedingstuffs, complementary feeds or additives to produce total mixed rations. Feeder wagons are fitted with weighing facilities that allow specific amounts of individual feeds to be mixed together. Such rations may be fed several times a day in troughs. Some farmers use feeder wagons to mix forages with other dry or moist feed materials for feeding in troughs whilst still feeding compound feeds, either in the milking parlour or through out-of-parlour feeders.

b) Dry mixing – a few ruminant farms produce their own home mixed 'compound' equivalent for feeding separately from the forage component.

c) Mobile mill and mix units - as for pigs and poultry, some ruminant farms employ the services of a mobile mill and mixer unit.

Feeding practices for Ruminants

85. Forages, either fresh or conserved, constitute the main feeds for most ruminant livestock. Fresh forage (e.g. grass) is usually grazed directly by livestock, and not mixed with other feeds. Because of their bulk and physical nature, conserved forages (particularly hay and silage) may be fed as the sole feed or as discrete feeds, depending on the productivity of the stock in question. Grass or maize silage stored in clamps is fed to cattle or sheep on a 'self feed' basis, with access controlled by some form of physical barrier. This approach is favoured where the silage clamp is in close proximity to the cattle or sheep accommodation. Alternatively, silage may be removed from the clamp and fed in ring feeders, or along troughs or feed passages, either on its own or as part of a complete diet. Either way, livestock have access to forage for most of the day. Conservation of silage in bales provides greater flexibility, particularly in respect to where it can be fed on the farm and the livestock to which it can be fed.

86. Where forages alone are insufficient to meet the nutritional requirements for growth, pregnancy or milk production, additional feeds are provided. These may be fed as discrete meals or as mixtures of feeds, the former being particularly common for bulky moist feeds (e.g. brewers' grains) or where only one other feed (e.g. a cereal or a compound feedingstuff) is fed.

Feeding practices for Ruminants (adding new text after 2nd bullet point in paragraph 46)

87. Ruminant livestock are generally fed on a group basis. Exceptions to this are:

•young calves which, during the first few weeks of life, are usually individually penned and fed on a purchased milk replacer and calf compound. Calves may be fed whole milk produced on farm. The compound may be a home- produced or purchased meal, a coarse mixture or a purchased pelleted feed; and

•milking cows, which are usually fed compound feed in the milking parlour or through programmed out-of-parlour dispensers. The amount of compound feed they receive is related to the quality and quantity of other feeds available to them outside the parlour and their level of milk production. Such compounds are purchased as pellets to aid their flow through the feeding equipment.

Ordering Medicated Feed

88. Farmers can only be supplied with medicated feed if they have received a prescription from their vet. Livestock farmers should contact their vet when:

- they believe that they have a livestock health issue that requires veterinary intervention; and
- they have previously used medicated feed and the disease has not been resolved, or a new disease outbreak has occurred.

89. Farmers should only approach feed suppliers with orders for medicated feed once they have obtained a medicated feedingstuff prescription from their vet.

Responsible use of antimicrobial medicines

90. Antimicrobial resistance is of global concern in both human and veterinary medicine. The majority of veterinary antibiotics are prescribed and administered to livestock in medicated feed. In all cases where an antibiotic veterinary medicine is prescribed, farmers should consider reviewing the management practice of the animals in their care with a view to minimising disease and thereby reducing the amount of prescribed antibiotics. The

farmer's veterinary surgeon should be able to advise on all possible means to reduce the need for antibiotic treatment of their animals in the future. The responsible use of medicines in Agriculture (RUMA) Alliance has produced information on the responsible use of antibiotics for the different livestock sectors. Of particular importance is the strict observance of withdrawal periods following use of medicated feed and the prevention of any inadvertent cross contamination.

IV Identification of Possible Hazards and Risks Associated with On-farm Feeding (paragraphs 47 to 49 of original report)

91. In order to maximise the safety of animal feed and food products, thus protecting animal health and the ultimate consumer, **farmers must apply good manufacturing practice across the farming system and adopt a systematic approach to the identification, evaluation and control of hazards within their own feed production and feeding system.** In evaluating their own procedures, **farmers are encouraged to adopt the principles of Good Agricultural Practice (GAP)/Good Manufacturing Practice (GMP).** There are various guides to GAP and GMP that can be used to identify the general hazards relating to on-farm feed production and handling. Through the application of GMP, farmers can prevent many of the possible hazards from entering into, or developing on their farms. **Alternatively, farmers may choose to initiate a Hazard Analysis and Critical Control Point (HACCP) plan.** HACCP is most useful where hazards are known to exist on the farm and require management to ensure that they do not pose a threat to human or animal health.

92. Section III reviewed the range of on-farm mixing and feeding practices in the UK. The following list summarises the general areas of concern identified in that section:

- sourcing and selection of feedingstuffs;
- transport;
- receipt and handling;
- on-farm storage;
- manufacturing and mixing;
- feeding practices;
- competence and training; and

- documentation and traceability.

93. This review has highlighted the need for farmers to consider their own farming system when identifying the key components involved in each process step. In overview, these are summarised in Annex II. Please note this Annex does not identify hazards per se; these will be dealt with subsequently.

94. Article 5(1) and Annex I of EC Regulation 183/2005 sets out requirements for FeBOs at the level of primary production of feed.

Practices and Practical Control Measures

Hazard Analysis and Critical Control Points (HACCP) (paragraphs 50 to 51 of original report)

Suggest paragraphs are redrafted to include the following:

95. Articles 6 and 7 of Regulation EC 183/2005 lay down requirements for feed business operators concerning procedures based on the HACCP principles. These include that the FeBO puts in place, implements and maintains a permanent written procedure or procedures based on the HACCP principles. The legislation provides details of the principles.

96. The FSA is developing an on-line tool to assist FeBOs to undertake analysis of the hazards associated with the activities they undertake and develop a HACCP study which details identified hazards and the steps taken to control them. The work involves further development of an existing tool called 'MyHACCP' which the FSA has produced for food businesses which can be found at https://myhaccp.food.gov.uk

97. Work on developing a MyHaCCP tool for the feed sector has been put on hold following recent discussion within Europe and within Codex on HACCP approaches and the flexibilities necessary across the range of feed businesses.

98. In addition, the FSA is currently reviewing its MyHACCP tool for food businesses to ensure it is an appropriate approach for the range of businesses targeted.

99. The outcome of both of these will inform our decision on further development of the proposed tool for feed businesses.

Good Agricultural Practice (GAP) and Good Manufacturing Practice (GMP) Sourcing and Selection of Feedingstuffs (amending text of paragraphs 53 to 58 of original report)

100. Through GAP and GMP, farmers can successfully avoid many of the above hazards. The following sections, read in conjunction with Annex III, are designed to illustrate the role of good practice in hazard prevention and management.

101. Paragraph 53 – Article 5(6) of EC Regulation 183/2005 requires that FeBOs and farmers shall only source and use feed from establishments which are registered and/or approved. This is to ensure that the hazards and potential risks associated with the supply of raw materials are minimised.

102. **The Committee was also concerned that farmers purchasing surplus food materials direct from food factories should not assume that the material is necessarily safe as animal feed.** Farmers should ensure that former foodstuffs are covered by an appropriate assurance scheme such as FEMAS or the appropriate module of the BRC scheme. Such products can be susceptible to spoilage e.g. mould and mycotoxin formation, and require effective removal of any packaging prior to feeding.

103. The commercial feed industry in the UK has taken steps to ensure that feed materials and manufactured feeds are judged independently to be safe and fit as animal feedingstuffs. As a result, many merchants and compounders are

already audited independently to a certificated standard embracing both GMP and HACCP. Such companies, in turn, require their suppliers to be 'assured'. Similarly, many UK livestock assurance schemes require their farmer members to purchase feedingstuffs only from assured sources. **By opting to buy from assured sources, the farmer is spared the need to undertake his own in-depth checks unless he has reason to believe that the product is not sound.**

104. As the commercial feed sector increasingly subscribes to assurance schemes, non-assured materials, including those produced on-farm or traded locally between farms, are the only feedingstuffs not subject to the standards of quality control expected of other parts of the industry. **Improved and consistent standards of quality control should be the aim of the farming community and this must eventually encompass all feeds/feed materials from whatever source.** There is no reason, not even on the grounds of small or irregular volumes, for anyone to be excluded from this requirement. Although the onus for demonstrating quality should be on those supplying the material, **farmers should exercise particular caution when purchasing cheap or unusual feedingstuffs,** including distressed materials. A number of recent food safety incidents in Europe have arisen from contaminated feed materials supplied either to farms or feed manufacturers. It is very much a case of 'buyer beware'. **The European Commission's proposals on feed hygiene will introduce the registration of all feed businesses, including producers of feed materials, who would be required to apply HACCP principles. The Committee supports this development.**

105. Farmers who utilise their own products in effect become their own suppliers with all of the expectations this imposes. The farmer must apply GAP/GMP to the production, handling and storage of such materials taking care to ensure that pesticides and herbicides are used in accordance with published recommendations, and that storage facilities and equipment are cleaned and maintained appropriately. Farmers are reminded that visual inspection alone is

insufficient and that some testing is necessary to demonstrate that feedingstuffs do not contain excessive levels of, for example, microbial pathogens, mycotoxins or other undesirable substances. A reputable, accredited laboratory should be used for this purpose**. Farmers who sell feed materials to other farmers or businesses will be required to demonstrate 'due diligence' to their customers; such farmers are likely to require membership of an appropriate farm assurance scheme.**

106. E-commerce is increasingly used as a medium for buying and selling crops and other feeds. There are no additional hazards for materials traded via E-commerce, provided they come from assured sources. However, particular care is needed if buying feed additives or other products advertised via the internet. It is important to ascertain that products bought from outside the UK comply with UK law.

Transport (paragraphs 59 to 61 of original report)

107. Hazards that may be a risk to feed or food safety can be introduced as a result of contamination prior to arrival at the farm during transportation. Such contamination will not be eliminated simply by good management on the farm and may not be controlled by further processing through the home mix plants (e.g. materials contaminated with salmonella as a result of transport in unclean vehicles will not be effectively de-contaminated unless the feed itself is subsequently processed at a certain temperature for a specified duration or treated using organic acids). Therefore, transportation to the farm must be tightly controlled.

108. **It is imperative that equipment used to transport feeds, either to a home mixer or within the farm itself, is suitable for the purpose, has not been used previously to transport inappropriate loads, is adequately cleaned**

and is driven by trained personnel. Inappropriate loads would include, for example, manure, soil, carcases or other meat materials, domestic waste or non-food/non-feed items such as coal, glass and fertiliser.

109. When the feed supplier provides the transportation, farmers should ensure that they can provide evidence of membership of the industry-wide scheme for road haulage, or request written assurance that the correct standards are applied, adhered to and maintained. **Compliance with the code of practice for road haulage will provide assurance to the farmer.** This code includes a full list of prohibited materials, haulage of which could pose a threat to animal or human health. There is also a list of other materials which trigger thorough cleansing after haulage. The responsibility for safe transport moves to the farmer in situations where the farmer's own vehicles are used. **Farmers responsible for organising their own road haulage are advised that compliance with the code of practice for road haulage will provide them with a level of independent assurance.**

Receipt and Handling

110. The first task here is for the farmer to check that the delivery conforms to the order and that all accompanying paperwork is correct. A visual appraisal of bulk goods is helpful in confirming that the product is as required and free from visible contamination. It would be in the farmer's best interests to take a sample prior to discharge for future reference and possible testing.

111. If the feedingstuff arriving at the farm fails visual and/or paperwork checks, then the supplier must be contacted and an appropriate course of action agreed. Unsafe feeds must be disposed of legally.

112. The risks of spoilage or contamination will depend on the discharge facilities available on the farm and associated practices. These may vary from tipping the raw material directly from a trailer onto a concrete yard that is open to the elements and crossed daily by livestock and/or machinery, to the raw material being blown into a closed bin used specifically for that raw material. **The risks are considerably higher for open tipping than for closed bins.** When direct discharge to the final storage point is not possible, or when there is a need to move feeds to different premises, tractors fitted with front–end loaders or farm trailers may be used. This equipment is rarely dedicated to handling feed alone, and is often used for a wide variety of materials including soils and manure. This poses a high risk of contamination and such machinery should be cleaned thoroughly before feed use. **The hazards and risks associated with the discharge and handling system must be assessed on each farm and effective control measures applied.**

On-farm Storage

113. **Assuming that the feedingstuffs which have been delivered to the farm are wholesome and present minimal or no risk to livestock or humans, they must be stored in such a way as to maintain their high quality status.** For example, if a feed material is stored in warm, damp conditions, the fungus *Aspergillus flavus* could develop and grow, producing Aflatoxin B_1, thus rendering the raw material both toxic and illegal for use in livestock feed. Similarly, overheating can occur where damp materials are stored in poorly ventilated conditions, resulting in elevated temperature, growth of mould, and in extreme cases, combustion.

On-farm Storage (amending text of paragraph 66 of original report)

114. It is important that feed materials are kept separate from each other and from other farm materials (e.g. fertiliser or other farm chemicals), and that they are clearly identifiable. Due care should be paid to the cleanliness and driving of

vehicles within storage sheds. It is of critical importance that manufactured feeds (bought-in or home- produced), particularly those containing medicines or specified feed additives, do not contaminate feed materials and vice versa, and that medicated feeds are kept separate from non-medicated feeds. Storage areas for each type of feed should be entirely separate and clearly marked, and bulk bins should be either dedicated to particular feeds or cleaned thoroughly if switching between different feeds.

115. There are many different types of storage as identified in Section III. Feed material suppliers are best equipped to advise on the most effective means of safe storage. These will vary depending largely on the moisture content of the material or feed. In the case of moist feeds, including home-produced forages, there are three key principles (in addition to the more general rules on hygiene). These are: consolidate, sheet and weigh down. By these means air is forced from the stack and excluded, thus safeguarding against undesirable fermentation.

Manufacturing and Mixing (Amending text in paragraph 70 of original report)

116. Home mixing is a general term applied to any process by which the farmer mixes differing feedingstuffs together to form either a compound feed and/or a daily ration for the livestock. A wide range of mixing facilities is in use as mentioned in Section III, ranging from the traditional static mixing systems (similar to those used by the feed industry), more recent feeder wagons for ruminants and liquid feeding systems for pigs, to mobile mill and mixing operations that move from farm to farm. In each case, the objectives of the mixing operation are the same:

a) to obtain a thorough mix of all components, in the right proportions, such that there is good dispersion of nutrients and micro-elements within the feed;

b) to avoid cross-contamination between batches of differing feeds thus preventing unwanted materials or additives in non-target feeds;

c) to avoid contamination of feed from build-up of stale residues within the plant through regular cleaning; and

d) to achieve a consistent product and safeguard against microbial spoilage in liquid feeds.

117. Achieving a thorough mix of the intended components relies on adding the correct amount of each ingredient and ensuring adequate mixing. This requires calibration of the weighing/addition equipment (including buckets, scoops, etc.) and mixing efficiency tests (achieved for example by testing a number of samples from the mix for salt or one of the trace elements such as manganese). Such tests should be conducted on a bi-annual basis.

118. At this point, it may be appropriate to consider in a little more detail the application of HACCP principles within the on-farm mixing situation. Apart from the importance of GAP/GMP in safeguarding against possible hazards, there are instances where farmers are faced with handling existing hazards which can pose a threat to animal and human health. A good example is medicinal and/or specified feed additives in a feed mixing plant that also makes non-medicated feeds.

119. Consider the case of an approved and registered home mixer who produces a feed for growing pigs using a vitamin/trace element premix containing a “prescription only” medicine and who also produces, using the same plant and

equipment, a separate feed for finishing pigs containing a non-medicated vitamin/trace element premix. It is very important that no trace of the medicine gets into the finishing pig feed as this would either delay slaughter (the extent of which would depend upon the specified withdrawal period of the medicine) or may leave residues in the meat for human consumption. Note that the problems arising from cross-contamination could be even higher if the farmer is producing feeds for other species, which may suffer adverse effects from the particular medicinal product used. Any such adverse effects would be highlighted on the premix label. The farmer must not only ensure correct mixing of both feeds but also prevent any of the medicine/medicated feed from contaminating the non-medicated feed.

120. Critical parts of the farm where cross-contamination could occur are:

a) the bagged material store where the premixes are stored;

b) the weighing point for premix additions, including scoops, buckets;

c) the tip-in point for premixes and other minor ingredients;

d) the any transfer lines i.e. conveyors to the mixer;

e) the mixer itself;

f) any subsequent transfer system for the mixed feed e.g. auger to the bulk bins or bagging-off point;

g) the storage facility for the finished feed i.e. bagged store or bulk bins; and

h) any equipment used to move the feed to the animals.

121. Control at these critical points is vital. Annex III highlights some of the practical measures which can be taken to prevent cross-contamination. If a batch of non-medicated feed is to be produced after a medicated batch then the areas and equipment identified in paragraph 72 must be cleaned prior to manufacture. Cleaning may be achieved either by sweeping down with a clean brush or, if access is restricted or the feed plant in constant use, by “flushing” through the plant using a neutral material, e.g. barley. This will pick up any residues which can then be incorporated either into the medicated feed itself or

stored for use in the next batch of medicated feed. Alternatively, the sequence of production can be scheduled to ensure that susceptible feed is not made too soon after the medicated feed. Where possible, facilities such as bulk bins should be dedicated to medicated or non-medicated feeds.

122. **It is important to be sure that the methods adopted to prevent cross contamination throughout the plant are effective.** To confirm this, samples of the non-medicated feed should be taken and sent for analysis for traces of the medicine used. If traces are found then extra cleaning, flushing or other control measures will have to be undertaken. Once the control measures have been validated, the frequency of sampling and testing can be reduced. Occasional samples should still be taken to show continued compliance. For their own protection, farmers are strongly advised to take and retain samples of mixed batches of feed for a suitable period of time, for reference in the event of any subsequent feed-related problems. (N.B. The EC Council Directive 95/69/EC requiring on-farm mixers to be approved/registered is currently interpreted as requiring samples to be taken and retained). Retention of moist or liquid feeds is difficult without access to suitable freezer/refrigeration capacity.

Whilst the example given in paragraphs 71-74 of the original report (now 121-122 above) refers to the use of a medicine, similar rules will apply to other specified feed additives posing a risk either to non-target species or of residues in food products. **.**

Feeding Practices (amending paragraph 76 of original report)

123. As Section III illustrates, there are many types of feeding systems depending on the type and age of livestock and the feed materials. The aim is to ensure that each animal receives the correct quantity of the right feed. Delivering the correct quantity of feed requires maintenance and calibration of dispensing equipment, not only for automatic feeding systems but also for feed delivered

by hand using buckets, or scoops. Giving animals the wrong feed can, in extreme cases, be fatal. Such a risk is highest on farms with more than one livestock species. For example, certain feed additives included in broiler feeds can be fatal if fed to turkeys and horses. Clear and unambiguous labelling of bagged feeds and bulk feeds/storage units is therefore vital. Farmers must check the labels on all purchased materials to ensure that they understand any limitations on use or contra-indications applying to the products. Sheep, for example, are highly susceptible to copper, and for this reason many other ruminant feeds containing supplemental copper are labelled 'Do not feed to sheep'. There have also been occasions when livestock have consumed the wrong feed as a result of poor penning of the animals or inadequate fencing (e.g. sheep have gained unintentional access to cattle feed and ducks and geese to ruminant feed). A further example is that of pet food which often contains processed animal proteins prohibited in farmed animal feeds. All such feeds, including those in bags, must be stored and used well separated from the feed intended for farmed animals and from access by non-target species, in such a way that prevents accidental misuse or access.

124. Paragraph 76 above should be amended to include references to EC Regulation 767/2009 – for example 'Regulation EC 767/2009 requires that the labelling and presentation of feed shall not mislead the user. The legislation also lays down requirements for feed materials or compound feed marketed in bulk or in unsealed packages or containers. The aim of legislation 767/2009 is to harmonise the conditions for the placing on the market and the use of feed, in order to ensure a high level of feed safety and thus a high level of protection of public health, as well as to provide adequate information for users and consumers and to strengthen the effective functioning of the internal market.

Add new text following paragraph 80 of original report

125. **Even on single species farms, regular cleaning to remove residues of earlier feeds is essential.** For example, there have been cases of mycotoxicoses in livestock which occurred as a direct consequence of them consuming old feed that had been allowed to deteriorate in troughs and hoppers. One of the main causes of tissue residues of medicinal and specified feed additives is failure to use up all of a batch of medicated feed and then, failure to empty feed bins thoroughly prior to changing to withdrawal feeds.

126. Another concern is possible contamination of feeds with manure, slurry (e.g. cattle that are floor-fed through feed barriers either side of a passage along which tractors, etc. are driven to dispense the feed in front of the livestock). Livestock cannot be kept separate from their faeces but every effort should be made to ensure that troughs and feed passages are kept clean to ensure there is no build-up of microbial pathogens.

127. Certain feed supplements, including salt licks and feed blocks, may be provided to animals at pasture where this may be deficient in essential trace elements and vitamins. Such blocks, as well as oral pastes, drenches and slow release capsules (boluses) can play an important part in meeting the animal's total nutrient requirements. However, **it is important for farmers to be conscious of the total nutrient intake of their animals.** For example, it is well known that copper is toxic to sheep at relatively low dietary concentrations. Less widely appreciated is that excess copper can also be toxic to cattle. Thus, cattle may be receiving copper from pasture, from home-produced or bought-in feed materials, from purchased complementary feeds (premixes or concentrates) as well as from non-feed forms administered direct. This could lead to toxic intakes of copper and health problems for the animals, as well as unnecessary expense for the farmer.

128. "Top dressing" is a feeding practice used on some farms, where a pre-mixture or complementary feed is spread on top of other feed materials, commonly

silage, in the feeding trough. The feed is not mixed and as a result there is a risk that some animals may consume an uneven share of the product spread on top. The Veterinary Medicines Directorate has already made clear to farmers that medicated premixes (complementary feedingstuffs) must not be top dressed in this way as the practice falls outside the marketing authorisations for the medicated premixes.

129. It is a breach of the Veterinary Medicines Regulations if anyone promotes or labels a medicated pre-mix or anything containing a medicated pre-mix as being suitable for top-dressing. Therefore, farmers should not top-dress medicated premixes onto feed. It must be thoroughly mixed by an approved manufacturer.

Amend paragraph 81 to read:

130. The grazing of grass pastures and arable crops such as kale or fodder beet should be managed in such a way that possible contamination by physical, biological or chemical food safety hazards is minimised. Further advice is provided in Annex III of EC Regulation 183/2005. For example, an adequate period should be observed before allowing livestock to graze pastures that have been treated with manure and/or between grazing rotations in order to minimise biological cross-contamination from manure. Farmers should also ensure that required withholding periods following agricultural chemical applications (e.g. pesticides and herbicides) are observed. An additional consideration for grazing and growing crops is their proximity to factories or other industrial processes, where harmful emissions could lead to elevated levels of certain environmental pollutants, e.g. polychlorinated biphenyls and dioxins, within the surrounding soil and crops. Redundant farm machinery must be removed from animals' reach to prevent possible harm caused through leaking batteries, flaking paint, litter etc.

Competence and Training

131. Council Directive 95/69/EC on the approval and registration of feed establishments, as implemented into national law, sets out requirements for producers registering as mixers of feed containing additives. Additives will be present in complementary feeds ("premixes" or "concentrates") bought and used by the farmer. The Directive indicates that the feed manufacturer, in this case the farmer, must have sufficient staff possessing the necessary skills and qualifications. The National Farmers' Union Code of Practice for On-Farm Mixers Producing Complete Feeds for Their Own Use has provided a useful interpretation. It indicates that **everyone involved in mixing animal feed must be able to demonstrate their competence, having appropriate skills to match the scale, risks and complexity of the feed mixing operation.** Training should be either by practice or instruction. That apart, **it is important that the farmer has access to the necessary expertise when identifying feed and food safety hazards within the business and deciding upon suitable and effective control measures.**

132. The Defra Codes of Practice for the Control of Salmonella during storage, handling and transport of raw materials and on production of final feed for livestock[4] indicate that there should be sufficient personnel with the ability, training and experience necessary to ensure that the provisions of the Codes are applied. They refer to the need for clear guidance and instruction on their duties, and for training to cover not only specific tasks but also good hygiene practice and GMP generally, as well as the importance of personal hygiene.

Documentation and Traceability

133. The numerous feed-related scares in Europe over recent years, including Foot and Mouth Disease, have highlighted the importance of traceability within the food supply chain. Without the ability to identify rapidly where animals, feed

[4] Defra Publications

or food products have come from and gone to, it is impossible for anyone to respond quickly and effectively when problems are found within the system. Future legislation will make traceability an obligation for all operators in the feed/food supply chain. **Traceability will not be achieved without adequate and clear documentation. As far as livestock farmers are concerned, the minimum requirement will be:**

a) records of feedingstuffs purchased – date, description including ingredients, quantity, supplier, batch code for additives;
b) records of any tests conducted on purchased feedingstuffs;
c) details of storage e.g. main barn, bay 3;
d) date and quantity mixed including formulation record and record of mixing sequence;
e) records of any analyses conducted to confirm adequacy of mixing times, cleaning procedures;
f) date fed (if different from above) and livestock details; and
g) grazing records - dates of pasture treatments.

V Conclusions and Recommendations (to be updated)

VI Glossary of Terms and Abbreviations (Amending and adding new definitions from original report

Medicated feed	A complete compound feed which is ready prepared for marketing which contains one or more veterinary products for curative or preventative action against animal disease.
New Pre-mix for medicated feedingstuffs	Any veterinary medicinal product prepared in advance with a view to the subsequent manufacture of medicated feedingstuffs
Top dressing	A feeding practice whereby a pre-mix or complementary feed is spread on top of other feed materials.- medicated pre-mixes cannot be top dressed – VMD has asked for definition to be clarified.
~~Zootechnical~~ Specified feed additive	**coccidiostats, histomonostats and non antibiotic growth promoters.**

Annexes

Annex V - On-farm mixing (Amending paragraphs 13, 14, 15(i), 15 (ii) of original report)

13.If however, the farmer mixes into the feed materials, medicines or certain specified additives, then the premises need to be approved or registered by the VMD for this activity. The premises must also be approved or registered if compound feeds containing these or any additives are mixed.

14.The requirement for premises to be approved or registered for these mixing activities is found in the Feeding Stuffs (Establishments and Intermediaries) Regulations 1999, which implements EC Council Directive 95/69/EC into UK law or the Veterinary Medicines Regulations which implement Directive 90/167 and Regulation 183/2005 into UK law. There are also separate registration requirements under the TSE Regulations for using certain derogated protein products to mix in non-ruminant feed.

15.The activities that require farm premises to be either approved or registered can be conveniently divided into three categories as follows:

(a) specified feed additives (coccidiostats, histomonostats or non antibiotic-growth promoter) contained in premixes, or complementary feeds containing those premixes. These must be mixed into final feed only on premises approved by the Animal Medicines Inspectorate of the Royal Pharmaceutical Society of Great Britain; and .

(b) specified non-zootechnical additives (e.g. vitamins and trace elements) some of which will already be in premixtures or complementary feeds. These must be mixed into final feeds only on premises registered with the local authority and subject to inspection by their inspectors.

Animal by-products legislation (amending paragraphs 20-24 of original report)

20. The requirements for the use and disposal of animal by-products are found in EU Animal By-Products (ABP) Regulations (EC) No 1069/2009 & 142/2011. The implementing domestic legislation is the Animal By-products (Enforcement) (England) Regulations 2013, with parallel legislation being applicable in Scotland, Wales and N. Ireland.

21. The ABP Regulations categorise animal by-products into three categories:

• category 1 - e.g. carcases of BSE suspects, Specified Risk Material (SRM), ruminant carcasses from which SRM has not been removed at the time of disposal; catering waste from means of transport operating internationally, etc;
• category 2 - e.g. carcasses of animals with diseases other than BSE, carcases of animals which were not slaughtered for human consumption (including such ruminant carcases where the SRM has been removed), manure and gut contents etc; and
• category 3 - material fit for human consumption.

23. The ABP Regulations then determine how each category can be treated, used and disposed of, according to risk.

24. The main provisions of the ABP Regulations relating to feed for farm animals include:
•only Category 3 material can be used in feed for farm animals and then only after satisfactory processing in an approved ABP plant and subject to further controls within the ABP Regulations and the Transmissible Spongiform Encephalopathies (TSE) Regulations.
•processed material of Category 3 origin (low risk material fit for human consumption) is generally called processed animal protein, except where this involves products such as milk, milk products, eggs, egg products, blood products, hydrolysed proteins, dicalcium and tricalcium phosphate, gelatine, collagen, etc;
•specific requirements for the processing or treatment of certain derived products or processed animal proteins, which may be used in farm animal feed, under

circumstances dictated by the controls in both the TSE and ABP Regulations are included in the regulations for processed animal proteins; blood products; rendered fats and fish oils; milk, colostrum and their products; gelatine & hydrolysed proteins; dicalcium phosphate of animal origin; tricalcium phosphate of animal origin; collagen and egg products;

•the feeding of farmed animals with catering waste or feed material containing catering waste is prohibited;

•the feeding of terrestrial animals (other than fur animals) with processed animal protein derived from the bodies or parts of animals of the same species is prohibited;

•the feeding of farmed fish with processed animal protein derived from the bodies or parts of bodies of farmed fish of the same species is prohibited; and

•the feeding of farmed animals with herbage, either directly by grazing or by feeding cut herbage, from land to which organic fertilisers or soil improvers, other than manure, have been applied is prohibited unless the cutting or grazing takes place after the expiry of a waiting period which ensures adequate controls of risks to public and animal health and is at least 21 days (60 days in the UK for pigs).

24. Catering waste is defined as: ‘all waste food, including cooking oil originating in restaurants, catering facilities and kitchens, including central kitchens and household kitchens’.

25. Bakery products (such as bread, cakes, pastry, biscuits), pasta, chocolate, sweets and similar products such as breakfast cereals can be used in feed for farm animals, which:

•have undergone processing as defined in Article 2 (1)(m) of Regulation (EC) No. 852/2004 (Hygiene of Foodstuffs) or in accordance with the Implementing Regulation. Under the Hygiene of Foodstuffs Regulation, ‘processing’ means any action that substantially alters the initial product, including heating, smoking, curing, maturing, drying, marinating, extraction, extrusion or a combination of those processes;

•is composed of or contain one of the following Category 3 foodstuffs no longer intended for human consumption: milk, milk-based products, milk-derived products, eggs, egg products, honey, rendered fats, collagen and/or gelatine of non-ruminant origin. Foodstuffs containing rennet can also be used; and
•do not contain, and have not been in contact with raw eggs, meat, fish, and products or preparations derived from or incorporating meat or fish.
In addition, all necessary precautions must have been taken to prevent contamination of the material with products not eligible for feed use, such as meat, fish and products containing them.

Transmissible Spongiform Encephalopathies Legislation (Amending paragraphs 25-29 of original report)

25. The Community-wide TSE Regulation (999/2001), which came into force on 1 July 2001, aimed to provide a secure legal basis for the full range of Community measures against Transmissible Spongiform Encephalopathies (TSEs). Most of its provisions, including transitional measures relating to it were already in force under UK legislation, but for the sake of clarity and completeness, most existing TSE-related legislation was consolidated into one set of Regulations, adjusting the requirements where necessary to take into account EC and national measures.

26. The regulation and controls have evolved during the period since then. A recent regulatory change has seen a relaxation to enable the use of non-ruminant processed animal protein in feed for aquaculture animals, in line with the stated goal of the TSE Roadmap 2, a strategy paper produced by the EU for TSEs for the period 2010-2015, “to review certain measures of the current total feed ban, when certain conditions are met”.

26. The domestic implementing regulations in the UK are the Transmissible Spongiform Encephalopathies (England) Regulations 2010 and equivalent regulations in Scotland, Wales, and Northern Ireland.

26. There are Guidance Notes available for the Animal Feeding section of the Regulations on the feed ban section of the Defra BSE web site at:

http://www.defra.gov.uk/ahvla-en/files/AG-ABP-01.pdf.

27. Listed below is a summary of the latest EC controls.

Ruminant and non-ruminant farmed animals, must not be fed the following prohibited derived products, either directly or in feed:

- processed animal protein (with specific exemptions); and
- collagen and gelatine from ruminants, e.g. beef gelatine (including in surplus food).

Ruminants must not be fed any animal protein - or any feedingstuff which contains animal protein - except the following permitted proteins (also permitted for non-ruminant feed), when sourced and processed in accordance with the Animal By-Product (ABP) Regulations:

- milk, milk-based products and colostrum;
- eggs & egg products;
- collagen & gelatine derived from non-ruminants;
- hydrolysed proteins derived from parts of non-ruminants or from ruminant hides and skins; and
- fishmeal is permitted only for use in milk replacer powder for feeding to unweaned ruminants in liquid form but it must not be fed to weaned ruminants.

The following derived products may be used for feeding to non-ruminant farmed animals only, subject to authorisation requirements:

- fishmeal;
- blood products from non-ruminants;
- dicalcium phosphate and tricalcium phosphate of animal origin. (Mineral-derived versions are permitted for all livestock and are the most commonly used – feed labels not specifying ‘animal origin’ can be taken to be of mineral origin); and

- processed animal protein derived from non-ruminants may be used for feeding aquaculture animals. Aquaculture animals means any 'aquatic animal' at all its life stages, including eggs and sperm/gametes, reared in a farm or mollusc farming area, including any aquatic animal from the wild intended for a farm or mollusc farming area. 'Aquatic animal' is also defined in the ABP Regulation and includes specified species of fish and shellfish.

Future Legislation (New paragraph after paragraph 31 of original report)

Regulation on the production, placing on the market and use of medicated feed and repealing Directive 90/167/EEC

The Commission published a proposal [expected September 2014] [Text to be added when proposal is published.]

Annex VI – Useful reference documentation produced by ACAF

Code of Practice for the Control of Salmonella in Animal Feed

The revised Code of Practice for the Control of Salmonella in Animal Feeds was published on 4 November 2009 in partnership with Defra and the Food Standards Agency.

One route for Salmonella entering the food chain is through animals eating contaminated animal feed. The main purpose of the Code is to provide information on best practice, and to help those involved in the manufacture, storage and transport of feeds to minimise the risk of Salmonella contamination.

To assist users, the Code brings together in one document, the advice that was previously dispersed in three codes and this has been updated after an extensive consultation of stakeholders. It has also been considered and endorsed by the independent Advisory Committee on Animal Feedingstuffs.

The Code is voluntary but the guidance it contains reflects recent legislative developments including the requirements of the EC Zoonoses Regulation (2160/2003) and the EC Feed Hygiene Regulation (183/2005).

http://acaf.food.gov.uk/papers/copsalanimalfeed