INTRODUCTION

In July 2005, Defra published an independent review by Professor William Hill FRS of the University of Edinburgh examining the possible reasons for the cases of bovine spongiform encephalopathy (BSE) born after July 1996 when the United Kingdom (UK)’s reinforced feed ban is considered effective (BARB\(^2\) cases) and the Government’s BSE control measures. The review is available at [http://www.defra.gov.uk/animalh/bse/pdf/hillreport.pdf](http://www.defra.gov.uk/animalh/bse/pdf/hillreport.pdf).

The Spongiform Encephalopathy Advisory Committee (SEAC) considered Professor Hill’s review at its June 2005 meeting. The minutes of this meeting are available at [http://www.seac.gov.uk/minutes/final88.pdf](http://www.seac.gov.uk/minutes/final88.pdf).

Professor Hill made a number of recommendations based upon his review and these are addressed below.

DEFRA’S RESPONSE TO PROFESSOR HILL’S RECOMMENDATIONS

1. Background

   a. Making data (on BSE and BARB cases) available and regularly updating analyses (of the BSE epidemic and BARB cases) should be continued.

   Defra supports this recommendation and intends to continue to make data on BSE (including BARB) cases available on its website, [http://www.defra.gov.uk/animalh/bse](http://www.defra.gov.uk/animalh/bse), and in other publications.

2. Biological Characteristics of BARB cases

   a. Obtaining hard evidence on the crucial hypothesis of identity of BSE in BARBs and previous cases is highly desirable and the relevance of atypical forms of BSE found by active surveillance in other countries needs to be resolved.

   b. The efficacy and interpretation of the tests used in active surveillance of animals for BSE should be kept under review.

Evidence from the investigation of BSE cases throughout the epidemic in the UK indicates a uniform profile of the disease. These characteristics have also been found in BARB cases, which have received particular attention. To


2 Born After the Reinforced feed Ban
ensure that all reasonable steps are taken, to identify or to exclude variant forms of the disease, which might have an influence on control measures, the Department intends to:

- continue to apply recently developed diagnostic methods and future advances to the study of BARB cases.
- carry out a retrospective study on samples collected during the BSE epidemic with wider and more detailed examinations using more recently developed methods.
- continue to monitor the methods and findings relating to the identification of atypical cases in other countries and to review advances in diagnostic methods.
- continue to exchange data on the study and diagnosis of BSE between countries through the Neuroprion\(^3\) Network.
- continue to lead on moves for the standardisation of methods, terminology and taxonomy through the World Organisation for Animal Health (Office International des Epizooties (OIE)).

3. Nature of the Disease

| a. Unless there is new evidence on BSE in cattle that lends support to alternative hypotheses underlying the cause of BARB cases there continues to be little justification for Defra to pursue research on them. Monitoring and free exchange of ideas is, however, encouraged. |

Defra's BSE control policies are directed at preventing transmission of the disease to animals via feed and preventing potentially infected material entering the human food chain. These continue to be the most probable routes of cattle and human exposure, irrespective of the origin of BSE. The controls do not therefore depend on any individual theory of the specific origin of BSE. The UK control's measures have resulted in a dramatic reduction in the incidence and prevalence of BSE. In March 2005, the European Food Safety Authority (EFSA) confirmed that the whole UK cattle population could be considered a moderate risk for BSE\(^4\).

Defra supports the view that alternative theories on the disease should be monitored, particularly for supportable evidence that might require changes in control policy. In considering these hypotheses, Defra will be guided by advice from expert advisory bodies such as SEAC and EFSA.

4. Spontaneous Occurrence

| a. A watching brief is kept on surveillance efforts worldwide. |

\(^3\) http://www.neuroprion.com/home.html
\(^4\) http://www.efsa.eu.int/science/biohaz/biohaz_documents/catindex_en.html
Defra supports this recommendation and its Veterinary Laboratories Agency (VLA) is well positioned globally as the BSE Reference Laboratory for the European Community (EC) and one of three BSE Reference Laboratories for the OIE. Defra intends to continue maintaining a watching brief on TSE surveillance and developments in other European Union (EU) Member States and elsewhere in the world.

5. Genetic Variation in Susceptibility

- The analysis of the GB data should be completed and arrangements sought to combine them with the NI data.
- If the results of the current analyses are confirmed as negative, it is unnecessary to continue genotyping all but atypical BARB cases.
- Even if genetic differences in susceptibility to infection were revealed, removing the source of infection rather than genetic selection is the route of choice for disease control.
- Defra should be better positioned to have quick access to DNA sequencing for TSE research.

a. In June 2005, VLA and the Department for Agriculture and Rural Development in Northern Ireland (DARD NI), presented results of two studies comparing the sequence of the prion protein (PrP) gene in BARB cases with that in healthy control animals. The Northern Irish study is complete. The British study terminated in March 2006. To date, analysis of the data has not identified any significant association between genotype and the presence or absence of BSE. Defra will continue to analyse the combined data from both studies for any associations.

b. In June 2005, SEAC supported Professor Hill’s recommendation that unless an association is found between genotype and the presence or absence of BSE, it is unnecessary to continue genotyping all but atypical cases. The British BARB genotyping project terminated in March 2006. However the genotyping of new BARB cases in Great Britain is likely to continue, at least in the short term, subject to approval of a new research project proposal. The number of BARB cases is very low and any additional results will improve the confidence in the data obtained, as well as raising the possibility of detecting any emerging genetic differences in future BARB cases.

c. Defra agrees with this recommendation noting that UK control measures aimed at eliminating the source of infection have proved highly effective with fewer than 0.1% of the total BSE cases in the UK born after July 1996. However, should future research reveal clear genetic differences in susceptibility to BSE infection, which appears highly unlikely, Defra would be guided by advice from expert advisory bodies such as SEAC and EFSA on
the relative merits of control policies based on genetic selection, elimination of the source of infection or a combination of these.

d. Defra’s DNA sequencing capability for TSE research has been improved with appropriate contractual arrangements, including shorter response times.

6. Environmental Contamination and Other Non-Feed Bourne Sources of Infection

| a. If feasible, it might be a useful long shot to consider prior cases in neighbouring farms as a route to checking environmental contamination. |
| b. In view of the need to eradicate disease, consideration should be given to decontamination procedures on premises. |
| c. The analysis of environmental risk factors being undertaken in the FATEPriDe study should be facilitated. |

a. Although it may be possible to consider previous BSE cases on premises neighbouring those on which new cases occur, the definition of neighbouring premises is difficult, particularly in retrospect. It may be difficult to obtain precise details of exactly where BSE cases were kept on particular premises and for how long, in relation to neighbouring cattle where there have been changes in land ownership and land management over time. Defra is advised that the outcome of such a study would neither prove nor disprove the role of environmental contamination as a specific cause of BARB cases because it would be impossible to eliminate the role of confounding factors such as infection in contaminated feed.

b. As Professor Hill’s review concludes, epidemiological evidence indicates that the risk of BSE infection as a result of environmental contamination with the BSE agent is extremely low, compared to the risk from contaminated feed. There is no evidence that animal by-products such as faeces, urine, milk, periparturient (calving) discharges or placental tissues from live cattle infected with BSE are themselves infective, and no epidemiological evidence for horizontal transmission of BSE in cattle.

There are potential risks of environmental contamination with infected carcase material or infected mammalian meat and bone meal (MMBM) in fertiliser or contaminated feed. However there are strict rules governing the disposal of specified risk material and other animal by-products, and the use of fertilisers containing MMBM. Epidemiological studies linked the BSE epidemic to the use of feed containing MMBM rather than to use of fertilisers or to direct access to infected carcases. In view of the 1988, 1994 and 1996 UK feed bans, the 1996 UK Voluntary Feed Recall Scheme (VFRS) and the 2001 EU feed ban, the current risk of MMBM-contaminated feed produced before the feed bans, persisting on farms is believed to be extremely low. However, following recent epidemiological evidence suggesting the retention of traces of
contaminated feed in farm feed stores as a possible source of infection for some BARB cases, Defra published advice on cleaning feed bins in December 2005. This advice is consistent with the Food Standards Agency (FSA) recommendation, in response to the Advisory Committee on Animal Feedingstuffs (ACAF) review of on-farm feeding practices 2003, that those involved in livestock feeding “undertake regular cleaning to remove residues of earlier feeds”. A full report of the epidemiological investigations into herds generating multiple BARB cases, which suggested the possibility of contaminated feed retention in farm feed stores, is available at http://www.defra.gov.uk/animalh/bse/controls-eradication/feedban-bornafterban.html

Defra favours proportionate risk-based decontamination procedures. These will be adapted to respond to any evidence of risk of disease spread and are currently directed towards potentially contaminated feed stores and equipment.

c. Defra is willing to provide data to researchers engaged in the EU-funded FATEPriDE study (which is investigating whether environmental factors, such as trace element levels in soil, affect the risk of development of prion diseases such as BSE and scrapie). Invitations have been extended to discuss the data requirements for the project.

7. Feed borne Infection

| a. Defra continues to operate on the basis that BSE transmission via feed is the major route in BARB cases. |

Defra supports this recommendation.

8. Control Measures on Feed

| a. The feed controls currently in place seem adequate but require vigilant enforcement. Defra should continue to review appropriate controls, including consideration of regulations on composition and access of livestock to petfood. |
| b. Efforts to obtain consistent quality of feed testing for animal derived material in all EU member states should be made. |
| c. In view of the likelihood that breaches of regulations have occurred and enabled BSE contaminated material to enter the cattle feed chain, Defra should help facilitate the recent recommendations of the Advisory Committee on Animal Feedingstuffs to ensure a more coordinated and risk-based |

6 http://www.food.gov.uk/multimedia/pdfs/farm.pdf
programme of over-all feed law enforcement.

a. Defra notes Professor Hill’s comment that the feed controls currently in place seem adequate, but require vigilant enforcement. The bodies responsible for overall feed law enforcement are detailed in the ACAF Review of Feed Law Enforcement\(^7\) and include the FSA, Defra and its agencies (the Veterinary Medicines Directorate, the Pesticide Safety Directorate and the State Veterinary Service (SVS)), the Scottish Executive Environment and Rural Affairs Department, the National Assembly for Wales Agriculture Department, DARD NI, Local Authorities and the Animal Medicines Inspectorate. However, these bodies are not necessarily involved in feed law enforcement related specifically to TSE controls.

The National Feed Audit (NFA) monitors and enforces the feed ban – the exclusion of processed animal proteins (PAP) from farmed animal feed. The feed ban is the primary BSE eradication measure. The NFA covers the feed supply chain from production and distribution through to end-use. The SVS delivers the NFA in GB on behalf of Defra. Commission Recommendation 2004/163/EC advises that the minimum numbers of feed inspections and feed samples per year should be 10 and 20 respectively, per 100 000 tonnes of compound feed produced in a Member State. Calculated against the level of compound feed production in the GB in 2005\(^8\), the recommended minimum annual level of monitoring was approximately 900 feed inspections and 1800 feed samples. In 2005, the SVS carried out over 2 000 risk-based feed inspections at a wide range of premises and collected over 12 000 feed samples. None of the livestock feed samples tested, contained evidence of prohibited PAP of terrestrial animal origin. Further information is available at [http://www.defra.gov.uk/animalh/bse/controls-eradication/feed-ban.html](http://www.defra.gov.uk/animalh/bse/controls-eradication/feed-ban.html)

On 1 March 2006, the Transmissible Spongiform Encephalopathy Regulations 2006\(^9\) came into force in England. Equivalent legislation will follow in Wales, Scotland and Northern Ireland. The Regulations consolidate existing TSE control provisions, including the feed-related controls, which feature some new requirements. These include requirements to identify both reject petfood containing animal protein and feed ingredients originating on premises where PAP is used, to prevent their inadvertent use in livestock feed. Further guidance is available at [http://www.defra.gov.uk/animalh/bse/animal-health/feedbanuide.pdf](http://www.defra.gov.uk/animalh/bse/animal-health/feedbanuide.pdf)

Defra intends to continue to review the TSE controls for which it has specific responsibility. Any changes must –

- ensure that consumers and animal health continue to be properly and fully protected;

\(^{7}\) [http://www.food.gov.uk/multimedia/pdfs/acaffeedlaw.pdf](http://www.food.gov.uk/multimedia/pdfs/acaffeedlaw.pdf)


\(^{9}\) SI 2006 No.68 (replace the TSE (England) Regulations 2002, SI 2002 No. 843 for which there is equivalent legislation in the devolved administrations of Scotland, Wales and Northern Ireland.)
• be based on sound science, taking account of the latest scientific developments;
• be proportionate to the known risk; and
• be practicable and enforceable.

Regulation (EC) No.1774/2002 (The Animal By-Products Regulation) which has applied in EU member states since 1 May 2003, and which is administered in England by the Animal By-Products Regulations 2005\textsuperscript{10}, only permits the use of specific types of Category 3 animal by-products in petfood. These are low risk materials derived from carcases that were formerly considered fit for human consumption. Regulation (EC) No. 999/2001 (The TSE Regulation) requires that the carcases of emergency slaughtered cattle aged over 24 months, and the carcases of cattle aged over 30 months intended for human consumption, must first test negative for BSE before any parts of their carcases can be released into the food or feed chains. Specified Risk Material (SRM) controls are estimated to remove over 99% of any BSE infectivity that might be present in bovine carcases. The Transmissible Spongiform Encephalopathy Regulations 2006 implement the ban on feeding mammalian protein and PAP to farmed animals. The Animal By-Products Regulations 2005 also prohibit intra-species recycling. Defra has provided clear advice\textsuperscript{11} on the legal requirements relating to the storage of petfood containing PAP on livestock premises.

With reference to paragraph 35 of Professor Hill’s review, while tallow produced in accordance with Regulation (EC) No.1774/2002 is permitted for use in animal feed, there is currently a voluntary UK manufacturers’ agreement not to use tallow in calf milk replacement products. In September 2005 EFSA published an opinion on quantative risk assessment of the residual BSE risk in tallow,\textsuperscript{12} which concluded that even under the worst case scenario the BSE risk from tallow is minimal.

b. The Microscopy Analysis Test (MAT) procedure for the detection of bone fragments in feed is set out in Commission Decision 2003/126/EC. In recent years the EU, supported by Defra’s VLA, has conducted a series of structured EU-wide ring trials to standardise and improve the sensitivity of the Microscopy Analysis Test (MAT). Defra also strongly supports the continuing development of new methods to improve the ability to differentiate species specific animal proteins in feed, such as the Polymerase Chain Reaction (PCR) method based on DNA technology, and the Near Infra-Red (NIR) test which has the potential to enhance the microscopy test. In addition to supporting test development at EU level, the UK has its own test development programme where these methods are showing promise.

\textsuperscript{10} SI 2005 No.2347 (and equivalent legislation in the devolved administrations of Scotland, Wales and Northern Ireland).

\textsuperscript{11} http://www.defra.gov.uk/animalh/bse/animal-health/febdbanguide.pdf

\textsuperscript{12} http://www.efsa.eu.int/science/biohaz/biohaz_opinions/1110_en.html
c. The ACAF recommendations from the Review of Feed Law Enforcement are summarised in Annex 1. Defra broadly supports the ACAF recommendations. Defra is only one of many bodies responsible for overall feed law enforcement and notes ACAF’s recommendation that the FSA is well placed to take on the role of further coordination of feed law activities. Defra will, where possible, help to facilitate the ACAF recommendations in conjunction with FSA coordinators and others responsible for feed law enforcement. Additional controls on imports of animal feed from other EU member states would require agreement at EU level.

Defra participates in the Animal Feed Law Enforcement Liaison Group, which first convened in May 2005 and is chaired by the FSA. Defra has contributed to the FSA’s October 2005 consultation on a proposed code of practice on the enforcement of animal feedingstuffs legislation in the UK13.

9. Potential Feed borne Sources of BARB Cases

| a. No source of feed contamination should be ruled out and detailed investigations should be continued. |
| b. Some improvements in the design of the case-control study can be effected fairly straightforwardly and should be undertaken. A major effort to obtain feed records on control animals does not seem justified, if indeed it is feasible. |

a. Defra intends to continue ongoing detailed epidemiological investigations of BARB cases with the assistance of the SVS. A broad range of data is collected from individual BSE cases including a detailed study of feed and feeding practices. This focus will be maintained and data requirements will continue to be amended in the light of emerging scientific data.

A full report of the epidemiological investigation into the two 2001-born cases and the 2002-born case, referred to in Professor Hill’s review, is available at http://www.defra.gov.uk/animalh/bse/controls-eradication/feedban-bornafterban.html

In April 2005 the SEAC ad hoc Epidemiology Subgroup on bovine spongiform encephalopathy (BSE) cases born after July 1996 recommended that Defra undertake an evaluation of animal feed use and supply routes currently and in the recent past to provide information on their vulnerability to cross-contamination. Later in April 2005, the Subgroup reported their recommendation to SEAC. SEAC agreed that a study of feeding practices was important and noted that, although it was unlikely that conclusive evidence would be obtained for particular feeding practices being associated with BSE cases born after July 1996, such a study might give insight into

13 http://www.food.gov.uk/foodindustry/Consultations/ukwideconsults/feedingstuffscoop
possible controls that might be applied if such cases continue\textsuperscript{14}. Defra is following up SEAC’s recommendation.

b. The amended case-control study was completed shortly before Professor Hill’s review was published in July 2005, but failed to add any new understanding to the examination of risk factors. Analytical epidemiological studies are continuing. Defra concurs that in many cases it is not possible to trace reliably, the source of ingredients used historically in feeds because detailed records are no longer available.

10. General Conclusions

| a. It is essential that appropriate, risk based controls and monitoring should be maintained on animals and feed until no cases of BSE are found, and controls tightened up where feasible, both in the UK and elsewhere that the UK can influence. In view of the very long incubation period of BSE in some animals, long-continued vigilance is necessary. It is not evident, however, that specific new measures are needed. Basically it is necessary to “keep taking the medicine”. Nevertheless, in view of new discoveries on the nature of the disease and the possibilities of new or changed TSEs arising, relevant research capacity in GB should be maintained. |

Defra has set challenging targets\textsuperscript{15} to reduce the incidence of new BSE cases in GB to 60 by 2006 and to eradicate the disease by 2010. Defra agrees that controls must be maintained with vigilant enforcement. Due to the long incubation period of BSE, the achievement of the 2006 target now depends upon the effectiveness of controls in previous years. The longevity of cattle born before August 1996 and the level of BSE surveillance in that sub-population will determine achievement of the 2006 target. Continued or increasing numbers of BARB cases could also impact on the targets.

BSE controls must:

- ensure that consumers and animal health are fully protected;
- be based on sound science, taking account of the latest scientific developments;
- be proportionate to the known risk; and
- be practicable and enforceable.

This does not rule out changes to the control current regime but the overall objective of protection of public and animal health is paramount. This is Defra’s basis for negotiations on the European Commission’s TSE

\textsuperscript{14}http://www.seac.gov.uk/minutes/final87.pdf
\textsuperscript{15}http://www.defra.gov.uk/corporate/busplan/psa2004.htm
Roadmap\textsuperscript{16}, which considers possible changes to current EU rules, whilst maintaining effective TSE controls.

Defra believes that the maintenance of appropriate TSE research capacity in the UK is essential to support current and future disease control needs. Defra’s VLA has established a national and international level of expertise in BSE in its role as BSE Reference Laboratory for the UK, the EC and the OIE.

Annex I: ACAF Review of Feed Law Enforcement - Summary of Recommendations

1. The committee recommends that the current responsibilities for feed law enforcement in the UK should continue with significant modifications made to processes and procedures to ensure the necessary improvements to feed law enforcement.

2. The committee recommends that enforcement authorities adopt a proportionate risk-based approach to the enforcement of feed law.

3. The committee recommends that risk-based schemes for feed law enforcement should be extended or introduced to take into account risks from hazards such as contaminants, unauthorised additives and feeds from unverified sources.

4. The committee recommends that there should be a greater sharing of information and co-operation between official enforcement authorities and assurance scheme auditors.

5. The committee recommends that there should be greater co-ordination between enforcement authorities.

6. The committee recommends that further co-ordination of feed law activities is required and considers that the FSA is well placed to take on this role.

7. The committee recommends the compilation of a central database of feed businesses available to all enforcement agencies. The Committee further recommends that all relevant information should be considered for inclusion in a central database to help establish enforcement priorities.

8. The committee recommends that animal feed imports should be part of a risk-based enforcement programme. The Committee further recommends the introduction of a statutory requirement for the prior notification of imports of animal feed.

\textsuperscript{16} \url{http://europa.eu.int/comm/food/food/biosafety/bse/roadmap_en.pdf}
9. The committee recommends that local authorities should make better use of existing funds by targeting higher risk areas. The Committee further recommends that if funds for new work become available, the FSA and other government departments should consider providing such funds direct to the appropriate enforcement agencies.

10. The committee recommends the introduction of codes of practice for all areas of feed law enforcement.

11. The committee recommends that the codes of practice that apply to local authorities should be included within the scope of the FSA’s Framework Agreement with local authorities.

12. The committee recommends that compliance with the codes of practice should be audited by the FSA under the terms of the Framework Agreement.