Appendix 3 – A Summary of Scientific Opinions from the EC Scientific Steering Committee (SSC) and European Food Safety Authority (EFSA) and other Scientific Data

1. Specified Risk Material

1.1. General

1.1.1. EFSA Opinion on a Quantitative Assessment of the Risk Posed to Humans by Tissues of Small Ruminants in case BSE is present in these animal populations, 8 June 2005

BSE confirmed in French goat, January 2005. Currently not enough data on BSE in goats to allow a quantitative assessment of risk posed to humans by consumption of meat and meat products derived from goats infected with BSE. Risk assessment directed at goat meat to be based on sheep data, plus increased surveillance. Sheep will be considered separately in future risk assessment.

Current BSE risk, related to consumption of goat meat and goat products considered to be small for goats born after feed ban (2001 and later).

1.1.2. Experimental Transmission of Chronic Wasting Disease Agent from Mule Deer to Cattle by Intracerebral Route, Hamir et al. 2005, J Vet Diagn Invest 17(3)276-81

Experiment shows that CWD transmission in cattle could have long incubation period (up to 5 years), although intracerebral inoculation is an unnatural route of exposure. This finding suggests that oral exposure of cattle to CWD agent, a more natural potential route of exposure, would require not only a much larger dose of inoculum but also may not result in amplification of PrP(res) within CNS tissues during the normal lifespan of cattle.

1.1.3. EFSA Opinion on Assessment of Age Limit for SRM Removal in Cattle, 27-28 April 2005

Previous SSC opinions set age limit for SRM removal (excluding intestines and tonsils) at 12 months.

Generally the number of young cases of BSE is reducing. The minimum age of BSE cases in the EU has increased from 28 months in 2001 to 42 months in 2004[1]. The mean age of BSE cases has increased from 86 months in 2001 to 108 in 2004. There has been progressive improvement in implementation of total feed ban.

[1] Bovine Spongiform Encephalopathy in Poland, Polak and Zmudzinski 2005, Vet.Rec. 157, 56-58 – report diagnosis of BSE in a 33-month old animal in 2005. Also in 2005, UK confirmed BSE in a 36-month animal (born 1 May 2002), and a 39-month animal (born 3 October 2001). On 13 June 2005, Spain confirmed BSE in an animal born 14 January 2002 ($\leq$40 month old).

Precautionary approach indicates that a 30-month age limit for SRM removal (excluding tonsils and intestines) would not cover the very small number of young animals, assuming infectivity of CNS appears at ¾ of the incubation period[2].

However a 21-month limit would cover the last quarter of even the single youngest animal detected since the start of EU surveillance in 2001 (28 months).

EFSA Recommendation – Establish likelihood of the infectivity in SRM derived from infected cattle at different age groups, by back calculation modelling with further assessment of experimental and epidemiological data.

1.1.4. Pathogenesis of Experimental BSE: Preclinical Infectivity in Tonsil & Observations on the Distribution of Lingual Tonsil in Slaughtered Cattle, Wells et al. 2005 (Vet. Rec. 156 (401-407))

Pathogenesis study detected traces of infectivity in tonsil of cattle killed 10 months after exposure. Includes summary of previous results of Cattle Pathogenesis Study[3] demonstrating early detection of infection of distal ileum followed by later detection of infection in CNS, dorsal root ganglia and trigeminal ganglia.

1.1.5. EFSA Advice on "OIE-facilitated consultation between EU and USE on the Interpretation and Implementation of the OIE Standard on BSE, May 2004

Assuming a common scientific understanding of BSE pathogenesis, at what time during the incubation period are various SRMs (CNS & DRG and associated tissues) considered to become infective?

- No conclusive evidence to enable us to define the precise time, relative to the incubation period or age of clinical manifestation, at which the CNS tissue becomes infected
- In as much as the size of the cattle to human species barrier is unknown, we cannot determine the time at which CNS tissues become infectious for humans
- For these reasons the previous precautionary approach to SRM removal of CNS and associated tissues has been based on approximately half the age of the youngest cases recorded; where age is used as a surrogate for incubation period.

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[2] On the basis of the VLA pathogenesis studies results (100g and preliminary results 1g), it can be assumed that in CNS, the likely detectable PrPsc, and consequently the likely detectable infectivity appears at about ¾ of the incubation time. This is somewhat deviating from the former SSC opinions where an average figure of approximately 50% of the way through the incubation period was assumed. However full results of the 1gram dose group are pending and will not be available until 2006, but it is not expected that they will show a shorter incubation period than the 100g dose group.

[3] Preliminary observations on the pathogenesis of experimental bovine spongiform encephalopathy (BSE): an update. Wells et al. 1998 Vet.Rec.142 (103-106)

- A range of experimental and observational data provide information on which to formulate a revised approach.

1.1.6. EFSA Opinion on BSE Risk from Bovine Tonsil and Consumption of Bovine Tongue, 4 March 2004

Tonsils of bovine animals of any age should be considered a risk, and tongues for human consumption should be harvested such that the lingual tonsil is excluded.

1.1.7. SSC Opinion on Chronic Wasting Disease and Tissues that might carry a risk for Human and Animal Feed Chains, 6-7 March 2003

Theoretical risk for prion transmission to humans consuming products of CWD affected cervids of all ages cannot be excluded.

Similarly, transmission risk to domestic animals cannot be excluded[4].

Early and widespread involvement of tissues in CWD-infected animals does not allow definition of SRM list, nor to define age limits. Insufficient data to define exclusions or amendment of any SRM rule on the basis of relative genetic resistance to infection.

Important to be certain that no risk of transmission of CWD from North America to EU through trade in live cervids or their products.

No scientific data that CWD is present in countries outside North America (except single import to Korea). However further European surveillance necessary.

1.1.8. SSC Opinion on BSE Risk of Autonomic Nervous System, 6-7 March 2003

Infectivity found in vagus nerve and sympathetic mesenteric ganglia of experimental animals (mice/hamsters) and sheep infected with scrapie. Experimental data from cattle insufficient, but infectivity in these tissues has not been shown in cattle[5] other than the inconsistent presence of disease-related PrP in the myenteric plexus (network of nerve fibres throughout muscle of digestive tract) of cattle during the clinical phase of disease.

Unclear whether scrapie models are applicable to pathogenesis of BSE. Cannot exclude possibility that other autonomic NS structures carry infectivity in BSE-infected cattle.

Recommend collection of tissue samples appropriate to improving understanding role of PNS and particularly the autonomic NS, from field cases and cattle in pathogenesis studies.

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[4] See also 1.1.2. Experimental Transmission of Chronic Wasting Disease Agent from Mule Deer to Cattle by Intracerebral Route, Hamir et al.2005, J Vet Diagn Invest 17(3)276-81

[5] The Japanese Institute for Animal Health has detected Western Blot positives in peripheral nerves in a fallen bovine. Further results are expected in late 2005/early 2006.

Following results of such studies, it may become necessary to investigate feasibility of removal post slaughter. However, substantial parts of autonomic NS are currently removed. No evidence of involvement of peripheral nerves to muscles. No justification for further action to remove these nerves.

1.1.9. SSC Update of the Opinion on TSE Infectivity Distribution in Ruminant Tissues, Adopted 10-11 January 2002, Amended 7-8 November 2002

Updated summary of current state of knowledge of infectivity in bovine, ovine and caprine tissues.

1.1.10. SSC Opinion & Report Assessment on Human BSE Risk posed by Bovine Vertebral Column including Dorsal Root Ganglia, 16 May 2002

Consideration of Irish FSA quantitative assessment of risk of possible BSE infectivity in DRG -> scientifically sound but applies only to UK and Ireland, because of consumption patterns and BSE incidence.

Quantitative assessment of BSE risk from consumption of bovine vertebral column including DRG ->Cattle Pathogenesis Study cannot be exploited to show express the time of detectable infectivity in the CNS tissues as a fraction of the total incubation period. Limited number of animals used in study do not allow conclusion that infectivity in spinal cord absent until a few months before clinical signs.

What evidence required to increase current age limit of 12 months for treating bovine vertebral column as SRM? ->Recommends further surveillance data, and that various Member States assess the risk before and after implantation of control measures including total feed ban.

1.1.11. SSC Opinion on Safe Sourcing of Small Ruminant Materials (Should BSE in Small Ruminants Become Probable: Genotype, Breeding, Rapid TSE Testing, Flocks Certification and Specified Risk Materials), 4-5 April 2002

Provides a useful summary of the distribution of infectivity in experimentally infected BSE-susceptible sheep. Tissues/organs that may contain BSE infectivity include head, spinal cord and dorsal root ganglia, spleen, peripheral nervous system, other lymphoid tissue, liver, pancreas, placenta and the alimentary tract including its lymph nodes and nerves.

1.1.12. SSC Opinion on TSE Infectivity Distribution in Ruminant Tissues, State of Knowledge, December 2001

Summary of current state of knowledge of infectivity in bovine, ovine and caprine tissues.

1.2. Tallow[6]

1.3. Collagen

[6] See also 2.3

1.3.1. EFSA Opinion on Safety of Collagen and a Processing Method for Production of Collagen, 26 January 2005

A hydrolysis-based process that has a conservatively estimated TSE inactivation capacity of 5 logs (currently used for pig/poultry bones which run a small risk of contamination with low-risk bovine bones).

1.4. Gelatine

1.4.1. Inactivation of the BSE agent by the heat and pressure process for manufacturing gelatine. Grobben et al. 2005 Vet.Rec. 157, 277-281

This study investigated whether the autoclaving process used in the industrial manufacture of gelatine (3 bar, 133°C, 20 minutes) inactivates the BSE agent. Crushed bovine bones and vertebral column spiked with the brains of mice infected with the 301V strain of BSE, were subjected to a simulated industrial gelatine-extraction process. No infectivity was detected by intracerebral inoculation of mice with the extracted gelatine. The process was calculated to reduce infectivity by at least 10 E6.5 ID50.

1.4.2. SSC Updated Opinion with regard to TSE Risks of Gelatine Derived from Ruminant Bones or Hides, 6-7 March 2003

Three major factors – source material, effectiveness of inactivation process, end use.

Processes which are guaranteed to eliminate all infectivity have so far not been described for products such as gelatine, tallow, MBM and dicalcium phosphate.

Parts of bovine hides used for gelatine production do not present a TSE risk, provided contamination avoided.

Risk of TSE contamination with TSE infectivity is much higher with bones than with hides. Method of production of safe gelatine specified.

1.4.3. SSC Report on the Current State of Knowledge on the TSE Infectivity Clearance Capacity of Various Gelatine Production Processes, 5 September 2002

A summary of methods, including four (inactivation capacity >4.5 logs) that when used with appropriate raw material sourcing, will reduce end product TSE risk close to zero.

2. Feed Ban

2.1 Environmental Contamination of Beet Pulp

2.1.1. Bone Fragments in Beet Cossettes, Updated Expert Opinion No. 005/2005 of BfR[7], January 2005

Beet cossettes (thin strips of sugar beet) are formed by extraction of sugar from sugar beet and used as animal (including ruminant) feed.

Microscopic bone fragments and hair detected in beet cossettes from Germany. In 4/10 samples examined, genetic material was from rats; in 7/10 samples, genetic material was human; in 2/10 samples genetic material was from pigs. No genetic material from cattle was detected.

In the opinion of BfR there is no BSE risk associated with these beet cossettes contaminated with bone fragments.

BfR cannot rule out the risk of food producing animals becoming infected with BSE through the consumption of beet cossettes which have been contaminated via arable soil with animal constituents, bearing in mind the persistence of prions in soil. However this risk is considered low and unquantifiable.

2.2 Fishmeal/Lifting Feed Ban Provisions

2.2.1 Area-Level Risks for BSE in British Cattle Before and After the July 1988 Meat and Bone Meal Feed Ban, Wilesmith et al. 2005 Prev.Vet.Med. Jun 10;69 (1-2):129-44

Demonstrated that after the July 1988 ban on feeding ruminant derived meat and bone meal to ruminants, the area-level risk was associated with greater numbers of pigs relative to cattle. This finding supports the role of low level cross contamination of cattle feed with pig feed (which at that time was still permitted to contain meat and bone meal).

2.2.2 Poultry, Pig and the Risk of BSE Following the Feed Ban in France – A Spatial Analysis, Abrial et al. 2005 Vet.Res. July-August;36(4):615-628

Demonstrated that after the July 1990 French ban on feeding meat and bone meal to cattle, the area-level risk was associated with pig density. The areas with a significant pig effect were located in regions with a high pig density as well as a high ratio of pigs to cattle. In some cases the poultry density also had an effect. This finding supports the role of low level cross contamination of cattle feed with meat and bone meal used in pig (and poultry) feed at the feed mill, during shipment or on the farm.

2.2.3 Review of the Evidence for the Occurrence of BSE Cases in Cattle Born After the Reinforced Feed Ban in UK, Hill 2005 http://defraweb/animalh/bse/pdf/hillreport.pdf

[7] German Federal Institute for Risk Assessment (BfR)

Recent unpublished VLA experiments have shown that feeding exceptionally low doses (0.001g) of infected neural tissue to calves can cause BSE.

Exceedingly low dose of infective material required, reductions in BSE incidence resulting from feed bans (ruminant to ruminant and total feed ban) in the UK and elsewhere, and the lack of evidence that other causes are responsible strongly supports the hypothesis that ingestion of contaminated feed is the major cause of BSE in animals born after the 1996 reinforced feed ban.

Control of disease requires complete elimination of the BSE agent from the cattle feed chain.

Hill considers it 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.

2.2.4. Update on Research into Detection of Mammalian Protein, Advisory Committee on Animal Feedingstuffs, 2002 & Defra Website 2004 & VLA Luddington 2005

- Microscopic Analysis Test (MAT) is only method officially recommended by EC.

2003 and 2004 trials involving laboratories across the EU revealed that although updated MAT method (2003/126/EC) is superior to its predecessor, it is <u>currently unable</u> to reliably detect a 0.1% MMBM level in the presence of 5% fishmeal in feed.

- ELISA[8] – can detect rendered proteins, but difficulties with high-temperature (>130C) high-pressure (>2.7 bar) rendered proteins.

- Counter-Immuno Electrophoresis (CIE) – can detect low temperature treated animal derived proteins.

- Polymerase Chain Reaction (PCR) test – under current development; could detect materials processed up to 145°C

- Near-InfraRed (NIR) test – progress being made; could identify proteins subject to *high temperature, pressure* rendering.

- DELFIA – development work ongoing.

2.2.5. SSC Opinion on the Feeding of Wild Fish meal to Farmed Fish and Recycling of Fish with Regard to TSE, 6-7 March 2003

From the limited available research results, scientific literature on TSEs in fish and routine examination of fish brain, it can be concluded that there is no evidence that a natural TSE exists in fish and there are no indications of replication of scrapie or BSE

[8] 2.2.1 Hill Review 2005 states that ELISA test for animal proteins in feed is reliable only down to 0.1% contamination with meat and bone meal.

agent in experimental transmission studies. There is no evidence that the feeding of wild fish meal to farmed fish presents any TSE risk to human or animal health.

However the transmission research[9] is incomplete and other data sources are limited

2.2.6. Conclusions of Advisory Committee on Animal Feedingstuffs on the Feeding of Fish Meal to Farmed Animals, May 2001

Committee is aware of no specific risks to animal or fish health from the inclusion of fish meal in animals or fish feed, provided that no fish meal produced as a by-product of aquaculture is recycled in fish. Cross contamination or adulteration of fish meal with meat and bone meal (MBM) were considered unlikely when material arrived in UK direct from South American fish meal plants. Any additional steps in the distribution chain would increase the risks of contamination. The ability to trace fish meal at all stages of its journey are considered most important. The total removal of fish from animal diets would not be justified in terms of animal or human health risks. The risk of cross contamination of fish meal with MBM, would not warrant a ban providing existing rules on the use of MBM were fully adhered to, and there was an assured and protected production and supply chain for fish meal, whatever its origin.

2.2.7. SSC Statement on its Report and Scientific Opinion on Mammalian Derived Meat and Bone Meal forming a Cross-Contaminant of Animal Feedingstuffs adopted 24-25 September 1998, 26-27October 2000

In 1998 the SSC considered the question of acceptable levels of cross-contamination of ruminant feed with mammalian meat and bone meal (MMBM).

The SSC gave the opinion that in principle cross-contamination of animal feedstuffs with MMBM is not acceptable and that only a zero level of cross contamination can exclude any risk resulting from it. The risk for cross-contamination should be avoided by appropriate measures during the production, transport, storage and processing of the raw materials and of the processed feedstuffs.

The SSC further recommended that taking into account present technical limits of detection, it considered that levels of cross-contamination of ruminant feeds with MMBM (derived from pressure rendered, non SRM, fit for human consumption material) exceeding 0.5% (or 0.15% bone fragments or 0.15% protein whichever is the lowest) should be condemned.

In the 2000 statement the SSC further confirms that in principle, cross-contamination of ruminant feedstuffs with MMBM is not acceptable. Feed cross-contaminated above levels that are reliably quantifiable should be condemned. The SSC further confirms that it is updating the quantitative risk assessment of cross-contaminated feedstuffs presented in the September 1998 report in the light of new information available[10].

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[9] EC FAIR CT97 3308 Project

[10] Refers to April 2004 SSC Opinion on oral exposure of humans to BSE agent: infective dose and species barrier. This refers to small amount of tissue that can contain an infective dose of BSE agent for cattle and sheep ($\leq$ 1 gram of homogenised brain tissue). 2005 data suggests 1mg is sufficient to infect calves.

2.2.8. Intra-Species Recycling – SSC Opinion on the Risks born by Recycling Animal By-Products as Feed with regard to Propogating TSE in Non-Ruminant Farmed Animals, September 1999

So far, no scientific evidence of naturally occurrence of TSE in farmed pigs, poultry and fish. (Evidence that pigs are experimentally susceptible to TSE by intra-cerebral infection but not oral infection. No convincing evidence of TSE susceptibility in fish or poultry). However the possibility cannot be excluded because of surveillance limitations and the commercial lifespan versus the incubation period. Recycling of animal material will, in general, increase the risk that TSE cases occur or undetected infectivity pools build up, particularly if potentially BSE (TSE) contaminated material is recycled to ruminants or (possibly) susceptible non-ruminants. Intra-species recycling will increase risk further due to absence of species barrier. If recycling, and in particularly intra-species recycling, of animal material to farmed animals cannot be avoided, all measures that reduce infectivity would reduce the risk. These include pressure rendering or equivalent, excluding SRM, excluding fallen stock, stop feeding pig, poultry or fish potentially contaminated feed a sufficiently long period of time before slaughter in order to reduce risk of recycling infectivity through gut content. These measures would not achieve zero risk, should infectivity enter the recycling loop. Due to the long incubation period of TSEs, a significant risk could build up before disease was detectable.

2.2.9. SSC Opinion on the Risks of Non-Conventional Transmissible Agents, Conventional Infectious Agents or Other Hazards such as Toxic Substances Entering the Human Food or Animal Feed Chains via Raw Material from Fallen Stock and Dead Animals or via Condemned Materials, June 1999

A complex opinion including the following in relation to TSE agents: the recycling or disposal of condemned animals and materials should not lead to any direct human consumption. Also indirect human consumption resulting from the use of animals fed with condemned animals or materials should be avoided, but could possibly be envisaged under specified conditions.

2.3 Tallow

2.3.1 EFSA Opinion on the Assessment of the Human and Animal BSE Risk Posed by Tallow with respect to Residual BSE Risk, 27-28 April 2005

EFSA assessed the validity of the outcome of a quantitative risk assessment (QRA) of the residual BSE risk in tallow. The QRA supports the general conclusions of the 2001 SSC Opinion and Report on the safety of tallow (2.3.5). The estimates of risk for tallow production and use, as specified in the 2001 Opinion, are low. This may have implications for relaxation of the rules. In general the calculated exposure levels can be regarded as minimal.

2.3.2. Unpublished Data from VLA, 2005

Unpublished data from a pressure rendering study indicates that BSE infectivity can survive in tallow recovered by centrifugation and tallow recovered by solvent extraction.

2.3.3. Rendering Practices and Inactivation of Transmissible Spongiform Encephalopathy Agents, Taylor 2003 (Rev.Sci.Tech.Int.Epiz. 22(1),297-310)

Although adopted as the only appropriate method for producing meat and bone meal (MBM) for inclusion in animal feed, the 133°C, 3 bar, 20 minute rendering method might not be robust under worst-case conditions. One study[11] reported survival of some BSE infectivity when spiked raw material was subjected to the process.

Solvent extraction can be used to enhance the yield of tallow and produce low-fat MBM. Solvent extraction experiments[12] on solid material derived from rendered BSE and scrapie infected tissue, demonstrated that, on average, the solvent extraction systems achieved approximately a ten-fold reduction in the titre of the TSE agents tested. [Brown P. 2001 Bovine spongiform encephalopathy. British Medical Journal 322, 841-844 - indicates that a one log reduction might have been sufficient for infectivity to survive the process and contaminate the MBM produced.]

Tallow has been considered generally to be relatively free from BSE risks because

- Epidemiological studies[13] have failed to find any association between occurrence of BSE and consumption of tallow.

- In BSE-spiked rendering studies[14], no infectivity was found in crude, unfiltered tallow produced by a rendering procedure that produced MBM with almost as much infectivity as was present in the untreated, BSE-spiked raw material.

However, it is unrealistic to consider that tallow could never become contaminated with BSE agent. Source material and levels of suspended solids affect risk.

2.3.4. SSC Opinion on the Safety of Tallow Derivatives from Cattle Tallow, April 2003

SSC classified cattle tallow as “not infectious” in relation to BSE. Given the pharmaceutical, cosmetic and food applications of tallow derivatives, the SSC modulates the risk reduction according to the source of the tallow and the geographical BSE risk level[15]:

- Tallow derivatives are safe with regards to BSE risk if they are derived from food or feed grade tallow and if cross contamination is prevented.

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[11] Schreuder et al. 1998 Studies on the efficacy of hyperbaric rendering procedures in inactivating BSE and scrapie agents. Vet.Rec.142,474-480

[12] Taylor et al. 1998 Solvent extraction as an adjunct to rendering: the effect on BSE and scrapie agents of hot solvents followed by dry heat and steam. Vet.Rec. 143,6-9

[13] Wilesmith et al. 1988 BSE Epidemiological studies on the origin. Vet.Rec.128,199 -203

[14] Taylor et al. 1995 Inactivation of the BSE agent by rendering procedures. Vet.Rec.137,605-610

[15] Geographical BSE Risk is qualitative indicator of the likelihood of the presence of one or more cattle being infected with BSE, at a given point in time in a country. GBR I = highly unlikely; GBR IV=confirmed at a higher level

- Tallow derivatives are safe with regards to BSE risk if they are derived from lowest risk categories (GBR-C I) and fallen stock are excluded.

- For GBR-C II countries, tallow derivatives are safe if fallen stock are excluded, the animals are fit for human consumption, various other production standards are met (including filtration) and cross contamination is prevented.

- For GBR-C III and IV countries, tallow derivatives are safe if SRMs have been removed, in addition to the requirements for GBR-C II countries.

2.3.5. SSC Revised Opinion and Report on the Safety of Tallow obtained from Ruminant Slaughter By-Products, 28-29 June 2001

No evidence that ruminant tallow constitutes a TSE risk. SSC considers that possible TSE risks associated with tallow will result from protein impurities in end product.

Cannot rely on infection reduction capacity of process, so need to set safety criteria based on geographical source of raw materials, individual animal source of by-products, presence of SRM, risk of cross contamination, level of residual impurities, and intended use.

2.4 Dicalcium Phosphate & Tricalcium Phosphate

2.4.1 SSC Updated Opinion & Report on the Safety of Dicalcium Phosphate (DCP) and Tricalcium Phosphate (TCP) from Bovine Bones used as a Feed Additive or as a Fertiliser, 6-7 March 2003

Phosphates derived from bovine or porcine bones. Porcine bones not a BSE risk.

Concentration levels of DCP and TCP in feed are low (<1% DM/day). There is evidence of the possible presence of proteinaceous impurities.

Residual risk in DCP derived from bovine bones from higher BSE risk countries (GBR-C II, III and IV) is negligible providing raw material sourced from animals fit for human consumption, SRM excluded and contamination avoided, and production process has proven TSE infectivity reduction capacity.

TCP produced from bovine bones does not represent a BSE risk in animal feed provided the conditions for sourcing and production are similar to those for gelatine.

General opinion is that BSE risk from the use of DCP and TCP, processed to feed standards, and as applied as fertiliser in normal quantities, is remote.

3. Monitoring programmes

3.1. Annexes I and II of The TSE Roadmap, July 2005

Provide statistical data on BSE surveillance since 2001. Assuming the effectiveness of the total feed ban, the number of younger cases will reduce, and the total cost of surveillance for detection of each positive younger case will increase.

3.2. OIE Terrestrial Animal Health Code 2005, Appendix 3.8.4 – Surveillance for BSE

Sets out surveillance goals, including detecting disease, monitoring disease, monitoring controls, supporting BSE status, or gaining a higher status for trade.

Sets out target groups.

Type A Surveillance - surveillance for supporting BSE status or gaining a higher status 1:100 000 (95%).

Type B Surveillance - maintenance surveillance for negligible risk countries 1:50 000 (95%).

3.3. EFSA Report on the BSE Surveillance Model (BSurvE) established by the Community Reference Laboratory for TSE, October 2004

BSurvE model represents a major step forward in the analysis of BSE prevalence having regard to age distributions and surveillance streams and statistical uncertainty (confidence intervals) when compared to the use of the current OIE thresholds for BSE prevalence that are crude prevalences.

3.4. EFSA Opinion on a Surveillance Programme for Chronic Wasting Disease in the European Union, June 2004

Recommends initiation of an EU-wide experimental screening, targeting at-risk groups of animals, using rapid test and confirmatory methods. Should focus initially on farmed deer and fallen stock cervids >18 months. Should include all forms of TSE. Should match a cut-off prevalence of at least 0.5% (for risk populations) or at least 1% for other populations.

3.5. EFSA Advice on "OIE-facilitated consultation between EU and USA on the Interpretation and Implementation of the OIE Standard on BSE, May 2004

Influence of effective BSE surveillance programme on SRM removal requirements?

- The purpose of BSE surveillance is to determine the presence of BSE and, if occurrence of BSE is demonstrated, to estimate the prevalence and monitor the evolution of the epidemic and thus the efficiency of feed bans.

- Effective surveillance could influence SRM measures in

-High incidence epidemics where the volume of data is sufficient to demonstrate that the age structure of cases is significantly different (i.e. younger) that that observed in other high incidence countries. In such cases, removal of CNS SRM might be

considered necessary at younger age. The relative effect of such a change could theoretically be quantified.

-Circumstances in which cumulative surveillance data are deemed to have confidence levels of prevalence consistent with BSE freedom. In such cases, the removal of SRM might no longer be necessary.

- During the course of a surveillance programme, it may be possible to review SRM removal requirements

3.6 EFSA Opinion on the Interpretation of Results of EU Surveillance of TSEs in Ovine & Caprine Animals, Culling Strategies for TSEs in Small Ruminants and the TSE-Related Safety of certain Small Ruminant Products, November 2003

Data obtained under current EU TSE surveillance programme in small ruminants would make it possible to estimate the prevalence of TSE in each Member State, but the reliability of the estimate would vary significantly between Member States.

Recommend a higher number of sheep be tested using validated tests in order to obtain reliable data.

Emerging data that scrapie resistance of ARR/ARR sheep infected naturally, and BSE resistance of ARR/ARR sheep infected intra-cerebrally, is not absolute.

Recommend active surveillance and genotyping to determine TSE presence in ARR/ARR sheep, with brain and lymphoid examination.

Recommend validation of rapid post mortem BSE tests for TSEs in sheep.

Recommend searching for potential “carrier state” ARR/ARR asymptomatic sheep

When implementing a total ARR/ARR policy, it would be prudent to protect the genetic diversity of the species.

EFSA summary - no need to revise previous opinions on the breeding for TSE resistance, culling strategies or safe sourcing of small ruminants. In comparison to previous opinion (2002) there is no significant new data on risks of products, or evidence for a higher probability of BSE being present under natural conditions.

4. The categorisation of countries according their BSE risk.

4.1. OIE Terrestrial Animal Health Code 2005, Chapter 2.3.13

Details conditions for categorisation and trade, as specified in The TSE Roadmap.

There are three categories – negligible BSE risk, controlled BSE risk; undetermined BSE risk.

Categorisation is based on a risk assessment, and if appropriate an exposure assessment covering presence or absence of TSE, and prevalence based on surveillance; use of MBM; import of cattle; import of feed; import of products of ruminant origin; recycling of BSE agent; use of ruminant carcases in animal feed;

feeding ruminants with MBM and level of surveillance. Other factors include awareness of passive surveillance, compulsory notification of TSE, use of approved laboratories, feed ban monitoring, restriction of cohorts and offspring. There are two tiers of surveillance.

4.2 Update of the Opinion of the Scientific Steering Committee on the Geographical Risk of Bovine Spongiform Encephalopathy (GBR), January 2002

4.3 Final Opinion of the Scientific Steering Committee on the Geographical Risk of Bovine Spongiform Encephalopathy (GBR), July 2000

GBR is a qualitative indicator of the likelihood of the presence of one or more cattle being infected with BSE, pre-clinically as well as clinically, at a given point in time, in a country. Where the presence of BSE is confirmed, the GBR gives an indication of the level of infection. There are four levels: I – highly unlikely; II-unlikely but not excluded; III-likely but not confirmed or confirmed, at a lower level; IV-confirmed at a higher level.

The assessment is based on 8 factors – structure and dynamics of cattle population; BSE surveillance; BSE related culling; import of cattle and MBM; feeding; MBM-bans; SRM-bans; rendering.

5. Review of culling policy with regard to TSEs in small ruminants

5.1 Natural transmission of BSE between sheep within an experimental flock, Bellworthy et al. 2005. Vet.Rec. 157:7 p.206

The preliminary results of this study indicate that experimental BSE in sheep can transmit either *in utero* or perinatally.

5.2 Commission Regulation (EC) No 36/2005 of 12/01/2005

Amends Commission Regulation (EC) 999/2001 (“The TSE Regulation”), requiring primary discriminatory immuno-blot testing of all positive scrapie cases, and further discriminatory testing of any samples from which BSE cannot be excluded.

5.3 EFSA Opinion on the Interpretation of Results of EU Surveillance of TSEs in Ovine & Caprine Animals, Culling Strategies for TSEs in Small Ruminants and the TSE-Related Safety of certain Small Ruminant Products, November 2003

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Recommend active surveillance and genotyping to determine TSE presence in ARR/ARR sheep, with brain and lymphoid examination.

Recommend validation of rapid post mortem BSE tests for TSEs in sheep.

Recommend searching for potential "carrier state" ARR/ARR asymptomatic sheep

When implementing a total ARR/ARR policy, it would be prudent to protect the genetic diversity of the species.

EFSA summary - no need to revise previous opinions on the breeding for TSE resistance, culling strategies or safe sourcing of small ruminants. In comparison to previous opinion (2002[16]) there is no significant new data on risks of products, or evidence for a higher probability of BSE being present under natural conditions.

5.4 BSE – Two Statements by the Royal Society 1996[17]

Spongiform encephalopathies are found in various forms in a variety of animals. The human form in CJD. The sheep form is scrapie, which is a common and long-standing sheep disease and in which the agent is not known to infect humans.

6. Cohort culling in bovine animals

6.1. Defra Public service agreement 2005-2008
http://defraweb/corporate/busplan/psa2004.htm

PSA 9. To improve the health and welfare of kept animals, and protect society from the impact of animal diseases, through sharing the management of risk with industry, including:

- *a reduction in the number of cases of BSE detected by both passive and active surveillance to less than 60 in 2006, with the disease being eradicated by 2010*

6.2. OIE Terrestrial Animal Health Code 2005, Chapter 2.3.13

Includes the requirement for the progeny of female BSE cases, born within 2 years prior to or after onset of clinical disease, and all cattle reared with the BSE case during the first year of life and which consumed the same feed, and all cattle born in the same herd as, and within 12 months of the birth of the BSE case to be permanently identified, have their movements controlled, and be completely destroyed following slaughter or death.

6.3 EFSA Opinion on BSE-Related Culling in Cattle, April 2004

There is no new data concerning embryos, ova and progeny of BSE cases, that would modify the previous opinion of the SSC (2000). If there is a risk of transmission

[16] SSC Opinion on Safe Sourcing of Small Ruminant Materials (Should BSE in Small Ruminants Become Probable: Genotype, Breeding, Rapid TSE Testing, Flocks Certification and Specified Risk Materials), 4-5 April 2002

[17] http://www.royalsoc.ac.uk/displaypagedoc.asp?id=11291and http://www.royalsoc.ac.uk/displaypagedoc.asp?id=11292

from dam to offspring, by a mechanism that is not understood, it is not related to ova and embryos.

Based on 2002 and 2003 testing data, it can be concluded that the prevalence [positives per 10 000 sampled] of BSE in birth cohorts[18] of affected cattle was about ten times higher than the prevalence of BSE in the overall healthy animal population (2.77 versus 0.31 in 2002, 3.70 versus 0.29 in 2003).

In the light of current data, and absence or more sensitive *in vivo* tests, there is not enough evidence to modify the former SSC opinion concerning the definition or application of birth cohort culling.

6.4 Implications of BSE Infection Screening Data for the Scale of the British BSE Epidemic and Current European Infection Levels, Donnelly et al. 2002 Proc.R.Soc.Lond. 269:27179-90

Paper based on BSE survey and clinical incidence data, estimated maternal transmission at 0.5% (0-2.8%). When the effects of the offspring cull were taken into account, the estimate increased to 0.7% (0-4%). These represent the most recent estimates of the risk of maternal transmission replacing the 9.6% estimate in the 1997 cohort study[19]. Evidence derived from the 1997 cohort study also suggests that the risk for offspring declined as the feedbourne risk declined. The low level of maternal transmission would not be sufficient to maintain the BSE epidemic alone.

6.5 SSC Opinion on BSE-Related Culling in Cattle, September 2000

What is the expected impact of different culling schemes on the current pre-clinical incidence of BSE and the future clinical incidence?

The impacts of BSE culling is dependent upon many factors. Ideally all cattle exposed to the same feed should be culled. Limited information indicates that herd culling is having some effect in eliminating pre clinical cases and preventing future clinical cases. However data also indicate that birth cohort culling has a similar effect, and is more cost efficient.

Up to 57% of the cases in the national UK birth cohort 1987/88 could have been eliminated by an early birth cohort cull. It is not clear if a similarly significant effect can be expected in the later stages of an epidemic.

Key assumptions

-BSE not horizontally transmitted. Only significant routes of transmission are feed, and much less importantly vertically from infected dam to calf*.

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[18] In this context “birth cohort” refers to the group of bovine animals born in the same herd as the index case within 12 months before or after the birth of the affected animal

[19] A cohort study to examine maternally associated risk factors for bovine spongiform encephalopathy. Wilesmith et al. 1997 Vet.Rec. 141, 239-243 and Analysis of the bovine spongiform encephalopathy maternal cohort study: Evidence for Direct Maternal Transmission. Donnelly et al. 1997 App.Stats. 46, (3) 321-344

-Infection normally takes place in first months of life

-Incubation period is2-14 years (mean 60 months), with the vast majority of clinical cases being 4-6 years at clinical onset

-Current diagnostic tools can diagnose BSE in asymptomatic animals in the late stages of incubation, but not in the early stages of incubation.

-BSE is a rare event.

*The estimated risk of maternal transmission is 10% or less. Data on the offspring cull point to a low probability of removing undiscovered clinical cases. However most offspring culled are either too young or born too long before the dam developed BSE. The number of offspring culled is too low to expect occurrence of a maternally transmitted case within the small numbers examined. In order to verify the maternally transmitted hypothesis, it would be useful to restrict and monitor at least the most recent offspring of BSE dams.

7. UK restrictions

7.1. EFSA Statement on UK Application for Moderate BSE Risk Status, March 2005

Confirmed that according to the OIE classification, the UK can be considered as a country with moderate risk status in terms of BSE for its whole cattle population (less than 200 cases of BSE per 1 million cattle aged over 24 months, over a 12 month period)

7.2. EFSA Opinion on UK Application for Moderate Risk BSE Status, April 2004

The modelling methodology used to calculate the absolute incidence is statistically sound. On the basis of projected upper 95% confidence limits, UK has made robust case for its whole cattle population to be considered as OIE moderate BSE risk status from a date intermediate between July and December 2004.

Already UK is clearly moderate risk in respect of cattle born after July 1996

7.3. EFSA Opinion on the Scientific Justification for Proposing Amendments to the UK Date Based Export Scheme (DBES) and to the Over Thirty Months (OTM) rule, April 2004

The prevalence of BSE in UK cattle born after 31 July 1996 is below 200 cases per million adult cattle (i.e. “OIE moderate risk”). The UK is likely to become OIE moderate risk in respect of its total cattle population in 2004.

Removal of OTM rule will result in a higher probability of BSE infected animals entering food and feed chains. Replacing OTM with testing alone will not detect all pre-clinical cases. Therefore further measures (i.e. removal of SRM and feed ban irrespective of age, cohort culling) are needed to address additional risk. Recommend special scheme to keep cattle born before 1 August 1996 out of food and feed chain. For cattle born after this date the OTM can be replaced with the same measures in other Member States with similar OIE classification.

Removal of dam survival rule and lower (6 month) age limit for eligible cattle will not increase BSE risk to human health.

EFSA recommend that if OTM is removed, it is replaced by a comprehensive testing programme identical to that in other Member States.