

Final report on the updated assessment of the Geographical BSE-Risk (GBR) of FINLAND - 2002

Provided to the SSC on 16 May 2002

NOTE TO THE READER

Independent experts have produced this report, applying an innovative methodology by a complex process to data that were supplied by the responsible country authorities. Both, the methodology and the process, are described in detail in the final opinion of the SSC on "the Geographical Risk of Bovine Spongiform Encephalopathy (GBR)", 6 July 2000 and its update of 11 January 2002. These opinions are available at the following Internet address:

<http://europa.eu.int/comm/food/fs/sc/ssc/outcome_en.html>

This report, and the opinion of the SSC based on it, is now serving as the risk assessment required by the TSE-Regulation EU/999/2001 for the categorisation of countries with regard to their BSE-status. The final BSE-status categorisation depends also on other conditions as stipulated in annex II to that TSE-Regulation.

1. DATA

- The available information was sufficient to carry out the qualitative assessment of the GBR.

Sources of data

- Country dossier (CD) consisting of information provided from the country's authorities in 1998-2002.
- Final report of the Missions of the FVO to Finland carried out from 23 to 27 April 2001 in order to evaluate the implementation of protection measures against BSE (30/10/01).

Other sources:

- EUROSTAT data on export of "live bovine animals" and on "flour, meal and pellets of meat or offal, unfit for human consumption; greaves", covering the period 1980 to 2000.
- UK-export data (UK) on "live bovine animals" and on "Mammalian Flours, Meals and Pellets", 1980-1996. As it was illegal to export mammalian meat meal, bone meal and MBM from UK since 27/03/1996, exports indicated after that date should only have included non-mammalian MBM.
- Export data from the Czech Republic, Cyprus, Estonia, Lithuania, Slovenia and Switzerland.

2. EXTERNAL CHALLENGES

2.1 Import of cattle from BSE-Risk¹ countries

According to the CD 84 live beef cattle were imported for breeding purposes from the UK between 1983 and end 1988. Eurostat/UK recorded 127 cattle being exported from UK to FIN in that period. Verification of the BSE-status of the herds of origin in the UK was carried out in 1999 and the following information on the origin and fate of 84 cattle imported from the UK was provided on 13/4/1999:

- ⇒ 11 cattle were possibly exposed to the BSE-agent prior to export as they came from herds with BSE cases within the same birth cohort (+12 months). These 11 animals went into the feed/food chain of Finland between 1989 and 1995.
- ⇒ 20 cattle came from herds with homebred BSE cases born more than 12 months before or after the imported animal.
- ⇒ 27 cattle came from herds that never reported a homebred BSE case, even if some had imported cases.

Age at death	3	4	5	6	7	8	9	10	11	12	??
Case in birth cohort	1	2	2	4	1		1				
Case outside birth cohort		2	3	2	3	1	7		2		
No homebred case	3		1	3	1	5	1			1	12
All	4	4	5	9	5	6	9		2	1	12

Table 1: Distribution of age at death of breeding cattle imported from UK between 1980 & 1988.

¹ BSE-Risk countries are all countries already assessed as GBR III or IV or with at least one confirmed domestic BSE case.

Country		80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	2000	2001	Total	
Belgium	CD																					45*		45	
	Other																						47		47
Denmark	CD										98	210	209	144	23	22	7	16	30						759
	Other								3	8	100	211	206	135	23	22			1						709
France	CD																					6		6	
	Other																					4		4	
Germany	CD																								
	Other														127										127
Netherlands	CD																					20**			20
	Other											13						90				20			123
UK	CD					19	12	7	14	32															84
	Other				2	22	36	8	14	45															127
All Non UK	CD										98	210	209	144	23	22	7	16	30			26	45		835
	Other								3	8	100	224	206	135	150	22	90	0	1			24	47		1021
UK	CD					19	12	7	14	32															84
	Other				2	22	36	8	14	45															127

Table 2: Live cattle imports into Finland (CD) and corresponding exports from BSE risk countries. Source for export data: Eurostat and UK export statistics and, where available, export statistics from other BSE risk countries. Note: Only imports in Risk periods are taken into account. Risk periods are defined according to the SSC opinion of January 2002.

- ⇒ 3 cattle could not be traced back to their herd of origin.
- ⇒ 23 cattle did not enter the food or feed chain. 15 of these were already examined on 13/4/1999 by histopathology for BSE, with negative result. 6 were excluded from the feed and food chain and (on 13/4/1999) foreseen for brain examination, and 2 were disposed-of without brain examination.

In addition to cattle imported from the UK, Finland also imported cattle from other BSE risk countries. While the country dossier indicates only import of 693 live bovines from DK (FVO/2000: 801), Eurostat shows exports of 1001 cattle to Finland from DK (709), Germany (127), The Netherlands (103), and France (4). Most of these exports took place between 1988 and 1997.

2.2 Import of MBM² or MBM-containing feedstuffs from BSE-Risk countries

- Between 1980 and 2000, Finland imported, according to the country dossier, 197.641 tons of MBM from BSE risk countries, other than UK, and nothing from the UK itself. The corresponding Eurostat figure is 182.448 tons. Eurostat (and UK) export data do also show 96 tons of MBM being exported from UK to Finland in 1984 (13 tons) and in 1991-1996 (83 tons). According to the CD there were no MBM imports from any country in 2001.
- Until 1990 the imported MBM could legally be included into ruminant feed.
- In 1990 a national ban was implemented, prohibiting the use of imported animal protein (other than fishmeal) in cattle feed. However, according to the CD 135,353 tons of MBM were imported from BSE affected countries before end 1990 and 70,328 tons from 1991 to 1996. According to Eurostat 80.553 tons were exported from EU-Member States (MS) to Finland before end 1990 and 101,895 tons of MBM were exported from MS to Finland in the period 1991 to 2000.
- The import of processed animal proteins for any animal is prohibited since 1/1/2001.

² For the purpose of the GBR assessment the abbreviation “MBM” refers to rendering products, in particular the commodities Meat and Bone Meal as such; Meat Meal; Bone Meal; and Greaves. With regard to imports it refers to the customs code 2301 10 “flours, meals and pellets, made from meat or offal, not fit for human consumption; greaves”.

Country	data	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	0	1	Total	
Austria	CD																	25						25	
	other																								0
Belgium	CD																								0
	other																					9			9
Denmark	CD						5445	5157	11600	14093	10463	4479	6526	9218	8168	11606	317	448	3561	4009	848	1378		97316	
	other						4454	4138	11318	13081	8558	4054	7361	8853	7632	9238	1880	776	3522	3961	198	1006		90030	
France	CD														81	11			87	2062	114			2355	
	other						23					23		47				25	162	135				415	
Germany	CD	262	202	182	222	397			23	1100	1		55	122	291	71	268	247						3443	
	other													305	725	463	337	462	462	2240	222			5216	
Ireland	CD																	25						50	
	other																25							0	
Italy	CD																							0	
	other									300				72										372	
Netherlands	CD						845	7580	5406	9291	13949	9913	1903	5656	7847	8516	8038	1792	3425	4270	3382	2664		94477	
	other									10102	15232	9293	1903	6525	4521	12731	8965	5280	4578	5570	1413	243		86356	
UK	CD																								
	other					13								21	10	29		23						96	
All non UK	CD	262	202	182	222	397	6290	12737	17029	24484	24413	14392	8429	14929	16218	20424	8426	2558	7320	10341	4344	4042	0	197641	
	Other	0	0	0	0	0	4477	4138	11318	23183	24090	13347	9287	15378	12577	22719	11333	6418	8724	10128	3851	1480	0	182448	
UK	CD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Other	0	0	0	0	13	0	0	0	0	0	0	0	21	10	29	0	23	0	0	0	0	0	96	

Table 3: MBM imports (tons) into Finland (CD) and corresponding exports from BSE risk countries. Source for export data: Eurostat and UK export statistics and, where available, export statistics from other BSE risk countries. Note: Only imports in Risk periods are taken into account. Risk periods are defined according to the SSC opinion of January 2002.

- According to the CD it is assumed that before 1990 most, and after 1990 all of this imported MBM went into pet food and fur-animal feed. Information was provided how it was verified or controlled after 1990 that imported MBM was not used in other feeds and that it was not ending-up in cattle feed due to cross-contamination. However, even small breaches would have posed a significant risk. That this risk exists can be concluded from the fact that since 1991, according to data provided by the country, a significant share of imported MBM went to feed mills producing feed for food- and non-food animals.

2.3 Overall assessment of the external challenge

The level of the external challenge that has to be met by the BSE/cattle system is estimated according to the guidance given by the SSC in its final opinion on the GBR of July 2000 (as updated in January 2002).

- Live cattle imports:

In the period 1980-2000 the country imported 919 (source: CD) or 1148 (source: Eurostat) live cattle from BSE risk countries, of which 84 (CD) or 127 (Eurostat/UK) came from the UK. Together these imports represent a moderate external challenge. Broken down to 5 year periods the resulting external challenge is as given in table 4. This assessment takes into account the different aspects discussed above that allow to assume that certain imported cattle did not enter the domestic BSE/cattle system, i.e. were not rendered into feed. The external challenge resulting from live cattle imports was therefore very low from 1981 to 1985 and moderate from 1986 to 1990 inclusive. It was again very low from 1991 to 1995 and negligible thereafter.

- MBM imports:

In the period 1980-2000 the country imported 197,641 tons MBM (CD) from BSE risk countries. According to Eurostat it also imported 96 tons from the UK. Together these imports represent an extremely high external challenge. Broken down to 5 year periods the resulting external challenge is as given in table 4. This assessment takes into account the different aspects discussed above that allow to assume that certain imported MBM did not enter the domestic BSE/cattle system or did not represent an external challenge for other reasons. The imports of MBM led to a moderate external challenge in the first half of the eighties. Thereafter it was always very high.

External Challenge experienced by <u>FINLAND</u>				
External challenge		Reason for this external challenge		
Period	Level	Cattle imports	MBM imports	Comment
1980 to 1985	Moderate	Very low	Moderate	
1986 to 1990	Very high	Moderate	Very high	
1991 to 1995		Very low		
1996 to 2000		Negligible		
2001 to current	Not assessed	No data	No data	

Table 4: External Challenge resulting from live cattle and/or MBM imports from the UK and other BSE risk countries. The Challenge level is determined according to the SSC-opinion on the GBR of July 2000 (as updated in January 2002).

3. STABILITY

3.1 Overall appreciation of the ability to avoid recycling of BSE infectivity, should it enter processing

Feeding

Feed bans

- A ban on the use of ruminant feed stuff containing imported animal protein, other than fishmeal was instigated in 1990.
- An MMBM³-ban to ruminants was implemented on 1/3/1995. In 1998, a Decree of the Ministry of Agriculture and Forestry on self-control programs of the feed sector (139/1998) implemented compulsory self-control programs for feed producers including measures to avoid cross-contamination.
- A ban [see (EC) 2000/766] prohibiting the use of processed animal proteins in feed for food animals is in force since 1/1/2001. Feed was removed from farms and the trade sector and compensated by the government.
- A ministerial decree regulates the use of fishmeal. It entered into force on 23/3/2001 and allows use of fishmeal only in feed production on separate lines, not used for ruminant feed production. The only plant that produces fish-meal containing non-ruminant feed as well as ruminant feed used flushing until the second line was finalised in April 2001.

Past use of MBM in cattle feed

- In the original country dossier (8/6/1998) it was estimated that until end 1989 about 50% of the cattle feed contained MBM in an amount equivalent to 1-5%. It is also argued that most of this was domestic because the imported Meat-meals were destined for fur feed and pet food production. After 1/3/90 feed producer that used imported MBM could not any more produce cattle feed but some feed producers continued to include domestic MBM into cattle feed, with special authorisation some continued to include domestic non-ruminant MBM into cattle feed until beginning of 1996.
- Since 1/3/1995 the deliberate inclusion of MBM into cattle feed is unlikely, with the exceptions mentioned above, but cross-contamination cannot be excluded (see below).
- The CD confirmed that between 1990-1995 less than 1% of cattle feed contained MBM.
- The use of MBM was completely stopped in feed mills since 14/12/2000 (CD) and the use of fishmeal for ruminants since 5/12/2000. In 2001 two feed mills re-started using domestic MBM for non food animals but in fully separate feed plants with no other feed production.
- Since 1/1/2001 deliberate inclusion of MBM in cattle feed as well as cross-contamination is regarded to be practically impossible.

Information on feeding patterns

A breakdown of the energy intake of dairy cows, heifers and beef cattle was provided in the original CD of 1998. The data for 1996 indicate that between 4.8 and 16% of the energy annually consumed by cattle was from compound feed or concentrates.

Potential for cross-contamination and measures taken against

³ MMBM = Mammalian-MBM

In 2000 there were 33 feed mills and 4 registered on-farm mixers in Finland. Ruminant feed was produced in 11 feed mills (around 580.000 tons p.a.). One of these 11 mills produced only ruminant feed, 4 did not use any protein of mammalian origin. These 5 mills produced more than 50% of the Finish ruminant feed. With other words in 2000 about 200.000 tons of ruminant feed was produced in feed mills also producing other feeds and using mammalian proteins.

- It is concluded that cross-contamination of MBM-free cattle feed with MBM was possible in feed mills. The FVO mission reports of 1996 and of 2001 show that at least in the visited feed mills no separate lines for ruminant and non-ruminant feeds were available. Flushing batches were used between ruminant and non-ruminant feed production.
- On-farm cross-contamination cannot be excluded but the number of farms having ruminants and monogastric animals was only 726 in 2001 (FVO mission report, April 2001). However, the risk of deliberate cross feeding is regarded small as since 1995 MBM-containing feed is labelled “Contains ruminant/mammalian protein. Must not be used for ruminants.” Of 70 mixed farms sampled in January to April 2001, four were found having MBM-containing feed despite the total feed ban of 01/01/2001 and the subsequent national recall that yielded 3.600 tons of MBM-containing feed from farms (50%), feed industry (42%) and distribution channels (8%).
- Since 15 January 2001 feed mixtures and feed materials containing fishmeal, dicalcium phosphate and hydrolysed protein are labelled accordingly.
- Compliance of the feed bans has been assessed by the examination of samples of finished feed stuff by the microscopic test since 1/4/1997: 60-70 samples were tested annually. All were negative for MBM.
- In 2000 and 2001, the total number of cattle feed samples increased to 385 and 665 (for MBM + 440 for fishmeal) respectively. There were no positives in 2001 and 2 positives in 2000.
- The FVO mission report of 2000 contained the following information: In 1998, 2 of 92 feed samples were found positive. One with more and one with less than 0.5% MBM. In 1999 a total of 101 feed samples were examined of which 69 were taken for MMBM control. 2 (2%) contained MBM, below 0.5%. A large feed mill, producing several thousand tons of ruminant feed per year, was found to have been sampled only once in 1999 while the overall sampling frequency was said to be 1/1000 tons as long as no problems are suspected. A contamination between 0.1% (detection limit of the method used) and 0.5% is regarded as cross-contamination and the producer is informed. A contamination with 0.5% or more results in immediate prohibition of further marketing of the batch.
- In 2001, after the total feed ban, 665 feed samples were examined for MBM and 440 for fishmeal. Every imported consignment of fishmeal is also sampled for MBM contamination. All samples in 2001 were negative for MBM.

Rendering

- Since 1980 four companies in Finland produced annually between 20.000 and 29.000 tons of processed animal protein.
- One plant used until 1994 batch pressure cooking at 110-150°C, 1-3bar, and 10-30 minutes. Temperatures below 133°C and lower pressures than 3 bar were only used for low-risk material. Fallen stock, hooves and other animal waste was processed at

higher temperatures of 125-140°C and with longer time intervals. Since 1996 the plant operates according to the 133/20/3 standard. It produced MBM for all animals but since 1996 not any more for ruminant feeds.

- Another plant was authorised in 1994 and operated always in accordance with the 133/20/3 standard. It only produced MBM for fur animals.
- The two remaining plants operated continuous atmospheric pressure processes with a temperature of 110-120°C and a processing time of 2-3h. The two companies merged in 1989 and continued operation at the same conditions until 1995 when the temperature was raised to 140°C. They ceased operation in July 1996. The use of MBM from these plants in cattle feed was prohibited since 1990 because they processed animal waste imported from Sweden.
- In April 2001 there were 2 high risk processing plants in Finland, annually processing about 65.000 tons of raw material (incl. about 15.000 tons SRM) into 25.000 tons of MBM. SRM is processed in a separate line but was processed in the same line as other material between October 2000 and April 2001. Before it was included into normal animal waste (FVO, 2001).
- Since 1996/97 the entire rendering is apparently operating according to the 133/20/3-standard, with some initial problems recorded in the FVO mission report of 1996.

SRM and fallen stock

- Until October 2000 SRM was rendered together with other high or low risk material for use in feed.
- Since 1 October 2000 an SRM ban is in place. It was amended twice to enlarge the list of SRM. SRM are now normally processed into MBM for incineration but some small slaughterhouses may also bury it (400-500kg per week; FVO, 2001). It is therefore regarded highly unlikely that any SRM could be recycled to cattle via feed.
- Approximately 30% of fallen stock was always collected and processed in plants dedicated to MBM for fur animals. The rest was otherwise disposed of. The FVO report of 2000 indicated that burial was still the rule rather than the exception. Since March 2001 a centralised collection system for fallen stock exists, covering all but the most remote northern and eastern areas.

Conclusion on the ability to avoid recycling

- Until 1995 BSE infectivity entering rendering could have been recycled and could have reached domestic cattle, in particular if it was processed as low-risk material (e.g. SRM from healthy slaughter). The fact that fallen stock was either buried or processed in plants dedicated to fur feed made recycling to cattle of BSE-infectivity contained in BSE infected fallen stock less likely.
- The 1995 MBM-ban made recycling less probable but the available information does not allow judging its effectiveness. Cross-contamination was certainly possible.
- The improvements in the rendering system, realised in 1996/97, made recycling of the infective agent less likely from 1997 onwards.
- Concerning the compliance with the EU total feed ban introduced in January 2001, or the SRM ban introduced in October 2000 no data were available so far to judge its efficiency but the FVO report of April, 2001 indicated some problems with the SRM ban. Nevertheless, it is assumed that recycling of BSE infectivity is much less likely since October 2000 and highly unlikely since January 2001.

3.2 Overall appreciation of the ability to identify BSE-cases and to eliminate animals at risk of being infected before they are processed

Cattle population structure

Type of animal	1990		1997	
	n°	% of total	n°	% of total
Adult cattle (>2y)				
Milking cow	489.900	36	390.900	34
Suckler cow	14.200	1	32.400	3
Dairy heifer			23.100	2
Suckler heifer			3.000	0
Slaughter heifer			3.800	0
Bulls			8.900	1
Total adult	504.100	37	462.100	40
Cattle below 2y				
Dairy heifer	175.200	13	140.600	12
Suckler heifer	8.300	1	9.300	1
Slaughter heifer	35.300	3	17.000	1
Calves (<=1y)	487.900	36	401.800	35
Bulls <1	142.100	11	111.600	10
Total young	848.800	63	680.300	60
ALL CATTLE	1.352.900	100	1.142.400	100

Table 5: Cattle population structure in Finland, 1990 and 1997 (CD, 8/6/1998). For 1990 heifers were not differentiated by age.

- In 2000 the total cattle population in Finland was 1.056.700 of which 430.600 were older than 2 years and 261.200 between 12 and 24 months. (CD, 5/4/2001).
- The FVO mission of April 2001 was informed that of these cattle about 350.000 were older than 30 months and that annually about 130.000 cattle older than 30 months are slaughtered. Around 10.000 emergency slaughter and 6.000 fallen stock were estimated annually to occur.
- There have been no major changes in population structure. The average herd size for dairy cows was around 14.5 (in 1996) with only a small number (29) being larger than 50 heads.
- The average age at slaughter for dairy cows was 5 years in 1996 (from 5.6 years ten years ago). The total number of cows annually culled was between 80.000 and 90.000 heads per year between 1988 and 1996. Reasons for cull were given in the original dossier and remained rather constant during the period 1988-1996 (see table below).

Reason for culling in 1996	Accident	Udder disease	Calving difficulty	Bad temper	Old age	Deficiency disease	Low production	Sterile	Other
% of total annual cull	4.9	33.2	2.7	1.4	2.9	0.5	8.0	21.7	24.8

Table 6: Number of cows culled from the herds according to cause of culling, 1996.

- Dairy herds are managed intensively. Milk yield is relatively high with data for 1995 showing an average milk yield of 6.999 kg per cow (max: 7.800 kg in two regions) in milk recorded herds, and 5.063 kg per cow and year outside this scheme. Individual milk yields reached 11.204 kg per year for the 301 best cows but more than 58.000 cows produced 7.500 kg/year or more in 1996.

BSE surveillance

- All bovines are identified with double ear tags and registered in a central database. This database is recognised by the European Commission.
- Animals are marked with an ear tag before transport to slaughterhouses.
- Since 1995, a national identification system has been introduced. It now has 100% coverage.
- In 1988/89 there was a rabies outbreak in Finland and many cattle herds were vaccinated and checked for clinical symptoms for neurological diseases. Seven brains were checked for BSE, in addition to rabies and other neurological diseases. None was found positive for BSE. Only 3 were from animals older than 24 months.
- BSE was always compulsory notifiable, as all diseases that have not been diagnosed in Finland. It was specifically listed as notifiable disease in 1990 but hardly any BSE suspects were reported.
- Training in the diagnosis of TSEs has been provided by VLA-Weybridge, UK for a pathologist in 1994 and recently several more pathologists have been trained.
- In 1996 owners of UK imported cattle and their attendant veterinarians were informed of the clinical signs of BSE.
- Until 1997 surveillance was only based on examination of reported suspects.
- Suspects were and are fully compensated including production losses under the act of animal diseases No. 55/80 as amended by the act 809/1992.
- Since 1997 the passive surveillance is complemented by targeting animals with CNS-disease symptoms or symptoms for progressive disease that are presented at emergency slaughter.

Year	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
N°	7/ 3<24 m	6/ 1<24 m	17	23	14	5	12	11	13	57 (38)	94 (61)	91 (62)	93 (??)	27.876

Table 7: Number of cattle brains examined for BSE per year. According to 98/272/EC or OIE at a given population of 0,5 million adult cattle about 50 brains of cattle showing signs compatible with BSE should be examined annually. 1997 of the 57 brains examined, 38 were analysed in the context of an active surveillance targeting cattle over two years of age, sent for emergency slaughter because of CNS or progressive disease. In 1998/99 the total of 94/91 brains analysed included 61/62 brains from cattle showing symptoms of CNS or chronic wasting conditions. A breakdown for the 2001 figure is given below.

- Since end 2000 active surveillance is introduced, consisting of sampling (now testing all) healthy "normal" slaughter cattle over 30 months of age and of a fraction (Since 2002 all) of the fallen stock and emergency slaughtered animals first over 30 months and since mid 2001 over 24 months of age.

BSE suspect animals ¹	Risk Animals ²	Healthy Animals ³	BSE Eradication ⁴
3	17.960	9.882	31

Table 8: BSE Testing, cumulative figures January to December 2001. ¹ = Animal reported as clinical suspects; ² = Dead-on-farm animals, emergency slaughtered animals, animals sent for normal slaughter but found sick at ante mortem inspection; ³ = Healthy animals subject to normal slaughter; ⁴ = Birth and rearing cohorts, feed cohorts, offspring of BSE cases, animals from herds with BSE.

- A first BSE case was identified in November 2001. The six year old cow (born 1995) from the northern part of the country showed clinical signs of disorder and was emergency slaughtered but not declared as suspect BSE case. The EU reference laboratory confirmed the case on 7 December 2001.

3.3 Overall assessment of the stability

For the overall assessment of the stability the impact of the three main stability factors and of the additional stability factor, surveillance, has to be estimated. Again, the guidance provided by the SSC in its opinion on the GBR of July 2000 is applied.

Feeding

- Until 1990 it was legally possible to feed imported and domestic MBM to cattle and a significant fraction of cattle feed is assumed to have included MBM. In 1990 inclusion of imported MBM into cattle feed was prohibited but domestic MBM could still be included. Feeding was therefore **“not OK”** until end 1995. Since 1996 an MMBM-to-ruminant feed ban was in force and some control measures were put in place. This made deliberate inclusion of MBM into cattle feed unlikely but as cross-contamination remained possible Feeding can only be considered **“reasonably OK” since 1996**. Since January 2001 EU legislation requires a total ban of processed animal protein (other than fishmeal) from feed to be used to farmed livestock animals. Controls are strongly increased and feeding is now **“OK”**.

Rendering

- Until 1996, only a part of the rendering system was able to significantly reduce BSE infectivity, should it have entered. Rendering was therefore **“not OK”**.
- Since 1996/97 the entire rendering system operates according to standard, reaching optimal effectivity with regard to reducing BSE infectivity⁴. Rendering is therefore considered **“OK”** since 1998.
- Since March 2001 all MBM produced in Finland is destined for incineration.

SRM-removal

- Before October 2000 SRM was rendered into feed, as was fallen stock, the latter, however, in fur feed dedicated plants. SRM removal is regarded as **“not OK” until 1/10/2000**. Since then EU legislation required an SRM ban. As the FVO found some irregularities with the implementation of the SRM ban in April 2001, and as no detailed information is available concerning the efficiency of its implementation, SRM-removal would normally be considered **“reasonably OK”** since 1/1/2001.

⁴ It should be noted that according to the SSC even the 133/20/3-process does only reduce BSE infectivity by a factor of 1,000 but cannot guarantee sterilisation.

However, even if some SRM should be rendered the risk that it could be recycled to cattle is extremely low, given the fact that all domestic MBM is incinerated. SRM-removal is therefore regarded “OK” since 3/2001.

BSE surveillance

- Until 1997, the surveillance was entirely passive and hence not able to identify all clinical BSE cases, should they occur.
- Since 1997 surveillance of CNS-suspects in emergency slaughter improved the ability to identify clinical BSE cases.
- Since 2000 a larger scale active surveillance was introduced. However, the number of cattle that is tested for BSE remains too low to provide statistically significant information as to the size of the BSE incidence in the country. It has, however, already confirmed that BSE is present in the domestic cattle herd of Finland.

Stability of the BSE/cattle system in <u>FINLAND</u> over time					
Stability		Reasons			
Period	Level	Feeding	Rendering	SRM removal	BSE surveillance
1980 to 1995	Very unstable	Not OK	Not OK	Not OK	↓
1996	Unstable	Reasonably OK			OK
1997					
1998	Neutrally stable	OK	OK	OK	↑
1999					
2000	Optimally stable	OK	OK	OK	↑
2001					

Table 9: Stability resulting from the interaction of the three main stability factors and surveillance. The Stability level is determined according to the SSC-opinion on the GBR of July 2000.

On the basis of the available information it has to be concluded that the country's BSE/cattle system was very unstable until 1996 i.e. it would have recycled and amplified BSE infectivity, should it have entered the system, rather fast. A factor that might have enhanced the stability to some extent was probably the fact that a significant part of the fallen stock was not rendered for feed or if it was rendered the products were destined for fur animals. This excluded a significant part of the potentially highest contaminated materials from entering the Finnish cattle-feed cycle. The system improved to “unstable” in 1996 when the MMBM-feed ban improved the feeding to “reasonably OK”, and it became neutrally stable in 1998 when appropriate rendering conditions were met throughout. It is optimally stable since 2001 when first an SRM ban (October 2000) and then a "total" feed ban and incineration of all domestic MBM was implemented (March 2001). The surveillance was also improved in 2000, as demonstrated by the first case found in 2001, thus enhancing the stability.

4. CONCLUSION ON THE RESULTING RISKS

4.1 Interaction of stability and challenges

The interaction of the stability of the Finland BSE/cattle system in the past and the external challenges the system has coped with is summarised in the table below. From the interaction of the two parameters “stability” and “external challenge” a conclusion is drawn on the level of “internal challenge” that emerged and had to be met by the system, in addition to external challenges that occurred.

INTERACTION OF STABILITY AND EXTERNAL CHALLENGE IN FINLAND			
Period	Stability	External Challenge	Internal challenge
1980 - 1985	Very unstable	Moderate	Likely and growing, in particular towards the end of the period
1986 to 1990		Very high	Present and growing at least since 1995, the year of birth of the first domestic BSE case.
1991 to 1995			
1996 to 1997	Unstable	Not assessed	Present and constant
1998 to 2000	Neutrally stable		
2001	Very stable	Not assessed	Likely and decreasing

Table 10: Internal challenge resulting from the interaction of the external challenge and stability. The internal challenge level is determined according to guidance given in the SSC-opinion on the GBR of July 2000.

An external challenge resulting from cattle import could only lead to an internal challenge once imported infected cattle were rendered for feed and this contaminated feed reached domestic cattle. Cattle imported for slaughter would normally be slaughtered at an age too young to harbour plenty of BSE infectivity or to show signs, even if infected prior to import. Breeding cattle, however, would normally live much longer and only animals having problems would be slaughtered younger. If being 4-6 years old when slaughtered, they could suffer from early signs of BSE, being approaching the end of the BSE-incubation period. In that case, they would harbour, while being pre-clinical, as much infectivity as a clinical BSE case. Hence cattle imports could have led to an internal challenge about 3 years after the import of breeding cattle (that are normally imported at 20-24 months of age) that could have been infected prior to import.

In the case of Finland cattle imported from the UK could have been processed into "domestic" MBM in the late 80s early 90. Later on cattle imported from DK might have carried the agent when slaughtered around the mid 90s.

On the other hand imports of contaminated MBM, MM, BM or Greaves would lead to an internal challenge in the year of import, if fed to cattle. The feeding system is of utmost importance in this context. If it could be excluded that imported, potentially contaminated feed stuffs reached cattle, such imports might not lead to an internal challenge at all.

In Finland first MBM imports from BSE-risk countries occurred in the early 80s (DE) and particularly since 1985 (NL and DK).

In view of the above-described reflection the registered external challenges could have led to an internal challenge in Finland around 1985. This internal challenge met the very unstable system.

- The very unstable BSE/cattle system of Finland was exposed to an increasing external challenge since the early 80s. An internal challenge might have started to develop before 1985. However, since 1986 the external challenge was very high, resulting from MBM-imports while it was still allowed (until 1990) to include imported MBM into cattle feed. This makes the occurrence of an internal challenge during this period particularly likely.
- This internal challenge met the very unstable system and any infectivity that was already in the system was recycled and amplified, growing over time. This growth was further fuelled by the continuing very high external challenge.
- This conclusion is supported by the first domestic BSE case in Finland, born in 1995.
- With the appropriate rendering in place since 1997/98, a further growth of the internal challenge became unlikely and it rather remained constant until end 2000/early 2001, when further improvements made the system optimally stable. The internal challenge can be expected to decrease since then with the rate at which domestic cattle born before 1/3/2001 leave the system.

4.2 Risk that BSE infectivity entered processing

A certain risk that BSE-infected cattle entered processing in Finland, and were at least partly rendered for feed, occurred in the mid 80s when cattle imported from BSE risk countries could have been slaughtered. This risk continued to exist, and grew significantly in the 90s, when domestic cattle, infected by MBM-imports in the mid 80s, reached processing. If that happened, and given the low stability of the system at that time, the risk increased that incubating cattle not showing any signs of BSE were processed, sometime while approaching the end of the incubation period. Since 2001 the system is optimally stable and it is assumed that the rate of new infection is zero or at least very significantly lower than the rate by which incubating animals leave the system. Hence the risk of incubating cattle being processed will start decreasing once the 2001 birth cohort is slaughtered. With the additional safeguard of testing all healthy cattle over 30 months and all fallen stock and emergency slaughter over 24 months in combination with the BSE eradication measures the processing risk is decreasing even faster.

4.3 Risk that BSE infectivity was recycled and propagated

Given that the BSE-agent was potentially imported into the country in the early 80s by live cattle and by MBM, a risk that BSE infectivity was recycled and amplified existed since the moment when a processing risk existed, i.e. since the mid 80s. Given the instability of the system, this risk grew over time. With the improved controls on feeding and the improved rendering the recycling efficiency probably decreased since 1996 but this might have been compensated by the still increasing processing risk.

Since 1/3/2001 recycling and propagation of the BSE agent should be stopped and further propagation of the disease is highly unlikely.

5. CONCLUSION ON THE GEOGRAPHICAL BSE-RISK

5.1 The current GBR as function of the past stability and challenge

- The current geographical BSE risk (GBR) level is *III*, i.e. *it is confirmed at a lower level* that domestic cattle are (clinically or pre-clinically) infected with the BSE-agent.

5.2 The expected development of the GBR as a function of the past and present stability and challenge

- Assuming that measures in place continue to be appropriately implemented the GBR will decrease over time at the rate at which already infected animals leave the system. However, this does not exclude that other cattle infected in the past may be discovered as clinical cases in the future.
- If the measures in place are effectively implemented import of live animals cannot increase the risk because the infectivity that could theoretically be harboured by them would not reach domestic cattle.