

FINAL REPORT

ON THE

ASSESSMENT OF THE GEOGRAPHICAL BSE-

RISK (GBR) OF

CROATIA

27 June 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, are 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.

FULL REPORT

1. DATA

- The available information was suitable to prepare the GBR risk assessment for Croatia. Reasonable worst case assumptions have been used in cases where the available information was not fully adequate.

Sources of data

Country Dossier consisting of:

- Answers to the questionnaire on geographical BSE risk assessment, received on 12 March 2001, and annexes.
- Additional information, comments on the initial and on the second draft report, received on 3 July 2001.
- Additional information provided by Croatia after meeting of Croatian national experts and the SSC secretariat on 6 July 2001 and during another meeting on 8 of August 2001.
- Additional information provided by Croatia received on 29 May 2002.

Other sources:

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

2. EXTERNAL CHALLENGES

Croatia has been independent from Yugoslavia since 1991; however, separate data for Croatia is only available since 1992.

2.1 Import of cattle from BSE-Risk¹ countries

Because the Croatian authorities did not provide information on imports of cattle from BSE risk countries to the Croatian part of former Yugoslavia for the period between 1980 and 1992, the proportion of the Yugoslavian imports (before 1992) remaining in Croatia is not known.

Table 1 provides an overview of the exports of live cattle from BSE risk Member States (source: Eurostat) and Switzerland (source: Swiss country export data) into the former republic of Yugoslavia.

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

Table 2 provides data on the imports/exports of live cattle from BSE risk countries, to Croatia for the time since 1992 based on CD data, Eurostat, UK export statistics and data submitted by other GBR III and IV countries.

Former Yugoslavia (from 1980 - 1991)

Eurostat does not provide a breakdown of exports to different parts of former Yugoslavia. According to Eurostat, no animals were exported from UK to Yugoslavia between 1980 and 1992 (this is confirmed by UK export data). On the other hand between 1980 and 1992 Yugoslavia received significant numbers of animals (31,000 cattle) exported from other BSE risk countries than UK, mainly from DE, CH, NL and FR.

Export of live cattle (n/year) to former <u>YUGOSLAVIA</u>										
From EU-Member States and Switzerland										
Period	CH	UK		IT	DE	NL	DK	FR	SP	All BSE-risk countries
Source	CH	EU	UK	EU	EU	EU	EU	EU	EU	
1980	32									32
1981	306				913					1,219
1982	328			(169)	1,137		(670)			1,465
1983	150				945	(36)		100		1,195
1984					700					700
1985				10	598			20		628
1986					106					106
1987					2,078					2,078
1988					688					688
1989	160			29	922			10		1,121
1990					5,177	269		245	64	5,755
1991				2	15,945			66		16,013
Total	976	0	0	41	29,209	269	0	441	64	31,000

Table 1: Live Cattle exports to former Yugoslavia from a number of the BSE risk countries. Values in brackets show imports outside the assumed BSE risk period. Sources: EU = Eurostat for former Yugoslavia, UK = Export data from UK, CH= Export data from Switzerland.

Republic of Croatia (data since 1992, see table 2)

According to the country dossier, no cattle have ever been imported from UK. This is confirmed by the UK and Eurostat export statistics.

According to Eurostat, since 1992, approximately 46,000 cattle were exported from non-UK Member States (DE, AT, NL, FR, BE and IT), to Croatia. The CD indicates higher imports of around 577,000 cattle from BSE-risk countries, as it includes imports from some BSE-risk countries outside the EU, mainly from Hungary, Poland, Slovak Republic and Czech Republic.

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														844		1544	4681	5593	1216	1183	1118	2147	18326	
	other																2313	5562	6335	1432	1117	658			17417
Belgium	CD																	0	0						0
	other																	64	2						66
Czech Rep.	CD													27691				1578	1727	1516			868		33380
	other														308	5415	2573	8516	16592	14054	10344	8228	576		66606
France	CD																			120					120
	other															17					129	4			150
Germany	CD													176	334	1050	2141	3012	12196	3038	1251	1239			24437
	other													151	398	1212	2070	2324	11481	3750	893	1439			23718
Hungary	CD													16545	4770	12784	11012	29933	46123	40679	28723	35021	19369		244959
	other														3517	10813	9355	35030	45786	35666	26411	34725			201303
Italy	CD														43	1				2					46
	other														45	15	1								61
Lithuania	CD															1133	990	1375	920	1227			2103		7748
	other																								0
Netherlands	CD																71	637	1934	106	70	2275			5093
	other														22		112	795	1638	106	70	2248			4991
Poland	CD													1168	45	7527	11347	3685	4437	24590	26871	58025	35266		172961
	other																								0
Slovak Rep.	CD														1171	6340	3449	3318	9354	10108	13239	10166	9967		67112
	other																								0
Slovenia	CD													315		52	338		165	2	2253	3			3128
	other													554	70	76			165	2	2	3			872
UK	CD																								
	other																								
ALL TOTALS																									
non UK	CD	0	0	0	0	0	0	0	0	0	0	0	0	45895	7207	28887	30892	48219	82451	82602	73590	110818	66749		577310
	other	0	0	0	0	0	0	0	0	0	0	0	0	727	4338	17548	16424	52291	81999	55139	38841	47301	576		315184
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	0
	other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 2: Cattle import (CD) into Croatia and corresponding cattle export data (other) from countries in GBR III or IV or with a confirmed BSE case. Source for exports data: UK exports statistics and Eurostat and Third Country export statistics. Different shading represents different BSE risk as defined in the SSC opinion of January 2002.

The size of the importation ranged from about 50 (IT) to almost 250,000 heads (Hungary). The highest imports occurred in 2000 (mainly from Poland) and in 1998 (mainly from Hungary). Most of the imported animals reported by Eurostat (>90%) were classified as pure-bred breeding bovines, whereas cattle imported from eastern European countries were, according to the CD, mainly imported for slaughter or for fattening (almost 500,000 cattle).

It has to be considered that a certain percentage of the cattle imported for fattening or slaughter might have been diverted to the Croatian cattle population, i.e. were used instead as breeding stock. Another part was probably imported and slaughtered at an age older than 30 months when they were already advanced in the incubation period and their SRM would most probably have been rendered and by that route entered the BSE/cattle system.

The Croatian authorities provided information on the fate of cattle imported from countries affected by BSE as follows:

- The fate is known for 1,715 of the animals imported from DE, NL and IT:
 - 1,275 cattle imported from DE were slaughtered and 221 died.
 - 186 cattle imported from NL were slaughtered and 27 died.
 - 6 cattle imported from Italy were slaughtered.
 - Out of the total number of 248 animals that have died, 99 have been rendered, while the remaining 149 animals have been buried.
- Croatia provided extracts from the national imported bovines database, which demonstrate that approximately 28,000 of the bovines imported since 1993 are still alive. It is not clear in which years these have been imported.
- For the remaining cattle that were imported from BSE risk countries, it is assumed that they were old enough at slaughter that they could have approached the end of the BSE incubation period in cattle.

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

Table 3 provides an overview of the MBM-exports from EU Member States (source: Eurostat) to the former republic of Yugoslavia.

Table 4 provides data on the imports/exports of MBM from BSE risk countries to Croatia for the time since 1992 based on CD data, Eurostat, UK export statistics and data submitted by other GBR III and IV countries.

The Croatian authorities have not submitted data on MBM imports to the Croatian part of former Yugoslavia for the period between 1980 and 1991. Therefore, the proportion of these imports ending in Croatia (before 1992) is unknown.

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 230110 “flours, meals and pellets, made from meat or offal, not fit for human consumption; greaves”.

Former Yugoslavia (from 1980 - 1992)

Eurostat does not provide a breakdown of exports to different parts of former Yugoslavia. According to Eurostat, no MBM was exported from UK to former Yugoslavia between 1980 and 1992 (this is confirmed by UK export figures). On the other hand, between 1980 and 1992 Yugoslavia received significant amounts of MBM (more than 27,000 tons) exported from other BSE risk countries, mainly from IT and FR.

Export of MBM, MM, BM or greaves (t/year) to former <u>Yugoslavia</u> from BSE risk countries						
Period	UK	IT	FR	DE	NL	non-UK
1980	0	(7,962)	1,500			1,500
1981	0	(5,878)	580	260		740
1982	0	(7,354)		77	(50)	77
1983	0	14,949				14,949
1984	0	6,014				6,014
1985	0	2,136				2,136
1986	0	464				464
1987	0	124				124
1988	0	623				623
1989	0	251				251
1990	0	239		3		242
1991		24		1		25
1980-1991		24,824	2,080	341	(50)	27,245

Table 3: MBM exports from BSE risk countries to former Yugoslavia. Values in brackets show exports outside the assumed BSE risk period³.

- The Croatian authorities also reported figures (by year of import) on the import of MBM, meat meal and bone meal to the former Yugoslavia from AT, IT, Russia and Mongolia. The total amount for the period from 1980-1990 is 68,927 tons.
- Between 1992 and 2000, Croatia imported, according to the CD, 5,895 tons of MBM from BSE risk countries other than UK (2,860 tons from IT), and no MBM from the UK itself.
- The corresponding Eurostat and Third Country export figures are much higher (total MBM exports to Croatia 12,654 tons) mainly due to the different figures regarding MBM from Slovenia (CD: 2,250 tons, other sources: 8,031 tons).
- According to Eurostat, since 1992, around 4,600 tonnes of MBM (3,422 tons from IT) were exported from non-UK Member States (AT, BE, DE, IT, NL) to Croatia.
- The highest imports occurred in the period 1997-2000 (mainly from Slovenia and IT).
- The Croatian authorities stated that the final destination for MBM originating from IT and DE has mainly been farms for breeding/fattening of calves intended for export. Between 1985 and 1993, a contract with the known buyer of the finished product (baby-beef) included delivery of the feedstuffs (MBM) that were hence imported. These feedstuffs were exclusively destined for calves that were subsequently exported and the BSE-agent, should it have been present in these feeds, would not have entered the Croatian system. However, the exact volume of these imports is not known and the Croatian authorities did also not explain how it

³ As defined by the SSC opinion of January 2002.

was controlled that no fraction of the imported feedstuffs reached domestic cattle and that no calves that received it survived in the national herd. Therefore, for the time being also the MBM imported for this purpose is regarded to present a certain external challenge.

- Croatia states that only 5% of the imported MBM reached cattle. This statement is supported with arguments about the cattle population and farming structure, feeding tradition and by a survey made among feed factories (see 3.1). However, 5% is not regarded as a reasonable worst case scenario. Instead, it is assumed that a higher fraction of the imported MBM could have reached domestic cattle and that therefore all imports should be taken into account when assessing the external challenge they represented.
- The Croatian authorities have mentioned that some imported MBM might have been re-exported to Bosnia. The additional information provided in 2001 shows that between 7 and 560 tonnes of MBM have been exported to Bosnia annually from 1995-2000. It is however not shown that this is *re-exported* MBM, i.e. that it had another country of origin than Croatia.

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																140	19	48					207
	other																259	473	118				50	900,4
Belgium	CD																			183				183
	other																			92				92
Czech Rep.	CD																							0
	other																							0
Germany	CD													44	1							98	23	166
	other												0,1	0,9								124	24	148,8
Italy	CD													106	85		50	48	789	1083			699	2860
	other													54		58	5	47	835	1133	848	442		3422
Lithuania	CD																							0
	other																							0
Netherlands	CD																	106	44					150
	other													15						45				60
Slovenia	CD															563	352	413	922					2250
	other													509	836	607	416	390	913	1310	1318	1733		8031
UK	CD																							0
	other																							0
TOTALS																								
non UK	CD	0	0	0	0	0	0	0	0	0	0	0	0	150	86	563	542	586	2065	1083	98	722	0	5895
	other	0	0	0	0	0	0	0	0	0	0	0	0	578	837	665	680	910	2003	2443	2289	2249	0	12654
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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 4: MBM imports into Croatia (CD) and corresponding MBM exports from BSE risk countries. Source for exports data: UK exports statistics and Eurostat and Third Country export statistics. Different shading represents different BSE risk as defined in the SSC opinion of January 2002.

2.3 Overall assessment of the external challenge

It has been noted that the external challenge faced by the former Yugoslavia prior to 1992 was always significant. Between 1980 and 1991 it was high, mainly due to imports of MBM or due to the combined imports of live cattle and MBM from BSE risk countries. The proportion of these imports that remained in Croatia is not known and therefore as a realistic worst case assumption, it is assumed that the external challenge experienced by the territory of Croatia before 1992 was high enough to make it possible that the BSE-agent could have been introduced.

The level of the external challenge that has to be met by the Croatian BSE/cattle system since 1992 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:** From 1992 to 2000, in total the country imported 577,310 live cattle from BSE risk countries, of which none came from the UK. These imports represent a high external challenge but not an extremely high external challenge because a significant fraction was slaughtered at very young age. Broken down to 5 year periods the resulting external challenge is as given in table 5. 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 or were very young when slaughtered.
- **MBM imports:** From 1992 to 2000, in total the country imported 12,654 tons MBM from BSE risk countries, of which nothing came from the UK. Together these imports represent a very high external challenge. Broken down to 5 year periods the resulting external challenge is as given in table 5. This assessment takes into account the different aspects discussed above.

External Challenge experienced by CROATIA				
<i>External challenge</i>		<i>Reason for this external challenge</i>		
Period	Overall Level	Cattle imports	MBM imports	Comment
1992-1995	High	Moderate	High	
1996-2000	Very high	High	Very high	

Table 5: 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.

On the basis of the available information the overall assessment of the external challenge is as given in the table above. Croatia was exposed to a high external challenge from 1992 to 1995, and to a very high external challenge from 1996 to 2000, mainly due to the importation of MBM from non-UK BSE and due to the importation of cows for slaughter, which may have entered the Croatian BSE/cattle system, when the slaughter offals were processed into MBM.

3. STABILITY

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

Feeding

Until March 1997 feeding of MBM to cattle was not prohibited in Croatia. Since then a ruminant to ruminant ban was installed that was converted into a "total feed ban" in 2001, prohibiting the use of any animal protein for any farmed animal, with certain exceptions (see below).

Croatia, however, argues that also before 1997 cattle feed did not contain MBM. The following arguments are put forward:

- In Croatia there were 117 registered plants for the preparation of compound feed and for mixing of different feedingstuffs. There are also 15 registered feedingstuff storage facilities (July 2001). Since the production of poultry is the most intensive livestock-breeding industry in Croatia, production of feedstuff is highly linked to that industry.
- In order to support their assumption that cattle feed did not contain MBM, the Croatian authorities performed a survey among their feed factories (n=117) in July 2001, asking for information on quantities of MBM used in feed production over the past 20 years. 85 factories responded, the other 32 were not existing any longer. Four feed mills informed that they have been using some MBM for the production of cattle feed.
- The 4 feedmills having used MBM for the production of ruminant feed have used 57 tons of MBM for this purpose from 1980 – 2000.
- In total more than 180,000 tons of MBM were used in the years 1980-2000.
- It seems likely that the survey underestimates the true volume of MBM used in cattle feed. It is difficult to assess whether the result of the survey is reasonable without having information on the total amount of feed produced by each plant, both for those using MBM and those that report they have not used MBM.

In any case, the data confirm that inclusion of MBM in cattle feed took place during the reference period. The survey also clearly indicates that substantial amounts of MBM have been used in feed mills that produced non-ruminant as well as ruminant feed, with all implications of potential cross-contamination of cattle feed with MBM, even if it was not deliberately included.

Feed bans

From March 1997 (Official Gazette N°28/97) and up to January 2001, the use of ruminant proteins (milk and dairy products excepted) were banned for ruminant feeding purposes (RMBM ban).

Since January 2001 (Official Gazette N°08/01), it has been forbidden to use proteins of animal origin to feed any farmed animal ("total feed ban"). This does not apply to fishmeal for animals other than ruminants and to milk and dairy products.

In 2001, 11,761 tons of MBM were bought by the state, which is gradually incinerated (until June 2002, 1,099 tons have been incinerated).

Feed controls

Regarding controls in feed factories it is not clear since when they have been carried out and if controls to check for MBM contamination in cattle feed have been carried out at all:

- Until 1997, no measures to control the use of MBM in animal feed were taken, because it was not prohibited to include MBM in all kinds of animal feed.
- Croatia reports that all establishments producing or storing animal feed are under official veterinary supervision. An authorised veterinary inspector is present in animal feed plants and mixing plants when any consignment of feed is to be placed on the market. In addition every registered establishment must be checked by a veterinary inspection at least twice a year. At the inspection the whole production process is checked, including packaging, and focussing on process conditions and hygiene. Also, samples are taken to check for contamination with *Salmonella ssp.*
- Since January 2001 a systematic inventory of all feed containing proteins of animal origin has been carried out. The products concerned were sealed off and kept under veterinary supervision, the use of these feed stuffs was prohibited until 30th June 2001. Before that date, the Croatian authorities wanted to reconsider their position and to reach a final decision about these feed stuffs and their fate. No information on this decision was provided so far.

From the information available it is understood that also after 1997, when the ruminant to ruminant ban came into force, no feed controls were carried out with regard to ruminant MBM in cattle feed. This is understandable from an analytical point of view, as it is nearly impossible to distinguish ruminant MBM from other MBM. There is also no evidence of feed controls carried out since January 2001.

It is concluded that (R)MBM could have been legally fed to cattle until 1997 and that this happened, at least at small scale, if not deliberately then due to cross-contamination. It has been legal to feed mammalian, non-ruminant MBM to cattle until 2001.

Cross-contamination

- Before 1997 cross-contamination was no issue as it was legal to include any MBM in cattle feed. To assess the risk that cross-contamination took place in feed mills, information would be needed on the structure of the feed industry before 1997, i.e. number of mono-line feedmills producing feed for monogastric animals and ruminants, were specific measures like flushing of the production line applied etc.
- Since March 1997 the inclusion of ruminant MBM into ruminant feed is prohibited. However, the only stated measure to prevent cross-contamination is the labelling of “non ruminant feed”. While this might have some effect with regard to deliberate cross-feeding of non-ruminant feed to cattle, it will not influence the risk of cross-contamination in feed mills.
- Since 1/1/2001 inclusion of any animal protein other than milk in feed for farmed animals is prohibited but no information was provided on how this is controlled.

It is concluded that all cattle that (occasionally) received supplementary feed (concentrates) are at risk of having been exposed to MBM, either due to deliberate inclusion (that is documented to have occurred, albeit at a low rate) or by cross-contamination. The latter is likely to have been widespread before and after the feed ban of 1997.

Rendering

The total annual domestic production of MBM amounts to 15,000 tons (produced from 50,000 tonnes of raw material).

Since 1991, there have been five rendering plants operating in Croatia, two more were operational on the territory of Croatia before the independence.

- There is one so-called "open" plant that gathers material from several sources. This plant was founded in 1985 and is the only one that processes fallen stock and other high-risk material from cattle.
- The other plants are regarded as "closed", i.e. they are linked to a slaughterhouse and produce MBM from material produced by its own abattoirs and cutting plants. Three of the four closed plants are linked to the poultry industry. One processes material from cattle.
- The open plant was operating under 120°C/3-4 hours between 1985 and 1996 and is operating under 135°C/3bar/20min heat treatment condition since 1996. The raw material consists of 90% cattle and pig slaughter material, and 10% fallen stock (all species) and poultry waste. In the year 2000 the plant produced 6,500 tonnes of MBM (production varying every year but at least 4,250 tonnes per year since 1985).
- No information is provided on the closed plant that processes cattle waste.
- No information is provided on the two plants that were operational before 1991.

At current (since January 2001) bovine raw material is burnt and the remainder is used for landfill. It is therefore understood that since 2001 cattle material is not any more rendered in Croatia. The separation and deposition of bovine raw material at slaughterhouses is under veterinary supervision. No information was provided on the efficacy of this separation and its control.

SRM and fallen stock

According to the CD, brain, and spinal cord of cattle and fallen stock were rendered between 1980 and 2001. Until 1997, when an order prohibiting the use of SRM for human consumption was issued, all SRM of domestic origin was potentially used as human food.

From 1997 onwards all cattle suspected of BSE and all fallen stock were analysed by a specific histopathological test and only after obtaining no indication for BSE the carcasses were rendered at 135°C/ 3-bars/ 20 minutes.

Between December 1997 and 2001, high-risk materials including SRM were forbidden for the production of meat products for human consumption. This applied also to imports if originating from a country in which BSE cases had been confirmed. In effect this should have significantly increased the volume of that type of material that was rendered for feed.

According to the CD, since January 2001, this material is separated and incinerated. Fallen stock is also incinerated. All authorised veterinary inspectors carrying out controls in slaughterhouses, cutting-plants and processing establishments have received detailed instructions for implementation of the regulation ordering strict separation and disposal of bovine raw materials in, for that purpose, specially specified and designated areas. At the time of slaughter and cutting, authorised veterinary inspection is obligatorily present and therefore control over the establishments is permanent.

It is concluded that there was no SRM ban before 1997, that the SRM ban between 1997 and 2001 was for human food only and that an SRM ban for cattle feed has been in place since 2001. However, no data on the control of this SRM-ban has been provided.

Conclusion on the ability to avoid recycling

On the basis of the available information, it is concluded that should BSE have entered the Croatian system it would have been recycled and amplified, at least until end 2000.

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

The country experts indicated that Croatia lost approximately 150,000 bovine animals killed during the war in former Yugoslavia (approximately 20-25% of the previous population).

Period		Total (all ages)	Over 24 months old				
			Male		Female		
			Breeding	Meat	Dairy cows	Pregnant dairy heifers	Meat
At current	N°	438,000	144 ^b	1,856 ^b	228,014	46,702	
	age ^a		4.2 y		10 y		

Table 6: Data on the cattle population. ^a average age at slaughter. ^b 2,000 breeding bulls and oxen in 1999 of which 144 were bulls in artificial insemination centres and for natural mating.

According to the country expert, co-farming is common practice on smaller farms.

According to the Croatian Livestock Selection Centre, the Dairy herd structure in Croatia is as follows:

Farms with:

- less than 4 cows 62%
- less than 10 cows 33%
- less than 15 cows 4%
- 16 cows and more 1%

According to the CD this distribution remained more or less the same before and after the independence of Croatia. About 95% of the cows are in farms with not more than 9 cows.

On average, the annual milk yield is around 2,700 litres per year and cow. The annual milk yield on the larger farms (more than 9 cattle) is 6,438 litres.

BSE surveillance

BSE is notifiable since 18 June 1996, compensation is foreseen if BSE occurs.

According to the CD, awareness training has been in place since 1997. Numerous training courses (exact number not specified) have been held for field veterinarians/practitioners, veterinary inspectors and laboratory staff. After 8 hours of theoretical lectures, every participant in the course has been presented with the manual for detection, diagnostic and preventing of BSE, containing a total number of 150 pages of text and illustrations. During the training course video recordings have been shown illustrating the clinical picture of the BSE, as well as the clinical diagnostic of BSE.

The experts from the laboratory for BSE diagnostics at the Croatian Veterinary Institute, have been trained in 1998 in the U.K. (histopathology) and in Zurich, Switzerland (Prionics). For the purpose of sampling for the rapid testing authorised veterinary inspectors have been trained in sampling procedures in slaughterhouses.

All animals with CNS symptoms are screened for rabies. Brains are collected and samples are prepared by the regional veterinary laboratories and sent to the central veterinary laboratory in Zagreb for final histopathological evaluation.

A BSE case would be confirmed on the basis of symptoms observed and on two positive laboratory diagnoses, of which at least one is immuno-histochemistry. The results of BSE examinations carried out since 1996 are presented in Table 7 below.

Year	Domestic BSE suspects			Domestic fallen stock	
	> 24 months	> 36 months	Total	> 24 months	Total
1996	1	18	19	0	15
1997	1	11	12	8	17
1998	2	16	18	3	26
1999	6	17	23	5	5
2000	3	10	13	5	10
Total	13	72	85	21	73

Table 7: Breakdown of BSE examinations on domestic cattle brains. All were negative, none was doubtful. Indications were provided on differential diagnosis for 85% of BSE suspects (metabolic disorders 62%, intoxications 13%, listeriosis 6%, rabies 5% and “polyencephalomalatia”).

A special monitoring programme for imported cattle has been in place since 1996. Between 1996 and 2000, a total of 189 brains of imported cattle, were examined for BSE. All but 9 were less than 24 months old, making detection of brain lesions anyway highly unlikely, even if the animal would have been infected at birth. All were negative. According to the CD, all imported animals found as fallen stock have had to be examined for BSE since 1996, although the number of fallen stock examined does not support this statement; none was found positive.

The veterinary laboratory of Zagreb has introduced the Prionics test in order to carry out active BSE surveillance in Croatia. The target group consists of all cattle over 30 months from routine slaughter, all bovine fallen stock older than 30 months and all bovine fallen stock younger than 30 months that have shown CNS signs.

From 1 May 2001 – December 2001, a total of 9,729 BSE tests had been carried out, none inconclusive; all were negative. All samples were from normal slaughter. The corresponding number for January to April 2002 is 5,310 also all with negative results.

It is concluded that BSE surveillance was non-existent before 1996, when BSE became notifiable. The passive surveillance in place since then has not met OIE standards. In addition, it is not clear how many of the sampled animals did fulfil the criteria of the sample population as defined by the OIE. Active surveillance was implemented on 1 January 2001.

3.3 Overall assessment of the stability

For the overall assessment of the stability the impact of the three main stability factors (i.e. feeding, rendering and SRM) and of the BSE surveillance has to be estimated. The guidance provided by the SSC in its opinion on the GBR of July 2000 is applied.

Feeding: RMBM could be legally fed to cattle until 1997, and non-ruminant MMBM could be fed to cattle until 2001. No data were provided on the controls of the RMBM-feed ban of 1997 and cross-contamination is regarded likely. It is therefore concluded that feeding was “**not OK**” before and after the 1997 feed ban. In 2001, a recall action was carried out and the available MBM (imported and domestic) was bought by the government to be incinerated. As cross-contamination in feed mills, during transport and on farm remained possible, feeding is regarded as “**reasonably OK**” since 1/1/2001 until it is shown that no MBM is anymore present in the system.

Rendering has been “**not OK**” up to end 2000 as bovine material was processed at too gentle conditions. Since 1996, the only plant processing fallen bovine stock has complied with the operating standards required but the “closed” plant that processes bovine material continued to operate under unknown conditions. Most likely it also processed SRM that were included into the normal slaughter waste generated in the slaughterhouse it is linked to. Since January 2001, bovine animal waste including SRM and all fallen stock is to be incinerated or otherwise disposed. Subject to confirmation of the efficiency of these measures, rendering is therefore assessed as “**OK**” since January 2001.

SRM-removal There was no SRM ban before 1997 and the SRM ban between 1997 and 2001 was covering human consumption only, probably increasing the amount of SRM that was rendered for feed. Therefore SRM was “**not OK**” until in 2001, when an SRM ban for cattle feed has been implemented. Subject to confirmation of the efficiency of these measures, SRM-removal is therefore assessed as “**OK**” since January 2001.

BSE surveillance BSE surveillance did not exist before 1996. It was only passive thereafter and the number of BSE suspects remained unrealistically low. Active BSE surveillance is in place since 2001. However, the number of animals tested is still too low and data on age and risk category of tested animals are lacking.

Stability of the BSE/cattle system in CROATIA over time					
Stability		Reasons			
Period	Level	Feeding	Rendering	SRM removal	BSE surveillance
1992-2000	Extremely unstable	Not OK	Not OK	Not OK	↓
2001	Very stable	Reasonably OK	OK	OK	→

Table 8: Stability resulting from the interaction of the three main stability factors and the BSE-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 extremely unstable between 1992 and 2000 and is, subject to confirmation of the efficiency of the then introduced measures, very stable since 2001.

For the period before the independence of Croatia a reasonable worst case assumption is that the stability was similar to the situation in Croatia after 1992.

4. CONCLUSION ON THE RESULTING RISKS

4.1 Interaction of stability and challenges

In conclusion, the stability of the Croatian BSE/cattle system in the past and the external challenges the system has coped with are 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.

Before 1991, the former Yugoslavia faced a high external challenge. The stability of the system cannot be assessed, as no data are available. However, it is reasonable that the system was similar to the one found in Croatia in 1992, i.e. extremely unstable. This implies a significant risk that the BSE-agent, should it have been introduced into the country at that time, would have entered the BSE/cattle system of the country.

It is clear, from the available data, that since 1992, Croatia faced a high external challenge mainly due to imports of MBM. Cattle were continuously imported since 1992, probably to re-stock the national herd and for human consumption. If some of these imported cattle were infected with BSE prior to export, they could have entered the Croatian BSE/cattle system around 1995, while the system was still extremely unstable. Between 1995 and 2000, the external challenge faced by Croatia was very high, mainly due to MBM-imports. At this time the system was still extremely unstable. Since 2001, the system is very stable.

INTERACTION OF STABILITY AND EXTERNAL CHALLENGE IN <u>CROATIA</u>			
Period	Stability	External Challenge	Internal challenge
1992 – 1995	Extremely unstable	High	Likely to be present and growing
1996-2000		Very high	
2001-	Very stable		

Table 9: 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.

The combination of significant external challenges with an extremely unstable system makes the occurrence of an internal challenge likely since 1992 but probably already earlier. Today, it is more unlikely that BSE infectivity is recycled and, if the efficiency of the measures in place could be demonstrated, any existing internal challenge should decrease at the rate by which cattle born before these measures were effective leave the system. If the measures in place since January 2001 are well implemented the internal challenge will decrease rather fast.

4.2 Risk that BSE infectivity entered processing

There is a certain risk that BSE infectivity entered processing in the territory of Croatia when it was still a part of former Yugoslavia. After the independence of the country, it is likely that BSE infectivity entered the country via cattle or MBM imports. Around 1995 potentially infected cattle could have been slaughtered that were imported in 1992. This processing risk increased around 1997, i.e. about 3 years after the first significant imports of potentially contaminated MBM occurred, that could have led to infection of domestic cattle in the year of import (1994). It continued to grow thereafter because MBM imports from BSE-risk countries continued. In addition it is likely that since 1995 at the latest also domestic MBM was contaminated with the agent. As feeding was “not OK”, the agent probably reached domestic cattle, leading to new infections until end 2000. Hence the processing risk will continue to exist as long as cattle that could potentially have been exposed to the agent, are processed. The risk continues to increase, at a reduced pace, until the birth cohorts 2001 and later reach processing.

4.3 Risk that BSE infectivity was recycled and propagated

Given that the system was extremely unstable and a processing risk may have existed in Croatia since some time but since the mid-90s at the latest, it is very likely that the BSE-agent was recycled, propagated and amplified in the country. Since 1997 the recycling was somewhat reduced, thanks to the improved rendering but a propagation risk continued to exist. In 1/1/2001 measures were taken that should have interrupted recycling of the BSE-agent. The efficiency of these measures is not well documented but subject to confirmation it is regarded unlikely that further propagation of the disease occurs after beginning of 2001.

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 likely but not confirmed* 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

- From the very stable system (subject to confirmation of the efficiency of the measures taken in 2000/2001), it follows that the GBR decreases fast.

5.3 Recommendations for influencing the future GBR

- It is essential that the recently taken stability enhancing measures are correctly applied and their implementation is controlled and documented.
- Improved passive and active surveillance, i.e. sampling of animals not recognised as BSE-suspects from “at-risk” cattle populations, such as adult cattle in fallen stock and emergency slaughter, would allow monitoring the efficiency of the stability enhancing measures.